Attachment A

Attachment A

Proposed Budgets 2012-2014				
	ESAP			
Utility	2012	2013	2014	Cycle Total
PG&E	$157,023,000	$162,622,000	$168,347,000	$487,992,000
SCE	$57,717,000	$64,528,000	$62,971,000	$185,216,000
SDG&E	$22,044,929	$22,462,163	$22,832,030	$67,339,122
SoCalGas	$99,909,056	$82,121,475	$84,178,885	$266,209,415
Total	**$336,693,984**	**$331,733,638**	**$338,328,915**	**$1,006,756,537**
	CARE			
	2012	2013	2014	Cycle Total
PG&E	$672,301,000	$644,316,000	$617,600,000	$1,934,217,000
SCE	$335,551,000	$382,365,000	$422,422,000	$1,140,338,000
SDG&E	$77,589,684	$86,588,094	$87,588,301	$251,766,080
SoCalGas	$136,764,829	$137,639,959	$139,006,654	$413,411,441
Total	**$1,222,206,513**	**$1,250,909,053**	**$1,266,616,955**	**$3,739,732,521**

Adopted Budget Summary 2012-2014 per D1208044				
	ESAP			
Utility	2012	2013	2014	Cycle Total
PG&E	$150,982,212	$156,363,352	$161,862,111	$469,207,675
SCE	$72,461,946	$72,640,016	$72,736,631	$217,838,592
SDG&E	$21,716,006	$22,140,542	$22,515,618	$66,372,165
SoCalGas	$113,292,891	$117,559,854	$120,506,165	$351,358,910
Total	**$358,453,054**	**$368,703,763**	**$377,620,525**	**$1,104,777,343**
	CARE			
	2012	2013	2014	Cycle Total
PG&E	$675,973,667	$647,622,512	$620,892,512	$1,944,488,691
SCE	$342,541,000	$389,332,000	$429,388,000	$1,161,261,000
SDG&E	$79,100,350	$88,060,980	$89,098,739	$256,260,069
SoCalGas	$145,502,691	$146,016,933	$147,506,690	$439,026,314
Total	**$1,243,117,708**	**$1,271,032,425**	**$1,286,885,942**	**$3,801,036,075**

New Adopted Budget Summary 2012-2014 (Phase II)				
	ESAP			
Utility	2012	2013	2014	Cycle Total
PG&E	$150,982,212	$156,363,352	$161,862,111	$469,207,675
SCE	$72,461,946	$72,640,016	$72,736,631	$217,838,592
SDG&E	$22,972,638	$23,397,174	$23,772,250	$70,142,062
SoCalGas	$127,199,269	$130,346,135	$132,417,191	$389,962,594
Total	**$373,616,065**	**$382,746,676**	**$390,788,183**	**$1,147,150,924**
	CARE			
	2012	2013	2014	Cycle Total
PG&E	$675,973,667	$647,622,512	$620,892,512	$1,944,488,691
SCE	$335,791,000	$383,329,460	$423,819,650	$1,142,940,110
SDG&E	$79,100,350	$88,060,980	$89,098,739	$256,260,069
SoCalGas	$145,502,691	$146,016,933	$147,506,690	$439,026,314
Total	**$1,236,367,708**	**$1,265,029,885**	**$1,281,317,592**	**$3,782,715,185**

	Proposed Number of Homes to be Treated			
Utility	2012	2013	2014	Total Cycle
PG&E	125,000	125,000	125,000	375,000
SCE	68,200	77,000	74,800	220,000
SDG&E	20,000	20,000	20,000	60,000
SoCalGas	129,106	100,249	100,249	329,604
Total	**342,306**	**322,249**	**320,049**	**984,604**
	Adopted Number of Homes to be Treated			
Utility	2012	2013	2014	Total Cycle
PG&E	119,940	119,940	119,940	359,820
SCE	87,389	87,389	87,389	262,166
SDG&E	20,316	20,316	20,316	60,948
SoCalGas	136,836	136,836	136,836	410,508
Total	**364,481**	**364,481**	**364,481**	**1,093,442**

(END OF ATTACHMENT A)

A- Budget Summary

Attachment B

Attachment B

PY 2012-2014 ESAP Proposed Electric & Gas Budget
Pacific Gas and Electric Company* *Based on 125,000 Homes/Year

	PY2011 Authorized	PY 2012 Proposed	PY 2013 Proposed	PY 2014 Proposed	3-Year Request PY 2012 - 2014
Energy Savings Assistance Program					
Energy Efficiency	$126,597,157				
Appliances [1]		$36,476,000	$37,774,000	$39,118,000	$113,368,000
Domestic Hot Water [2]		$10,382,000	$10,751,000	$11,133,000	$32,266,000
Enclosure [3]		$38,209,000	$39,569,000	$40,978,000	$118,756,000
HVAC [4]		$4,305,000	$4,454,000	$4,611,000	$13,370,000
Maintenance		$0	$0	$0	$0
Lighting [5]		$27,769,000	$28,757,000	$29,781,000	$86,307,000
Miscellaneous [6]		$10,549,000	$10,923,000	$11,312,000	$32,784,000
Customer Enrollment	$1,654,446	$1,728,000	$1,788,000	$1,852,000	$5,368,000
In Home Education	$14,890,018	$14,827,000	$15,355,000	$15,902,000	$46,084,000
Pilot	$516,666	$0	$0	$0	$0
Energy Efficiency Total	**$143,658,287**	**$144,245,000**	**$149,371,000**	**$154,687,000**	**$448,303,000**
Training Center	$942,706	$914,000	$944,000	$976,000	$2,834,000
Inspections	$5,917,128	$5,847,000	$6,046,000	$6,252,000	$18,145,000
Marketing and Outreach	$1,988,195	$1,856,000	$1,913,000	$1,980,000	$5,749,000
Statewide Marketing Education and Outreach	$0	$120,000	$123,000	$127,000	$370,000
Measurement and Evaluation Studies [7]	$0	$90,000	$93,000	$95,000	$278,000
Regulatory Compliance	$289,752	$346,000	$404,000	$371,000	$1,121,000
General Administration [8]	$3,892,750	$3,550,000	$3,673,000	$3,804,000	$11,027,000
CPUC Energy Division [9]	$100,220	$55,000	$55,000	$55,000	$165,000
TOTAL PROGRAM COSTS	**$156,789,038**	**$157,023,000**	**$162,622,000**	**$168,347,000**	**$487,992,000**
Funded Outside of Energy Savings Assistance Program Budget					
Indirect Costs [10]	N/A	N/A	N/A	N/A	N/A
NGAT Costs [11]	N/A	N/A	N/A	N/A	N/A

PY 2012-2014 ESAP AUTHORIZED Electric & Gas Budget
Pacific Gas and Electric Company

	PY 2012 Authorized	PY 2013 Authorized	PY 2014 Authorized	3-Year Authorized PY 20012- 2014
Energy Savings Assistance Program				
Energy Efficiency				
Appliances [1]	$34,999,468	$36,244,925	$37,534,521	$108,778,914
Domestic Hot Water [2]	$9,961,741	$10,315,804	$10,682,341	$30,959,887
Enclosure [3]	$36,662,317	$37,967,264	$39,319,229	$113,948,810
HVAC [4]	$4,130,736	$4,273,704	$4,424,349	$12,828,788
Maintenance	$0	$0	$0	$0
Lighting [5]	$26,644,923	$27,592,929	$28,575,478	$82,813,331
Miscellaneous [6]	$10,121,981	$10,480,842	$10,854,095	$31,456,918
Customer Enrollment	$1,658,051	$1,715,623	$1,777,032	$5,150,706
In Home Education	$14,226,810	$14,733,436	$15,258,294	$44,218,540
Pilot	$0	$0	$0	$0
Energy Efficiency Total	**$138,406,027**	**$143,324,528**	**$148,425,339**	**$430,155,894**
Training Center	$914,000	$944,000	$976,000	$2,834,000
Inspections	$5,610,316	$5,801,261	$5,998,922	$17,410,498
Marketing and Outreach	$1,780,870	$1,835,563	$1,899,850	$5,516,283
Statewide Marketing Education and Outreach	$120,000	$123,000	$127,000	$370,000
Measurement and Evaluation Studies [7]	$200,000	$203,000	$205,000	$608,000
Regulatory Compliance	$346,000	$404,000	$371,000	$1,121,000
General Administration [8]	$3,550,000	$3,673,000	$3,804,000	$11,027,000
CPUC Energy Division [9]	$55,000	$55,000	$55,000	$165,000
TOTAL PROGRAM COSTS	**$150,982,212**	**$156,363,352**	**$161,862,111**	**$469,207,675**
Funded Outside of Energy Savings Assistance Program Budget				
Indirect Costs [10]	N/A	N/A	N/A	N/A
NGAT Costs [11]	N/A	N/A	N/A	N/A

Footnotes
1 Includes: Refrigerators, Evaporative coolers, Room & Window AC, LIHEAP Leveraging, and Microwaves
2 Includes: Water heater repair, water heater replacement, water heater blanket, water heater pipe wrap, faucet aerators, shower start
3 Includes: Weatherization/ Minor Home Repairs
4 Includes: Central AC Tune-Up, Central AC, Furnace Repair, Furnace Replacement, R&R Service Calls
5 Includes: Occupancy sensors, interior hardwire fixtures, CFLs, hard wired porch lights, torchieres
6 Includes: Attic insulation, and SmartFan Delay
7 M&E includes funding for the two Joint Utility Studies - the Impact Evaluation and the Energy Education Study.
8 Includes PG&E costs such as Smarter Energy Line. Cost escalation was applied using labor escalation rates from the union contract and non-labor escalation rates developed by Global insights in Q2 2010
9 CPUC Energy Division budget was developed based on historical spend 2009-2010
10 Indirect costs are funded outside of the ESA Program budget.
11 NGAT costs are funded outside of the ESA Program budget

(END OF ATTACHMENT B)

B- PG&E ESAP Budget

Attachment C

Attachment C

PY 2012-2014 ESAP Proposed Electric & Gas Budget
Southern California Edison

	PY2011 Authorized	PY 2012 Proposed	PY 2013 Proposed	PY 2014 Proposed	3-Year Request PY 2012 - 2014
Energy Savings Assistance Program					
Energy Efficiency					
Appliances		$16,404,000	$18,521,000	$17,991,000	$ 52,916,000
Domestic Hot Water		$40,000	$45,000	$44,000	$ 129,000
Enclosure		$210,000	$237,000	$229,000	$ 676,000
HVAC		$21,302,000	$24,049,000	$23,373,000	$ 68,724,000
Maintenance		$0	$0	$0	$ -
Lighting		$2,554,000	$2,884,000	$2,801,000	$ 8,239,000
Miscellaneous		$3,689,000	$4,165,000	$4,046,000	$ 11,900,000
Customer Enrollment		$4,381,000	$4,947,000	$4,805,000	$ 14,133,000
In Home Education		$972,000	$1,098,000	$1,066,000	$ 3,136,000
Pilot		$0	$0	$0	$ -
Energy Efficiency Total		**$49,552,000**	**$55,946,000**	**$54,355,000**	**$ 159,853,000**
Training Center		$315,000	$306,000	$279,000	$ 900,000
Inspections		$1,319,000	$1,329,000	$1,352,000	$ 4,000,000
Marketing and Outreach		$1,252,000	$1,414,000	$1,373,000	$ 4,039,000
Statewide Marketing Education and Outreach		$120,000	$120,000	$120,000	$ 360,000
Measurement and Evaluation Studies		$90,000	$90,000	$90,000	$ 270,000
Regulatory Compliance		$581,000	$594,000	$606,000	$ 1,781,000
General Administration		$4,428,000	$4,669,000	$4,736,000	$ 13,833,000
CPUC Energy Division		$60,000	$60,000	$60,000	$ 180,000
TOTAL PROGRAM COSTS	**$63,414,000**	**$57,717,000**	**$64,528,000**	**$62,971,000**	**$ 185,216,000**
Not Subject to This Application - Funded Outside of ESAP Program Budget					
Indirect Costs	N/A	N/A	N/A	N/A	N/A
NGAT Costs	N/A	N/A	N/A	N/A	N/A

PY 2012-2014 ESAP AUTHORIZED Electric & Gas Budget
Southern California Edison

	PY 2012 Authorized	PY 2013 Authorized	PY 2014 Authorized	3-Year Authorized PY 20012- 2014
Energy Savings Assistance Program				
Energy Efficiency				
Appliances	$21,019,404	$21,019,806	$21,018,838	$ 63,058,048
Domestic Hot Water	$51,254	$51,071	$51,405	$ 153,731
Enclosure	$269,085	$268,975	$267,540	$ 805,601
HVAC	$27,295,497	$27,293,630	$27,306,615	$ 81,895,742
Maintenance	$233,333	$233,333	$233,333	$ 700,000
Lighting	$3,272,589	$3,273,102	$3,272,401	$ 9,818,092
Miscellaneous	$4,726,931	$4,726,931	$4,726,931	$ 14,180,794
Customer Enrollment	$5,613,631	$5,614,437	$5,613,669	$ 16,841,737
In Home Education	$1,245,480	$1,246,139	$1,245,405	$ 3,737,025
Pilot	$0	$0	$0	$ -
Energy Efficiency Total	**$63,727,206**	**$63,727,426**	**$63,736,138**	**$ 191,190,769**
Training Center	$403,628	$347,285	$325,955	$ 1,076,868
Inspections	$1,690,112	$1,508,305	$1,579,538	$ 4,777,955
Marketing and Outreach	$1,252,000	$1,414,000	$1,373,000	$ 4,039,000
Statewide Marketing Education and Outreach	$120,000	$120,000	$120,000	$ 360,000
Measurement and Evaluation Studies	$200,000	$200,000	$200,000	$ 600,000
Regulatory Compliance	$581,000	$594,000	$606,000	$ 1,781,000
General Administration	$4,428,000	$4,669,000	$4,736,000	$ 13,833,000
CPUC Energy Division	$60,000	$60,000	$60,000	$ 180,000
TOTAL PROGRAM COSTS	**$72,461,946**	**$72,640,016**	**$72,736,631**	**$ 217,838,592**
Not Subject to This Application - Funded Outside of ESAP Program Budget				
Indirect Costs	N/A	N/A	N/A	N/A
NGAT Costs	N/A	N/A	N/A	N/A

The budget categories and subcategories for 2012-2014 were revised by the Commission and do not fully align with the categories and subcategories that were authorized for 2009 – 2011. Therefore, SCE has provided only the total authorized annual funding for 2011

(END OF ATTACHMENT C)

C- SCE ESAP Budget

Attachment D

Attachment D

PY 2009-2011 ESAP Proposed Electric & Gas Budget
San Diego Gas & Electric Company

	PY2011 Authorized	PY 2012 Proposed	PY 2013 Proposed	PY 2014 Proposed	3-Year Request PY 2009 - 2011
Energy Savings Assistance Program					
Energy Efficiency [1]					
Appliances	-	$4,701,644	$4,523,692	$4,443,374	$ 13,668,709
Domestic Hot Water	-	$1,557,722	$1,603,093	$1,651,185	$ 4,812,000
Enclosure	-	$3,138,071	$3,229,471	$3,326,355	$ 9,693,898
HVAC	-	$1,474,200	$1,517,424	$1,562,945	$ 4,554,569
Maintenance	-	$530,185	$545,627	$561,996	$ 1,637,808
Lighting	-	$2,577,454	$2,652,526	$2,732,101	$ 7,962,082
Miscellaneous	-	$450,000	$463,500	$477,000	$ 1,390,500
Customer Enrollment	-	$3,549,357	$3,929,832	$4,014,925	$ 11,494,114
In Home Education	-	$399,658	$411,299	$423,638	$ 1,234,595
Pilot	-	$0	$0	$0	$ -
Energy Efficiency Total	$17,196,378	$18,378,291	$18,876,463	$19,193,519	$ 56,448,274
Training Center	$0	$0	$0	$0	$ -
Inspections	$62,694	$54,877	$56,581	$58,284	$ 169,743
Marketing and Outreach	$714,341	$1,173,730	$1,135,788	$1,146,595	$ 3,456,113
Statewide Marketing Education and Outreach	$100,000	$60,000	$60,000	$0	$ 120,000
Measurement and Evaluation Studies	-$45,864	$135,000	$0	$60,000	$ 195,000
Regulatory Compliance	$286,006	$306,554	$339,384	$322,214	$ 968,152
General Administration	$1,969,103	$1,891,477	$1,948,947	$2,006,417	$ 5,846,841
CPUC Energy Division	$44,948	$45,000	$45,000	$45,000	$ 135,000
TOTAL PROGRAM COSTS	**$20,327,606**	**$22,044,929**	**$22,462,163**	**$22,832,030**	**$ 67,339,122**
Funded Outside of ESAP Program Budget					
Indirect Costs [2]	-	-	-	-	$ -
					$ -
NGAT Costs	$300,000	$535,000	$535,000	$535,000	$ 1,605,000

PY 2009-2011 ESAP AUTHORIZED Electric & Gas Budget- D1208044
San Diego Gas & Electric Company

	PY 2012 Authorized	PY 2013 Authorized	PY 2014 Authorized	3-Year Authorized PY 20012- 2014
Energy Savings Assistance Program				
Energy Efficiency [1]				
Appliances	$4,775,958	$4,595,194	$4,513,607	$ 13,884,759
Domestic Hot Water	$1,582,344	$1,628,431	$1,677,284	$ 4,888,059
Enclosure	$3,187,672	$3,280,517	$3,378,932	$ 9,847,121
HVAC	$1,609,636	$1,653,543	$1,699,783	$ 4,962,962
Maintenance	$538,565	$554,251	$570,879	$ 1,663,695
Lighting	$2,618,194	$2,694,452	$2,775,285	$ 8,087,931
Miscellaneous	$457,113	$470,826	$484,540	$ 1,412,478
Customer Enrollment	$2,799,492	$3,185,982	$3,272,419	$ 9,257,893
In Home Education	$405,975	$417,800	$430,334	$ 1,254,109
Pilot	$0	$0	$0	$ -
Energy Efficiency Total	$17,974,949	$18,480,995	$18,803,063	$ 55,259,006
Training Center	$0	$0	$0	$ -
Inspections	$55,745	$57,475	$59,206	$ 172,426
Marketing and Outreach	$1,192,282	$1,153,740	$1,164,718	$ 3,510,741
Statewide Marketing Education and Outreach	$60,000	$60,000	$0	$ 120,000
Measurement and Evaluation Studies	$190,000	$55,000	$115,000	$ 360,000
Regulatory Compliance	$306,554	$339,384	$322,214	$ 968,152
General Administration	$1,891,477	$1,948,947	$2,006,417	$ 5,846,841
CPUC Energy Division	$45,000	$45,000	$45,000	$ 135,000
TOTAL PROGRAM COSTS	**$21,716,006**	**$22,140,542**	**$22,515,618**	**$ 66,372,165**
Funded Outside of ESAP Program Budget				
Indirect Costs [2]	-	-	-	$ -
				$ -
NGAT Costs	$535,000	$535,000	$535,000	$ 1,605,000

[1] The budget for 2011 was not authorized using the new 2012-2014 reporting categories, therefore SDG&E is unable to allocate the budgeted dollars for the subcategories under the Energy Efficiency category.
[2] SDG&E does not budget or project indirect costs.

PY 2009-2011 ESAP AUTHORIZED Electric & Gas Budget- PHASE II
San Diego Gas & Electric Company

	PY2011 Authorized	PY 2012 Authorized	PY 2013 Authorized	PY 2014 Authorized	3-Year Authorized PY 20012- 2014
Energy Savings Assistance Program					
Energy Efficiency [1]					
Appliances	-	$5,194,884	$5,014,120	$4,932,533	$ 15,141,537
Domestic Hot Water	-	$1,960,578	$2,006,666	$2,055,518	$ 6,022,762
Enclosure	-	$4,398,587	$4,491,432	$4,589,847	$ 13,479,866
HVAC	-	$3,837,709	$3,881,616	$3,927,857	$ 11,647,183
Maintenance	-	$538,565	$554,251	$570,879	$ 1,663,695
Lighting	-	$2,618,194	$2,694,452	$2,775,285	$ 8,087,931
Miscellaneous	-	$457,113	$470,826	$484,540	$ 1,412,478
Customer Enrollment	-	$2,912,714	$3,299,204	$3,385,641	$ 9,597,559
In Home Education	-	$405,975	$417,800	$430,334	$ 1,254,109
Pilot	-	$0	$0	$0	$ -
Fund shifting Offset*		-$3,132,739	-$3,132,739	-$3,132,739	$ (9,398,216)
Energy Efficiency Total	$17,196,378	$19,191,581	$19,697,627	$20,019,695	$ 58,908,903
Training Center	$0	$0	$0	$0	$ -
Inspections	$62,694	$95,745	$97,475	$99,206	$ 292,426
Marketing and Outreach	$714,341	$1,192,282	$1,153,740	$1,164,718	$ 3,510,741
Statewide Marketing Education and Outreach	$100,000	$60,000	$60,000	$0	$ 120,000
Measurement and Evaluation Studies	-$45,864	$190,000	$55,000	$115,000	$ 360,000
Regulatory Compliance	$286,006	$306,554	$339,384	$322,214	$ 968,152
General Administration	$1,969,103	$1,891,477	$1,948,947	$2,006,417	$ 5,846,841
CPUC Energy Division	$44,948	$45,000	$45,000	$45,000	$ 135,000
TOTAL PROGRAM COSTS	**$20,327,606**	**$22,972,638**	**$23,397,174**	**$23,772,250**	**$ 70,142,062**
Funded Outside of ESAP Program Budget					
Indirect Costs [2]	-	-	-	-	$ -
					$ -
NGAT Costs	$300,000	$535,000	$535,000	$535,000	$ 1,605,000

(END OF ATTACHMENT D)

D- SDG&E ESAP Budget

Attachment E

Attachment E

PY 2012-2014 ESAP Proposed Electric & Gas Budget
Southern California Gas Company

	PY2011 Authorized	PY 2012 Proposed	PY 2013 Proposed	PY 2014 Proposed	3-Year Request PY 2012 - 2014
Energy Savings Assistance Program					
Energy Efficiency					
Appliances	$3,963,911.00	$4,273,045	$4,725,254	$5,069,638	$ 14,067,937
Domestic Hot Water	$4,298,090.00	$14,053,437	$11,084,205	$11,260,521	$ 36,398,164
Enclosure	$18,725,309.00	$29,982,892	$23,940,183	$24,599,087	$ 78,522,163
HVAC	$17,345,119	$16,053,624	$12,780,810	$13,073,791	$ 41,908,225
Maintenance	$5,800,598	$2,303,685	$1,828,838	$1,868,898	$ 6,001,421
Lighting	$0.00	$0	$0	$0	$ -
Miscellaneous	$0.00	$0	$0	$0	$ -
Customer Enrollment	$17,211,246.00	$20,368,129	$16,032,969	$16,235,643	$ 52,636,741
In Home Education	$2,188,110.00	$2,427,634	$1,844,475	$1,854,400	$ 6,126,510
Pilot	$28,127.00	$0	$0	$0	$ -
Energy Efficiency Total	**$69,560,510**	**$89,462,446**	**$72,236,735**	**$73,961,979**	**$ 235,661,160**
Training Center	$320,587	$505,117	$486,403	$498,992	$ 1,490,512
Inspections	$1,701,533	$2,618,378	$2,093,899	$2,156,375	$ 6,868,652
Marketing and Outreach	$1,050,293	$1,013,000	$931,900	$878,000	$ 2,822,900
Statewide Marketing Education and Outreach	$0	$100,000	$100,000	$100,000	$ 300,000
Measurement and Evaluation Studies	$0	$225,000	$0	$0	$ 225,000
Regulatory Compliance	$272,837	$295,333	$295,333	$295,333	$ 886,000
General Administration	$5,264,735	$5,603,781	$5,891,204	$6,202,206	$ 17,697,191
CPUC Energy Division	$85,774	$86,000	$86,000	$86,000	$ 258,000
TOTAL PROGRAM COSTS	**$78,256,269**	**$99,909,056**	**$82,121,475**	**$84,178,885**	**$ 266,209,415**
Funded Outside of ESAP Program Budget					
NGAT Costs	$1,600,000	$4,200,000	$4,200,000	$4,200,000	$ 12,600,000

PY 2012-2014 ESAP AUTHORIZED Electric & Gas Budget-D1208044
Southern California Gas Company

	PY 2012 Authorized	PY 2013 Authorized	PY 2014 Authorized	3-Year Authorized PY 20012- 2014
Energy Savings Assistance Program				
Energy Efficiency				
Appliances	$4,528,886	$6,449,788	$6,919,859	$ 17,898,534
Domestic Hot Water	$15,216,788	$15,460,812	$15,710,853	$ 46,388,452
Enclosure	$39,298,898	$40,418,299	$41,537,596	$ 121,254,792
HVAC	$17,559,517	$18,006,083	$18,422,053	$ 53,987,652
Maintenance	$2,441,614	$2,496,293	$2,550,973	$ 7,488,880
Lighting	$0	$0	$0	$ -
Miscellaneous	$0	$0	$0	$ -
Customer Enrollment	$20,704,408	$20,746,914	$21,023,556	$ 62,474,878
In Home Education	$2,572,984	$2,517,638	$2,531,184	$ 7,621,806
Pilot	$0	$0	$0	$ -
Energy Efficiency Total	**$102,323,095**	**$106,095,825**	**$108,696,075**	**$317,114,995**
Training Center	$535,360	$663,921	$681,105	$ 1,880,386
Inspections	$2,959,003	$3,063,896	$3,155,344	$ 9,178,243
Marketing and Outreach	$1,073,652	$1,272,007	$1,198,436	$ 3,544,095
Statewide Marketing Education and Outreach	$100,000	$100,000	$100,000	$ 300,000
Measurement and Evaluation Studies	$316,667	$91,667	$91,667	$ 500,000
Regulatory Compliance	$295,333	$295,333	$295,333	$ 886,000
General Administration	$5,603,781	$5,891,204	$6,202,206	$ 17,697,191
CPUC Energy Division	$86,000	$86,000	$86,000	$ 258,000
TOTAL PROGRAM COSTS	**$113,292,891**	**$117,559,854**	**$120,506,165**	**$351,358,910**
Funded Outside of ESAP Program Budget				
NGAT Costs	$4,200,000	$4,200,000	$4,200,000	$ 12,600,000

PY 2012-2014 ESAP AUTHORIZED Electric & Gas Budget-Phase II
Southern California Gas Company

	PY2011 Authorized	PY 2012 Authorized	PY 2013 Authorized	PY 2014 Authorized	3-Year Authorized PY 20012- 2014
Energy Savings Assistance Program					
Energy Efficiency					
Appliances	$3,963,911.00	$16,410,368	$16,738,575	$16,738,575	$ 49,887,519
Domestic Hot Water	$4,298,090.00	$15,889,976	$16,366,675	$16,843,374	$ 49,100,024
Enclosure	$18,725,309.00	$39,607,317	$40,795,537	$41,983,756	$ 122,386,609
HVAC	$17,345,119	$18,123,476	$18,667,180	$19,210,885	$ 56,001,540
Maintenance	$5,800,598	$2,008,345	$2,068,596	$2,128,846	$ 6,205,787
Lighting	$0.00	$0	$0	$0	$ -
Miscellaneous	$0.00	$0	$0	$0	$ -
Customer Enrollment	$17,211,246.00	$20,775,400	$20,825,610	$20,834,354	$ 62,435,364
In Home Education	$2,188,110.00	$2,569,098	$2,517,646	$2,531,192	$ 7,617,936
Pilot	$28,127.00	$0	$0	$0	$ -
Energy Efficiency Total	$69,560,510	**$115,383,980**	**$117,979,817**	**$120,270,983**	**$353,634,780**
Training Center	$320,587	$535,360	$663,921	$681,105	$ 1,880,386
Inspections	$1,701,533	$3,168,321	$3,263,371	$3,361,051	$ 9,792,743
Marketing and Outreach	$1,050,293	$1,073,652	$1,272,007	$1,198,436	$ 3,544,095
Statewide Marketing Education and Outreach	$0	$100,000	$100,000	$100,000	$ 300,000
Measurement and Evaluation Studies	$0	$316,667	$91,667	$91,667	$ 500,000
Regulatory Compliance	$272,837	$295,333	$295,333	$295,333	$ 886,000
General Administration	$5,264,735	$5,193,381	$5,547,442	$5,286,041	$ 16,026,864
CPUC Energy Division	$85,774	$86,000	$86,000	$86,000	$ 258,000
Carry Back Funding*		$1,046,575	$1,046,575	$1,046,575	$ 3,139,726
TOTAL PROGRAM COSTS	$78,256,269	**$127,199,269**	**$130,346,135**	**$132,417,191**	**$ 389,962,594**
Funded Outside of ESAP Program Budget					
Indirect Costs[1]					
NGAT Costs	$1,600,000	$4,200,000	$4,200,000	$4,200,000	$ 12,600,000

(END OF ATTACHMENT E)

E- SoCalGas ESAP Budget

Attachment F

Attachment F

Projected Number of Homes to be Treated 2012-2014

	2012		2013		2014					
Utility	IOU Proposed	CPUC Projection	IOU Proposed	CPUC Projection	IOU Proposed	CPUC Projection	2012-2014 IOU Proposed	2012-2014 CPUC Projection	Remaining Homes to be treated 2012-2020 (IOU Proposed)	Remaining Homes to be treated 2012-2020 (CPUC Projection)
PG&E	125,000	119,940	125,000	119,940	125,000	119,940	375,000	359,820	862,552	1,079,461
SCE	68,200	87,389	77,000	87,389	74,800	87,389	220,000	262,166	625,429	786,498
SDG&E	20,000	20,316	20,000	20,316	20,000	20,316	60,000	60,948	144,243	182,845
SoCalGas	129,106	136,836	100,249	136,836	100,249	136,836	329,604	410,508	902,237	1,231,521
Total	342,306	364,481	322,249	364,481	320,049	364,481	984,604	1,093,442	2,534,462	3,280,324

SUPPORT: Delta Between Proposed and 5% Ineligibility Factor

PG&E (App 1-17)

	15%	5%
Filed 12/30/2010 Estimated Eligible Homes	1,983,285	1,983,285
Filed 12/30/2010 estimated eligible escalated by 1% to 2020	2,169,090	2,169,090
Less % of 2020 estimate due to unwilling or unable to participat	325,364	108,455
Less PG&E Homes Treated 2002 - 2010	629,143	629,143
Less PG&E Estimated Homes Treated 2011	126,248	126,248
Less LIHEAP Homes Treated 2002-2007 (D08-11-031)	76,537	76,537
Less LIHEAP Homes Treated 2008-2020 (90% of 2002-2007 Av	149,247	149,247
Remaining to be Treated 2012-2020	862,552	1,079,461
2012-2014 Minimum Homes Treated =1/3 of homes remaining	287,517	359,820
per yr	95,839	119,940

SCE (App- p24)

	15%	5%
Filed 12/30/2010 Estimated Eligible Homes	1,458,131	1,458,131
Filed 12/30/2010 estimated eligible escalated by 1% to 2020	1,610,684	1,610,684
Less % of 2020 estimate due to unwilling or unable to participat	241,603	80,534
Less SCE Homes Treated 2002 - 2010	474,916	474,916
Less SCE Estimated Homes Treated 2011	73,800	73,800
Less LIHEAP Homes Treated 2002-2007 (D08-11-031)	66,080	66,080
Less LIHEAP Homes Treated 2008-2020 (90% of 2002-2007 Av	128,856	128,856
Remaining to be Treated 2012-2020	625,429	786,498
2012-2014 Minimum Homes Treated =1/3 of homes remaining	208,476	262,166
per yr	69,492	87,389

SDG&E (SW-14)

	15%	5%
Filed 12/30/2010 Estimated Eligible Homes	352,952	352,952
Filed 12/30/2010 estimated eligible escalated by 1% to 2020	386,018	386,018
Less % of 2020 estimate due to unwilling or unable to participat	57,903	19,301
Less SDG&E Homes Treated 2002 - 2010	138,398	138,398
Less SDG&E Estimated Homes Treated 2011	20,384	20,384
Less LIHEAP Homes Treated 2002-2007 (D08-11-031)	7,700	7,700
Less LIHEAP 2008 100% of 2002-2007 LIHEAP average	1,283	1,283
LIHEAP 2009-2010 Actual	3,277	3,277
Less LIHEAP Homes Treated 2008-2020 (90% of 2002-2007 Av	12,830	12,830
Remaining to be Treated 2012-2020	144,243	182,845
2012-2014 Minimum Homes Treated =1/3 of homes remaining	48,081	60,948
per year	16,027	20,316

SCG (DM 16)

	19%	5%
Filed 2/16/2012 Estimated Eligible Homes	2,106,758	2,106,758
Filed 2/16/2012 estimated eligible escalated by 1% to 2020	2,304,130	2,304,130
Less % of 2020 estimate due to unwilling or unable to participat	437,785	115,207
Less SCG Homes Treated 2002 - 2010	548,110	545,385
Less SCG Estimated Homes Treated 2011	165,000	161,020
Less LIHEAP Homes Treated 2002-2007 (D08-11-031)	73,780	73,780
Less LIHEAP 2008 100% of 2002-2007 LIHEAP average	12,297	12,297
Less LIHEAP 2009-2010 LIHEAP 2009-2010 actual	41,954	41,954
Less LIHEAP Homes Treated 2011-2020 (90% of 2002-2007 Av	122,967	122,967
Remaining to be Treated 2012-2020	902,237	1,231,521
2012-2014 Minimum Homes Treated =1/3 of homes remaining	300,746	410,507
per year	100,249	136,836

(END OF ATTACHMENT F)

F-Projected Homes to be Treated

Attachment G

Attachment G

BUDGET ADJUSTMENTS per D1208044	PGE				SCE				SDGE				SoCalGas				Total
Issue	2012	2013	2014	Cycle	2012	2013	2014	Cycle	2012	2013	2014	Cycle	2012	2013	2014	Cycle	
ORIGINAL ESAP BUDGET	**$ 157,023,000.00**	**$ 162,622,000.00**	**$ 168,347,000.00**	**$ 487,992,000.00**	**$ 57,717,000.00**	**$ 64,528,000.00**	**$ 62,971,000.00**	**$ 185,216,000.00**	**$ 22,044,928.55**	**$ 22,462,163.02**	**$ 22,832,030.32**	**$ 67,339,121.89**	**$ 99,909,055.86**	**$ 82,121,474.95**	**$ 84,178,884.56**	**$ 266,209,415.31**	**$ 1,006,756,537.20**
Contractor Customer Referral Incentive	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($43,425)	($43,425)	($43,425)	($130,275)	$0	$0	$0	**$0**	($130,275)
Customer Referral Incentive (Gift Card)	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($750,000)	($750,000)	($750,000)	($2,250,000)	($833,333)	($833,333)	($833,333)	($2,500,000)	($4,750,000)
SCE Maintenance Measure Costs-ADD BACK	$0	$0	$0	**$0**	$233,333	$233,333	$233,333	**$700,000**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	**$700,000**
SDGE Duct, Test, and Seal - ADD BACK (HVAC)	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$112,134	$112,134	$112,134	**$336,403**	$0	$0	$0	**$0**	**$336,403**
SoCalGas- Domestic Hot Water, MF- ADD BACK	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$321,925	$331,301	$340,678	**$993,904**	**$993,904**
SoCalGas- Enclosures, MF (attic Insulation)- ADD BACK	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$186,497	$191,932	$197,364	**$575,793**	**$575,793**
SoCalGas- Enclosures, SF (attic Insulation)- ADD BACK	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$7,334,334	$7,548,944	$7,763,431	**$22,646,709**	**$22,646,709**
SoCalGas- HVAC (Duct, Test & Seal) ADD BACK	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$544,710	$560,772	$576,835	**$1,682,317**	**$1,682,317**
SoCalGas- Inspections (Due to Add back of Attic Insulation)	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$183,854	$205,805	$211,976	**$601,635**	**$601,635**
Needs Assessment	$70,000	$70,000	$70,000	**$210,000**	$70,000	$70,000	$70,000	**$210,000**	$35,000	$35,000	$35,000	**$105,000**	$58,333	$58,333	$58,333	**$175,000**	**$700,000**
Multifamily Study	$40,000	$40,000	$40,000	**$120,000**	$40,000	$40,000	$40,000	**$120,000**	$20,000	$20,000	$20,000	**$60,000**	$33,333	$33,333	$33,333	**$100,000**	**$400,000**
PHASE II Adjustments																	
SDGE- Upward Trend in HVAC- Furnace R&R costs	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$2,228,074	$2,228,074	$2,228,074	**$6,684,221**	$0	$0	$0	**$0**	**$6,684,221**
SDGE- Upward Trend in Domestic Hot Water - Water Heater R&R costs	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$378,234	$378,234	$378,234	**$1,134,703**	$0	$0	$0	**$0**	**$1,134,703**
SDGE- Upward Trend in Appliances - Clothes Washers costs	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$418,926	$418,926	$418,926	**$1,256,778**	$0	$0	$0	**$0**	**$1,256,778**
SDGE- Upward Trend in Enclosures costs	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$1,210,915	$1,210,915	$1,210,915	**$3,632,745**	$0	$0	$0	**$0**	**$3,632,745**
SDG&E- Customer Enrollment	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$113,222	$113,222	$113,222	**$339,666**	$0	$0	$0	**$0**	**$339,666**
SDG&E- Inspections	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$40,000	$40,000	$40,000	**$120,000**	$0	$0	$0	**$0**	**$120,000**
SDG&E- Fund shift of unspent Gas funds to Provide more Gas measures approved per ALJ Ruling 3/30/12	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($611,000)	($611,000)	($611,000)	**($1,833,000)**	$0	$0	$0	**$0**	**($1,833,000)**
SDG&E- Fund shift of unspent Gas funds to Provide more Gas measures	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($55,667)	($55,667)	($55,667)	**($167,000)**	$0	$0	$0	**$0**	**($167,000)**
SDG&E- Fund shift of unspent Electric funds to Provide more Gas measures	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($1,400,000)	($1,400,000)	($1,400,000)	**($4,200,000)**	$0	$0	$0	**$0**	**($4,200,000)**
SDG&E- Fund shift of unspent Electric funds to Provide more Gas measures approved per ALJ Ruling 3/30/12	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($566,667)	($566,667)	($566,667)	**($1,700,000)**	$0	$0	$0	**$0**	**($1,700,000)**
SDG&E- Fund shift of unspent Electric funds to Provide more Electric measures	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($499,405)	($499,405)	($499,405)	**($1,498,216)**	$0	$0	$0	**$0**	**($1,498,216)**
SoCalGas- Upward Trend in HE Washers	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$11,881,462	$10,288,787	$9,818,716	**$31,988,965**	**$31,988,965**
SoCalGas- Upward Trend in Domestic Hot Water	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$673,188	$905,863	$1,132,521	**$2,711,572**	**$2,711,572**
SoCalGas- Upward Trend in Enclosure	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$308,419	$377,239	$446,160	**$1,131,817**	**$1,131,817**
SoCalGas- Upward Trend in HVAC	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$563,959	$661,097	$788,832	**$2,013,888**	**$2,013,888**
SoCalGas- Downward Adjustment in Maintenance	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($433,269)	($427,697)	($422,127)	**($1,283,093)**	**($1,283,093)**
SoCalGas- Adjustment in Customer Enrollment	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$70,992	$79,696	($189,202)	**($39,514)**	**($39,514)**
SoCalGas- Adjustment in Home Education	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($3,886)	$8	$8	**($3,870)**	**($3,870)**
SoCalGas- Upward Trend in Inspections	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$209,318	$199,475	$205,707	**$614,500**	**$614,500**
SoCalGas- Adjustment in General Admin (Removal of PC Tablets + HEAT system upgrades)	$0	$0	$0	**$0**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	($410,400)	($343,782)	($916,165)	**($1,670,327)**	**($1,670,327)**
SoCalGas- 2012 Bridge funding used to cover the 2011 shortfall, and needed to cover 2012-2014 cycle					$0	$0	$0	**$0**	$0	$0	$0	**$0**	$1,046,575	$1,046,575	$1,046,575	**$3,139,726**	**$3,139,726**
Total Deduction/Addition	$110,000	$110,000	$110,000	$330,000	$343,333	$343,333	$343,333	$1,030,000	$630,342	$630,342	$630,342	$1,891,025	$21,736,032	$20,883,368	$20,259,643	$62,879,042	$66,130,067
Orig Budget+ Total Deduction/Addition	$157,133,000	$162,732,000	$168,457,000	**$488,322,000**	$58,060,333	$64,871,333	$63,314,333	**$186,246,000**	$22,675,270	$23,092,505	$23,462,372	**$69,230,147**	$ 121,645,087.53	$103,004,843	$104,438,527	**$329,088,457**	**$1,072,886,604**
Original Budget $ per Orig Number of Home Est.	$1,256	$1,301	$1,347	$1,301	$846	$838	$842	$842	$1,102	$1,123	$1,142	$1,122	$774	$819	$840	$808	$1,022
New Budget $ per Orig Number of Home Est.	$1,259	$1,304	$1,350	$1,304	$829	$831	$832	$831	$1,069	$1,090	$1,108	$1,089	$828	$859	$881	$856	$1,010
New Authorized Budgets Based on New Projected Homes to be Treated	**$150,982,212**	**$156,363,352**	**$161,862,111**	**$469,207,675**	**$72,461,946**	**$72,640,016**	**$72,736,631**	**$217,838,592**	**$21,716,006**	**$22,140,542**	**$22,515,618**	**$66,372,165**	**$113,292,891**	**$117,559,854**	**$120,506,165**	**$351,358,910**	**$1,104,777,343**
Projected Difference Between Proposed and Authorized Budget	($6,040,788)	($6,258,648)	($6,484,889)	**($18,784,325)**	$14,744,946	$8,112,016	$9,765,631	**$32,622,592**	($328,923)	($321,621)	($316,412)	**($966,957)**	$113,292,891	$35,438,379	$36,327,281	**$85,149,495**	**$98,020,806**
WORK AREA																	
IOU Proposed Budgets	$157,023,000	$162,622,000	$168,347,000	$487,992,000	$57,717,000	$64,528,000	$62,971,000	$185,216,000	$22,044,929	$22,462,163	$22,832,030	$67,339,122	$ 99,909,055.86	$ 82,121,474.95	$84,178,885	$266,209,415	$1,006,756,537
IOU Original Proposed Elig. Customers	125,000	125,000	125,000	**375,000**	68,200	77,000	74,800	**220,000**	20,000	20,000	20,000	**60,000**	129,106	100,249	100,249	**329,604**	**984,604**
CPUC New Projected Elig. Customers	119,940	119,940	119,940	**359,820**	87,389	87,389	87,389	**262,166**	20,316	20,316	20,316	**60,948**	136,836	136,836	136,836	**410,508**	**1,093,442**
Escalation Factor	96%	96%	96%	96%	128%	113%	117%	119%	102%	102%	102%	102%	106%	136%	136%	125%	111%
Proportion of Total ESAP Budget	15.60%	16.15%	16.72%	**48.47%**	5.73%	6.41%	6.25%	**18.40%**	2.19%	2.23%	2.27%	**6.69%**	9.92%	8.16%	8.36%	**26.44%**	**100.00%**

(END OF ATTACHMENT G)

G- ESAP Budget Impacts

Attachment H

Attachment H.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
Pacific Gas and Electric Company

	Measure	Measure Group	Type of Home	Electric or Gas	Climate Zone	Ratio of Benefits Over Costs*			Add Back *A	Add Back *B
						Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
			(SF, MH, MF)	(E,G)	(Number)					
New	AC TIME DELAY MH/CZ13	HVAC	MH	E	13	2.03	6.43	1.73		
New	AC TIME DELAY MH/CZ14	HVAC	MH	E	14	2.02	6.43	1.73		
New	AC TIME DELAY MH/CZ11	HVAC	MH	E	11	1.95	5.34	1.68		
New	AC TIME DELAY MH/CZ12	HVAC	MH	E	12	1.87	4.35	1.62		
New	AC TIME DELAY MH/CZ4	HVAC	MH	E	4	1.65	3.09	1.42		
	A/C Tune-up- Central w/CZ14 w/SF	HVAC	SF	E	14	1.64	3.08	1.40		
New	AC TIME DELAY MH/CZ16	HVAC	MH	E	16	1.64	3.06	1.42		
	A/C Tune-up- Central w/CZ14 w/MH	HVAC	MH	E	14	1.62	3.00	1.39		
New	AC TIME DELAY MH/CZ2	HVAC	MH	E	2	1.55	2.56	1.34		
New	AC TIME DELAY SF/CZ13	HVAC	SF	E	13	1.54	2.55	1.32		
New	AC TIME DELAY SF/CZ14	HVAC	SF	E	14	1.53	2.55	1.31		
New	AC TIME DELAY SF/CZ11	HVAC	SF	E	11	1.45	2.14	1.25		
	A/C Tune-up- Central w/CZ14 w/MF	HVAC	MF	E	14	1.37	2.01	1.18		
	A/C Tune-up- Central w/CZ13 w/SF	HVAC	SF	E	13	1.36	1.96	1.17		
	A/C Tune-up- Central w/CZ11 w/SF	HVAC	SF	E	11	1.30	1.71	1.12		
New	AC TIME DELAY MH/CZ5	HVAC	MH	E	5	1.20	1.66	1.02		
New	AC TIME DELAY MH/CZ6	HVAC	MH	E	6	1.20	1.66	1.02		
	A/C Tune-up- Central w/CZ13 w/MH	HVAC	MH	E	13	1.25	1.63	1.07		
New	AC TIME DELAY MF/CZ14	HVAC	MF	E	14	1.23	1.59	1.06		
New	AC TIME DELAY MF/CZ13	HVAC	MF	E	13	1.24	1.59	1.06		
New	AC TIME DELAY MH/CZ3	HVAC	MH	E	3	1.19	1.44	1.03		
	A/C Tune-up- Central w/CZ11 w/MH	HVAC	MH	E	11	1.18	1.42	1.02		
	A/C Tune-up- Central w/CZ13 w/MF	HVAC	MF	E	13	1.14	1.38	0.98		
New	AC TIME DELAY SF/CZ12	HVAC	SF	E	12	1.18	1.35	1.03		
New	AC TIME DELAY MF/CZ11	HVAC	MF	E	11	1.13	1.30	0.98		
	A/C Tune-up- Central w/CZ12 w/SF	HVAC	SF	E	12	1.11	1.22	0.96		
	A/C Tune-up- Central w/CZ11 w/MF	HVAC	MF	E	11	1.05	1.15	0.91		
	Evap Coolers SF/CZ13	HVAC	SF	E	13	1.03	1.15	0.88		
	Evap Coolers SF/CZ14	HVAC	SF	E	14	1.02	1.15	0.88		
	Evap Coolers SF/CZ16	HVAC	SF	E	16	1.03	1.14	0.88		
	Air Sealing / Envelope MH/CZ13/G-wAC	HVAC	MH	EG	13	0.53	1.08	0.45		
	Air Sealing / Envelope MH/CZ14/G-wAC	HVAC	MH	EG	14	0.52	1.08	0.45		
	A/C Tune-up- Central w/CZ12 w/MH	HVAC	MH	E	12	1.03	1.07	0.89		
New	AC TIME DELAY SF/CZ16	HVAC	SF	E	16	1.00	1.07	0.86		
	Evap Coolers MH/CZ14	HVAC	MH	E	14	0.97	1.06	0.83		
	Evap Coolers MH/CZ13	HVAC	MH	E	13	0.98	1.06	0.83		
	Air Sealing / Envelope SF/CZ13/G-wAC	ENCLOSURE	SF	EG	13	0.52	1.04	0.44		
	Air Sealing / Envelope SF/CZ14/G-wAC	ENCLOSURE	SF	EG	14	0.52	1.04	0.44		
	Air Sealing / Envelope MH/CZ16/G-wAC	ENCLOSURE	MH	EG	16	0.49	0.98	0.41		
	Air Sealing / Envelope SF/CZ16/G-wAC	ENCLOSURE	SF	EG	16	0.48	0.95	0.41		
	Air Sealing / Envelope MH/CZ11/G-wAC	ENCLOSURE	MH	EG	11	0.48	0.94	0.40		
	Air Sealing / Envelope SF/CZ11/G-wAC	ENCLOSURE	SF	EG	11	0.45	0.88	0.38		
New	AC TIME DELAY MF/CZ12	HVAC	MF	E	12	0.91	0.87	0.79		
	Air Sealing / Envelope MH/CZ12/G-wAC	ENCLOSURE	MH	EG	12	0.44	0.84	0.38		
	A/C Tune-up- Central w/CZ16 w/SF	HVAC	SF	E	16	0.84	0.83	0.72		
	Evap Coolers MH/CZ11	HVAC	MH	E	11	0.85	0.81	0.73		
New	AC TIME DELAY SF/CZ4	HVAC	SF	E	4	0.83	0.81	0.71		
	Evap Coolers SF/CZ11	HVAC	SF	E	11	0.84	0.81	0.73		
	Evap Coolers SF/CZ12	HVAC	SF	E	12	0.84	0.78	0.73		
	Air Sealing / Envelope SF/CZ12/G-wAC	ENCLOSURE	SF	EG	12	0.41	0.77	0.35		
	Air Sealing / Envelope MF/CZ14/G-wAC	ENCLOSURE	MF	EG	14	0.40	0.75	0.35		
	Air Sealing / Envelope MF/CZ13/G-wAC	ENCLOSURE	MF	EG	13	0.40	0.75	0.35		
	Evap Coolers MH/CZ12	HVAC	MH	E	12	0.82	0.75	0.71		
	Air Sealing / Envelope MH/CZ13/E-wAC	ENCLOSURE	MH	E	13	0.40	0.74	0.34		
	Air Sealing / Envelope MH/CZ14/E-wAC	ENCLOSURE	MH	E	14	0.40	0.74	0.34		
	Air Sealing / Envelope SF/CZ13/E-wAC	ENCLOSURE	SF	E	13	0.40	0.73	0.34		
	Air Sealing / Envelope SF/CZ14/E-wAC	ENCLOSURE	SF	E	14	0.39	0.73	0.34		
	Air Sealing / Envelope MF/CZ14/E-wAC	ENCLOSURE	MF	E	14	0.39	0.73	0.34		
	Air Sealing / Envelope MF/CZ13/E-wAC	ENCLOSURE	MF	E	13	0.40	0.73	0.34		
	A/C Tune-up- Central w/CZ16 w/MH	HVAC	MH	E	16	0.76	0.72	0.65		
New	AC TIME DELAY MF/CZ16	HVAC	MF	E	16	0.77	0.72	0.66		
	Air Sealing / Envelope MH/CZ1/G-wAC	ENCLOSURE	MH	EG	1	0.34	0.72	0.29		
	Air Sealing / Envelope MH/CZ1/G-noAC	ENCLOSURE	MH	G	1	0.35	0.72	0.29		
	A/C Tune-up- Central w/CZ12 w/MF	HVAC	MF	E	12	0.75	0.66	0.65		
	Air Sealing / Envelope SF/CZ1/G-wAC	ENCLOSURE	SF	EG	1	0.32	0.65	0.27		
	Air Sealing / Envelope SF/CZ1/G-noAC	ENCLOSURE	SF	G	1	0.32	0.65	0.27		
	A/C Tune-up- Central w/CZ4 w/SF	HVAC	SF	E	4	0.70	0.65	0.60		
	Air Sealing / Envelope MF/CZ16/G-wAC	ENCLOSURE	MF	EG	16	0.35	0.64	0.30		
	A/C Tune-up- Central w/CZ6 w/MH	HVAC	MH	E	6	0.63	0.62	0.53		
	Air Sealing / Envelope MH/CZ2/G-wAC	ENCLOSURE	MH	EG	2	0.32	0.62	0.27		
New	AC TIME DELAY MF/CZ4	HVAC	MF	E	4	0.67	0.61	0.58		
	Air Sealing / Envelope MF/CZ16/E-wAC	ENCLOSURE	MF	E	16	0.34	0.61	0.29		
	Air Sealing / Envelope SF/CZ16/E-wAC	ENCLOSURE	SF	E	16	0.33	0.58	0.28		
	Air Sealing / Envelope SF/CZ2/G-wAC	ENCLOSURE	SF	EG	2	0.30	0.57	0.25		
	Air Sealing / Envelope MH/CZ16/E-wAC	ENCLOSURE	MH	E	16	0.32	0.57	0.28		
	Air Sealing / Envelope MH/CZ5/G-wAC	ENCLOSURE	MH	EG	5	0.28	0.57	0.23		
	Air Sealing / Envelope MH/CZ6/G-wAC	ENCLOSURE	MH	EG	6	0.28	0.57	0.23		
	A/C Tune-up- Central w/CZ6 w/SF	HVAC	SF	E	6	0.59	0.57	0.49		
New	AC TIME DELAY SF/CZ2	HVAC	SF	E	2	0.65	0.56	0.56		
	Air Sealing / Envelope MH/CZ4/G-wAC	ENCLOSURE	MH	EG	4	0.28	0.54	0.24		
	Air Sealing / Envelope MH/CZ3/G-wAC	ENCLOSURE	MH	EG	3	0.27	0.53	0.23		
	A/C Tune-up- Central w/CZ4 w/MH	HVAC	MH	E	4	0.61	0.53	0.52		
	Air Sealing / Envelope SF/CZ5/G-wAC	ENCLOSURE	SF	EG	5	0.27	0.53	0.22		
	Air Sealing / Envelope SF/CZ6/G-wAC	ENCLOSURE	SF	EG	6	0.27	0.53	0.22		
New	AC TIME DELAY MH/CZ1	HVAC	MH	E	1	0.59	0.53	0.51		
	Air Sealing / Envelope MF/CZ11/G-wAC	ENCLOSURE	MF	EG	11	0.30	0.52	0.26		
	Air Sealing / Envelope MH/CZ11/E-wAC	ENCLOSURE	MH	E	11	0.30	0.51	0.26		
	Air Sealing / Envelope SF/CZ4/G-wAC	ENCLOSURE	SF	EG	4	0.27	0.50	0.22		
	Air Sealing / Envelope MF/CZ11/E-wAC	ENCLOSURE	MF	E	11	0.29	0.49	0.25		
	A/C Tune-up- Central w/CZ16 w/MF	HVAC	MF	E	16	0.57	0.49	0.49		
	Air Sealing / Envelope MH/CZ3/G-noAC	HVAC	MH	G	3	0.25	0.48	0.20		
	Air Sealing / Envelope SF/CZ11/E-wAC	ENCLOSURE	SF	E	11	0.29	0.48	0.25		
	Air Sealing / Envelope SF/CZ3/G-wAC	ENCLOSURE	SF	EG	3	0.25	0.47	0.21		
	A/C Tune-up- Central w/CZ6 w/MF	HVAC	MF	E	6	0.51	0.47	0.43		
	Air Sealing / Envelope MF/CZ12/G-wAC	ENCLOSURE	MF	EG	12	0.29	0.46	0.25		
	Air Sealing / Envelope MH/CZ2/G-noAC	ENCLOSURE	MH	G	2	0.24	0.46	0.20		
	Air Sealing / Envelope MH/CZ12/E-wAC	ENCLOSURE	MH	E	12	0.29	0.46	0.25		
	Attic Insulation SF/CZ14/G-wAC	ENCLOSURE	SF	EG	14	0.50	0.44	0.43		
	Attic Insulation SF/CZ13/G-wAC	ENCLOSURE	SF	EG	13	0.51	0.44	0.43		
	Air Sealing / Envelope MF/CZ12/E-wAC	ENCLOSURE	MF	E	12	0.27	0.44	0.24		
	A/C Tune-up- Central w/CZ2 w/MH	HVAC	MH	E	2	0.53	0.43	0.45		
	Air Sealing / Envelope SF/CZ12/E-wAC	ENCLOSURE	SF	E	12	0.27	0.43	0.23		
	Air Sealing / Envelope MH/CZ11/G-noAC	ENCLOSURE	MH	G	11	0.22	0.43	0.18		
	A/C Tune-up- Central w/CZ2 w/SF	HVAC	SF	E	2	0.51	0.42	0.44		
	Air Sealing / Envelope MH/CZ16/G-noAC	ENCLOSURE	MH	G	16	0.21	0.41	0.18		
	Air Sealing / Envelope SF/CZ2/G-noAC	ENCLOSURE	SF	G	2	0.21	0.41	0.18		
	Attic Insulation SF/CZ16/G-wAC	ENCLOSURE	SF	EG	16	0.47	0.41	0.40		
	Air Sealing / Envelope MH/CZ5/G-noAC	ENCLOSURE	MH	G	5	0.20	0.41	0.17		
	Air Sealing / Envelope MH/CZ6/G-noAC	ENCLOSURE	MH	G	6	0.20	0.41	0.17		

H.1- Measures PG&E Weather

Attachment H.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
Pacific Gas and Electric Company

	Measure	Measure Group	Type of Home	Electric or Gas	Climate Zone	Ratio of Benefits Over Costs*			Add Back *A	Add Back *B
						Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
	Air Sealing / Envelope SF/CZ11/G-noAC	ENCLOSURE	SF	G	11	0.21	0.40	0.17		
	Air Sealing / Envelope SF/CZ3/G-noAC	ENCLOSURE	SF	G	3	0.20	0.38	0.16		
	Air Sealing / Envelope MH/CZ12/G-noAC	ENCLOSURE	MH	G	12	0.20	0.38	0.16		
	Air Sealing / Envelope SF/CZ16/G-noAC	ENCLOSURE	SF	G	16	0.20	0.38	0.16		
	Attic Insulation SF/CZ11/G-wAC	ENCLOSURE	SF	EG	11	0.45	0.38	0.38		
	Air Sealing / Envelope MH/CZ4/G-noAC	ENCLOSURE	MH	G	4	0.20	0.38	0.16		
	Air Sealing / Envelope SF/CZ5/G-noAC	ENCLOSURE	SF	G	5	0.19	0.37	0.15		
	Air Sealing / Envelope SF/CZ6/G-noAC	ENCLOSURE	SF	G	6	0.19	0.37	0.15		
New	AC TIME DELAY MF/CZ2	HVAC	MF	E	2	0.46	0.36	0.40		
	Attic Insulation MF/CZ14/G-wAC	ENCLOSURE	MF	EG	14	0.43	0.36	0.37		
	Attic Insulation MF/CZ13/G-wAC	ENCLOSURE	MF	EG	13	0.44	0.36	0.37		
	A/C Tune-up- Central w/CZ4 w/MF	HVAC	MF	E	4	0.44	0.36	0.38		
	Air Sealing / Envelope SF/CZ12/G-noAC	ENCLOSURE	SF	G	12	0.18	0.34	0.15		
	Air Sealing / Envelope MH/CZ14/G-noAC	ENCLOSURE	MH	G	14	0.17	0.34	0.15		
	Air Sealing / Envelope MH/CZ13/G-noAC	ENCLOSURE	MH	G	13	0.18	0.34	0.15		
	Air Sealing / Envelope SF/CZ4/G-noAC	ENCLOSURE	SF	G	4	0.18	0.34	0.15		
	Attic Insulation SF/CZ13/E-wAC	ENCLOSURE	SF	E	13	0.39	0.31	0.33		
	Attic Insulation SF/CZ14/E-wAC	ENCLOSURE	SF	E	14	0.39	0.31	0.33		
	Attic Insulation SF/CZ12/G-wAC	ENCLOSURE	SF	EG	12	0.39	0.31	0.33		
	Air Sealing / Envelope SF/CZ13/G-noAC	ENCLOSURE	SF	G	13	0.16	0.31	0.14		
	Air Sealing / Envelope SF/CZ14/G-noAC	ENCLOSURE	SF	G	14	0.16	0.31	0.14		
	Attic Insulation MF/CZ13/E-wAC	ENCLOSURE	MF	E	13	0.39	0.31	0.33		
	Attic Insulation MF/CZ14/E-wAC	ENCLOSURE	MF	E	14	0.39	0.31	0.33		
	A/C Tune-up- Central w/CZ2 w/MF	HVAC	MF	E	2	0.39	0.30	0.33		
	Attic Insulation SF/CZ1/G-wAC	ENCLOSURE	SF	EG	1	0.30	0.27	0.25		
	Attic Insulation SF/CZ1/G-noAC	ENCLOSURE	SF	G	1	0.31	0.26	0.26		
	Attic Insulation SF/CZ16/E-wAC	ENCLOSURE	SF	E	16	0.32	0.25	0.28		
	Attic Insulation MF/CZ12/G-wAC	ENCLOSURE	MF	EG	12	0.33	0.25	0.28		
	Attic Insulation MF/CZ11/G-wAC	ENCLOSURE	MF	EG	11	0.32	0.25	0.27		
	Attic Insulation SF/CZ2/G-wAC	ENCLOSURE	SF	EG	2	0.29	0.24	0.24		
	Air Sealing / Envelope MF/CZ5/G-wAC	ENCLOSURE	MF	EG	5	0.12	0.22	0.10	X	
	Air Sealing / Envelope MF/CZ6/G-wAC	ENCLOSURE	MF	EG	6	0.12	0.22	0.10	X	
	Air Sealing / Envelope MF/CZ4/G-wAC	ENCLOSURE	MF	EG	4	0.13	0.22	0.11	X	
	Attic Insulation SF/CZ11/E-wAC	ENCLOSURE	SF	E	11	0.29	0.21	0.25		
	Attic Insulation SF/CZ4/G-noAC	ENCLOSURE	SF	G	4	0.24	0.21	0.20	X	
	Attic Insulation SF/CZ5/G-noAC	ENCLOSURE	SF	G	5	0.24	0.21	0.20	X	
	Attic Insulation SF/CZ6/G-noAC	ENCLOSURE	SF	G	6	0.24	0.21	0.20	X	
New	AC TIME DELAY SF/CZ3	HVAC	SF	E	3	0.28	0.20	0.24	X	
	Attic Insulation SF/CZ3/G-wAC	ENCLOSURE	SF	EG	3	0.24	0.20	0.21	X	
	Evap Coolers SF/CZ2	HVAC	SF	E	2	0.27	0.20	0.23		
	Evap Coolers SF/CZ3	HVAC	SF	E	3	0.27	0.20	0.23		
	Evap Coolers SF/CZ4	HVAC	SF	E	4	0.26	0.20	0.22		
	Evap Coolers SF/CZ1	HVAC	SF	E	1	0.25	0.20	0.22		
	Attic Insulation MF/CZ12/E-wAC	ENCLOSURE	MF	E	12	0.27	0.19	0.24		
	Attic Insulation MF/CZ11/E-wAC	ENCLOSURE	MF	E	11	0.26	0.19	0.23		
	Air Sealing / Envelope MF/CZ4/E-wAC	ENCLOSURE	MF	E	4	0.12	0.19	0.10	X	
	Air Sealing / Envelope MF/CZ5/E-wAC	ENCLOSURE	MF	E	5	0.11	0.19	0.09	X	
	Air Sealing / Envelope MF/CZ6/E-wAC	ENCLOSURE	MF	E	6	0.11	0.19	0.09	X	
	Air Sealing / Envelope MF/CZ2/G-wAC	ENCLOSURE	MF	EG	2	0.12	0.19	0.10	X	
	Evap Coolers MH/CZ2	HVAC	MH	E	2	0.26	0.19	0.22		
	Evap Coolers MH/CZ3	HVAC	MH	E	3	0.26	0.19	0.22		
	Evap Coolers MH/CZ4	HVAC	MH	E	4	0.25	0.19	0.21		
	Evap Coolers MH/CZ16	HVAC	MH	E	16	0.25	0.19	0.22		
	Attic Insulation SF/CZ12/E-wAC	ENCLOSURE	SF	E	12	0.25	0.17	0.22		
	Attic Insulation SF/CZ2/G-noAC	ENCLOSURE	SF	G	2	0.21	0.17	0.17	X	
	Air Sealing / Envelope SF/CZ4/E-wAC	ENCLOSURE	SF	E	4	0.10	0.17	0.09	X	
	Air Sealing / Envelope SF/CZ5/E-wAC	ENCLOSURE	SF	E	5	0.09	0.17	0.08	X	
	Air Sealing / Envelope SF/CZ6/E-wAC	ENCLOSURE	SF	E	6	0.09	0.17	0.08	X	
	Attic Insulation SF/CZ11/G-noAC	ENCLOSURE	SF	G	11	0.20	0.16	0.17	X	
	Air Sealing / Envelope MH/CZ5/E-wAC	ENCLOSURE	MH	E	5	0.09	0.16	0.08	X	
	Air Sealing / Envelope MH/CZ6/E-wAC	ENCLOSURE	MH	E	6	0.09	0.16	0.08	X	
	Air Sealing / Envelope MH/CZ4/E-wAC	ENCLOSURE	MH	E	4	0.10	0.16	0.09	X	
	Attic Insulation SF/CZ16/G-noAC	ENCLOSURE	SF	G	16	0.19	0.16	0.16	X	
	Air Sealing / Envelope SF/CZ2/E-wAC	ENCLOSURE	SF	E	2	0.10	0.16	0.09	X	
	Air Sealing / Envelope MH/CZ2/E-wAC	ENCLOSURE	MH	E	2	0.10	0.16	0.09	X	
	Air Sealing / Envelope MF/CZ2/E-wAC	ENCLOSURE	MF	E	2	0.10	0.16	0.09	X	
	Attic Insulation SF/CZ3/G-noAC	ENCLOSURE	SF	G	3	0.19	0.15	0.15	X	
	Attic Insulation MF/CZ4/G-wAC	ENCLOSURE	MF	EG	4	0.19	0.14	0.16	X	
	Attic Insulation MF/CZ5/G-wAC	ENCLOSURE	MF	EG	5	0.17	0.14	0.15	X	
	Attic Insulation SF/CZ12/G-noAC	ENCLOSURE	SF	G	12	0.17	0.14	0.14	X	
	Attic Insulation SF/CZ4/G-noAC	ENCLOSURE	SF	G	4	0.17	0.14	0.14	X	
	Attic Insulation SF/CZ5/G-noAC	ENCLOSURE	SF	G	5	0.16	0.14	0.14	X	
	Attic Insulation SF/CZ14/G-noAC	ENCLOSURE	SF	G	14	0.15	0.13	0.13	X	
	Attic Insulation SF/CZ13/G-noAC	ENCLOSURE	SF	G	13	0.16	0.13	0.13	X	
	Attic Insulation MF/CZ2/G-wAC	ENCLOSURE	MF	EG	2	0.17	0.13	0.14	X	
	Attic Insulation MF/CZ3/G-wAC	ENCLOSURE	MF	EG	3	0.16	0.12	0.14	X	
	Air Sealing / Envelope MF/CZ3/G-wAC	ENCLOSURE	MF	EG	3	0.07	0.12	0.06	X	
	Air Sealing / Envelope SF/CZ3/E-wAC	ENCLOSURE	SF	E	3	0.06	0.09	0.05	X	
	Air Sealing / Envelope MF/CZ3/E-wAC	ENCLOSURE	MF	E	3	0.06	0.09	0.05	X	
	Attic Insulation MF/CZ2/G-noAC	ENCLOSURE	MF	G	2	0.09	0.07	0.07	X	
	Attic Insulation MF/CZ3/G-noAC	ENCLOSURE	MF	G	3	0.08	0.06	0.06	X	
	Attic Insulation MF/CZ12/G-noAC	ENCLOSURE	MF	G	12	0.07	0.05	0.06	X	
	Attic Insulation MF/CZ11/G-noAC	ENCLOSURE	MF	G	11	0.07	0.05	0.06	X	
	Air Sealing / Envelope MH/CZ3/E-wAC	ENCLOSURE	MH	E	3	0.03	0.05	0.03	X	
	Air Sealing / Envelope MF/CZ1/G-wAC	ENCLOSURE	MF	EG	1	0.03	0.05	0.02	X	
	Attic Insulation MF/CZ5/G-noAC	ENCLOSURE	MF	G	5	0.06	0.05	0.05	X	
	Attic Insulation MF/CZ4/G-noAC	ENCLOSURE	MF	G	4	0.06	0.05	0.05	X	
	Attic Insulation MF/CZ13/G-noAC	ENCLOSURE	MF	G	13	0.06	0.05	0.05	X	
	Air Sealing / Envelope MF/CZ1/G-noAC	ENCLOSURE	MF	G	1	0.03	0.05	0.02	X	
	Air Sealing / Envelope MF/CZ16/G-noAC	ENCLOSURE	MF	G	16	0.02	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ2/G-noAC	ENCLOSURE	MF	G	2	0.02	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ11/G-noAC	ENCLOSURE	MF	G	11	0.02	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ3/G-noAC	ENCLOSURE	MF	G	3	0.02	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ5/G-noAC	ENCLOSURE	MF	G	5	0.01	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ6/G-noAC	ENCLOSURE	MF	G	6	0.01	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ12/G-noAC	ENCLOSURE	MF	G	12	0.01	0.03	0.01	X	
	Air Sealing / Envelope MF/CZ4/G-noAC	ENCLOSURE	MF	G	4	0.01	0.02	0.01	X	
	Air Sealing / Envelope MF/CZ14/G-noAC	ENCLOSURE	MF	G	14	0.01	0.02	0.01	X	
	Air Sealing / Envelope MF/CZ13/G-noAC	ENCLOSURE	MF	G	13	0.01	0.02	0.01	X	
	Air Sealing / Envelope MF/CZ1/E-wAC	ENCLOSURE	MF	E	1	0.00	0.00	0.00	X	
	Air Sealing / Envelope MH/CZ1/E-wAC	ENCLOSURE	MH	E	1	0.00	0.00	0.00	X	
	Air Sealing / Envelope SF/CZ1/E-wAC	ENCLOSURE	SF	E	1	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ1/E-noAC	ENCLOSURE	MF	E	1	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ11/E-noAC	ENCLOSURE	MF	E	11	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ12/E-noAC	ENCLOSURE	MF	E	12	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ13/E-noAC	ENCLOSURE	MF	E	13	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ14/E-noAC	ENCLOSURE	MF	E	14	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ16/E-noAC	ENCLOSURE	MF	E	16	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ2/E-noAC	ENCLOSURE	MF	E	2	0.00	0.00	0.00	X	
	Air Sealing / Envelope MF/CZ3/E-noAC	ENCLOSURE	MF	E	3	0.00	0.00	0.00	X	

H.1- Measures PG&E Weather

Attachment H.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
Pacific Gas and Electric Company

Measure	Measure Group	Type of Home	Electric or Gas	Climate Zone	Ratio of Benefits Over Costs*			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
Air Sealing / Envelope MF/CZ4/E-noAC	ENCLOSURE	MF	E	4	0.00	0.00	0.00	X	
Air Sealing / Envelope MF/CZ5/E-noAC	ENCLOSURE	MF	E	5	0.00	0.00	0.00	X	
Air Sealing / Envelope MF/CZ6/E-noAC	ENCLOSURE	MF	E	6	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ1/E-noAC	ENCLOSURE	MH	E	1	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ11/E-noAC	ENCLOSURE	MH	E	11	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ12/E-noAC	ENCLOSURE	MH	E	12	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ13/E-noAC	ENCLOSURE	MH	E	13	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ14/E-noAC	ENCLOSURE	MH	E	14	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ16/E-noAC	ENCLOSURE	MH	E	16	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ2/E-noAC	ENCLOSURE	MH	E	2	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ3/E-noAC	ENCLOSURE	MH	E	3	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ4/E-noAC	ENCLOSURE	MH	E	4	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ5/E-noAC	ENCLOSURE	MH	E	5	0.00	0.00	0.00	X	
Air Sealing / Envelope MH/CZ6/E-noAC	ENCLOSURE	MH	E	6	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ1/E-noAC	ENCLOSURE	SF	E	1	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ11/E-noAC	ENCLOSURE	SF	E	11	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ12/E-noAC	ENCLOSURE	SF	E	12	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ13/E-noAC	ENCLOSURE	SF	E	13	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ14/E-noAC	ENCLOSURE	SF	E	14	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ16/E-noAC	ENCLOSURE	SF	E	16	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ2/E-noAC	ENCLOSURE	SF	E	2	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ3/E-noAC	ENCLOSURE	SF	E	3	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ4/E-noAC	ENCLOSURE	SF	E	4	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ5/E-noAC	ENCLOSURE	SF	E	5	0.00	0.00	0.00	X	
Air Sealing / Envelope SF/CZ6/E-noAC	ENCLOSURE	SF	E	6	0.00	0.00	0.00	X	
Furnace Repair	MAINTENANCE	All	E/G	System	0.00	0.00	0.00	X	
Furnace Replacement	MAINTENANCE	All	E/G	System	0.00	0.00	0.00	X	
Duct Testing and Sealing - Electric All/CZ-All		All	E	System	-	-	-		X
Duct Testing and Sealing - Gas All/CZ-All		All	G	System	-	-	-		X
Central A/C Replacement SF/CZ14	HVAC	SF	E	14	-	-	-		X
Room A/C Replacement MF/CZ-All Z13 ONLY	HVAC	MF	E	13	-	-	-		X
Room A/C Replacement MH/CZ-All Z13 ONLY	HVAC	MH	E	13	-	-	-		X
Room A/C Replacement SF/CZ13	HVAC	SF	E	13	-	-	-		X

Notes:

2012 Installations, impacts and budgets are post-Bridge Funding forecasts, for October 1 - December 31, 2012.

Add-back Measures: Measures that did not pass the 0.25 Cost Effectiveness Threshold. Existing measures were required to pass one of the two Low Income Cost Effectiveness Tests (either the Utility Cost Test or the Modified Participant Test). New proposed measures were required to pass both the Utility Cost Test and the Modified Participant Test. The TRC Test is included for informational purposes.

Add Back *A: Add-back measures requested by PG&E and included in PG&E's original budget application.

Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in PG&E's original budget application.

Attachment H.2

Energy Savings Assistance Program Cost-Effectiveness - Non Weather Sensitive Measures
Pacific Gas and Electric Company

	Measure*	Measure Group	Type of Home	Electric or Gas	Ratio of Benefits Over Costs*			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
			(SF,MH,MF)	(E,G)					
	Water Heater Pipe Insulation SF/CZ-All/Gas	Domestic Hot Water	SF	G	2.41	35.79	1.95		
	Water Heater Pipe Insulation MH/CZ-All/Gas	Domestic Hot Water	MH	G	2.02	12.83	1.63		
	Faucet Aerator SF/CZ-All/Elec	Domestic Hot Water	SF	G	1.63	6.83	1.32		
	Water Heater Blanket MH/CZ-All/Elec	Domestic Hot Water	MH	E	1.47	5.42	1.19		
	Faucet Aerator MH/CZ-All/Elec	Domestic Hot Water	MF	E	1.47	5.36	1.19		
	Water Heater Pipe Insulation MF/CZ-All/Gas	Domestic Hot Water	MF	G	1.45	5.10	1.18		
	Faucet Aerator SF/CZ-All/Gas	Domestic Hot Water	SF	G	1.23	3.68	1.00		
	Faucet Aerator MH/CZ-All/Gas	Domestic Hot Water	MH	G	1.19	3.44	0.96		
	Faucet Aerator MF/CZ-All/Gas	Domestic Hot Water	MF	G	1.19	3.44	0.96		
	Faucet Aerator MF/CZ-All/Elec	Domestic Hot Water	MF	E				X	
New	Low Flow Shower Head SF/CZ-All/Elec	Domestic Hot Water	SF	E	1.07	2.97	0.87		
New	Microwave-replacing gas oven MF/CZAll	Appliances	MF	E	1.10	2.77	0.89		
New	Microwave-replacing gas oven SF/CZAll	Appliances	SF	G	1.10	2.77	0.89		
New	Microwave-replacing gas oven MH/CZAll	Appliances	MH	E	1.10	2.77	0.89		
	Water Heater Blanket SF/CZ-All/Elec	Domestic Hot Water	SF	E	0.98	2.59	0.80		
New	Low Flow Shower Head MH/CZ-All/Elec	Domestic Hot Water	MH	E	0.97	2.54	0.78		
	Torchiere - 55 W (D03-842 RES00AVTor55) w/CZ w/SF	Lighting	All	E	1.27	2.04	1.03		
New	Microwave-replacing electric oven SF/CZAll	Appliances	SF	E	1.25	1.95	1.03		
New	Microwave-replacing electric oven MH/CZAll	Appliances	MH	E	1.25	1.95	1.03		
New	Microwave-replacing electric oven MF/CZAll	Appliances	MF	E	1.25	1.95	1.03		
New	Low Flow Shower Head MH/CZ-All/Gas	Domestic Hot Water	MH	G	0.80	1.85	0.65		
	Water Heater Pipe Insulation MH/CZ-All/Elec	Domestic Hot Water	MH	E	0.75	1.74	0.61		
	CFL - MF/CZ-All	Lighting	MF	E	1.15	1.72	0.94		
	CFL - MH/CZ-All	Lighting	MH	E	1.05	1.46	0.86		
	CFL - SF/CZ-All	Lighting	SF	E	1.04	1.43	0.85		
New	Low Flow Shower Head SF/CZ-All/Gas	Domestic Hot Water	SF	G	0.65	1.39	0.53		
	Water Heater Pipe Insulation SF/CZ-All/Elec	Domestic Hot Water	SF	E	0.54	1.12	0.43		
	Water Heater Blanket MH/CZ-All/Gas	Domestic Hot Water	MH	G	0.54	1.09	0.44		
	Refrigerator SFCZ-All	Appliances	SF	E	0.83	1.04	0.67		
	Refrigerator MHCZ-All	Appliances	MH	E	0.82	1.03	0.67		
	LIHEAP - Appliance SF/CZ-All	Appliances	SF	E	0.77	0.94	0.62		
	LIHEAP - Appliance MH/CZ-All	Appliances	MH	E	0.77	0.93	0.62		
	Exterior Hard wired CFL fixtures MF/CZ-All	Lighting	MF	E	0.69	0.86	0.56		
	Water Heater Blanket SF/CZ-All/Gas	Domestic Hot Water	SF	G	0.43	0.82	0.34		
	Refrigerator MFCZ-All	Appliances	MF	E	0.69	0.82	0.56		
	Exterior Hard wired CFL fixtures SF/CZ-All	Lighting	SF	E	0.67	0.81	0.54		
	Exterior Hard wired CFL fixtures MH/CZ-All	Lighting	MH	E	0.65	0.78	0.52		
	Interior Hard wired CFL fixtures MF/CZ-All	Lighting	MF	E	0.66	0.75	0.54		
	LIHEAP - Appliance MF/CZ-All	Appliances	MF	E	0.64	0.74	0.52		
	Interior Hard wired CFL fixtures SF/CZ-All	Lighting	SF	E	0.63	0.71	0.51		
	Interior Hard wired CFL fixtures MH/CZ-All	Lighting	MH	E	0.61	0.68	0.50		
	Occupancy Sensor All/CZ-All	Lighting	All	E	0.51	0.53	0.41		
	Water Heater Blanket MF/CZ-All/Gas	Domestic Hot Water	MF	G	0.17	0.29	0.13	X	
New	Low Flow Shower Head MF/CZ-All/Gas	Domestic Hot Water	MF	G	0.14	0.24	0.11	X	
	Faucet Aerator MF/CZ-All/Elec	Domestic Hot Water	MF	E	0.00	0.00	0.00	X	
New	Low Flow Shower Head MF/CZ-All/Elec	Domestic Hot Water	MF	E	0.00	0.00	0.00	X	
	Water Heater Blanket MF/CZ-All/Elec	Domestic Hot Water	MF	E	0.00	0.00	0.00	X	
	Water Heater Pipe Insulation MF/CZ-All/Elec	Domestic Hot Water	MF	E	0.00	0.00	0.00	X	
	Water Heater R&R	Domestic Hot Water	ALL	E/G	0.00	0.00	0.00	X	
	*** Water heater R&R added back in owner occupied homes, consistent with D0811031								
New	Smart Power Strips	Miscellaneous	ALL	E	0.66	0.72	0.55		

Notes:

2012 Installations, impacts and budgets are post-Bridge Funding forecasts, for October 1 - December 31, 2012.

Add-back Measures: Measures that did not pass the 0.25 Cost Effectiveness Threshold. Existing measures were required to pass one of the two Low Income Cost Effectiveness Tests (either the Utility Cost Test or the Modified Participant Test). New proposed measures were required to pass both the Utility Cost Test and the Modified Participant Test. The TRC Test is included for informational purposes.

Add Back *A: Add-back measures requested by PG&E and included in PG&E's original budget application.

Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in PG&E's original budget application.

(END OF ATTACHMENT H)

H.2- Measures PG&E Non-Weather

Attachment I

Attachment I.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
Southern California Edison

Measure	Measure Group	Type of Home (SF, MH, MF)	Electric or Gas (E,G)	Climate Zone (Number)	Ratio of Benefits Over Costs			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
Envelope and Air Sealing	Enclosure	SF	E	6	0.02	0.02	0.02	X	
Envelope and Air Sealing	Enclosure	SF	E	8	0.02	0.02	0.02	X	
Envelope and Air Sealing	Enclosure	SF	E	9	0.13	0.13	0.12	X	
Envelope and Air Sealing	Enclosure	SF	E	10	0.05	0.04	0.04	X	
Envelope and Air Sealing	Enclosure	SF	E	13	0.16	0.16	0.14	X	
Envelope and Air Sealing	Enclosure	SF	E	14	0.04	0.04	0.03	X	
Envelope and Air Sealing	Enclosure	SF	E	15	0.41	0.40	0.33	X	
Envelope and Air Sealing	Enclosure	SF	E	16	0.00	0.00	0.00	X	
Envelope and Air Sealing	Enclosure	MF	E	6	0.02	0.02	0.01	X	
Envelope and Air Sealing	Enclosure	MF	E	8	0.02	0.02	0.02	X	
Envelope and Air Sealing	Enclosure	MF	E	9	0.05	0.05	0.04	X	
Envelope and Air Sealing	Enclosure	MF	E	10	0.04	0.04	0.04	X	
Envelope and Air Sealing	Enclosure	MF	E	13	0.15	0.15	0.14	X	
Envelope and Air Sealing	Enclosure	MF	E	14	0.05	0.05	0.05	X	
Envelope and Air Sealing	Enclosure	MF	E	15	0.05	0.05	0.04	X	
Envelope and Air Sealing	Enclosure	MF	E	16	-	-	-	X	
Envelope and Air Sealing	Enclosure	MH	E	6	0.02	0.02	0.02	X	
Envelope and Air Sealing	Enclosure	MH	E	8	0.25	0.25	0.22		
Envelope and Air Sealing	Enclosure	MH	E	9	0.18	0.18	0.16	X	
Envelope and Air Sealing	Enclosure	MH	E	10	0.18	0.18	0.16	X	
Envelope and Air Sealing	Enclosure	MH	E	13	0.33	0.32	0.27		
Envelope and Air Sealing	Enclosure	MH	E	14	0.16	0.16	0.15	X	
Envelope and Air Sealing	Enclosure	MH	E	15	0.18	0.18	0.16	X	
Envelope and Air Sealing	Enclosure	MH	E	16	0.11	0.11	0.10	X	
Room Air Conditioner	HVAC	SF	E	10	0.11	0.08	0.10	X	
Room Air Conditioner	HVAC	SF	E	13	0.09	0.07	0.09	X	
Room Air Conditioner	HVAC	SF	E	14	0.12	0.08	0.11	X	
Room Air Conditioner	HVAC	SF	E	15	0.24	0.18	0.21	X	
Room Air Conditioner	HVAC	MF	E	10	0.05	0.03	0.04	X	
Room Air Conditioner	HVAC	MF	E	13	0.06	0.04	0.06	X	
Room Air Conditioner	HVAC	MF	E	14	0.08	0.06	0.08	X	
Room Air Conditioner	HVAC	MF	E	15	0.17	0.12	0.15	X	
Room Air Conditioner	HVAC	MH	E	10	0.13	0.09	0.11	X	
Room Air Conditioner	HVAC	MH	E	13	0.18	0.13	0.16	X	
Room Air Conditioner	HVAC	MH	E	14	0.24	0.17	0.21	X	
Room Air Conditioner	HVAC	MH	E	15	0.49	0.36	0.39	X	
Central Air Conditioner	HVAC	SF	E	14	0.03	0.02	0.03	X	
Central Air Conditioner	HVAC	SF	E	15	0.06	0.05	0.06	X	
Central Air Conditioner	HVAC	MF	E	14	0.19	0.13	0.16	X	
Central Air Conditioner	HVAC	MF	E	15	0.35	0.25	0.28		
Central Air Conditioner	HVAC	MH	E	14	0.28	0.20	0.24		
Central Air Conditioner	HVAC	MH	E	15	0.37	0.27	0.30		
Heat Pump	HVAC	SF	E	14	0.26	0.24	0.21		
Heat Pump	HVAC	SF	E	15	0.21	0.18	0.17	X	
Heat Pump	HVAC	MF	E	14	0.27	0.26	0.22		
Heat Pump	HVAC	MF	E	15	0.23	0.21	0.19	X	
Heat Pump	HVAC	MH	E	14	0.39	0.34	0.31		
Heat Pump	HVAC	MH	E	15	0.38	0.33	0.30		
Evaporative Cooler	HVAC	SF	E	10	0.83	0.64	0.58		
Evaporative Cooler	HVAC	SF	E	13	0.86	0.66	0.60		
Evaporative Cooler	HVAC	SF	E	14	0.86	0.69	0.59		
Evaporative Cooler	HVAC	SF	E	15	2.63	1.46	1.19		
Evaporative Cooler	HVAC	SF	E	16	0.44	0.33	0.35		
Evaporative Cooler	HVAC	MH	E	10	0.82	0.60	0.58		
Evaporative Cooler	HVAC	MH	E	13	0.81	0.60	0.57		
Evaporative Cooler	HVAC	MH	E	14	0.82	0.66	0.57		
Evaporative Cooler	HVAC	MH	E	15	2.79	1.34	1.23		
Evaporative Cooler	HVAC	MH	E	16	0.61	0.42	0.46		
Central AC Service Maintenance Measure									X
Evaporative Coolers Maintenance									X

AddBack *A: Add-back measures requested by SCE and included in SCE's original budget application.
Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in SCE's original budget application.

I.1- Measures SCE Weather

Attachment I.2

Energy Savings Assistance Program Cost-Effectiveness - Non Weather Sensitive Measures
Southern California Edison

Measure	Measure Group	Type of Home	Electric or Gas	Ratio of Benefits Over Costs			Add Back *A	Add Back *B
				Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
		(SF,MH,MF)	(E,G)					
Refrigerators	Appliances	SF	E	1.07	1.16	0.67		
Refrigerators	Appliances	MF	E	0.84	0.91	0.56		
Refrigerators	Appliances	MH	E	1.06	1.16	0.66		
Domestic Hot Water Conservation	Domestic Hot Water	All	E	0.94	1.04	0.75		
Compact Fluorescent Lamps	Lighting	SF	E	0.44	0.42	0.97		
Compact Fluorescent Lamps	Lighting	MF	E	0.46	0.43	0.98		
Compact Fluorescent Lamps	Lighting	MH	E	0.47	0.44	0.99		
Hard Wired CFL Fixtures	Lighting	SF	E	0.72	0.13	0.65		
Hard Wired CFL Fixtures	Lighting	MF	E	0.84	0.87	0.65		
Hard Wired CFL Fixtures	Lighting	MH	E	0.84	0.87	0.65		
Torchieres	Lighting	SF	E	3.51	3.65	1.48		
Torchieres	Lighting	MF	E	3.51	3.65	1.48		
Torchieres	Lighting	MH	E	3.51	3.65	1.48		
Pool Pumps - Variable Speed	Miscellaneous	SF	E	1.32	1.19	0.78		
Smart Power Strips	Miscellaneous	All	E	0.41	0.45	0.49		

AddBack *A: Add-back measures requested by SCE and included in SCE's original budget application.
Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in SCE's original budget application.

(END OF ATTACHMENT I)

I.2- Measures SCE Non-Weather

Attachment J

Attachment J.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
San Diego Gas & Electric Company

Measure	Measure Group	Type of Home	Electric or Gas	Climate Zone	Ratio of Benefits Over Costs			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
		(SF, MH, MF)	(E,G)	(Number)					
AC Tuneup	Maintenance	MF	E	6	0.80	1.42	0.75		
AC Tuneup	Maintenance	MF	E	7	0.77	1.30	0.72		
AC Tuneup	Maintenance	MF	E	8	0.94	1.85	0.88		
AC Tuneup	Maintenance	MF	E	10	1.03	2.17	0.96		
AC Tuneup	Maintenance	MF	E	14	1.00	2.07	0.93		
AC Tuneup	Maintenance	MF	E	15	1.00	2.07	0.93		
AC Tuneup	Maintenance	MH	E	6	0.80	1.42	0.75		
AC Tuneup	Maintenance	MH	E	7	0.77	1.30	0.72		
AC Tuneup	Maintenance	MH	E	8	0.94	1.85	0.88		
AC Tuneup	Maintenance	MH	E	10	1.03	2.17	0.96		
AC Tuneup	Maintenance	MH	E	14	1.00	2.07	0.93		
AC Tuneup	Maintenance	MH	E	15	1.00	2.07	0.93		
AC Tuneup	Maintenance	SF	E	6	0.77	1.33	0.72		
AC Tuneup	Maintenance	SF	E	7	0.74	1.24	0.69		
AC Tuneup	Maintenance	SF	E	8	0.99	2.05	0.93		
AC Tuneup	Maintenance	SF	E	10	1.07	2.35	1.00		
AC Tuneup	Maintenance	SF	E	14	1.04	2.22	0.97		
AC Tuneup	Maintenance	SF	E	15	1.04	2.22	0.97		
Air sealing	Enclosure	MF	E	6	0.06	0.48	0.06		
Air sealing	Enclosure	MF	E	7	0.09	0.70	0.08		
Air sealing	Enclosure	MF	E	8	0.09	0.70	0.08		
Air sealing	Enclosure	MF	E	10	0.11	0.81	0.10		
Air sealing	Enclosure	MF	E	14	0.12	0.93	0.11		
Air sealing	Enclosure	MF	E	15	0.10	0.76	0.09		
Air sealing	Enclosure	MH	E	6	0.06	0.48	0.06		
Air sealing	Enclosure	MH	E	7	0.08	0.64	0.08		
Air sealing	Enclosure	MH	E	8	0.09	0.70	0.08		
Air sealing	Enclosure	MH	E	10	0.11	0.82	0.10		
Air sealing	Enclosure	MH	E	14	0.10	0.76	0.09		
Air sealing	Enclosure	MH	E	15	0.07	0.51	0.06		
Air sealing	Enclosure	SF	E	6	0.11	0.82	0.10		
Air sealing	Enclosure	SF	E	7	0.09	0.66	0.08		
Air sealing	Enclosure	SF	E	8	0.09	0.70	0.08		
Air sealing	Enclosure	SF	E	10	0.10	0.79	0.09		
Air sealing	Enclosure	SF	E	14	0.10	0.78	0.09		
Air sealing	Enclosure	SF	E	15	0.09	0.65	0.08		
Air sealing	Enclosure	MH	G	7	0.13	1.12	0.11		
Air sealing	Enclosure	MH	G	10	0.14	1.21	0.12		
Air sealing	Enclosure	MH	G	14	0.13	1.18	0.12		
Air sealing	Enclosure	MH	G	15	0.15	1.31	0.13		
Air sealing	Enclosure	SF	G	7	0.10	0.87	0.09		
Air sealing	Enclosure	SF	G	10	0.11	0.99	0.10		
Air sealing	Enclosure	SF	G	14	0.37	1.41	0.35		
Air sealing	Enclosure	SF	G	15	0.34	1.30	0.33		
Attic insulation	Enclosure	MF	E	6	0.12	0.33	0.11		
Attic insulation	Enclosure	MF	E	7	0.12	0.32	0.11		
Attic insulation	Enclosure	MF	E	8	0.12	0.33	0.11		
Attic insulation	Enclosure	MF	E	10	0.12	0.33	0.11		
Attic insulation	Enclosure	MF	E	14	0.12	0.33	0.11		
Attic insulation	Enclosure	MF	E	15	0.12	0.33	0.11		
Attic insulation	Enclosure	SF	E	6	0.14	0.37	0.12		
Attic insulation	Enclosure	SF	E	7	0.12	0.32	0.10		
Attic insulation	Enclosure	SF	E	8	0.12	0.33	0.11		
Attic insulation	Enclosure	SF	E	10	0.13	0.35	0.11		
Attic insulation	Enclosure	SF	E	14	0.12	0.33	0.11		
Attic insulation	Enclosure	SF	E	15	0.12	0.33	0.11		
Attic insulation	Enclosure	SF	G	7	0.13	0.37	0.11		
Attic insulation	Enclosure	SF	G	10	0.14	0.42	0.13		
Attic insulation	Enclosure	SF	G	14	0.08	0.39	0.06		
Attic insulation	Enclosure	SF	G	15	0.08	0.39	0.06		
Attic insulation	Enclosure	MF	G	7					X
Attic insulation	Enclosure	MF	G	10					X
Attic insulation	Enclosure	MF	G	14					X
Attic insulation	Enclosure	MF	G	15					X
Furnace Clean and Tune	Maintenance	MF	G	7	0.58	2.30	0.40		
Furnace Clean and Tune	Maintenance	MF	G	10	0.58	2.30	0.40		
Furnace Clean and Tune	Maintenance	MF	G	14	1.08	4.76	0.75		
Furnace Clean and Tune	Maintenance	MF	G	15	1.08	4.76	0.75		
Furnace Clean and Tune	Maintenance	MH	G	7	0.58	2.30	0.40		
Furnace Clean and Tune	Maintenance	MH	G	10	0.73	2.98	0.51		
Furnace Clean and Tune	Maintenance	MH	G	14	1.08	4.76	0.75		
Furnace Clean and Tune	Maintenance	MH	G	15	0.58	2.30	0.40		
Furnace Clean and Tune	Maintenance	SF	G	7	0.58	2.30	0.40		
Furnace Clean and Tune	Maintenance	SF	G	10	0.46	1.81	0.32		
Furnace Clean and Tune	Maintenance	SF	G	14	0.58	2.30	0.40		
Furnace Clean and Tune	Maintenance	SF	G	15	0.27	1.02	0.19		
Furnace Repair/Replacement	HVAC	MF	G	7	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	10	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	14	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	15	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	7	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	10	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	14	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	15	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	7	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	10	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	14	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	15	0.00	0.00	0.00	X	
Room AC	HVAC	MF	E	10	0.00	0.00	0.00	X	
Room AC	HVAC	MH	E	10	0.00	0.00	0.00	X	
Room AC	HVAC	SF	E	10	0.14	0.17	0.13	X	
Duct Test and Seal	HVAC	SF	G	7					X

J.1- Measures SDG&E Weather

Attachment J.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
San Diego Gas & Electric Company

Measure	Measure Group	Type of Home	Electric or Gas	Climate Zone	Ratio of Benefits Over Costs			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
Duct Test and Seal	HVAC	SF	G	10					X
Duct Test and Seal	HVAC	SF	G	14					X
Duct Test and Seal	HVAC	SF	G	15					X
Duct Test and Seal	HVAC	MH	G	7					X
Duct Test and Seal	HVAC	MH	G	10					X
Duct Test and Seal	HVAC	MH	G	14					X
Duct Test and Seal	HVAC	MH	G	15					X
Duct Test and Seal	HVAC	SF	E	7					X
Duct Test and Seal	HVAC	SF	E	8					X
Duct Test and Seal	HVAC	SF	E	10					X
Duct Test and Seal	HVAC	SF	E	14					X
Duct Test and Seal	HVAC	SF	E	15					X
Duct Test and Seal	HVAC	MH	E	7					X
Duct Test and Seal	HVAC	MH	E	8					X
Duct Test and Seal	HVAC	MH	E	10					X
Duct Test and Seal	HVAC	MH	E	14					X
Duct Test and Seal	HVAC	MH	E	15					X

*** Furnace R&R added back in owner occupied homes, consistent with D0811031
Add Back *A: Add-back measures requested by SDG&E and included in SDG&E's original budget application.
Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in SDG&E's original budget application.

Attachment J.2

Energy Savings Assistance Program Cost-Effectiveness - Non Weather Sensitive Measures
San Diego Gas & Electric Company

Measure	Measure Group	Type of Home	Electric or Gas	Ratio of Benefits Over Costs			Add Back *A	Add Back *B
		(SF,MH,MF)	(E,G)	Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
CFL Lighting	Lighting	All	E	0.94	1.20	0.79		
Faucet Aerators	Domestic Hot Water	MH	E	0.73	3.66	0.62		
Faucet Aerators	Domestic Hot Water	SF	E	0.76	3.78	0.64		
Faucet Aerators	Domestic Hot Water	MF	G	0.11	0.46	0.10		
Faucet Aerators	Domestic Hot Water	MH	G	0.60	2.61	0.52		
Faucet Aerators	Domestic Hot Water	SF	G	0.84	2.75	0.79		
HE Clothes Washers	Appliance	All	E	0.65	3.27	0.54		
HE Clothes Washers	Appliance	All	G	0.40	1.75	0.35		
Interior Hardwire CFL Fixtures	Lighting	MF	E	0.57	0.77	0.46		
Interior Hardwire CFL Fixtures	Lighting	MH	E	0.46	0.63	0.38		
Interior Hardwire CFL Fixtures	Lighting	SF	E	0.52	0.71	0.43		
LED Night Light	Lighting	All	E	1.05	1.28	0.92		
Low Flow Showerhead	Domestic Hot Water	MH	E	0.63	2.91	0.54		
Low Flow Showerhead	Domestic Hot Water	SF	E	0.68	3.00	0.60		
Low Flow Showerhead	Domestic Hot Water	MF	G	0.11	0.32	0.10		
Low Flow Showerhead	Domestic Hot Water	MH	G	0.56	1.97	0.50		
Low Flow Showerhead	Domestic Hot Water	SF	G	0.46	2.06	0.40		
Microwave	Appliance	All	E	1.33	1.68	1.10		
Exterior Hardwire CFL Fixtures	Lighting	SF	E	0.61	0.92	0.46		
Refrigerator	Appliance	MF	E	0.45	0.66	0.36		
Refrigerator	Appliance	MH	E	0.53	0.77	0.42		
Refrigerator	Appliance	SF	E	0.53	0.77	0.42		
Smart Strip	Miscellaneous	All	E	0.95	1.25	0.77		
FAU Standing Pilot Light Conversion	HVAC	All	G	0.78	0.89	0.67		
Thermostatic Shower Valve	Domestic Hot Water	All	E	1.24	1.57	1.09		
Thermostatic Shower Valve	Domestic Hot Water	All	G	0.87	0.91	0.78		
Torchiere Lamp	Lighting	All	E	0.91	1.06	0.81		
Water Heater Repair/Replacement	Domestic Hot Water	All	G	0.00	0.00	0.00	X	
Water Heater Blanket	Domestic Hot Water	MH	E	0.57	0.54	0.52		
Water Heater Blanket	Domestic Hot Water	SF	E	0.41	0.36	0.37		
Water Heater Blanket	Domestic Hot Water	MH	G	0.47	0.34	0.43		
Water Heater Blanket	Domestic Hot Water	SF	G	0.33	0.22	0.30		
Water Heater Pipe Insulation	Domestic Hot Water	MH	E	1.08	1.41	0.86		
Water Heater Pipe Insulation	Domestic Hot Water	SF	E	1.27	1.61	1.01		
Water Heater Pipe Insulation	Domestic Hot Water	MF	G	0.55	0.69	0.45		
Water Heater Pipe Insulation	Domestic Hot Water	MH	G	0.88	1.11	0.73		
Water Heater Pipe Insulation	Domestic Hot Water	SF	G	1.20	1.49	0.98		

Add Back *A: Add-back measures requested by SDG&E and included in SDG&E's original budget application.
Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in SDG&E's original budget application.

(END OF ATTACHMENT J)

J.2- Measures SDG&E Non-Weather

Attachment K

Attachment K.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
Southern California Gas Company

Measure*	Measure Group	Type of Home	Electric or Gas	Climate Zone**	Ratio of Benefits Over Costs***			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
		(SF, MH, MF)	(E,G)	(Number)					
Envelope and Air Sealing	Enclosure	MF	G	4	0.03	0.23	0.02	X	
Envelope and Air Sealing	Enclosure	MF	G	5	0.03	0.22	0.02	X	
Envelope and Air Sealing	Enclosure	MF	G	6	0.02	0.13	0.01	X	
Envelope and Air Sealing	Enclosure	MF	G	7	0.02	0.16	0.02	X	
Envelope and Air Sealing	Enclosure	MF	G	8	0.02	0.13	0.01	X	
Envelope and Air Sealing	Enclosure	MF	G	9	0.02	0.13	0.01	X	
Envelope and Air Sealing	Enclosure	MF	G	10	0.02	0.14	0.01	X	
Envelope and Air Sealing	Enclosure	MF	G	13	0.03	0.23	0.02	X	
Envelope and Air Sealing	Enclosure	MF	G	14	0.03	0.23	0.02	X	
Envelope and Air Sealing	Enclosure	MF	G	15	0.02	0.13	0.01	X	
Envelope and Air Sealing	Enclosure	MF	G	16	0.02	0.16	0.02	X	
Envelope and Air Sealing	Enclosure	MH	G	4	0.32	2.28	0.23		
Envelope and Air Sealing	Enclosure	MH	G	5	0.32	2.28	0.23		
Envelope and Air Sealing	Enclosure	MH	G	6	0.26	1.82	0.19		
Envelope and Air Sealing	Enclosure	MH	G	7	0.28	1.98	0.20		
Envelope and Air Sealing	Enclosure	MH	G	8	0.22	1.56	0.16		
Envelope and Air Sealing	Enclosure	MH	G	9	0.22	1.58	0.16		
Envelope and Air Sealing	Enclosure	MH	G	10	0.26	1.82	0.19		
Envelope and Air Sealing	Enclosure	MH	G	13	0.31	2.18	0.22		
Envelope and Air Sealing	Enclosure	MH	G	14	0.35	2.52	0.26		
Envelope and Air Sealing	Enclosure	MH	G	15	0.23	1.61	0.17		
Envelope and Air Sealing	Enclosure	MH	G	16	0.36	2.54	0.26		
Envelope and Air Sealing	Enclosure	SF	G	4	0.16	1.15	0.12		
Envelope and Air Sealing	Enclosure	SF	G	5	0.19	1.31	0.14		
Envelope and Air Sealing	Enclosure	SF	G	6	0.12	0.86	0.09		
Envelope and Air Sealing	Enclosure	SF	G	7	0.12	0.81	0.08		
Envelope and Air Sealing	Enclosure	SF	G	8	0.12	0.83	0.09		
Envelope and Air Sealing	Enclosure	SF	G	9	0.12	0.83	0.09		
Envelope and Air Sealing	Enclosure	SF	G	10	0.13	0.94	0.10		
Envelope and Air Sealing	Enclosure	SF	G	13	0.18	1.30	0.13		
Envelope and Air Sealing	Enclosure	SF	G	14	0.21	1.48	0.15		
Envelope and Air Sealing	Enclosure	SF	G	15	0.12	0.86	0.09		
Envelope and Air Sealing	Enclosure	SF	G	16	0.15	1.08	0.11		
Attic insulation	Enclosure	SF	G	5	0.18	0.33	0.13		
Attic insulation	Enclosure	SF	G	13	0.19	0.35	0.13		
Attic insulation	Enclosure	SF	G	14	0.20	0.36	0.14		
Attic insulation	Enclosure	MF	G	10					X
Attic insulation	Enclosure	MF	G	15					X
Attic insulation	Enclosure	MF	G	16					X
Attic insulation	Enclosure	MF	G	4					X
Attic insulation	Enclosure	MF	G	6					X
Attic insulation	Enclosure	MF	G	7					X
Attic insulation	Enclosure	MF	G	8					X
Attic insulation	Enclosure	MF	G	9					X
Attic insulation	Enclosure	SF	G	10					X
Attic insulation	Enclosure	SF	G	15					X
Attic insulation	Enclosure	SF	G	16					X
Attic insulation	Enclosure	SF	G	4					X
Attic insulation	Enclosure	SF	G	6					X
Attic insulation	Enclosure	SF	G	7					X
Attic insulation	Enclosure	SF	G	8					X
Attic insulation	Enclosure	SF	G	9					X
Duct Test and Seal	HVAC	MH	G	4					X
Duct Test and Seal	HVAC	MH	G	5					X
Duct Test and Seal	HVAC	MH	G	6					X
Duct Test and Seal	HVAC	MH	G	7					X
Duct Test and Seal	HVAC	MH	G	8					X
Duct Test and Seal	HVAC	MH	G	9					X
Duct Test and Seal	HVAC	MH	G	10					X
Duct Test and Seal	HVAC	MH	G	13					X
Duct Test and Seal	HVAC	MH	G	14					X
Duct Test and Seal	HVAC	MH	G	15					X
Duct Test and Seal	HVAC	MH	G	16					X
Duct Test and Seal	HVAC	SF	G	4					X
Duct Test and Seal	HVAC	SF	G	5					X
Duct Test and Seal	HVAC	SF	G	6					X
Duct Test and Seal	HVAC	SF	G	7					X
Duct Test and Seal	HVAC	SF	G	8					X
Duct Test and Seal	HVAC	SF	G	9					X
Duct Test and Seal	HVAC	SF	G	10					X
Duct Test and Seal	HVAC	SF	G	13					X
Duct Test and Seal	HVAC	SF	G	14					X
Duct Test and Seal	HVAC	SF	G	15					X
Duct Test and Seal	HVAC	SF	G	16					X
Furnace clean and tune	Maintenance	MF	G	4	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	5	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	6	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	7	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	8	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	9	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	10	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	13	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	14	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	15	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MF	G	16	0.44	1.58	0.30		
Furnace clean and tune	Maintenance	MH	G	4	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	5	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	6	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	7	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	8	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	9	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	10	0.51	1.83	0.35		
Furnace clean and tune	Maintenance	MH	G	13	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	14	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	MH	G	15	0.43	1.54	0.30		

Attachment K.1

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
Southern California Gas Company

Measure*	Measure Group	Type of Home	Electric or Gas	Climate Zone**	Ratio of Benefits Over Costs***			Add Back *A	Add Back *B
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
		(SF, MH, MF)	(E,G)	(Number)					
Furnace clean and tune	Maintenance	MH	G	16	0.43	1.54	0.30		
Furnace clean and tune	Maintenance	SF	G	4	0.43	1.51	0.29		
Furnace clean and tune	Maintenance	SF	G	5	0.43	1.51	0.29		
Furnace clean and tune	Maintenance	SF	G	6	0.43	1.51	0.29		
Furnace clean and tune	Maintenance	SF	G	7	0.43	1.51	0.29		
Furnace clean and tune	Maintenance	SF	G	8	0.31	1.07	0.21		
Furnace clean and tune	Maintenance	SF	G	9	0.28	0.96	0.19		
Furnace clean and tune	Maintenance	SF	G	10	0.36	1.27	0.25		
Furnace clean and tune	Maintenance	SF	G	13	0.43	1.51	0.29		
Furnace clean and tune	Maintenance	SF	G	14	0.43	1.51	0.29		
Furnace clean and tune	Maintenance	SF	G	15	0.23	0.80	0.16		
Furnace clean and tune	Maintenance	SF	G	16	0.43	1.51	0.29		
Furnace Repair/Replacement	HVAC	MF	G	4	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	5	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	6	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	7	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	8	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	9	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	10	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	13	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	14	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	15	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MF	G	16	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	4	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	5	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	6	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	7	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	8	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	9	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	10	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	13	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	14	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	15	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	MH	G	16	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	4	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	5	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	6	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	7	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	8	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	9	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	10	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	13	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	14	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	15	0.00	0.00	0.00	X	
Furnace Repair/Replacement	HVAC	SF	G	16	0.00	0.00	0.00	X	

*** Furnace R&R added back in owner occupied homes, consistent with D0811031

Add Back *A: Add-back measures requested by SCG and included in SCG's original budget application.
Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in SCG's original budget application.

Attachment K.2

Energy Savings Assistance Program Cost-Effectiveness - Non Weather Sensitive Measures
Southern California Gas Company

Measure*	Measure Group	Type of Home	Electric or Gas	Ratio of Benefits Over Costs***			Add Back *A	Add Back *B
		(SF,MH,MF)	(E,G)	Utility Cost Test	Modified Participant Test	Total Resource Cost Test		
FAU standing pilot light conversion	HVAC	All	G	0.63	0.71	0.43		
Faucet Aerator	Domestic Hot Water	MH	G	0.36	0.62	0.24		
Faucet Aerator	Domestic Hot Water	SF	G	0.42	0.73	0.28		
Faucet Aerator	Domestic Hot Water	MF	G					X
HE Clothes washer	Appliance	All	G	0.38	0.65	0.26		
Low Flow Shower Head	Domestic Hot Water	MF	G	0.20	0.38	0.14		
Low Flow Shower Head	Domestic Hot Water	MH	G	0.47	0.86	0.33		
Low Flow Shower Head	Domestic Hot Water	SF	G	0.56	1.02	0.40		
Thermostatic Shower Valve	Domestic Hot Water	All	G	0.67	0.81	0.47		
Water Heater Blanket	Domestic Hot Water	MH	G	0.28	0.34	0.20		
Water Heater Blanket	Domestic Hot Water	SF	G	0.33	0.41	0.24		
Water Heater Blanket	Domestic Hot Water	MF	G					X
Water Heater Pipe Insulation	Domestic Hot Water	MH	G	0.22	0.27	0.15		
Water Heater Pipe Insulation	Domestic Hot Water	SF	G	0.48	0.59	0.34		
Water Heater Pipe insulation	Domestic Hot Water	MF	G					X
Water heater repair and replace	Domestic Hot Water	MF	G	0.00	0.00	0.00	X	
Water heater repair and replace	Domestic Hot Water	MH	G	0.00	0.00	0.00	X	
Water heater repair and replace	Domestic Hot Water	SF	G	0.00	0.00	0.00	X	

*** Water heater R&R added back in owner occupied homes, consistent with D0811031

Add Back *A: Add-back measures requested by SCG and included in SCG's budget application.
Add Back *B: Add-back measures ordered through D.12-08-044 that were not included in SCG's budget application.

(END OF ATTACHMENT K)

Attachment L

Attachment L

Utilities	Study/Pilot Name	Budget Requested				Budget Authorized				Difference
		2012	2013	2014	Total Requested	2012	2013	2014	Total Authorized	
Joint Utility	**Energy Education Assessment Study**				**$300,000**				**$300,000**	**$0**
	PG&E Share	$30,000	$30,000	$30,000	$90,000	$30,000	$30,000	$30,000	$90,000	$0
	SCE Share	$30,000	$30,000	$30,000	$90,000	$30,000	$30,000	$30,000	$90,000	$0
	SoCalGas Share	$25,000	$25,000	$25,000	$75,000	$25,000	$25,000	$25,000	$75,000	$0
	SDG&E Share	$15,000	$15,000	$15,000	$45,000	$15,000	$15,000	$15,000	$45,000	$0
	Impact Evaluation of the 2012 ESA Program (Programmatic M&E)				**$600,000**				**$600,000**	**$0**
	PG&E Share	$60,000	$60,000	$60,000	$180,000	$60,000	$60,000	$60,000	$180,000	$0
	SCE Share	$60,000	$60,000	$60,000	$180,000	$60,000	$60,000	$60,000	$180,000	$0
	SoCalGas Share	$50,000	$50,000	$50,000	$150,000	$50,000	$50,000	$50,000	$150,000	$0
	SDG&E Share	$30,000	$30,000	$30,000	$90,000	$30,000	$30,000	$30,000	$90,000	$0
	Needs Assessment				**$0**				**$700,000**	**$700,000**
	PG&E Share	$0	$0	$0	$0	$70,000	$70,000	$70,000	$210,000	$210,000
	SCE Share	$0	$0	$0	$0	$70,000	$70,000	$70,000	$210,000	$210,000
	SoCalGas	$0	$0	$0	$0	$58,333	$58,333	$58,333	$175,000	$175,000
	SDG&E Share	$0	$0	$0	$0	$35,000	$35,000	$35,000	$105,000	$105,000
	CHANGES Pilot*				**$0**				**$2,160,000**	**$2,160,000**
	PG&E Share	$0	$0	$0	$0	$216,000	$216,000	$216,000	$648,000	$648,000
	SCE Share	$0	$0	$0	$0	$216,000	$216,000	$216,000	$648,000	$648,000
	SoCalGas	$0	$0	$0	$0	$180,000	$180,000	$180,000	$540,000	$540,000
	SDG&E Share	$0	$0	$0	$0	$108,000	$108,000	$108,000	$324,000	$324,000
	CHANGES Pilot Evaluation				**$0**				**$80,000**	**$80,000**
	PG&E Share	$0	$0	$0	$0	$24,000	$0	$0	$24,000	$24,000
	SCE Share	$0	$0	$0	$0	$24,000	$0	$0	$24,000	$24,000
	SoCalGas	$0	$0	$0	$0	$20,000	$0	$0	$20,000	$20,000
	SDG&E Share	$0	$0	$0	$0	$12,000	$0	$0	$12,000	$12,000
	Multifamily Study				**$0**				**$400,000**	**$400,000**
	PG&E Share	$0	$0	$0	$0	$40,000	$40,000	$40,000	$120,000	$120,000
	SCE Share	$0	$0	$0	$0	$40,000	$40,000	$40,000	$120,000	$120,000
	SoCalGas	$0	$0	$0	$0	$33,333	$33,333	$33,333	$100,000	$100,000
	SDG&E Share	$0	$0	$0	$0	$20,000	$20,000	$20,000	$60,000	$60,000

*CHANGES Pilot funding updated per D.12-12-011

(END OF ATTACHMENT L)

L- Pilots & Studies Budgets

Attachment M

Attachment M
PROPOSED & AUTHORIZED CARE BUDGETS PY 2012 - 2014

Pacific Gas and Electric (Proposed)

CARE Budget Categories	2011 Authorized	2012 Proposed	2013 Proposed	2014 Proposed	Total Cycle
Outreach	$ 5,900,000	$ 6,651,000	$ 5,818,000	$ 6,001,000	$ 18,470,000
Processing, Certification, Recertification	$ 2,000,000	$ 1,607,000	$ 1,667,000	$ 1,729,000	$ 5,003,000
Post Enrollment Verification (1)	$ -	$ 375,000	$ 388,000	$ 402,000	$ 1,165,000
IT Programming	$ 300,000	$ 751,000	$ 646,000	$ 651,000	$ 2,048,000
Cool Centers (2)	$ 450,000	$ 229,000	$ 236,000	$ 243,000	$ 708,000
Pilots	$ -	$ -	$ -	$ -	$ -
Measurement and Evaluation (3)	$ -	$ 45,000	$ 46,000	$ 48,000	$ 139,000
Regulatory Compliance	$ 115,000	$ 311,000	$ 316,000	$ 342,000	$ 969,000
General Administration	$ 550,000	$ 1,984,000	$ 2,042,000	$ 2,106,000	$ 6,132,000
CPUC Energy Division Staff (4)	$ 206,000	$ 128,000	$ 128,000	$ 128,000	$ 384,000
SUBTOTAL MANAGEMENT COSTS (5)	$ 9,521,000	$ 12,081,000	$ 11,287,000	$ 11,650,000	$ 35,018,000
Subsidies and Benefits (6)	$ 479,707,435	$ 660,220,000	$ 633,029,000	$ 605,950,000	$ 1,899,199,000
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 489,228,435	$ 672,301,000	$ 644,316,000	$ 617,600,000	$ 1,934,217,000

Pacific Gas and Electric (Authorized Phase II)

CARE Budget Categories	2012 Authorized	2013 Authorized	2014 Authorized	Total Cycle
Outreach	$ 6,317,667	$ 5,484,667	$ 5,667,667	$ 17,470,000
Processing, Certification, Recertification	$ 3,607,000	$ 3,667,000	$ 3,729,000	$ 11,003,000
Post Enrollment Verification (1)	$ 1,920,000	$ 1,920,000	$ 1,920,000	$ 5,760,000
IT Programming	$ 751,000	$ 646,000	$ 651,000	$ 2,048,000
Cool Centers (2)	$ 450,000	$ 127,846	$ 134,846	$ 712,691
Pilots	$ 216,000	$ 216,000	$ 216,000	$ 648,000
Measurement and Evaluation (3)	$ 69,000	$ 46,000	$ 48,000	$ 163,000
Regulatory Compliance	$ 311,000	$ 316,000	$ 342,000	$ 969,000
General Administration	$ 1,984,000	$ 2,042,000	$ 2,106,000	$ 6,132,000
CPUC Energy Division Staff (4)	$ 128,000	$ 128,000	$ 128,000	$ 384,000
SUBTOTAL MANAGEMENT COSTS (5)	$ 15,753,667	$ 14,593,512	$ 14,942,512	$ 45,289,691
Subsidies and Benefits(6)	$ 660,220,000	$ 633,029,000	$ 605,950,000	$ 1,899,199,000
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 675,973,667	$ 647,622,512	$ 620,892,512	$ 1,944,488,691

Southern California Edison (Proposed)

CARE Budget Categories	2011 Authorized	2012 Proposed	2013 Proposed	2014 Proposed	Total Cycle
Outreach	$ 2,230,000	$ 2,050,000	$ 2,100,000	$ 2,155,000	$ 6,305,000
Processing, Certification, Recertification	$ 900,000	$ 530,000	$ 559,000	$ 588,000	$ 1,677,000
Post Enrollment Verification		$ 700,000	$ 700,000	$ 700,000	$ 2,100,000
IT Programming	$ 1,000,000	$ 950,000	$ 950,000	$ 1,000,000	$ 2,900,000
Cool Centers	N/A	N/A	N/A	N/A	$ -
Pilots	$ -	$ -	$ -	$ -	$ -
Measurement and Evaluation	$ 56,000	$ 50,000	$ 50,000	$ 50,000	$ 150,000
Regulatory Compliance	$ 145,000	$ 251,000	$ 265,000	$ 264,000	$ 780,000
General Administration	$ 948,000	$ 680,000	$ 702,000	$ 725,000	$ 2,107,000
CPUC Energy Division Staff	$ 206,000	$ 140,000	$ 140,000	$ 140,000	$ 420,000
SUBTOTAL MANAGEMENT COSTS	$ 5,485,000	$ 5,351,000	$ 5,465,000	$ 5,622,000	$ 16,438,000
Subsidies and Benefits	$ 211,400,000	$ 330,200,000	$ 376,900,000	$ 416,800,000	$ 1,123,900,000
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 216,885,000	$ 335,551,000	$ 382,365,000	$ 422,422,000	$ 1,140,338,000
Cool Centers* Funded Separately	$ 792,000	$ 766,667	$ 766,667	$ 766,667	$ 2,300,000

Southern California Edison (Authorized Phase II)

CARE Budget Categories	2012 Authorized	2013 Authorized	2014 Authorized	Total Cycle
Outreach	$ 2,050,000	$ 2,558,000	$ 2,613,000	$ 7,221,000
Processing, Certification, Recertification	$ 530,000	$ 559,000	$ 588,000	$ 1,677,000
Post Enrollment Verification	$ 700,000	$ 989,460	$ 1,423,650	$ 3,113,110
IT Programming	$ 950,000	$ 950,000	$ 1,000,000	$ 2,900,000
Cool Centers	N/A	N/A	N/A	$ -
Pilots	$ 216,000	$ 216,000	$ 216,000	$ 648,000
Measurement and Evaluation	$ 74,000	$ 50,000	$ 50,000	$ 174,000
Regulatory Compliance	$ 251,000	$ 265,000	$ 264,000	$ 780,000
General Administration	$ 680,000	$ 702,000	$ 725,000	$ 2,107,000
CPUC Energy Division Staff	$ 140,000	$ 140,000	$ 140,000	$ 420,000
SUBTOTAL MANAGEMENT COSTS	$ 5,591,000	$ 6,429,460	$ 7,019,650	$ 19,040,110
Subsidies and Benefits	$ 330,200,000	$ 376,900,000	$ 416,800,000	$ 1,123,900,000
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 335,791,000	$ 383,329,460	$ 423,819,650	$ 1,142,940,110
Cool Centers* Funded Separately	$ 792,000	$ 105,084	$ 105,084	$ 1,002,167

San Diego Gas & Electric (Proposed)

CARE Budget Categories	2011 Authorized	2012 Proposed	2013 Proposed	2014 Proposed	Total Cycle
Outreach	$ 1,734,261	$ 2,069,410	$ 2,283,171	$ 2,300,352	$ 6,652,933
Processing, Certification, Recertification	$ 230,015	$ 209,305	$ 216,278	$ 223,296	$ 648,879
Post Enrollment Verification	$ -	$ 116,183	$ 118,626	$ 81,074	$ 315,883
IT Programming	$ 452,687	$ 560,195	$ 538,841	$ 544,887	$ 1,643,924
Cool Centers	$ 56,000	$ 57,456	$ 59,122	$ 60,778	$ 177,356
Pilots	$ -	$ -	$ -	$ -	$ -
Measurement and Evaluation	$ 4,326	$ 22,500	$ 22,500	$ 22,500	$ 67,500
Regulatory Compliance	$ 196,401	$ 154,917	$ 160,136	$ 165,362	$ 480,415
General Administration	$ 423,927	$ 492,559	$ 505,430	$ 518,406	$ 1,516,395
CPUC Energy Division Staff	$ 102,900	$ 49,535	$ 53,002	$ 56,712	$ 159,249
SUBTOTAL MANAGEMENT COSTS	$ 3,200,517	$ 3,732,059	$ 3,957,106	$ 3,973,368	$ 11,662,534
Subsidies and Benefits	$ 48,231,658	$ 73,857,825	$ 82,830,988	$ 83,614,933	$ 240,103,546
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 51,432,175	$ 77,589,684	$ 86,588,094	$ 87,588,301	$ 251,766,080

San Diego Gas & Electric (Authorized Phase II)

CARE Budget Categories	2012 Authorized	2013 Authorized	2014 Authorized	Total Cycle
Outreach	$ 2,069,410	$ 2,283,171	$ 2,300,352	$ 6,652,933
Processing, Certification, Recertification	$ 629,215	$ 636,188	$ 643,206	$ 1,908,609
Post Enrollment Verification	$ 403,200	$ 403,200	$ 403,200	$ 1,209,600
IT Programming	$ 1,245,390	$ 1,224,036	$ 1,230,082	$ 3,699,509
Cool Centers	$ 56,000	$ 34,329	$ 35,985	$ 126,314
Pilots	$ 108,000	$ 108,000	$ 108,000	$ 324,000
Measurement and Evaluation	$ 34,500	$ 22,500	$ 22,500	$ 79,500
Regulatory Compliance	$ 154,917	$ 160,136	$ 165,362	$ 480,415
General Administration	$ 492,559	$ 505,430	$ 518,406	$ 1,516,395
CPUC Energy Division Staff	$ 49,535	$ 53,002	$ 56,712	$ 159,249
SUBTOTAL MANAGEMENT COSTS	$ 5,242,725	$ 5,429,992	$ 5,483,806	$ 16,156,523
Subsidies and Benefits	$ 73,857,825	$ 82,830,988	$ 83,614,933	$ 240,103,546
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 79,100,350	$ 88,060,980	$ 89,098,739	$ 256,260,069

Southern California Gas (Proposed)

CARE Budget Categories	2011 Authorized	2012 Proposed	2013 Proposed	2014 Proposed	Total Cycle
Outreach	$ 3,785,932	$ 3,909,220	$ 3,845,745	$ 3,750,223	$ 11,505,188
Processing, Certification, Recertification	$ 1,248,928	$ 1,027,881	$ 1,004,923	$ 1,036,958	$ 3,069,762
Post Enrollment Verification	$ -	$ 322,188	$ 333,083	$ 343,978	$ 999,249
IT Programming	$ 522,554	$ 1,539,760	$ 1,334,767	$ 1,468,725	$ 4,343,252
Cool Centers	$ -	$ -	$ -	$ -	$ -
Pilots	$ -	$ -	$ -	$ -	$ -
Measurement and Evaluation	$ 17,192	$ 17,639	$ 18,150	$ 18,659	$ 54,448
Regulatory Compliance	$ 236,919	$ 227,412	$ 234,962	$ 242,507	$ 704,881
General Administration	$ 604,963	$ 887,541	$ 915,488	$ 943,426	$ 2,746,455
CPUC Energy Division Staff	$ 171,500	$ 60,000	$ 60,000	$ 60,000	$ 180,000
SUBTOTAL MANAGEMENT COSTS	$ 6,587,988	$ 7,991,640	$ 7,747,118	$ 7,864,477	$ 23,603,235
Subsidies and Benefits	$ 135,901,649	$ 128,773,189	$ 129,892,840	$ 131,142,177	$ 389,808,206
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 142,489,637	$ 136,764,829	$ 137,639,959	$ 139,006,654	$ 413,411,441

Southern California Gas (Authorized Phase II)

CARE Budget Categories	2012 Authorized	2013 Authorized	2014 Authorized	Total Cycle
Outreach	$ 3,909,220	$ 3,845,745	$ 3,750,223	$ 11,505,188
Processing, Certification, Recertification	$ 4,479,171	$ 4,456,213	$ 4,488,248	$ 13,423,632
Post Enrollment Verification	$ 3,744,000	$ 3,744,000	$ 3,744,000	$ 11,232,000
IT Programming	$ 3,204,520	$ 2,669,534	$ 2,937,450	$ 8,811,504
Cool Centers	$ -	$ -	$ -	$ -
Pilots	$ 180,000	$ 180,000	$ 180,000	$ 540,000
Measurement and Evaluation	$ 37,639	$ 18,150	$ 18,659	$ 74,448
Regulatory Compliance	$ 227,412	$ 234,962	$ 242,507	$ 704,881
General Administration	$ 887,541	$ 915,488	$ 943,426	$ 2,746,455
CPUC Energy Division Staff	$ 60,000	$ 60,000	$ 60,000	$ 180,000
SUBTOTAL MANAGEMENT COSTS	$ 16,729,502	$ 16,124,092	$ 16,364,513	$ 49,218,108
Subsidies and Benefits	$ 128,773,189	$ 129,892,840	$ 131,142,177	$ 389,808,206
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS	$ 145,502,691	$ 146,016,933	$ 147,506,690	$ 439,026,314

(END OF ATTACHMENT M)

M- CARE Budgets

Attachment N

Attachment N

	PGE				SCE				SDGE				SoCalGas				Total
Issue	2012	2013	2014	Cycle	2012	2013	2014	Cycle	2012	2013	2014	Cycle	2012	2013	2014	Cycle	
Proposed Management Costs	**$ 12,081,000.00**	**$ 11,287,000.00**	**$ 11,650,000.00**	**$ 35,018,000.00**	**$ 5,351,000.00**	**$ 5,465,000.00**	**$ 5,622,000.00**	**$ 16,438,000.00**	**$ 3,732,059.06**	**$ 3,957,106.34**	**$ 3,973,368.11**	**$ 11,662,533.52**	**$ 7,991,639.96**	**$ 7,747,118.48**	**$ 7,864,476.52**	**$ 23,603,234.96**	**$ 86,721,768.48**
D1208044 Adjustments																	
CARE Tier Rate Change Notification (PGE)	($333,333)	($333,333)	($333,333)	**($1,000,000)**	$0	$0	$0	$ -	$0	$0	$0	$ -	$0	$0	$0	**$0**	**$ (1,000,000.00)**
2% Monthly PEV Budget Requirement Increases	$1,545,000	$1,532,000	$1,518,000	**$4,595,000**	$2,756,000	$2,756,000	$2,756,000	**$8,268,000**	$287,017	$284,574	$322,126	**$893,717**	$3,421,812	$3,410,917	$3,400,022	**$10,232,751**	**$23,989,468**
Eligibility Proof at time of Recertification	$2,000,000	$2,000,000	$2,000,000	**$6,000,000**	$3,994,000	$3,994,000	$3,994,000	**$11,982,000**	$419,910	$419,910	$419,910	**$1,259,730**	$3,451,290	$3,451,290	$3,451,290	**$10,353,870**	**$29,595,600**
IT Program Costs				**$0**				**$0**	$685,195	$685,195	$685,195	**$2,055,585**	$1,664,760	$1,334,767	$1,468,725	**$4,468,252**	**$6,523,837**
Cooling Centers	$ 221,000	($108,154)	($108,154)	**$4,691**					($1,456)	($24,793)	($24,793)	**($51,042)**	$0	$0	$0	**$0**	**($46,351)**
CHANGES Pilot*	$216,000	$216,000	$216,000	**$648,000**	$216,000	$216,000	$216,000	**$648,000**	$108,000	$108,000	$108,000	**$324,000**	$180,000	$180,000	$180,000	**$540,000**	**$2,160,000**
CHANGES Pilot Evaluation**	$24,000	$0	$0	**$24,000**	$24,000	$0	$0	**$24,000**	$12,000	$0	$0	**$12,000**	$20,000	$0	$0	**$20,000**	**$80,000**
Phase II Adjustments																	
SCE- Adjustment to Outreach	$0	$0	$0	**$0**	$0	$458,000	$458,000	**$916,000**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	**$916,000**
SCE- Adjustment to Processing, Certification, Recertification	$0	$0	$0	**$0**	($3,994,000)	($3,994,000)	($3,994,000)	**($11,982,000)**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	**($11,982,000)**
SCE- Adjustment to PEV	$0	$0	$0	**$0**	($2,756,000)	($2,466,540)	($2,032,350)	**($7,254,890)**	$0	$0	$0	**$0**	$0	$0	$0	**$0**	**($7,254,890)**
Net Balance	**$3,672,667**	**$3,306,512**	**$3,292,512**	**$10,271,691**	**$240,000**	**$963,460**	**$1,397,650**	**$2,601,110**	**$1,510,666**	**$1,472,886**	**$1,510,438**	**$4,493,990**	**$8,737,862**	**$8,376,974**	**$8,500,037**	**$25,614,873**	**$ 42,981,663.89**
Approved Management Costs	$ 15,753,666.67	$ 14,593,512.33	$ 14,942,512.33	$ 45,289,691.33	$ 5,591,000.00	$ 6,428,460.00	$ 7,019,650.00	$ 19,039,110.00	$ 5,242,725.17	$ 5,429,992.22	$ 5,483,806.00	$ 16,156,523.39	$ 16,729,502.10	$ 16,124,092.37	$ 16,364,513.18	$ 49,218,107.65	$ 129,703,432.37
Proposed Subsidy BUDGET	$ 660,220,000.00	$ 633,029,000.00	$ 605,950,000.00	$ 1,899,199,000.00	$ 330,200,000.00	$ 376,900,000.00	$ 416,800,000.00	$ 1,123,900,000.00	$ 73,857,625.00	$ 82,630,988.00	$ 83,614,933.00	$ 240,103,546.00	$ 128,773,188.80	$ 129,892,840.29	$ 131,142,177.09	$ 389,808,206.17	$ 3,653,010,752.17
Total Approved CARE Budget	**$ 675,973,666.67**	**$ 647,622,512.33**	**$ 620,892,512.33**	**$ 1,944,488,691.33**	**$ 335,791,000.00**	**$ 383,328,460.00**	**$ 423,819,650.00**	**$ 1,142,939,110.00**	**$ 79,100,350.17**	**$ 88,060,980.22**	**$ 89,098,739.00**	**$ 256,260,069.39**	**$ 145,502,690.90**	**$ 146,016,932.66**	**$ 147,506,690.27**	**$ 439,026,313.82**	**$ 3,782,714,184.55**
SCE Cooling Center-*Funded Separately*					$25,333	($661,583)	($661,583)	**($1,297,833)**									**($1,297,833)**

*CHANGES Pilot funding updated per D.12-12-011

**CHANGES Pilot Evaluation corrected to reflect accurate authorization amount

(END OF ATTACHMENT N)

N- CARE Budget Impacts

Attachment O

Attachment O

	SDGE			
Additional Budget Request	**2012**	**2013**	**2014**	**Cycle**
SDGE- Upward Trend in HVAC- Furnace R&R costs	$2,228,074	$2,228,074	$2,228,074	$6,684,221
SDGE- Upward Trend in Domestic Hot Water - Water Heater R&R costs	$378,234	$378,234	$378,234	$1,134,703
SDGE- Upward Trend in Appliances - Clothes Washers costs	$418,926	$418,926	$418,926	$1,256,778
SDGE- Upward Trend in Enclosures costs	$1,210,915	$1,210,915	$1,210,915	$3,632,745
Total	**$4,238,161**	**$4,238,162**	**$4,238,163**	**$12,708,447**

	SoCalGas			
Additional Budget Request	**2012**	**2013**	**2014**	**Cycle**
SoCalGas- Upward trend in Appliances (Clothes Washer)	$1,999,876	$1,999,876	$1,999,876	$5,999,628
SoCalGas- Upward trend in Domestic Hot Water (Increased install rates and measure costs)	$6,220,780	$6,297,065	$6,373,186	$18,891,031
SoCalGas- Upward trend in Enclosures (Increased install rates and measure costs)	$188,252	$193,603	$198,932	$580,787
SoCalGas- Upward trend in HVAC (Increased install rates and measure costs)	$4,477,007	$4,547,747	$4,649,091	$13,673,845
SoCalGas- Upward trend in Maintenance (Increased install rates and measure costs)	$81,335	$83,824	$86,312	$251,471
SoCalGas- 2012-14 Borrowed Amount to fund 2011 activities				$3,411,020
Total	**$12,967,250**	**$13,122,115**	**$13,307,397**	**$42,807,782**

(END OF ATTACHMENT O)

O- Sempra Add'l Budget Requests

Attachment P-1



Southern California Gas Company

Management Audit of the Energy Savings Assistance Program

December 21, 2012

MACIAS CONSULTING GROUP

Contents

Executive Summary 3
Background 4
Scope 5
Objectives 5
Methodology 5
Principal Results 6
Recommendations 18
Appendix A 19

Executive Summary

Why the Examination was Conducted

On February 16, 2012, the Joint Assigned Commissioner and Administrative Law Judge before the California Public Utilities Commission (CPUC) ordered that Southern California Gas Company (SoCal Gas) retain an independent third party management auditing firm to examine the records of its Energy Savings Assistance Program (ESAP). ESAP provides no-cost weatherization services to low-income households that meet certain income guidelines. ESAP contracts with area vendors to provide these services. The CPUC order required SoCal Gas' management audit to determine what causes, precursors, or contributory factors affected and otherwise triggered a "sudden spike" in contractors' invoicing in November of 2011 which in turn led to SoCal Gas' decision to temporarily suspend ESAP activities during the month of December 2011[1].

What the Review Found

Our review found that the "sudden spike" in contractors' invoices projected by ESAP management did not actually materialize as predicted. The "sudden spike" projections were largely based on inaccurate contractor estimates and not actual data. While the program ultimately did go over budget by $23.9 million[2] for program year 2011, the number of actual November and December 2011 invoices paid by ESAP was significantly lower than projected. Although the program did experience sustained above-average invoice amounts in the last five months of program year 2011, actual expenditures that occurred in the months of November and December were not significantly higher than in other months in program year 2011.

We examined ESAP management practices during program year 2011 and determined there were various reasons why the "sudden spike" in contractor invoices did not materialize and why ESAP eventually exceeded its program budget. We found that ESAP management could have done more to monitor and control expenditures throughout the program year including aligning the aggregate maximum spending limits in its vendor agreements to the ESAP budget in program year 2011, ensuring its contract provisions did not limit management's ability to manage expenditures, and enforcing existing contract provisions that would result in timelier invoice data.

What We Recommend

This report contains five recommendations for ESAP management to strengthen its contractual control over program expenditures, more accurately project future program expenditures and ensure it has complete and timely information from its contractors.

[1] Joint Assigned Commissioner and Administrative Law Judge's Post Order to Show Cause Hearing Ruling: http://www.liob.org/docs/Joint%20ACR%20and%20ALJ%20Post%20Order%20to%20show%20cause%20hearing%20ruling%202-16-12.pdf

[2] Carryover funds from prior under-budget program years were used to cover $20.9 million of the $23.9 million in over-budget expenditures.

Background

The Energy Savings Assistance Program (ESAP) began as a direct assistance program provided by some investor-owned utilities (IOUs) in the 1980s. In 1990, the program was formally adopted by the Legislature within Public Utilities Code Section 2790. Formerly known as the Low Income Energy Efficiency Program or LIEE, ESAP provides no-cost weatherization services to low-income households that meet certain income guidelines. The program is managed by the California Public Utilities Commission (CPUC) and administered by four of the IOUs it regulates – Southern California Gas Company, Pacific Gas & Electric, San Diego Gas & Electric and Southern California Edison – and funded by the Public Purpose Program charge included in customers' bills. Services provided include attic insulation, energy efficient refrigerators, energy efficient furnaces, weather stripping, caulking, low-flow showerheads, water heater blankets, and door and building envelope repairs which reduce air infiltration. The program may also include installation of energy efficient appliances. According to the CPUC, ESAP reached over 300,000 low-income California homes in 2011.

At the Southern California Gas Company (SoCal Gas), ESAP is managed by the Customer Programs division within the Customer Programs and Assistance Department. The division uses an Internet-facing web application called Home Energy Assistance Tracking (HEAT), to manage ESAP activities. The HEAT information management system is used by both SoCal Gas employees and its external ESAP contractors to facilitate program outreach and installation. Contractor invoice data, once processed and approved by division management, is exported from HEAT to the SoCal Gas accounting system, SAP, for payment.

In Decision 08-11-031, the CPUC authorized SoCal Gas $204.7 million for the 2009-2011 energy efficiency program cycle. In the fall of 2011, SoCal Gas' Energy Savings Assistance Program (ESAP) management anticipated that the program may exceed its program budget for the 2011 program year and ultimately, for the 2009-2011 cycle. Management's initial projections in September 2011 estimated ESAP expenditures for the entire program year to be $101 million. This amount would exceed the program's combined authorized budget of $78.2 million and exhaust its carryover amount from prior under-budget program years of $20.9 million.

In November 2011, SoCalGas ESAP management officials attempted to gather additional information from their largest contractors and debated various ways to slow expenditures prior to the program year-end, including requesting estimates from all 44 of its authorized contractors for work to be completed but not yet entered into the HEAT system and for estimates of all other work to be completed before program year-end. These new projections, including contractors' estimates of work completed and projected work, were much higher than expected.

Ultimately, on November 28, 2011 SoCal Gas notified its contractors of its decision to suspend ESAP activity effective December 1, 2011 until 2012 when funds would become available. A day later, the East Los Angeles Community Union, the Association of California Community and Energy Services, and the Maravilla Foundation filed a Joint Emergency Motion to continue SoCal Gas' ESAP. The subsequent Order to Show Cause (OSC) hearing held on December 6, 2011 led to an order from the Administrative Law Judge that SoCal Gas retain an independent third party to examine its program year 2011 ESAP records, specifically those related to November 2011.

Scope

This review examined SoCal Gas' management policies and actions of the Energy Savings Assistance Program during program year 2011, particularly in the fall of 2011. We also verified a random selection of 10 percent of contractors' actual November 2011 invoices.

Objectives

The Administrative Law Judge's order for an independent management audit required that the audit identify and examine all of SoCal Gas' management actions relating to the ESAP activities with a focus on the period from July 1, 2011 to December 31, 2011, to determine what causes, precursors, or contributory factors affected and otherwise triggered the "sudden spike" in contractors' invoicing in November 2011.

Methodology

To address the objectives, we:

- Conducted interviews with key ESAP management staff.
- Reviewed all communication between SoCal Gas and the CPUC relevant to the audit time period.
- Reviewed SoCal Gas' ESAP vendor agreement in place in November 2011 and documented any changes to the vendor agreement that management enacted in 2012.
- Reviewed the most recent internal audit of SoCal Gas' ESAP.
- Documented enhancements to ESAP management practices, protocols and contract management tools that SoCal Gas has either implemented or plans to implement.
- Analyzed overall ESAP 2011 expenditures and homes treated data from SoCalGas' invoicing system and financial reporting system
- Reviewed a random sample of contractors' actual November 2011 invoices to determine if work was documented in compliance with SoCal Gas' vendor contracts and ESAP policies and procedures.
- Developed recommendations for how management practices and tools should be enhanced to prevent recurrence of any potential stoppage of future ESAP activities.

In accordance with the Administrative Law Judge's Order we will also complete on-site verification of a randomly selected sample of ten percent of the contractors' actual November 2011 invoices to ascertain whether ESAP measures were actually installed and whether such work was completed in compliance with ESAP rules and standards. The results of our on-site verification will be presented in a separate report.

We conducted this management audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This work was conducted between July and November 2012.

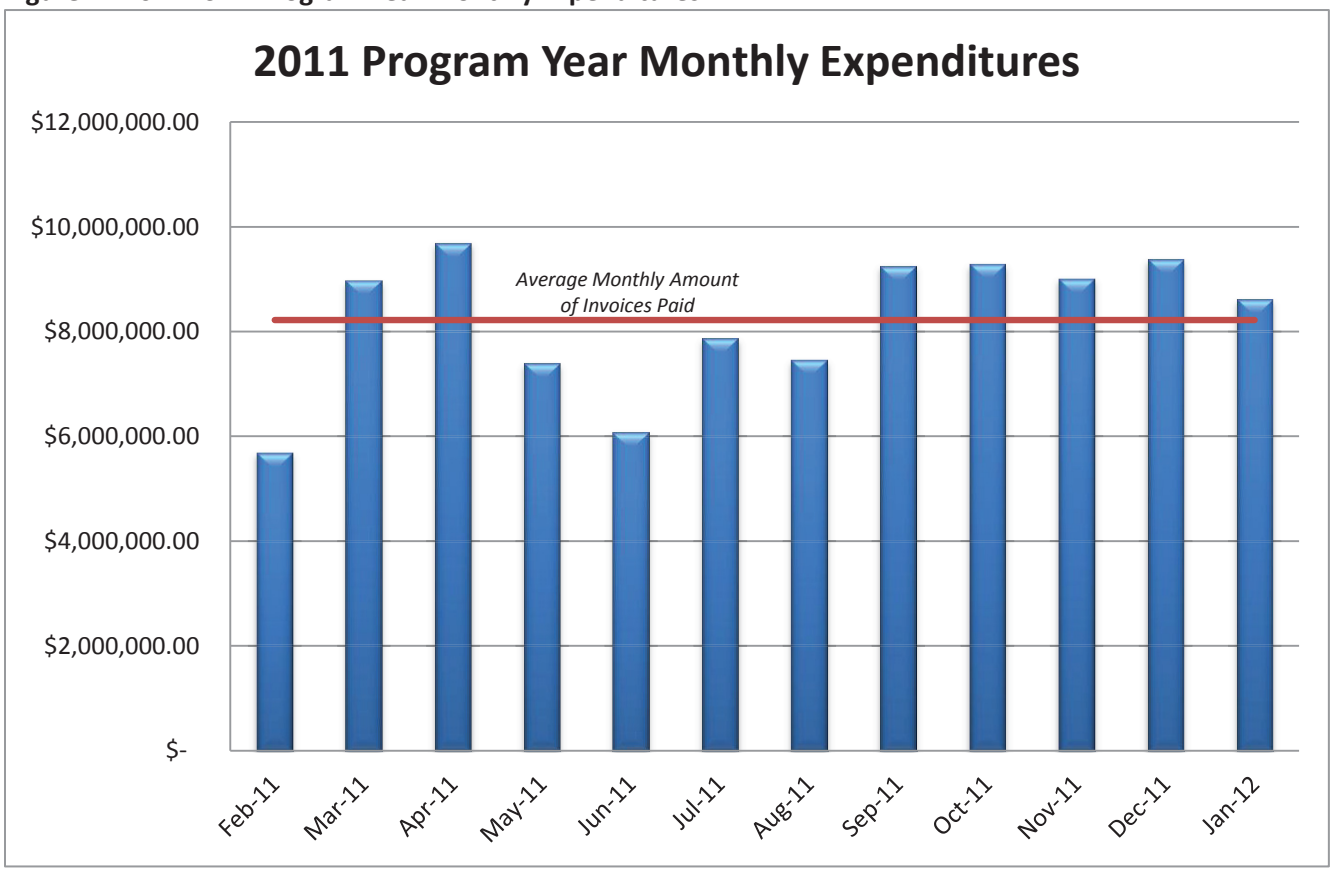
We have discussed the results with SoCalGas ESAP management and they had been provided a copy of the draft report. SoCal Gas ESAP management agrees with the recommendations in the report and had no further comments.

Principal Results

The Projected Sudden Spike in Contractor Invoices did not Materialize

Although ESAP management projected a spike to occur in November and December 2011, our review of actual ESAP expenditures found that a "sudden spike" did not actually occur. Figure 1 below illustrates SoCal Gas' actual monthly ESAP expenditures by the month invoices were processed for payment as well as the average monthly amount of invoices paid for program year 2011. We performed this analysis using data from SoCal Gas' accounting system. To gain assurance that the invoice data was reasonable, we verified supporting invoice documentation on a sample basis. The results of this verification are documented within the Appendix. As shown below, while the last five months of program year 2011 expenditures were all above the monthly average of $8.2 million, November and December 2011 were not the highest months of expenditures in program year 2011 and were on par with expenditures that occurred in the prior two months and earlier in the year.

Figure 1: 2011 ESAP Program Year Monthly Expenditures



Source: ESAP Program Year 2011 expenditure data from SoCal Gas' SAP system by date of export from the HEAT system for payment from February 2011 through January 2012 for work performed between January 2011 and December 2011. This chart is on a cash disbursement basis and therefore, does not include quarterly accrual amounts.

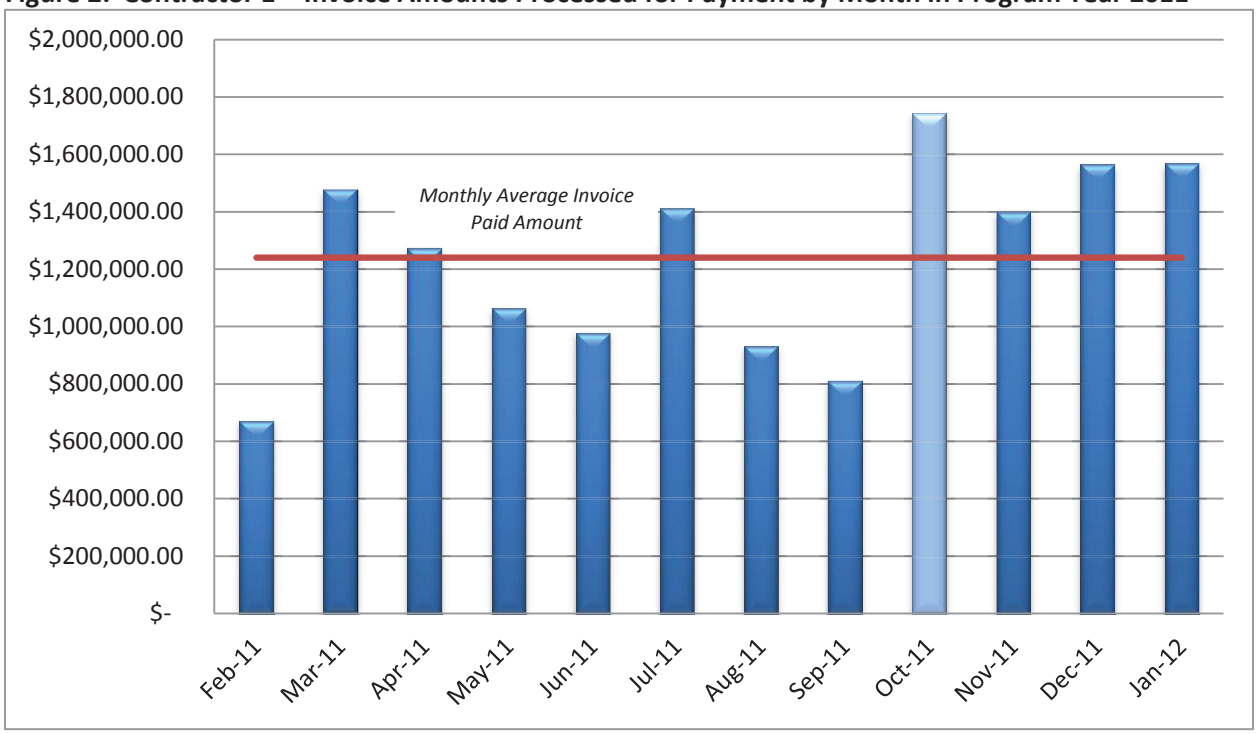
The Three Largest ESAP Contractors Also did not Experience a "Sudden Spike" in November and December 2011.

Three ESAP contractors accounted for over $40 million, or 41 percent, of the total ESAP expenditures in program year 2011. According to monthly expenditure data for program year 2011, these three contractors also did not experience a "sudden spike" at year-end. To maintain confidentiality of ESAP data, we have labeled these three contractors: Contractor 1, Contractor 2 and Contractor 3.

Contractor 1

Figure 2 below shows the amount of invoices processed for payment by month in program year 2011 for Contractor 1. While invoices paid at year-end were above average for this contractor, the highest month of expenditures actually occurred in October 2011.

Figure 2: Contractor 1 – Invoice Amounts Processed for Payment by Month in Program Year 2011

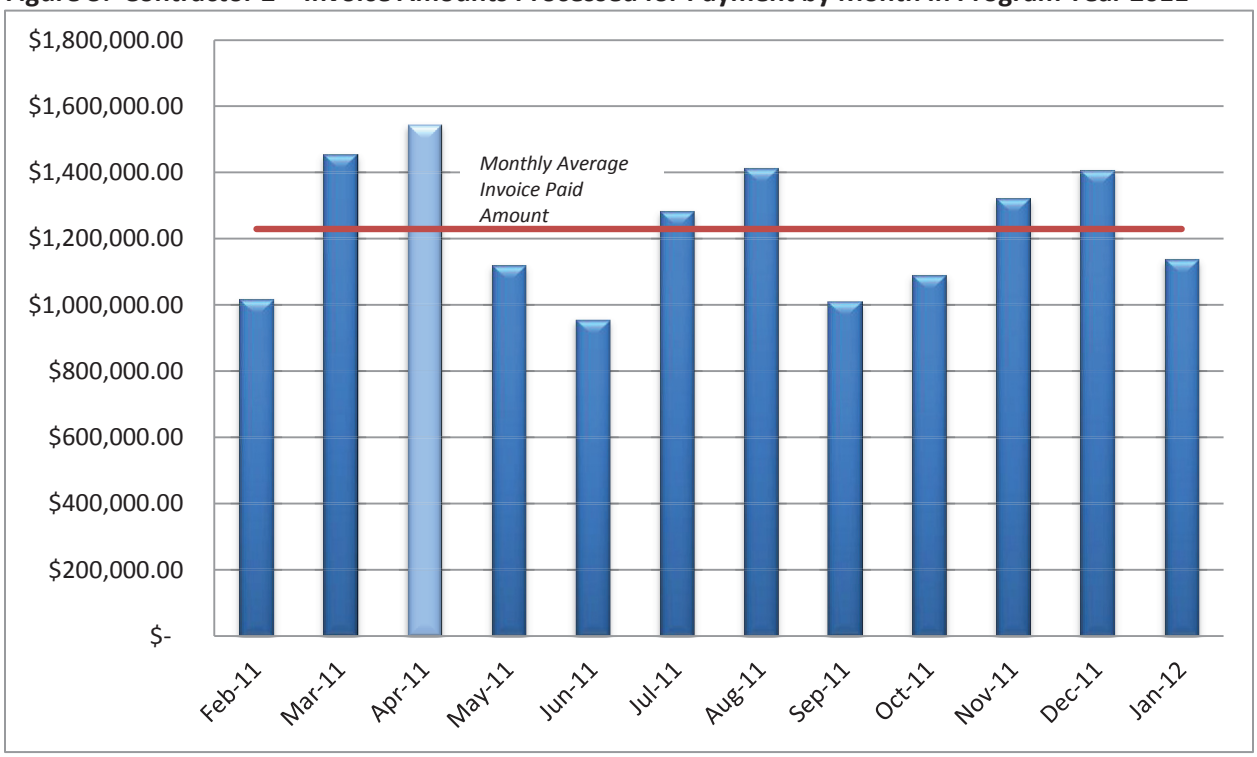


Source: ESAP Program Year 2011 expenditure data from SoCal Gas' SAP system by date of export from the HEAT system for payment from February 2011 through January 2012 for work performed between January 2011 and December 2011. This chart is on a cash disbursement basis and therefore, does not include quarterly accrual amounts.

Contractor 2

Figure 3 shows the amount of invoices processed for payment by month in program year 2011 for Contractor 2, who also did not experience a year-end spike in the amount of invoices processed for payment. The highest month of invoices processed for payment occurred in April 2011. In contrast, the amount of invoices processed for payment in the final month of the program year was below the annual average.

Figure 3: Contractor 2 – Invoice Amounts Processed for Payment by Month in Program Year 2011

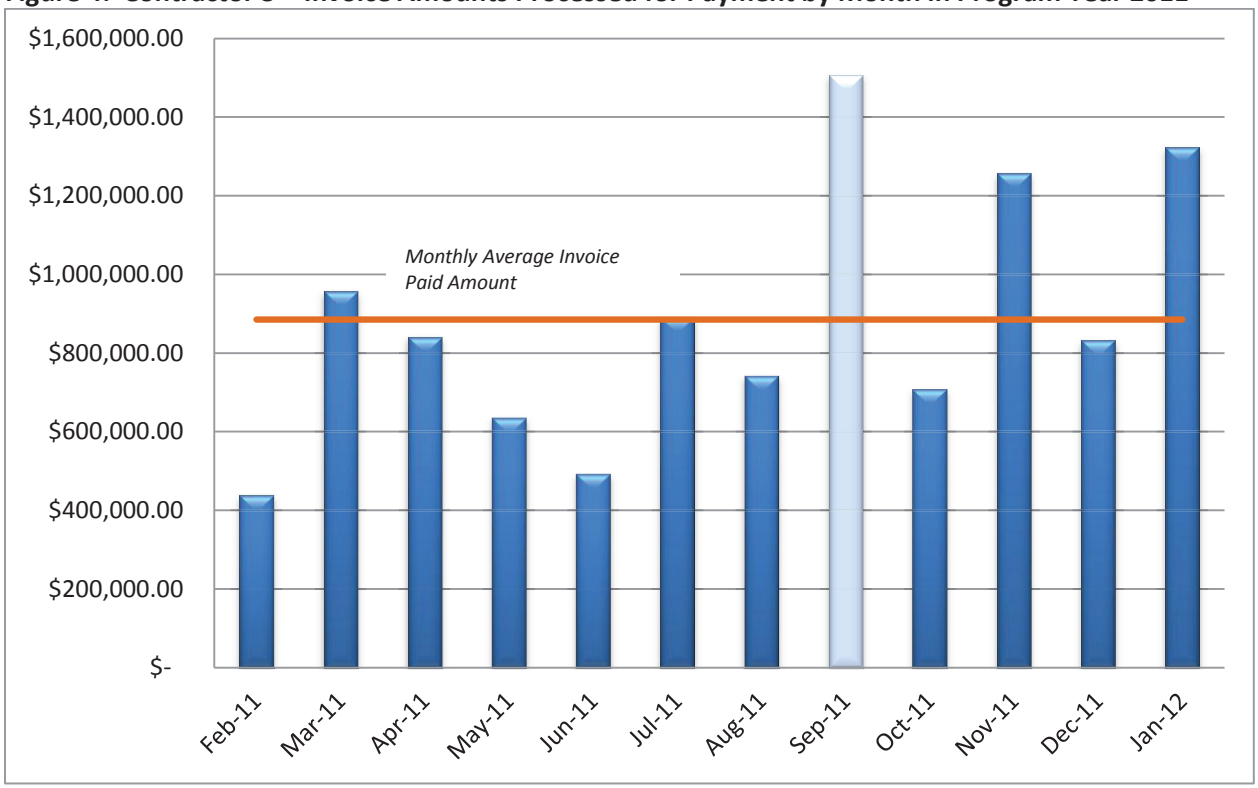


Source: ESAP Program Year 2011 expenditure data from SoCal Gas' SAP system by date of export from the HEAT system for payment from February 2011 through January 2012 for work performed between January 2011 and December 2011. This chart is on a cash disbursement basis and therefore, does not include quarterly accrual amounts.

Contractor 3

Figure 4 shows the amount of invoices processed for payment by month in program year 2011 for Contractor 3. While some months at year-end did have higher than average amounts of invoices processed for payment, Contractor 3 did not experience a sustained spike in the last quarter of program year 2011. The highest amount of invoices processed for payment for Contractor 3 actually occurred in September 2011.

Figure 4: Contractor 3 – Invoice Amounts Processed for Payment by Month in Program Year 2011



Source: ESAP Program Year 2011 expenditure data from SoCal Gas' SAP system by date of export from the HEAT system for payment from February 2011 through January 2012 for work performed between January 2011 and December 2011. This chart is on a cash disbursement basis and therefore, does not include quarterly accrual amounts.

While our review of monthly expenditure data for these three contractors did not find that any of them experienced a spike in invoices processed for payment at year-end, it did show that there was no cohesive pattern among the contractors in invoice amounts by month in program year 2011. The significant differences in invoice amounts from month-to-month could be due to the contractors' activity variations or lags in their entering of invoice data into the HEAT system for processing by SoCal Gas. During our verification of 10 percent of enrollments, discussed in the Appendix, we note that SoCal Gas did not enforce its contract provision requiring its contractors to submit invoices within 14 calendar days of work completion[3]. Enforcing this provision may aid ESAP management in receiving invoices timely and possibly smooth the pattern of invoice receipt during the program year rendering projections more reliable.

[3] This date corresponds to the date the Work Order work flow step is closed in the HEAT system.

ESAP Management Projections and Budgeting Predicted a Spike for Various Reasons

Effective program management depends, in part, on accurate and timely data that enables decision-makers to monitor program budgets and expenditures. However, ESAP relied on inaccurate data to formulate project projections for the 2011 program year..

In late November 2011, ESAP management tried to estimate its total commitment through program year-end. This estimate included:

- Invoices already submitted for payment,
- Contractor work already completed, but yet to be invoiced, and
- Contractor estimates of work yet to be completed and scheduled to be completed by year end.

This estimate totaled $32.6 million. In SoCal Gas' December 2011 response to the Joint Emergency Motion, this amount was detailed as:

- $22.4 million in total November 2011 program expenses, and
- $10.2 million in contractor projections for December 2011 planned work.

While the $22.4 million appeared to be a "sudden spike" in monthly expenditures, it did not represent just a one month estimate of invoices to be paid, but the total amount of invoices that were submitted for payment in November 2011, all of the expected invoices that were recorded as work in progress, and the contractors' estimates of work to be completed by calendar year-end. The additional $10.2 million that was included in the ESAP estimate was based on contractor estimates of their remaining planned program year 2011 work and was used by ESAP to estimate December 2011 projections.

Figure 5 compares the committed and projected amounts according to ESAP management on November 21, 2011 to the actual amount of invoices paid for the same period.

Figure 5: ESAP Projections versus Actual Expenditure Amounts

	ESAP Estimated Amounts as of November 21, 2011*	Actual Invoice Amount Paid	Difference
Invoices Submitted for Payment** November 1 - November 21, 2011	$6,780,080	$6,839,234	($59,154)
Invoices submitted and pending utility approval	11,402,262		
Contractors' estimate of work completed but not yet submitted to SoCal Gas	4,244,968		
Invoices Projected for November 22 - December 31, 2011	15,647,230	11,548,668	4,098,562
Total Invoices Submitted for Payment and Estimates of Invoices Awaiting Submission. **November 1 - December 31, 2011**	**$22,427,310**	**$18,387,902**	**$4,039,408**
Contractors estimates of additional anticipated work for program year 2011.	10,234,170	8,612,057	1,622,113
TOTAL Program Expenditures (processed and projections)	**$32,661,480**	**$26,999,959**	**$5,661,521**

*Program Committed/Projected amounts.
**Invoices submitted to SoCal Gas' financial management system (SAP) for payment

Source: Response of Southern California Gas Company to the Joint Emergency Motion to Continue the Low Income Energy Savings Assistance Program for Southern California Gas Company's Low Income Household filed on December 1, 2011, interviews with SoCal Gas ESAP management, SAP data and auditor analysis.

As described in Figure 5 above, $14.5 million, or 44 percent, ($4.24 Million and $10.23 million) of the total $32.6 million committed or projected amount as of November 21, 2011 was based on contractor-provided estimates, not historical expenditure data for the same time period within prior program years. By relying so heavily on contractor estimates, rather than historical or actual data, SoCal Gas' projections were found to be significantly higher than actual invoices amounts paid. Reviewing contractor performance from year-to-year and month-to-month may have alerted management to be more cautious in using the figures provided by contractors.

Limited Management Oversight Led to Budget Overruns

In program year 2011, SoCal Gas' ESAP actual versus budgeted expenditures, units treated and cost per unit treated were significantly different. SoCal Gas management stated in its response to the Joint Emergency Motion before the California Public Utilities Commission that shortage of program funding is fundamentally a result of the success of the program but that this success has also revealed new challenges that need to be addressed. Based on the program's ability to meet its goals, it has become increasingly successful in recent program years. At the same time, our review found that the gap

between budget and actual expenditures and units treated goals have been narrowing significantly from program year 2009-2011, shifting from underperformance to overspending. This trend has been due to multiple factors including the program treating more units than projected, increasing costs, and greater installation of certain measures.

SoCal Gas' ESAP Treated a Greater Number of Homes each Program Year

As shown in Figures 6 and 7, SoCal Gas' ESAP program treated a significantly greater number of homes in program year 2011 than in prior program years. Figure 6 below lists the percentage of each program year's units treated goals that SoCal Gas achieved. Between each program year, SoCal Gas made significant progress in meeting, and finally exceeding, its goal for units treated.

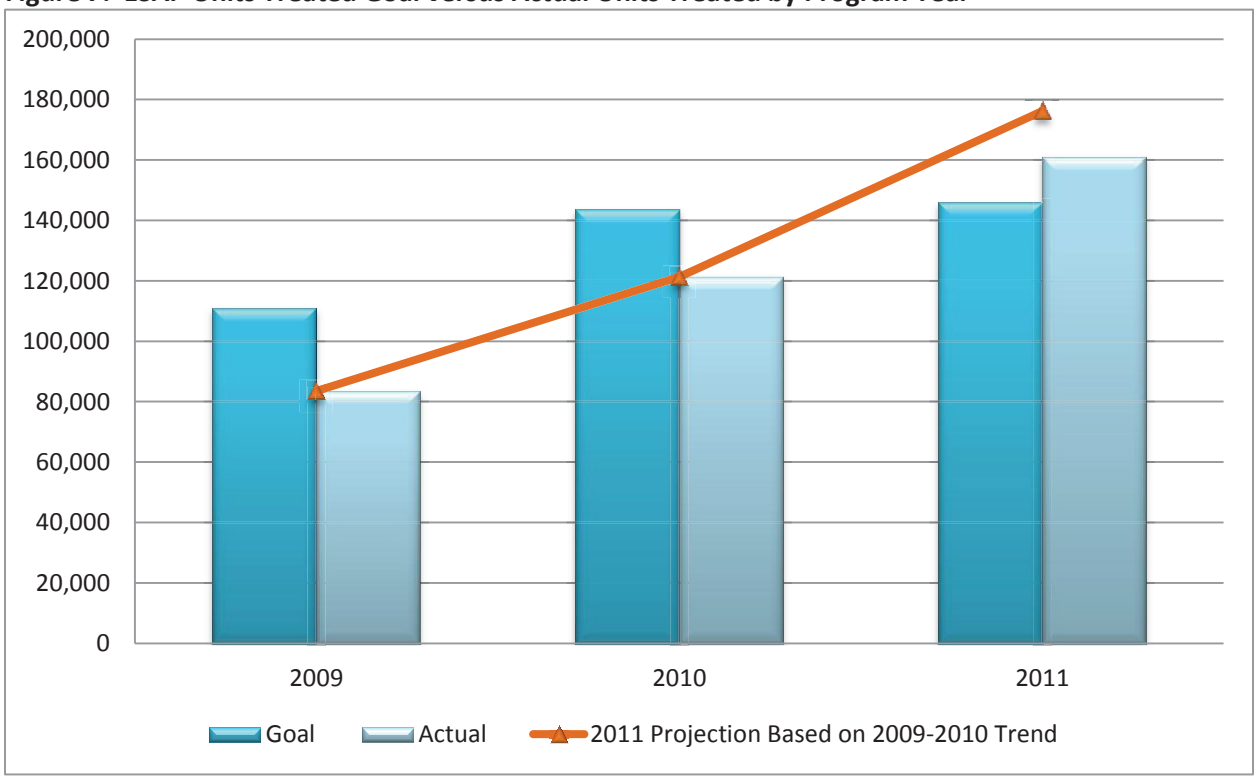
Figure 6: Percentage of Units Treated Goal Met by Program Year

Program Year	Percentage of Units Treated Goal Met
2009	75 percent of goal units treated
2010	85 percent of goal units treated
2011	110 percent of goal units treated

Source: Auditor Analysis of actual units treated and unit treated goals by program year as provided by SoCal Gas ESAP Management.

Figure 7 below compares the goal and actual units treated by program year. The orange line represents the number of units treated in program years 2009 and 2010 and the 2011 projections if the percentage of growth from program years 2009 to 2010 continued unchanged into program year 2011. This calculation could have alerted management earlier in program year 2011 that it would likely surpass its unit treated goals. Our review of reports used by management did not include any high-level unit, expenditure or cost per unit trend reports comparing program years.

Figure 7: ESAP Units Treated Goal versus Actual Units Treated by Program Year

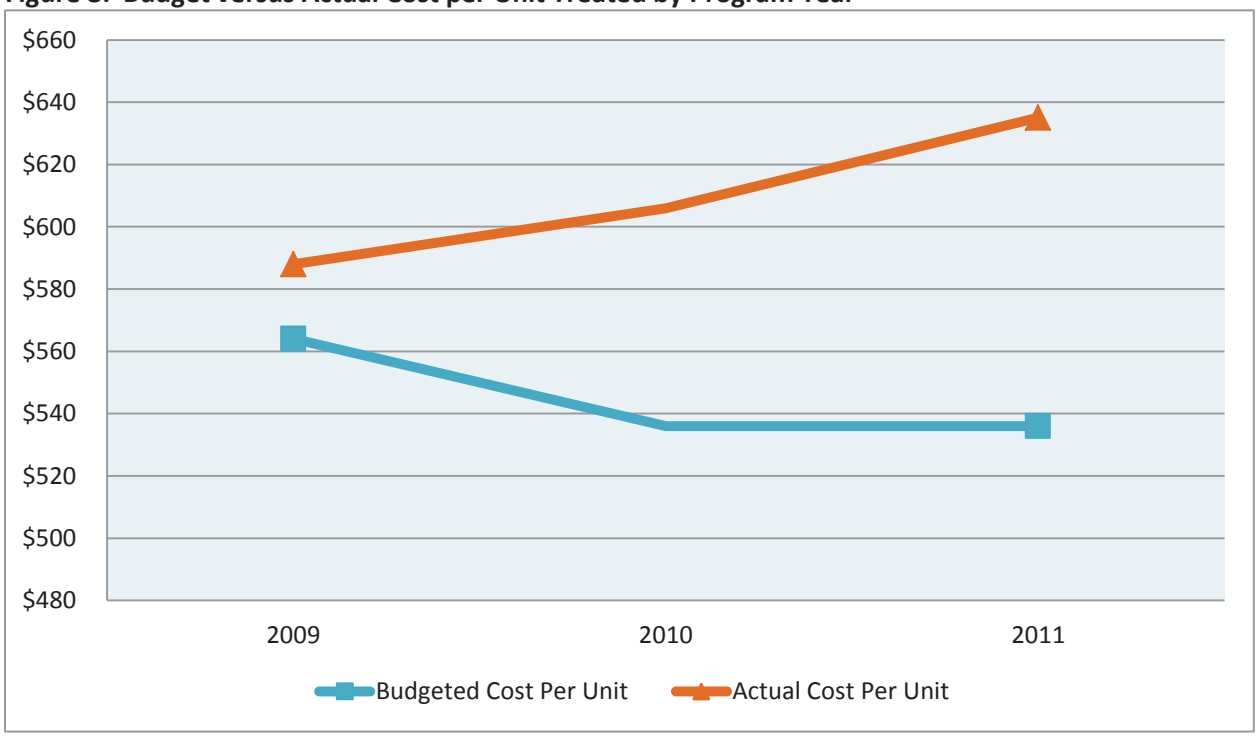


Source: Auditor Analysis of SoCal Gas' Annual Reports to the CPUC available publically on www.LIOB.org.

The Actual Cost per Unit Treated Has Consistently Increased

As shown in Figure 8 below, the actual cost per unit treated increased in two years from $588 to $635, but the amount budgeted, on a per unit basis, by ESAP declined to $536.

Figure 8: Budget versus Actual Cost per Unit Treated by Program Year



Source: Auditor Analysis of SoCal Gas' Annual Reports to the CPUC available publically on www.LIOB.org.

This increase in the cost per unit treated, combined with the increase in the number of units treated, contributed to the increased expenditures and the budget overrun in program year 2011. The table below, Figure 9, lists planned and actual installations by measure categories. Four categories of measures experienced a sharp increase in expenditures in program year 2011: envelope and air sealing measures, attic insulation, water heater conservation and water heater replacement measures. According to its response to the CPUC's Joint Emergency Motion, SoCal Gas did not anticipate the installation of weatherization measures such as weather stripping and outlet gaskets. For this reason, funding for the installation of these measures was not included in the program years 2009-2011 budget. Also shown in Figure 9 is that over twice the amount budgeted was expended on the installation of envelope and air sealing measures.

SoCal Gas' ESAP management also stated that many contractors expanded their capacity to install certain measures during program years 2009-2011 contributing to an increase in the installation of certain measures, such as attic insulation. During the same period the cost of attic insulation materials increased. Also shown in Figure 9, not only was the number of homes that received attic insulation higher than planned but the average cost per unit increased significantly. The results of this increase in homes treated and cost per unit is that SoCal Gas expended nearly twice as much as planned on attic insulation. Conversely, while the per unit cost of water heater replacement was lower, the total number

of units replaced was more than four times the number estimated resulting in expenditures for this measure being 466.4 percent more than budgeted.

Figure 9: Planned versus Completed & Expensed Installations in Program Year 2011

Measures with large increases in quantity installed and/or average unit cost.

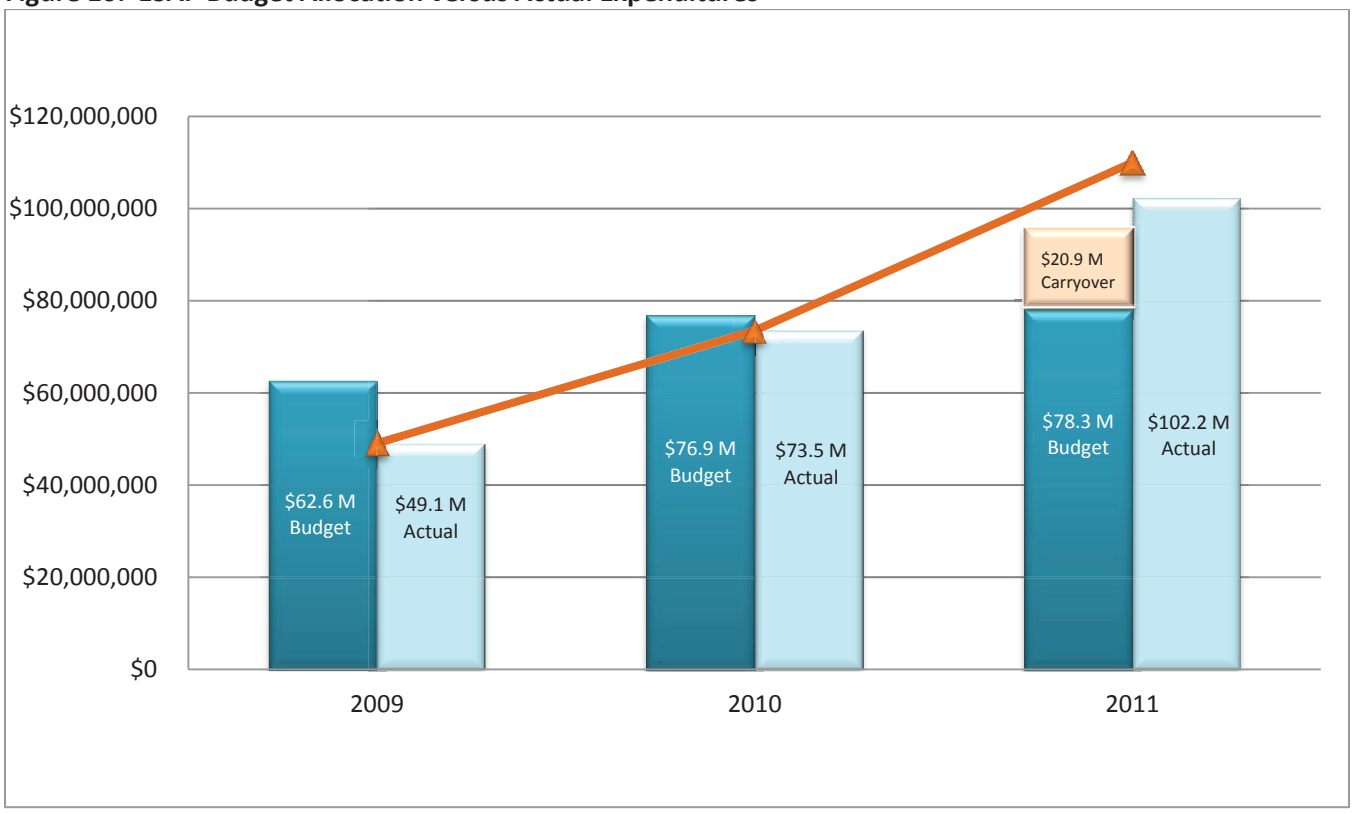
Measures	Program Year 2011 Planned Installations (Budgeted)				Program Year 2011 Completed & Expensed Installations (Actual)				% of 2011 Budget Spent
	Units	Quantity Installed	Expenses	Average Unit Cost	Units	Quantity Installed	Expenses	Average Unit Cost	
Heating Systems									
Furnaces	Each	12,281	$10,145,459	$826	Each	13,090	$14,100,070	$1,077	138.98%
Infiltration & Space Conditioning									
Envelope and Air Sealing Measures	Home	N/A	$13,902,073	N/A	Home	117,617	$32,778,417	$279	235.78%
Duct Sealing	Home	N/A	$3,010,642	N/A	Home	2,478	$3,149,034	$1,271	104.60%
Attic Insulation	Home	6,504	$4,823,236	$742	Home	7,836	$8,319,788	$1,062	172.49%
Water Heating Measures									
Water Heater Conservation Measures	Home	N/A	$3,899,530	N/A	Home	123,805	$6,185,768	$50	158.63%
Water Heater Replacement – Gas	Each	334	$356,118	$1,066	Each	1,635	$1,660,939	$1,016	466.40%
Tankless Water Heater – Gas	Each	17	$42,442	$2,540		0	$0	$0	0.00%
New Measures									
Forced Air Unit Standing Pilot Change Out	Each	15,808	$4,189,019	$265	Each	127	$39,418	$310	0.94%
Furnace Clean and Tune	Each	N/A	$5,800,598	N/A	Each	21,265	$1,301,979	$61	22.45%
High Efficiency Clothes Washer	Each	7,928	$3,963,911	$500	Each	2,119	$1,594,731	$753	40.23%
Total			**$50,133,027**				**$69,130,143**		**137.89%**
Homes Treated and Weatherized	**Planned Homes Weatherized**	**141,498**	**Planned Homes Treated**	**145,874**	**Actual Homes Weatherized**	**129,514**	**Actual Homes Treated**	**161,020**	**110.38%**

Source: Energy Programs Supervisor, SoCal Gas and SoCal Gas' Program Year 2011 Annual Report to the CPUC.

SoCal Gas' Energy Savings Assistance Program Expenditures Increased from 2009 to 2011

Actual expenditures between program years 2009 and 2010 increased by $24.4 million or 49.75 percent. According to SoCal Gas, the expenditures increased from program year 2009 through 2011 because the ESAP budget did not include certain weatherization measures that were installed, contractors increased their installation capabilities and the program itself was more successful due in part to new outreach efforts. We reviewed the total expenses, units treated and cost per unit treated trends in program years 2009 – 2011. Figure 10 shows the budged and actual ESAP expenditures by program year.

Figure 10: ESAP Budget Allocation versus Actual Expenditures



Source: Auditor Analysis of SoCal Gas' Annual Reports to the CPUC available publically on www.LIOB.org.

Prior to 2011, SoCal Gas' ESAP management relied on its contractors' previously consistent under-budget performance and did not effectively monitor the program's increasing expenditures. The increase in expenditures between 2009 and 2010 was not viewed by management as an indication that program year 2011 would most likely go over budget. For example, as shown by the orange line in Figure 10, if the rate of increase between program years 2009 and 2010 had remained unchanged, program year 2011 expenditures could have been projected by management to be $110 million and over the authorized budget amount of $78.2 million. While actual program year 2011 expenditures were ultimately $102.2 million, they remained significantly higher than the authorized budget amount and also exceeded the total budget amount. Foreseeing the possibility of exceeding its budget earlier in program year 2011 may have allowed SoCal Gas' ESAP management greater maneuverability to address these increased expenditures.

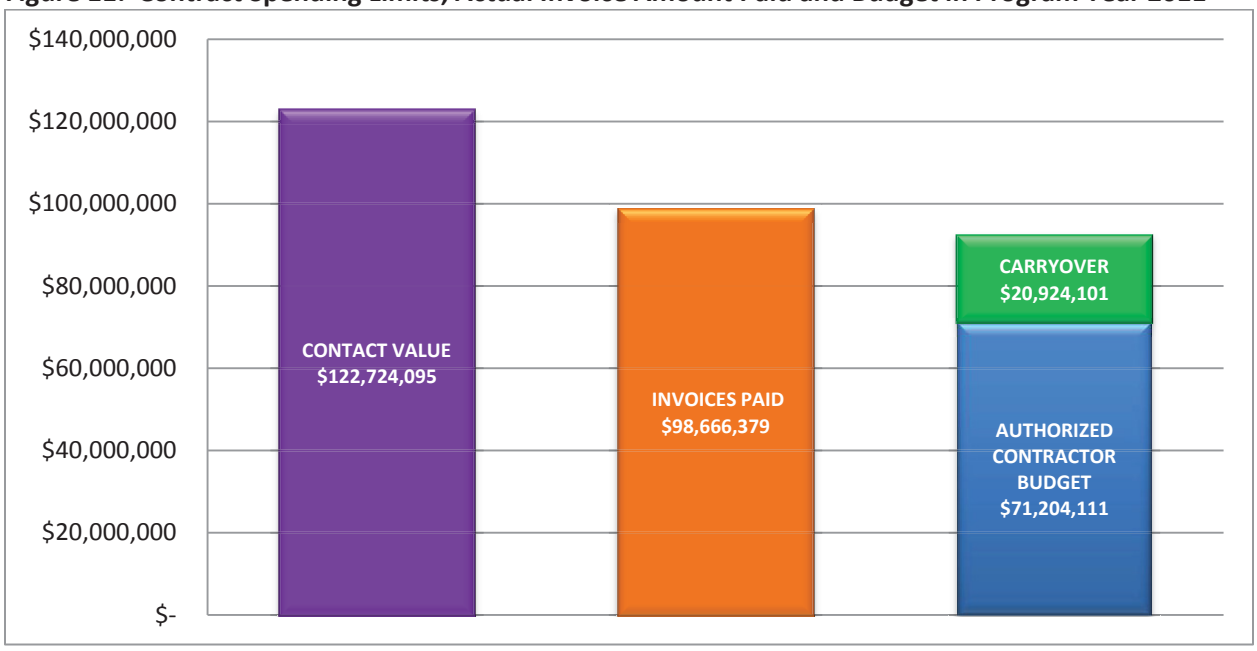
ESAP Contracting Weaknesses Contributed to Budget Overruns

SoCal Gas' ability to manage its contractors was limited by its vendor contracts. The vendor contracts effective in November 2011 had two major control weaknesses:

- Aggregate maximum spending limits within the vendor contracts were greater than the authorized Program Year 2011 budget; and
- SoCal Gas could not change the maximum spending limit or homes treated goals of a vendor's contract without vendor agreement.

As seen in Figure 11 below, the program year 2011 aggregate maximum spending limits within the vendor contracts were higher than the authorized budget and were also higher than the total budget which included carryover funds[4]. While the amount of actual invoices paid did not reach the contracts' maximum spending limit, it far exceeded the program's authorized budgeted amount and was also greater than the total budget amount. According to SoCal Gas' ESAP management, the original intention behind having higher maximum spending limits was to encourage its contractors to meet performance goals.

Figure 11: Contract Spending Limits, Actual Invoice Amount Paid and Budget in Program Year 2011



Source: ESAP Management, SAP data for Program Year 2011 and the program year 2011 ESAP Budget.

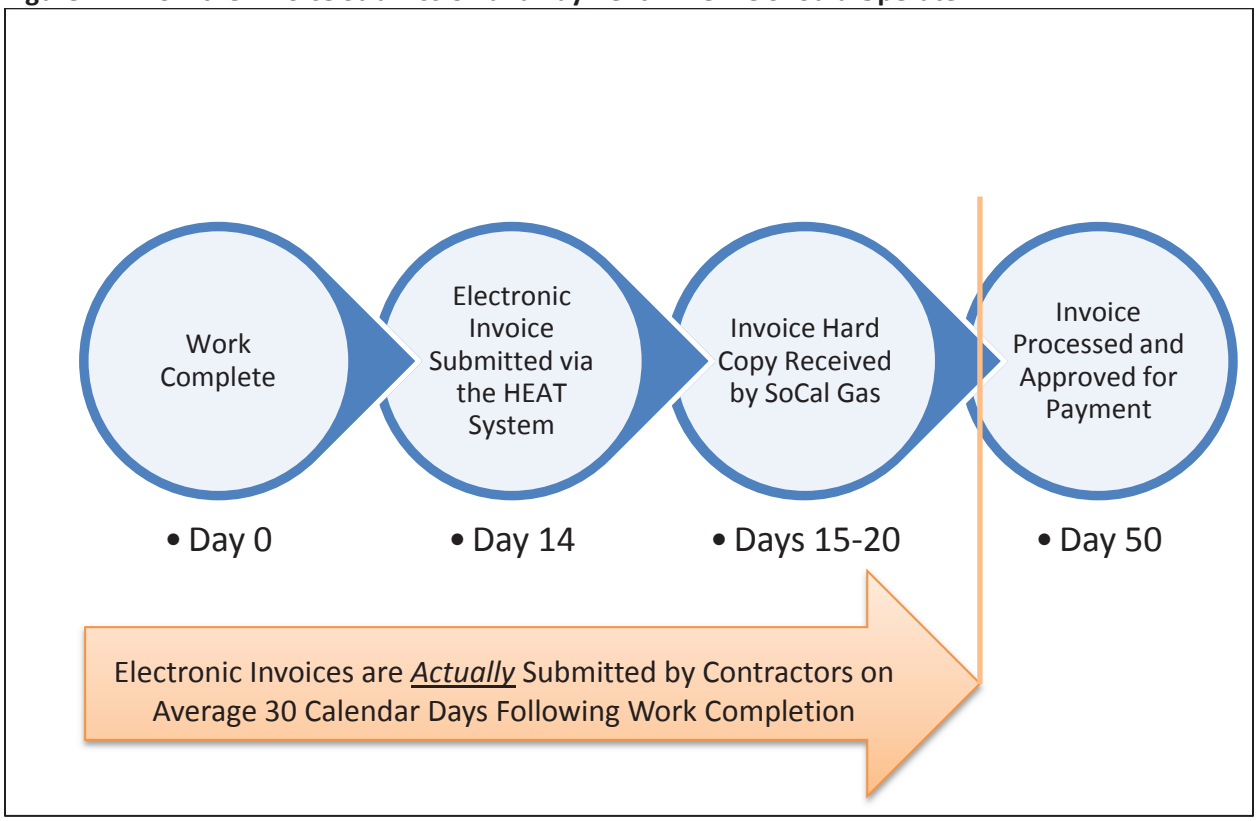
SoCal Gas' HEAT system uses the maximum spending limit amount for each vendor as a ceiling and will not allow a contractor to proceed with the submission of an invoice once the ceiling has been reached. This system control ensures that no contractor is paid for invoices beyond their agreed upon limit. Had the program year 2011 maximum spending limits aligned with the total budget, the HEAT system would have rejected invoices submitted above the total budgeted amount. By not having the maximum spending limits of its contractors align with the total budget SoCal Gas was negating one of its cost

[4] Carryover funds may be used to pay for expenses within the ESAP budget other than contractor invoices, such as training.

controls. Beginning in January 2012, SoCal Gas' ESAP management ensured its aggregate contractual maximum spending limits were in line with the authorized program budget.

Moreover, we found that SoCal Gas ESAP management has not enforced a provision of its contract requiring that vendors submit invoices within 14 calendar days of work completion[5]. Within our testing of a sample of invoices, as described in the Appendix, we found that contractors submit electronic invoices, on average, 30 calendar days following work completion and submit the hard copy invoices on average 5 calendar days following the electronic invoice submission, for a total of 35 days on average. Figure 12 below depicts the process timeline as it should operate based on contract provisions and SoCal Gas' ESAP policies. The time lag between work completion and invoice submission poses challenges for SoCal Gas because the utility is not fully aware when work will be invoiced by the contractor. According to SoCal Gas' Customer Programs Manager, not receiving invoices within this time frame does affect the company's ability to make accurate projections. Without timely submission of invoice data, SoCal Gas' projections are less data-driven and may therefore be less reliable.

Figure 12: How the Invoice Submission and Payment Timeline Should Operate



Source: Auditor analysis of SoCal Gas' November 2011 vendor contract provisions and invoice processing policies.

[5] This date corresponds to the date the Work Order work flow step is closed in the HEAT system.

Recommendations

1. ESAP management should ensure that the aggregate contractual maximum spending limits are within budget.

    a. SoCal Gas corrected this issue by aligning the ESAP contractors' maximum spending limits with the program year budget as of January 1, 2012.

2. ESAP management should change the contract language with vendors to allow SoCal Gas to unilaterally change unit treated goals and maximum spending limit during the program year.

    a. SoCal Gas changed the language in its vendor contracts and is now able to change maximum spending limits and unit treated goals, without vendor agreement, effective January 1, 2012.

3. ESAP management should enforce the contract provision requiring that vendors submit invoices within 14 calendar days of work completion to ensure the HEAT system's data is timely and accurate.

4. ESAP management should develop a projection methodology that is data-driven, produced on a frequent basis (quarterly), consistently evaluated for its accuracy and easily visible by ESAP management. This methodology should produce a high-level report that quickly shows managers overall program status, i.e. budget versus actual, commitments, and remainder of program year projections for the entire ESAP program. In addition to a high-level report, the projection methodology should produce detailed reports that alert management to changes in its quantities installed, average cost per unit and expenses by unit and by contractor.

    a. While SoCal Gas has much of this information available now, ESAP management has stated it is difficult and time consuming to analyze and compile it into useful reports. For this reason, staff is contracting with the original developer of the HEAT system to enhance its management tools.

5. ESAP management should provide Outreach Workers with clear training on how to complete the Income Worksheet and what supporting documentation is appropriate and necessary.

    a. SoCal Gas' ESAP Management recently reviewed the proper way to complete an Income Worksheet and income documentation requirements with its Outreach Workers through training.

Appendix

ESAP is Not Collecting all Required Customer Information

Of the 325 transactions we randomly selected for verification, we tested 301[6]. We compared hard copy invoice and enrollment documentation to data within the HEAT system and SAP accounting system, ESAP policies and procedures, and vendor contract language to ensure all documentation was complete, accurate and consistent with ESAP rules and standards. We also examined the group of transactions for any trends in ESAP activities to better understand the "sudden spike". The frequency of transactions by type is listed in Figure A1 below. The majority of our randomly selected transactions, 46.8 percent, were for work orders – the actual installation of an energy savings measure followed by enrollments and assessment transactions at 41.2 percent. Enrollment and assessment transactions include documentation from the Outreach Worker of the Customer Agreement, Assessment and Income Worksheet and associated documentation. A small percentage of the sample transactions were made up of inspections, combined enrollment, assessment and work order samples, and leads.

Figure A1: Breakdown of Enrollment Sample Items

Sample Type	Count	Percentage of Total
Work Orders (WO)	152	46.8%
Enrollments & Assessments (E&A)	134	41.2%
Removed NGAT Only[3]	24	7.4%
Inspections	10	3.1%
Both WO and E&A	4	1.2%
Lead	1	0.3%
Total	**325**	**100.00%**

During our testing of the 301 transactions, we initially found 19 exceptions. SoCal Gas staff was able to locate the appropriate documentation to support eight of those 19 initial exceptions, leaving 11 remaining exceptions. Figure A2 summarizes the 11 remaining exceptions by category.

[6] 24 enrollments were not tested because they were for Natural Gas Appliance Testing (NGAT). NGAT does not impact SoCal Gas' ESAP budget and therefore, is excluded from our testing.

Figure A2: Summary of Exceptions

Category	Preliminary Exceptions	Percentage of Category	Percentage of Enrollments Tested
E&A	9	6.7%	3.0%
WO	1	.7%	.3%
Both	1	4.2%	.3%
Inspection	0	n/a	n/a
Lead	0	n/a	n/a
Total	**11**		**3.6%**

The majority of the exceptions, nine in total, occurred within enrollment and assessment transactions. While this only represents a small amount of the overall 301 transactions at 3.0 percent, it does constitute a significant portion, greater than 5 percent, of the 134 enrollment and assessment transactions at 6.7 percent. These exceptions were primarily due to incomplete income documentation for customer enrollments.

SoCal Gas' ESAP vendor contracts require the completion of an Income Worksheet for all household members of working age and in some cases, supporting documentation of income or enrollment in another means-tested program, such as Medi-Cal. Without proper income documentation, outreach workers could enroll some households into ESAP that may not actually be eligible. SoCal Gas management became aware of this issue following a recently issued internal audit. In response to the audit in early 2012, SoCal Gas's ESAP management stated it would reinforce the importance of accuracy and completeness of the ESAP enrollment process with contractors reminding them that they will be held accountable for ensuring accuracy via the imposition of a processing fee.

(END OF ATTACHMENT P-1)

Attachment P-2



Southern California Gas Company

Management Audit of the Energy Savings Assistance Program

On-Site Verification Appointment Results

MACIAS CONSULTING GROUP

February 25, 2013

Contents

Executive Summary 3
Why the Examination was Conducted 3
What the Review Found 3
What We Recommend 3
Background 4
Scope 5
Objectives 5
Principal Results 7
Each Measure Inspected was Properly Installed and Agreed with Invoice Data 7
November 2011 Invoices Accurately Reflect Work Completed by ESAP Contractors 7
Appendix A: Detailed Methodology: Sampling, Scheduling and Performing On-site Verifications 8
Sampling Methodology 8
Scheduling Methodology 9
Performing the On-Site Verifications 12

Executive Summary

Why the Examination was Conducted

On February 16, 2012, the Joint Assigned Commissioner and Administrative Law Judge before the California Public Utilities Commission (CPUC) ordered that Southern California Gas Company (SoCal Gas) retain an independent third party management auditing firm to examine the records of its Energy Savings Assistance Program (ESAP)[1]. ESAP provides no-cost weatherization services to low-income households that meet certain income guidelines. ESAP contracts with area vendors to provide these services. The CPUC order required SoCal Gas' management audit to include random verification of ten percent of the contractors' actual November 2011 invoices.

What the Review Found

We found no exceptions in any of the on-site verifications we performed. Each measure inspected was installed in accordance with California Weatherization Installation Standards, installed in the quantity indicated on the invoice and appeared to have been installed on the installation date indicated on the invoice.

The results of this review, combined with the work from our first report, dated December 21, 2012, detailing the causes, precursors, or contributory factors for the perceived "sudden spike" in ESAP contractor invoices in November 2011, leads us to conclude that the invoices submitted by ESAP contractors to SoCal Gas for payment accurately reflected the work they performed.

What We Recommend

As there were no exceptions, this report contains no recommendations.

[1] Joint Assigned Commissioner and Administrative Law Judge's Post Order to Show Cause Hearing Ruling: http://www.liob.org/docs/Joint%20ACR%20and%20ALJ%20Post%20Order%20to%20show%20cause%20hearing%20ruling%202-16-12.pdf

Background

The Energy Savings Assistance Program (ESAP) began as a direct assistance program provided by some investor-owned utilities (IOUs) in the 1980s. In 1990, the program was formally adopted by the Legislature within Public Utilities Code Section 2790. Formerly known as the Low Income Energy Efficiency Program or LIEE, ESAP provides no-cost weatherization services to low-income households that meet certain income guidelines. The program is managed by the California Public Utilities Commission (CPUC) and administered by four of the IOUs it regulates – Southern California Gas Company, Pacific Gas & Electric, San Diego Gas & Electric and Southern California Edison – and funded by the Public Purpose Program charge included in customers' bills. Services provided include attic insulation, energy efficient refrigerators, energy efficient furnaces, weather stripping, caulking, low-flow showerheads, water heater blankets, and door and building envelope repairs which reduce air infiltration. The program may also include installation of energy efficient appliances. According to the CPUC, ESAP reached over 300,000 low-income California homes in 2011.

At the Southern California Gas Company (SoCal Gas), ESAP is managed by the Customer Programs division within the Customer Programs and Assistance Department. The division uses an Internet-facing web application called Home Energy Assistance Tracking (HEAT), to manage ESAP activities. The HEAT information management system is used by both SoCal Gas employees and its external ESAP contractors to facilitate program outreach and installation. Contractor invoice data, once processed and approved by division management, is exported from HEAT to the SoCal Gas accounting system, SAP, for payment.

In Decision 08-11-031, the CPUC authorized SoCal Gas $204.7 million for the 2009-2011 energy efficiency program cycle. In the fall of 2011, SoCal Gas' Energy Savings Assistance Program (ESAP) management anticipated that the program may exceed its program budget for the 2011 program year and ultimately, for the 2009-2011 cycle. Management's initial projections in September 2011 estimated ESAP expenditures for the entire program year to be $101 million. This amount would exceed the program's combined authorized budget of $78.2 million and exhaust its carryover amount from prior under-budget program years of $20.9 million.

In November 2011, SoCalGas ESAP management officials attempted to gather additional information from their largest contractors and debated various ways to slow expenditures prior to the program year-end, including requesting estimates from all 44 of its authorized contractors for work to be completed but not yet entered into the HEAT system and for estimates of all other work to be completed before program year-end. These new projections, including contractors' estimates of work completed and projected work, were much higher than expected.

Ultimately, on November 28, 2011 SoCal Gas notified its contractors of its decision to suspend ESAP activity effective December 1, 2011 until 2012 when funds would become available. A day later, the East Los Angeles Community Union, the Association of California Community and Energy Services, and the Maravilla Foundation filed a Joint Emergency Motion to continue SoCal Gas' ESAP. The subsequent Order to Show Cause (OSC) hearing held on December 6, 2011 led to an order from the Administrative Law Judge that SoCal Gas retain an independent third party to examine its program year 2011 ESAP records, specifically those related to November 2011.

Scope

This review examined a random sample of ten percent of ESAP contractors' invoices processed for payment by SoCal Gas in November 2011.

Objectives

The Administrative Law Judge's Order for an independent management audit required that the audit include the random verification of ten percent of the ESAP contractors' actual November 2011 invoices to ascertain whether such work was completed in compliance with the ESAP rules and standards and to see a random profile of ESAP activities during that anomalous period to better understand the "sudden spike."

Methodology

To address the objectives, we:

- Conducted interviews with key ESAP management staff.
- Selected a random ten percent sample of the 612 work order-related invoices processed for payment in November 2011 resulting in 62 sample invoices.
- Randomly selected three work order enrollments[2] within each invoice to increase our probability of scheduling one on-site verification appointment per randomly selected invoice[3]. These three work order enrollments are referred to as the primary, secondary and tertiary enrollments within a sample invoice.
- In cooperation with SoCal Gas staff, developed a customer contact strategy, phone script, scheduling process and logistical plans to achieve the maximum number of on-site verification appointments.
- Scheduled 46 on-site verification appointments.
- Conducted 45 on-site verification appointments.
- Documented and photographed each measure inspected during each on-site verification appointment to determine if:
    - The measure was installed and if so, if it was installed in accordance with applicable California Weatherization Installation Standards;
    - The quantity listed on the invoice of the measure installed was accurate; and
    - The measure appeared to have been installed on the installation date indicated on the invoice.
- Analyzed the results of on-site verification appointments conducted.

In accordance with the Administrative Law Judge's Order, we previously completed the first phase of this management audit which determined what causes, precursors, or contributory factors affected and otherwise triggered a "sudden spike" in contractors' invoicing in November of 2011 which in turn led to

[2] Contractor invoices may include one or more work orders for weatherization measure installations at individual residences, or enrollments. Some invoices contained fewer than three work order enrollments and therefore, only one or two work order enrollments were selected within those invoices.

[3] Home residents were not provided any incentive, nor were they obligated to participate in the inspections.

SoCal Gas' decision to temporarily suspend ESAP activities during the month of December 2011. We provided our initial report to SoCal Gas on December 21, 2012.

We conducted both phases of this management audit in accordance with the Institute of Internal Auditors' International Standards for the Professional Practice of Internal Auditing. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. This work was conducted between December 2012 and February 2013. See Appendix A for the detailed implementation methodology.

We have discussed the results with SoCalGas ESAP management and they were provided a copy of the draft report. SoCal Gas ESAP management had no comments on this report.

Principal Results

Each Measure Inspected was Properly Installed and Agreed with Invoice Data

There were no exceptions among any of the 45 on-site physical verifications we performed. All measures inspected were installed in accordance with the California Weatherization Installation Standards and in the quantity specified on the invoice. Each inspected measure also appeared to have been installed on the date indicated on the invoice.

November 2011 Invoices Accurately Reflect Work Completed by ESAP Contractors

In our previous report, dated December 21, 2012, we determined that the projected sudden spike in contractor invoices did not materialize. While this remains true, our on-site verifications, combined with invoice data reliability work completed in the prior report, validates that the ESAP invoices paid by SoCal Gas in November 2011 accurately reflect work completed. In our prior report, we tested 301 enrollments included in contractors' November 2011 invoices to determine if the work billed was documented in compliance with SoCal Gas' vendor contracts and ESAP policies and procedures. While there were some exceptions mainly due to incomplete enrollment and assessment documentation, work order billing information was overall, accurate. Our physical inspections of work performed found no exceptions and no evidence that the invoices SoCal Gas paid in November 2011 did not accurately represent completed ESAP work.

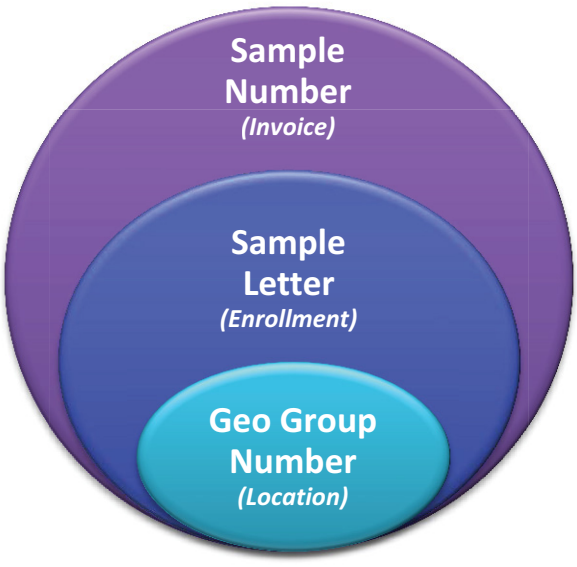
Appendix A: Detailed Methodology: Sampling, Scheduling and Performing On-site Verifications

Sampling Methodology

Each ESAP contractor's invoice can contain multiple enrollments. Each enrollment represents one property and may include charges for initial assessment and enrollment into ESAP, measure installation (work order) or an inspection. For this reason, some of the 779 November 2011 invoices contain only enrollments with charges for the assessment of a residence or the inspection of a previously installed measure and were not suitable for our on-site verification sample. Of the 779 November 2011 invoices, we identified 612 as most likely to contain work orders and therefore, would contain a measure installation that we could inspect.

From those 612 invoices, we randomly selected a ten percent sample of 62 invoices. Of the 33 contractors doing business under the ESA program in November 2011, 22 were represented within our 62 sample invoices. To increase our odds of achieving one on-site verification appointment per invoice, we then randomly selected a primary, secondary and tertiary work order-related enrollment from each sample invoice. As shown in Figure 1 below, we labeled each of our sample invoices with a number, one through 62, and each of the three enrollments within each invoice with the letter A, B or C. Each enrollment was then further coded based on its geographical location within SoCal Gas' territory.

Figure 1: Sample Codes

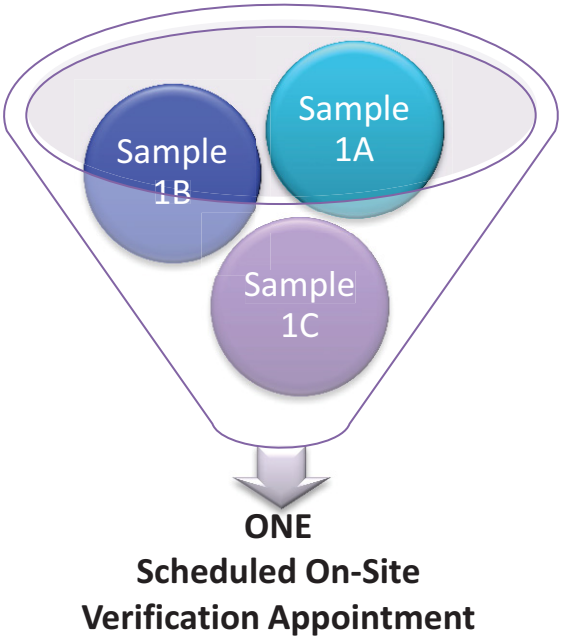


Source: Auditor Analysis of Sample Methodology.

As shown in Figure 2 below, to better our chances of performing at least one on-site verification of an enrollment within each of our 62 sample invoices, we randomly selected three enrollments within each invoice[4] as candidates for verification because customers:

- May not respond to our phone calls; or
- Could decline to schedule an on-site verification appointment; or
- May have sold the property within which the measure was originally installed.

Figure 2: Goal of Using Three Randomly-Selected Enrollments per Sample Invoice



Source: Auditor Analysis of Sampling Methodology.

Scheduling Methodology

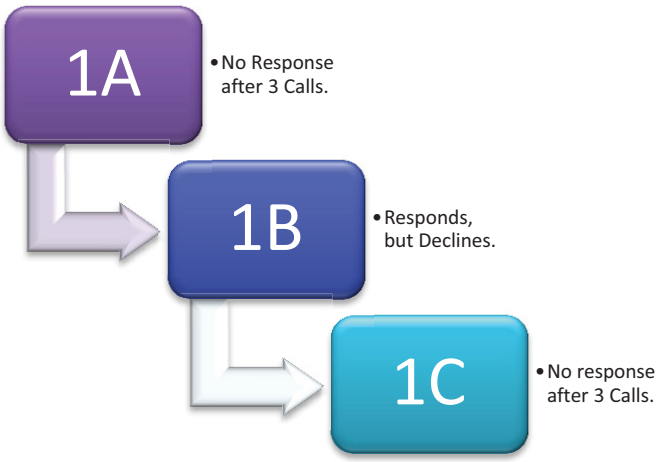
As shown in Figure 2 above, for Sample Invoice 1 there are three randomly-selected enrollments: the primary enrollment (A), the secondary enrollment (B) and the tertiary enrollment (C). For each sample invoice, we contacted the primary enrollment first, followed by the secondary enrollment and finally the tertiary enrollment, if necessary. All contact was made by phone by SoCal Gas Customer Service Representatives.

We contacted each enrollment up to three times with one phone call per day over the course of three days. If there was no response on the fourth day, we marked that enrollment as non-responsive and began the process again with the next enrollment within the sample invoice. Each customer that did

[4] Some invoices contained fewer than three work order enrollments and therefore, only one or two work order enrollments were selected within those invoices.

respond could also do so by declining to schedule an on-site verification appointment. In these instances, we also moved on to the next enrollment within a sample invoice. If all three enrollments within a sample invoice did not respond or declined to schedule an appointment, due to time constraints we moved on to the next invoice sample. Figure 3 provides an example wherein all three enrollments within a sample invoice are either non-responsive or decline to schedule an on-site verification appointment.

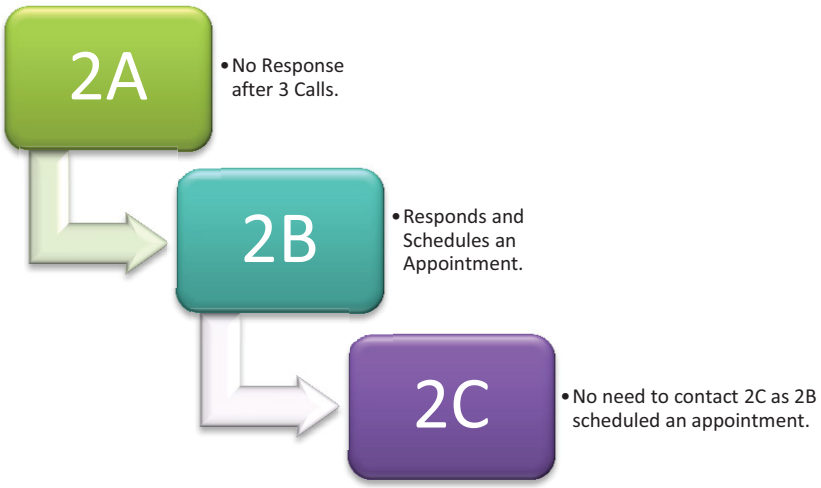
Figure 3: Example Scheduling Scenario 1 – Non-Responsive and Decline to Schedule an Appointment



Source: Auditor Analysis of Scheduling Process.

In most instances, we were able to successfully schedule an on-site verification appointment. If at any time an enrollment within a sample invoice agreed to schedule an on-site verification appointment, the remaining enrollments within that sample invoice no longer needed to be contacted. For example, in Figure 4 below, within Sample Invoice 2, while Enrollment A does not respond after three phone calls, Enrollment B does respond and schedules an on-site verification appointment. At this point in the process, we achieved our goal of scheduling one on-site verification appointment per sample invoice and therefore, Enrollment C no longer needs to be contacted.

Figure 4: Example Scheduling Scenario 2 – A Customer Agrees to Schedule an Appointment



Source: Auditor Analysis of Scheduling Process.

In total, SoCal Gas Customer Service Representatives made over 110 phone calls to schedule our 46 on-site verification appointments. Additionally, Customer Service Representatives contacted each customer that scheduled an on-site verification appointment 48 hours ahead of time to confirm the appointment. Although we designed our sampling and scheduling methodology to achieve the highest number of on-site verification appointments, some customers either did not respond to our request for an appointment or declined to schedule an appointment. Ultimately, we were able to schedule 46 on-site verification appointments. Due to one customer not showing up for a scheduled appointment, we completed 45 on-site verifications.

As required by the ALJ Order, our 62 sample invoices and the work order enrollments within them were randomly selected and therefore, each of the 178 residences in our sample could be located anywhere within SoCal Gas' territory. According to its website, SoCal Gas serves 20.9 million consumers in more than 500 communities. As shown in Figure 5 below, SoCal Gas' territory encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from Visalia to the Mexican border.

Figure 5: SoCal Gas Territory Map



Source: SoCal Gas' website - http://www.socalgas.com/about-us/company-info.shtml.

To schedule our confirmed on-site verifications more efficiently, we assigned each enrollment with a Geo Code Group. Using Geographical Information System (GIS) software, we were able to divide SoCal Gas' territory into 19 Geo Code Groups. If a customer agreed to schedule an on-site verification appointment, the appointment was scheduled on a day assigned for that customer's corresponding Geo Code Group. In this way, on-site verification appointments could be grouped by location to allow for us to complete more appointments in a shorter period of time.

Performing the On-Site Verifications

With the assistance of SoCal Gas employees, we performed the on-site verification appointments by traveling to each of the 46 residences and personally examining a previously installed ESAP measure. At each on-site verification, we photographed the inspected measure and documented our confirmation that the measure existed, was installed in accordance with California Weatherization Installation Standards, was installed in the quantity indicated on the invoice and appeared to have been installed on the installation date indicated on the invoice. Figures 6 and 7 below are examples of these forms and photographs.

Figure 6: Example of On-Site Verification Form

Performed by: _____ Enrollment: Sample:

Appointment Date	Appointment Time

Appointment Information	
Customer Name	
Customer Address	
Phone Number for Day of Appointment	
Special Notes	

Sample	Measure	Quantity	Date Installed	Exists?	Quantity Accurate?	Appear to have been installed on date indicated?	Appear to have been installed properly?

Please Record Any Additional Notes on the back of this form.

Source: Auditor-developed On-Site Verification Form.

Figure 7: Photographs of Some of the Installed Measures Inspected During On-Site Verifications



Low Flow Handheld Showerhead | Door Striker Plate | Door Weather Stripping | Door Lockset



Furnace Line Valve and Flex Connector



Water Heater Pipe Insulation

Source: Auditor photographs from some of the on-site verifications completed.

(END OF ATTACHMENT P-2)

Attachment Q

Attachment Q

GUIDANCE DOCUMENT FOR THE ENERGY SAVINGS ASSISTANCE (ESA) AND CALIFORNIA ALTERNATE RATES FOR ENERGY (CARE) PROGRAMS AND BUDGETS APPLICATION FOR THE 2015-2017 PROGRAM YEARS (PYs)

I. SUMMARY AND OVERVIEW OF THE ESA AND CARE PROGRAMS AND BUDGETS APPLICATION FOR THE 2015-2017 PYs

In the Summary and Overview sections of the applications, the investor-owned utilities (IOUs) must provide a brief descriptive introduction of the ESA and CARE Programs and a summary of the utility's requests, including proposals and budgets associated with the 2015-2017 cycle applications and an overview of the service area. The IOUs may also include any further information that is relevant for consideration in their respective budget applications. The framework and guidelines outlined below must be followed as closely as possible to allow for ease of application review and analysis.

II. ESA PROGRAM AND BUDGETS APPLICATION FOR THE 2015-2017 PYs

A. ESA PROGRAM BACKGROUND

In the ESA Program Background section of the application, the IOUs must:

1. **History:** Provide a brief history of the ESA Program and how it helps low-income customers, how it is funded and how the program has changed over the years, including any prior guidance given by the Commission.

2. **Summary:** Provide a description of the ESA Program, including descriptions of (i) the legal framework of the ESA Program, (ii) the ESA Program Eligibility Guidelines, and (iii) the eligible population.

3. **Current Proposal:**

   a) Explain how your current proposal has changed from that in prior years, including any proposed new ESA Program measures or other activities.

   b) Based on your review of all of the previous budget cycle study findings and working group recommendations, are there any new measures, strategies or best practices that could be considered for inclusion in this program that could benefit California's low -income customers?

   c) In early 2014, Governor Brown declared a state of emergency due to the drought and directed state officials to take all necessary actions to prepare for these drought conditions. We note that several of California's Native American tribes have declared a drought emergency including the Hoopa Valley Tribe, the Yurok Tribe, and the Yocha Dehe Wintun Nation. Each utility's proposal shall consider the water-energy nexus and propose measures and ways to prioritize the cost-effective ESA measures that also save water and contribute to alleviating the drought emergency.

   d) Explain how you coordinated and consulted with water utilities, water districts, water agencies, government offices, Native American tribes, community-based organizations and non-profits, and water experts including the Commission and the Commission's water-energy nexus proceeding(s) to identify potential water-energy nexus measures and analyze their cost effectiveness. Take into account the potential to

forestall use of high energy water sources such as desalinization in analyzing cost effectiveness.

B. ESA PROGRAM GOALS AND BUDGETS FOR THE 2015, 2016 AND 2017 PYs

In the ESA Program Goals section of the application, the IOUs must:

1. **Strategic Plan:** Identify the Strategic Plan Vision, Goals and Strategies for the ESA Program.
2. **Participation Goals:** Propose specific ESA Program participation goals for 2015-2017 (number of homes treated and weatherized). Provide the estimated number of eligible and willing households.
3. **Willingness to Participate (WTP):** Specify all WTP factors being used by your utility, in addition to other factors taken into consideration (e.g., CSD treated homes, the modified 3 Measure Minimum (Modified 3MM) Rule limitations and non-feasibility based on historical tracking data, etc.) in proposing the homes treated goals for the next ESA program cycle. The 2013 Low Income Needs Assessment (LINA) reports varying WTP estimates (anywhere from 52%-72%) based on the pool of respondents and various sources. This estimate is also dependent on unidentified barriers to participation in the ESA Program.
4. **Response to Barriers to Participation:** Identify how your utility has addressed barriers to participation, including WTP related issues, and attempted to serve those customers that have been unwilling to participate. Indicate why those efforts have been successful or not successful.
5. **2002-2013 Homes Treated Data:** Provide actual or estimated participation data and the number of homes treated or weatherized compared against the benchmarks, if any, established by the Commission for the period 2002 to 2013.

6. **Unique Factors:** Discuss unique issues in your utility's service area that would make 100 percent penetration challenging (Include discussion of homes projected but not reached in the 2012-2013 PYs).
7. **Estimated Energy Savings:** Provide a chart of estimated energy savings in kilowatt hour (kWh) or Therms from years 2015 to 2017.

In the ESA Program Budgets section of the application, the IOUs must:

1. **Strategies:** Present a detailed discussion that clearly identifies specific strategies and programs for the budget years 2015-2017, including proposed budget strategies, aimed at accomplishing the ESA Program programmatic initiative. In light of Governor Brown's declaration of a state of emergency due to the drought, and other drought emergency declarations, also present any strategies incorporating the Governor's directive and other drought directives, and ways to prioritize the cost-effective ESA measures that also save water and could contribute to alleviating the drought emergency.
2. **Actual 2012 and 2013 Expenditures:** Provide actual expenditures, along with approved budgets, from 2012 and 2013 by line item, consistent with Accounting and Reporting Requirements previously distributed by the Energy Division. Costs must be shown on an annual basis; and the 2014 approved budget must also be included.
3. **Carry-over Funds:** Discuss carry-over funds from the 2012-2014 budget cycle. Explain why the carry-over funds exist.

C. PROGRAM DELIVERY

1. Program Design

In the ESA Program Design section of the application, the IOUs must:

a) Proposal(s): Describe any specific proposed requests to enhance the ESA Program during the 2015-2017 program years, including budget and proposed program design modifications based on Phase II Studies and/or Working Groups' findings and recommendations, and also describe any requests, including budgets and proposed program designs, aimed at furthering your strategies concerning the Governor's drought emergency directive, and other drought declarations and directives, and ways to prioritize the cost-effective ESA measures that also save water and could contribute to alleviating the drought emergency.

b) Approach and Design: Describe how the utility intends to approach and design its ESA Program during the 2015-2017 program years. Discuss past program accomplishments and obstacles with regard to program implementation.

c) Complaint History: Describe your utility's history of any customer complaints or concerns. Provide a brief discussion of the following items:

   (1) Program Delivery: Use of CBOs, private contractors, third parties, etc.;

   (2) Portfolio composition: Mix of measures and proposed new measures. Include potential alternatives to mitigate challenges faced by single fuel utilities, such as customer reliance on natural gas or propane or similar barriers to ESA Program participation; and

(3) Leveraging: Coordination with other utility programs and other entities to increase efficiency and ensure eligible homes are afforded an opportunity to participate in the ESA Program.

2. Marketing, Education and Outreach

In the ESA Program Marketing, Education and Outreach section of the application, the IOUs must include discussions of each of the following subject areas:

a) Renters: Discuss program marketing and outreach improvements that will assist with easier enrollment for renters, particularly those living in Single Family homes that have identified barriers with enrollment such as landlord approvals and completed Property Owner Waivers.

b) Rural Population: Identify specific underserved rural areas (by ZIP code or county, tribal area, or other appropriate area considering climate and population) in your utility's service area. Discuss what new strategies your utility will employ to better target and enroll those households in the ESA Program. Also, identify the strategies to be carried out in each county, zip code, tribal area, or identified area, if they vary. Consider coordination with California and Federal LifeLine providers offering service in those areas, tribal Governments, local governments, CBOs, and others when developing your marketing and outreach strategies.

c) High Poverty Areas (income less than 100% of federal poverty guidelines): Identify the very high poverty areas within your service territory that have low rates of participation in the ESA Program (by ZIP code or county, tribal area, or other identified area), and discuss what new

strategies your utility will employ to increase ESA Program participation. Consider coordination with California and Federal LifeLine providers offering service in those areas, with CBOs, consultation with tribal Governments, and with local government agencies in those areas, when developing your marketing and outreach strategies.

d) Transiency in the Low -Income Population: As outlined in the Multifamily Segment Study and echoed in other studies, a large component of California's low-income population is transient, particularly those low-income Californians residing in multifamily housing. Discuss how your utility proposes to track and manage past ESA Program participants to ensure that they continue, if they are still eligible, to live in ESA Program-treated households. Discuss what systems your utility can use to flag and follow past ESA Program participants as they move from one residence or meter to another.

e) Non-Transient CARE Population and ESA Program Participation: While a high transiency rate is observed for part of the low-income population, Commission staff has analyzed CARE program data that indicates that a large proportion of enrolled CARE customers have lived at their current address (and same energy meter/account) for over four years and have never participated in the ESA Program. What is your utility's plan to ensure that this specific CARE customer segment participates in the ESA Program to both reduce their energy burden, energy consumption, and their subsequent CARE subsidy impact?

f) Brand Identity: The 2013 Low Income Needs Assessment study reported that few customers knew of the ESA Program by its name or acronym, whereas there is much more widespread awareness of CARE. This lack of ESA Program name recognition was true even of those customers who had participated previously or had recently had contact with the program. The study makes the recommendations to link ESA marketing consistently with existing outreach efforts for CARE whenever that is not already done and establish a clearer identity and brand for the ESA Program. Describe your utility's response to these two recommendations and propose how these two recommendations could best be implemented amongst the four IOUs, at a minimum employing the examples provided in the study.

In the ESA Program Marketing, Education and Outreach section of the application, the IOUs must also:

a) Plans for Improving Enrollment: Describe all current and suggested Marketing, Education and Outreach methods, including all efforts to coordinate with California and federal LifeLine providers in the utility's service territory and any water utilities and water districts in the utility's service territory, CBO, tribal Government, and local government and business partnerships to improve ESA enrollment, and include the estimated costs.

b) Coordination Between the ESA and Lifeline Programs: D.14-01-036 allows low-income customers to receive subsidized wireless service through the California Lifeline Program. In what ways can this new opportunity be leveraged to market the ESA Program, improve outreach to

enroll eligible households, and enhance existing PEV and re-certification processes during the upcoming 2015-2017 program cycle and beyond? Be specific in your response to the above and include opportunities for data sharing to support inter-program coordination. In particular, address how smart phones can be used to facilitate customer education/outreach, and income verification.

c) Plans for Meeting Participation Goals: Discuss how Marketing, Education and Outreach efforts will result in meeting program participation goals including any specific population sectors or segments.

d) 2012-2014 Actual Expenditures and Per Household Cost: For each of the program years from 2012 to 2014, provide a comparison of the budgeted, recorded or estimated average Marketing, Education and Outreach cost per household.

e) Effectiveness: Discuss the effectiveness of the Marketing, Education and Outreach methods for your service territory and what has been your past experience regarding the success of these methods.

3. ESA Program Implementation

In the ESA Program Implementation section of the application, the IOUs must include discussions of each of the following subject areas:

a) Reduce the number of visits to a home for measure implementation: One of the barriers identified by the 2013 Low Income Needs Assessment (LINA) study was that the number of visits to a home deterred households from enrolling. Discuss how your utility will continue to refine its implementation strategies to reduce the number of visits so that households that refuse to enroll due to

difficulties being home for subsequent visits may participate in greater numbers.

b) Priorities for treatment: One of the recommendations provided by the 2013 LINA study was to explore the tradeoffs associated with screening customers based on energy usage, energy burden, and health, comfort and safety criteria to determine priorities for treatment and/or tailor ESA Program services to the home. Based on the demographics and characteristics of those customers exhibiting the highest energy burden and insecurity, discuss how your utility will prioritize this segment of the low-income population to ensure that they are targeted and enrolled into the program, and how their homes will be treated, if differently from other low-income homes. In light of the drought emergency declared in 2014 and uncertainties about future water supplies in California, and in light of the energy intense nature of certain water supplies (e.g. desalination which may be used in some areas if other supplies are not available in sufficient quantities), discuss how your utility will prioritize delivery of the ESA measures to save water or enable water savings.

c) Overlapping Service territories: Discuss how your utility will ensure that in the IOUs' overlapping service areas (especially SCE and SoCalGas), customers are screened for both IOUs' measures efficiently to increase the number of customers that pass the Modified 3MM rule and to provide comprehensive treatment.

d) In Home Energy Education: Phase 1 of the Energy Education Study revealed opportunities for standardization and improvement to the existing ESA Program energy education materials. What specific enhancements and improvements are planned to encourage customer behavior changes toward gaining greater energy efficiency and conservation in low-income households and to improve their awareness of energy efficiency and conservation practices?

e) Modified Materials: Describe all modified materials to improve customer engagement, recollection and subsequent use (e.g., guidebooks, energy wheel, calendars, website or internet-based materials, phone apps, etc.), including materials that are customized with applicable and tailored content to certain household demographics including households with multiple members, small children, teenagers, seniors, persons with disabilities, non-English dominant speakers, etc.

f) Post ESA-treatment Follow-up: Describe all post ESA treatment follow-up activities including all mail-back or web-based survey, texts, apps, calls or other forms of periodic communications that are being considered for the upcoming program cycle.

g) Training and Materials: Describe plans for standardization of training and materials across all four of the IOUs' service areas.

h) Compliance Surveys: Describe plans for augmentation of your utility's existing compliance surveys and In-Home Inspections to ascertain the quality of the Energy Education information provided.

i) Comparative Home Energy Usage Reports/Residential Behavior-Based Energy Efficiency for Low -Income Customers: Home Energy Usage Reports provide customers with a comparison of their energy usage to that of their neighbors in similar-sized households. Customers who use more than their neighbors receive reports that reveal their relative higher usage patterns for the month and recommendations to lower their energy usage. Customers who use less energy than their neighbors receive reports that include positive messages to encourage continued "good behavior." The 2013 *Evaluation of Pacific Gas and Electric Company's Home Energy Report Initiative for the 2010–2012 Program* verified energy savings claims from PG&E's piloting of Comparative Usage Reports. Describe plans, if any, for implementing either the same or similar Residential Behavior-Based Energy Efficiency efforts to ESA Program eligible customers, separately or as part of

the subsequent phase of the Energy Education Study (Phase 2).

j) Multifamily Sector: Describe all updated program designs and marketing approaches for Multifamily Households, including efforts to coordinate or integrate with non-low-income energy efficiency programs. Indicate how these updated design(s) and marketing approaches address the ESA program goals and strategies. Indicate how these updated design(s) and marketing approaches for Multifamily Households address the dual objectives of serving all ESA Program eligible and willing households and delivering energy efficiency measures cost-effectively. Address all of the topics listed below:

   (1) D.12-08-044 directed the IOUs to implement Multifamily Segment Strategy 3 - an updated marketing approach to treating this sector. Discuss how your utility implemented this strategy in the last program cycle.

   (2) A primary finding of the Multifamily Segment Study suggests that the ESA Program employ a marketing strategy component that targets the owners and operators of multifamily properties with low-income residents and to align this new messaging to communicate the benefits of building upgrades from an investment perspective. Discuss what specific changes your utility will be making to the ESA Program's existing marketing and outreach efforts in light of these recommendations.

   (3) The Multifamily Segment Study recommends that the IOUs develop a system to receive notices about low-income multifamily buildings planning a recapitalization event through the Low Income Housing Tax Credit (LIHTC) administered by the State Treasurer's office and conduct targeted, in-person outreach to these identified properties and owners. Discuss how your utility plans to target low-income multifamily properties and their owners with outreach and marketing at identified "

trigger-points" (i.e. scheduled or ongoing building recapitalization, renovation, or refinancing events) and what this targeted outreach will entail.

(4) Discuss how your utility plans to leverage relationships with lenders and other banking institutions, Local, state, and federal government institutions, tribes, non-profits and others including trade associations to identify, and target outreach to market-rate low-income multifamily property owners initiating or undergoing a recapitalization, renovation, or refinancing event, and whose buildings may house low-income households.

(5) Discuss all new approaches your utility plans to utilize to improve the quality of data collected (i.e., building vintage data via county assessor and recorder information, historical/future permitting data via county building inspection data, US Department of Agricultural Rural Development housing data, tribal or Bureau of Indian Affairs Data, local, state, and federal, and CBO data, etc.). Discuss how your utility plans to utilize these data to target potential ESA Program eligible multifamily properties and their owners. Discuss how your utility plans to leverage existing relationships and data sharing agreements with mainstream energy efficiency funded, local government partnerships to acquire the data and insight to help target low-income multifamily properties and residents for ESA Program participation. Indicate what third party data are available, and how your utility will use these data to augment your current customer database(s) to help identify low-income multifamily properties and residents eligible for ESA Program participation.

(6) Discuss how your utility's ESA Program multifamily offerings will utilize benchmarking for marketing, education, outreach and other program delivery efforts. Discuss whether EPA's Portfolio Manager benchmarking tool could fulfil the benchmarking

needs for the ESA Program's participating multifamily properties. Provide an analysis of the costs and benefits of requiring mandatory whole-building benchmarking for multifamily property participation in the ESA Program.

(7) The Multifamily Segment Study recommends revisiting ESA Program policy on expanding the variances under which a low-income building qualifies for relaxed income verification requirements for the program. The study also provides a method by which to determine the viability and potential costs and benefits of implementing this recommendation. Indicate which, if any, ESA Program policy and procedure changes your utility requests in regards to allowing documentation that certifies a building for identified income-based subsidy programs (e.g., Section 8, deed-restricted, HUD, TCAC, HCD or USDA) and serve as qualification to enroll tenants in the ESA Program. Using the study consultant's outlined methods, discuss the viability and potential costs and benefits of implementing this recommendation.

(8) 80:20 Rule: Discuss how your utility would implement a change to the ESA Program policy and procedures that would lower the level of verification from 80% of a multifamily building's tenants being income qualified to treat unoccupied units and the building shell and other energy systems, to some lower level of verification. Based on historical participant data and measure installation costs, describe what your utility projects as the resulting impact(s) of instituting this rule change in your utility's service territory.

(9) Single Point of Contact: D.12-08-044 directed the IOUs to implement a single point of contact to coordinate the varying IOUs' programs for the multifamily segment. For program year 2013, discuss what level of ESA Program funding, staff time, or other resources

supported IOUs' compliance with this directive. Discuss your utility's lessons learned from implementing a single point of contact and how they are reflected or otherwise incorporated in any updated program delivery design.

(10) For the 2015-2017 cycle, specify the level of funding, staff time, or other resources the ESA Program will dedicate to continuing the single point of contact effort.

(11) The Multifamily Segment Study findings indicate that for low-income multifamily properties, there is less opportunity for owners to increase rents to cover the costs of energy efficient upgrades, making energy efficient retrofits more costly and less likely. Describe how your utility plans to coordinate the ESA Program funding with the Energy Upgrade California Multifamily (EUC-MF) or Multi-Family Energy Efficiency Rebate (MFEER) programs for low-income buildings or with energy efficiency upgrades associated with other utility energy efficiency, energy procurement or demand response strategies. Discuss all funding options your utility is considering (including coordinated funding and no funding) or whether your utility is considering leveraging other program funding or private funding, energy procurement or demand response strategies, or carbon compliance offset/credit strategies. An example may be, but is not limited to, a per-unit adder, based on the number of verified low-income tenant units, from the ESA Program, to the EUC-MF or MFEER programs.

(12) Multifamily Measure Offerings: Discuss if your utility will be proposing to offer common area lighting measures and/or other "new" measures to eligible and willing multifamily properties via the ESA Program? If so, discuss whether there is precedent or justification for a mechanism to pool or comingle ESA Program funds with MFEER and/or EUC-MF offerings or other energy efficiency, energy

procurement or demand response programs to provide increased incentives for those programs for eligible low-income properties?

k) Energy Upgrade California Multifamily Program (EUC-MF)/Middle Income Direct Install Program (MIDI)/ Multi-Family Energy Efficiency Rebate (MFEER) Coordination for Multifamily Sector: Describe all updated plans and proposals to coordinate among ESA and EUC-MF/MIDI/MFEER or other energy efficiency, energy procurement or demand response programs. Specifically, address the items below:

   (1) Per D.12-08-044's Multifamily Segment Strategy 4, describe all steps your utility took since 2012 to synchronize the ESA Program's policies and procedures with those of EUC-MF and MFEER.

   (2) Describe whether these efforts been successful. If not, identify how your utility plans to overcome these barriers in the next cycle.

   (3) Describe how your utility plans to implement a single intake form for any and all programs that have multifamily offerings. Explain whether your utility plans to allow or request that the more rigorous audit and assessment findings from other IOU programs (i.e., EUC-MF) will fulfill the assessment requirements for the ESA Program.

l) Leveraging and Coordination: Describe all updated plans and proposals for leveraging and coordination with other IOU programs, Government and Local Agencies, and tribes, including the below:

   (1) Department of Community Services Development: Discuss the existing leveraging efforts with this agency for the pilots listed below and any other similar efforts and how lessons learned from those efforts will be applied in 2015-2017:

      (i) Data Sharing Pilot Results

      (ii) Geographic Coordination Pilot Results

(iii) Solar Water Heater Pilot Results

(iv) Bulk Purchasing Pilot Results

(2) CBOs: Discuss how you will coordinate *differently* in this next cycle with CBOs to conduct outreach to overcome potential ESA Program customers' lack of trust in contractors, a significant barrier identified in the LINA study.

(3) Other utilities: Discuss coordination plans with other water, telephone, energy utilities, or water districts to increase and improve outreach to the CARE and ESA population and improve program delivery.

(4) Other coordination: Discuss coordination between ESA and other energy efficiency, energy procurement, or demand response programs and coordination between ESA and local, state, federal, and regional government entities, and California Tribes including associations and service providers for tribes.

m) Program Rule(s) Modification(s): Describe all updated plans and proposals, if any, for modifications to the existing program rules and attendant justifications, including but not limited to:

(1) Income self-certification (CARE and ESA)

(2) Modified 3MM Rule

(3) 10 Year go back rule

(4) Second Refrigerator replacements & Proposed incentives (per LINA recommendation)

(5) High Efficiency Furnaces (95 AFUE) (Model & Efficiency levels)

(6) Exceptions specific to Multifamily

(7) Exceptions specific to those with high energy burden, energy insecurity, or medical issues

(8) Others

n) Workforce Education and Training (WE&T): Describe the current status of WE&T data collection and your utility's plan to complete the collection of ESA Program workforce data that is necessary for meaningful analysis and addresses concerns of uniformity, consistency, accuracy, and granularity by filling any current data gap. Describe your utility's proposed plan, schedule and budget to develop and implement your WE&T plan.

o) Best Practices: Incorporating Best Practices and Lessons Learned from 2012-2014 Implementation: Discuss the challenges and obstacles your utility experienced in meeting the 2012-2014 budget cycle goals. Include any changes your utility would propose in the program delivery cycle to further your success in meeting the strategic planning goals. Consider opportunities for partnerships and coordination such as coordination with other energy, water or telephone utilities, local, state, federal, regional, and tribal governments, CBOs, non-profits or trade associations to meet strategic planning goals. Consider use of technologies such as apps, text, internet services, calls, instant messages, community, tribal, and CBO-based outreach, media including non-English language media and social media, and other methods and avenues to achieve program goals.

p) Customer Service Strategies: Describe all new and proposed Customer Service Improvements and Strategies.

q) Legislative Changes: Describe your utility's plan and proposals to comply with legislative changes including but not limited to AB 327 and related budget impact projections.

r) AB 270: Describe your utility's plan and projected costs of complying with the data publication requirements of PU Code 589 as legislated by AB 270.

s) Single Family Affordable Homes (SASH) Solar Program and Multifamily Affordable Solar Housing (MASH) Program: Describe your utility's plan to prioritize SASH and MASH applicants in compliance with AB 217, and include a discussion of the following:

(1) Costs, benefits, and barriers to implementing a synchronized data exchange/lead generation protocol for the SASH, MASH and ESA Programs to ensure that the programs work cooperatively and in an integrated manner.

(2) Costs and benefits of referring your utility's CARE customers with electric usage above 400% baseline to the SASH and MASH programs: Discuss whether such a referral should be triggered after the first time a customer reaches 400% of average use, or rather the second time that threshold is reached in a 12-month period. What are the costs and benefits of making such referrals to tenants of single family households or multifamily households. Also discuss the costs and benefits of outreach to landlords and landlord representatives or associations where tenants use 400% of baseline energy; and

(3) Any program delivery design benefits from authorizing and training SASH and MASH contractors and outreach workers to do ESA Program assessments and enrollments, keeping in mind that energy efficiency and demand response are first in the loading order.

D. COST EFFECTIVENESS AND ENERGY SAVINGS

In the Cost Effectiveness and Energy Savings section of the application, the IOUs must include discussions of each of the following subject areas:

1. **Summary and Overview**:

   Provide a summary and overview of the ESA Program cost effectiveness and energy savings. Include a discussion of plans to prioritize cost-effective measures that also save water and contribute to alleviating the drought emergency. Analysis may also include consideration of all climate-zone specific cost-effective measures that save energy and water and consideration of water saving education to raise awareness of the water energy nexus issues. Include a discussion and analysis with supporting data, if any, of whether any passive efforts such as water education, passive cooling through climate appropriate trees, drought tolerant landscape education or replacement incentives could be considered cost-effective measures in the ESA Program.

2. **2012-2014:**

   Specifically discuss the results of the ESA Program efforts, cost effectiveness and energy savings, accomplished during the 2012-2014 program cycle.

3. **Plans and Proposals:**

   Explain how your utility plans to incorporate the results and recommendations into the 2015-2017 program cycle while incorporating the Cost Effectiveness Working Group Final Recommendations and coordinating with the directions in the Commission's Rulemaking proceeding, R.09-11-014. Discuss your utility's plans to address the water-energy nexus.

E. MEASURE PORTFOLIO COMPOSITION

In the IOUs' Measure Portfolio section, IOUs must include the following:

1. **Overall Portfolio Composition:**

   Discuss the mix of measures proposed for the 2015-2017 portfolio, including discussion of the topics below:

   a) Cost Effectiveness and Other Criteria for Program Measures:

- Describe the criteria used to compose the portfolio.
- Describe how the portfolio composition results in improved cost-effectiveness.
- Describe how each measure included in the portfolio achieves the dual objectives of maximizing long-term and enduring energy savings and enhancing the participants' quality of life.
- Discuss the benefit/cost ratio and cost-effectiveness ratio of proposed measures using the proposed CE tests. Explain assumed values and variables and other model components.
- Provide justification for measures included in the portfolio (if any) that do not meet the current criteria of cost effectiveness but serve other important policy objectives. This may include, but is not limited to, consideration of water-energy nexus measures that address the drought or forestall the need to use highly energy intensive water resources such as desalination.
- If your utility is proposing to go back to homes that have received ESA Program treatment since 2002 to provide additional new measures, discuss the tradeoffs of doing so and include the cost implications.

b) <u>New Measures</u>:

- Identify new measures that are being proposed for the 2015-2017 program cycle, with the relevant cost effectiveness ratios or justification for deviations as described above.
- Provide justification for why such measures should be included in your ESA program portfolio.

c) <u>Retired Measures</u>:

- Identify measures from the 2012-2014 portfolio that are being retired or proposed to be retired from the 2015-2017 program cycle.
- Provide a justification for why such measures should no longer be included in your portfolio.

F. OTHER ESA PROGRAM ELEMENTS AND POLICIES:

1. Existing Policies:

Generally, discuss the existing policies that should be reiterated and will be continued into the 2015-2017 program cycle, any existing policies that are being proposed to be retired, and any existing policies that are being proposed to be expanded or modified in the next cycle.

2. Southern California Edison (SCE) and Audit Findings:

SCE must provide as a separate attachment to its 2015-2017 budget application filing, its utility's response to the Utility Audit Finance and Compliance Branch (UAFCB's) 2009-2010 Audit Report along with a summary of all corrective measures that were implemented to ensure compliance. SCE must specify where each corrective measure is also properly reflected and/or documented (e.g., monthly and/or annual reports, formal filings, etc.).

3. ESA Program Report Posting to the California Energy Efficiency Statistics (EEStats) Site:

In addition to sending the monthly and annual ESA Program compliance reports to the service lists, the IOUs should begin planning to post ESA Program Monthly and Annual Reports to the California Energy Efficiency Statistics (EEStats) Site. EEStats is an easy to navigate public website that among other functions, acts as a repository for the IOUs' Energy Efficiency reports. The IOUs should begin planning and coordinating with Energy Division to integrate ESA Program data, starting in the 2015-2017

program cycle, into EEStats' EE Data Portal functionality. The EE Data Portal is the official public reporting site for California energy efficiency program tracking data. This site presents standardized quarterly program tracking data submitted by the state's IOUs.

The IOUs, in their respective applications, should describe what coordination and planning have been completed to ensure that they are ready to submit the monthly and annual ESA Program compliance reports to the service lists, as well as posting ESA Program Monthly and Annual Reports to the California Energy Efficiency Statistics (EEStats) Sites, starting January 2015.

4. San Onofre Nuclear Generating Station (SONGS):

a) San Diego Gas & Electric Company (SDG&E) and SCE must describe how your utilities are utilizing the ESA Program to reduce load and energy usage in transmission constrained areas resulting from the decommissioning of the SONGS. Describe efforts to coordinate your ESA program efforts with other energy efficiency, energy procurement, or demand response efforts, and D.14-03-044 which authorized procurement for SCE and SDG&E to meet local capacity needs stemming from the retired SONGS.

b) SDG&E, SCE and Pacific Gas & Electric Company (PG&E) must describe how residents in other transmission constrained areas in their respective service territories are being prioritized for participation in the ESA Program.

5. Advanced Metering Initiative:

With over $5 Billion dollars in ratepayer funds expended on the Advanced Metering Initiative, describe how the smart meter data, including Green Button Data, or Smart Meter functionality, are being utilized by the ESA Program in planning,

implementation, and program design. Third party data analytics may be available to do remote, appliance level load disaggregation for potential ESA Program participants. Describe how this data interpretation, or similar analytics, is being planned for use in outreach, assessment, or educating potential ESA Program participants. Describe how Smart Meter functionality including local area networks (LANS) is being used to implement ESA Program. Describe how Smart Meter LANS and other resources could be used to coordinate with water utilities to promote water consumption awareness and leak detection to address the water-energy nexus.

7. **Workforce Education and Training:** D.12-08-044 established the ESA Program Workforce, Education and Training Working Group (WE&T Working Group). The WE&T Working Group attempted, but was unable, to collect and report data in several WE&T areas. The ESA WE&T Working Group proposed that the WE&T expert consultants selected in the mainstream energy efficiency proceeding address the ESA Program workforce data collection needs as well as research questions provided in the Working Group's final recommendation filing. However, the expert consultants may not be able to provide the data the WE&T Working Group has recommended. One of the WE&T expert consultants will be developing an action plan that will include recommendations on how the IOUs can begin this data collection effort.

   a) Describe how and when your utility would be able to implement the plan to collect this ESA Program workforce data to ensure that the data is useful for analysis and addresses concerns of uniformity, consistency, accuracy, and granularity?

b) As part of the consultant's action plan, the consultant may suggest the IOUs acquire off-the-shelf software tools to track workforce data. Describe how your utility would implement such tools to develop and report on the workforce data requirements outlined in D.12-08-044. Assume for purposes of this response that the IOUs would be authorized to pool their funding to procure one reporting system that can be utilized across multiple programs.

c) The WE&T expert consultant may recommend instituting a wage-floor or prevailing wage for the contractors participating in the ESA Program. Include your utility's estimated budget to facilitate a prevailing wage and the cost-effectiveness implications of instituting such a change. Consider employer savings on turnover costs, increases in productivity, the effect on work quality, and accepting a lower profit margin when determining cost effectiveness. When could a prevailing wage be established in the ESA Program for your utility?

d) Worker Training Ladder: How will your utility develop a "career pipeline" for workers currently employed in the IOUs' ESA Program that articulates career pathways and educational opportunities or certificates for workers to access higher wage and higher skill jobs? Possible career pipeline development strategies can include the release of Requests For Proposals to qualified workforce development entities for the creation of a pre-apprenticeship training and certificate program that will provide the ESA Program workers the skills, training and skills needed to provide access to entry-level residential, non-residential EE, and utility employment.

e) "First Source" Hiring Requirements: A "First Source" requirement requires that contractors provide advanced notice of upcoming job or internship opportunities to the utilities. Moreover, the language requires that the IOUs have existing relationships with experienced workforce training providers, who can match skilled EE workers to the job openings. SDG&E and SoCalGas have begun inserting "Source" and "Job Creation" reporting requirements in their contracts with energy efficiency contractors. Their language can be easily used by other IOUs.[1] How can your utility implement similar "Source" language in the next round of ESA contracting? Strong and specific "First Source" language in all ESA Program contracts between the IOUs and a given contractor can increase access for low-income, disadvantaged workers to enter the ESA jobs pipeline. Furthermore, by establishing relationships with experienced and skilled workforce development organizations, the IOUs can create a pipeline of disadvantaged workers with the necessary skills to work in the ESA program.

8. **Database for Energy Efficient Resources (DEER):** How will your utility's ESA Program support (via allocated employee resources, etc.) the planned updates to the DEER database to include ESA Program specific measures, as well as low-income usage profiles for current measure entries? What is your utility's plan to augment or bolster these

[1] The language is as follows: "In the event that new job opportunities arise as a result of this SOW, Contractor shall provide advanced notice of job or internship opportunities and the skills required for those positions to COMPANY or COMPANY's designee. Advanced notice should be provided at least two weeks before the job or internship opportunity is listed publicly. These opportunities may be shared with organizations that provide EE workforce training."

ongoing DEER updates and will these updates be incorporated into ESA Program planning? If so, how will this incorporation occur?

9. **Evaluation, Measurement & Valuation (EM&V):**

   The 2012-2014 budget cycle saw several corresponding ESA and CARE Program studies that, in conjunction with other planned mainstream energy efficiency EM&V efforts, inundated IOUs' EM&V staff and systems with high volume, complex, data demands. As a result, there were delays in processing consultant data requests and transmitting data to study consultants. What is your utility's plan to support these internal EM&V departments, staff and systems to prevent future resource constraints and data delays?

10. **AB 327:**

    In light of potential future rate design changes directed under AB 327 and under consideration in R.12-06-013, how will your electric utility address affordability issues through ESA? Discuss whether your utility would be seeking to roll out technological solutions, new outreach plans or partnerships, or other initiatives under ESA to address AB 327, and if so, explain how your utility plans to implement the solution, in detail.

G. ESA PROGRAM PILOTS:

Clearly describe a summary of any new pilots being proposed that are consistent with the programmatic initiatives findings and recommendations of the study reports and working group reports. Describe any new proposals for water-energy nexus pilots. Describe any new proposals for pilots to use the ESA Program to ameliorate carbon emissions, encourage or support carbon offset projects, and address factors that contribute to climate change. Discuss specifically how each pilot contributes to meeting the programmatic initiative, consistent with the findings and recommendations of the study reports and working group reports. All proposals must

include proposed budgets and detailed justifications for the proposed pilot and budget.

H. STUDIES AND EVALUTATIONS:

Clearly describe a summary of any new studies and/or evaluations being proposed. Discuss how each study/evaluation contributes to meeting the programmatic initiative. All proposals must include proposed budgets and detailed justifications for the proposed study/evaluation and budget, as proposed.

I. IMPACT EVALUATION STUDY

1. 2012-2014 Impact Evaluation:

Discuss the results of the 2012-2014 Impact Evaluation carried out during the 2012-2014 program cycle. Explain how those results and recommendations will be incorporated into the 2015-2017 program cycle.

2. 2015-2017 Impact Evaluation:

In addition to other elements that may be added, the 2015-2017 Impact Evaluation will estimate first-year gas and electric energy savings and coincident peak demand reduction attributable to the ESA Program energy savings impact estimates, in aggregate, by IOU service territory, by average participant, by household, by measure and/or measure group, and, where possible and appropriate, by climate zone and housing type.

J. LOW INCOME NEEDS ASSESSMENT

1. 2012-2014 Low Income Needs Assessment Study:

Discuss the results of the recently completed Low Income Needs Assessment Study that was carried out during the 2012-2014 program cycle. Explain how those results and recommendations will be incorporated into the 2015-2017 program cycle.

2. AB 327:

Pursuant to the AB 327 requirement for a triennial needs assessment study, the IOUs must propose specific study areas or subjects for further study in the next LINA. Present a specific areas or subjects and detailed discussion of why these areas warrant further study and how the additional information works towards accomplishing the ESA Program's programmatic initiatives. At minimum, include the following topics:

c) Estimates of Remaining Energy Savings Potential.

d) Updated Assessment of Energy Insecurity and Energy Burden.

e) Level of burden in providing income documentation for CARE Program participation.

f) Most beneficial program measures.

3. Energy Education Study Phase 2:

On November 1, 2013, a joint petition to modify D.12-08-044 (Joint Petition) was filed by the IOUs seeking modification of that decision that would authorize an extension of time for the IOUs to complete the Energy Education Study ordered in that decision, including completing the field study requirements in assessing the benefits of the current energy education offerings until the ESA and CARE 2015-2017 program cycle. Provide a joint proposal for the subsequent phase of the Energy Education Study (Phase 2) for the 2015-2017 program cycle pursuant to the requested and granted modifications to D.12-08-044.

K. ESA PROGRAM BUDGET

Present a detailed budget discussion that clearly identifies specific strategies and programs for budget years 2015-2017 and works towards accomplishing the ESA Program's programmatic initiatives.

1. The proposed budget must clearly outline each program category cost and break it into specific components.
2. Include a table on the 2012-2014 actual budget, comparing the costs with the proposed 2015-2017 budget, and indicate the reasons for an increase or decrease in proposed allocations for program categories.
3. Tracking Program Costs - Propose methods for reporting costs and demonstrate consistency across the utilities.
4. Include a discussion on required budget flexibility and potential Fund Shifting.

L. Revenue Requirement and Impacts

In the ESA Program Revenue Requirement and Impact section of the application, the IOUs must:

1. Discuss the revenue requirements necessary to achieve the program plans and objectives proposed for the three year application period as well as the projected rate impacts that would arise due to the increased revenue requirements.
2. Include a detailed accounting of funds unused from prior budget cycles and how these funds will reduce the revenue requirement.
3. Include a brief discussion of the costs and the benefits of these programs and how they impact the rates and the general well-being of ratepayers of your service area and priorities such as energy reliability, safety, and the water-energy nexus.
4. Include a brief description of the balancing accounts for the ESA Program and CARE Programs. Explain any changes to the balancing accounts.

M. PROGRAM FUNDING AND FUND SHIFTING REQUESTS

In the ESA Program Funding and Fund Shifting Requests section of the application, the IOUs must request Commission authorization to continue funding for the 2015-2017 program

cycle and for any flexibility in managing the funds each program year if the Commission decision is delayed.

III. CARE PROGRAM PLAN AND BUDGETS APPLICATION FOR THE 2015-2017 PYs

A. CARE PROGRAM BACKGROUND

In the CARE Program Background section of the application, the IOUs must:

1. **History:** Provide a brief history of the CARE Program and how it helps low-income customers, how it is funded and how the program has changed over the years, including any prior guidance given by the Commission.
2. **Summary:** Provide a summary of the CARE Program, including descriptions of (i) the legal framework of CARE Program, and (ii) the eligible population.
3. **Program Eligibility Guidelines**

   Provide a summary of the program eligibility guidelines, including income, categorical eligibility qualifications, self-certifications, and the process for getting enrolled. Identify any proposed changes from the 2012-2014 framework and implications associated with the recent adoption of AB 327 (Perea 2013).
4. **Current Proposal:**

   a) Explain your proposal and plans for the CARE Program during the upcoming 2015-2017 budget cycle.

   b) Discuss how the elements and strategies in the proposed 2015-2017 CARE Program are specifically designed to reach the penetration goal of 90%.

   c) Provide an estimate of the number of households projected to be enrolled in the 2015-2017 program

years, along with the overall budget requested to meet this goal.

d) Explain how your current proposal has changed from that in prior years, if any.

e) Based on your review of all of the study findings and working groups' recommendations and in light of new technologies and opportunities for partnership and collaboration, are there any new strategies or best practices that could be considered for inclusion in this program that could benefit California customers? For example, to promote eligible households to enroll or re-enroll in the CARE Program, consider the use of apps, text, media including social media and non-English language media, partnerships with California and federal LifeLine providers, partnerships with water, telephone or energy utilities, CBOs, non-profits, businesses or trade associations, consultation with tribal governments, and other avenues or means of effectively communicating with eligible customers.

D. CARE PROGRAM GOALS AND BUDGETS FOR THE 2015, 2016 AND 2017 PYs

In the CARE Program Goals section of the application, the IOUs must provide a description of the 2015-2017 program requests, including:

1. A detailed description of all proposed program activities and program participation goals for each year. Include the number of eligible households.
2. A summary of actual participant data from 2012 and 2013, including CARE participant counts and percentage rates for program enrollment. Also provide estimated participation data for 2014 and provide a

comparison to the benchmarks established by the Commission.

3. A discussion of any significant variations in enrollment from year to year and unique issues, if any, of your service area that presents challenges toward reaching the penetration goals of enrollment established by the Commission.
4. A discussion of how the utility's CARE Program goals for the 2015-2017 CARE Program align with Commission directives of reaching the penetration goal of 90%.
5. A description of your utility's existing program elements and strategies to be continued.
6. A description of any new program elements and strategies to be implemented, including estimates of budgets for these new approaches.
7. A detailed description of any proposed pilots and/or studies to be conducted, including detailed proposed budgets.
8. Your utility's total requested budget of the portfolios for each year, and for the entire budget cycle.
9. Estimates of the total number of households to be enrolled for each year, and for the entire budget cycle.
10. Requests for any exceptions, as necessary.

E. PROGRAM DELIVERY

1. Existing Strategies:

Discuss the mechanics of the program and provide a brief description of the strategies employed during 2012-2014 that will be continued through 2015-2017, including a

description of all activities performed by third-parties and other stakeholders.

2. Post Enrollment Verification (PEV) Long Term Probability Model:

a) Discuss the results of both the interim and long term CARE probability models implemented during the 2012-2014 program cycle.

b) Identify the factors used, any identifiable best practices, and explain how the results will be incorporated into the 2015-2017 program cycle.

c) The IOUs' long-term probability advice letters and supplemental advice letters (SDG&E 2515-E-A/2224-G-A, SoCalGas 4537-G-A, PG&E 3410-G-A/4279-E-A, SCE 2936-E-A), noted that CARE customers who fail to respond to the requests for income verification during the PEV process may not be ineligible for the CARE Program. However, much is not known as to why these CARE customers fail to respond, nor is much known as to the characteristics of this customer segment - precisely because they fail to respond to the utility's requests for further information. Discuss the efforts and strategies your IOU will be implementing in the 2015-2017 budget cycle to learn more about this customer segment and to decrease the number of CARE customers who fail to respond to income verification requests during the PEV process.

d) These long-term probability advice letters and supplemental advice letters include extensive detail in outlining what specific customer factors may indicate eligibility and ineligibility for the CARE Program. Describe how these factors relate to the findings in the Low Income Needs Assessment. Discuss whether these factors need to be updated to correspond with the Needs

Assessment findings. Discuss the process your utility will employ to conduct this update.

e) The IOUs' long-term probability model advice letters illustrated some variation in the application of these tools, and some best practices are identified as well. Discuss how quickly, and at what cost, your utility would be able to implement the following PEV procedures:

(i) Prior to probability model screening, require random selection of 1% of all CARE customers for post-enrollment verification?

(ii) Subject all remaining CARE customers (not including those on CARE Program for 20 days or less, or passing verification in the last 24 months, or users with electric usage above 400% baseline who must undergo PEV separately per D.12-08-044) to your utility's individual probability models?

(iii) Using all past program data, project/estimate the total number of CARE customers that would be selected (by month, and by percentage of total CARE population) that would be required to undergo the PEV process using the above procedures as well as the projected administrative costs to facilitate implementation.

3. Targeting the Rural Population:

Identify specific underserved rural areas (by ZIP code or county, tribal area, or appropriate area), as discussed in the latest Needs Assessment or as additional analysis to assess rural population needs, and discuss what new strategies your utility will employ to better target and enroll those households. Include a discussion on your utility's strategies will be carried out in each area, if different.

4. **Targeting the High Poverty Areas (income less than 100% of federal poverty guidelines):**

   Identify the very high poverty areas within your service territory that are underserved (by ZIP code or county), and discuss what new strategies your utility will employ to increase CARE penetration in these areas.

5. **Other New and Proposed Strategies**:

   Discuss the mechanics of the program and provide a brief description of new strategies that will be employed, including a description of activities performed by third-parties and other stakeholders.

6. **New and Proposed Strategies to Reach the "Hard to Reach"**:

   Discuss how your utility will address the needs of hard to reach low-income customers.

7. **Leveraging with California Department of Community Services and Development (CSD):**

   Third-party, off-the-shelf software solutions are available to help streamline the data exchange between Low-Income Home Energy Assistance Program (LIHEAP) utility assistance providers and the IOUs' customer service representatives who oversee customer billing and accounting. How will your utility seek to improve the application of LIHEAP crisis grants for those CARE customer accounts at risk of disconnection? What customer credit or customer billing system upgrades or enhancements has your utility considered to reduce the delay in applying LIHEAP crisis grants/pledges for CARE customers?

F. PROGRAM ADMINISTRATION

Describe the administration of the program, including outreach, and any change or improvement being implemented by category. Include cost by category (should match the budget table).

G. OTHER CARE PROGRAM ELEMENTS PROGRAM DELIVERY

Discuss the existing policies that should be reiterated and should be continued into the 2015-2017 cycle, any existing policies that are being proposed to be retired, and any existing policies that are being proposed to be expanded or modified in the next cycle.

H. COORDINATION BETWEEN CARE AND LIFELINE PROGRAM

D.14-01-036 allows low-income customers to receive subsidized wireless service through the California Lifeline Program. In what ways can this new opportunity be leveraged to market the CARE Program and improve outreach to enroll eligible households, and enhance existing PEV and re-certification processes during the upcoming 2015-2017 program cycle and beyond? Be specific in your response to the above and include opportunities for data sharing to support inter-program coordination. In particular, address how smart phones can be used to facilitate customer education/outreach, and income verification.

I. COOLING CENTERS

D.12-08-044 reinstated cooling center restrictions previously ordered in D.05-04-052 and authorized lower cooling center budgets for SCE, SDG&E and PG&E. The annual cooling center reports submitted on behalf of these utilities summarize recent cooling center activity and reflect overall budget surpluses for all three participating IOUs. Propose cooling center budgets consistent with the requirements and restrictions outlined in D.12-08-044 for the upcoming 2015-2017 program cycle.

J. OUTREACH REPORT

1. Describe the current and suggested Outreach methods to improve enrollment, and include the estimated costs;

2. Discuss how Outreach efforts will result in meeting program participation goals, including any specific population sectors or segments; and

3. As appropriate, for each of the years from 2012 to 2013 provide a comparison of the budgeted, recorded or estimated average Outreach cost per household.

K. PILOTS

1. Include a detailed description of any new pilots being proposed, if any.

2. Discuss how each pilot contributes specifically to meeting the programmatic initiative.

3. Provide a detailed budget for any proposed pilot.

L. STUDIES

1. Include a summary of any studies being proposed.

2. Discuss how each study contributes to meeting the programmatic initiative; and

3. Provide a detail budget for any proposed study.

M. CARE PROGRAM BUDGET

1. Strategies:

Present a detailed budget discussion that clearly identifies specific strategies and programs for the 2015-2017 budget years.

2. 2012-2014 Actual Expenditures:

Provide a detailed summary of your utility's actual expenditures, along with approved budgets, from 2012 and 2013 by line item, consistent with Accounting and Reporting Requirements previously distributed. Costs should be shown on an annual basis. The 2014 approved budget should also be included.

3. 2012-2013 Actual Average Cost Per Household:

Provide an actual or estimated average cost per enrolled household (from 2012-2013) for all major categories of expenses such as processing, certification, verification, outreach, and general administration.

4. Tracking Program Costs:

Propose all methods for reporting costs and demonstrate how the proposed methods are consistent across the utilities.

N. REVENUE REQUIREMENTS AND RATE IMPACTS

Discuss the revenue requirements necessary to achieve the program plans and objectives proposed for the three year application period as well as the projected rate impacts that would arise due to the increased revenue requirements.

O. AB 327 Marketing, Education and Outreach:

What is your utility's plan for communicating/ messaging to the customers of the potential CARE rate changes per AB 327? What are the projected costs of this expanded marketing and outreach effort? Will this marketing be a statewide effort, regional, and/or local effort? And if so, how will it integrate with the California Center for Sustainable Energy (CCSE) Statewide Marketing effort?

O. General Report

1. Discuss all program accomplishments and challenges; and
2. Describe any customer complaints or concerns.

IV. CONCLUSION

Summarize your utility's requests seeking the Commission's approval as part of the CARE and ESA Programs and budgets for the 2015, 2016, and 2017 PYs.

Provide your utility's potential bridge funding estimates for your utility's ESA and CARE Programs, in the event that a decision on the applications for the 2015-2017 ESA and CARE Programs is not adopted before January 1, 2015. Provide your utility's bridge funding estimates for a delay of 3 months, 6 months, 9 months and 12 months for both the CARE and ESA Programs to continue without disruption.

V. EXCEL ATTACHMENTS

The IOUs must use the attached excel templates to be filed with their 2015-2017 application and testimony.

A. ESA Program

1. ESA Program BUDGET PROPOSAL TEMPLATE
2. ESA Program BUDGET PROPOSAL TEMPLATE- ELECTRIC
3. ESA Program BUDGET PROPOSAL TEMPLATE- GAS
4. ESA Program PLANNING
5. ESA Program COMPREHENSIVE MEASURES LIST
6. ESA Program PENETRATION
7. ESA Program -- DETAIL BY HOUSING TYPE
8. ESA Program -- COST EFFECTIVENESS
9. ESA Program -- COST EFFECTIVENESS- WEATHER SENSITIVE
10. ESA Program -- COST EFFECTIVENESS- NON WEATHER SENSITIVE
11. ESA Program STUDIES AND PILOTS PROPOSAL
12. SUMMARY: ALL Proposed Changes to the ESA Program

B. CARE

1. CARE BUDGET PROPOSAL TEMPLATE
2. CARE RATE IMPACTS
3. CARE RATE IMPACTS- GAS
4. CARE RATE IMPACTS- ELECTRIC

5. CARE PENETRATION
6. CARE PROGRAM DETAIL- USAGE AND SAVINGS
7. CARE STUDIES AND PILOTS PROPOSAL
8. SUMMARY: ALL Proposed Changes to the CARE Program

C. STUDIES AND PILOTS PROPOSAL TEMPLATE

D. UTILITY TESTIMONY

Attachment A-1

PY 2015-2017 Energy Savings Assistance Program Proposed Electric & Gas Budget
[Utility Name]

	PY2014 Authorized	PY 2015 Year-End Projected	PY 2016 Year-End Projected	PY 2017 Year-End Projected
Energy Savings Assistance Program				
Energy Efficiency				
Appliances				
Domestic Hot Water				
Enclosure				
HVAC				
Maintenance				
Lighting				
Miscellaneous				
Customer Enrollment				
In Home Education				
Pilot				
Energy Efficiency Total				
Training Center				
Inspections				
Marketing and Outreach				
Statewide Marketing Education and Outreach				
Measurement and Evaluation Studies				
Regulatory Compliance				
General Administration				
CPUC Energy Division				
TOTAL PROGRAM COSTS				
Funded Outside of ESAP Program Budget				
Indirect Costs				
NGAT Costs				

Attachment A-1a

PY 2015-2017 Energy Savings Assistance Program Proposed Electric Budget
[Utility Name]

	PY2014 Authorized	PY 2015 Year-End Projected	PY 2016 Year-End Projected	PY 2017 Year-End Projected
Energy Savings Assistance Program				
Energy Efficiency				
Appliances				
Domestic Hot Water				
Enclosure				
HVAC				
Maintenance				
Lighting				
Miscellaneous				
Customer Enrollment				
In Home Education				
Pilot				
Energy Efficiency Total				
Training Center				
Inspections				
Marketing and Outreach				
Statewide Marketing Education and Outreach				
Measurement and Evaluation Studies				
Regulatory Compliance				
General Administration				
CPUC Energy Division				
TOTAL PROGRAM COSTS				
Funded Outside of ESAP Program Budget				
Indirect Costs				
NGAT Costs				

Attachment A-1a

PY 2015-2017 Energy Savings Assistance Program Proposed Gas Budget
[Utility Name]

	PY2014 Authorized	PY 2015 Year-End Projected	PY 2016 Year-End Projected	PY 2017 Year-End Projected
Energy Savings Assistance Program				
Energy Efficiency				
Appliances				
Domestic Hot Water				
Enclosure				
HVAC				
Maintenance				
Lighting				
Miscellaneous				
Customer Enrollment				
In Home Education				
Pilot				
Energy Efficiency Total				
Training Center				
Inspections				
Marketing and Outreach				
Statewide Marketing Education and Outreach				
Measurement and Evaluation Studies				
Regulatory Compliance				
General Administration				
CPUC Energy Division				
TOTAL PROGRAM COSTS				
Funded Outside of ESAP Program Budget				
Indirect Costs				
NGAT Costs				

Attachment 2

PY 2015-2017 Energy Savings Assistance Program Planning Assumptions
[Utility Name]

Measures*	Units	PY 2014 Authorized					PY 2015 Planned					PY 2016 Planned					PY 2017 Planned				
		Quantity Installed	kWh (Annual)	kW (Annual)	Therms (Annual)	Projected Expenses	Quantity Installed	kWh (Annual)	kW (Annual)	Therms (Annual)	Proposed Expenses	Quantity Installed	kWh (Annual)	kW (Annual)	Therms (Annual)	Proposed Expenses	Quantity Installed	kWh (Annual)	kW (Annual)	Therms (Annual)	Proposed Expenses
Appliances																					
High Efficiency Clothes Washer	Each																				
Refrigerators	Each																				
Microwaves	Each																				
Domestic Hot Water																					
Water Heater Blanket	Home																				
Low Flow Shower Head	Home																				
Water Heater Pipe Insulation	Home																				
Faucet Aerator	Home																				
Water Heater Repair/Replacement	Each																				
Thermostatic Shower Valve	Each																				
Enclosure																					
Caulking	Home																				
Weatherstripping	Home																				
Utility Gaskets	Home																				
Attic Access Weatherstripping	Home																				
Evaporative Cooler Cover	Home																				
AC Vent Cover	Each																				
Attic Insulation	Home																				
HVAC																					
FAU Standing Pilot Light Conversion	Each																				
Furnace Repair/Replacement	Each																				
Room A/C Replacement	Each																				
Central A/C Replacement	Each																				
Heat Pump Replacement	Each																				
Evaporative Coolers (Replacement)	Each																				
Evaporative Coolers (Installation)	Each																				
Duct Testing and Sealing	Home																				
Maintenance																					
Furnace Clean and Tune	Home																				
Central A/C Tune-up	Home																				
Evaporative Cooler Maintenance	Home																				
Lighting																					
Compact Fluorescent Lights (CFLs)	Each																				
Interior Hard wired CFL fixtures	Each																				
Exterior Hard wired CFL fixtures	Each																				
Torchiere	Each																				
Occupancy Sensor	Each																				
LED Night Lights	Each																				
Miscellaneous																					
Pool Pumps	Each																				
Pilots																					
	Each																				
	Each																				
Customer Enrollment																					
In-Home Education	Home																				
Total																					

* Include all proposed new measures, where appropriate.

Attachment A-3

Energy Savings Assistance Program Penetration
[Utility Name]

	Number of Customers in Utility Service Area	Number of Eligible Low Income Customers*	Number of Customers Served by ESAP in Past 10 Years	Number of Customers Enrolled in CARE	Number of Eligible and Willing ESAP Customers**	Customers to be Treated by ESAP Program	Percent of ESAP Programmatic Initiative Achieved
PY 2007							
PY 2008							
PY 2009							
PY 2010							
PY 2011							
PY 2012							
PY 2013							
PY 2014							
PY 2015							
PY 2016							
PY 2017							

* Number of eligible low income customers to be based on customers at or below 200 percent of the Federal Poverty Line.
** Number of eligible and willing ESAP customers based on utility's proposed "standard means of deriving the number of LIEE customers on which to reaching 1/2 of the Commission's programmtic initiative," as discussed in Section III.

Attachment A-4

Energy Savings Assistance Program Detail by Housing Type
[Utility Name]

	PY 2013		PY 2014 (Projected)		PY 2015 (Projected)		PY 2016 (Projected)		PY 2017 (Projected)	
	Customers Eligible	Customers Treated	Customers Eligible	Customers Treated	Customers Eligible	Customers Treated	Customers Eligible	Customers Treated	Customers Eligible	Customers Treated
Gas and Electric Customers										
Owners - Total										
Single Family										
Multifamily										
Mobile Homes										
Renters - Total										
Single Family										
Multifamily										
Mobile Homes										
Electric Customers (only)										
Owners - Total										
Single Family										
Multifamily										
Mobile Homes										
Renters - Total										
Single Family										
Multifamily										
Mobile Homes										
Gas Customers (only)										
Owners - Total										
Single Family										
Multifamily										
Mobile Homes										
Renters - Total										
Single Family										
Multifamily										
Mobile Homes										

Summary of Energy Savings Assistance Program Cost Effectiveness
[Utility Name]

	Ratio of Program Benefits over Program Costs		
	Utility Cost Test	Modified Participant Test	Total Resource Cost Test
PY 2008			
PY 2009			
PY 2010			
PY 2011			
PY 2012			
PY 2013			
PY 2014			
PY 2015			
PY 2016			
PY 2017			

Attachment A-6

Energy Savings Assistance Program Cost-Effectiveness - Weather Sensitive Measures
[Utility Name]

Measure*	Measure Group	Type of Home (SF, MH, MF)	Electric or Gas (E,G)	Climate Zone** (Number)	Ratio of Benefits Over Costs***		
					Utility Cost Test	Modified Participant Test	Total Resource Cost Test
	Appliances						
	Domestic Hot Water						
	Enclosure						
	HVAC						
	Maintenance						
	Lighting						
	Miscellaneous						

* Include chart pertaining to each proposed measure, with information included on type of home (ie. Single Family, Multi Family, Mobile Home) and electric or gas (if applicable).
** Charts to include information on each climate zone in utility service area.
***

Attachment A-7

Energy Savings Assistance Program Cost-Effectiveness - Non Weather Sensitive Measures
[Utility Name]

Measure*	Measure Group	Type of Home (SF,MH,MF)	Electric or Gas (E,G)	Ratio of Benefits Over Costs***		
				Utility Cost Test	Modified Participant Test	Total Resource Cost Test
	Appliances					
	Domestic Hot Water					
	Enclosure					
	HVAC					
	Maintenance					
	Lighting					
	Miscellaneous					

***

Attachment A-8

PY 2015 - 2017 Energy Savings Assistance Program Pilots and Studies
[Utility Name]

Line No.	Statewide Study	Total Cost	Percent paid by Utility	Total Cost paid by Utility
Total				

Attachment A-9

PY 2015 - 2017 Energy Savings Assistance Program Summary of Proposed Changes
[Utility Name]

Proposed Program Change	Notes

PY 2015 - 2017 CARE Proposed Program Budget
[Utility Name]

CARE Budget Categories	2014 Authorized	2015 Planned	2016 Planned	2017 Planned
Outreach				
Processing, Certification, Recertification				
Post Enrollment Verification				
IT Programming				
Cool Centers				
Pilots				
Measurement and Evaluation				
Regulatory Compliance				
General Administration				
CPUC Energy Division Staff				
SUBTOTAL MANAGEMENT COSTS				
Subsidies and Benefits				
TOTAL PROGRAM COSTS & CUSTOMER DISCOUNTS				

Attachment B-2

PY 2015 - 2017 CARE and ESAP Rate Impacts - Gas
[Utility Name]

PY 2015 Customer Type	Average Rate Excluding CARE/ESA Surcharge	CARE Subsidy Portion of Rate	CARE Administration Portion of Rate	ESA Program Portion of Rate	ESA Program Administration Portion of Rate	Total CARE/ESA Surcharge	Average Rate Including CARE/ESA Surcharge
Residential							
Commercial							
Industrial							
Agricultural							
Lighting							
System							

PY 2016 Customer Type	Average Rate (cents/Therms)	Portion for CARE surchage and administration	Portion for CARE rate exemptions (cents/Therms)	Portion for ESA (cents/Therms)	Average Rate (cents/Therms) including surcharge
Residential					
Commercial					
Industrial					
Agricultural					
Lighting					
System					

PY 2017 Customer Type	Average Rate (cents/Therms)	Portion for CARE surchage and administration	Portion for CARE rate exemptions (cents/Therms)	Portion for ESA (cents/Therms)	Average Rate (cents/Therms) including surcharge
Residential					
Commercial					
Industrial					
Agricultural					
Lighting					
System					

Attachment B-3

PY 2015 - 2017 CARE and ESAP Rate Impacts - Electric
[Utility Name]

PY 2015 Customer Type	Average Rate (cents/kWh)	Portion for CARE surchage and administration (cents/kWh)	Portion for CARE rate exemptions (cents/kWh)	Portion for ESA (cents/kWh)	Average Rate (cents/kWh) including surcharge
Residential					
Commercial					
Industrial					
Agricultural					
Lighting					
System					

PY 2016 Customer Type	Average Rate (cents/kWh)	Portion for CARE surchage and administration (cents/kWh)	Portion for CARE rate exemptions (cents/kWh)	Portion for ESA (cents/kWh)	Average Rate (cents/kWh) including surcharge
Residential					
Commercial					
Industrial					
Agricultural					
Lighting					
System					

PY 2017 Customer Type	Average Rate (cents/kWh)	Portion for CARE surchage and administration (cents/kWh)	Portion for CARE rate exemptions (cents/kWh)	Portion for ESA (cents/kWh)	Average Rate (cents/kWh) including surcharge
Residential					
Commercial					
Industrial					
Agricultural					
Lighting					
System					

PY 2013-2014 CARE Outreach and Penetration Information
[Utility Name]

CARE PY 2013				
Outreach Method	Total Cost	Estimated # of Customers	Estimated # of Customers	Percent of Net Enrollment

CARE PY 2014				
Outreach Method	Total Cost	Estimated # of Customers	Estimated # of Customers	Percent of Net Enrollment

Attachment B-5

PY 2015 - 2017 CARE Estimated Participation
[Utility Name]

	Total Enrolled 12-31-13	Total Enrolled Through June 2014	PY 2014 Estimated Eligible	Estimated Net PY 2014 Enrollments	Estimated Year End PY 2014 Participation	Estimated PY 2014 Goal Rate	Estimated PY 2015 Net Enrollments	Estimated Year End PY 2015 Participation	Estimated PY 2015 Goal Rate (a)	Estimated PY 2016 Net Enrollments	Estimated Year End PY 2016 Participation	Estimated PY 2016 Goal Rate (a)	Estimated PY 2017 Net Enrollments	Estimated Year End PY 2017 Participation	Estimated PY 2017 Goal Rate (a)
(Source)	(1)		(2)	(3)	(Col. B+E)	(Col. F/D)	(2)	(Col. F+H)	(Col. I/D)	(2)	(Col. I+K)	(Col. L/D)	(2)	(Col. L+N)	(Col. O/D)
	0	0	0	0	0	0%	0	0	0%	0	0	0%	0	0	0%

(a) Estimated PY2015, PY2016 and PY2017 Goal Rate will fluctuate based on updated CARE Eligibility information to be filed December 2015, December 2016 and December 2017.
(1) CARE Annual Reports, dated 5/1/14
(2) Each utility's estimate based on eligibility rates filed.
(3) Most recent estimates of net enrollments.

Attachment B-6

Low Income Customer Usage Levels
[Utility Name]

		PY 2013		PY 2014 (Projected)		PY 2015 (Projected)		PY 2016 (Projected)		PY 2017 (Projected)	
		Number of CARE Customers	Number of Customers Treated by ESAP	Number of CARE Customers	Number of Customers Treated by ESAP	Number of CARE Customers	Number of Customers Treated by ESAP	Number of CARE Customers	Number of Customers Treated by ESAP	Number of CARE Customers	Number of Customers Treated by ESAP
Electric	Total										
	Tier 1*										
	Tier 2*										
	Tier 3*										
	Tier 4*										
	Tier 5*										
Gas	Total										
	Below Baseline*										
	Above Baseline*										

* Utility may include a more detailed breakdown of gas customers' usage level and an explanation of measurement breakdown employed.
The usage tier should be reported as the tier the customer was on, the maximum number of months, in the reported year.

Attachment B-7

PY 2015 - 2017 CARE Pilots and Studies
[Utility Name]

Line No.	Statewide Study	Total Cost	Percent paid by Utility	Total Cost paid by Utility
Total				

Attachment B-8

PY 2015 - 2017 CARE Program Summary of Proposed Changes
[Utility Name]

Proposed Program Change	Notes

(END OF ATTACHMENT Q)

Attachment R

Attachment R
Statewide Energy Savings Assistance Program
Policy and Procedures
Manual

Applicable to:
Pacific Gas & Electric Company
Southern California Edison Company
Southern California Gas Company
San Diego Gas & Electric Company

California Statewide Energy Savings Assistance Program
Policy and Procedures Manual

1 INTRODUCTION 5

1.1 OVERVIEW 5
1.2 STRUCTURE OF THIS MANUAL 6

2 CUSTOMER AND STRUCTURAL ELIGIBILITY 7

2.1 OVERVIEW 7
2.2 CUSTOMER ELIGIBILITY REQUIREMENTS 7
Income Guidelines 7
Types of Income Included in Household Income 8
Verification of Income 8
Actual Income Documentation Required 8
Household Income Calculation Procedures 13
Determining Household Size 13
Qualifying Multifamily Complexes 13
2.3 SERVICE ELIGIBILITY 14
General Service Eligibility Conditions 14
Referrals 15
2.4 STRUCTURAL ELIGIBILITY 16
2.5 HOME OWNERSHIP DOCUMENTATION 18
Overview 18
Multiple Ownership 19
Life Estate/Living Trust 19
Power of Attorney (POA) 19
Property Management Companies 19
2.6 TREATMENT OF RENTAL UNITS 20
Property Owner Approval 20
Eligibility of Rental Units for Certain Measures 20
2.7 PREVIOUS PROGRAM PARTICIPATION 21
2.8 NEED FOR ESA PROGRAM SERVICES 21

3 CUSTOMER OUTREACH AND CUSTOMER RELATIONS 22

3.1 INTRODUCTION 22
3.2 CUSTOMER OUTREACH 22
Promotional Guidelines 22
Representations by Contractor and Contractor's Employees 22
Outreach Interaction 22
Targeted Outreach 23
3.3 CUSTOMER RELATIONS 23
Introduction 23
Expedient Service 23
Other Work 23
Staff Identification 24
Crew Appearance 24
Customers 18 Years or Older 24
Customer Complaint Procedures 24
Substance Abuse and Smoking Policy 25
Incident Report 25

4 PROCEDURES FOR PRE-INSTALLATION CONTACTS *26*
4.1 INTRODUCTION 26
4.2 DESCRIPTION OF PROGRAM SERVICES 26
4.3 DATA COLLECTION 27
4.4 IN-HOME ENERGY EDUCATION 27
4.5 IN-HOME ENERGY ASSESSMENT 28

5 PROGRAM MEASURES .....
5.1 INTRODUCTION 29
5.2 PROGRAM MEASURES 29
5.3 CONSIDERATION OF CHANGES TO MEASURE LIST 29

6 MINOR HOME REPAIRS *34*
6.1 INTRODUCTION 34
6.2 MINOR HOME REPAIRS 34
6.3 LIMITS ON MINOR HOME REPAIRS 35
6.4 PRIORITIZATION OF MINOR HOME REPAIRS 35

7 MEASURE INSTALLATION POLICIES AND PROCEDURES *36*
7.1 INTRODUCTION 36
7.2 GENERAL INSTALLATION POLICIES 36
Introduction *36*
Installation by Contractor *36*
Installation Standards *36*
Safety *36*
Installation of Feasible Measures *37*
Lead-Safe Practices *37*
Site Clean-Up Policies *37*
Recycling and Disposal Policy *37*
Weatherization of Mobile Homes *37*

8 INSPECTION POLICIES *38*
8.1 INTRODUCTION 38
8.2 INSPECTION PERSONNEL 38
8.3 PRE-INSTALLATION INSPECTION 38
8.4 POST-INSTALLATION INSPECTION 38
General Polices on Post-Installation Inspection *38*
Types of Pass Rates *39*
Post-Installation Inspection Frequency *39*
Failed Inspections *40*
Failed Inspection Dispute Resolution *41*
Inspection Waivers *41*

9 CONTRACTOR ELIGIBILITY *42*

9.1 INTRODUCTION 42
9.2 INSURANCE REQUIREMENTS 42
9.3 LICENSING REQUIREMENTS 42
9.4 WORKFORCE EDUCATION AND TRAINING (WE&T) *42*

10 NATURAL GAS APPLIANCE TESTING *43*

10.1 INTRODUCTION 43
10.2 APPLICABILITY OF NATURAL GAS APPLIANCE TESTING 43
General Applicability *43*
Applicability to Combustion Fuels other than IOU Natural Gas *43*
10.3 NATURAL GAS APPLIANCE TESTING PROTOCOLS 44
General Protocols *44*
Pre-Weatherization Evaluations of Gas Appliances *44*
Post-Weatherization Natural Gas Appliance Testing (NGAT) *44*
Disposition of Appliance Fails/Problems *44*
10.4 TIMING OF COMBUSTION APPLIANCE TESTING 44
Homes with Natural Gas Appliances *44*
10.5 ACTIONS TO BE TAKEN WHEN APPLIANCES FAIL NGAT 45
10.6 PERSONNEL PERFORMING NATURAL GAS APPLIANCE ASSESSMENTS AND TESTING 46

TABLES

Table 2-1: Items Included in Income 8
Table 2-2: Types of Income Documentation 12
Table 5-1: Eligible Measures 30
Table 6-1: Caps on Minor Home Repairs 35
Table 8-1: Minimum Sample Sizes for Inspections (90%/□5% precision) 39

1 Introduction

1.1 Overview

This *Statewide Energy Savings Assistance Program Policy and Procedures Manual*[1] *(P&P Manual)* describes the policies and procedures followed in the Energy Savings Assistance (ESA) Programs administered by Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E) (collectively referred to as the utilities or investor-owned utilities (IOUs)). The Statewide ESA Program (Program) policy and procedures are adopted by the California Public Utilities Commission (Commission or CPUC). This Manual provides policies and procedures for implementation of the ESA Program and is being updated pursuant to the changes in the Program in Commission Decision (D.) 12-08-044. This *P&P Manual* is accompanied by the ESA Program California Installation Standards Manual[2] which specifically outlines technical procedures and standards associated with installation of program measures. All contractors employed in the ESA Program must comply with both manuals.

An electronic copy of this Statewide P&P Manual may be obtained at the CPUC website at www.cpuc.ca.gov/PUC/energy/Low+Income. In situations where there are questions regarding the interpretation of a certain policy or procedure, the Utilities shall use Commission D.12-08-044 as the overriding authority.

The policies and procedures in this *P&P Manual* are supplemented by the general and specific terms and conditions incorporated into contracts between the IOUs and their contract service providers as part of the ESA Program.

Updates in ESA Program policies and procedures may be issued by the utilities during the course of the Program Year subject to approval by the CPUC. ESA Program Managers have the flexibility to deviate from established procedures to respond to cases of customer hardship and unusual circumstances. The approving Program Managers shall document any exceptions along with adequate justification and his or her in the customer file.

[1] Formerly known as the Statewide Low Income Energy Efficiency Policy and Procedures Manual.
[2] The California Installation Standards Manual was also updated and revised to comply with D.12-08-044.

1.2 Structure of this Manual

The remainder of this *P&P Manual* is organized as follows:

- Section 2 specifies general statewide policies and procedures relating to customer and home eligibility for the ESA Program.
- Section 3 discusses polices relating to customer outreach and customer relations.
- Section 4 describes the services that are provided under the ESA Program in the initial home visit.
- Section 5 lists the energy efficiency measures that are available to participants in the ESA Program.
- Section 6 discusses policies relating to minor home repairs.
- Section 7 describes policies and procedures relating to the installation of energy efficiency measures.
- Section 8 summarizes general statewide inspection policies and procedures.
- Section 9 discusses contractor eligibility.
- Section 10 describes policies and procedures relating to natural gas appliance testing and furnace repairs and replacements.
- Appendix A provides a list of the cities comprising the California Energy Commission (CEC) climate zones used in the determination of attic insulation levels and program eligibility of other measures.

2 Customer and Structural Eligibility

2.1 Overview

This section discusses the eligibility of individual households for ESA Program services. Eligibility of a household for measures offered through the ESA Program depends on several factors, including:

- Household income;
  - Actual income documentation
  - Categorical eligibility
  - Self certification
- The utility services provided by the utility to the dwelling;
- The specific type of structure in which the household resides;
- The ability to obtain the approval of the property owner or authorized agent in the event the household resides in rental property;
- Previous ESA Program services provided for the property in question; and
- The dwelling's need for energy efficiency measures offered through the Program.

These eligibility requirements are explained below.

2.2 Customer Eligibility Requirements

2.2.1. Income Guidelines

All the utilities use the ESA Program income guidelines established by the CPUC to qualify participants in the ESA Program.

These guidelines are provided to the utilities by the CPUC on an annual basis. As set forth in D.05-10-044, the income eligibility level is based on 200% of the Federal Poverty Guidelines. The CPUC updates the ESA Program income guidelines every year for inflation. The current ESA Program income guidelines can be obtained at the CPUC website at www.cpuc.ca.gov/PUC/energy/Low+Income.

2.2.2. Types of Income Included in Household Income

For the purposes of determining ESA Program eligibility, all income is considered, from all household members, from all sources listed in Table 2-1, whether taxable or non-taxable income, including (but not limited to) wages, salaries, interest, dividends, child support, spousal support, disability or veteran's benefits, rental income, Social Security, pensions and all social welfare program benefits before any deductions are made. Table 2-1 indicates the specific items included as income, but is not limited for the purpose of determining eligibility for the ESA Program.

The following types of receipts **are *not*** considered household income for the purposes of determining eligibility:

- Loan proceeds; including reverse mortgages
- Assets (money in bank accounts, a house, a car or other property of possessions);
- Funds transferred from one applicant account to another; or
- Liquidation of assets (other than the portion representing capital or other gains).

Table 2-1: Items Included in Income

Wages, salaries and commissions	401K payments or withdrawals[1]
Alimony payments	Rental income and royalties[2]
Child support payments	School grants, scholarships or other aid[1]
Disability benefits	Self-employment earnings[2]
Foster care payments	Social security payments
Realized capital gains on assets	Housing subsidies
Interest and dividends on assets	Supplemental Security Income (SSI) payments and State Supplemental Payments (SSPs)
Food stamps	Temporary Assistance to Needy Families (TANF) payments
Gambling/lottery winnings	Unemployment Benefits payments
General relief	Veterans Administration Benefit payments
Monetary gifts (both one-time and recurring)	Workers Compensation payments
Insurance settlements or legal settlements[1]	Union strike fund benefits
Pension payments or withdrawals[1]	

[1] Other than loans.

[2] For rental income and self-employment income, only positive values of income are included. Negative net rents and negative self-employment income are ignored.

2.2.3. Verification of Income

2.2.3.1 Actual Income Documentation Required

When income documentation is required, income documentation must be reviewed, recorded, copied and securely stored by service providers prior to the installation of measures for all prospective participants.

CARE **self-certification** does not automatically qualify a household for ESA Program, except in the case of group homes or targeted self certification areas, where it is specifically allowed unless otherwise noted by Commission Decision.

In the case where the utility has **verified** that the customer is CARE-eligible within the past year, such income verification may be used for ESA Program participation.

The utility will periodically audit enrollment information and /or income documentation retained by the contractor. In the event that information and/or documentation is not complete and correct for a participant, payment to the contractor for the provision of Program services to that unit may be disallowed.

The kinds of income documentation required by the Program include but are not limited to those presented in Table 2-2. In applying these documentation requirements, the following stipulations must be observed:

- Current award letters must include the value of the award and the period of time in question. They must also be dated within one year of the customer's signature date and must list the customer's name.
- Affidavits relating to gifts must indicate the amount and frequency of the gift(s). They must also contain the name, phone number, address and signature of the giver.
- In determining rental income, a renter-landlord relationship exists between household members when a room or rooms in the house is being rented and the renter is not a dependent of anyone in the household. Therefore, the renter is not counted as a household member and the rent paid is counted as part of the total household income. If the renter is a dependent, the renter is counted as a household member (even if he or she is paying rent) and his or her income is considered part of the total household income. A dependent is anyone claimed on the applicant's income tax return.
- Federal income tax documentation must include copies of all 1099s and W-2 forms.

- Affidavits from an employer who plays the applicant cash wages must include the company name, address and phone number. It must also include the name of the applicant, total amount paid to the applicant, and the frequency of payments, and must contain a signature from the employer's authorized representative.

- If the applicant receives cash wages for jobs like mowing lawns, babysitting, handyman services, casual day labor, etc., a self-employment affidavit from the applicant is acceptable if it meets all Program criteria.

- In cases where a household claims no income for the past 12 months, the applicant must demonstrate his or her means of financial support other than income. In the event that the applicant cannot provide documentation of either income or other means of support, Program services will not be performed until such information is provided.

2.2.3.2. Categorical Eligibility

Categorical eligibility is another enrollment procedure designed to ease enrollment processes in both ESA and CARE programs. Customers may be eligible to participate under categorical eligibility[3] and enroll in the ESA Program based on their current participation in another local, state, or federal means-tested program if those income guidelines are at or below current CARE/ESA program income guidelines as set forth by the Commission. The categorical programs that have been adopted can be found at www.cpuc.ca.gov/PUC/energy/Low+Income .

Applicants utilizing the categorical eligibility option to enroll in ESA Program must present documentation reflecting current participation in one of the Commission approved programs in order to satisfy the "income documentation" component. Such documentation must be reviewed, recorded, copied and securely stored by service providers prior to the installation of measures for all prospective applicants.

[3]Categorical eligibility approved in Decision 06-12-038 for SCE, PG&E, SoCalGas, and SDG&E. Utilities, Energy Division staff and DRA to determine acceptable categorical eligibility programs.

2.2.3.3. Targeted Self-Certification

Targeted Self Certification is a third enrollment procedure designed to ease enrollment processes in ESA Program. Eligibility for self certification is determined by each utility based on their identification of geographic areas of their service territory where 80% of the customers are at or below 200% of the federal poverty line. Applicants residing within these targeted self certification areas must sign a "self certification statement" certifying that they do indeed meet the current income guidelines established for participation in the ESA Program. This self certification statement is to be retained in lieu of other income documentation or proof of participation in a categorical eligibility program. A current CARE self certification statement is allowed.

Table 2-2: Types of Income Documentation

Type of Income	Documentation
Wages, salaries and Commissions	Copy of customer's payroll check stub(s) OR Federal income tax filing showing gross income OR affidavit from employer (for cash wages only, and only where just one employer)
Alimony or Child Support Payments	Copy of check, bank statement, OR most recent court document stating amount
Disability benefits, Foster Care payments, Unemployment Benefits, VA Benefits, Workers Compensation	Copy of checks stubs OR copy of most recent award letter
Capital or Other gains	Federal Income Tax filing showing capital or other gains
Food stamps	Copy of most recent award letter OR food stamp/cash issuance letter (indicate TANF or General Relief)
Gambling/lottery winnings	determined on case-by-case basis
General relief	Copy of most recent award letter (Notice of Action) OR copy of un-cashed check(s) OR copy of direct deposit statement(s)
Monetary gifts	Copy of customer's bank statement OR affidavit from gift giver
Proceeds from insurance settlements or legal settlements	Copy of settlement document
Interest and dividend income	Copy of customer's bank statement(s) OR copy of customer's investment statement(s) OR Federal Income Tax filing showing gross income
Pension or 401K payments or Withdrawals	Copy of customer's check stubs OR copy of most recent award letter OR Form 1099R from prior year OR copy of most recent bank statement
Rental income [4]	Tax return (Form 1040, Schedule E, Total Rental Real Estate and Royalty Income or Loss) showing rental income OR copy of rental receipts OR copy of rental agreement specifying rent amount and affidavit from tenant
School grants, scholarships or other aid	Copy of award letter OR copies of cancelled checks
Self-employment earnings [3]	Income statement showing most recent quarterly adjusted earnings plus prior year's tax return (1040 Schedule C, Net Profit or Loss) OR written affidavit from an accountant or applicant
Housing subsidies	award letter
SSI payments, TANF payments, or Social Security payments	Copy of most recent award letter (Notice of Action) OR copy of un-cashed check(s) OR copy of customer's direct deposit statement
Union strike fund benefits	Copy of benefits payment stub

[4] For rental income and self-employment income, only positive values of income are included. Negative net rents and negative self-employment income are ignored.

2.2.4. Household Income Calculation Procedures

Household income guidelines are based on gross *(pre-tax)* annual income. For self-employed individuals, gross (pre-tax) income is defined to be net profit or loss from self-employment. In the event that a full 12 months of income information is not available, or if there has been a change in the employment status of the household over the past 12 months, it may be necessary to annualize income from a shorter period of time. If, for instance, a household member has been employed for six months, the income earned over this period would be annualized by multiplying it by 2.

It is the intention of the ESA Program for all outreach personnel to compute annual income as accurately as possible. The calculations used will depend on the type of records available from each household member. Since all household members may not have the same type of income records, it may be necessary, and appropriate, to use more than one method when documenting income for different members of the same household.

2.2.5. Determining Household Size

Household size is the current number of people living in the home as permanent residents. Friends or family on a temporary visit (less than 6 months) are not considered household members nor are their earnings part of household income.

Children and/or other dependents residing in the household *only* on weekends, holidays, or vacations may be counted as part of the household only if the family claims them as dependents on their federal income tax filing. Children by previous marriages who do not reside in the home cannot be considered household members, even if they are receiving child support, unless they are claimed as dependents on the applicant's federal income tax filing.

2.2.6. Qualifying Multifamily Complexes

The ESA Program makes use of fractional income qualification for certain measures for multifamily complexes. The terms of income qualification are as follows:

- For the purposes of determining income eligibility, multifamily complexes are defined as those with five (5) or more dwelling units. Duplexes, triplexes, and fourplexes will be qualified as single family homes for the purposes of determining income eligibility.
- For multi-family buildings, refer to Table 5-1 herein for the measures available to multi-family buildings.

- To qualify an entire multifamily building for other measures offered by the Program (defined as 80-20 measures), at least 80% of all (occupied and unoccupied) dwelling units must be occupied by income-qualified households. However, if at least 80% of all units adjacent to a common attic space satisfy the 80% rule, that attic space may be treated even if the 80% rule is not satisfied for the entire building. In the event that fewer than 80% of the dwelling units are occupied by income-qualified households, individual dwelling units occupied by qualifying households may still receive all feasible 80-20 measures.
- Service providers must review, record, copy and securely store income documentation for all households used to qualify an apartment building. The provider must also make its best effort to review and record income documentation for all other households in the multifamily building (i.e., those not used to meet the 80% qualification standard).
- Unoccupied and other non-qualified multifamily dwellings may be weatherized, as long as the multifamily building satisfies the 80% rule for income qualification.

2.3 Service Eligibility

2.3.1. General Service Eligibility Conditions

To be eligible for the ESA Program, a customer must be served by an active utility account/meter (includes master meter). In an area served by different investor-owned gas and electric utilities (e.g., the SoCalGas-SCE overlap area) the fuel source for the dwelling's space heat shall determine which utility will be the provider of air sealing/envelope and attic insulation measures to the dwelling as long as that fuel source is either natural gas or electricity. In the event that a non-IOU heating fuel is used *and* the home has air conditioning, the electric IOU will be the provider of weatherization measures other than infiltration-reduction measures.

Measure-specific eligibility requirements will be followed in the ESA Program. Not all measures are offered in all utility services territories or climate zones. Table 5-1 shows the measures offered by each utility.

2.3.2. Referrals

In order to provide the maximum opportunity for eligible customers to receive all feasible measures, the four IOUs—PG&E, SCE, SoCalGas, and SDG&E—will set up a referral system with each other. In addition, the utilities will work with community agencies and local governments including their local Department of Community Services and Development (DCSD) agencies to expand leveraging opportunities. This will increase the number of measures available to eligible customers by sharing the cost of measures offered by both programs.

In areas where a customer receives natural gas and electric services from two different IOUs, the utilities will work together to ensure the customer receives all feasible measures. The utility installing infiltration measures will conduct natural gas appliance testing as long as the utility serves natural gas somewhere in its service area (and thus has trained gas service representatives). In the event that the customer has electric space heat served by an electric-only utility, the electric utility will not install infiltration measures if natural gas appliances are present.

In order to mitigate the duplication of costs that could otherwise be associated with customers participating in two utility programs, two steps shall be taken:

- First, customers that have provided proof of income qualification or deemed categorically eligible by one IOU, shall be considered eligible by all other IOU's serving this customer; and
- Second, gas and electric utilities will offer common energy education in overlap areas so that customers will need to receive education from only one utility.

Additionally, the minimum measure requirement for eligibility (see Section 2.8) will not apply to homes referred by one IOU to another, if the first IOU establishes that a home meets this minimum for the combination of gas and electricity.

2.4 Structural Eligibility

Public Housing. Public housing is eligible for participation in the ESA Program, but must meet the program eligibility requirements in order to participate. (Note that this does not include on-base military housing, insofar as these dwelling units are not served by the investor-owned utilities.)

Housing Type

Single family homes, multifamily dwelling units, and mobile homes are eligible to participate in the program.

- Duplexes, triplexes, and fourplexes will be qualified as single family homes.
- Multifamily complexes are defined as those with five (5) or more dwelling units.
- Mobile homes are defined by California Department of Housing and Community Development as having "over 320 square feet of gross floor area, more than eight feet in width, and more than 40 feet in length." A mobile home is a manufactured home regulated by the U.S. Department of Housing and Urban Development code (Sec. 3280) and built on a trailer chassis and designed for highway delivery to a permanent location, and it can be a single-, double-, or triple-wide home.

The utilities may promote or limit the treatment of housing types in individual program years as long as these actions are consistent with the achievement of the programmatic initiative.

Housing on Non-Residential Rates. In general, only residential customers on residential rates are eligible to participate in the ESA Program. However, group homes on non-residential rates are eligible for ESA Program services as long as they are currently eligible for CARE under current CARE guidelines applicable to group living facilities,[5] and the structure in question is a single family, multifamily or mobile home suitable for weatherization under ESA Program standards.[6]

CARE-eligible facilities include but are not limited to the following.

- Migrant farm worker housing centers, as defined in Section 50710 of the Health and Safety Code, provided that 70% of all energy usage in master-metered facilities and 100% of all energy usage in individually-metered facilities is residential.
- Privately owned employee housing, as defined in Section 17009 of the Health and Safety Code, that is licensed and inspected by the state and local agencies pursuant to Part I of Division 13, and in which 100% of all energy use is residential.
- Housing for agricultural employees operated by non-profit entities, as defined in Subdivision (b) of Section 1140.4 of the Labor Code, and that has an exception from local property taxes pursuant to subdivision (g) of the Revenue and Taxation Code, provided that 70% of all energy usage in master-metered facilities and 100% of all energy usage in individually-metered facilities is residential.
- Non-profit group living facilities, defined as transitional housing (such as a drug rehabilitation or halfway house), short- or long-term care facilities (such as a hospice, nursing home, children's home or seniors' home), group homes for physically or mentally challenged persons, or other nonprofit group living facilities.
- Homeless shelters, hospices and women's shelters with the primary function of providing lodging and which are open for operation with at least six beds for a minimum of 180 days and/or nights (including satellite facilities in the name of the licensed corporation, where 70% of the energy supplied is for residential purposes).

[5] See D. 92-04-024, April 8, 1992; D. 92-06-060, June 17, 1992; D. 95-10-047, October 18, 1995. Also see *Commission Advisory and Compliance Division, Workshop Report on California Alternate Rates for Energy (CARE): The Development of Guidelines to Implement CARE for Migrant Farmworker Housing, Agricultural Employee Housing, and Employee Housing,* May 1995

[6] It should be noted that CARE income eligibility requires that 100% of the residents of the facility (other than live-in staff) meet the CARE income guideline. This income eligibility criterion will be applied to group homes for the purposes of determining ESA Program income eligibility.

As mandated by AB 868 and reiterated by an October 1, 2004 Administrative Law Judge's Ruling,[7] migrant housing centers are presumed to meet CARE income eligibility guidelines without verification. This presumption will also be used in determining ESA Program income eligibility of such facilities. For the purpose of determining eligibility of other types of housing on non-residential rates, income qualification shall be considered satisfied if the facility is on CARE. These facilities represent a unique situation and this income verification procedure shall not be considered a precedent for other circumstances.

2.5 Home Ownership Documentation

2.5.1. Overview

Home ownership must be verified in order to ensure that the legal owner or authorized agent signs the Property Owner Waiver. It is the responsibility of the contractor to review the documents and ensure proof of home ownership. If a home is in the name of a deceased spouse, the surviving spouse should be considered as the owner. For example, if the home is in the husband's name and never transferred to the widow, the widow is considered the current homeowner.

Any of the following may be used for home ownership documentation.

- Current loan or mortgage documents;
- Property tax records or bills;
- Home owner property insurance (fire insurance);
- Mortgage payment invoices or book;
- Data Quick or similar title search service;
- Deeds; and
- Current Mobile Home Registration from Department of Housing and Community Development.

[7] Administrative Law Judge's Ruling Seeking Input Regarding Assembly Bill 868 (Care Eligibility for Migrant Housing Centers), October 1, 2004.

2.5.2. Multiple Ownership

If the home is owned by more than one person, the homeowner will be considered any one of the persons whose name appears on the document.

2.5.3. Life Estate/Living Trust

A homeowner may have established a "Life Estate" or “Living Trust.” With either, the property is deeded to another individual or trust but the original owner maintains control of the property. The original owner may sign as the property owner only if he or she has a copy of Life Estate or Living Trust documents. Contractor must review and verify that the individual signing the Property Owner Waiver is authorized to do so within the “Life Estate” or “Living Trust”. Contractor and individual signing POW shall sign a statement to document that they are authorized to sign agreement to participate in ESA Program and a copy of the signed statement must be maintained in the customer’s file.

2.5.4. Power of Attorney (POA)

In cases where the property owner is not available to sign on the Agreement, any person having a Power of Attorney (POA) for that owner may sign the Agreement. Contractor and individual signing POA shall sign a statement to document that they are authorized to sign agreement to participate in ESA Program and a copy of the signed statement must be maintained in the customer’s file.

2.5.5. Property Management Companies

Authorized representatives of property management companies may sign for property owners for both single family and multifamily agreements under the following conditions: the property management company has a standard Power of Attorney agreement with the property owner; or the property management company has a signed Management Agreement with the owner authorizing the property management company to act as the agent for the specific property; or any other documentation that the utility may require to establish that an agreement exists between the property owner and the management company. A copy of any support documentation must be kept in the customer’s files.

2.6 Treatment of Rental Units

2.6.1. Property Owner Approval

In general, rental units may not receive Program Services and Measures until a Property Owner's Waiver has been received. This approval must cover the participation of the unit in the Program as well as the installation of specific measures. Such approval is valid for a period of 12 months from the date it is signed by the Property Owner or authorized agent. If approval of the Property Owner is not received before the installation of such services, the Contractor will be required to reimburse the utility for all payments received from the utility for the measures in question. However with prior written authorization from the utilities' Program Manager, a contractor may proceed with the installation of services and measures that do not directly affect the condition and/or structure without the signed Property Owner Waiver.

2.6.2. Eligibility of Rental Units for Certain Measures

Assuming that the Property Owner's permission is required and has been obtained and that other eligibility conditions are met, rental units may be treated under the Program. However, the following policies relating to specific measures shall be applied. Not all measures listed are offered in all utility service territories or climate zones. See Table 5-1.

- Rental units are not eligible for furnace replacements or major furnace repairs associated with the mitigation of NGAT failures. However, service and adjustments may be made to furnaces and water heaters if these actions would improve the performance of the system at a minimal cost.
- Refrigerator and air conditioner replacements may be provided at no charge to either the tenant or the property owner, except in the instance where the property owner owns the refrigerator or air conditioning unit that is replaced and also pays the utility bill. In these instances, the utilities may make payments to installation contractors that cover only part of the cost of replacement.
- The utilities may opt to provide, at a nominal charge to the property owner, evaporative coolers, refrigerator replacement, and replacement air conditioners and heat pumps.

2.7 Previous Program Participation

In order to provide services to the widest range of low-income households possible, D.08-11-031 places the following restrictions on the participation of homes that have previously been treated under the ESA Program.

- The IOUs are allowed to go back and treat any dwelling served prior to 2002, but they will first seek out new dwellings that have yet to be treated.

2.8 Need for ESA Program Services

A home must receive all feasible measures offered under the ESA Program. In D.08-11-031, the Commission modified the "3 Measure Minimum Rule" to allow utilities to install one or two measures, as long as the installed measures meet the specified minimum energy savings threshold. Decision 09-06-026 issued June 18, 2009 further modified the "3 Measure Minimum Rule" to clarify the allowable measures under the "3 Measure Minimum Rule". For homes that need fewer than 3 measures, the energy savings achieved must meet certain minimums as established by the Commission. Energy savings of at least 125 kWh annually or 25 therms annually must be achieved in homes where only one or two measures are to be installed. Each IOU will provide its contractors with the individual measures that qualify for installation if a home requires less than three measures. The total energy savings achieved by either one or two measures combined should yield savings of at least either 125 kWh annually or 25 therms annually. The IOUs are to use the most current energy savings estimates as determined in the Final Report of the Load Impact Evaluation for the applicable program cycle, unless directed otherwise by the Commission. For measures not reflected in the Load Impact Evaluation, those energy savings can be derived from DEER, engineering calculations, etc. as appropriate.

Homes that require three or more individual measures qualify for ESA Program participation regardless of energy savings. For homes that require more than three individual measures, refer to Table 5-1.

In an area served by multiple investor-owned gas and electric utilities (investor-owned or municipal), the minimum number of measures will be defined as if the home were served by a combined gas and electric utility, and the utilities will use a referral system to ensure the installation of all feasible measures.

For all homes meeting the minimum for necessary measures, all feasible measures must be installed.[8] As stipulated in the standard non-feasibility criteria, if a measure is already in place and operating properly, even if it does not meet the current Installation Standards for new installations, it should not be removed and replaced.

[8] If a customer refuses a measure, that measure is considered non-feasible. See Section 7.

3 Customer Outreach and Customer Relations

3.1 Introduction

This section presents statewide ESA Program policies and procedures in the areas of customer outreach and customer relations. Subsection 3.2 discusses policies relating to the recruitment of participants for the Program, while Subsection 3.3 focuses on the maintenance of proper relationships with customers. It should be understood that the policies in this section are supplemented by additional provisions in both specific and general terms and conditions included in formal agreements between utilities and contractors.

3.2 Customer Outreach

Contractors recruiting customers for participation in the ESA Program are required to follow strict policies relating to customer outreach. Customer outreach policies cover promotional guidelines, limitations on representations made by contractors and their employees, outreach interactions, and tracking.

3.2.1. Promotional Guidelines

Only promotional materials approved by the Utility Program Manager may be used to promote participation in the ESA Program.

3.2.2. Representations by Contractor and Contractor's Employees

Neither the contractor nor his/her employees may imply that they are employees of the Utility or affiliated with the Utility in any way other than through the ESA Program.

3.2.3. Outreach Interaction

Outreach personnel must effectively contact and interact with a diverse set of customers. These personnel shall have available any necessary multilingual staff and/or translators and shall make every effort to resolve barriers to communication attributable to disabilities.

3.2.4. Targeted Outreach

Outreach efforts should target those customers with the highest energy usage, energy burden and/or energy insecurity but not at the expense of all other customers. Contractors shall also serve those customers who are disabled. Such customers may be identified based on their enrollment in the Medical Baseline Program, their enrollment in the Deaf and Disabled Telecommunications Program (DDPT), their enrollment in ESA Program through a disability-based community-based organization (CBO), their request for accessible formats of written materials or use of Tele-Typewriter/Telecommunications Device for the Deaf (TTY/TDD), the visibility of an observed disability and/or their self-identification as having a disability. Contractors shall not ask the customer if he/she is disabled.

3.3 Customer Relations

3.3.1. Introduction

It is imperative that both contractors and utility employees maintain proper customer relationships. The ESA Program is a customer service program, and should be delivered accordingly. Specific polices with respect to customer relations are specified below.

3.3.2. Expedient Service

Service must be provided to participants in a reasonable time frame, as determined by the utility. Crews must inform customers of the approximate amount of time required for installations, inspections and gas appliance testing (if required), and shall provide services as expeditiously as possible. The number of visits to a home shall be kept to a minimum.

3.3.3. Other Work

Only work directly associated with providing ESA Program authorized services to participating customers may be billed to the ESA Program. The contractor is prohibited from selling other services to the customer or charging the customer for any other service.[9]

[9] Note that this provision does not preclude the possibility of requiring a co-payment for the installation of one or more measures, if approved by the utility.

3.3.4. Staff Identification

All contractor or subcontractor employees who engage in customer contact must wear identification badges provided or approved by the utility at all times. Each badge must include a color photo of the employee. If the contractor produces badges, templates for identification badges will be provided by the utility. The contractor shall immediately return the ID badges of all personnel no longer working for the contractor or its subcontractors on the ESA Program. In the event the contractor is unable to return a badge, the contractor shall immediately notify the Program Administrator.

3.3.5. Crew Appearance

ESA Program contractors are responsible for the courtesy and appearance of their employees. Discourteous personnel and unprofessional appearance will not be tolerated in this program and may constitute grounds for contract termination.

3.3.6. Customers 18 Years or Older

In general, contractors shall enter customer's residences only when adults, eighteen (18) years of age or older are present. The only exception to this rule is that contractors may enter the home of a customer under eighteen (18) years of age if the customer is married or has been declared an emancipated minor by the courts.

3.3.7. Customer Complaint Procedures

The contractor must make every effort to resolve barriers to communication attributable to factors including language preference and disabilities. The contractor must make every effort to resolve and document customer complaints. The Contractor must notify the utility or its designee of the status of each complaint within 24 hours of the contractor's receipt of the complaint. If the complaint deals with customer safety, the contractor must resolve it within 24 hours. If the complaint does not relate to customer safety, the contractor must resolve the complaint to the satisfaction of the customer as required by the IOU. The acceptability of the contractor's resolution of complaints will be determined at the sole discretion of the utility. If the contractor has not resolved the complaint within the mandated period, the contractor shall notify the utility or its designee of this failure.

3.3.8. Substance Abuse and Smoking Policy

In addition to local and state laws, contractor personnel shall not be under the influence of drugs or alcohol nor be using drugs or alcohol anytime when performing ESA Program work. Smoking is prohibited within the residence being served at all times and on the customer's property.

3.3.9. Incident Report

Contractors must immediately contact the utility or its designee if during a home visit there is damage to a customer's home and/or property or if the contractor's employee has been accused of an illegal act. Within 24 hours, the contractor will inform the utility or its designee of the resolutions of all such incidents.

4 Procedures for Pre-Installation Contacts

4.1 Introduction

This section describes the procedures to be followed by outreach workers and contractors during pre-installation visit or visits to a participating home. These procedures cover the provision of general program information, the collection of data on the household and the home, the administration of home energy education, the completion of the home energy assessment, and the installation of measures as approved by each IOU.

4.2 Description of Program Services

In the course of the customer enrollment, the outreach worker shall provide a thorough description of the program services available to the income qualified household. At a minimum, this description must cover the following services:

- The ESA Program, including program goals, eligibility requirements, eligible measures, and procedures. The procedures to be covered by this description must encompass energy education, available energy efficiency services and minor home repairs, general installation procedures, inspection procedures, and natural gas appliance testing procedures (if applicable).
- Other programs designed to repair/replace furnaces or install other energy efficiency measures (if these are offered as separate programs).
- The California Alternate Rates for Energy (CARE) Program. Outreach workers will also provide assistance in enrolling the customer in CARE if the customer chooses to participate in it.
- Other utility programs designed to provide services to low-income customers, including level-payment programs, medical baseline programs, and other energy efficiency programs for which the customer may be qualified.
- Similar programs offered by DCSD and other known energy related programs.

The outreach worker may also describe other utility and non-utility low income assistance and energy efficiency programs. At no time shall Program personnel promote or provide fee-based services to customers in lieu of free services offered under the ESA Program.

4.3 Data Collection

During the initial interview, the outreach worker will also collect data needed to document eligibility and to meet tracking and reporting requirements. In general, information including, but not limited to the following must be collected:

- Name, address and phone number of applicant,
- Senior/disability status of applicant or other permanent household member, as observed by the assessor or voluntarily provided by the applicant,
- Residence type and owner/renter status,
- Gas and/or electric account information,
- Appliance/HVAC system information,
- Customer unwillingness/inability to participate, and
- Home square footage.

Demographic data may also be collected if offered by the customer.

4.4 In-Home Energy Education

In-home energy education will be provided to all income-eligible applicants whose dwellings require the minimum number of measures, using forms and checklists provided by the utilities. Energy education will cover the following general areas: heating and cooling usage, water heating system usage, major electric and gas appliance usage, small appliance usage, benefits of energy efficiency programs in reducing greenhouse gas emissions, water conservation, and lighting usage. At a minimum, topics to be covered in the course of energy education must include:

- The general levels of usage associated with specific end uses and appliances,
- The impacts on usage of individual energy efficiency measures offered through the ESA Program or other Programs offered to low-income customers by the utility,
- Practices that diminish the savings from individual energy efficiency measures, as well as the potential cost of such practices,
- Ways of decreasing usage through changes in practices,
- Information on CARE, the Medical Baseline Program, and other available programs,

- Appliance safety information,
- The way to read a utility bill,
- Greenhouse gas emissions,
- Water conservation,
- CFL disposal and recycling, and
- The procedures used to conduct natural gas appliance testing (if applicable).

4.5 In-Home Energy Assessment

An assessment of the structure will be completed on homes with income-qualifying applicants using utility approved forms and/or tools. The assessment will identify measures which may be installed through the Program.

5 Program Measures

5.1 Introduction

This section identifies the energy efficiency measures available through the ESA Program and discusses the means by which changes in eligible measures are made over time. Subsection 5.2 focuses on measures offered under the program, while Subsection 5.3 outlines the process that will be used to evaluate measures for inclusion in the Program in future years.

5.2 Program Measures

Table 5-1 indicates the specific Program measures that may be provided to participants for the ESA Program in accordance with Commission Decision D.12-08-044 and the California Installation Standards Manual.

5.3 Consideration of Changes to Measure List

Utilities will jointly evaluate existing Program measures in the course of developing recommendations for programs in subsequent years. The utilities evaluate these measures using all available information on both costs and benefits (including energy benefits as well as non-energy benefits), and develop a set of recommendations for CPUC approval. If warranted by the evidence, these recommendations may vary across climate zones. The utilities will also implement a process for considering new measures to be added to the Program. This process will entail the issuance of a solicitation for recommendations for new measures and the assessment of the cost-effectiveness of these measures.

Table 5-1 Eligible Measures

Measure [1]	PG&E			Avail. to Renters	SDG&E			Avail. to Renters	SCE			Avail. to Renters	SCG			Avail. to Renters
	S/F	M/F	M/H		S/F	M/F	M/H		S/F	M/F	M/H		S/F	M/F	M/H	
Heating, Ventilation & Air Conditioning																
Gas Furnace [4] Repair/Replace CZ 1,2,3,4,5,6,11, 12, 13,14, 16	√	√	√													
Gas Furnace [4] Repair/Replace - CZ -7, 10, 14,15					√	√	√									
Gas Furnace [4] Repair/Replace - CZ –4, 5, 6, 7, 8, 9,10,13,14,15,16													√	√	√	
Forced Air Unit Standing Pilot Light Conversion - All – CZ					√	√	√	√					√	√	√	√
Room A/C Replacement																
-CZ 10					√	√	√	√								
- CZ 10,13,14, 15	√								√	√	√	√				
Central A/C Replacement																
- CZ 14	√															
- CZ 14 & 15									√	√	√	√				
Heat Pump - CZ 14 & 15									√	√	√	√				
AC Time Delay - CZ 1, 2, 3, 4, 5, 6, 11, 12, 13, 14, 16**,** (Except SF & MF CZ 1,5,6 and MF CZ 3)	√	√	√	√												
Duct Sealing CZ 1, 2, 3, 4, 5, 11, 12, 13, 16	√		√	√												
- CZ 7, 8, 10, 14,15 (Except CZ 8 Gas)					√		√	√								
- CZ 4, 5, 6, 7, 8, 9,10,13,14,15,16													√		√	√
Evaporative Coolers																
-CZ 10,13,14,15,16									√		√	√				
- CZ 1, 2, 3, 4, 11, 12,13, 14, 16 (Except MH CZ 1)	√		√	√												

Table 5-1 Eligible Measures (Continued)

Measure [1]	PG&E				SDG&E				SCE				SCG			
	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters
Maintenance																
Furnace Clean & Tune CZ 4,5, 6,7, 8, 9,10,13,14,15,16													√	√	√	√
- CZ 7,10,14,15					√	√	√	√								
Central A/C Tune-up/Services																
- CZ 2, 4, 6, 11, 12, 13, 14, 16	√	√	√	√												
- CZ 6,7, 8, 14, 15					√	√	√	√								
All CZ									√	√	√	√				
Enclosure																
Envelop/Air Sealing Measures [2]																
- CZ 1, 2, 3, 4, 5, 6,11,12,13,14,16	√	√	√	√												
- CZ 4,5,6,7,8,9,10, 13,14, 15,16													√	√	√	√
- CZ 6,8, 9, 10, 13, 14, 15, 16 Electric Heated Home									√	√	√	√				
- CZ 6, 7, 8,10,14, 15 Electric Heated Home					√	√	√	√								
- CZ 7, 10,14, 15 Gas Heated Home					√		√	√								
Attic Insulation																
CZ 1, 2, 3, 4, 5, 6. 11, 12, 13, 14, 16	√	√		√												
- CZ 4,5,6,7,8,9,10 13, 14, 15, 16													√	√		√
- CZ 6,7,8,10,14,15 Electric					√	√		√								
- CZ 7,10,14,15 Gas					√	√		√								
Minor Home Repairs - All - CZ [3]	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Table 5-1 Eligible Measures (Continued)

Measure [1]	PG&E			Avail. to	SDG&E			Avail. to	SCE			Avail. to	SCG			Avail. to
	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters
Domestic Hot Water																
Faucet Aerators All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Low Flow Showerhead All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Water Heater [4] Repair/ Replacement - Gas - All CZ	√	√	√		√	√	√						√	√	√	
Water Heater Blanket All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Water Heater Pipe Insulation All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√[5]	√	√
Thermostatic Shower Valve - All – CZ	√	√	√	√	√	√	√	√					√	√	√	√
Lighting Measures																
CFL Lighting - All – CZ	√	√	√	√	√	√	√	√	√	√	√	√				
Interior Hard wired CFL fixtures - All - CZ	√	√	√	√	√	√	√	√								
Exterior Hard wired CFL fixtures - All - CZ	√	√	√	√	√			√	√			√				
Torchiere All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				
Occupancy Sensors - All C	√	√	√	√												
LED Night Light - All CZ					√	√	√	√								
Appliances																
Refrigerators - All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				
High Efficiency Clothes Washer - All – CZ					√	√	√	√					√	√	√	√
LIHEAP Appliances All CZ	√	√	√	√												
Microwave Ovens - All - CZ	√	√	√	√	√	√	√	√								
Miscellaneous																
Pool Pumps - All CZ									√			√				
Smart Power Strip All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				

Table 5-1 Footnotes:

[1] Table 5-1 indicates the specific Program measures that may be provided to participants for the ESA Program in accordance with the California Installation Standards Manual

[2] Includes Caulking, Outlet Cover Plate Gaskets, Evaporative Cooler Cover, Air Conditioner Cooler Cover, Attic Access Weather-Stripping Doors and Minor Home Repairs (which include repairs such as ceiling repair, cover plates, door jams, door patch/plate, door replacement, exhaust fan vents, exterior wall repair, foam wall patch, interior wall repair, glass replacements, glazing compounds, lock sets (exterior door) windowsill repair, thresholds, vent repair and alignment, and window repair). For the purposes of qualifying a home for the Program, these measures count as a single measure. If contractors are installing less than three measures in a home, they should refer to Section 2.8.

[3.] There are multiple sub-measures included under minor home repairs. Minor home repairs are constituted by services that either reduce infiltration (e.g., window repairs), mitigate a hazardous condition, or accommodate the installation of Program measures (e.g., attic venting). For the purposes of qualifying a home for the Program, all minor home repairs (combined) count as a single measure.

[4.] For owner occupied, furnace repairs and replacements are provided only when necessary to mitigate NGAT fails and pursuant to the installation of infiltration-reduction measures. Water heater repairs and replacements are also provided only to mitigate NGAT fails or to replace leaking water heater tanks.

Note:

In situations where there are questions regarding the interpretation of a certain measure, the Utilities shall use D.12-08-044 as the overriding authority.

6 Minor Home Repairs

6.1 Introduction

This section describes the ESA Program policies and procedures relating to minor home repairs. Section 6.2 discusses the minor home repairs that may be provided through the ESA Program. Section 6.3 describes Program limits on expenditures on general types of minor home repairs. Finally, Section 6.4 describes the prioritization criteria that will be used by Program Managers to prioritize repairs for a specific home when not all needed minor home repairs can be made within the constraints of the budget limits for that home.

6.2 Minor Home Repairs

Minor home repairs are repairs required to enable installation of weatherization measures, to reduce infiltration, or to mitigate a hazardous condition. Minor home repairs shall be done in a manner that maintains accessibility for customers with observed disabilities.

In *owner-occupied* homes receiving infiltration-reduction measures, minor home repairs may be necessary to mitigate natural gas appliance testing (NGAT) fails that cannot be corrected with service by utility gas service personnel (or their designated representative). Such NGAT fails may include, but are not limited to, CO above the action level, inadequate draft, unsafe flue/vent pipe/system, unacceptable flame or flame change when air handler comes on, a non-operable appliance, or the absence of a furnace in cases where another gas appliance is used for space heating.

In *all* homes receiving infiltration-reduction measures, minor home repairs also include other corrections needed to pass the NGAT protocol, including but not limited to, adding combustion and ventilation air (CVA) venting, and other corrections. It is the general policy of the ESA Program that these repairs must be made if they are needed and feasible, subject to budgetary limits.

6.3 Limits on Minor Home Repairs

There are two types of limits on costs incurred for minor home repairs.

- ***Average Cost Limits.*** These are limits on the average cost of categories of service across all homes receiving the service in question. They are designed to provide overall cost control for the provision of these services.
- ***Individual Home Limits.*** These are defined as limits on the cost that can be incurred for an individual home without the specific approval of the utility Program Manager. Individual home limits are meant to provide for equity in the distribution of program funds across individual households but yet provide Program Managers enough flexibility to respond to individual customer needs and hardship situations.

These limits are presented in Table 6-1. It should be noted that the expenditure limits apply to all minor home repairs, including any actions taken to respond to gas leak/carbon monoxide emission problems identified during the utility's gas appliance testing procedures.

Table 6-1 Caps on Minor Home Repairs

Service	Average Cost per Home Receiving Service	Maximum Cost for Individual Home
Furnace Replacements Central Furnaces Wall/Floor/Direct Vent Furnaces		$2,000[10] $1,500
Water Heater Repairs and Replacements (Total Combined Cost for home receiving one or the other)	$900	$1,250
Other Minor Home Repairs	$300	$750
Furnace Repairs (restriction on repair expenditures relative to cost of replacement) Central Furnaces Wall/Floor/Direct Vent Furnaces		50%[10] 40%

[10] Does not include the costs of Title 24 compliance.

Total of All Minor Home Repairs		
1 Does not include the costs of Title 24 compliance.		

6.4 Prioritization of Minor Home Repairs

In the event that a contractor requests permission from the utility Program Manager to exceed the limit on minor home repairs, the Program Manager will base a decision on the status of the Contractor's minor home repair budget, the overall program budget, and the need for the repairs in question. The approving Program Managers shall ensure that any exceptions and adequate justification are documented along with his or her name in the customer file. If the Program Manager deems it necessary to limit expenditures on the home, measures will be prioritized using the following general priority list:

- Repairs needed to mitigate immediate hazards (e.g., repairs made to mitigate natural gas appliance testing (NGAT) fails, or door repairs where doors will not close or lock),
- Repairs needed to mitigate major infiltration sources (e.g., broken windows, holes in doors, etc.),
- Repairs required to permit the installation of a measure, and
- Other repairs.

7 Measure Installation Policies and Procedures

7.1 Introduction

This section presents ESA Program policies for Program measures that are covered in the ESA Program Installation Standards Manual. Subsection 7.2 specifies general policies that apply to all measures, including contractor installation, installation standards, safety, site clean up, and other policies.

7.2 General Installation Policies

7.2.1. Introduction

Several general policies relating to the installation of Program measures must be followed by installation personnel. These policies are presented below.

7.2.2. Installation by Contractor

All measures, including CFLs must be installed by the contractor in compliance with Program rules. Dropping off materials for later installation by the customer is not permitted under this Program.

7.2.3. Installation Standards

All measures must be installed in conformance with the ESA Program Installation Standards Manual. These standards are intended to meet or exceed existing codes and regulations, and to conform to accepted building practices. When a conflict exists between these installation standards and local codes, the more stringent requirement shall take precedence. Copies of these Installation Standards Manual may be obtained by using the contact information provided in Section 1.1.

7.2.4. Safety

Contractors must plan and conduct all work in a manner that is consistent with the safety of persons and property. All work shall be conducted in compliance with reasonable and safe working practices and with applicable federal, state, and local laws. For instance, the Contractor is responsible for complete compliance with California Occupational Safety and

Health Standards.

It is the responsibility of each program contractor to establish and maintain a safety program for all work undertaken for the ESA Program. It is also the responsibility of each contractor to ensure that all employees observe safety rules by complying with all required safety precautions and regulations. Contractors must ensure that their staff members receive appropriate training in the safe and proper use of the tools associated with the installation of each ESA Program measure.

7.2.5. Installation of Feasible Measures

It is the policy of the CPUC that ESA Program Contractors must install all feasible measures unless after communicating the benefits of installing the new measure(s), the customer specifically refuses the measure(s). If the installer determines that a measure cannot be installed, the reason shall be recorded and made available to the utility or its designee.

7.2.6. Lead-Safe Practices

Contractors shall conduct lead-safe practices when working with pre-1978 painted materials in accordance with federal, state, and local regulations and codes. Lead-safe practices for specific measures are listed in the California Installation Standards Manual.

7.2.7. Site Clean-Up Policies

The Contractor must maintain all work sites and related structures, equipment and facilities in a clean, orderly condition during all work conducted under the ESA Program. Any unused or leftover materials, garbage and debris must be promptly removed from the customer's premises by the Contractor and disposed of at the Contractor's expense. The customer's premises must be left in a clean and orderly condition at the end of each day and at the completion of work.

7.2.8. Recycling and Disposal Policy

The contractor shall properly dispose and recycle replaced measures in an environmentally safe manner and in accordance with federal, state, and local regulations and codes. Specific disposal and recycling policies and procedures of measures are listed in the California Installation Standards Manual.

7.2.9. Weatherization of Mobile Homes

Mobile homes with open combustion furnaces or water heaters drawing air from inside the conditioned space may not have infiltration reduction measures installed under the ESA Program. In addition, attic insulation (and therefore attic duct reconnection) is not a measure for mobile homes.

8 Inspection Policies

8.1 Introduction

This section summarizes the inspection policies used in the ESA Program to ensure safety and quality control in the installation of measures and minor home repairs. Subsection 8.2 discusses the designation of the responsibilities for inspections. Subsection 8.3 describes policies relating to pre-installation inspections. Subsection 8.4 presents policies on post-installation inspections.

8.2 Inspection Personnel

Utilities will use in-house personnel, contract employees, or contractors to conduct inspections. However, each utility will undertake in-house either the prime contractor (administration) function or the inspection function, but not both, with the very limited exceptions discussed in D. 00-07-020.

8.3 Pre-Installation Inspection

The IOUs may implement a pre-installation inspection process for their respective ESA Program. As part of this process, each IOU can select the percentage of homes to be evaluated for program eligibility prior to the installation of measures.

8.4 Post-Installation Inspection

8.4.1. General Polices on Post-Installation Inspection

Post-installation inspections are used to assure that Contractors install measures in accordance with the California Installation Standards of the ESA Program. In this subsection, specific polices relating to post-installation inspections are presented. These policies encompass the types of pass rates used in program administration, the frequency of post-installation inspections, the treatment of failed inspections, resolution of disputes relating to inspections, inspection waivers, and minor job corrections.

8.4.2. Types of Pass Rates

Utilities or their designees will collect information on both per-home and per-measure pass rates. Per-home pass rates will be used for the purposes of determining minimum sample sizes for tracking performance. Per-measure pass rates will be used to tailor training and technical assistance for contractors, as well as to manage programs in a prudent manner.

8.4.3. Post-Installation Inspection Frequency

Utilities or their inspection contractors will select[11] for inspection all attic insulation and furnace replacement jobs. For all other jobs not involving attic insulation or furnace replacement, random inspections will be conducted for a sample of dwelling units.

Suggested minimum sample sizes are shown in Table 8-1. These sample sizes are designed to provide 90% confidence that the true pass rate is within 5% of the estimated value.

Table 8-1: Minimum Sample Sizes for Inspections (90%/□5% precision)

Pass Rate	Number of Homes Completed By Contractor					
	200	500	1000	2000	5000	10000
0.70	140	241	317	377	425	444
0.75	129	210	265	306	337	348
0.80	115	176	213	239	257	264
0.85	98	139	161	175	184	188
0.90	76	97	108	114	118	119
0.95	45	51	54	56	57	57

[11] It is understood that selecting 100% of jobs for inspection does not necessarily mean that 100% of inspections will be completed, since the utilities and their inspection contractors cannot compel program participants to be present for inspection appointments.

Utilities or their inspection contractors may exceed these minimum sample sizes if, in the judgment of the administrator, larger sample sizes are necessary to preserve program quality control. Circumstances that may justify larger sample sizes include, but are not limited to, the following.

1. If the utility's program or the amount of additional post-inspections undertaken is small enough to conduct additional post inspections without substantially increasing total program expenditures.
2. If a particular contractor exhibits a pattern of inspection failures that justifies inspection of a higher percentage of jobs.
3. If a contractor is on a quality improvement plan which requires improvement of its inspection pass rates.
4. If contractor crews are newly trained or new to the program, and require closer field supervision and on-the-job training.
5. If a contractor's installation crews are not sure of program **installation** standards, as shown by failed inspection results.
6. If a contractor's allocation of homes covers multiple counties.
7. If post-inspections are done in conjunction with post-installation natural gas appliance tests, since there are economies associated with conducting post-installation inspections and post-installation natural gas appliance testing **at the same time.**[12]
8. If larger sample sizes are necessary to resolve disputes with contractors over estimated billing fail rates.
9. If a new measure has been added to the Program.

Utilities will keep records of actual inspection frequencies by contractor.

8.4.4. Failed Inspections

If a feasible measure is installed incorrectly or is not installed at all, Contractor may be issued a correction fail which must be resolved as required by the IOU. Hazardous fails must be addressed within 24 hours of notification by the utility and/or its designee.

[12] The rational here is that there are economies associated with conducting post-installation inspections and post-installation natural gas appliance testing.

8.4.5. Failed Inspection Dispute Resolution

In those instances where a dispute arises between inspectors and contractors, the utility and service provider may agree to utilize in-house personnel to hear and determine appropriate action on any unresolved dispute between service providers and inspectors. In the event that an agreement cannot be reached between the utility and service provider, a neutral third party may be utilized. The costs of such service shall be paid by the party that "loses" the arbitration.

8.4.6. Inspection Waivers

Policies on inspection waivers vary between mandatory and non-mandatory inspections, as follows:

- ***Mandatory inspections*** are required for projects which include attic insulation or furnace replacement. For mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. After three such attempts, the inspection provider will send a certified letter to the participant asking for permission to inspect the home. If the participant does not respond to this certified letter within two weeks, the inspection provider need not conduct the inspection but must notify the utility that the inspection could not be completed. In these instances, the portion of program funding associated mandatory inspections should be either not billed by the or refunded to the program. ***Non-mandatory inspections*** relate to projects not involving attic insulation or furnace replacement. They are non-mandatory in the sense that only a sample of projects must be inspected. For non-mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. A non-mandatory inspection of a sampled project may be waived by the utility after three attempts to contact the participant, provided that attempts are made in an effort to overcome barriers attributable to language preference or disability. The inspection provider shall replace a waived inspection with another inspection and shall complete a sufficient number of inspections as provided in the policy on post inspection frequency (see above).

9 Contractor Eligibility

9.1 Introduction

This section outlines contractor eligibility conditions under the ESA Program. Subsection 9.2 deals with insurance requirements. Subsection 9.3 relates to licensing requirements. Subsection 9.4 relates to workforce, education, and training. The purpose of this section is to provide general information on these requirements. It may not include all of the requirements specified in the contracts between contractors and Program Administrators. Contractors interested in participating in the ESA Program can obtain information at each utilities respective website.

9.2 Insurance Requirements

Contractors shall maintain insurance in full force and effect during the life of the contract with the utility, with responsible insurance carriers authorized to do business in California and having a Best Insurance Guide (or equivalent) rating that meets the guidelines of each utility.

9.3 Licensing Requirements

Any organization or company contracting under the ESA Program must comply with all applicable federal, state and local laws and regulations, as well as with utility guidelines. Contractors and subcontractors must also comply with any applicable CSLB licensing requirements, including current requirements for electrical, plumbing and HVAC, and must remain in good standing with the CSLB.

9.4 Workforce Education and Training (WE&T)

Contractors should make every effort to hire and train from the local low income communities. Additionally the contractors are required to work with the utilities to better track the training and hiring of a low income energy efficiency workforce.

10 Natural Gas Appliance Testing

10.1 Introduction

This section summarizes the statewide policy on ESA Program natural gas appliance testing (NGAT). Subsection 10.2 discusses the circumstances when such testing must be conducted. Subsection 10.3 presents the general protocols that are followed in the course of natural gas appliance testing. Subsection 10.4 addresses the timing of testing. Subsection 10.5 considers actions to be taken when one or more test is failed by appliances in a participating home. Finally, Subsection 10.6 discusses the types of personnel used for the assessments.

Note that specific standards for these natural gas appliance testing (NGAT) protocols are described in the *ESA Program California Installation Standards Manual.*

10.2 Applicability of Natural Gas Appliance Testing

10.2.1. General Applicability

In general, natural gas appliance testing will be conducted for all homes that receive infiltration reduction measures and that have at least one natural gas appliance affecting the living space.[13] In addition, the repair and replacement of a natural gas furnace or water heater involves appliance testing. See the Natural Gas Appliance Testing section in the California Installation Standards Manual, as applicable.

10.2.2. Applicability to Combustion Fuels other than IOU Natural Gas

Homes with non-IOU (e.g., propane) space heating fuels are not eligible for infiltration reduction measures. As a consequence, they are not eligible for natural gas appliance testing. Homes with IOU space heating but which use a non-IOU combustion fuel for another appliance (i.e., water heating) are also ineligible for NGAT due to the inability of the IOUs to service combustion appliances using non-IOU fuels. The IOUs will refer these latter homes to local LIHEAP agencies.

[13] The NGAT section of the ESA Program Installation Standards Manual describes the conditions under which an appliance is determined to affect the living space.

10.3 Natural Gas Appliance Testing Protocols

10.3.1. General Protocols

General natural gas appliance testing (NGAT) protocols are presented below. Note again that detailed procedures are described in the NGAT section of the California *Installation Standards Manual.* The types of checks conducted as part of NGAT are described in this section.

10.3.2. Pre-Weatherization Evaluations of Gas Appliances

In order to avoid cases in which post-weatherization NGAT would discover nonconforming conditions that (a) preclude installation of infiltration reduction measures, and (b) cannot be corrected within the scope of the program, some pre-weatherization evaluations of gas appliances are performed as part of the home assessment.

Required corrections will be performed before weatherization commences. The customer will be informed of conditions that preclude installation of infiltration reduction measures and cannot be remedied by the ESA Program (e.g., exhausting clothes dryers outdoors, and repair or replacement of appliances and gas vents for which repair or replacement is not available).

10.3.3. Post-Weatherization Natural Gas Appliance Testing (NGAT)

After completion of weatherization that includes infiltration reduction measures, NGAT is performed for all natural gas appliances affecting the living space.

10.3.4. Disposition of Appliance Fails/Problems

If a problem is identified through the application of the overall natural gas appliance testing protocol (i.e., elevated CO, inadequate draft, or defect causing an unsafe condition), the case will be referred for resolution to qualified utility-trained personnel or a contractor licensed to repair appliances. Such resolution may involve the use of flue CO testing as well as other procedures.

10.4 Timing of Combustion Appliance Testing

10.4.1. Homes with Natural Gas Appliances

For homes with natural gas appliances, post-weatherization NGAT protocols are conducted after weatherization. Post-weatherization NGAT shall be conducted within five (5) working days from the date that infiltration reduction measures are installed.

10.5 Actions to be Taken When Appliances Fail NGAT

The following actions will be taken when appliances fail NGAT:

- In owner-occupied homes, natural gas space heaters failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment and, if necessary, will be repaired or replaced subject to Program policies and procedures.[14]
- In owner-occupied homes, natural gas water heaters failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment and, if necessary, will be repaired or replaced subject to Program policies and procedures.[15]
- In owner-occupied homes, non-program appliances[16] failing one or more of the tests covered by the NGAT protocols will be provided with Service/Adjustment.[17] If Service/Adjustment does not correct the problem in question, the appliance will be tagged, shut off, and/or capped and reported to the customer.
- In renter-occupied homes, appliances failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment. [18] If Service/Adjustment does not correct the problem in question, the appliance will be tagged, shut off, and/or capped and reported to the customer.
- In *owner-occupied* homes receiving infiltration-reduction measures, furnace repair or replacement and water heater repair or replacement may be necessary to mitigate natural gas appliance testing (NGAT) fails that cannot be corrected with service by utility gas service personnel (or their designated representative). Such NGAT fails may include, but are not limited to, CO above the action level, inadequate draft, unsafe flue/vent pipe/system, unacceptable flame or flame change when air handler comes on, a non-operable appliance, or the absence of a furnace in cases where another gas appliance is used for space heating.

[14] Note that the absence of a furnace in cases where another gas appliance is used for space heating will constitute an NGAT fail.
[15] Water heater repairs and replacements are provided only to mitigate NGAT fails or to replace leaking water heaters.
[16] Appliances for which ESA Program repair or replacement is not available.
[17] In this context, Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.
[18] In this context, Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.

There are cost restrictions to be considered when determining whether to repair the furnace measure. The cost to repair the measure should not be more than the cost to replace the measure as follows:

Central Furnaces - 50% (Does not include the costs of Title 24 compliance.)

Wall/Floor/Direct Vent Furnaces - 40% (Does not include the costs of Title 24 compliance.)

10.6 Personnel Performing Natural Gas Appliance Assessments and Testing

The utilities have the option of conducting natural gas appliance assessments and testing using in-house staff or contracting with third parties to provide these services.

(END OF ATTACHMENT R)

Attachment S

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BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U338E) for Approval of its 2012- 2014 California Alternate Rates for Energy (CARE) and Energy Savings Assistance Programs and Budgets.	Application 11-05-017 (Filed May 16, 2011)
And Related Matters.	Application 11-05-018 Application 11-05-019 Application 11-05-020

ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENTS

This ruling directs the parties to the above-captioned Consolidated Proceeding (Proceeding) to file and serve comment to the final working group reports attached to this Ruling as Appendices A (Energy Savings Assistance Program, Workforce Education & Training Working Group, Final Report and Recommendations), B (Mid-Cycle Working Group, Final Report), and C (Addendum to Energy Savings Assistance Program Cost-Effectiveness Working Group White Paper, Working Group Final Recommendations), including responses to the questions set forth in Appendix D. This ruling also memorializes the email ruling dated August 9, 2013, granting the Utilities' request for extension of time to prepare and submit the Final Report (for Phases I and II) for the Energy Education Study.

This ruling follows the submission of final reports and recommendations by the three working groups as ordered in and in compliance with, inter alia, Ordering Paragraphs 4-13 of Decision (D.) 12-08-044, as part of Phase II of the Proceeding. D.12-08-044 anticipated the circulation of these reports and recommendations for comment.

IT IS RULED that:

1. By October 17, 2013, parties shall file and serve comment to the Appendices A (Energy Savings Assistance Program, Workforce Education & Training Working Group, Final Report and Recommendations), B (Mid-Cycle Working Group, Final Report), and C (Addendum to Energy Savings Assistance Program Cost-Effectiveness Working Group White Paper, Working Group Final Recommendations), including responses to the questions set forth in Appendix D.
2. By October 22, 2013, parties may file and serve reply comment.
3. This ruling confirms the Administrative Law Judge's email ruling dated August 9, 2013, (a) granting the Utilities' request for extension of time to prepare and submit the Final Report (for Phases I and II) for the Energy Education Study, (b) relieving the Utilities from complying with the August 31, 2013 due date for the Final Report, including Phases I and II, on Energy Education Study ordered in Decision (D.) 12-08-044, (c) granting the extension of time to submit the Phase I Final Report of the Energy Education Study until October 31, 2013, and (d) directing the Utilities to file a petition to modify D.12-08-044 to seek extension for submitting the Phase II Final Report of the Energy Education Study, which the

Utilities anticipate to be completed after the expiration of the current program cycle and therefore outside the scope of D.12-08-044 timeframe.

Dated October 9, 2013, at San Francisco, California.

/s/ KIMBERLY H. KIM
Kimberly H. Kim
Administrative Law Judge

APPENDIX A

A.11-05-017
Energy Savings Assistance Program
Workforce Education & Training Working Group
Final Report and Recommendations

July 15, 2013

Table of Contents

Sections

1. Background
2. Summary of Working Group Activity
3. Status of Working Group Efforts
4. Working Group Recommendations

Appendices

A. Working Group Participant List
B. Data Collection Template Improvements
C. List of Researchable Questions

Section 1

Background

The Energy Savings Assistance Program (ESAP) Workforce, Education and Training Working Group (WE&T Working Group)[1] is one of three working groups ordered in the California Public Utilities Commission's Decision (D.) 12-08-044.[2] Subsequent Rulings of Administrative Law Judge Kimberly Kim initiated and established each of the Working Groups and their membership makeup.[3]

D.12-08-044 also ordered the four Investor Owned Utilities (individually: Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas and Electric Company; and collectively: the Utilities or IOUs) to collect and report data by February 1, 2013 in seven WE&T areas[4]:

(a) Contractor and subcontractor contract terms (competitive bid, direct award, etc.);

(b) Contractor and subcontractor compensation schemes (hourly, piecemeal, salaried, etc.);

(c) Number of inspection failures and the types of failures (including the number of enrolled customers later deemed ineligible, number of incorrectly assessed households and instances of measure installation inspection failures);

(d) Level and type of IOU training (including lead safety training) and screening (including background check) these specific contractors have completed;

(e) Customer feedback for these contractors, positive and negative;

(f) Demographic data of the current ESA workforce, including minority, local, low income, disabled, displaced, and other disadvantaged communities; and

(g) The IOU's assessment of any other needs of the existing workforce to meet the current and future ESA Program demands.

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[1] To avoid confusion with the Mainstream Energy Efficiency WE&T Taskforce, all references to that taskforce, proceeding, and portfolio will be preceded with the words "Mainstream Energy Efficiency."

[2] D.12-08-044, ordering paragraph 4 directed the Energy Division to form the Mid-Cycle Working Group, Cost-effectiveness Working Group and the Workforce, Education and Training Working Group to review components of the Commission's Low Income Programs.

[3] Administrative Law Judge Ruling, issued September 28, 2012 initiated the establishment of the Working Groups. Administrative Law Judge Ruling, issued October 26, 2012 established the Working Groups.

[4] D.12-08-044, p. 181.

D.12-08-044 further outlines the charge for the WE&T Working Group as follows:

> With the IOUs' reports (IOUs' Reports) containing the above information, the WE&T Working Group, led by Energy Division, and generally organized and administered under sections 3.11.5.4, 3.11.5.5, and 5.3.8 of this decision shall evaluate the data submitted and develop and present recommendations addressing the aforementioned seven areas and another other recommendations on significant WE&T issues the Working Group finds necessary for review as part of the next step going forward. Additionally, the IOUs are directed to work with the Energy Efficiency WE&T Working Group to share any pertinent overlapping information from the ESA Program WE&T Working Group efforts.[5]

In addition to evaluating the data gathered and submitted by the IOUs, the WE&T Working Group was tasked with developing and submitting to the assigned Administrative Law Judge a Progress Report of its findings and recommendations, if any, by April 15, 2013.[6] The WE&T Working Group has also been tasked with submitting its final report of findings and recommendations, if any, by July 15, 2013.[7] The term of the WE&T Working Group expires 45 days after issuance of this final report.[8]

[5] D.12-08-044, p. 182.

[6] D.12-08-044, ordering paragraph 10 directed the WE&T Working Group to submit to the assigned Administrative Law Judge their Progress Report of its activities since inception and a detailed description of the status of efforts in each of the subject areas it is charged to review with justification showing good cause for any additional and estimated time it may require.

[7] D.12-08-044, p. 182-183.

[8] D.12-08-044, p. 183.

Section 2

Summary of Working Group Activity

The WE&T Working Group convened a total of ten meetings between November 15, 2012 and July 15, 2013.[9] These meetings were held via conference call. A list of WE&T Working Group Participants is provided in Appendix A.

During the first meetings on November 15 and November 26, 2012, the participants researched past efforts to define and determine the demographic data fields. The WE&T Working Group discussed the potential of other workforce tracking efforts and databases used by various stakeholders, including Investor Owned Utilities (IOUs), California Employment Development Department (EDD), California Department of Community Services and Development (CSD), and the Mainstream Energy Efficiency WE&T Taskforce.[10] This research also drew upon a wide range of programs and practices, including General Order 156, the San Francisco Local Hiring Policy for Construction, and the Weatherization Assistance Program under the U.S. Department of Energy and American Recovery and Reinvestment Act (ARRA).

As part of that research, the WE&T Working Group learned that other workforce demographic data collection efforts, including EDD's recently launched Virtual OneStop database platform did not collect the level of data directed for collection in D.12-08-044. From these investigations, WE&T Working Group members determined that replicating or reproducing other program's successes in this data collection effort was not an option as no other programs collect this level of workforce data.

Subsequently, the IOUs collaborated to develop a reporting template for their contractors and timely filed their WE&T reports on February 1, 2013 as directed by D.12-08-044.[11] The WE&T Working Group then reviewed these preliminary IOU WE&T Demographic Data filings. In an effort to distill the data, the WE&T Working Group has also refined the reporting template and created a list of researchable questions.

Since issuing its progress report on April 15, 2013, the WE&T Working Group has also tracked and discussed the efforts of the WE&T Consultant for the Mainstream Energy Efficiency Portfolio, particularly its new proposals for data collection.

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[9] WE&T Working Group Meeting dates (1) November 15, 2012, (2) November 26, 2012, (3) December 19, 2012, (4) January 15, 2013, (5) February 19, 2013, (6) March 12, 2013, (7) March 29, 2013, (8) May 22, 2013, (9) June 27, 2013, and (10) July 9, 2013

[10] For instance, additional workforce databases included study of Proteus Inc.'s "POSSE," EDD's Virtual OneStop ("VOS") workforce database, and CSD's quarterly reports.

[11] D.12-08-044, p. 182.

Section 3

Status of Working Group Efforts

The WE&T Working Group has focused its activities to date on forming the templates and reviewing the initial collected data from the templates. The WE&T Working Group has also focused on three ways to improve these efforts: incorporating filters by key data fields, articulating hypotheses to test with the data, and determining the ESA Programs' applicability to the Mainstream Energy Efficiency Portfolio.

First, the original templates remain in need of better filtering by certain reporting fields. The Greenlining Institute has proposed delineating the reporting fields further from contractor to job classification for future versions. This proposal would help to refine data collection efforts by filtering for demographic and training backgrounds within specific job categories. The draft of the improved template is provided in Appendix B. As the Working Group discussed, the short deliverable timeline for development and fielding of the tool, coupled with the difficulty in developing and fielding a combined contractor firm and contractor employee level tool, has resulted in data that is too aggregate to yield determinable findings and workforce trends.

Secondly, hypotheses or "researchable questions" were deemed necessary to comprehend the data's scope and volume. This list would help to refine and ease further data collection efforts by focusing on specific issues, such as community access to certain energy efficiency job categories with career ladders and good wages. With input from the WE&T Working Group, Brightline Defense Project has formed a list of researchable questions, provided in Appendix C.

Finally, the WE&T Working Group also has discussed the applicability of its efforts to the Mainstream Energy Efficiency Portfolio, including the WE&T Consultant selection process. Per A.12-07-001, the "Decision Approving 2012-14 Energy Efficiency Programs and Budgets," the Investor Owned Utilities (IOUs) will be hiring an expert entity (WE&T Consultant) to help design a comprehensive approach to the WE&T issues inherent in their energy efficiency portfolios, no later than March 31, 2013.

Since the granularity of the results of the ESA data collection was hampered by aggregate data and lack of a clear research plan, the efforts of the WE&T Consultant may be useful to developing a robust process and queries. The process should consider testing a readily applicable subset of the energy efficiency portfolios, such as Direct Installation programs. The WE&T Consultant could help to refine and/or design a WE&T data collection tool that provides rigorous results upon which policy decisions can be made about workforce development in future portfolios, or consideration of other measurement approaches for obtaining the desired data.

While formulating this data collection plan, the WE&T Working Group expects the WE&T Consultant to address most, if not all, of its adopted recommendations as provided in Section 4 as well as research questions as provided in Appendix C. These recommendations and research questions have emerged from discussing the recent experiences of diverse interests, including IOUs, community-based organizations, contractors, and regulatory agencies. Given its capacity for research as an academic institution, the WE&T Consultant may be able to provide more recent data and address the final recommendations of the WE&T Working Group. Improving data collection efforts could then inform workforce strategies in future proceedings for both ESA and the Mainstream Energy Efficiency Portfolio.

Section 4

Working Group Recommendations

The WE&T Working Group has reached general consensus around these recommendations and request that the WE&T Consultant address some, if not all, of the recommendations:

(1) Currently, the data collected for the ESA Program is not granular enough to provide definitive workforce demographics, causality between training and energy savings, and data on career ladders since it was not collected by individual work position. In order to meet the timeframe outlined by the D.12-08-044, efforts to revise the initial template have been limited, and while refined data collection is not "impossible," it would require more time. A refined template from the initial data collection efforts should make the workforce data more comprehensible. Additionally, self-reported data by participating ESA Program contracting firms and their employees may yield less reliable data than preferred.

(2) Adopted by the WE&T Working Group, the list of researchable questions should be addressed by the WE&T Consultant to hone the direction of workforce data collection and determine the workforce needs and successes within the ESA Program. The questions should be considered and revised as appropriate to reflect workforce needs and successes within the Mainstream Energy Efficiency portfolio.

(3) Future data collection would also benefit from the WE&T Consultant research plan development.

(4) In order to begin to adequately answer the research questions posed, more granular and standardized data is needed. If data collection templates are found to be useful for answering the researchable questions, the data will need to be stored in a manner that facilitates analysis. As such, we recommend the creation of a database that will allow the researcher to offer a standardized format used to collect data which can easily be compared across contractors. The researcher can easily assign a random digit to each individual to conceal individual identities and data can easily be exported to a statistical program for more advanced analyses. The researcher can set constraints on the data to make sure data is entered in a standardized format. The researcher can choose from numerous off-the-shelf products that are relatively inexpensive and secure.

Appendix A

WE&T Working Group Participant List

• John Fasana - Southern California Edison Company
• Charles Segerstrom, Lisa Shell, Mary O'Drain, Gary Girardi, Frances Thompson - Pacific Gas and Electric Company
• Sandra Williams - San Diego Gas & Electric Company
• Mark Aguirre, Emma Ponco, Iris Montoya, Steven Hruby - Southern California Gas Company
• Eddie Ahn - Brightline Defense Project
• Ryan Young - Greenlining Institute
• Ortensia Lopez – El Concilio of San Mateo County
• Camille Watts-Zagha – California Public Utilities Commission DRA
• Tory Francisco, Lisa Paulo – California Public Utilities Commission Energy Division

Appendix B

Data Collection Template Improvements

(see attached for original and improved templates)

Appendix C

List of Researchable Questions

For Questions 1-9, while interested about the entire scope of the ESA workforce, we believe in prioritizing data collection efforts to answer these questions for jobs in the Outreach, Assessment, and Installer categories.

1. Is the ESA Program fully maximizing potential opportunities for job creation, incubation, or development for displaced and disadvantaged workers?

2. How many ESA Program workers come from economically disadvantaged local communities/neighborhoods?

3. How much workforce diversity exists in ESA Program WE&T programs (by race, gender, disabled, other metrics)?

4. How much of the ESA workforce has access to career ladders and ability to diversify their skillsets?

5. How much turnover exists in the ESA workforce?

6. How is the ESA Program addressing the training needs and barriers to employment of rural, urban and suburban populations?

7. What successful workforce policies and program development have contractors utilized in connecting disadvantaged communities to employment opportunities after training?

8. How many hours are worked?

9. What are the pay ranges for each position?

10. Are ESA Program installation, enrollment, assessment failure rates too high? Are they acceptable?

11. How can these rates be correlated to payment schema or training regime?

12. Is there a correlation between increased training and higher energy savings?

13. Is there a correlation between better wages/benefits and higher energy savings?

(END OF APPENDIX A)

APPENDIX B

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U338E) for Approval of its 2012-2014 California Alternate Rates for Energy (CARE) and Energy Savings Assistance Programs and Budgets	A. 11-05-017 (Filed May 6, 2011)
Application of Southern California Gas Company (U 904 G) for Approval of Low-Income Assistance Programs and Budgets for Program Years 2012-2014	A. 11-05-018 Filed May 16, 2011
Application of Pacific Gas and Electric Company for Approval of the 2012-2014 Energy Savings Assistance and California Alternate Rates for Energy Programs and Budgets (U 39 M)	A. 11-05-019 Filed May 16, 2011
Application of San Diego Gas & Electric Company (U 902 M) for Approval of Low-Income Assistance Programs and Budgets for Program Years 2012-2014	A. 11-05-020 Filed May 16, 2011

MID-CYCLE WORKING GROUP FINAL REPORT

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July 15, 2013

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U338E) for Approval of its 2012-2014 California Alternate Rates for Energy (CARE) and Energy Savings Assistance Programs and Budgets	A. 11-05-017 (Filed May 6, 2011)
Application of Southern California Gas Company (U 904 G) for Approval of Low-Income Assistance Programs and Budgets for Program Years 2012-2014	B. 11-05-018 Filed May 16, 2011
Application of Pacific Gas and Electric Company for Approval of the 2012-2014 Energy Savings Assistance and California Alternate Rates for Energy Programs and Budgets (U 39 M)	B. 11-05-019 Filed May 16, 2011
Application of San Diego Gas & Electric Company (U 902 M) for Approval of Low-Income Assistance Programs and Budgets for Program Years 2012-2014	B. 11-05-020 Filed May 16, 2011

MID-CYCLE WORKING GROUP FINAL REPORT

I. INTRODUCTION

Pursuant to Ordering Paragraph 7 of Decision (D.) 12-08-044 (Decision), directs the Mid Cycle Working Group to submit their Final Reports and Recommendations to the Assigned Law Judge by July 15, 2013.

San Diego Gas & Electric Company (SDG&E) on behalf of the Mid-Cycle Working Group hereby submits the attached Energy Savings Assistance Program Mid-Cycle Working Group Final Report and Recommendations.[1]

Respectfully submitted,

By: */s/ Kim F. Hassan*

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[1] The Mid-Cycle Working Group is comprised of representatives from the following parties: San Diego Gas & Electric Company, Southern California Gas Company, Southern California Edison Company, Pacific Gas and Electric Company, The East Los Angeles Community Union, the Energy Efficiency Council, Proteus, the Division of Ratepayer Advocates, The Utility Reform Network, and the California Housing Partnership, Inc. It is led by Syreeta Gibbs, Energy Division Staff.

A.11-05-017
Energy Savings Assistance Program
Mid-Cycle Working Group Final Report

July 15, 2013

Table of Contents

Section

1. Background
2. Summary of Activity and Status of Working Group Efforts
3. Remaining Working Group Charges and Final Recommendations

Appendices

A. Working Group Participant List
B. Summary of Statewide Energy Savings Assistance Program Policy and Procedures Manual Proposed Updates
C. Redlined Statewide Energy Savings Assistance Program Policy and Procedures Manual
D. Black-lined Statewide Energy Savings Assistance Program Policy and Procedures Manual
E. Summary of California Installation Standards Manual Proposed Updates

Section 1

Background

The Energy Savings Assistance (ESA) Program Mid-Cycle Working Group is one of three working groups ordered in Decision (D.) 12-08-044[1]. Subsequent Rulings of Administrative Law Judge Kimberly Kim initiated and established each of the Working Groups[2]. D.12-08-044, Ordering Paragraph 5.c.1.iii outlines the charge for the Mid-Cycle Working Group as follows;

"The charge for the Mid-Cycle Working Group will be to review: (a) Weatherization and Installation (WIS) Manual[3] Updates; (b) Statewide Energy Savings Assistance Program Policy and Procedures Manual Updates; (c) Streamlining of the Utilities' Reporting Requirements; (d) The Utilities' Best Practices; (e) General Mid-cycle Program and Process Improvements; and (f) Potential 2015-2017 Application and Cycle Issues, including whether the next cycle applications could benefit from bifurcation of California Alternate Rates for Energy Program issues from Energy Savings Assistance Program issues"

A list of Mid-Cycle Working Group participants is provided in Appendix A. This report provides final recommendations of the working group, where consensus was reached, as ordered in Ordering Paragraph 7 of (D.)12-08-044.

[1]D.12-08-044, Ordering Paragraph 4 directed the Energy Division to form the Mid-Cycle Working Group, Cost-effectiveness Working Group and the Workforce, Education and Training Working Group to review components of the Commission's Low Income Programs.

[2] Administrative Law Judge Ruling, issued September 28, 2012 initiated the establishment of the Working Groups. Administrative Law Judge Ruling, issued October 26, 2012 established the Working Groups.

[3] The name of the Weatherization Installation Standards Manual was formally changed to the California Installation Standards Manual as of July 1, 2012.

Section 2

Summary Activities and Status of Working Group Efforts

Since the working group filed its progress report on February 15, 2013, the group has met eight times and hosted one public workshop to solicit input on the proposed updates and revisions to the Statewide Energy Savings Assistance Program Policy and Procedure and California Installation Standards Manuals[4].

The bulk of the working group's time was devoted primarily to Tasks a and b, California Installation Standards Manual (Installation Standards Manual) and Statewide Energy Savings Assistance Program Policy and Procedures Manual (Policy and Procedures Manual) updates, as these two tasks were considered high in priority by the working group participants. As indicted in the progress report, the working group agreed to extend an invitation to representatives from Richard Heath and Associates (RHA) to participate in meetings and respond to technical questions regarding the manuals due to their involvement and history with the ESA Program and role in the development of, and updates, to the Policy and Procedures and Installation Standards Manuals. Once the manual revisions were completed, the working group addressed the remaining tasks and charges outlined in D.12-08-044.

A summary of the working group's proposed updates to the Statewide Energy Savings Assistance Program Policy and Procedures Manual is provided in Appendix B. A redlined version of the Statewide Policy and Procedures Manual and a clean black-lined version of the Statewide Policy and Procedures Manual, without redline, are provided respectively in Appendices C and D. A summary of the proposed revisions to the California Installation Standards Manual is provided in Appendix E. The full version of the California Installation Standards manual is not attached to this final report due to its size. However, parties who wish to view the proposed updates to the California Installation Standards Manual may request access

[4] Mid-Cycle Working Group meetings (1) March 14, 2013, (2) March 27, 2013 ,(3) April 11, 2013, (4) May 9, 2013, (5) May 28, 2013 (6) June 25, 3013, (7) July 3, 2013, (8) July 10, 2013. Public workshop held June 19, 2013.

to the full redlined version by submitting an email request to Dana Kennedy @ DKennedy@rhainc.com. The status and final recommendations for each of the remaining working group charges issues are provided below in section 3.

Section 3

Remaining Working Group Charges and Final Recommendations

As noted above, the Working Group devoted its time primarily to the review of the Statewide Policy and Procedures and Installation Standards Manuals. The Working Group also identified the following items for discussion, review and potential resolution related to OP 5 of D.12-08-044:

1. Supporting MF properties with energy usage data uploads to benchmarking software such as the Environmental Protection Agency's Portfolio Manager Tool.

   Background: DRA, TURN and CHPC brought this matter of interest to the working group and provides the following background for issue context. California's statewide energy efficiency strategies include improving the energy information feedback loop to energy customers. Improving the feedback loop is understood as a first step that subsequently leads to building audits, and finally to building retrofits and other conservation action. For example, the CPUC's Guidance Decision for 2013-2014 Energy Efficiency portfolios in December 2012, D.12-05-015 states, "Performance data at the building, tenant, or end use level is pertinent information, and proposals to increase measurement, retention, and utilization of such information should be included in the 2013-2014 transition applications." [5]

   D.12-05-015 also directs "parallel and coordinated initiatives among utility programs, private market actors, and state and local government policies."[67] Prior CPUC guidance recommended closer coordination between the utilities' Energy Efficiency portfolios, ESA, and the recommendations of the Multifamily Subcommittee of the California Home

[5] CPUC Decision 12-05-015, Finding of Fact 64.

[6] CPUC D.12-05-015, pp. 163-164.

[7] CPUC Programmatic Guidance Ruling in Energy Efficiency Rulemaking 09-11-014,

Energy Retrofit Coordinating Council (HERCC).[8] The Multifamily Subcommittee of the California HERCC explicitly recommends that multifamily buildings utilize the usage tracking and benchmarking systems in coordination with utilities.[9] The report explains, "Improved ability to consistently track and analyze building performance and improvements would likely result in an increase in the rate and effectiveness of energy efficiency upgrades in multifamily buildings."[10]

The need for historic energy usage data was also recognized for nonresidential properties and enacted into California law in 2007 (AB 1103-Saldana). This law requires gas and electric utilities, after January 1, 2009 to maintain records of the energy consumption data of all nonresidential buildings to which they provide service in a format compatible for uploading to the Environmental Protection Agency's Portfolio Manager (EPA PM), for at least the more recent twelve months.

The EPA PM offers associated data exchange/web services[11] which is a software platform that allows utilities to electronically transfer data to and from Portfolio Manager via web services. Originally designed for non-residential commercial real estate, EPA PM tracks dozens of metrics across energy, financial, and environmental data categories and was a key tool in establishing the Energy Star building certification program. Data exchange/web services allows utilities (upon customer approval) to upload actual historical energy consumption data into Portfolio Manager and continue to update this data as new utility electricity and gas bills become available. Because the customer initiates the request and provides the appropriate utility account numbers and meter

[8] CPUC D.12-05-015, p. 186.

[9] MF HERCC Final Report, April 8, 2011, p. 40.

[10] MF HERCC Final Report, April 8, 2011, p. 40.

[11] Prior to July 17, 2013 the data exchange/web services is known as Automated Benchmarking Services (ABS). For more information on this transition see http://portfoliomanager.energystar.gov/webservices/pdf/Transitioning_from_Automated_Benchmarking_(ABS)_2.5.pdf

numbers, the service cannot begin without customer approval. The data exchange/web services are designed to streamline the Portfolio Manager process and relieve users from having to collect billing and usage history and manually enter these data into Portfolio Manager.[12]

For multifamily, EPA PM allows apartment building owners and operators to track weather-normalized energy use intensity data over time and compare performance across a portfolio of multifamily buildings. The tracking and benchmarking of building energy data encourages property owners and managers to engage in an energy audit, a high priority of statewide energy efficiency planners. According to the EPA, multifamily adopters have used the system to prioritize cap-ex investments, verify and track progress of projects, identify under-performing facilities, be more responsive to utility issues, and identify billing errors. For an example of the energy reduction benefits made possible for multifamily buildings as a result of benchmarking with EPA PM, see the "Energy Star Success Story: TIAA-CREF Multifamily Housing" available at http://www.energystar.gov/ia/business/multifam_housing/TIAA-CREF_MF_Housing_Case_Study.pdf.

The EPA is scheduled to update EPA PM on July 17, 2013 with additional features that will benefit multifamily buildings, such as new tabs for planning and goal setting.[13] The California utilities have been automatically uploading data to EPA PM for nonresidential properties. A CPUC- commissioned report on utility benchmarking in California and the EPA PM tool was completed in April 2012.[14]

[12] The EPA will complete its upgrade of Automating Benchmarking Services on July 17, 2013 with a new software platform for web services. The platform will switch from the legacy SOAP web services to REST web services, to facilitate

[13] For additional information on the new features and functionality that will become available July 17, 2013, see http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_upgrade

[14] NMR Group, Inc. and Optimal Energy, Inc., *Statewide Benchmarking Process Evaluation, Volume 1: Report*, April 2012 available at www.calmac.org

Final Recommendation: The feasibility of the automatic uploading of utility usage data for residential multifamily properties will be investigated. If feasible, the ESA Program will promote the EPA PM (or analogous tools agreed upon by the working group) and the associated data exchange/web services[15] as a free online tool that offers valuable energy management capability for multifamily buildings. ESA would only promote energy tracking and benchmarking tools for master-metered multifamily building owners and operators. The utility customer of a master-metered building will typically be the property owner and/or manager. The master-metered customer is the entity granted access to all building energy usage and billing statements issued by the utility. By restricting this final recommendation of the mid-cycle working group to master-metered buildings, there will be no change to the entity granted access to this data. Therefore this should not trigger any privacy concerns because the entity with current access to the building usage data will continue to be the only entity with access to the building usage data that becomes available through data exchange. The CPUC is establishing privacy protocols in CPUC Rulemaking 08-12-009. If the CPUC resolves privacy protocols for individual units in multifamily buildings, it may be possible then for ESA to promote tracking and benchmarking tools to all multifamily building owners and operators.

Because of the ESA program's ambitious initiative to reach 100% of low income dwellings by 2020, the program outreaches to significant numbers of multifamily buildings each year. ESA marketing, outreach and assessment activities would also be examined as an avenue through which to advise multifamily owners and operators of the energy tracking and benchmarking tools. The Working Group has not had time to discuss the implementation details of this recommendation (what type of collateral, scripts, etc. to deliver to customers) and these details can be discussed as the utilities prepare their 2015 – 2017 ESA program applications.

[15] Prior to July 17, 2013 the data exchange/web services is known as Automated Benchmarking Services (ABS). For more information on this transition see http://portfoliomanager.energystar.gov/webservices/pdf/Transitioning_from_Automated_Benchmarking_(ABS)_2.5.pdf

2. Exploration of how electronic payments and transfer of income may require modified verification policies and practices for ESA.
   Background: This issue was raised during one of the Mid-Cycle Working Group meetings when updates to the ESA Policy and Procedures Manual were being discussed. Currently ESA contractors must document all sources of customer income, however, due to enhanced compensation alternatives, not all sources of income can be easily verified. Some income and salaries are electronically deposited and are not accompanied with hard copy documentation, which is required by auditors.

   Final Recommendation: The working group discussed possible alternatives to resolve this issue but has not yet developed a viable solution. As this issue continues to be encountered in the field, the working group participants have agreed to continue to independently explore and recommend potential modifications to the existing income verification practices for future ESA program cycles.

3. Examining changes to the Contractor State Licensing Board requirements for Home Improvement Salesperson Certification (HISC).
   Background: A suggestion was made during a working group meeting to revisit existing Contractors State Licensing Board (CSLB) /HISC certification requirements in an effort to minimize existing barriers currently encountered such as contractor hiring delays. Although the working group has discussed this issue at length, it was unable to come to agreement regarding existing certification requirements.

   Final Recommendation: Working group participants propose to independently seek further guidance from each of their respective legal and leadership teams and submit a supplemental informal filing to the proceeding service list with an updated status and

consensus, if reached, prior to the sunset of the Mid-Cycle Working Group, within 45 days after submission of the final report as outlined in D.12-08-044[16].

4. Potential new measures and pilots to be tested in 2014 in order to include in 2015 applications.

   Background: During one of the working group meetings PG&E suggested consideration, piloting and potential introduction of new measures into the ESA program. Additionally, during the June 7, 2013 joint public meeting hosted by the IOUs, the following measures were discussed; 1) High efficiency motors – Forced Air Units 2) Carbon monoxide detectors 3) Efficiency fan control – Forced Air Units 4) Multifamily Unit Dwelling (MUD) – exterior lighting attached to the unit and common area exterior lighting 5) Multifamily Unit Dwelling – Cost sharing for replacement of faulty appliances shut off for safety reasons. Public input was also provided to explore the implementation of paperless processes, to perform an examination of portfolio cost effectiveness vs. measure specific cost effectiveness and to evaluate expanded use of social media.

   Final Recommendation: The working group has discussed this preliminary list and recommends additional exploration of this list in preparation for the 2015-2017 IOU budget application filings.

5. CARE/Bifurcation

   Background: The Commission included this as an item in this charge of the working group and the participants discussed potential benefits and drawbacks of filing the next applications for CARE and ESA in separate proceedings. The parties were unable to reach agreement regarding bifurcation of CARE and ESA. As of our most recent discussion on this topic, DRA and CHPC were in favor of bifurcation while the IOUs, TELACU & Energy Efficiency Council oppose bifurcation of CARE and ESA.

[16] D.12-08-044, ordering paragraph 5C(8)

Final Recommendation: Since the working group participants were split and unable to reach a consensus on this issue, we have no final recommendation as it relates to bifurcation of CARE and ESA.

6. Streamlining of Utilities' Reporting Requirements

Background: The streamlining of reporting requirements has occurred outside of the working group and is ongoing. The Energy Division and the IOUs met and conferred prior to the establishment of the Mid-Cycle Working Group and were able to modify the monthly reporting templates to align with D.12-08-044 in time for the filing of the January 2013 monthly reports, which were filed on February 21st, 2013. The Energy Division has also since consulted with the IOUs and DRA regarding the existing quarterly reporting requirements and agreed to discontinue these quarterly reports because they are duplicative. The Energy Division, the IOUs, and DRA will continue to refine the monthly reports as needed as well as the annual reporting templates in time for the filing of the 2013 annual reports which are due on May 1st, 2014.

Final Recommendation: Because the streamlining of reporting requirements has occurred outside of the working group, we recommend that this activity continue, as needed, between interested parties, including but not limited to the Energy Division, the Utilities and DRA.

The above list of items supersedes the prior list submitted as part of the progress report filed on February 15, 2013 by the Mid-Cycle Working Group.

APPENDIX A

Appendix A

Mid Cycle Working Group Participant List

• John Fasana, Roberto Del Real, Davi Ibarra, Heather Rosa - Southern California Edison Company
• Frances Thompson, Mary O'Drain - Pacific Gas and Electric Company
• Sandra Williams, Yvette Vazquez, Kathy Wickware, Aida Velazquez - San Diego Gas & Electric Company
• Southern California Gas Company - Mark Aguirre, Carmen Rudshagen, Andrew Steinberg, Craig Allen
• Richard Villasenor - The East Los Angeles Community Union
• Jose Landeros - Proteus
• Allan Rago - Energy Efficiency Council
• Camille Watts-Zagha - Division of Ratepayer Advocates
• Cynthia Mitchell - The Utility Reform Network
• Ann Gressani[17] - California Housing Partnership Corporation (CHPC)
• Syreeta Gibbs – California Public Utilities Energy Division

[17] Ann Gressani replaced Megan Kirkeby as a Mid Cycle Working Group Participant on January 11, 2013 at CHPC's request.

APPENDIX B

APPENDIX B

Final

PROPOSED REVISIONS TO THE STATEWIDE ENERGY SAVINGS ASSISTANCE PROGRAM POLICY AND PROCEDURES MANUAL

1. Introduction

This document describes a set of changes to the Statewide Energy Savings Assistance Program Policy and Procedures (P&P) Manual proposed by Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (SCE), and Southern California Gas Company (SoCalGas), (collectively referred to as the Joint Utilities) for the Energy Savings Assistance (ESA) Program. The P&P Manual was last revised in August 2010.

This document reflects the proposed changes as of July 15, 2013. There are four types of revisions covered in this summary: revisions that establish and revise existing policies and procedures to comply with ESA Program measures and services adopted for program budget cycle 2012 through 2014 pursuant to California Public Utilities Commission (Commission) Decision (D.) 12-08-044; revisions to delete language specific to the measure installation; revisions designed to update and refine current policies and procedures; and minor language revisions for clarification purposes. The background for these changes is briefly summarized below.

1.1. Establish and revise Existing Policies and Procedures to Comply with Measures adopted in D.12-08-044

The Commission in D.12-08-044 adopted the utilities ESA Program design and budgets for program years 2012 through 2014. The decision adopted policies and certain measures for the ESA Program therefore the revisions proposed in the P&P Manual are summarized below and are in accordance with the Commission decision.

- Where appropriate, revised to refer to D-12-08-044.
- Revised the language under Section 2.2.3.2 to reflect that the Commission adopted categorical programs can be obtained at the CPUC website, provided the website address, and deleted the listing of those programs. This revision is proposed because the list of categorical programs can change on an annual basis and therefore the most current list may be obtained via the CPUC website.

- Updated Table 5-1 to reflect the 2012-2014 measures authorized by the Commission for each utility, by climate zone, dwelling type, and applicability to renters. Revised the footnote in Table 5-1 to reflect that gas furnaces and water heaters are repaired or replaced to mitigate natural gas appliance testing (NGAT) fails and the policy is located under Section 10 NGAT. Included footnote in Table 5-1 to reflect that water heater blanket and water heater pipe insulation measures are currently not approved for installation in owner-occupied multi-family dwellings in SoCalGas' service territory.
- Revised language in Section 2.8 to clarify that each IOU will provide its contractors with the measures that meet the energy savings threshold (125 kwh or 25 therms.) adopted by the Commission for one or two measure installation.
- Deleted Table 9-1 in Section 10 which identified individual measures that qualify for installation if home requires less than Three Measures. Instead each IOU will identify those qualifying measures and provide to contractors.

1.2. Revisions to delete language specific to the measure

The P&P Manual has been revised to delete certain areas of the Manual which should be reflected in the California Installation Manual in lieu of the P&P Manual as summarized below:

- Deleted Section 4.6 which addresses installation of compact fluorescent bulbs (CFLs). The procedures for installation of CFLs are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Deleted Tables 6-1 through 6-8 under Section 6 Minor Home Repairs because the procedures for installation of measures are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Deleted Sections 7.3 measure specific policies because the procedures for installation of measures are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Deleted Section 8.4.6 because it is a contractual issue between the utility and the contractor and should be addressed in the contract instead of the P&P Manual.
- Deleted Section 8.4.7 because it is a contractual issue between the utility and the contractor and should be addressed in the contract instead of the P&P Manual.
- Deleted Section 10.4.2 homes for which infiltration reduction is simulated because procedures are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Deleted Section 10.7 the non-feasibility criteria for NGAT because criteria is appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.

1.3. Revisions designed to refine current policies and procedures

The P&P Manual has been revised to refine current policies and procedures to include the following summarized below:

- Revised Section 1.1 to clarify that the Program Manager has flexibility to deviate from established process due to customer hardship or unforeseen circumstances on a case-by-case basis.
- Revised language under Section 2.2.1 to reflect that the Commission income levels can be obtained at the CPUC website, provided the website address, and deleted Table 2-1 which reflected the income guidelines based on the number of people residing in household. This revision is proposed because the Commission provides income levels on an annual basis and therefore the most current income levels may be easily obtained via the CPUC website.
- Revised language under Section 2.2.3.1 to clarify the stipulations that should be observed in determining rental income.
- General revision of language to consolidate certain portions of the Manual.
- Moved language in Manual to appropriate subsection.
- Revised language under Section 2.2.3.3 to include that a current CARE self certification statement is allowed to enroll in the ESA Program.
- Deleted Section 2.4 Treatment of Master Metered Units and the language under Section 2.3.1 revised to include master meter accounts.
- Revised Section 2.5 to include the definition for the applicable program dwellings. The definitions for single family and multi-family existed in the Manual and therefore copied into this section. The definition for mobile homes has been included in the Manual as defined by the California Department of Housing and Community Development.
- Revised Section 2.6.3, 2.6.4 and 2.6.5 to eliminate the requirement to retain copies of legal documents in the customer file, specifically the "Life Estate", "Living Trust", "Power of Attorney", or "Management Agreement".
- Revised language in Section 6 Minor Home Repairs to remove the reference that furnace repair and replacement and water heater repair and replacement are measures under the minor home repair. The reference to furnace repair and replacement and water heater repair and replacement, have been moved to NGAT Section because these two measures are only provided to mitigate NGAT fails. Therefore these measures will be appropriately addressed under Section 10.
- Deleted Tables 6-1 through 6-8 under Section 6 Minor Home Repairs because the procedures for installation of measures are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Revised Table 6-9 under the Section 6 Minor Home Repair to remove reference of furnace repair and replacement and water heater repair and replacement.
- Revised Section 7.2.6 to clarify lead safe practices.
- Revised Section 7.2.8 to include new language for recycling and disposal of measures.
- Revised language under Section 8.3 for the pre-installation inspection.

- Revised heading under Section 8.4.4 and included additional language to clarify failed inspection policy.
- Revised language under Section 8.4.5 to clarify failed inspection dispute resolution policy.
- Revised Section 9.2 to remove certain insurance requirements from the P&P Manual because each IOU may have specific insurance requirement based on their company requirements.
- Revised Section 10.2.2 to remove the specific requirements for LIHEAP.
- Revised Section 10.3.2 to remove the pre-weatherization appliance evaluation components for NGAT because they are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Revised Section 10.3.3 to remove the post-weatherization NGAT because they are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.
- Revised Section 10.3.4 to remove the Ambient CO Testing for NGAT because they are appropriately addressed in the California Installation Standards Manual. Therefore no need to duplicate in the P&P Manual.

1.4. Minor language revisions for clarification purposes

The P&P Manual has been revised to reflect minor language changes as summarized below:

- Revised to reflect program name change as directed by the Commission from the Low Income Energy Efficiency program or LIEE program to the Energy Savings Assistance Program.
- Revised the name from the "California Conventional Home Weatherization Installation Standards" Manuals to the "California Installation Standards" Manuals to reflect that the measures are not purely weatherization any longer and that the standards are applicable to the ESA Program as opposed to being statewide standards such as Title 24.
- Where appropriate, revised to remove the reference for "audit" as it pertains to assessment of the home for measure feasibility.
- Where appropriate, revised language from "landlord" to "property owner or authorized agent".
- Where appropriate, language revised to reflect that program documentation should be "securely stored" especially as technology and cyberspace advances by protecting customer privacy.

APPENDIX C

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APPENDIX C

~~ATTACHMENT 1~~

Final Draft 7/15/2013

Statewide Energy Savings Assistance ~~Low Income Energy Efficiency~~ Program
Policy and Procedures Manual

Applicable to:
Pacific Gas & Electric Company
Southern California Edison Company
Southern California Gas Company
San Diego Gas & Electric Company

July 2013~~August 2010,~~

The format for the Table of Contents and Tables will be revised at a later date.

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1 INTRODUCTION *7*

1.1 OVERVIEW 7
1.2 STRUCTURE OF THIS MANUAL 8

2 CUSTOMER AND STRUCTURAL ELIGIBILITY *9*

2.1 OVERVIEW 9
2.2 CUSTOMER ELIGIBILITY REQUIREMENTS 10
Income Guidelines *10*
Types of Income Included in Household Income *12*
Verification of Income *13*
Actual Income Documentation Required *13*
Household Income Calculation Procedures *17*
Determining Household Size *17*
Qualifying Multifamily Complexes *17*
2.3 SERVICE ELIGIBILITY 18
General Service Eligibility Conditions *18*
Referrals *19*
2.4 TREATMENT OF MASTER-METERED UNITS 19
2.5 STRUCTURAL ELIGIBILITY 20
2.6 HOME OWNERSHIP DOCUMENTATION 21
Overview *21*
Multiple Ownership *22*
Life Estate/Living Trust *22*
Power of Attorney (POA) *22*
Property Management Companies *22*
2.7 TREATMENT OF RENTAL UNITS 22
Property Owner Approval *22*
Eligibility of Rental Units for Certain Measures *23*
2.8 PREVIOUS PROGRAM PARTICIPATION 23
2.9 NEED FOR LIEE SERVICES 24

3 CUSTOMER OUTREACH AND CUSTOMER RELATIONS *25*

3.1 INTRODUCTION 25
3.2 CUSTOMER OUTREACH 25
Promotional Guidelines *25*
Representations by Contractor and Contractor's Employees *25*
Outreach Interaction *25*
Targeted Outreach *25*
3.3 CUSTOMER RELATIONS 26
Introduction *26*
Expedient Service *26*
Other Work *26*
Staff Identification *26*
Crew Appearance *27*
Customers 18 Years or Older *27*

Customer Complaint Procedures *27*
Substance Abuse and Smoking Policy *27*
Incident Report *27*

4 PROCEDURES FOR PRE-INSTALLATION CONTACTS *28*

4.1 INTRODUCTION 28
4.2 DESCRIPTION OF PROGRAM SERVICES 28
4.3 DATA COLLECTION 29
4.4 IN-HOME ENERGY EDUCATION 29
4.5 IN-HOME ENERGY ASSESSMENT~~/AUDIT~~ 30
4.6 INSTALLATION OF COMPACT FLUORESCENT LIGHT BULBS 30

5 PROGRAM MEASURES *31*
5.1 INTRODUCTION 31
5.2 PROGRAM MEASURES 31
5.3 CONSIDERATION OF CHANGES TO MEASURE LIST 31

6 MINOR HOME REPAIRS *36*
6.1 INTRODUCTION 36
6.2 MINOR HOME REPAIRS 36
6.3 LIMITS ON MINOR HOME REPAIRS 40
6.4 PRIORITIZATION OF MINOR HOME REPAIRS 41

7 MEASURE INSTALLATION POLICIES AND PROCEDURES *42*
7.1 INTRODUCTION 42
7.2 GENERAL INSTALLATION POLICIES 42
Introduction *42*
Installation by Contractor *42*
Installation Standards *42*
Safety *42*
Installation of Feasible Measures *43*
Lead-Safe Practices *43*
Site Clean-Up Policies *43*
Weatherization of Mobile Homes *43*
7.3 MEASURE-SPECIFIC POLICIES 43
Introduction *43*
Caulking *45*
Weather Stripping Doors *45*
Attic insulation *47*
Water Heater Blankets *50*
Water Heater Pipe Insulation *52*
Cover Plate Gaskets *52*
Energy-Saver Showerheads *53*
Faucet Aerators *54*
Evaporative Cooler and Room Air Conditioner Vent Covers *54*
Exterior Door Replacements *55*
Window Replacements *55*
Glass Replacement *56*
Thread-Based Compact Fluorescent Lamps (CFLs) *56*
Exterior Hard-Wired Compact Fluorescent Lamp Light Fixtures *57*
Room Evaporative Cooler Installation *57*
Furnace Repair and Replacement *58*
Natural Gas Water Heater Repair or Replacement *62*
Refrigerator Replacement *63*
High Efficiency Room Air Conditioner *64*
High Efficiency Central Air Conditioners *64*
Duct Testing and Sealing as a Program Measure *66*
Duct Testing and Sealing as a Means of Title 24 Compliance *68*

Pool Pump Replacement.....69
High Efficiency (HE) Clothes Washer.....70
Energy Efficient Torchiere Lamps.....70

LED Night Lights *71*
Microwaves *71*
Furnace Clean and Tune *72*
FA U Standing Pilot Light Conversion *72*
Thermostatic Shower Valve *73*
Occupancy Sensors *73*
Central Air Conditioner Service/Tune-up *74*
Interior Hardwired CFL Fixtures *74*

8 INSPECTION POLICIES *75*

8.1 Introduction 75
8.2 Inspection Personnel 75
8.3 Pre-Installation Inspection 75
8.4 Post-Installation Inspection 76
General Polices on Post-Installation Inspection *76*
Types of Pass Rates *77*
Post-Installation Inspection Frequency *77*
Hazardous Fails *78*
Failed Inspection Dispute Resolution *78*
Failure to Install Feasible Measures *79*
Charge for Reinspection *79*
Inspection Waivers *79*

9 CONTRACTOR ELIGIBILITY *81*

9.1 Introduction 81
9.2 Insurance Requirements 81
9.3 Licensing Requirements 82
9.4 Workforce Education and Training (WE&T) *82*

10 NATURAL GAS APPLIANCE TESTING *83*

10.1 Introduction 83
10.2 Applicability of Natural Gas Appliance Testing 83
General Applicability *83*
Applicability to Combustion Fuels other than IOU Natural Gas *83*
10.3 Natural Gas Appliance Testing Protocols 84
General Protocols *84*
Pre-Weatherization Evaluations of Gas Appliances *84*
Post-Weatherization Natural Gas Appliance Testing (NGAT) *85*
Ambient CO Testing of Natural Gas Appliances *86*
Disposition of Appliance Fails/Problems *86*
10.4 Timing of Combustion Appliance Testing 87
Homes with Natural Gas Appliances *87*
Homes for which Infiltration Reduction is Simulated *87*
10.5 Actions to be Taken When Appliances Fail NGAT *87*
10.6 Personnel Performing Natural Gas Appliance Assessments and Testing 88
10.7 Nonfeasibility Criteria for Natural Gas Appliance Testing 88

Tables

Table 2-1: Income Guidelines (June 1, 20112~~09~~ Through May 31, 20123~~0~~) 10
Table 2-2: Items Included in Income 12
Table 2-3: Types of Income Documentation 16
Table 5-1: Eligible Measures 32
Table 6-1: General Repairs 37
Table 6-2: Repairs Required to Mitigate Catastrophic Envelope Leaks 37
Table 6-3: Repairs Required to Support Installation of Attic insulation 38
Table 6-4: Repairs Required to Support Weather-stripping and Caulking 38
Table 6-5: Repairs Required to Install Attic Ventilation 39
Table 6-6: Repairs Required to Install Water Heating Measures 39
Table 6-7: Repairs Required to Mitigate Non-Appliance Hazards 39
Table 6-8: Repairs Required to Mitigate Natural Gas Appliance Fails 39
Table 6-9: Caps on Minor Home Repairs 41
Table 7-1: Attic insulation Additions 48
Table 8-1: Minimum Sample Sizes for Inspections (90%/□5% precision) 77
Table 9-1: Allowable Measures when Home Needs Less than Three Measures..... 89

1 Introduction

1.1 Overview

This *Statewide Energy Savings Assistance ~~LIEE~~ Program Policy and Procedures Manual*[1] *(P&P Manual)* describes the policies and procedures followed in the Energy Savings Assistance (ESA) ~~Low-Income Energy Efficiency (LIEE)~~ Programs administered by Pacific Gas and~~&~~ Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E) (collectively referred to as the utilities or investor-owned utilities (IOUs)). The Statewide ESA Program~~LIEE~~ policy and procedures are adopted by the California Public Utilities Commission (Commission or CPUC). This Manual provides policies and procedures for implementation of the ESA~~LIEE~~ Program and is being updated pursuant to the changes in the Program in Commission Decision (D.) 12-08-044. ~~08-11-031.~~ This *P&P Manual* is accompanied by the ESA Program California Installation Standards Manual ~~two other documents with~~ which all contractors working in this~~these~~ ~~p~~Program~~s~~ must comply. ~~:~~

- ~~*LIEE Conventional Home Installation Standards,* which describes the materials and installation procedures that must be followed during the installation of measures in conventional homes; and~~
- ~~LIEE *Mobile Home Installation Standards,* which describes the materials and installation procedures that must be followed during the installation of measures in mobile homes;~~

An electronic copy of this ~~LIEE~~ Statewide P&P Manual may be obtained at the CPUC ~~Low-Income Oversight Board (LIOB)~~ website at www.cpuc.ca.gov/PUC/energy/Low+Income ~~www.liob.org.~~ In situations where there are questions regarding the interpretation of a certain policy or procedure, the Utilities shall use Commission D. 12-08-044~~08-11-031~~ as the overriding authority.

The policies and procedures in this *P&P Manual* are supplemented by the general and specific terms and conditions incorporated into contracts between the utilities and their contract service providers as part of the ESA~~LIEE~~ Program.

Updates in Program policies and procedures may be issued by the utilities during the course of the Program Year subject to approval by the CPUC~~.~~. ESA Program Managers have the flexibility to deviate from established procedures to respond to cases of customer hardship and unusual circumstances. The Program Managers shall document any exceptions in the customer file. ~~The operational interpretation of policies and procedures incorporated into this~~

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[1] Formerly known as the Statewide Low Income Energy Efficiency Policy and Procedures Manual.

~~Manual and the associated Installation Standards rests with the utilities' Program Managers.~~
Changes in the means of implementing policies, procedures and standards will be discussed with contractors prior to being made.

1.2 Structure of this Manual

The remainder of this *P&P Manual* is organized as follows:

- Section 2 specifies general statewide policies and procedures relating to customer and home eligibility for the ESA~~LIEE~~ Program.
- Section 3 discusses polices relating to customer outreach and customer relations.
- Section 4 describes the services that are provided under the ESA~~LIEE~~ Program in the initial home visit.
- Section 5 lists the energy efficiency measures that are available to participants in the ESA~~LIEE~~ Program.
- Section 6 discusses policies relating to minor home repairs~~ and furnace repairs and replacements.~~
- Section 7 describes policies and procedures relating to the installation of energy efficiency measures~~ and the provision of minor home repairs in participating homes~~.
- Section 8 summarizes general statewide inspection policies and procedures.
- Section 9 discusses contractor eligibility.
- Section 10 describes policies and procedures relating to natural gas appliance testing and furnace repairs and replacements.
- Appendix A provides a list of the cities comprising the California Energy Commission (CEC) climate zones used in the determination of attic insulation levels and Program eligibility of other measures.

2 Customer and Structural Eligibility

2.1 Overview

This section discusses the eligibility of individual households for ESA~~LIEE~~ Program services. Eligibility of a household for measures offered through the Program depends on several factors, including:

- Household income;
  - Actual income documentation
  - Categorical eligibility
  - Self certification
- The utility services provided by the utility to the dwelling;
- The specific type of structure in which the household resides;
- The ability to obtain the approval of the property owner or authorized agent ~~landlord~~ in the event the household resides in rental property;
- Previous ESA~~LIEE~~ Program services provided for the property in question; and
- The dwelling's need for energy efficiency measures offered through the Program.

These eligibility requirements are explained below.

2.2 Customer Eligibility Requirements

2.2.1. Income Guidelines

All the utilities use the ESA ProgramLIEE income guidelines established by the California Public Utilities Commission ("CPUC" or "Commission") to qualify participants in the ESALIEE Program.

These guidelines are provided to the utilities by the CPUC on an annual basis. As set forth in D.05-10-044, the income eligibility level is based on 200% of the Federal Poverty Guidelines. The CPUC updates the ESA ProgramLIEE income guidelines every year for inflation. The current ESA Program income guidelines can be obtained at the CPUC website at www.cpuc.ca.gov/PUC/energy/Low+Income .Table 2-1 presents these guidelines for the current applicable period.. This table will be updated annually prior to June 1.

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Table 2-1: Income Guidelines (June 1, 2009 Through May 31, 2010)

Number of People Living in Household	Maximum Gross Household Income
1	$31,300
2	$31,300
3	$36,800
4	$44,400
5	$52,000
6	$59,600
If greater than 6, add the following amount per person	$7,600

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2.2.2. Types of Income Included in Household Income

For the purposes of determining Program eligibility, all income is considered, from all household members, from all sources listed in Table 2-1~~2~~, whether taxable or non-taxable income, including (but not limited to) wages, salaries, interest, dividends, child support, spousal support, disability or veteran's benefits, rental income, Social Security, pensions and all social welfare program benefits before any deductions are made. Table 2-1~~2~~ indicates the specific items included as income, but is not limited for the purpose of determining eligibility for the ESA~~LIEE~~ Program.

The following types of receipts **are *not*** considered household income for the purposes of determining eligibility:

- Loan proceeds; including reverse mortgages
- Assets (money in bank accounts, a house, a car or other property of possessions);
- Funds transferred from one applicant account to another; or
- Liquidation of assets (other than the portion representing capital or other gains).

Table 2-1~~2~~: Items Included in Income

Wages, salaries and commissions	401K payments or withdrawals[1]
Alimony payments	Rental income and royalties[2]
Child support payments	School grants, scholarships or other aid[1]
Disability benefits	Self-employment earnings[2]
Foster care payments	Social security payments
Realized capital gains on assets	Housing subsidies
Interest and dividends on assets	Supplemental Security Income (SSI) payments and State Supplemental Payments (SSPs)
Food stamps	Temporary Assistance to Needy Families (TANF) payments
Gambling/lottery winnings	Unemployment Benefits payments
General relief	Veterans Administration Benefit payments
Monetary gifts (both one-time and recurring)	Workers Compensation payments
Insurance settlements or legal settlements[1]	Union strike fund benefits
Pension payments or withdrawals[1]	

[1] Other than loans.

[2] For rental income and self-employment income, only positive values of income are included. Negative net rents and negative self-employment income are ignored.

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2.2.3. Verification of Income

2.2.3.1 Actual Income Documentation Required

When income documentation is required, income documentation must be reviewed, recorded, copied and securely stored~~retained~~ by service providers prior to the installation of measures for all prospective participants.

CARE **self-certification** does not automatically qualify a household for ESA Program,~~LIEE,~~ except in the case of group homes or targeted self certification areas, where it is specifically allowed.

In the case where the utility has **verified** that the customer is CARE-eligible within the past year, such income verification may be used for ESA Program ~~LIEE~~ participation.

The utility will periodically audit enrollment information and /or income documentation retained by the contractor. In the event that information and/or documentation is not complete and correct for a participant, payment to the contractor for the provision of Program ~~S~~services to that unit may be disallowed.

The kinds of income documentation required by the Program include but are not limited to those presented in Table 2-2~~3~~. In applying these documentation requirements, the following stipulations must be observed:

- Current award letters must include the value of the award and the period of time in question. They must also be dated within one year of the customer's signature date and must list the customer's name.
- Affidavits relating to gifts must indicate the amount and frequency of the gift(s). They must also contain the name, phone number, address and signature of the giver.
- In determining rental income, a renter-landlord relationship exists between household members when a room or rooms in the house is being rented and the renter is not a dependent of anyone in the household. Therefore, the renter is not counted as a household member and the rent paid is counted as part of the total household income. If the renter is a dependent, the renter is counted as a household member (even if he or she is paying rent) and his or her income is considered part of the total household income. A dependent is anyone claimed on the applicant's income tax return. ~~it must be understood that a renter-landlord relationship exists between household members when a room or rooms in the home are being rented. Unless the renter is a dependent of someone in the household, the renter's income is not included in household income and the renter is not counted as a household member. The rental payments count as household income. In the~~

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~~event that the renter is a dependent of someone in the household, the renter's income is counted, the renter is considered as a household member, and the rental payment is not counted as part of household income. A dependent is anyone claimed on the applicant's income tax return.~~

- Federal income tax documentation must include copies of all 1099s and W-2 forms.

- Affidavits from an employer who pays the applicant cash wages must ~~be on the employer's letterhead and~~ include the company name, address and phone number. It must also include the name of the applicant, total amount paid to the applicant, and the frequency of payments, and must contain a signature from the employer's authorized representative.

- If the applicant receives cash wages for jobs like mowing lawns, babysitting, handyman services, casual day labor, etc., a self-employment affidavit from the applicant is acceptable if it meets all Program criteria.
- In cases where a household claims no income for the past 12 months, the applicant must demonstrate his or her means of financial support other than income. In the event that the applicant cannot provide documentation of either income or other means of support, Program services will not be performed until such information is provided.

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2.2.3.2. Categorical Eligibility

Categorical eligibility is another enrollment procedure designed to ease enrollment processes in both ESA~~LIEE~~ and CARE programs. Customers may be eligible to participate under categorical eligibility[1] and enroll in the ESA~~LIEE~~ ~~p~~Program based on their current participation in another local, state, or federal means-tested program if those income guidelines are at or below current CARE/ESA~~LIEE~~ program income guidelines as set forth by the Commission. The categorical programs that have been adopted can be found at www.cpuc.ca.gov/PUC/energy/Low+Income . ~~following programs have been adopted for inclusion in categorical eligibility:~~

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- ~~Medi-Cal,~~
- ~~Food Stamps~~
- ~~Temporary Assistance to Needy Families (TANF);~~
- ~~Women and Infant Children program (WIC),~~
- ~~Low Income Home Energy Assistance Program (LIHEAP)~~
- ~~Healthy Families Categories A & B~~
- ~~Supplemental Security Income (SSI)~~
- ~~Federal Public Housing Assistance/Section 8;~~
- ~~National School Lunch's Free Lunch Program~~
- ~~Tribal TANF~~
- ~~Bureau of Indian Affairs General Assistance;~~
- ~~Head Start Income Eligible (Tribal only)~~.

Applicants utilizing the c~~C~~ategorical c~~E~~ligibility option to enroll in ESA Program~~LIEE~~ must present documentation reflecting current participation in one of the Commission approved programs in order to satisfy the "income documentation" component. ~~required of all applicants.~~ Such documentation must be reviewed, recorded, copied and securely stored~~retained~~ by service providers prior to the installation of measures for all prospective

applicants.

2.2.3.3. Targeted Self-Certification

Targeted Self Certification is a third enrollment procedure designed to ease enrollment processes in ESA Program.~~LIEE.~~ Eligibility for self certification is determined by each utility based on their identification of geographic areas of their service territory where 80% of the customers are at or below 200% of the federal poverty line. Applicants residing within these targeted self certification areas must sign a "self certification statement" certifying that they do indeed

[1] Categorical ~~E~~eligibility approved in Decision 06-12-038~~, December 2006~~ for SCE, PG&E, SoCalGas, and SDG&E. Utilities, Energy Division staff and DRA to determine acceptable categorical eligibility programs.

meet the current income guidelines established for participation in the ESA~~LIEE~~ ~~p~~Program. This self certification statement is to be retained in lieu of other income documentation or proof of participation in a categorical eligibility program. A current CARE self certification statement is allowed.

Table 2-~~2~~3: Types of Income Documentation

Type of Income	Documentation
Wages, salaries and Commissions	Copy of customer's payroll check stub(s) OR Federal income tax filing showing gross income OR affidavit from employer (for cash wages only, and only where just one employer)
Alimony or Child Support Payments	Copy of check, bank statement, OR most recent court document stating amount
Disability benefits, Foster Care payments, Unemployment Benefits, VA Benefits, Workers Compensation	Copy of checks stubs OR copy of most recent award letter
Capital or Other gains	Federal Income Tax filing showing capital or other gains
Food stamps	Copy of most recent award letter OR food stamp/cash issuance letter (indicate TANF or General Relief)
Gambling/lottery winnings	determined on case-by-case basis
General relief	Copy of most recent award letter (Notice of Action) OR copy of un-cashed check(s) OR copy of direct deposit statement(s)
Monetary gifts	Copy of customer's bank statement OR affidavit from gift giver
Proceeds from insurance settlements or legal settlements	Copy of settlement document
Interest and dividend income	Copy of customer's bank statement(s) OR copy of customer's investment statement(s) OR Federal Income Tax filing showing gross income
Pension or 401K payments or Withdrawals	Copy of customer's check stubs OR copy of most recent award letter OR Form 1099R from prior year OR copy of most recent bank statement
Rental income [1]	Tax return (Form 1040, Schedule E, Total Rental Real Estate and Royalty Income or Loss) showing rental income OR copy of rental receipts OR copy of rental agreement specifying rent amount and affidavit from tenant
School grants, scholarships or other aid	Copy of award letter OR copies of cancelled checks
Self-employment earnings [1]	Income statement showing most recent quarterly adjusted earnings plus prior year's tax return (1040 Schedule C, Net Profit or Loss) OR written affidavit from an accountant or applicant
Housing subsidies	award letter
SSI payments, TANF payments, or Social Security payments	Copy of most recent award letter (Notice of Action) OR copy of un-cashed check(s) OR copy of customer's direct deposit statement
Union strike fund benefits	Copy of benefits payment stub

1 For rental income and self-employment income, only positive values of income are included. Negative net rents and negative self-employment income are ignored.

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- ~~If the applicant receives cash wages for jobs like mowing lawns, babysitting, handyman services, casual day labor, etc., a self-employment affidavit from the applicant is acceptable if it meets all Program criteria.~~
- ~~In cases where a household claims no income for the past 12 months, the applicant must demonstrate his or her means of financial support other than income. In the event that the applicant cannot provide documentation of either income or other means of support, Program services will not be performed until such information is provided.~~

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2.2.4. Household Income Calculation Procedures

Household income guidelines are based on gross *(pre-tax)* annual income. For self-employed individuals, gross (pre-tax) income is defined to be net profit or loss from self-employment. In the event that a full 12 months of income information is not available, or if there has been a change in the employment status of the household over the past 12 months, it may be necessary to annualize income from a shorter period of time. If, for instance, a household member has been employed for six months, the income earned over this period would be annualized by multiplying it by 2.

It is the intention of the ESA~~LIEE~~ Program for all outreach personnel to compute annual income as accurately as possible. The calculations used will depend on the type of records available from each household member. Since all household members may not have the same type of income records, it may be necessary, and appropriate, to use more than one method when documenting income for different members of the same household.

2.2.5. Determining Household Size

Household size is the current number of people living in the home as permanent residents. Friends or family on a temporary visit (less than 6 months) are not considered household members nor are their earnings part of household income.

Children and/or other dependents residing in the household *only* on weekends, holidays, or vacations may be counted as part of the household only if the family claims them as dependents on their federal income tax filing. Children by previous marriages who do not reside in the home cannot be considered household members, even if they are receiving child support, unless they are claimed as dependents on the applicant's federal income tax filing.

2.2.6. Qualifying Multifamily Complexes

The ESA~~LIEE~~ Program makes use of fractional income qualification for certain measures for multifamily complexes. The terms of income qualification are as follows:

- *For the purposes of determining income eligibility,* multifamily complexes are defined as those with five (5) or more dwelling units. Duplexes, triplexes, and fourplexes will be qualified as single family homes for the purposes of determining income eligibility.
- For multi-family buildings, refer to Table 5-1 herein for the measures available to multi-family buildings.
- To qualify an entire multifamily building for other measures offered by the Program (defined as 80-20 measures), at least 80% of all (occupied and unoccupied) dwelling units must be occupied by income-qualified households. However, if at least 80% of all units adjacent to a common attic space satisfy the 80% rule, that attic space may be treated even if the 80% rule is not satisfied for the entire building. In the event that fewer than 80% of the dwelling units are occupied by income-qualified households, individual dwelling units occupied by qualifying households may still receive all feasible 80-20 measures.
- Service providers must review, record, copy and securely store income documentation for all households used to qualify an apartment building. The provider must also make its best effort to review and record income documentation for all other households in the multifamily building (i.e., those not used to meet the 80% qualification standard).
- Unoccupied and other non-qualified multifamily dwellings may be weatherized, as long as the multifamily building satisfies the 80% rule for income qualification.

2.3 Service Eligibility

2.3.1. General Service Eligibility Conditions

To be eligible for the ESA~~LIEE~~ Program, a customer must be served by an active utility account/meter (includes master meter). In an area served by different investor-owned gas and electric utilities (e.g., the SoCalGas-SCE overlap area) the fuel source for the dwelling's space heat shall determine which utility will be the ~~primary~~ provider of air sealing/envelope and attic insulation ~~weatherization services~~measures to the dwelling as long as that fuel source is either natural gas or electricity. In the event that a non-IOU heating fuel is used *and* the home has air conditioning, the electric IOU will be the provider of weatherization measures other than infiltration-reduction measures.

Measure-specific eligibility requirements will be followed in the ESA~~LIEE~~ Program. Not all measures are offered in all utility services territories or climate zones. Table 5-1 shows the measures offered by each utility.

2.3.2. Referrals

In order to provide the maximum opportunity for eligible customers to receive all feasible measures, the four IOUs—PG&E, SCE, SoCalGas, and SDG&E—will set up a referral system with each other. In addition, the utilities will work with community agencies and local governments including their local Department of Community Services and Development (DCSD) agencies to expand leveraging opportunities. This will increase the number of measures available to eligible customers by sharing the cost of measures offered by both programs.

In areas where a customer receives natural gas and electric services from two different IOUs, the utilities will work together to ensure the customer receives all feasible measures. The utility installing infiltration measures will conduct natural gas appliance testing as long as the utility serves natural gas somewhere in its service area (and thus has trained gas service representatives). In the event that the customer has electric space heat served by an electric-only utility, the electric utility will not install infiltration measures if natural gas appliances are present.

In order to mitigate the duplication of costs that could otherwise be associated with customers participating in two utility programs, two steps shall be taken:

- First, customers that have provided proof of income qualification or deemed categorically eligible by one IOU, shall be considered eligible by all other IOU's serving this customer; and
- Second, gas and electric utilities will offer common energy education in overlap areas so that customers will need to receive education from only one utility.

Additionally, the minimum measure requirement for eligibility (see Section 2.8~~9~~) will not apply to homes referred by one IOU to another, if the first IOU establishes that a home meets this minimum for the combination of gas and electricity.

~~2.4 Treatment of Master-Metered Units~~

~~Customers whose service is covered by master meters may participate in the LIEE Program. For these customers, the following policies and procedures will apply:~~

- ~~Deemed savings can be used in the evaluation of Program savings for master-metered units.~~
- ~~Program personnel will explain the Program to the landlord or property manager prior to contacting tenants.~~

- ~~If the master-metered dwellings are multifamily units, the terms of Section 2.2.6 will apply. Landlords must be informed that income documentation may be required for the purposes of determining eligibility.~~

2.5 Structural Eligibility

Public Housing. Public housing is eligible for participation in the ESA~~LIEE~~ Program, but must meet the program eligibility requirements in order to participate. (Note that this does not include on-base military housing, insofar as these dwelling units are not served by the investor-owned utilities.)

Housing Type[2]

Single family homes, multifamily dwelling units, and mobile homes are eligible to participate in the program.[2]

- Duplexes, triplexes, and fourplexes will be qualified as single family homes.
- Multifamily complexes are defined as those with five (5) or more dwelling units.
- Mobile homes are defined by California Department of Housing and Community Development as having "over 320 square feet of gross floor area, more than eight feet in width, and more than 40 feet in length." A mobile home is a manufactured home regulated by the U.S. Department of Housing and Urban Development code (Sec. 3280) and built on a trailer chassis and designed for highway delivery to a permanent location, and it can be a single-, double-, or triple-wide home.

The utilities may promote or limit the treatment of housing types in individual program years as long as these actions are consistent with the achievement of the programmatic initiative.

Housing on Non-Residential Rates. In general, only residential customers on residential rates are eligible to participate in the ESA~~LIEE~~ Program. However, group homes on non-residential rates are eligible for ESA~~LIEE~~ Program services as long as they are currently eligible for CARE under current CARE guidelines applicable to group living facilities,[3] and the structure in question is a single family, multifamily or mobile home suitable for weatherization under ESA~~LIEE~~ Program standards.[4]

CARE-eligible facilities include but are not limited to the following.

- Migrant farm worker housing centers, as defined in Section 50710 of the Health and Safety Code, provided that 70% of all energy usage in master-metered facilities and 100% of all energy usage in individually-metered facilities is

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residential.

- Privately owned employee housing, as defined in Section 17008 of the Health and Safety Code, that is licensed and inspected by the state and local agencies pursuant to Part I of Division 13, and in which 100% of all energy use is residential.

[2] Multifamily dwellings are defined as those in buildings with five (5) or more dwelling units.

[3] See D. 92-04-024, April 8, 1992; D. 92-06-060, June 17, 1992; D. 95-10-047, October 18, 1995. Also see *Commission Advisory and Compliance Division, Workshop Report on California Alternate Rates for Energy (CARE): The Development of Guidelines to Implement CARE for Migrant Farmworker Housing, Agricultural Employee Housing, and Employee Housing,* May 1995.

[4] It should be noted that CARE income eligibility requires that 100% of the residents of the facility (other than live-in staff) meet the CARE income guideline. This income eligibility criterion will be applied to group homes for the purposes of determining ESA Program ~~LIEE~~ income eligibility.

- Housing for agricultural employees operated by non-profit entities, as defined in Subdivision (b) of Section 1140.4 of the Labor Code, and that has an exception from local property taxes pursuant to subdivision (g) of the Revenue and Taxation Code, provided that 70% of all energy usage in master-metered facilities and 100% of all energy usage in individually-metered facilities is residential.
- Non-profit group living facilities, defined as transitional housing (such as a drug rehabilitation or halfway house), short- or long-term care facilities (such as a hospice, nursing home, children's home or seniors' home), group homes for physically or mentally challenged persons, or other nonprofit group living facilities.
- Homeless shelters, hospices and women's shelters with the primary function of providing lodging and which are open for operation with at least six beds for a minimum of 180 days and/or nights (including satellite facilities in the name of the licensed corporation, where 70% of the energy supplied is for residential purposes).

As mandated by AB 868 and reiterated by an October 1, 2004 Administrative Law Judge's Ruling,[5] migrant housing centers are presumed to meet CARE income eligibility guidelines without verification. This presumption will also be used in determining ESA Program~~LIEE~~ income eligibility of such facilities. For the purpose of determining eligibility of other types of housing on non-residential rates, income qualification shall be considered satisfied if the facility is on CARE. These facilities represent a unique situation and this income verification procedure shall not be considered a precedent for other circumstances.

2.6 Home Ownership Documentation

2.6.1. Overview

Home ownership must be verified in order to ensure that the legal owner or authorized agent signs the Property Owner Waiver. It is the responsibility of the contractor to review the documents and ensure proof of home ownership. If a home is in the name of a deceased spouse, the surviving spouse should be considered as the owner. For example, if the home is in the husband's name and never transferred to the widow, the widow is considered the current homeowner.

Any of the following may be used for home ownership documentation.

- Current loan or mortgage documents;
- Property tax records or bills;
- Home owner property insurance (fire insurance);

[5] Administrative Law Judge's Ruling Seeking Input Regarding Assembly Bill 868 (Care Eligibility for Migrant Housing Centers), October 1, 2004.

- Mortgage payment invoices or book;
- Data Quick or similar title search service;~~ and~~
- Deeds; and
- Current Mobile Home Registration from Department of Housing and Community Development.

2.6.2. Multiple Ownership

If the home is owned by more than one person, the homeowner will be considered any one of the persons whose name appears on the document.

2.6.3. Life Estate/Living Trust

A homeowner may have established a "Life Estate" or "Living Trust." With either, the property is deeded to another individual or trust but the original owner maintains control of the property. The original owner may sign as the property owner only if he or she has a copy of Life Estate or Living Trust documents. Contractor must review and verify that the individual signing the Property Owner Waiver is authorized to do so within the "Life Estate" or "Living Trust". Contractor and individual signing POW shall sign a statement to document that they are authorized to sign agreement to participate in ESA Program and a ~~A~~ copy of the signed statement ~~of the Life Estate or Living Trust~~ must be maintained in the customers file.

2.6.4. Power of Attorney (POA)

In cases where the property owner is not available to sign on the Agreement, any person having a Power of Attorney (POA) for that owner may sign the Agreement. Contractor and individual signing POA shall sign a statement to document that they are authorized to sign agreement to participate in ESA Program and a ~~A~~ copy of the signed statement ~~POA~~ must be maintained in the customer's file.

2.6.5. Property Management Companies

Authorized representatives of property management companies may sign for property owners for both single family and multifamily agreements under ~~either of~~ the following conditions: the property management company has a standard Power of Attorney agreement with the property owner; or the property management company has a signed Management Agreement with the owner authorizing the property management company to act as the agent for the specific property; or any other documentation that the utility may require to establish that an agreement exists between the property owner and the management company. A copy of any support documentation ~~the Power of Attorney or the Management Agreement~~ must be kept in the customer's files for that customer.

2.7 Treatment of Rental Units *2.7.1. Property Owner Approval*

In general, rental units may not receive Program Services and Measures until a Property Owner's Waiver has been received. This approval must cover the participation of the unit in the Program as well as the installation of specific measures. Such approval is valid for a period of 12 months from the date it is signed by the Property Owner or authorized agent. If approval of the

Property Owner is not received before the installation of such services, the Contractor will be required to reimburse the utility for all payments received from the utility for the measures in question. However with prior written authorization from the utilities' Program Manager, a contractor may proceed with the installation of services and measures that do not directly affect the condition and/or structure without the signed Property Owner Waiver.

2.7.2. Eligibility of Rental Units for Certain Measures

Assuming that the Property Owner's permission is required and has been obtained and that other eligibility conditions are met, rental units may be treated under the Program. However, the following policies relating to specific measures shall be applied. Not all measures listed are offered in all utility service territories or climate zones. See Table 5-1.

- Rental units are not eligible for furnace replacements or major furnace repairs associated with the mitigation of NGAT failures. However, ~~minor repairs and~~ service and adjustments may be made to furnaces and water heaters if these actions would improve the performance of the system at a minimal cost.
- ~~Rental units are not eligible for water heater repairs and replacements associated with the mitigation of NGAT failures. However, services and adjustments may be made to water heaters if these actions would improve the performance of the system at a minimal cost.~~
- ~~Evaporative coolers and hard-wired fixtures may be provided without charge to either the tenant or the landlord.~~ Refrigerator and air conditioner replacements may ~~also~~ be provided at no charge to either the tenant or the property owner~~landlord~~, except in the instance where the property owner~~landlord~~ owns the refrigerator or air conditioning unit that is replaced and also pays the utility bill. In these instances, the utilities may make payments to installation contractors that cover only part of the cost of replacement.
- The utilities may opt to provide, at a nominal charge to the ~~landlord~~property owner, evaporative coolers, refrigerator replacement, and replacement air conditioners and heat pumps.

2.8 Previous Program Participation

In order to provide services to the widest range of low-income households possible, D.08-11-031 places the following restrictions on the participation of homes that have previously been treated under the ESA~~LIEE~~ Program.

- The IOUs are allowed to go back and treat any dwelling served prior to 2002, but they will first seek out new dwellings that have yet to be treated.

2.9 Need for ESA Program~~LIEE~~ Services

A home must receive all feasible measures offered under the ESA~~LIEE~~ ~~p~~Program. In D.08-11- 031, the Commission modified the "3 Measure Minimum Rule" to allow ~~U~~utilities to install one or two measures, as long as the~~y~~ installed measures meet the specified ~~a~~ minimum energy savings threshold. Decision 09-06-026 issued June 18, 2009 further modified the "3 Measure Minimum Rule" to clarify the allowable measures under the "3 Measure Minimum Rule". For homes that need fewer than 3 measures, the energy savings achieved must meet certain minimums as established by the Commission. Energy savings of at least 125 kWh ~~/~~annually or 25 therms ~~/~~annually must be achieved in homes where only one or two measures are to be installed. Each IOU will provide its contractors with the individual measures ~~Table 9-1 (Page 87) identifies which individual measures~~ that qualify for installation if a home requires less than three measures~~.~~ The total energy savings achieved by either one or two measures combined ~~in Table 9-1 (Page 87)~~ should yield savings of at least either 125 kWh ~~/~~annually or 25 therms ~~/~~annually. The IOUs are to use the most current energy savings estimates as determined in the Final Report of the Load Impact Evaluation for the applicable program cycle, unless directed otherwise by the Commission. For measures not reflected in the Load Impact Evaluation, those energy savings can be derived from DEER, engineering calculations, etc. as appropriate.

Homes that require three or more individual measures qualify for ESA Program~~LIEE~~ participation regardless of energy savings. For homes that require more than three individual measures, refer to Table 5-1 ~~(Page 31).~~

In an area served by multiple investor-owned gas and electric utilities (~~(~~investor-owned or municipal~~)~~), the minimum number of measures will be defined as if the home were served by a combined gas and electric utility, and the utilities will use a referral system to ensure the installation of all feasible measures.

For all homes meeting the minimum for necessary measures, all feasible measures must be installed.[6] As stipulated in the standard non-feasibility criteria, if a measure is already in place and operating properly, even if it does not meet the current Installation Standards for new installations, it should not be removed and replaced.

[6] If a customer refuses a measure, that measure is considered non-feasible. See Section 7.

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3 Customer Outreach and Customer Relations

3.1 Introduction

This section presents statewide ESA Program~~LIEE~~ policies and procedures in the areas of customer outreach and customer relations. Subsection 3.2 discusses policies relating to the recruitment of participants for the Program, while Subsection 3.3 focuses on the maintenance of proper relationships with customers. ~~Subsection 3.4 focuses on Targeted Outreach.~~ It should be understood that the policies in this section are supplemented by additional provisions in both specific and general terms and conditions included in formal agreements between utilities and contractors.

3.2 Customer Outreach

Contractors recruiting customers for participation in the ESA~~LIEE~~ Program are required to follow strict policies relating to customer outreach. Customer outreach policies cover promotional guidelines, limitations on representations made by contractors and their employees, outreach interactions, and tracking.

3.2.1. Promotional Guidelines

Only promotional materials approved by the Utility Program Manager may be used to promote participation in the ESA~~LIEE~~ Program.

3.2.2. Representations by Contractor and Contractor's Employees

Neither the contractor nor his/her employees may imply that they are employees of the Utility or affiliated with the Utility in any way other than through the ESA~~LIEE~~ Program.

3.2.3. Outreach Interaction

Outreach personnel must effectively contact and interact with a diverse set of customers. These personnel shall have available any necessary multilingual staff and/or translators and shall make every effort to resolve barriers to communication attributable to disabilities.

3.2.4. Targeted Outreach

Outreach efforts should target those customers with the highest energy usage, energy burden and/or energy insecurity but not at the expense of all other customers. Contractors shall also serve those customers who are disabled. Such customers may be identified based on their

enrollment in the Medical Baseline Program, their enrollment in the Deaf and Disabled Telecommunications Program (DDPT), their enrollment in ESA Program~~LIEE~~ through a disability-based community-based organization (CBO), their request for accessible formats of written materials or use of Tele-Typewriter/Telecommunications Device for the Deaf (TTY/TDD), the visibility of an observed disability and/or their self-identification as having a disability. Contractors shall not ask the customer if he/she is disabled.

3.3 Customer Relations

3.3.1. Introduction

It is imperative that both contractors and utility employees maintain proper customer relationships. The ESA~~LIEE~~ Program is a customer service program, and should be delivered accordingly. Specific polices with respect to customer relations are specified below.

3.3.2. Expedient Service

Service must be provided to participants in a reasonable time frame, as determined by the utility. Crews must inform customers of the approximate amount of time required for installations, inspections and gas appliance testing (if required), and shall provide services as expeditiously as possible. The number of visits to a home shall be kept to a minimum.

3.3.3. Other Work

Only ~~three types of~~ work directly associated with providing ESA Program authorized services to ~~for~~ participating customers may be billed to the ESA~~LIEE~~ Program.~~: energy education, the installation of eligible measures, and the provision of eligible minor home repairs.~~ The contractor is prohibited from selling other services to the customer or charging the customer for any other service.[7]

3.3.4. Staff Identification

All contractor or subcontractor employees who engage in customer contact must wear identification badges provided or approved by the utility at all times. Each badge must include a color photo of the employee. If the contractor produces badges, templates for identification badges will be provided by the utility. The contractor shall immediately return ~~or destroy~~ the ID badges of all personnel no longer working for the contractor or its subcontractors on the ESA~~LIEE~~ Program. In the event ~~that~~ the contractor is unable to return a ~~destroys the~~ badge~~s~~, the contractor shall immediately notify the Program Administrator.~~ in a timely fashion.~~

[7] Note that this provision does not preclude the possibility of requiring a co-payment for the installation of one or more measures, if approved by the utility.

(~~August, 2010,~~)

3.3.5. Crew Appearance

ESA Program~~LIEE~~ contractors are responsible for the courtesy and appearance of their employees. Discourteous personnel and unprofessional appearance will not be tolerated in this program and may constitute grounds for contract termination.

3.3.6. Customers 18 Years or Older

In general, contractors shall enter customer's residences only when adults, eighteen (18) years of age or older are present. The only exception to this rule is that contractors may enter the home of a customer under eighteen (18) years of age if the customer is married or has been declared an emancipated minor by the courts.

3.3.7. Customer Complaint Procedures

The contractor must make every effort to resolve barriers to communication attributable to factors including language preference and disabilities. The contractor must make every effort to resolve and document customer complaints. The Contractor must notify the utility or its designee of the status of each complaint within 24 hours of the contractor's receipt of the complaint. If the complaint deals with customer safety, the contractor must resolve it within 24 hours. If the complaint does not relate to customer safety, the contractor must resolve the complaint to the satisfaction of the customer as required by the IOU~~within 10 days of the receipt of the complaint~~. The acceptability of the contractor's resolution of complaints will be determined at the sole discretion of the utility. If the contractor has not resolved the complaint within the mandated period, the contractor shall notify the utility or its designee of this failure.

3.3.8. Substance Abuse and Smoking Policy

In addition to local and state laws, ~~While at the customer sites,~~ contractor personnel shall not be under the influence of drugs or alcohol nor be using drugs or alcohol anytime when performing ESA Program work. ~~on the job.~~ Smoking is prohibited within the residence being served at all times and on the customer's property.

3.3.9. Incident Report

Contractors must immediately contact the utility or its designee if during a home visit there is damage to a customer's home and/or property or if the contractor's employee has been accused of an illegal act. Within 24 hours, the contractor will inform the utility or its designee of the resolutions of all such incidents.

4 Procedures for Pre-Installation Contacts

4.1 Introduction

This section describes the procedures to be followed by outreach workers and contractors during pre-installation visit or visits to a participating home. These procedures cover the provision of general program information, the collection of data on the household and the home, the administration of home energy education, the completion of the home energy ~~audit~~ assessment, and the installation of measures as approved by each IOU.~~CFLs.~~

4.2 Description of Program Services

In the course of the ~~initial~~ customer enrollment, ~~home visit,~~ the outreach worker shall provide a thorough description of the program services available to the income qualified ~~low-income~~ household. At a minimum, this description must cover the following services:

- The ESA~~LIEE~~ Program, including program goals, eligibility requirements, eligible measures, and procedures. The procedures to be covered by this description must encompass energy education, available energy efficiency services and minor home repairs, general installation procedures, inspection procedures, and natural gas appliance testing procedures (if applicable).
- Other programs designed to repair/replace furnaces or install other energy efficiency measures (if these are offered as separate programs).
- The California Alternate Rates for Energy (CARE) Program. Outreach workers will also provide assistance in enrolling the customer in CARE if the customer chooses to participate in it.
- Other utility programs designed to provide services to low-income customers, including level-payment programs, medical baseline programs, and other energy efficiency programs for which the customer may be qualified.
- Similar programs offered by DCSD and other known energy related programs.

The outreach worker may also describe other utility and non-utility low income assistance and energy efficiency programs. At no time shall Program personnel promote or provide fee-based services to customers in lieu of free services offered under the ESA~~LIEE~~ Program.

4.3 Data Collection

During the initial interview, the outreach worker will also collect data needed to document eligibility and to meet tracking and reporting requirements. In general, information including, but not limited to the following must be collected:

- Name, address and phone number of applicant,
- Senior/disability status of applicant or other permanent household member, as observed by the assessor or voluntarily provided by the applicant,
- Residence type and owner/renter status,
- Gas and/or electric account information,
- Appliance/HVAC system information,
- Customer unwillingness/inability to participate, and
- Home square footage.

Demographic data may also be collected if offered by the customer.

4.4 In-Home Energy Education

In-home energy education will be provided to all income-eligible applicants whose dwellings require the minimum number of measures, using forms and checklists provided by the utilities. Energy education will cover the following general areas: heating and cooling usage, water heating system usage, major electric and gas appliance usage, small appliance usage, benefits of energy efficiency programs in reducing green house gas emissions, water conservation, and lighting usage. At a minimum, t~~T~~opics to be covered in the course of energy education must include:

- The general levels of usage associated with specific end uses and appliances,
- The impacts on usage of individual energy efficiency measures offered through the ESA~~LIEE~~ Program or other Programs offered to low-income customers by the utility,
- Practices that diminish the savings from individual energy efficiency measures, as well as the potential cost of such practices,
- Ways of decreasing usage through changes in practices,
- Information on CARE, the Medical Baseline Program, and other available programs,
- Appliance safety information,
- The way to read a utility bill,
- Green house gas emissions,
- Water conservation,

- CFL disposal and recycling, and
- The procedures used to conduct natural gas appliance testing (if applicable).

4.5 In-Home Energy Assessment~~/Audit~~

An assessment ~~or audit~~ of the structure will be completed on homes with income-qualifying applicants using utility approved forms and/or tools.~~a form provided by the utility.~~ The assessment~~/audit~~ will identify measures which may be installed through the Program.~~ Assessment/audit forms will be provided by the utility or approved by the utility if the contractor has an acceptable in-house form.~~

~~4.6 Installation of Compact Fluorescent Light Bulbs~~

~~The electric or dual-fuel utility outreach worker may install compact fluorescent light bulbs during the initial home visit. The number of compact fluorescent light bulbs installed will depend on unit type, feasibility and amount of time each lighting fixture is used (3.5 hours minimum). Contractors will remove old bulbs after installing CFLs, unless a customer asks to keep the old bulbs. Contractors shall provide information to the customer explaining how to dispose of CFLs safely. Leaving compact fluorescent light bulbs with customers for installation at a later time is not allowed.~~

5. Program Measures

5.1 Introduction

This section identifies the energy efficiency measures available through the ESA~~LIEE~~ Program and discusses the means by which changes in eligible measures are made over time. Subsection 5.2 focuses on measures offered under the program, while Subsection 5.3 outlines the process that will be used to evaluate measures for inclusion in the Program in future years. ~~The goal of the program is to remove all replaced measures from the home.~~

5.2 Program Measures

Table 5-1 indicates the specific Program measures that may be provided to participants~~are eligible~~ for the ESA~~LIEE~~ Program in accordance with the California Installation Standards Manual. ~~Note that there are some restrictions on the eligibility of individual homes for some of these measures. See Section 7.~~

5.3 Consideration of Changes to Measure List

Utilities will jointly evaluate existing Program measures in the course of developing recommendations for programs in subsequent years. The utilities evaluate these measures using all available information on both costs and benefits (including energy benefits as well as non-energy benefits), and develop a set of recommendations for CPUC approval. If warranted by the evidence, these recommendations may vary across climate zones. The utilities will also implement a process for considering new measures to be added to the Program. This process will entail the issuance of a solicitation for recommendations for new measures and the assessment of the cost-effectiveness of these measures.

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Table 5-1: Eligible Measures (REVISED 7/15/2013)

Measure [1]	PG&E			Avail. to Renters	SDG&E			Avail. to Renters	SCE			Avail. to Renters	SCG			Avail. to Renters
	S/F	M/F	M/H		S/F	M/F	M/H		S/F	M/F	M/H		S/F	M/F	M/H	
Heating, Ventilation & Air Conditioning																
Gas Furnace [4] Repair/Replace CZ 1,2,3,4,5,6,11, 12, 13,14, 16	√		√	√												
Gas Furnace [4] Repair/Replace - CZ -7, 10, 14,15					√		√	√								
Gas Furnace [4] Repair/Replace - CZ –4, 5, 6, 7, 8, 9,10,13,14,15,16													√		√	√
Forced Air Unit Standing Pilot Light Conversion - All – CZ					√	√	√	√					√	√	√	√
Room A/C Replacement																
- CZ 10					√	√	√	√								
- CZ 10,13,14, 15	√								√	√	√	√				
Central A/C Replacement																
- CZ 14	√															
- CZ 14 & 15									√	√	√	√				
Heat Pump - CZ 14 & 15									√	√	√	√				
AC Time Delay - CZ 1, 2, 3, 4, 5, 6, 11, 12, 13, 14, 16, (Except SF & MF CZ 1,5,6 and MF CZ 3)	√		√	√												
Duct Sealing CZ 1, 2, 3, 4, 5, 11, 12, 13, 16	√		√	√												
- CZ 7, 8, 10, 14,15 (Except CZ 8 Gas)					√		√	√								
- CZ 4, 5, 6, 7, 8, 9,10,13,14,15,16													√		√	√
Evaporative Coolers																
- CZ 10,13,14,15,16									√		√	√				
- CZ 1, 2, 3, 4, 11, 12,13, 14, 16 (Except MH CZ 1)	√		√	√												

Measure [1]	PG&E				SDG&E				SCE				SCG			
	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters
Maintenance																
Furnace Clean & Tune CZ 4,5, 6,7, 8,													√	√	√	√
- CZ 7,10,14,15					√	√	√	√								
Central A/C Tune-up/Services																
- CZ 2, 4, 6, 11, 12, 13, 14, 16	√	√	√	√												
- CZ 6,7, 8, 14, 15					√	√	√	√								
All CZ									√	√	√	√				
Enclosure																
Envelop/Air Sealing Measures [2]																
- CZ 1, 2, 3, 4, 5, 6,11,12,13,14,16	√	√	√	√												
- CZ 4,5,6,7,8,9,10, 13,14, 15,16													√	√	√	√
- CZ 6,8, 9, 10, 13, 14, 15, 16 Electric Heated Home									√	√	√	√				
- CZ 6, 7, 8,10,14, 15 Electric Heated Home					√	√	√	√								
- CZ 7, 10,14, 15 Gas Heated Home					√		√	√								
Attic Insulation																
CZ 1, 2, 3, 4, 5, 6. 11, 12, 13, 14, 16	√	√		√												
- CZ 4,5,6,7,8,9,10 13, 14, 15, 16													√	√		√
- CZ 6,7,8,10,14,15 Electric					√	√		√								
- CZ 7,10,14,15 Gas					√	√		√								
Minor Home Repairs - All - CZ [3]	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Measure [1]	PG&E			Avail. to	SDG&E			Avail. to	SCE			Avail. to	SCG			Avail. to
	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters
Domestic Hot Water																
Faucet Aerators All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Low Flow Showerhead All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Water Heater [4] Repair/ Replacement - Gas - All CZ	√	√	√		√	√	√						√	√	√	
Water Heater Blanket All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√[5]	√	√
Water Heater Pipe Insulation All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√[5]	√	√
Thermostatic Shower Valve - All – CZ	√	√	√	√	√	√	√	√					√	√	√	√
Lighting Measures																
CFL Lighting - All – CZ	√	√	√	√	√	√	√	√	√	√	√	√				
Interior Hard wired CFL fixtures - All - CZ	√	√	√	√	√	√	√	√								
Exterior Hard wired CFL fixtures - All - CZ	√	√	√	√	√			√	√			√				
Torchiere All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				
Occupancy Sensors - All C	√	√	√	√												
LED Night Light - All CZ					√	√	√	√								
Appliances																
Refrigerators - All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				
High Efficiency Clothes Washer - All – CZ					√	√	√	√					√	√	√	√
LIHEAP Appliances All CZ	√	√	√	√												
Microwave Ovens - All - CZ	√	√	√	√	√	√	√	√								
Miscellaneous																
Pool Pumps - All CZ									√			√				
Smart Power Strip All - CZ					√	√	√	√	√	√	√	√				

[1] Table 5-1 indicates the specific Program measures that may be provided to participants for the ESA Program in accordance with the California Installation Standards Manual. ~~All measures are available to homeowners and renters except where shown in Table 5-1.~~

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[2] Includes Caulking, Outlet Cover Plate Gaskets, Evaporative Cooler Cover, Air Conditioner Cooler Cover, Attic Access Weather-Stripping Doors and Minor Home Repairs (which include repairs such as ceiling repair, cover plates, door jams, door patch/plate, door replacement, exhaust fan vents, exterior wall repair, foam wall patch, interior wall repair, glass replacements, glazing compounds, lock sets (exterior door) windowsill repair, thresholds, vent repair and alignment, and window repair). For the purposes of qualifying a home for the Program, these measures count as a single measure. If contractors are installing less than three measures in a home, they should refer to Section 2.9 and Table 2.4. ~~the "Needs for LIEE Services" section on page 23 and Table 9-1 on page 87.~~

~~[3] Includes Low Flow Showerheads, Water Heater Blanket, Faucet Aerators, Water Heater Pipe Insulation. For the purposes of qualifying a home for the Program, these measures count as a single measure. If contractors are installing less than three measures in a home, they should refer to the "Needs for LIEE Services" section on page 23 and Table 9-1 on page 87.~~

[3] There are multiple sub-measures included under minor home repairs. Minor home repairs are constituted by services that either reduce infiltration (e.g., window repairs), mitigate a hazardous condition, or accommodate the installation of Program measures (e.g., attic venting). For the purposes of qualifying a home for the Program, all minor home repairs (combined) count as a single measure.

[4] For owner occupied, furnace repairs and replacements ~~fall under the category of minor home repairs, and~~ are provided only when necessary to mitigate NGAT fails and pursuant to the installation of infiltration-reduction measures. Water heater repairs and replacements are also ~~considered minor home repairs, and are~~ provided only to mitigate NGAT fails or to replace leaking water heater tanks. ~~For the purposes of qualifying a home for the Program, all minor home repairs (combined) count as a single measure.~~

[5] The water heater blanket and water heater pipe insulation measures are not currently approved for installation in owner-occupied multi-family dwellings for SoCalGas.

In situations where there are questions regarding the interpretation of a certain measure, the Utilities shall use D.12-08-044 ~~Attachment G in Commission D.08-11-031~~ as the overriding authority.

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6 Minor Home Repairs

6.1 Introduction

This section describes the ESA Program~~LIEE~~ policies and procedures relating to minor home repairs. Section 6.2 discusses the ~~specific~~ minor home repairs that may be provided through the ESA~~LIEE~~ Program. ~~.~~ Section 6.3 describes Program limits on expenditures on general types of minor home repairs. Finally, Section 6.4 describes the prioritization criteria that will be used by Program Managers to prioritize repairs for a specific home when not all needed minor home repairs can be made within the constraints of the budget limits for that home.

6.2 Minor Home Repairs

Minor home repairs are repairs required to enable installation of weatherization measures, to reduce infiltration, or to mitigate a hazardous condition. Minor home repairs shall be done in a manner that maintains accessibility for customers with observed disabilities.

In *owner-occupied* homes receiving infiltration-reduction measures, minor home repairs may be ~~include furnace repair or replacement and water heater repair or replacement, when~~ necessary to mitigate natural gas appliance testing (NGAT) fails that cannot be corrected with service by utility gas service personnel (or their designated representative). Such NGAT fails may include, but are not limited to, CO above the action level, inadequate draft, unsafe flue/vent pipe/system, unacceptable flame or flame change when air handler comes on, a non-operable appliance, or the absence of a furnace in cases where another gas appliance is used for space heating.

In *all* homes receiving infiltration-reduction measures, minor home repairs also include other corrections needed to pass the NGAT protocol, including but not limited to, adding combustion and ventilation air (CVA) venting, and other corrections. ~~listed in Table 6-8.~~ It is the general policy of the ESA~~LIEE~~ Program that these repairs must be made if they are needed and feasible, subject to budgetary limits. ~~Table 6-1 through Table 6-8 present the minor home repairs that are provided under the LIEE Program. Table 6-1 lists general structural repairs. Table 6-2 enumerates repairs required to mitigate catastrophic envelope leaks. Table 6-3 lists repairs necessary to support the installation of attic insulation. Table 6-4 lists repairs required to support weather-stripping and caulking. Table 6-5 indicates repairs required to install attic ventilation. Table 6-6 lists repairs required to support the installation of water heating measures. Finally, Table 6-7 enumerates repairs made to mitigate non-~~

~~appliance hazards. Finally, Table 6-8 indicates repairs required to mitigate natural gas appliance fails.~~

~~Table 6-1: General Repairs~~

~~Small holes in interior surface of wall between conditioned and unconditioned Space~~ ~~Repair holes 1 " in diameter or smaller~~ ~~Repair holes between 1 " and 6 "~~	**~~Windows~~** ~~Replace glazing compound~~ ~~Replace glass~~ ~~Replace sash[8]~~ ~~Repair or replace mullions/muntins[8]~~ ~~Install new window (not just glass)[8]~~ ~~Install casing~~
~~Exterior wall~~ ~~Patch stucco (up to 36 sq. in[7])~~ ~~Replace missing siding~~	

~~Table 6-2: Repairs Required to Mitigate Catastrophic Envelope Leaks~~

~~Large holes in interior surface of wall between conditioned and unconditioned Space~~[9,10] ~~Repair large portion of drywall or plaster (up to 4 sq. ft.).~~ ~~Replace entire drywall or wood panels (up to 8 sq. ft.).~~	**~~Windows and Doors~~** ~~Replace entire window[8]~~ ~~Replace entire door[8]~~

~~[8] Replaced only with Program Manager's approval on a case-by-case basis.~~

~~[9] Structural/framing members not included.~~

~~[10] Surface left in a prepared-for-paint condition.~~

~~Table 6-3: Repairs Required to Support Installation of Attic insulation~~

~~Attic access~~ ~~Install weather-stripping~~ ~~Repair access panel~~ ~~Replace molding around access~~ ~~Cut new access hole/opening (interior only and only between joists)~~	**~~Retractable ladder~~** ~~Install cover~~ ~~Install frame and cover~~ ~~Weather-strip opening~~ **~~Repair holes in ceiling~~**
~~Reconnect Duct~~ **~~Seal Return Plenum~~** **~~Closet vent/ceiling~~** ~~Cover vent with flexible insulation~~ ~~Install solid material to cover opening~~	**~~Exhaust vent~~** ~~Repair/replace bath vent pipe~~ ~~Repair/replace kitchen vent pipe~~

~~Table 6-4: Repairs Required to Support Weather-stripping and Caulking~~

~~Door Replacement~~ ~~Install door stops~~ ~~Replace door~~ ~~Replace door jamb~~ ~~Plane bottom of door~~ ~~Cut off bottom of door~~ ~~Replace interior casing~~ ~~Replace exterior casing~~ ~~Replace complete pre-hung door unit~~ ~~Adjust hinges~~ ~~Replace hinges~~ ~~Adjust loose screws~~ ~~Replace lock~~ ~~Replace existing night latch~~	**~~Door Replacement (cont.)~~** ~~Install/adjust striker plate~~ ~~Repair/replace subseal.[1]~~ **~~Threshold Repairs/Replacement~~** ~~Install new threshold~~ ~~Seal threshold~~ ~~Install riser~~ **~~Caulking Preparation~~** ~~Install backer rod~~ ~~Clean surface of dirt and oils~~

[1] ~~Subseal is directly under the riser which is directly under the threshold.~~

~~Table 6-5: Repairs Required to Install Attic Ventilation~~

~~Gable vent~~ ~~Install new vent~~ ~~Replace screen~~ ~~Repair existing wooden vent~~	**~~Eave/soffit vent~~** ~~Clean screen~~ ~~Replace screen~~ ~~Install new vent~~
~~Turbine/dormer vent~~ ~~Install new vent~~ ~~Repair existing vent~~	

~~Table 6-6: Repairs Required to Install Water Heating Measures~~

- ~~Install combustion air vent~~
- ~~Install showerhead adapter~~

~~Table 6-7: Repairs Required to Mitigate Non-Appliance Hazards~~

- ~~Replace broken/cracked switch/outlet covers~~
- ~~Remove combustible and flammable materials from combustion air vent proper clearance zone.~~

~~Table 6-8: Repairs Required to Mitigate Natural Gas Appliance Fails~~

~~All Appliances~~ ~~Repair gas leaks~~ ~~Replace soldered gas connector~~	**~~Cooking Appliances~~** ~~Correct mobile home kitchen exhaust defect.~~
~~Furnaces~~ ~~Correct CVA deficiency~~ ~~Clear covered CVA vent opening/ screen~~ ~~(Owner-Occupied) Major Repair or Replacement for non-op or NGAT Fail not correctable by Service~~	**~~Water Heaters~~** ~~Correct CVA deficiency~~ ~~Extend vent pipe if termination is too close to evaporative cooler~~ ~~Clear covered CVA vent opening/ screen~~ ~~(Owner-Occupied) Repair or Replacement for non-op or NGAT Fail not correctable by Service~~

6.3 Limits on Minor Home Repairs

There are two types of limits on costs incurred for minor home repairs. ~~, including furnace repairs and replacements, water heater repairs and replacements, and other minor home repairs.~~

- ***Average Cost Limits.*** These are limits on the average cost of categories of service across all homes receiving the service in question. They are designed to provide overall cost control for the provision of these services.
- ***Individual Home Limits.*** These are defined as limits on the cost that can be incurred for an individual home without the specific approval of the utility Program Manager. Individual home limits are meant to provide for equity in the distribution of program funds across individual households but yet provide Program Managers enough flexibility to respond to individual customer needs and hardship situations.

These limits are presented in Table 6-1~~9~~. It should be noted that the expenditure limits apply to all minor home repairs, including any actions taken to respond to gas leak/carbon monoxide emission problems identified during the utility's gas appliance testing procedures.

Table 6-19: Caps on Minor Home Repairs

Service	Average Cost per Home Receiving Service	Maximum Cost for Individual Home
~~Furnace Replacements~~ ~~Central Furnaces~~ ~~Wall/Floor/Direct Vent Furnaces~~	~~-~~	~~$2,0001~~ ~~$1,500~~
~~Water Heater Repairs and Replacements (Total Combined Cost for home receiving one or the other)~~	~~$900~~	~~$1,250~~
~~Other~~ Minor Home Repairs	$300	$750
~~Furnace Repairs (restriction on repair expenditures relative to cost of replacement)~~ ~~Central Furnaces~~ ~~Wall/Floor/Direct Vent Furnaces~~	~~-~~	~~50%1~~ ~~40%~~
~~Total of All Minor Home Repairs~~	~~-~~	~~$2,500~~

~~1 Does not include the costs of Title 24 compliance.~~

6.4 Prioritization of Minor Home Repairs

In the event that a contractor requests permission from the utility Program Manager to exceed the limit on minor home repairs, the Program Manager will base a decision on the status of the Contractor's minor home repair budget, the overall program budget, and the need for the repairs in question. If the Program Manager deems it necessary to limit expenditures on the home, measures will be prioritized using the following general priority list:

- Repairs needed to mitigate immediate hazards (e.g., repairs made to mitigate natural gas appliance testing (NGAT) fails, or door repairs where doors will not close or lock),
- Repairs needed to mitigate major infiltration sources (e.g., broken windows, holes in doors, etc.),
- Repairs required to permit the installation of a measure, and
- Other repairs.

7 Measure Installation Policies and Procedures

7.1 Introduction

This section presents ESA Program~~LIEE~~ policies for Program measures that are covered in the ESA Program~~LIEE~~ Installation Standards Manual. Subsection 7.2 specifies general policies that apply to all measures, including contractor installation, installation standards, safety, site clean up, and other policies. ~~Subsection 7.3 identifies non-feasibility criteria and other policies applicable to individual measures and minor home repairs. These measure-specific policies are also listed in the LIEE Installation Standards Manual.~~

7.2 General Installation Policies

7.2.1. Introduction

Several general policies relating to the installation of Program measures must be followed by installation personnel. These policies are presented below.

7.2.2. Installation by Contractor

Measures must be installed by the contractor. Dropping off materials for later installation by the customer is not permitted under this Program.

7.2.3. Installation Standards

All measures must be installed in conformance with the ESA Program~~LIEE~~ Installation Standards Manual~~.s.~~ These standards are intended to meet or exceed existing codes and regulations, and to conform to accepted building practices. When a conflict exists between these installation standards and local codes, the more stringent requirement shall take precedence. Copies of these ~~i~~Installation Sstandards M~~m~~anual~~s~~ may be obtained by using the contact information provided in Section 1.1.

7.2.4. Safety

Contractors must plan and conduct all work in a manner that is consistent with the safety of persons and property. All work shall be conducted in compliance with reasonable and safe working practices and with applicable federal, state, and local laws. For instance, the Contractor is responsible for complete compliance with California Occupational Safety and Health Standards.

It is the responsibility of each program contractor to establish and maintain a safety program for all work undertaken for the ESA~~LIEE~~ Program. It is also the responsibility of each contractor to ensure that all employees observe safety rules by complying with all required safety precautions and regulations. Contractors must ensure that their staff members receive appropriate training in the safe and proper use of the tools associated with the installation of each ESA~~LIEE~~ Program measure.

7.2.5. Installation of Feasible Measures

It is the policy of the CPUC that ESA~~LIEE~~ Program Contractors must install all feasible measures unless~~.~~ after communicating the benefits of installing the new measure(s), the customer specifically refuses the measure(s). If the installer determines that a measure cannot be installed, the reason shall be recorded and made available to the utility or its designee.

7.2.6. Lead-Safe Practices

Contractors shall conduct ~~L~~lead-safe practices ~~shall be employed~~ when working with pre-1978~~1979~~ painted materials in accordance with federal, state, and local regulations and codes. Lead-safe practices for specific measures are listed in the California Installation Standards Manual. ~~per Title 8 of the California Code of Regulations, Section 1532. 1, and Title 17 of the California Code of Regulations, Section 36000, et seq.~~

7.2.7. Site Clean-Up Policies

The Contractor must maintain all work sites and related structures, equipment and facilities in a clean, orderly condition during all work conducted under the ESA~~LIEE~~ Program. Any unused or leftover materials, garbage and debris must be promptly removed from the customer's premises by the Contractor and disposed of at the Contractor's expense. The customer's premises must be left in a clean and orderly condition at the end of each day and at the completion of work.

7.2.8. Recycling and Disposal Policy

The contractor shall properly dispose and recycle replaced measures in an environmentally safe manner and in accordance with federal, state, and local regulations and codes. Specific disposal and recycling policies and procedures of measures are listed in the California Installation Standards Manual.

7.2.~~9~~8. Weatherization of Mobile Homes

Mobile homes with open combustion furnaces or water heaters drawing air from inside the conditioned space may not have infiltration reduction measures installed under the ESA~~LIEE~~ Program. In addition, attic insulation (and therefore attic duct reconnection) is not a measure for mobile homes.

~~7.3 Measure-Specific Policies~~

~~*7.3.1. Introduction*~~

~~This section describes Statewide LIEE policies and procedures that are specific to the installation of specific measures and minor home repairs. Two kinds of policies and procedures are covered: 1) non-feasibility criteria and 2) other policies and procedures. Non-~~

feasibility criteria formalize conditions under which measures *may not* be installed in specific homes. In general, non-feasibility conditions refer to cases where a specific measure:

- Is present,
- Is refused by the customer,
- Cannot be physically installed,
- Cannot be installed without risk to the household or the contractor, or
- Is prohibited by code or Program policy.

Other policies and procedures are those policies which typically tell when, where, and under what circumstances a measure can be installed. Policies related to billing practices are excluded from this list, but may be covered by utility contracts with installation contractors.

Non-feasibility criteria and other policies and procedures are presented for the following LIEE Program measures and specific minor home repairs (MHRs): Note – Not all measures listed are offered in all utility service territories or climate zones.

- Weather Stripping Doors
- Attic insulation
- Water Heater Insulation
- Water Heater Pipe Insulation
- Central Air Conditioner Service/Tune-up
- Cover Plate Gaskets
- Energy Saver Showerheads
- Faucet Aerators
- Evaporative Cooler and Air Conditioner Vent Covers
- High Efficiency Room Air Conditioners
- High Efficiency Central Air Conditioners
- HE Clothes Washers
- FAU Standing Pilot Light Conversion
- Microwaves
- Occupancy Sensor
- Caulking
- Minor Home Repair[12]
- Thread-Based Compact Fluorescent Lamps
- Exterior Hardwired CFL Fixtures
- Energy Efficient Torchiere Lamps
- Interior Hardwired CFL Fixtures
- Evaporative Cooler Installation
- Furnace Repair/Replacement (MHR)
- Water Heater Repair/Replacement (MHR)
- Refrigerator Replacement
- Duct Testing and Sealing[13]
- Furnace Clean and Tune
- Pool Pump Replacement
- LED Night Lights
- Thermostatic Shower Valve

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[12] Minor Home Repairs are discussed in Section 6 of the P&P Manual.

[13] Duct testing and sealing are offered as a distinct measures, as well as a means of complying with Title 24 when alterations are made to the existing appliance. Different policies apply to these two applications.

7.3.2. Caulking

Non-Feasibility Criteria. Caulking shall not be applied:

- If the existing caulking is functioning properly, even if not installed in accordance with current Installation Standards,
- To cracks that do not penetrate the building envelope,
- To cracks that are too wide to be caulked (wider than 5/8") and must be repaired/patched, or
- If customer refuses caulking. ***Other***

Policies. Three other policies relate to caulking.

- For homes with lapped siding, caulk shall be applied in standard locations such as door thresholds, door stops, and gaps between different materials, etc. However, seams between lapped siding must not be caulked.
- When exterior caulking is required above the first story, it shall be applied whenever the area requiring caulking is readily accessible.
- For mobile homes, caulking should be applied to the interior only.

7.3.3. Weather Stripping Doors

Non-Feasibility Criteria. Weather stripping shall not be applied:

- If the existing weather stripping is functioning properly, even if not installed in accordance with current Installation Standards,
- If the door is located between two conditioned or two unconditioned spaces,
- To doors in multi-unit dwellings that separate the living space from heated hallway,
- To doors and/or frames with a fire rating greater than 20 minutes,
- When a functional storm door is present, or
- If the customer refuses installation of weather stripping. Weather

stripping shall not be applied to appliance closet doors when:

- The combustion appliance receives air from conditioned space (i.e. combustion air grills are present in the enclosure door or wall), or

- Inadequate combustion air (as defined in the installation standards) is being supplied to the appliance. [14, 15]

Other Policies. Additional weather stripping policies include the following.

- The contractor may adjust existing weather stripping in lieu of replacement only if existing weather stripping is functional and creates a proper seal.
- Door shoe and threshold combinations must be installed unless proven to be non-feasible.
- A threshold should not be installed which exceeds 1" in height from the finished floor (1/2" in height for handicapped).
- When the installation of a door shoe and threshold combination is not feasible for the following reasons, an automatic sweep may be used:
  - Medical reasons, such as wheelchairs or walkers, require that the floor be as flat as possible,
  - Metal doors cannot be cut to accommodate a shoe,
  - Doors open outward and do not overlap a floor surface when closed. "Bumper" type thresholds may be used in this circumstance if a tripping hazard will not be created,
  - Finished floor is ceramic tile (100% seal at grout lines is not required),
  - The installation of a proper threshold requires carpet cutting or repair to wooden or concrete sills, and
  - The door is unusually expensive and might be aesthetically damaged by cutting.
- A stationary sweep can be used in lieu of an automatic sweep if a door shoe and threshold combination is not feasible and an automatic sweep cannot be installed.
- The use of flip up sweeps is not allowed.

[14] This restriction covers two situations: when existing vents are inadequate, and when adequate vents cannot be added as a minor home repair.

[15] See the NGAT section of the Installation Standards Manual.

7.3.4. Attic insulation

Non-Feasibility Criteria Directly Related to Attic insulation. Attic insulation shall not be installed if any of the following criteria is applicable.

- In accordance with Table 7-1, the existing insulation level precludes raising the R-value.
- The roof is leaky or shows signs of water damage from leaks that have not been repaired.
- Adequate venting is not present and cannot be installed per installation standard attic ventilation guidelines.[16]
- Hazardous electrical wiring or other hazardous conditions are present.
- An enclosed cavity as defined in the installation standards is present.
- Exhaust vents terminating in the attic cannot be vented to the outside.[17]
- Disconnected or damaged space heating / cooling ducts are present and cannot be repaired.
- Attics having limited accessibility, as indicated when:
  - An inspector cannot gain safe physical access to all treated areas of the attic,
  - Clearance between top of ceiling joist and bottom of ridge board is less than 24 inches,
  - Structural obstructions, such as cross-members of truss systems, provide an opening of less than 18 inches, or
  - Access requires crawling over/under HVAC ducts, and clearance is less than 18 inches.
- The structure is unsound and will not support the weight of the insulation and installer.
- Knob-and-Tube (K&T) Wiring is present and:
  - Functioning knob-and-tube wiring cannot be certified safe by a C-10 contractor.
  - Abandoned K&T wiring is present that cannot be disconnected and certified as abandoned by a C-10 contractor.
  - Insulation over K&T wiring (live or abandoned) is prohibited by local codes.
- The customer refuses installation of attic insulation.

[16] An appendix to the Installation Standards Manual addresses all aspects of vent area determination.

[17] This covers two situations that are covered as minor home repairs: Reconnecting exhaust vents and/or addition of exterior venting as covered in the Installation Standards Manual.

Attic insulation Levels. The level of insulation to be installed varies across CEC climate zones and existing insulation levels, as shown in Table 7-1.

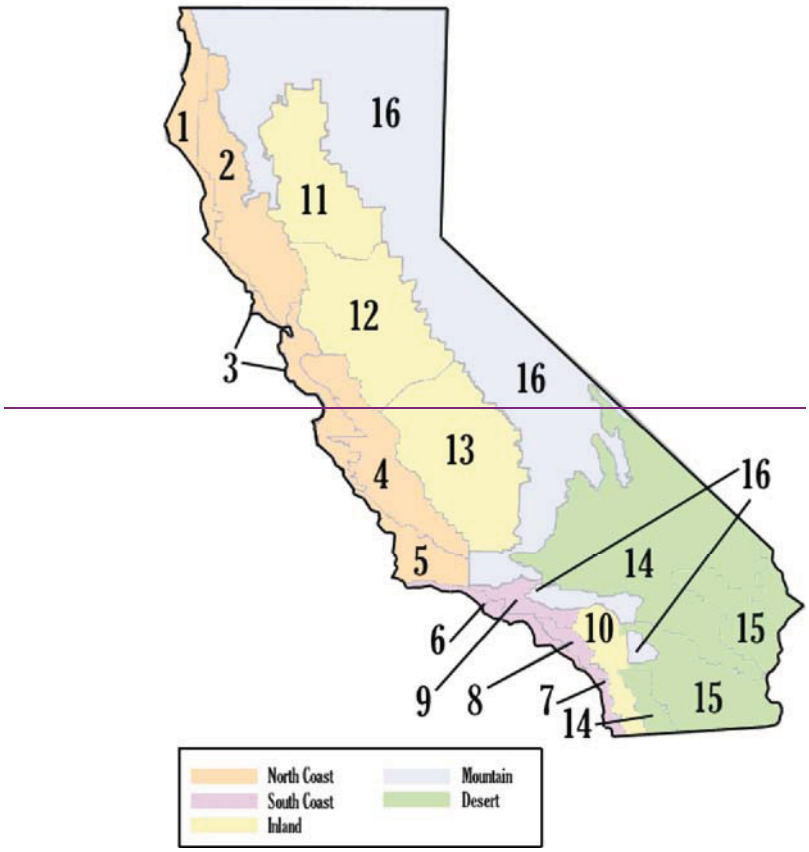
Table 7-1: Attic insulation Additions

Climate Zone	Existing Insulation Level	Action
CEC Climate Zones 2 – 15	R-11 or less	Raise R-Value to R-30
	More than R-11	Do not install additional insulation
CEC Climate Zones 1 and 16	R-19 or less	Raise R-Value to R-38
	More than R-19	Do not install additional insulation

The actions listed in the third column of Table 7-1 refer to the final level of insulation, including any pre-existing values as well as insulation added under the program. These levels apply on a forward-looking basis; homes previously receiving lower levels of attic insulation under the LIEE program will not be revisited to bring insulation up to the new higher level.

Figure 7-1 depicts the sixteen CEC Climate Zones. Climate Zones 1 and 16 have heating degree days in excess of 5,000. Appendix A contains a list of the locations contained in each CEC Climate Zone.

Figure 7-1: CEC Climate Zones



Other Policies Directly Related to Attic insulation. The other key policies that directly apply to attic insulation include the following.

- In cases where local jurisdiction mandates more insulation than required by the LIEE Program, contractors may install higher levels only after forwarding documentation of the more stringent requirements to and obtaining written authorization from the LIEE Program Manager.
- When no attic access exists, contractors will install one prior to installing attic insulation. Minimum dimensions of the new opening shall be 30" x 22" or as required by local code.

- If the gable vent is used for attic access, it must be hinged and large enough (18" x 18" minimum) to provide access for the inspector.
- In the event holes are observed in attic firewalls while performing attic insulation, the prime contractor will document and notify the property owner of the existing condition.
- There is no minimum attic square footage required for attic insulation.
- Homes having (a) separate attics, or (b) contiguous attics consisting of different sections with various crawl clearances shall have insulation installed only in the sections which have the clearances specified above.
- Before insulation is installed, duct leaks shall be sealed, disconnections shall be reconnected, and needed duct repairs shall be made in accordance with the Duct Sealing Standards section of the Installation Standards Manual.

Non-Feasibility Criteria Relating to Attic Ventilation. Attic Ventilation shall not be installed if:

- The existing venting already meets installation standards,
- Tiled hip roof without overhang, soffit, or accessible frieze blocks,
- Attic insulation is non-feasible,
- Roof-mounted vents are the only option for adding venting, but the roof is tile, wood shingles, or in poor condition (e.g. more than three layers of roofing, roof unable to support additional vents),
- The roof is a flat and/or built-up roof as defined in the installation standards, or
- The customer refuses installation of additional vents.

Other Policies Relating to Attic Ventilation. There are no other policies that apply to attic ventilation.

7.3.5. Water Heater Blankets

Non-Feasibility Criteria. A water heater blanket shall not be installed on any water heater if:

- The existing blanket is functioning properly, even if not installed in accordance with current Installation Standards,
- External insulation is specifically prohibited by the manufacturer,
- A T&P relief valve, or gas shutoff valve, is not present, or is not located within 6 of the tank,
- The T&P valve outlet is plugged or capped,

- The tank is exposed to the weather,
- A leak in the tank or water pipes is present,
- Plastic piping (e.g., CPVC) is present in the cold or hot water lines to/from the tank,
- The tank is located within 12 " of a stove, range, or cook top,
- The water heater tank capacity is greater than 100 gallons, or
- The customer refuses installation of a water heater blanket.

A water heater blanket shall not be installed on a gas water heater if any of the following criteria are applicable.

- A gas leak is present.[18]
- The vent pipe and/or draft hood is not properly installed including: [18]
  - No draft hood is present,
  - Two draft hoods are present, or
  - The vent pipe is defective or missing.
- There is evidence of improper combustion and/or venting as characterized by: [18]
  - Large accumulation of soot near the draft hood or on the floor underneath, or
  - Scorching at the draft hood or combustion chamber.
- There is no appliance line (gas shut-off) valve present.
- The combustion air supply is improper or inadequate according to installation standards[19] as characterized by: [18]
  - The absence of both low and high vents (when required),
  - Vent size is too small,
  - Room volume is inadequate, or
  - The customer refuses modifications needed to create adequate combustion air supply.
- Both burner access doors are missing.[18]
- Internal insulation is R-12 or greater.
- Perimeter clearance prior to blanket installation is less than 4 " between tank and door, and less than 1 " on sides and back.

A water heater blanket shall not be installed on an electric water heater if any of the following criteria are applicable.

- Hazardous electrical wiring/conditions are present.

[18] When these conditions exist, installers must contact the designated utility personnel.

[19] See the NGAT section of the Installation Standards Manual.

- The thermostat cover plate(s) not present.
- Internal insulation is R-16 or greater.
- Perimeter clearance prior to blanket installation is less than 1 " on the front, sides, and back.

Other Policies. Only water heaters supplying hot water to residential units receiving other program measures are eligible to receive water heater blankets.

7.3.6. Water Heater Pipe Insulation

Non-Feasibility Criteria. Water heater pipe insulation shall not be installed if:

- The existing pipe insulation is functioning properly, even if not installed in accordance with current Installation Standards,
- Leak is present in tank or water pipes,
- An unsafe condition is present that causes tank insulation to be nonfeasible.
- The water heater pipes are exposed to the elements (especially sunlight, which can quickly degrade the insulation),
- Less than 1 foot of continuous insulation can be installed,
- Plastic piping (e.g., CPVC) is present in the cold or hot water lines to/from the tank,
- Pipes are inaccessible or the configuration prevents proper installation, or
- The customer refuses installation of water heater pipe insulation.

Other Policies. There are no other policies relating to pipe insulation.

7.3.7. Cover Plate Gaskets

Non-Feasibility Criteria. Cover plate gaskets shall not be installed if any of the following criteria are applicable.

- There is evidence of electrical malfunction or hazard, such as:
  - Electrical box not permanently attached,
  - Loose electrical connection,
  - Signs of burning or charring or other evidence of hazardous wiring condition, or
  - In a mobile home, aluminum wiring is present.
- Gaskets are already present, even if not installed in accordance with current Installation Standards.

- The cover plate is located on a wall between two conditioned or two unconditioned areas.
- The cover plate is located behind furniture or major appliances that are too fragile or heavy to move.
- Removal of the cover plate will damage the wall surface (paint, wallpaper, etc.).
- The utility box is an odd size and standard gaskets will not work.
- The customer refuses installation of cover plate gaskets.

Other Policies. The following other policies apply to cover plate gaskets.

- All broken, cracked, or missing cover plates shall be replaced.
- All gaskets must be contractor installed. No gaskets are to be left behind for customer installation.

7.3.8. Energy Saver Showerheads

Non-Feasibility Criteria. Energy saver (i.e. low flow) showerheads shall not be installed if the following criteria are applicable.

- The existing showerhead(s):
  - Have a flow rate less than or equal to 2.5 gpm be functioning properly, even if not installed in accordance with current installation standards, or
  - Are required for medical reasons.
- The existing shower arm:
  - Is made of plastic (including ball joint),
  - Is cracked, broken, or missing, or
  - Requires removal.
- The shower is not mechanically functional.
- Standard metal adapters will not work.
- Piping is in such poor condition that showerhead installation could cause plumbing problems.
- The customer refuses installation of low flow showerheads.

Other Policies. The following other policies apply to energy saver (low flow) showerheads.

- All existing showerheads with a flow rate greater than 2.5 gpm flow and not required for medical reasons shall be replaced with low flow showerheads.
- Replaced showerheads may be left with the customer or the property manager only if requested.

7.3.9. Faucet Aerators[20]

Non-Feasibility Criteria. Faucet aerators may not be installed if:

- Aerators are already present and functioning properly, even if not installed in accordance with current Installation Standards,
- The faucet has a special fitting for attaching an appliance (e.g., portable dishwasher),
- The faucet does not provide hot water,
- The faucet or faucet threads are found to be damaged and/or leaky,
- Removal of the existing aerator is likely to cause damage to the aerator or the faucet,
- Standard aerators will not fit, or
- The customer refuses installation of faucet aerators.

Other Policies. There are no other policies with respect to faucet aerators.

7.3.10. Evaporative Cooler and Room Air Conditioner Vent Covers

Non-Feasibility Criteria for Evaporative Cooler Covers. Evaporative cooler covers shall not be installed if:

- An existing evaporative cooler vent cover is functioning properly, even if not installed in accordance with current Installation Standards,
- The vent(s) serving the evaporative cooler is (are) shared with a heating system,
- The evaporative cooler is ducted with multiple supply vents/registers, and it is impossible to equip all of them with covers,
- Water damage to the ceiling or wall area around the vent register is evident, prevents proper cover installation, and cannot be repaired,
- The vent/register opening is so close to the wall or ceiling that proper installation of the cover is impossible,
- Electrical wiring/plug/receptacle interferes with proper installation, and furring is not a feasible option,
- An external cover is already present, or
- The customer refuses installation of evaporative cooler vent covers.

[20] Faucet aerators are integrated into the energy saver showerheads section of the Installation Standards Manual.

Non-Feasibility Criteria for Room Air Conditioner Unit Covers. Air conditioner covers shall not be installed if:

- An existing air conditioner vent cover is functioning properly, even if not installed in accordance with current Installation Standards,
- Water damage to the window or wall area around the unit/vent is evident, prevents proper cover installation, and cannot be repaired,
- The vent/unit is so close to the wall that proper installation of the cover is impossible, or
- The customer refuses installation of air conditioner vent covers.

Other Policies. The following other policies apply to evaporative cooler and room air conditioner covers.

- A shop-built wooden vent cover can be used only when a commercially manufactured cover is not available.
- Each cover must be checked for proper fit. Removal and reinstallation must be demonstrated to the customer.
- In the cooling season when the cooler or room air conditioner is in use, the Contractor can leave the cover uninstalled after the initial installation and customer instruction.

7.3.11. Exterior Door Replacements

Non-Feasibility Criteria. An exterior door shall not be replaced if:

- The door can be repaired rather than replaced,
- The door is structurally sound and provides an adequate barrier to infiltration,
- Door jamb is not structurally sound and cannot be repaired or replaced within the Minor Home Repair cap, or
- The customer refuses door replacement.

Other Policies. There are no other policies relating to door replacement.

7.3.12. Window Replacements

Non-Feasibility Criteria. An exterior window shall not be replaced if:

- The window can be repaired rather than replaced,
- The window is structurally sound and provides an adequate barrier to infiltration,

- The window is located above the first floor of a structure and installation will present unsafe working conditions,
- In mobile homes, window replacement will require removal of siding, or
- The customer refuses door/window replacement.

Other Policies. All window replacements require written pre-approval from the LIEE Program Manager.

7.3.13. Glass Replacement

Non-Feasibility Criteria. Window glass shall not be replaced if:

- A small hole, ¼" or less, is present and can be patched with clear silicone or clear glass repair tape,
- There is only one crack less than 6 " long, extending from edge to edge, that can not come loose from the frame to pose a safety hazard,
- The complete window will be replaced, or
- The customer refuses glass replacement.

Other Policies. The following other policies apply to glass replacement.

- When only one pane in a dual pane window is cracked, the unit does not require repair/replacement. If one pane of a dual pane window is broken, all shards must be removed.
- Polycarbonate glazing is allowed only with written pre-approval from the LIEE Program Manager.

7.3.14. Thread-Based Compact Fluorescent Lamps (CFLs)

Non-Feasibility Criteria. A thread based CFL shall not be installed:

- In a socket/fixture that is nonfunctional,
- In a fixture that already has a functional CFL,
- If hazardous conditions exist at the socket/fixture,
- In a circuit that is controlled by a solid state timer,
- In a circuit that is controlled by a dimmer that is not compatible with available CFLs,
- In a fixture located in a storage room, closet, or multifamily common area,
- In any fixture that is not operable by the customer (i.e., on their electric meter/bill), or

- If the customer refuses installation of CFLs.

Other Policies. The following other policies apply to Thread-Based Compact Fluorescent Lamps (CFLs).

- Incandescent light bulbs are to be removed after a CFL has been installed unless the customer asks to keep the old bulb(s).

7.3.15. Exterior Hard-Wired Compact Fluorescent Lamp Light Fixtures Non-Feasibility Criteria.

An exterior hard-wired CFL fixture shall not be installed:

- If the existing location of the fixture is not suitable,
- If a thread-based CFL will fit in the existing fixture,
- In an electrical box that is substandard and/or cannot be properly secured,
- Where wiring is substandard, in a deteriorated condition, and/or rewiring is necessary,
- In a circuit that does not operate properly (e.g., defective switch),
- In a circuit that is controlled by a solid-state timer,
- In a circuit that is controlled by a dimmer that is not compatible with available hard-wired CFL fixtures,
- Existing fixture is in a wet location, and a grounding conductor is not available,
- If the existing fixture is not on the customer's electric meter/bill, or
- If the customer refuses installation of CFL fixture(s).

Other Policies. There are three other policies relating to hard-wired CFL exterior light fixtures:

- Hard-wired CFL exterior light fixtures may be installed only in single family non-mobile homes,
- No more than an average of three fixtures may be installed, and
- Replaced exterior light fixtures may be left with the customer or the property manager only if requested.

7.3.16 Room Evaporative Cooler Installation

Non-Feasibility Criteria for Room Evaporative Coolers. A room evaporative cooler shall not be installed if:

- The customer has an operational evaporative cooler,

- Proper electrical service is not present,
- Substandard wiring exists (e.g., ungrounded outlets or decayed insulation and/or exposed wires),
- Proper exhaust ventilation is not present,
- No feasible window or wall location is available,
- Exterior clearance requirements cannot be met,
- Egress requirements cannot be met,
- Wood windows are decayed or deteriorated,
- Siding is decayed or damaged, or
- The customer refuses installation of the evaporative cooler.

Other Policies. There are three other policies for this measure:

- Customer must have an operational refrigerated air conditioning unit,
- For single family homes and mobile homes, evaporative coolers are available only in those climate zones reflected in Table 5-1, and
- Evaporative coolers may not be installed in multi-family homes.

7.3.17. Furnace Repair and Replacement

Non-Feasibility Criteria for All Furnaces. A furnace shall not be repaired or replaced if:

- The property is renter-occupied,
- Fuel used by the existing unit is not supplied by the utility providing LIEE Program services,
- The existing furnace is inaccessible,
- Ducts cannot be brought into compliance with the Duct Sealing Section of the Installation Standards Manual.
- No furnace is present and no natural gas line or electric outlet is available to accommodate the installation of a furnace,
- The customer refuses furnace repair or replacement,

Non-Feasibility Criteria for (Central/Ducted) Furnaces in Conventional Homes. A central furnace in a conventional home shall not be repaired or replaced if:

- For roof-mounted units, the roof is not structurally adequate to support the installation,

- Adequate access and/or combustion air cannot be provided, or
- Disconnected or damaged space heating ducts are present and cannot be repaired.

Non-Feasibility Criteria for (Central/Ducted) Furnaces in Mobile Homes. A central furnace in a mobile home shall not be repaired or replaced if:

- Required furnace drawing combustion air from outdoors, and/or furnace components or flue system that are listed and labeled for manufactured home installation, cannot be obtained,
- Adequate access and/or combustion air cannot be provided,
- Depressurization by the forced air unit's non-ducted return system adversely affects an open combustion appliance, and correction is not feasible,
- Disconnected ducts or catastrophic leaks are present and cannot reasonably be repaired, or
- A leaky belly cavity or roof cavity return exists and a central return system will not be installed.

Non-Feasibility Criteria for Wall/Floor (Non-Ducted) Furnaces. A wall or floor furnace shall not be repaired or replaced if:

- Adequate access and/or combustion air cannot be provided, or
- Existing open combustion appliance is in a location prohibited by the replacement unit instructions or local code, and relocation to an approved location is not feasible.

Non-Feasibility Criteria for Installation or Repairs Requiring Attic or Crawl Space Access. In the event that attic or crawl space access is required for the installation or repair of wall/floor furnaces, the installation or repair of a furnace will be considered nonfeasible if:

- Attic clearance is less than 24 " between the top of ceiling joists and the bottom of the ridge board, or
- Crawl space clearance is less than 18 " from the ground to the bottom of the floor joist system, or
- Any of the following conditions is present in the crawl space area where access is required: hazardous insect infestation; excessive ground moisture (standing water or mud); or sewage waste on ground or other unsanitary conditions posing a health and safety hazard.

Non-Feasibility Criteria for Central Air Conditioner Replacement. Central air conditioner replacement as part of furnace replacement is non-feasible if:

- The heating system can be repaired with the existing refrigeration equipment intact,
- For roof-mounted units, the roof is not structurally adequate to support the installation,
- Electrical service requirements cannot be met,
- Split system line set is inadequate, or
- System airflow is inadequate.
- In mobile homes, a leaky belly-cavity or roof-cavity return exists, and a central return system will not be installed.

Non-Feasibility Criteria for the Installation of Programmable/Setback Thermostats. Programmable/Setback Thermostats shall not be installed if:

- The furnace is not being replaced or repaired,
- The furnace is being repaired, and a properly functioning thermostat is present,
- A programmable/setback thermostat is already present and operational.
- The measure is refused by the customer.

Non-Feasibility Criteria for HVAC Air Filters. HVAC unit air filters shall not be replaced if:

- A serviceable filter is already present,
- The furnace will not be repaired,
- The types of filters provided by the program are specifically prohibited by the appliance manufacturer,
- Filter replacement would require removal of a flue, duct, or pipe, or
- The proper filter support or retaining device is not present and installation is not feasible.

Other Policies. The following other policies apply to furnace repairs and replacements.

- Furnace repair or replacement may be provided only when the appliance fails NGAT, and correction cannot be achieved with Service/Adjustment[21] by utility gas service personnel (or their designated representative).[22]

[21] Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.

[22] Note that NGAT fails include cases where a furnace is non-operable, or where no furnace is present in the case where another gas appliance is used for space heating.

- Furnace replacements and major furnace repairs may be provided only if the residence is owner-occupied. Service/Adjustment may also be conducted in renter-occupied homes.
- A furnace will not be replaced if Title 24 provisions relating to alternations cannot be satisfied.
- A furnace that is not abandoned or inaccessible and that cannot be made operable through servicing, fails the NGAT.
- Furnace repairs and replacements will be provided only if the fuel used by the furnace is supplied by the utility providing LIEE Program services.
- Furnace replacement will not include hazardous material abatement, major structural alteration, concrete work, painting, or floor covering.
- A central furnace may be repaired only if the cost of repairing the unit would be less than 50% of the cost of replacement. A wall, floor or direct vent furnace may be repaired only if the cost of repairing the unit would be less than 40% of the cost of replacement.
- An air conditioning unit may be replaced in conjunction with a furnace replacement if:
  - the unit being replaced is a combined forced air heating and central AC package system, also referred to as a dual pack (i.e. the AC and furnace is manufactured as one unit and is housed in a single sheet metal housing); or
  - the furnace being replaced is part of a split forced air heating and AC system and the AC evaporative coil and/or the outside system cannot be matched with the new furnace. However, AC replacement must not require refrigerant line replacement.
- Replaced units must be de-manufactured in compliance with all laws and regulations.
- Installer must have a C-20 license.
- A programmable thermostat may be installed only if (a) a central furnace or central air conditioner is replaced (a programmable thermostat is required by Title 24 when a central heating system and/or a central air conditioner is replaced), or (b) a central furnace or central air conditioner is repaired and a properly functioning thermostat is not present.
- Prior to installation, contractors installing programmable thermostats shall explain the operation of these thermostats and provide the customer an opportunity to refuse the measure.
- Thermostats may be moved to resolve short cycling problems in mobile homes.
- HVAC filters may be replaced only as part of central furnace repair or central air conditioner replacement.
- Contractors who replace filters must show customers how to remove, clean and re-install the filters.

7.3.18. Natural Gas Water Heater Repair or Replacement

Non-Feasibility Criteria for Natural Gas Water Heater Replacement . A natural gas water heater shall not be replaced if:

- The property is renter-occupied,
- Fuel used by the existing unit is not supplied by the utility providing LIEE Program services,
- The existing water heater is inaccessible,
- The drain line for the T&P valve or drain pan cannot be properly terminated outdoors or to an approved indoor drain if required by local code, or a gas shutoff valve and pressure relief valve cannot be installed in lieu of a T&P valve and drain line,
- Required access, clearance or combustion air cannot be provided,
- Structure/floor cannot properly and safely support the installation,
- No suitable mounting locations for seismic bracing are available,
- A safety hazard is present which cannot be repaired (e.g., vent system defect, nonconforming gas piping),
- A watertight pan cannot be installed under the unit when required,
- A plumbing condition exists which prevents achieving satisfactory water pipe connections,
- A whole house fan is present, the existing water heater is in the attic, and a closed combustion unit cannot be installed,
- The unit is a central water heater serving more than one unit, or
- The customer refuses water heater replacement.

Non-Feasibility Criteria for Natural Gas Water Heater Repair. A natural gas water heater shall not be repaired if:

- The property is renter-occupied,
- Fuel used by the existing unit is not supplied by the utility providing LIEE Program services,
- The existing water heater is inaccessible,
- Proper combustion air cannot be provided,
- A safety hazard is present which cannot be repaired,
- The unit is a central water heater serving more than one unit, or

- The customer refuses water heater repair.

Other Policies. The following other policies apply to water heater repairs and replacements:

- Water heater repair or replacement may be provided only when (a) the appliance fails NGAT, and correction cannot be achieved with Service/Adjustment by utility gas service personnel (or their designated representative) or (b) the tank has a water leak.
- Water heater replacements and major repairs may be provided only if the residence is owner-occupied. Service/Adjustment may also be conducted in renter-occupied homes.
- Water heater repairs and replacements will be provided only if the fuel used by the appliance is supplied by the utility providing LIEE Program services.
- Water heater replacement will not include hazardous material abatement, major structural alteration, concrete work, painting, or floor covering.
- A water heater may be repaired only if the cost of repairing the unit would be less than 50% of the cost of replacement.

7.3.19. Refrigerator Replacement

Non-Feasibility Criteria. Refrigerators shall not be replaced if:

- Any refrigerator to be removed was manufactured after 1992,
- The electrical outlet used by the existing refrigerator is not properly grounded and cannot be properly grounded,
- Floor is not level and cannot safely support a new refrigerator,
- The refrigerator is not accessible for removal (e.g., doors from room are too small, refrigerator is encased in tile),
- Hazardous electrical conditions exist at the outlet used by the existing refrigerator, or
- The customer refuses refrigerator replacement. ***Other Policies.*** Other policies that apply to refrigerator replacement include the following.

- The minimum size for primary refrigerators replaced under the LIEE Program is 10 cubic feet.
- One of the refrigerators replaced under the Program must be a primary refrigerator. The primary refrigerator is the main refrigerator in the home, usually the kitchen refrigerator.

- The size of the replacement refrigerator shall be approximately equal to the size of the existing unit. When two refrigerators and/or freezers are exchanged for a single unit, the replacement unit may not be larger than the combined size of the two existing units, and may not be larger than 23 cubic feet.
- Space must be physically large enough to accommodate the new refrigerator, with entrance and passageways sufficient to allow removal of the existing refrigerator.
- Contractor shall dispose and recycle (de-manufacture) replaced refrigerators in an environmentally safe manner and in accordance with federal, state, and local regulations and codes. Contractor represents that it has knowledge of the Metal Discard Act, effective January 1, 1994, which prohibits disposal of refrigerators/freezers in landfills.

7.3.20. High Efficiency Room Air Conditioner

Non-feasibility Criteria. High efficiency room air conditioners shall not be installed:

- If the air conditioner to be replaced is operational and is less than 15 years old.
- If electric service requirements cannot be met.
- If a structurally sound mounting platform and/or suitable mounting location is not available.
- If the measure is refused by the customer. ***Other***

Policies. The following other policies apply to this measure:

- High efficiency room air conditioners may be installed only in those climate zones reflected in Table 5-1.
- Replacement unit must have a minimum EER of 10.7.
- Replaced units must be de-manufactured in compliance with all laws and regulations.
- All units must be adequately supported and braced.

7.3.21. High Efficiency Central Air Conditioners

Non-feasibility Criteria. The replacement of high efficiency air conditioners will be considered non-feasible if:

- The existing air conditioner is not operational,
- For PG&E and SDG&E, the central AC has a SEER greater than 9.0,
- For SCE, the central air conditioner has a SEER greater than 10.0 or is less than 10 years old,
- The property is renter-occupied, except in SCE territory,

- Existing system is a combined HVAC unit and the unit has not passed the pre-weatherization NGAT,
- For a roof-mounted unit, the roof is not structurally adequate to support the installation,
- Electrical service requirements cannot be met,
- Ducts cannot be brought into compliance with the Duct Sealing Section of the Installation Standards Manual,
- Existing HVAC unit is a combined fuel unit and the gas is not provided by one of the IOUs,
- Duct system is inadequate,
- Split system refrigerant line set is inadequate, or
- Customer refuses.

The unit is a mobile home, and either of the following conditions is present:

- Depressurization by the FAU non-ducted return system adversely affects an open-combustion appliance, and correction is not feasible, or
- Abandonment of a leaky belly-cavity or roof-cavity return is required but not feasible.

In the event that the replacement of the central air conditioning system requires attic or crawl space access, replacement will be considered non-feasible if:

- Attic crawl clearances do not meet required minimums:
  - Clearance between top of ceiling joist and bottom of ridge board is less than 24 inches, or
  - Access requires crawling over/under HVAC ducts, and clearance is less than 18 inches.
- Crawl space clearance is less than 18 ” from the ground to the bottom of the floor joist system,
- There is hazardous insect or pest infestation,
- There is excessive ground moisture (standing water or mud),
- There is sewage waste on the ground or other unsanitary conditions posing a health and safety hazard.

Non-feasibility Criteria for Programmable/Setback Thermostats. Programmable /Setback Thermostats shall not be installed:

- If a programmable/setback thermostat is already present and operational.
- If the measure is refused by the customer.

Other Policies. The following other policies will apply to central air conditioner replacements:

- Central air conditioner replacements will be offered only in Title 24 climate zones 14 and 15 and other climate zones as reflected in Table 5-1.
- A programmable/setback thermostat may be installed only if a central air conditioner is replaced (a programmable thermostat is required by Title 24 when a central air conditioning system is replaced).
- Prior to installation, contractors installing programmable thermostats shall explain the operation of these thermostats and provide the customer an opportunity to refuse the measure.
- Thermostats may be moved to resolve short cycling problems in mobile homes.
- HVAC filters may be replaced only as part of central furnace repair or central air conditioner replacement.
- Contractors who replace filters must show customers how to remove, clean and re-install the filters.
- Replacement of refrigerant line sets is beyond the scope of this Program.

7.3.22. Duct Testing and Sealing as a Program Measure

Non-feasibility Criteria for Duct Testing as a Program Measure. Duct testing as a program measure will be considered non-feasible if:

- Ductwork contains excessive damage or deterioration that would preclude proper testing,
- If the replacement of 40 or more feet of duct in unconditioned space would be necessary,
- Ductwork contains or is made of asbestos,
- Ductwork is insulated or sealed with asbestos,
- Ductwork is inaccessible or an unsafe condition exists, causing duct testing to be unfeasible,
- A hazardous condition exists requiring repair or replacement per NGAT policy, and repair/replacement is not feasible,
- Forced air heating unit is inoperative and cannot be repaired,
- Forced air heating unit is abandoned or inaccessible, or
- The customer refuses.

Non-feasibility Criteria for Duct Sealing as a Program Measure. Duct sealing as a program measure will be considered non-feasible if:

- Duct leakage is below the threshold leakage per the Duct Testing and Sealing Form,
- Replacement of 40 or more feet of duct in unconditioned space would be necessary,
- A natural gas appliance hazard exists, and repair is not feasible,
- Duct system has been abandoned,
- Duct system is damaged and deteriorated beyond repair,
- A health or safety hazard is present, such as insect infestation, hazardous electrical wiring, or structural hazard, which prevents safe access to the duct system,
- Ducts and/or components are made of or insulated with asbestos,
- Access to the duct system does not meet minimum accessibility criteria specified in the Program Policy & Procedures Manual,
- For ducts in the crawl space: sewage waste is on the ground, or excessive ground moisture (standing water or mud) is present,
- Forced air heating unit is inoperative and cannot be repaired,
- Forced air heating unit is abandoned or inaccessible, or
- Customer refuses.

Other Policies. The following other policies will apply to duct testing and sealing when conducted as a free-standing measure:

- Duct testing and sealing as a measure will be offered only in Single Family and Mobile Homes.
- Duct testing and sealing as a measure will be offered in those climate zones reflected in Table 5-1.
- For homes with electric space heat provided by the IOU, duct testing and sealing as a measure will be offered in those climate zones reflected in Table 5-1.
- Duct sealing is not required unless initial leakage is at least 28% of airflow.
- In order to be considered as a Program measure, potential duct leakage reduction must be at least 13% of total fan flow.
- For a duct system to be considered sealed, (a) the duct leakage reduction must equal or exceed 13% of airflow; (b) the final duct leakage must be reduced to less than 15% of airflow, or, if this cannot be reached, all accessible duct leaks must be sealed as verified by smoke tests.

- The utility or its designee will verify initial and final duct leakage rates, in accordance with the procedures in the Duct Testing Standards of the Installation Standards Manual.

7.3.23. Duct Testing and Sealing as a Means of Title 24 Compliance

Non-feasibility Criteria. Since Title 24 is a state law, there are no Program non-feasibility criteria. When required by Title 24, duct testing and sealing must conform to all provisions of Title 24 (applicable to conventional homes but not mobile homes).

Other Policies. The provision of duct testing and sealing as a means of Title 24 compliance will be governed by the following other policies:

- Beginning October 1, 2005, when "alterations" are made to HVAC systems in conventional homes located in climate zones 2 & 9-16, the following requirements for duct testing and duct sealing apply:

  1) HVAC Contractors must:

     a) Ensure that duct leakage is at an acceptable level – which involves duct testing and, as needed, duct sealing, or

     b) Utilize a Title 24 High Efficiency Alternative in lieu of duct testing and sealing.

  2) When duct testing and sealing is performed:

     a) All accessible ducts must be sealed by the HVAC Contractor, and

     b) A minimum of 1 in 7 of each contractor's completed installations must be verified by a HERS Rater to be in compliance with Title 24 Standards.

  3) *Exceptions:* Duct testing and sealing requirements do not apply when:

     a) Total length of ducts located in unconditioned space is less than 40 linear feet.

     b) Ducts are constructed, insulated, or sealed with asbestos.

     c.) Ducts have been previously verified by a HERS rate to be incompliance with Title 24.

- HERS verification of duct testing and sealing is tied to the building permit process. Under Title 24, a building permit for an HVAC alteration cannot be finalized until a form CF-6R has been completed and submitted to the HERS rater and a form CF-4R is completed by a HERS Rater and submitted to the Building Department.

- The Title 24 definition of an HVAC "alteration" is:

  1) Installation or replacement of an HVAC unit (central furnace and/or air conditioner or heat pump), or

2) Replacement of any of the following major HVAC components (the entire component, not a part within the component):

a) Air handler

b) Condenser (outdoor unit)

c) Indoor coil

d) Furnace heat exchanger

e) More than 40 feet of new ductwork in unconditioned space

By contrast, a "repair" is servicing an HVAC unit or fixing/replacing a defective part within a major component – such as the fan motor or blade within the air handler, or the compressor or cooling fan motor or blade within the condenser (outdoor unit). "Repairs" are not within the scope of Title 24 standards and do not mandate duct testing and sealing.

- When Title 24 duct testing and duct sealing is required, final duct leakage must be in conformance with the following criteria:

Primary Duct Leakage Options

1) Measured duct leakage shall be less than 15% of fan flow, or

2) Measured duct leakage shall be reduced by more than 60% compared to measured duct leakage prior to the alteration, with visual inspection and smoke test by a HERS Rater performed to verify that all accessible leaks have been sealed.

Secondary Duct Leakage Option. If it is not possible to meet the duct sealing options listed above:

1) All accessible duct leaks shall be sealed, and

2) A HERS Rater shall verify that all accessible leaks have been sealed by performing a visual inspection and a smoke test.

- When a primary duct leakage option is selected, conformance with Title 24 duct leakage criteria must be verified by a HERS Rater for a minimum of 1 in 7 jobs completed by each HVAC contractor. However, Title 24 gives the homeowner the option to request HERS verification for his/her home, rather than being part of a 1-in7 sample.

- When the secondary duct leakage option is selected, 100% HERS verification is required.

7.3.24. Pool Pump Replacement

Non-feasibility Criteria. *High efficiency pool pumps shall not be installed if:*
- The existing pool pump and pool pump motor is not in working condition.

- The pool is abandoned.
- Electric service requirements cannot be met.
- The plumbing in the pool area is substandard, or will not accept the new pool pump and pool pump motor.
- The filtration system is not in good working condition and operational.
- The existing controller is not compatible with available replacement pumps, and installation of a new controller is not feasible.
- A suitable installation location is not available.
- The measure is refused by the customer.

Other Policies. The following policies also apply to pool pumps:

- The existing pool pump motor must be single speed.
- Pool pump and pool pump motors can only be installed in Single Family homes.
- Pool must be a private, **in-ground** pool filled with water.

7.3.25. High Efficiency (HE) Clothes Washer

Non-feasibility Criteria. *High efficiency clothes washers shall not be provided if:*

- Household consist of 3 or less members.
- Water heating source energy is not supplied by the utility providing LIEE program services.
- The existing clothes washer and/or dryer is not in working condition.
- The existing clothes washer and/or dryer is not accessible.
- A properly grounded electrical receptacle is not located within reach of the washer's power cord.
- A suitable water supply and or drain system is not available.
- A suitable location, with acceptable floor and proper clearances, is not available.
- The existing clothes washer is a stacked unit.
- The existing clothes washer was manufactured after 1/1/2004.
- The dwelling is served by a central water heater.
- The measure is refused by the customer.

Other Policies. The following policies also apply to HE Clothes washers:

- HE Clothes Washers are available to both home owners and renters in all housing types and climate zones.
- HE Clothes Washers will not be offered in cases where the home is renter occupied and the landlord owns the existing washing machine.

7.3.26. Energy Efficient Torchiere Lamps

Non-feasibility Criteria. *Energy Efficiency Torchiere Lamps shall not be installed if:*

- An existing free-standing Torchiere floor lamp that qualifies for replacement is not present, i.e., none of the following is currently in use in the home:
  - A halogen Torchiere floor lamp, or
  - An incandescent Torchiere floor lamp with dimmer or 3-way switch, or
  - A Torchiere with a screw base not compatible with standard CFLs.
- Acceptable electrical service in compliance with this P&P document is not available, i.e., electrical equipment is not compatible or is substandard, such as the following:
  - The only available electrical outlet is:
    - Damaged or otherwise unsafe
    - Non-polarized
    - Controlled by a dimmer or sold state timer
  - Extension cord to be used is deteriorated or in poor condition.
- Fluorescent Torchiere floor lamp is already existing.
- The measure is refused by the customer.

Other Policies. The following policies also apply to Energy Efficient Torchiere Lamps:

- Existing free-standing Torchiere Floor lamp must be currently used in the Home and must be either a Halogen Torchiere floor lamp or other incandescent Torchiere floor lamp that cannot feasibly be retrofitted with CFLs.
- Power source must be a properly-installed 2-prong polarized receptacle or a 3-prong grounded outlet.
- Energy Efficient Torchiere Lamps may be performed in those climate zones and dwelling types reflected in Table 5-1.

7.3.27. LED Night Lights

Non-feasibility Criteria. *LED Night Lights shall not be installed if:*

- Socket is non-functional.
- Socket already has a functional LED night light.
- Hazardous conditions exist at the socket.
- Socket is located in storage room, closet or multifamily common area.
- Socket is not operable by the customer (i.e., on their electric meter bill).
- Customer refuses.

7.3.28. Microwaves

Non-feasibility Criteria. *Microwaves shall not be provided if:*

- The residence is not equipped with at least one electric/natural gas cooktop, range or oven.
- Functional microwave oven already present.
- Appropriate location is not available.
- Acceptable electrical outlet is not available.

- Customer refuses.

Other Policies.

- One extension cord may be used when allowed by appliance manufacture's instructions:
- Extension cord shall be:
  - UL listed and in accordance with manufacturer's specifications.
  - A 3-conductor cord with a 3-prong grounded plug.
  - Rated appropriately for the appliance, minimum 14 AWG.
  - The shortest feasible length, 6' maximum.
- Appliance cord and extension cord shall **not** be draped over a countertop or furnishings in a manner which:
  - Allows access to children (to reach and pull on them).
  - Creates a walking hazard (where people can trip).

7.3.29. Furnace Clean and Tune

Non-feasibility Criteria. *Furnace Cleaning and Tune-up shall not be provided if:*

- Space heating source energy is not supplied by the utility providing LIEE program services.
- Major repairs are required which exceed the scope of this measure.
- Furnace is a condensing type or other closed combustion unit.
- Furnace is a ducted gravity type located in a basement.
- Furnace is inaccessible.
- Furnace is located on a roof.
- Inadequate clearance in attic or crawlspace.
- Unsafe/unsanitary conditions exist in crawlspace or attic.
- Conditions are such that the furnace cannot be left operating safely and properly.
- The duct system cannot be brought into compliance with the Duct Sealing section of the Installation Standards manual.
- The condition or location of the furnace makes it unsafe to provide the service.
- An NGAT issue exists that cannot be mitigated (e.g., inadequate CVA, vent system defect etc).
- The measure is refused by the customer.

*7.3.30. FAU Standing Pilot Light Conversion**Non-feasibility Criteria.*** *FAU Pilot Light Conversion shall not be installed if:*

- Space heating source energy is not supplied by the utility providing LIEE program services.
- Furnace is not a 24 volt AC natural draft FAU with a standing pilot.
- Furnace and/or pilot is not operational and cannot be made operational.

- Furnace will be replaced.
- Furnace will be repaired using a standing pilot retrofit kit.
- An appropriate standing pilot retrofit kit is not available.
- Furnace cleaning and tune-up has not been performed.
- The duct system cannot be brought into compliance with the Duct Sealing section of the Installation Standards manual.
- The condition or location of the unit makes it unsafe to perform the procedure.
- The measure is refused by the customer.

Other Policies.

- There are no other policies relating to FAU standing pilot light conversion.

7.3.31. Thermostatic Shower Valve

Non-feasibility Criteria. *Thermostatic Shower Valve shall not be installed if:*

- Existing showerarm:
  - Is made of plastic (including ball joint).
  - Is cracked, broken or missing.
  - Requires removal.
- A showerarm adapter is needed, and standard metal adapters will not work.
- Piping is in such poor condition that Thermostatic Shower Saver installation could cause plumbing problems.
- Hot water is supplied by an on-demand or Tankless water heater.
- Hot water is supplied by a continuously-circulating system (i.e., water is always hot, with little or no wait at the shower.
- Customer refuses.

Other Policies.

- Thermostatic Shower Savers shall be installed only on functional showers – not on showers that are not functional due to plumbing or physical defects.

7.3.32. Occupancy Sensors

Non-feasibility Criteria, *Occupancy Sensors shall not be serviced if:*

- Electrical box and/or wiring is not safe.
- Occupancy sensor already exists.
- Compact Florescent Light (CFL) are installed.
- Location is not acceptable.
- The measure is refused by the customer.

Other Policies.

- Occupancy Sensors may be performed in those climate zones and dwelling types reflected in Table 5-1.

7.3.33. Central Air Conditioner Service/Tune-up

Non-feasibility Criteria. *Central air Conditioners shall not be serviced if:*

- The existing air conditioner is in need of repair or is non operational.
- The duct system contains disconnections and/or excessive damage or deterioration and cannot be brought into compliance with the Installation Standards manuals Duct Sealing standards.
- The supply air is not cool, and/or suction line is not cold.
- The airflow is below manufacturer's minimum specifications and required corrections cannot feasibly be made.
- The air conditioning system has a refrigerant leak.
- The condition or location of the unit makes it unsafe to perform one or more of the procedures.
- The measure is refused by the customer.

Other Policies.

- Central air conditioner service/tune-up may be performed in those climate zones and dwelling types reflected in Table 5-1.
- Air conditioner service/tune-up may be performed in intervals not to exceed the utility's maximum interval allowance.

7.3.34. Interior Hardwired CFL Fixtures

Non-feasibility Criteria. *Interior Hardwired CFL Fixtures shall not be installed if:*

- Existing location of the fixture is not suitable.
- A thread-based CFL will fit in the existing fixture.
- Electrical box is substandard and/or cannot be properly secured.
- Wiring is substandard, in a deteriorated condition, and/or rewiring is necessary.
- Circuit does operate properly (e.g., defective switch).
- Circuit is controlled by a solid-state timer.
- Circuit is controlled by a dimmer not compatible with available hard-wired fixtures CFL fixtures.
- Existing fixture is in a wet location and a grounding conductor is not available.
- Existing fixture is not on the customer's electric/meter bill.
- Customer refuses.

8. Inspection Policies

8.1 Introduction

This section summarizes the inspection policies used in the ~~LIEE~~ ESA Program to ensure safety and quality control in the installation of measures and minor home repairs. Subsection 8.2 discusses the designation of the responsibilities for inspections. Subsection 8.3 describes policies relating to pre-installation inspections. Subsection 8.4 presents policies on post-installation inspections.

8.2 Inspection Personnel

Utilities will use in-house personnel, contract employees, or contractors to conduct inspections. However, each utility will undertake in-house either the prime contractor (administration) function or the inspection function, but not both, with the very limited exceptions discussed in D. 00-07-020.

8.3 Pre-Installation Inspection

The IOUs may implement a pre-installation inspection process for their respective ESA Program. As part of this process, each IOU can select the percentage of homes to be evaluated for program eligibility prior to the installation of measures. ~~four investor-owned utilities have different pre-installation inspection policies, as follows:~~

~~PG&E may perform pre-inspections on homes receiving program services. PG&E's Energy Specialist performs a minimum measure feasibility evaluation.. This evaluation determines if the home requires enough work to be eligible for the program. If eligible, the Energy Specialist will then deliver an energy education to the customer. Then, while still on the customer's premises, the Energy Specialist will call PG&E's Central Inspection Program's toll-free number and report the proposed minimum weatherization measures and quantities, report the type of all combustion appliances present, and if a pre-inspection is selected, coordinate the pre-inspection appointment with the customer and PG&E. At the time of the PG&E visit, the inspector will confirm that the measures identified by the Energy Specialist are feasible. PG&E will also verify that the home is eligible for infiltration reduction measures. Additionally, the inspectors will verify that a refrigerator application was filled out, if required and check the refrigerator outlet for proper grounding.~~

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~~- SDG&E's outreach and assessment contractor performs an initial combustion air assessment and an initial feasibility assessment of the need for measures, prior to assigning a home for installation by the installation contractor. The installation contractor then does a more detailed audit and installs feasible measures. SDG&E may pre-inspect a percentage of homes prior to installation of measures.~~

~~- In the SoCalGas weatherization program, the installation contractor (or a subcontractor) does the initial measure assessment. SoCalGas may pre-inspect a percentage of homes prior to installation of measures. Furnace and water heater replacements require pre-authorization. Every service provider performing outreach and assessment under the program contracts with or hires personnel to enroll qualified customers in the program. These outreach and assessment personnel are required to attend extensive training, which provides them with the tools for enrolling customers and assessing the measures that are feasible to install under program guidelines. The certified outreach and assessment personnel recruit customers for the service providers and are responsible for ensuring both the customer and the dwelling are eligible for program services. They also provide energy education to the customer and perform an assessment (pre-inspection) of the home for feasible measures to be installed. The customer is advised of the measures identified for installation but is told that the installation contractor will make final determination for feasibility of installation.~~

~~- SCE contracts outreach and assessment agencies/personnel to conduct home assessments for SCE's Energy Management Assistance (EMA) program. The outreach and assessment personnel must receive certification for home assessment services by attending an EMA Assessment Workshop. Upon passing the exam, the assessor is given a certificate that allows him/her to perform assessments. Assessors then examine low-income customers' homes for all qualifying measures. This assessment process is a "check and balance" system that assures the right conditions are present for measure installation. Through this process, after verifying the customer's eligibility, assessors pre-screen the home and existing appliances to determine the need for measures. The results of the pre-screening determine if the assessor should conduct a thorough measure feasibility audit to determine measure eligibility. The assessment form is then processed in SCE's database and all eligible measures are assigned for installation. To ensure program integrity, SCE may pre-inspect a percentage of homes prior to installation of measures.~~

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8.4 Post-Installation Inspection

8.4.1. General Polices on Post-Installation Inspection

Post-installation inspections are used to assure that Contractors install measures in accordance with the California Installation Standards of the ~~LIEE~~ ESA Program. In this subsection, specific polices relating to post-installation inspections are presented. These policies encompass the types of pass rates used in program administration, the frequency of post-

installation

inspections, the treatment of failed inspections, ~~hazardous fails,~~ resolution of disputes relating to inspections, ~~charges for reinspection,~~ inspection waivers, and minor job corrections.

8.4.2. Types of Pass Rates

Utilities or their designees will collect information on both per-home and per-measure pass rates. Per-home pass rates will be used for the purposes of determining minimum sample sizes for tracking performance. Per-measure pass rates will be used to tailor training and technical assistance for contractors, as well as to manage programs in a prudent manner.

8.4.3. Post-Installation Inspection Frequency

Utilities or their inspection contractors will select[23] for inspection all attic insulation and furnace replacement jobs. For all other jobs not involving attic insulation or furnace replacement, random inspections will be conducted for a sample of dwelling units. ~~Minimum sample sizes will be determined for each contractor, and will depend upon the contractor's previous pass rates and the total number of units completed by the contractor.~~

Suggested minimum sample sizes are shown in Table 8-1. These sample sizes are designed to provide 90% confidence that the true pass rate is within 5% of the estimated value.

Table 8-1: Minimum Sample Sizes for Inspections (90%/□5% precision)

	Number of Homes Completed By Contractor					
Pass Rate	**200**	**500**	**1000**	**2000**	**5000**	**10000**
0.70	140	241	317	377	425	444
0.75	129	210	265	306	337	348
0.80	115	176	213	239	257	264
0.85	98	139	161	175	184	188
0.90	76	97	108	114	118	119
0.95	45	51	54	56	57	57

Utilities or their inspection contractors may exceed these minimum sample sizes if, in the judgment of the administrator, larger sample sizes are necessary to preserve program quality control. Circumstances that may justify larger sample sizes include, but are not limited to, the following.

[23] It is understood that selecting 100% of jobs for inspection does not necessarily mean that 100% of inspections will be completed, since the utilities and their inspection contractors cannot compel program participants to be present for inspection appointments.

1. If the utility's program or the amount of additional post-inspections undertaken is small enough to conduct additional post inspections without substantially increasing total program expenditures.
2. If a particular contractor exhibits a pattern of inspection failures that justifies inspection of a higher percentage of jobs.
3. If a contractor is on a quality improvement plan which requires improvement of its inspection pass rates.
4. If contractor crews are newly trained or new to the program, and require closer field supervision and on-the-job training.
5. If a contractor's installation crews are not sure of program **installation** standards, as shown by failed inspection results.
6. If a contractor's allocation of homes covers multiple counties.
7. If post-inspections are done in conjunction with post-installation natural gas appliance tests, since there are economies associated with conducting post-installation inspections and post-installation natural gas appliance testing **at the same time.**~~.~~[24]
8. If larger sample sizes are necessary to resolve disputes with contractors over estimated billing fail rates.
9. ~~8.~~ If a new measure has been added to the Program.

Utilities will keep records of actual inspection frequencies by contractor.

8.4.4. ~~Hazardous Fails~~Failed Inspections

If a feasible measure is installed incorrectly or is not installed at all, Contractor may be issued a correction fail which must be resolved as required by the IOU. Hazardous fails must be addressed within 24 hours of notification by the utility and/or its designee.

~~Contractors are required to correct hazardous fails within 24 hours of notification by the utility and/or its inspector.~~

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8.4.5. Failed Inspection Dispute Resolution

~~Dispute resolution practices of the utilities require the use of a neutral third party arbitrator in instances where utility personnel are used to perform the inspections. Utilities who use utility personnel for the inspection function are required to either 1) have available at least two professional arbitration services to hear and determine appropriate action on any unresolved dispute between LIEE service providers and the utility or 2) provide language in their contracts with LIEE service providers that the selection of an arbitrator must be mutually acceptable to both parties. The costs of such service shall be paid by the party which "loses" the arbitration. Utility personnel may, however, attempt to mediate or facilitate resolution of issues between utility inspectors and contractors, as long as a third party arbitrator is available for the final resolution of any unresolved disputes, as described above.~~

[24] The rational here is that there are economies associated with conducting post-installation inspections and post-installation natural gas appliance testing.

(~~August, 2010~~,)

~~Utilities that do not use utility personnel for either the inspection function or LIEE contracting work may, but are not required to, employ the dispute resolution procedures described above. Instead, I~~in those instances where a dispute arises between ~~outside~~ inspectors and contractors, the utility and service provider may agree to utilize in-house personnel to hear and determine appropriate action on any unresolved dispute between ~~LIEE~~ service providers and inspectors. In the event that an agreement cannot be reached between the utility and service provider, a neutral third party may be utilized. The costs of such service shall be paid by the party that "loses" the arbitration.

~~8.4.6. Failure to Install Feasible Measures~~

~~In the event that a contractor fails to correctly install a feasible measure, it will be accorded the following treatment.~~

- ~~If the measure is installed, but installed incorrectly, the measure will be given a correction fail,~~
- ~~If the measure is feasible but was not installed,and is not included on the invoice the measure will be issued a correction fail.~~
- ~~If the measure is included on a pre-approval list but not installed, and the measure is feasible, the measure will receive a correction fail.~~
- ~~If the measure is not installed at all, and is not feasible, but is included in the invoice for the dwelling, the measure will be given a fail.~~

~~8.4.7. Charge for Reinspection~~

~~The utility may levy a charge in the event that a job fail or a job correction is issued and the contractor contests this action. If the failure or correction is upheld, the utility will charge the contractor for the reinspection of the job by the utility arbitrator. If the utility uses an inspection contractor and the job fail or correction is reversed, the utility will charge the inspection contractor for the reinspection of the job by the utility arbitrator, and will reimburse the installation contractor for any direct costs associated with the reinspection of the job.~~

8.4.8. Inspection Waivers

Policies on inspection waivers vary between mandatory and non-mandatory inspections, as follows.

- ***Mandatory inspections*** are ~~those~~ required for projects ~~in~~ which include attic insulation or furnace replacement.~~is installed.~~ For mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. After three such attempts, the inspection provider will send a certified letter to the participant asking for permission to inspect the home. If the

participant does not respond to this certified letter within two weeks, the inspection provider need not conduct the inspection but must notify the utility that the inspection could not be completed. ~~prior to making final approval of payment for the weatherization job.~~

- ***Non-mandatory inspections*** relate to projects not involving attic insulation or furnace replacement. They are non-mandatory in the sense that only a sample of projects must be inspected. For non-mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. A non-mandatory inspection of a sampled project may be waived by the utility after three attempts to contact the participant, provided that attempts are made in an effort to overcome barriers attributable to language preference or disability. The inspection provider shall replace a waived inspection with another inspection and shall complete a sufficient number of inspections as provided in the policy on post inspection frequency (see above).

(August, 2010,)

9 Contractor Eligibility

9.1 Introduction

This section outlines contractor eligibility conditions under the ~~LIEE~~ ESA Program. Subsection 9.2 deals with insurance requirements. Subsection 9.3 relates to licensing requirements. Subsection 9.4 relates to workforce, education, and training. The purpose of this section is to provide general information on these requirements. It may not include all of the requirements specified in the contracts between contractors and Program Administrators. Contractors interested in participating in the ~~LIEE~~ ESA ~~p~~Program can obtain information at each utilities respective website.

9.2 Insurance Requirements

Contractors shall maintain insurance in full force and effect during the life of the contract with the utility.~~LIEE,~~ with responsible insurance carriers authorized to do business in California and having a Best Insurance Guide (or equivalent) rating that meets the guidelines of each utility. ~~of not less than A:VII. All policies shall be endorsed to require at least 30 days notice to the utility of any change or cancellation. Original certificates of insurance shall be provided to the Program Administrator prior to the commencement of any work for this program.~~

~~The following insurance shall be provided:~~

- ~~Workers' Compensation and Employer's Liability Insurance;~~
- ~~Comprehensive General Liability Insurance; and~~
- ~~Comprehensive Automobile Liability Insurance.~~

~~Required insurance of coverage will be provided by the utility. .~~

~~Workers' Compensation Insurance is required to maintain a contractor's license in good standing with the Contractors State License Board (CSLB). The CSLB will suspend the contractor's license of any contractor whose insurance lapses or is canceled. It is the responsibility of each LIEE contractor to provide documentation that all required insurance is in effect. This includes but is not limited to providing LIEE staff with new Certificates of Insurance, as necessary, at the renewal date of insurance.~~

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~~When records indicate a lapse of insurance coverage, contractors will be immediately suspended from working in LIEE.~~

9.3 Licensing Requirements

Any organization or company contracting ~~with a Program Administrator~~ under the ~~LIEE~~ ESA Program must comply with all applicable federal, state and local laws and regulations, as well as with utility guidelines. Contractors and subcontractors must also comply with any applicable CSLB licensing requirements, including current requirements for electrical, plumbing and HVAC, and must remain in good standing with the CSLB.

9.4 Workforce Education and Training (WE&T)

Contractors should make every effort to hire and train from the local low income communities. Additionally the contractors are required to work with the utilities to better track the training and hiring of a low income energy efficiency workforce.

10 Natural Gas Appliance Testing

10.1 Introduction

This section summarizes the statewide policy on ~~LIEE~~ ESA Program natural gas appliance testing (NGAT). Subsection 10.2 discusses the circumstances when such testing must be conducted. Subsection 10.3 presents the general protocols that are followed in the course of natural gas appliance testing. Subsection 10.4 addresses the timing of testing. Subsection 10.5 considers actions to be taken when one or more test is failed by appliances in a participating home. Finally, Subsection 10.6 discusses the types of personnel used for the assessments~~. Finally, Subsection 10.7 provides NGAT nonfeasibility criteria.~~

Note that specific standards for these natural gas appliance testing (NGAT) protocols are described in the ~~*LIEE*~~ *ESA Program California Installation Standards Manual.*

10.2 Applicability of Natural Gas Appliance Testing

10.2.1. General Applicability

In general, natural gas appliance testing will be conducted for all homes that receive infiltration reduction measures and that have at least one natural gas appliance affecting the living space.[25] In addition, the repair and replacement of a natural gas furnace or water heater involves appliance testing. See the Natural Gas Appliance Testing section in the California Installation Standards Manual~~for Conventional Homes or Mobile Homes,~~ as applicable.

10.2.2. Applicability to Combustion Fuels other than IOU Natural Gas

Homes with non-IOU (e.g., propane) space heating fuels are not eligible for infiltration reduction measures. As a consequence, they are not eligible for natural gas appliance testing. Homes with IOU space heating but which use a non-IOU combustion fuel for another appliance (i.e.~~, say,~~ water heating) are also ineligible for NGAT due to the inability of the IOUs to service combustion appliances using non-IOU fuels. The IOUs will refer these latter homes to local LIHEAP agencies~~ to conduct testing and do any repairs or replacement of non-IOU combustion fuel appliances and charge such services to the LIHEAP agencies' CSD-funded weatherization programs. Whether the LIHEAP agencies would also install infiltration reduction measures, or any other weatherization measures under their LIHEAP~~

[25] The NGAT section of the ~~LIEE~~ ESA Program Installation Standards Manual describes the conditions under which an appliance is determined to affect the living space.

~~programs, would be subject to voluntary agreements freely entered into by the IOUs and the local LIHEAP agencies.~~

~~Any agreement between an IOU and a local LIHEAP agency which does not contract with that IOU to provide weatherization services under the IOU's LIEE program will be voluntarily negotiated on a case-by-case basis, given different geographic areas served, and different situations which might occur in different parts of each IOU's service area.~~

~~In any part of a given IOU service area where the local LIHEAP agency chooses NOT to enter into such an agreement, the IOU will continue to install all feasible non-infiltration weatherization measures under its LIEE program, then refer customers to the local LIHEAP agency if they want to have their non-IOU fuel combustion appliances tested, repaired or replaced, and/or want to have infiltration reduction measures installed by the LIHEAP agency.~~

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10.3 Natural Gas Appliance Testing Protocols

10.3.1. General Protocols

General natural gas appliance testing (NGAT) protocols are presented below. Note again that detailed procedures are described in the NGAT section of the California ~~*LIEE*~~ *Installation Standards Manual.* The types of checks conducted as part of NGAT are described in this section.

10.3.2. Pre-Weatherization Evaluations of Gas Appliances

In order to avoid cases in which post-weatherization NGAT would discover nonconforming conditions that (a) preclude installation of infiltration reduction measures, and (b) cannot be corrected within the scope of the program, some pre-weatherization evaluations of gas appliances are performed as part of the ~~initial~~ home assessment. ~~Pre-weatherization appliance evaluations include the following components:~~

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- ~~***Gas Leaks.*** Each gas-burning appliance is checked for the presence of gas leaks. When a natural gas leak is found, the utility is contacted for gas service repairs. Non-IOU gas leaks are treated in accordance with utility-specific policies. All gas leaks must be repaired before weatherization commences.~~
- ~~***Combustion and Ventilation Air (CVA) Evaluations.*** CVA is evaluated for furnaces and water heaters to determine if it is adequate and, if inadequate, whether correction is feasible/possible.~~
- ~~***Flue and Vent Pipe Termination Evaluations.*** Flue and vent pipe terminations are checked to determine if any violate NGAT criteria and, if nonconforming, whether correction is feasible.~~

- ~~***Appliance Operation and Accessibility.*** All gas-burning appliances are checked to determine whether (a) they are accessible for testing, and (b) they are operable. Non-operable natural gas appliances are referred to the appropriate utility service department.~~

- ~~***Unvented Space Heater.*** The dwelling is checked for presence of an unvented combustion appliance used for heating the living space (which will preclude installation of infiltration reduction measures if not removed/eliminated).~~

- ~~***Whole House Fan.*** When a whole house fan exhausting into the attic is present, the attic is checked for the presence of a gas water heater or gas furnace with standing pilot (which will preclude installation of infiltration reduction measures).~~

- ~~***Gas Clothes Dryer.*** If located within the living space, the clothes dryer moisture exhaust is checked to determine if it is properly vented outdoors. If not properly vented outdoors, infiltration reduction measures will not be installed. This restriction does not apply to a gas clothes dryer located in an attached garage.~~

- ~~***Gas Range with Heater/Incinerator.*** When a gas range has a built-in space heater and/or incinerator, if the appliance is not properly vented outdoors, infiltration reduction measures will not be installed.~~

- ~~***Water Heater in Bedroom.*** If an open combustion water heater is present in a sleeping area, infiltration reduction measures will not be installed.~~

- ~~***Mobile Homes.*** Additional checks will be made in mobile homes to determine if (a) gas cooking is present and the kitchen exhaust to outdoors is nonconforming, (b) an exterior-accessed appliance enclosure has unacceptable isolation of furnace return air, and (c) an open combustion space or water heater is present within the living space. Items (a) and (b) may be corrected as a Minor Home Repair only if infiltration reduction measures are feasible, AND the work does not involve extensive repairs. Item (c) precludes the installation of infiltration reduction measures.~~

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Required corrections will be performed before weatherization commences. The ~~owner~~customer will be informed of conditions that preclude installation of infiltration reduction measures and cannot be remedied by the ~~LIEE~~ ESA ~~p~~Program (e.g., exhausting clothes dryers outdoors, and repair or replacement of appliances and gas vents for which repair or replacement is not available).

10.3.3. Post-Weatherization Natural Gas Appliance Testing (NGAT)

After completion of weatherization that includes infiltration reduction measures, NGAT is performed for all natural gas appliances affecting the living space. ~~Post-~~

~~weatherization NGAT includes the following components:~~

- ~~***Visual Examinations.*** Visual examination steps include the following: flue and vent system checks; appliance component checks; re-check for gas leaks,~~

~~inoperable or inaccessible appliances, nonconforming appliances, and whole house fan vented into attic; and check for properly blocked fireplace damper if gas log is used as the primary heat source.~~

~~□ **Combustion and Ventilation Air (CVA) Verification.** CVA adequacy is verified.~~

~~□ **Carbon Monoxide (CO) Tests.** A variety of ambient carbon monoxide tests are conducted on natural gas appliances. The specific nature of these tests is considered in 10.3.4.~~

~~□ **Draft Tests.** Smoke tests are used to check for proper drafting of appliances for which these tests are applicable (e.g., open combustion natural draft space and water heaters and gas logs).~~

~~10.3.4. Ambient CO Testing of Natural Gas Appliances~~

~~The assessment of non-IOU gas appliances was considered above. For IOU-fueled gas appliances (appliances using natural gas provided by SDG&E, PG&E or SoCalGas), ambient CO testing is conducted using the following protocols:~~

~~□ **Space Heating Appliances.** Appliance Ambient CO Test is performed for all space heating appliances.~~

~~□ **Water Heaters.** Appliance ambient CO Test is also performed for water heaters~~
~~in a location defined in the Installation Standards as affecting the living space.~~

~~□ **Cooking Appliances.** Room Ambient CO tests are performed in the kitchen separately during operation of each cooking appliance component (cook top, oven, and broiler).~~

~~□ **Gas Logs.** Exhaust gas CO test is conducted inside the top edge of the fireplace opening on gas logs.~~

~~**Clothes Dryers.** No CO tests are conducted on gas clothes dryers.~~

~~□~~ 10.3.5. Disposition of Appliance Fails/Problems

If a problem is identified through the application of the overall natural gas appliance testing protocol (i.e., elevated CO, inadequate draft, or defect causing an unsafe condition), the case will be referred for resolution to qualified utility-trained personnel or a contractor licensed to repair appliances. Such resolution may involve the use of flue CO testing as well as other procedures.

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10.4 Timing of Combustion Appliance Testing

10.4.1. Homes with Natural Gas Appliances

For homes with natural gas appliances, post-weatherization NGAT protocols are conducted after weatherization. Post-weatherization NGAT shall be conducted within five (5) working days from the date that infiltration reduction measures are installed.

~~*10.4.2. Homes for which Infiltration Reduction is Simulated*~~

~~Temporary sealing/blocking of defective windows and doors, in order to perform post-weatherization NGAT, is allowed when required materials (such as specialty glass or special-order windows or doors) are not available to be installed concurrently with the other weatherization measures. NGAT will be conducted with the defect sealed/blocked (e.g., with plastic sheeting) to simulate infiltration reduction achieved by the completed window/door repair/replacement. A repeat of NGAT following the completed repair/replacement is not required.~~

10.5 Actions to be Taken When Appliances Fail NGAT

The following actions will be taken when appliances fail NGAT:

- In owner-occupied homes, natural gas space heaters failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment and, if necessary, will be repaired or replaced subject to Program policies and procedures.[26]
- In owner-occupied homes, natural gas water heaters failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment and, if necessary, will be repaired or replaced subject to Program policies and procedures.[27]
- In owner-occupied homes, non-program appliances[28] failing one or more of the tests covered by the NGAT protocols will be provided with Service/Adjustment .[29] If Service/Adjustment does not correct the problem in question, the appliance will be tagged, shut off, and/or capped and reported to the customer.~~owner.~~

[26] Note that the absence of a furnace in cases where another gas appliance is used for space heating will constitute an NGAT fail.

[27] Water heater repairs and replacements are ~~also considered minor home repairs, and are~~ provided only to mitigate NGAT fails or to replace leaking water heaters.

[28] Appliances for which ~~LIEE~~ ESA Program repair or replacement is not available.

[29] In this context, Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.

- In renter-occupied homes, appliances failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment. [30] If Service/Adjustment does not correct the problem in question, the appliance ~~be~~ will be tagged, shut off, and/or capped and reported to the customer.~~tenant and the landlord.~~

- In *owner-occupied* homes receiving infiltration-reduction measures, furnace repair or replacement and water heater repair or replacement may be necessary to mitigate natural gas appliance testing (NGAT) fails that cannot be corrected with service by utility gas service personnel (or their designated representative). Such NGAT fails may include, but are not limited to, CO above the action level, inadequate draft, unsafe flue/vent pipe/system, unacceptable flame or flame change when air handler comes on, a non-operable appliance, or the absence of a furnace in cases where another gas appliance is used for space heating.

  There are cost restrictions to be considered when determining whether to repair the furnace measure. The cost to repair the measure should not be more than the cost to replace the measure as follows:

  Central Furnaces - 50% (Does not include the costs of Title 24 compliance.)

- ~~-~~ Wall/Floor/Direct Vent Furnaces - 40% (Does not include the costs of Title 24 compliance.)

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10.6 Personnel Performing Natural Gas Appliance Assessments and Testing

The utilities have the option of conducting natural gas appliance assessments and testing using in-house staff or contracting with third parties to provide these services.

~~10.7 Nonfeasibility Criteria for Natural Gas Appliance Testing~~

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~~***Nonfeasibility Criteria for Natural Gas Appliance Testing for the Entire Dwelling.***~~

~~Natural Gas Appliance Testing shall not be conducted in a dwelling when:~~

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- ~~No infiltration-reduction measures are installed,~~

- ~~No natural gas appliance affecting the living space is present.~~

- ~~A non-IOU combustion fuel is used for space heating.~~

~~Nonfeasibility Criteria for Natural Gas Appliance Testing for Individual Appliances.~~ ~~Natural Gas Appliance Testing shall not be conducted for an appliance if it:~~

- ~~Is abandoned.~~
- ~~Is inaccessible.~~
- ~~Uses non-IOU combustion fuel.~~

[30] In this context, Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.

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~~**Table 9-1 - Allowable Measures when Home Needs Less than Three Measures**~~

~~**San Diego Gas & Electric Company**~~

~~M~~	~~Annual~~	~~Annual~~

Furnaces Repair & Replacement	N/A	3.4
A/C Replacement - Room	93.3	12.1
A/C Replacement - Central	144.4	N/A
A/C Tune-up - Central	135.8	N/A
Evaporative Coolers	190.1	N/A
Duct Sealing	78.3	25.2
Attic Insulation	N/A	49.8
Water Heater Replacement - Gas	N/A	12.1
CFLs	16.0	N/A
Ext. Porchlights Fixture Replacement	16.0	N/A
Interior Hard wired CFL Fixtures	56.9	N/A
Refrigerators	752.3	N/A
Torchieres	203.9	N/A
Occupancy Sensor	213.8	N/A
Clothes Washer	287.9	17.4
Microwave	87.6	28.6
Air Sealing/ Envelope Repair* - All Measures		**8.0**
Outlet Cover Plate Gaskets	N/A	1.3
Evaportative Cooler/AC Cover	N/A	1.3
Attic Access Weatherization	N/A	1.3
Door Weatherstripping	N/A	1.3
Caulking	N/A	1.3
Minor Home Repairs	N/A	1.3
Water Heating Conservation *- All Measures		**13.0**
Water Heater Blanket	N/A	3.3
Low Flow Showerhead	N/A	3.3
Water Heater Pipe Wrap	N/A	3.3
Faucet Aerators	N/A	3.3

Southern California Edison

Measures	kWh Savings	Therms
A/C Replacement - Room	117.0	N/A
A/C Replacement - Central	621.0	N/A
A/C Services - Central	1076.9	N/A
Heat Pump	793.9	N/A
Evaporative Coolers	215.5	N/A
Evaporative Cooler Maintenance	70.7	N/A
Duct Sealing	276.4	N/A
CFLs	16.0	N/A
Exterior Hard wired CFL fixtures	254.0	N/A
Torchiere	191.0	N/A
Refrigerators -Primary	753.6	N/A
Refrigerators - secondary	753.6	N/A
Pool Pumps	1399.6	N/A

Air Sealing/ Envelope Repair* - All Measures	**53.0**	**N/A**
Outlet Cover Plate Gaskets	8.8	N/A
Evaporative Cooler/AC Cover	8.8	N/A
Attic Access Weatherization	8.8	N/A
Door Weatherstripping	8.8	N/A
Caulking	8.8	N/A
Minor Home Repairs	8.8	N/A
Water Heating Conservation * - All Measures	**299.0**	**N/A**
Water Heater Blanket	75.0	N/A
Low Flow Showerhead	75.0	N/A
Water Heater Pipe Wrap	75.0	N/A
Faucet Aerators	75.0	N/A

Southern California Gas Company

Measures	kW (Annual)	Therm Savings
Furnaces	N/A	28.2
Duct Sealing	N/A	21.1
Attic Insulation	N/A	41.0
Water Heater Replacement - Gas	N/A	12.1
Tankless Water Heater - Gas	N/A	28.0
High-Efficiency Clothes Washer	N/A	37.0
Forced Air Unit Furnace Standing Pilot Retrofit	N/A	44.0
Furnace Clean and Tune-up	NA	2.7
High-Efficiency Forced Air Unit Furnace	N/A	88.0
Air Sealing/ Envelope Repair* - All Measures		**6.0**
Outlet Cover Plate Gaskets	N/A	1.0
Evaporative Cooler/AC Cover	N/A	1.0
Attic Access Weatherization	N/A	1.0
Door Weatherstripping	N/A	1.0
Caulking	N/A	1.0
Minor Home Repairs	N/A	1.0
Water Heating Conservation * - All Measures		**13.0**
Water Heater Blanket	N/A	3.3
Low Flow Showerhead	N/A	3.3
Water Heater Pipe Wrap	N/A	3.3
Faucet Aerators	N/A	3.3

Footnotes

- All energy saving values are derived from the budget applications (PY 2009-2011 Planning Assumptions Table – Attachment A2) submitted by the Investor Owned Utilities. The 2009 annual planned energy savings were divided by the total number of installations in 2009, for each measure the IOUs provided, to arrive at an energy saving value for each household. While these numbers are not the exact values for the energy savings for each measure, they are reasonable approximations for determining if the measure/measures qualify for installation under the "three measure minimum" rule.

- The revised Attachment G will serve as a reference for the IOUs, the Commission, and interested stakeholders, in understanding the measures available in qualifying a home for LIEE program service. This attachment will NOT be used to calculate actual IOU program energy savings – which currently uses a separate methodology not related to this table.

- Attachment G will be updated after Impact Evaluation 2009.

[1] Value provided by SDGE

[2] Value provided by SoCalGas

*The measure group energy saving value is divided by the number of individual measures within the group, thereby assigning an 'average' savings value across all individual measures. The energy saving values for these sub measures are expected to be updated after the 2009 Impact Evaluation.

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APPENDIX D

Statewide Energy Savings Assistance Program
Policy and Procedures
Manual

Applicable to:
Pacific Gas & Electric Company
Southern California Edison Company
Southern California Gas Company
San Diego Gas & Electric Company

California Statewide Energy Savings Assistance Program
Policy and Procedures Manual

1 INTRODUCTION 5

1.1 OVERVIEW 5
1.2 STRUCTURE OF THIS MANUAL 6

2 CUSTOMER AND STRUCTURAL ELIGIBILITY 7

2.1 OVERVIEW 7
2.2 CUSTOMER ELIGIBILITY REQUIREMENTS 7
Income Guidelines 7
Types of Income Included in Household Income 8
Verification of Income 8
Actual Income Documentation Required 8
Household Income Calculation Procedures 13
Determining Household Size 13
Qualifying Multifamily Complexes 13
2.3 SERVICE ELIGIBILITY 14
General Service Eligibility Conditions 14
Referrals 15
2.4 STRUCTURAL ELIGIBILITY 16
2.5 HOME OWNERSHIP DOCUMENTATION 18
Overview 18
Multiple Ownership 19
Life Estate/Living Trust 19
Power of Attorney (POA) 19
Property Management Companies 19
2.6 TREATMENT OF RENTAL UNITS 20
Property Owner Approval 20
Eligibility of Rental Units for Certain Measures 20
2.7 PREVIOUS PROGRAM PARTICIPATION 21
2.8 NEED FOR ESA PROGRAM SERVICES 21

3 CUSTOMER OUTREACH AND CUSTOMER RELATIONS 22

3.1 INTRODUCTION 22
3.2 CUSTOMER OUTREACH 22
Promotional Guidelines 22
Representations by Contractor and Contractor's Employees 22
Outreach Interaction 22
Targeted Outreach 23
3.3 CUSTOMER RELATIONS 23
Introduction 23
Expedient Service 23
Other Work 23
Staff Identification 24
Crew Appearance 24
Customers 18 Years or Older 24
Customer Complaint Procedures 24
Substance Abuse and Smoking Policy 25
Incident Report 25

4 PROCEDURES FOR PRE-INSTALLATION CONTACTS *26*
4.1 INTRODUCTION 26
4.2 DESCRIPTION OF PROGRAM SERVICES 26
4.3 DATA COLLECTION 27
4.4 IN-HOME ENERGY EDUCATION 27
4.5 IN-HOME ENERGY ASSESSMENT 28

5 PROGRAM MEASURES .....
5.1 INTRODUCTION 29
5.2 PROGRAM MEASURES 29
5.3 CONSIDERATION OF CHANGES TO MEASURE LIST 29

6 MINOR HOME REPAIRS *34*
6.1 INTRODUCTION 34
6.2 MINOR HOME REPAIRS 34
6.3 LIMITS ON MINOR HOME REPAIRS 35
6.4 PRIORITIZATION OF MINOR HOME REPAIRS 35

7 MEASURE INSTALLATION POLICIES AND PROCEDURES *36*
7.1 INTRODUCTION 36
7.2 GENERAL INSTALLATION POLICIES 36
Introduction *36*
Installation by Contractor *36*
Installation Standards *36*
Safety *36*
Installation of Feasible Measures *37*
Lead-Safe Practices *37*
Site Clean-Up Policies *37*
Recycling and Disposal Policy *37*
Weatherization of Mobile Homes *37*

8 INSPECTION POLICIES *38*
8.1 INTRODUCTION 38
8.2 INSPECTION PERSONNEL 38
8.3 PRE-INSTALLATION INSPECTION 38
8.4 POST-INSTALLATION INSPECTION 38
General Polices on Post-Installation Inspection *38*
Types of Pass Rates *39*
Post-Installation Inspection Frequency *39*
Failed Inspections *40*
Failed Inspection Dispute Resolution *41*
Inspection Waivers *41*

9 CONTRACTOR ELIGIBILITY *42*

9.1 INTRODUCTION 42
9.2 INSURANCE REQUIREMENTS 42
9.3 LICENSING REQUIREMENTS 42
9.4 WORKFORCE EDUCATION AND TRAINING (WE&T) *42*

10 NATURAL GAS APPLIANCE TESTING *43*

10.1 INTRODUCTION 43
10.2 APPLICABILITY OF NATURAL GAS APPLIANCE TESTING 43
General Applicability *43*
Applicability to Combustion Fuels other than IOU Natural Gas *43*
10.3 NATURAL GAS APPLIANCE TESTING PROTOCOLS 44
General Protocols *44*
Pre-Weatherization Evaluations of Gas Appliances *44*
Post-Weatherization Natural Gas Appliance Testing (NGAT) *44*
Disposition of Appliance Fails/Problems *44*
10.4 TIMING OF COMBUSTION APPLIANCE TESTING 44
Homes with Natural Gas Appliances *44*
10.5 ACTIONS TO BE TAKEN WHEN APPLIANCES FAIL NGAT 45
10.6 PERSONNEL PERFORMING NATURAL GAS APPLIANCE ASSESSMENTS AND TESTING 46

TABLES

Table 2-1: Items Included in Income 8
Table 2-2: Types of Income Documentation 12
Table 5-1: Eligible Measures 30
Table 6-1: Caps on Minor Home Repairs 35
Table 8-1: Minimum Sample Sizes for Inspections (90%/□5% precision) 39

1 Introduction

1.1 Overview

This *Statewide Energy Savings Assistance Program Policy and Procedures Manual*[1] *(P&P Manual)* describes the policies and procedures followed in the Energy Savings Assistance (ESA) Programs administered by Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E) (collectively referred to as the utilities or investor-owned utilities (IOUs)). The Statewide ESA Program policy and procedures are adopted by the California Public Utilities Commission (Commission or CPUC). This Manual provides policies and procedures for implementation of the ESA Program and is being updated pursuant to the changes in the Program in Commission Decision (D.) 12-08-044. This *P&P Manual* is accompanied by the ESA Program California Installation Standards Manual which all contractors working in this Program must comply.

An electronic copy of this Statewide P&P Manual may be obtained at the CPUC website at www.cpuc.ca.gov/PUC/energy/Low+Income. In situations where there are questions regarding the interpretation of a certain policy or procedure, the Utilities shall use Commission D.12-08-044 as the overriding authority.

The policies and procedures in this *P&P Manual* are supplemented by the general and specific terms and conditions incorporated into contracts between the utilities and their contract service providers as part of the ESA Program.

Updates in Program policies and procedures may be issued by the utilities during the course of the Program Year subject to approval by the CPUC. ESA Program Managers have the flexibility to deviate from established procedures to respond to cases of customer hardship and unusual circumstances. The Program Managers shall document any exceptions in the customer file. Changes in the means of implementing policies, procedures and standards will be discussed with contractors prior to being made.

[1] Formerly known as the Statewide Low Income Energy Efficiency Policy and Procedures Manual.

1.2 Structure of this Manual

The remainder of this *P&P Manual* is organized as follows:

- Section 2 specifies general statewide policies and procedures relating to customer and home eligibility for the ESA Program.
- Section 3 discusses polices relating to customer outreach and customer relations.
- Section 4 describes the services that are provided under the ESA Program in the initial home visit.
- Section 5 lists the energy efficiency measures that are available to participants in the ESA Program.
- Section 6 discusses policies relating to minor home repairs.
- Section 7 describes policies and procedures relating to the installation of energy efficiency measures.
- Section 8 summarizes general statewide inspection policies and procedures.
- Section 9 discusses contractor eligibility.
- Section 10 describes policies and procedures relating to natural gas appliance testing and furnace repairs and replacements.
- Appendix A provides a list of the cities comprising the California Energy Commission (CEC) climate zones used in the determination of attic insulation levels and Program eligibility of other measures.

2 Customer and Structural Eligibility

2.1 Overview

This section discusses the eligibility of individual households for ESA Program services. Eligibility of a household for measures offered through the Program depends on several factors, including:

- Household income;
  - Actual income documentation
  - Categorical eligibility
  - Self certification
- The utility services provided by the utility to the dwelling;
- The specific type of structure in which the household resides;
- The ability to obtain the approval of the property owner or authorized agent in the event the household resides in rental property;
- Previous ESA Program services provided for the property in question; and
- The dwelling's need for energy efficiency measures offered through the Program.

These eligibility requirements are explained below.

2.2 Customer Eligibility Requirements

2.2.1. Income Guidelines

All the utilities use the ESA Program income guidelines established by the CPUC to qualify participants in the ESA Program.

These guidelines are provided to the utilities by the CPUC on an annual basis. As set forth in D.05-10-044, the income eligibility level is based on 200% of the Federal Poverty Guidelines. The CPUC updates the ESA Program income guidelines every year for inflation. The current ESA Program income guidelines can be obtained at the CPUC website at www.cpuc.ca.gov/PUC/energy/Low+Income.

2.2.2. Types of Income Included in Household Income

For the purposes of determining Program eligibility, all income is considered, from all household members, from all sources listed in Table 2-1, whether taxable or non-taxable income, including (but not limited to) wages, salaries, interest, dividends, child support, spousal support, disability or veteran's benefits, rental income, Social Security, pensions and all social welfare program benefits before any deductions are made. Table 2-1 indicates the specific items included as income, but is not limited for the purpose of determining eligibility for the ESA Program.

The following types of receipts **are *not*** considered household income for the purposes of determining eligibility:

- Loan proceeds; including reverse mortgages
- Assets (money in bank accounts, a house, a car or other property of possessions);
- Funds transferred from one applicant account to another; or
- Liquidation of assets (other than the portion representing capital or other gains).

Table 2-1: Items Included in Income

Wages, salaries and commissions	401K payments or withdrawals[1]
Alimony payments	Rental income and royalties[2]
Child support payments	School grants, scholarships or other aid[1]
Disability benefits	Self-employment earnings[2]
Foster care payments	Social security payments
Realized capital gains on assets	Housing subsidies
Interest and dividends on assets	Supplemental Security Income (SSI) payments and State Supplemental Payments (SSPs)
Food stamps	Temporary Assistance to Needy Families (TANF) payments
Gambling/lottery winnings	Unemployment Benefits payments
General relief	Veterans Administration Benefit payments
Monetary gifts (both one-time and recurring)	Workers Compensation payments
Insurance settlements or legal settlements[1]	Union strike fund benefits
Pension payments or withdrawals[1]	

[1] Other than loans.

[2] For rental income and self-employment income, only positive values of income are included. Negative net rents and negative self-employment income are ignored.

2.2.3. Verification of Income

2.2.3.1 Actual Income Documentation Required

When income documentation is required, income documentation must be reviewed, recorded, copied and securely stored by service providers prior to the installation of measures for all prospective participants.

CARE **self-certification** does not automatically qualify a household for ESA Program, except in the case of group homes or targeted self certification areas, where it is specifically allowed.

In the case where the utility has **verified** that the customer is CARE-eligible within the past year, such income verification may be used for ESA Program participation.

The utility will periodically audit enrollment information and /or income documentation retained by the contractor. In the event that information and/or documentation is not complete and correct for a participant, payment to the contractor for the provision of Program services to that unit may be disallowed.

The kinds of income documentation required by the Program include but are not limited to those presented in Table 2-2. In applying these documentation requirements, the following stipulations must be observed:

- Current award letters must include the value of the award and the period of time in question. They must also be dated within one year of the customer's signature date and must list the customer's name.
- Affidavits relating to gifts must indicate the amount and frequency of the gift(s). They must also contain the name, phone number, address and signature of the giver.
- In determining rental income, a renter-landlord relationship exists between household members when a room or rooms in the house is being rented and the renter is not a dependent of anyone in the household. Therefore, the renter is not counted as a household member and the rent paid is counted as part of the total household income. If the renter is a dependent, the renter is counted as a household member (even if he or she is paying rent) and his or her income is considered part of the total household income. A dependent is anyone claimed on the applicant's income tax return.
- Federal income tax documentation must include copies of all 1099s and W-2 forms.

- Affidavits from an employer who plays the applicant cash wages must include the company name, address and phone number. It must also include the name of the applicant, total amount paid to the applicant, and the frequency of payments, and must contain a signature from the employer's authorized representative.

- If the applicant receives cash wages for jobs like mowing lawns, babysitting, handyman services, casual day labor, etc., a self-employment affidavit from the applicant is acceptable if it meets all Program criteria.

- In cases where a household claims no income for the past 12 months, the applicant must demonstrate his or her means of financial support other than income. In the event that the applicant cannot provide documentation of either income or other means of support, Program services will not be performed until such information is provided.

2.2.3.2. Categorical Eligibility

Categorical eligibility is another enrollment procedure designed to ease enrollment processes in both ESA and CARE programs. Customers may be eligible to participate under categorical eligibility[2] and enroll in the ESA Program based on their current participation in another local, state, or federal means-tested program if those income guidelines are at or below current CARE/ESA program income guidelines as set forth by the Commission. The categorical programs that have been adopted can be found at www.cpuc.ca.gov/PUC/energy/Low+Income .

Applicants utilizing the categorical eligibility option to enroll in ESA Program must present documentation reflecting current participation in one of the Commission approved programs in order to satisfy the "income documentation" component. Such documentation must be reviewed, recorded, copied and securely stored by service providers prior to the installation of measures for all prospective applicants.

[2]Categorical eligibility approved in Decision 06-12-038 for SCE, PG&E, SoCalGas, and SDG&E. Utilities, Energy Division staff and DRA to determine acceptable categorical eligibility programs.

2.2.3.3. Targeted Self-Certification

Targeted Self Certification is a third enrollment procedure designed to ease enrollment processes in ESA Program. Eligibility for self certification is determined by each utility based on their identification of geographic areas of their service territory where 80% of the customers are at or below 200% of the federal poverty line. Applicants residing within these targeted self certification areas must sign a "self certification statement" certifying that they do indeed meet the current income guidelines established for participation in the ESA Program. This self certification statement is to be retained in lieu of other income documentation or proof of participation in a categorical eligibility program. A current CARE self certification statement is allowed.

Table 2-2: Types of Income Documentation

Type of Income	Documentation
Wages, salaries and Commissions	Copy of customer's payroll check stub(s) OR Federal income tax filing showing gross income OR affidavit from employer (for cash wages only, and only where just one employer)
Alimony or Child Support Payments	Copy of check, bank statement, OR most recent court document stating amount
Disability benefits, Foster Care payments, Unemployment Benefits, VA Benefits, Workers Compensation	Copy of checks stubs OR copy of most recent award letter
Capital or Other gains	Federal Income Tax filing showing capital or other gains
Food stamps	Copy of most recent award letter OR food stamp/cash issuance letter (indicate TANF or General Relief)
Gambling/lottery winnings	determined on case-by-case basis
General relief	Copy of most recent award letter (Notice of Action) OR copy of un-cashed check(s) OR copy of direct deposit statement(s)
Monetary gifts	Copy of customer's bank statement OR affidavit from gift giver
Proceeds from insurance settlements or legal settlements	Copy of settlement document
Interest and dividend income	Copy of customer's bank statement(s) OR copy of customer's investment statement(s) OR Federal Income Tax filing showing gross income
Pension or 401K payments or Withdrawals	Copy of customer's check stubs OR copy of most recent award letter OR Form 1099R from prior year OR copy of most recent bank statement
Rental income [3]	Tax return (Form 1040, Schedule E, Total Rental Real Estate and Royalty Income or Loss) showing rental income OR copy of rental receipts OR copy of rental agreement specifying rent amount and affidavit from tenant
School grants, scholarships or other aid	Copy of award letter OR copies of cancelled checks
Self-employment earnings [3]	Income statement showing most recent quarterly adjusted earnings plus prior year's tax return (1040 Schedule C, Net Profit or Loss) OR written affidavit from an accountant or applicant
Housing subsidies	award letter
SSI payments, TANF payments, or Social Security payments	Copy of most recent award letter (Notice of Action) OR copy of un-cashed check(s) OR copy of customer's direct deposit statement
Union strike fund benefits	Copy of benefits payment stub

[3] For rental income and self-employment income, only positive values of income are included. Negative net rents and negative self-employment income are ignored.

2.2.4. Household Income Calculation Procedures

Household income guidelines are based on gross *(pre-tax)* annual income. For self-employed individuals, gross (pre-tax) income is defined to be net profit or loss from self-employment. In the event that a full 12 months of income information is not available, or if there has been a change in the employment status of the household over the past 12 months, it may be necessary to annualize income from a shorter period of time. If, for instance, a household member has been employed for six months, the income earned over this period would be annualized by multiplying it by 2.

It is the intention of the ESA Program for all outreach personnel to compute annual income as accurately as possible. The calculations used will depend on the type of records available from each household member. Since all household members may not have the same type of income records, it may be necessary, and appropriate, to use more than one method when documenting income for different members of the same household.

2.2.5. Determining Household Size

Household size is the current number of people living in the home as permanent residents. Friends or family on a temporary visit (less than 6 months) are not considered household members nor are their earnings part of household income.

Children and/or other dependents residing in the household *only* on weekends, holidays, or vacations may be counted as part of the household only if the family claims them as dependents on their federal income tax filing. Children by previous marriages who do not reside in the home cannot be considered household members, even if they are receiving child support, unless they are claimed as dependents on the applicant's federal income tax filing.

2.2.6. Qualifying Multifamily Complexes

The ESA Program makes use of fractional income qualification for certain measures for multifamily complexes. The terms of income qualification are as follows:

- For the purposes of determining income eligibility, multifamily complexes are defined as those with five (5) or more dwelling units. Duplexes, triplexes, and fourplexes will be qualified as single family homes for the purposes of determining income eligibility.
- For multi-family buildings, refer to Table 5-1 herein for the measures available to multi-family buildings.

- To qualify an entire multifamily building for other measures offered by the Program (defined as 80-20 measures), at least 80% of all (occupied and unoccupied) dwelling units must be occupied by income-qualified households. However, if at least 80% of all units adjacent to a common attic space satisfy the 80% rule, that attic space may be treated even if the 80% rule is not satisfied for the entire building. In the event that fewer than 80% of the dwelling units are occupied by income-qualified households, individual dwelling units occupied by qualifying households may still receive all feasible 80-20 measures.
- Service providers must review, record, copy and securely store income documentation for all households used to qualify an apartment building. The provider must also make its best effort to review and record income documentation for all other households in the multifamily building (i.e., those not used to meet the 80% qualification standard).
- Unoccupied and other non-qualified multifamily dwellings may be weatherized, as long as the multifamily building satisfies the 80% rule for income qualification.

2.3 Service Eligibility

2.3.1. General Service Eligibility Conditions

To be eligible for the ESA Program, a customer must be served by an active utility account/meter (includes master meter). In an area served by different investor-owned gas and electric utilities (e.g., the SoCalGas-SCE overlap area) the fuel source for the dwelling's space heat shall determine which utility will be the provider of air sealing/envelope and attic insulation measures to the dwelling as long as that fuel source is either natural gas or electricity. In the event that a non-IOU heating fuel is used *and* the home has air conditioning, the electric IOU will be the provider of weatherization measures other than infiltration-reduction measures.

Measure-specific eligibility requirements will be followed in the ESA Program. Not all measures are offered in all utility services territories or climate zones. Table 5-1 shows the measures offered by each utility.

2.3.2. Referrals

In order to provide the maximum opportunity for eligible customers to receive all feasible measures, the four IOUs—PG&E, SCE, SoCalGas, and SDG&E—will set up a referral system with each other. In addition, the utilities will work with community agencies and local governments including their local Department of Community Services and Development (DCSD) agencies to expand leveraging opportunities. This will increase the number of measures available to eligible customers by sharing the cost of measures offered by both programs.

In areas where a customer receives natural gas and electric services from two different IOUs, the utilities will work together to ensure the customer receives all feasible measures. The utility installing infiltration measures will conduct natural gas appliance testing as long as the utility serves natural gas somewhere in its service area (and thus has trained gas service representatives). In the event that the customer has electric space heat served by an electric-only utility, the electric utility will not install infiltration measures if natural gas appliances are present.

In order to mitigate the duplication of costs that could otherwise be associated with customers participating in two utility programs, two steps shall be taken:

- First, customers that have provided proof of income qualification or deemed categorically eligible by one IOU, shall be considered eligible by all other IOU's serving this customer; and
- Second, gas and electric utilities will offer common energy education in overlap areas so that customers will need to receive education from only one utility.

Additionally, the minimum measure requirement for eligibility (see Section 2.8) will not apply to homes referred by one IOU to another, if the first IOU establishes that a home meets this minimum for the combination of gas and electricity.

2.4 Structural Eligibility

Public Housing. Public housing is eligible for participation in the ESA Program, but must meet the program eligibility requirements in order to participate. (Note that this does not include on-base military housing, insofar as these dwelling units are not served by the investor-owned utilities.)

Housing Type

Single family homes, multifamily dwelling units, and mobile homes are eligible to participate in the program.

- Duplexes, triplexes, and fourplexes will be qualified as single family homes.
- Multifamily complexes are defined as those with five (5) or more dwelling units.
- Mobile homes are defined by California Department of Housing and Community Development as having "over 320 square feet of gross floor area, more than eight feet in width, and more than 40 feet in length." A mobile home is a manufactured home regulated by the U.S. Department of Housing and Urban Development code (Sec. 3280) and built on a trailer chassis and designed for highway delivery to a permanent location, and it can be a single-, double-, or triple-wide home.

The utilities may promote or limit the treatment of housing types in individual program years as long as these actions are consistent with the achievement of the programmatic initiative.

Housing on Non-Residential Rates. In general, only residential customers on residential rates are eligible to participate in the ESA Program. However, group homes on non-residential rates are eligible for ESA Program services as long as they are currently eligible for CARE under current CARE guidelines applicable to group living facilities,[4] and the structure in question is a single family, multifamily or mobile home suitable for weatherization under ESA Program standards.[5]

CARE-eligible facilities include but are not limited to the following.

- Migrant farm worker housing centers, as defined in Section 50710 of the Health and Safety Code, provided that 70% of all energy usage in master-metered facilities and 100% of all energy usage in individually-metered facilities is residential.
- Privately owned employee housing, as defined in Section 17009 of the Health and Safety Code, that is licensed and inspected by the state and local agencies pursuant to Part I of Division 13, and in which 100% of all energy use is residential.
- Housing for agricultural employees operated by non-profit entities, as defined in Subdivision (b) of Section 1140.4 of the Labor Code, and that has an exception from local property taxes pursuant to subdivision (g) of the Revenue and Taxation Code, provided that 70% of all energy usage in master-metered facilities and 100% of all energy usage in individually-metered facilities is residential.
- Non-profit group living facilities, defined as transitional housing (such as a drug rehabilitation or halfway house), short- or long-term care facilities (such as a hospice, nursing home, children's home or seniors' home), group homes for physically or mentally challenged persons, or other nonprofit group living facilities.
- Homeless shelters, hospices and women's shelters with the primary function of providing lodging and which are open for operation with at least six beds for a minimum of 180 days and/or nights (including satellite facilities in the name of the licensed corporation, where 70% of the energy supplied is for residential purposes).

[4] See D. 92-04-024, April 8, 1992; D. 92-06-060, June 17, 1992; D. 95-10-047, October 18, 1995. Also see *Commission Advisory and Compliance Division, Workshop Report on California Alternate Rates for Energy (CARE): The Development of Guidelines to Implement CARE for Migrant Farmworker Housing, Agricultural Employee Housing, and Employee Housing,* May 1995

[5] It should be noted that CARE income eligibility requires that 100% of the residents of the facility (other than live-in staff) meet the CARE income guideline. This income eligibility criterion will be applied to group homes for the purposes of determining ESA Program income eligibility.

As mandated by AB 868 and reiterated by an October 1, 2004 Administrative Law Judge's Ruling,[6] migrant housing centers are presumed to meet CARE income eligibility guidelines without verification. This presumption will also be used in determining ESA Program income eligibility of such facilities. For the purpose of determining eligibility of other types of housing on non-residential rates, income qualification shall be considered satisfied if the facility is on CARE. These facilities represent a unique situation and this income verification procedure shall not be considered a precedent for other circumstances.

2.5 Home Ownership Documentation

2.5.1. Overview

Home ownership must be verified in order to ensure that the legal owner or authorized agent signs the Property Owner Waiver. It is the responsibility of the contractor to review the documents and ensure proof of home ownership. If a home is in the name of a deceased spouse, the surviving spouse should be considered as the owner. For example, if the home is in the husband's name and never transferred to the widow, the widow is considered the current homeowner.

Any of the following may be used for home ownership documentation.

- Current loan or mortgage documents;
- Property tax records or bills;
- Home owner property insurance (fire insurance);
- Mortgage payment invoices or book;
- Data Quick or similar title search service;
- Deeds; and
- Current Mobile Home Registration from Department of Housing and Community Development.

[6] Administrative Law Judge's Ruling Seeking Input Regarding Assembly Bill 868 (Care Eligibility for Migrant Housing Centers), October 1, 2004.

2.5.2. Multiple Ownership

If the home is owned by more than one person, the homeowner will be considered any one of the persons whose name appears on the document.

2.5.3. Life Estate/Living Trust

A homeowner may have established a "Life Estate" or “Living Trust.” With either, the property is deeded to another individual or trust but the original owner maintains control of the property. The original owner may sign as the property owner only if he or she has a copy of Life Estate or Living Trust documents. Contractor must review and verify that the individual signing the Property Owner Waiver is authorized to do so within the “Life Estate” or “Living Trust”. Contractor and individual signing POW shall sign a statement to document that they are authorized to sign agreement to participate in ESA Program and a copy of the signed statement must be maintained in the customers file.

2.5.4. Power of Attorney (POA)

In cases where the property owner is not available to sign on the Agreement, any person having a Power of Attorney (POA) for that owner may sign the Agreement. Contractor and individual signing POA shall sign a statement to document that they are authorized to sign agreement to participate in ESA Program and a copy of the signed statement must be maintained in the customer’s file.

2.5.5. Property Management Companies

Authorized representatives of property management companies may sign for property owners for both single family and multifamily agreements under the following conditions: the property management company has a standard Power of Attorney agreement with the property owner; or the property management company has a signed Management Agreement with the owner authorizing the property management company to act as the agent for the specific property; or any other documentation that the utility may require to establish that an agreement exists between the property owner and the management company. A copy of any support documentation must be kept in the customer’s files for that customer.

2.6 Treatment of Rental Units

2.6.1. Property Owner Approval

In general, rental units may not receive Program Services and Measures until a Property Owner's Waiver has been received. This approval must cover the participation of the unit in the Program as well as the installation of specific measures. Such approval is valid for a period of 12 months from the date it is signed by the Property Owner or authorized agent. If approval of the Property Owner is not received before the installation of such services, the Contractor will be required to reimburse the utility for all payments received from the utility for the measures in question. However with prior written authorization from the utilities' Program Manager, a contractor may proceed with the installation of services and measures that do not directly affect the condition and/or structure without the signed Property Owner Waiver.

2.6.2. Eligibility of Rental Units for Certain Measures

Assuming that the Property Owner's permission is required and has been obtained and that other eligibility conditions are met, rental units may be treated under the Program. However, the following policies relating to specific measures shall be applied. Not all measures listed are offered in all utility service territories or climate zones. See Table 5-1.

- Rental units are not eligible for furnace replacements or major furnace repairs associated with the mitigation of NGAT failures. However, service and adjustments may be made to furnaces and water heaters if these actions would improve the performance of the system at a minimal cost.
- Refrigerator and air conditioner replacements may be provided at no charge to either the tenant or the property owner, except in the instance where the property owner owns the refrigerator or air conditioning unit that is replaced and also pays the utility bill. In these instances, the utilities may make payments to installation contractors that cover only part of the cost of replacement.
- The utilities may opt to provide, at a nominal charge to the property owner, evaporative coolers, refrigerator replacement, and replacement air conditioners and heat pumps.

2.7 Previous Program Participation

In order to provide services to the widest range of low-income households possible, D.08-11-031 places the following restrictions on the participation of homes that have previously been treated under the ESA Program.

- The IOUs are allowed to go back and treat any dwelling served prior to 2002, but they will first seek out new dwellings that have yet to be treated.

2.8 Need for ESA Program Services

A home must receive all feasible measures offered under the ESA Program. In D.08-11-031, the Commission modified the "3 Measure Minimum Rule" to allow utilities to install one or two measures, as long as the installed measures meet the specified minimum energy savings threshold. Decision 09-06-026 issued June 18, 2009 further modified the "3 Measure Minimum Rule" to clarify the allowable measures under the "3 Measure Minimum Rule". For homes that need fewer than 3 measures, the energy savings achieved must meet certain minimums as established by the Commission. Energy savings of at least 125 kWh annually or 25 therms annually must be achieved in homes where only one or two measures are to be installed. Each IOU will provide its contractors with the individual measures that qualify for installation if a home requires less than three measures. The total energy savings achieved by either one or two measures combined should yield savings of at least either 125 kWh annually or 25 therms annually. The IOUs are to use the most current energy savings estimates as determined in the Final Report of the Load Impact Evaluation for the applicable program cycle, unless directed otherwise by the Commission. For measures not reflected in the Load Impact Evaluation, those energy savings can be derived from DEER, engineering calculations, etc. as appropriate.

Homes that require three or more individual measures qualify for ESA Program participation regardless of energy savings. For homes that require more than three individual measures, refer to Table 5-1.

In an area served by multiple investor-owned gas and electric utilities (investor-owned or municipal), the minimum number of measures will be defined as if the home were served by a combined gas and electric utility, and the utilities will use a referral system to ensure the installation of all feasible measures.

For all homes meeting the minimum for necessary measures, all feasible measures must be installed.[7] As stipulated in the standard non-feasibility criteria, if a measure is already in place and operating properly, even if it does not meet the current Installation Standards for new installations, it should not be removed and replaced.

[7] If a customer refuses a measure, that measure is considered non-feasible. See Section 7.

3 Customer Outreach and Customer Relations

3.1 Introduction

This section presents statewide ESA Program policies and procedures in the areas of customer outreach and customer relations. Subsection 3.2 discusses policies relating to the recruitment of participants for the Program, while Subsection 3.3 focuses on the maintenance of proper relationships with customers. It should be understood that the policies in this section are supplemented by additional provisions in both specific and general terms and conditions included in formal agreements between utilities and contractors.

3.2 Customer Outreach

Contractors recruiting customers for participation in the ESA Program are required to follow strict policies relating to customer outreach. Customer outreach policies cover promotional guidelines, limitations on representations made by contractors and their employees, outreach interactions, and tracking.

3.2.1. Promotional Guidelines

Only promotional materials approved by the Utility Program Manager may be used to promote participation in the ESA Program.

3.2.2. Representations by Contractor and Contractor's Employees

Neither the contractor nor his/her employees may imply that they are employees of the Utility or affiliated with the Utility in any way other than through the ESA Program.

3.2.3. Outreach Interaction

Outreach personnel must effectively contact and interact with a diverse set of customers. These personnel shall have available any necessary multilingual staff and/or translators and shall make every effort to resolve barriers to communication attributable to disabilities.

3.2.4. Targeted Outreach

Outreach efforts should target those customers with the highest energy usage, energy burden and/or energy insecurity but not at the expense of all other customers. Contractors shall also serve those customers who are disabled. Such customers may be identified based on their enrollment in the Medical Baseline Program, their enrollment in the Deaf and Disabled Telecommunications Program (DDPT), their enrollment in ESA Program through a disability-based community-based organization (CBO), their request for accessible formats of written materials or use of Tele-Typewriter/Telecommunications Device for the Deaf (TTY/TDD), the visibility of an observed disability and/or their self-identification as having a disability. Contractors shall not ask the customer if he/she is disabled.

3.3 Customer Relations

3.3.1. Introduction

It is imperative that both contractors and utility employees maintain proper customer relationships. The ESA Program is a customer service program, and should be delivered accordingly. Specific polices with respect to customer relations are specified below.

3.3.2. Expedient Service

Service must be provided to participants in a reasonable time frame, as determined by the utility. Crews must inform customers of the approximate amount of time required for installations, inspections and gas appliance testing (if required), and shall provide services as expeditiously as possible. The number of visits to a home shall be kept to a minimum.

3.3.3. Other Work

Only work directly associated with providing ESA Program authorized services to participating customers may be billed to the ESA Program. The contractor is prohibited from selling other services to the customer or charging the customer for any other service.[8]

[8] Note that this provision does not preclude the possibility of requiring a co-payment for the installation of one or more measures, if approved by the utility.

3.3.4. Staff Identification

All contractor or subcontractor employees who engage in customer contact must wear identification badges provided or approved by the utility at all times. Each badge must include a color photo of the employee. If the contractor produces badges, templates for identification badges will be provided by the utility. The contractor shall immediately return the ID badges of all personnel no longer working for the contractor or its subcontractors on the ESA Program. In the event the contractor is unable to return a badge, the contractor shall immediately notify the Program Administrator.

3.3.5. Crew Appearance

ESA Program contractors are responsible for the courtesy and appearance of their employees. Discourteous personnel and unprofessional appearance will not be tolerated in this program and may constitute grounds for contract termination.

3.3.6. Customers 18 Years or Older

In general, contractors shall enter customer's residences only when adults, eighteen (18) years of age or older are present. The only exception to this rule is that contractors may enter the home of a customer under eighteen (18) years of age if the customer is married or has been declared an emancipated minor by the courts.

3.3.7. Customer Complaint Procedures

The contractor must make every effort to resolve barriers to communication attributable to factors including language preference and disabilities. The contractor must make every effort to resolve and document customer complaints. The Contractor must notify the utility or its designee of the status of each complaint within 24 hours of the contractor's receipt of the complaint. If the complaint deals with customer safety, the contractor must resolve it within 24 hours. If the complaint does not relate to customer safety, the contractor must resolve the complaint to the satisfaction of the customer as required by the IOU. The acceptability of the contractor's resolution of complaints will be determined at the sole discretion of the utility. If the contractor has not resolved the complaint within the mandated period, the contractor shall notify the utility or its designee of this failure.

3.3.8. Substance Abuse and Smoking Policy

In addition to local and state laws, contractor personnel shall not be under the influence of drugs or alcohol nor be using drugs or alcohol anytime when performing ESA Program work. Smoking is prohibited within the residence being served at all times and on the customer's property.

3.3.9. Incident Report

Contractors must immediately contact the utility or its designee if during a home visit there is damage to a customer's home and/or property or if the contractor's employee has been accused of an illegal act. Within 24 hours, the contractor will inform the utility or its designee of the resolutions of all such incidents.

4 Procedures for Pre-Installation Contacts

4.1 Introduction

This section describes the procedures to be followed by outreach workers and contractors during pre-installation visit or visits to a participating home. These procedures cover the provision of general program information, the collection of data on the household and the home, the administration of home energy education, the completion of the home energy assessment, and the installation of measures as approved by each IOU.

4.2 Description of Program Services

In the course of the customer enrollment, the outreach worker shall provide a thorough description of the program services available to the income qualified household. At a minimum, this description must cover the following services:

- The ESA Program, including program goals, eligibility requirements, eligible measures, and procedures. The procedures to be covered by this description must encompass energy education, available energy efficiency services and minor home repairs, general installation procedures, inspection procedures, and natural gas appliance testing procedures (if applicable).
- Other programs designed to repair/replace furnaces or install other energy efficiency measures (if these are offered as separate programs).
- The California Alternate Rates for Energy (CARE) Program. Outreach workers will also provide assistance in enrolling the customer in CARE if the customer chooses to participate in it.
- Other utility programs designed to provide services to low-income customers, including level-payment programs, medical baseline programs, and other energy efficiency programs for which the customer may be qualified.
- Similar programs offered by DCSD and other known energy related programs.

The outreach worker may also describe other utility and non-utility low income assistance and energy efficiency programs. At no time shall Program personnel promote or provide fee-based services to customers in lieu of free services offered under the ESA Program.

4.3 Data Collection

During the initial interview, the outreach worker will also collect data needed to document eligibility and to meet tracking and reporting requirements. In general, information including, but not limited to the following must be collected:

- Name, address and phone number of applicant,
- Senior/disability status of applicant or other permanent household member, as observed by the assessor or voluntarily provided by the applicant,
- Residence type and owner/renter status,
- Gas and/or electric account information,
- Appliance/HVAC system information,
- Customer unwillingness/inability to participate, and
- Home square footage.

Demographic data may also be collected if offered by the customer.

4.4 In-Home Energy Education

In-home energy education will be provided to all income-eligible applicants whose dwellings require the minimum number of measures, using forms and checklists provided by the utilities. Energy education will cover the following general areas: heating and cooling usage, water heating system usage, major electric and gas appliance usage, small appliance usage, benefits of energy efficiency programs in reducing green house gas emissions, water conservation, and lighting usage. At a minimum, topics to be covered in the course of energy education must include:

- The general levels of usage associated with specific end uses and appliances,
- The impacts on usage of individual energy efficiency measures offered through the ESA Program or other Programs offered to low-income customers by the utility,
- Practices that diminish the savings from individual energy efficiency measures, as well as the potential cost of such practices,
- Ways of decreasing usage through changes in practices,
- Information on CARE, the Medical Baseline Program, and other available programs,

- Appliance safety information,
- The way to read a utility bill,
- Green house gas emissions,
- Water conservation,
- CFL disposal and recycling, and
- The procedures used to conduct natural gas appliance testing (if applicable).

4.5 In-Home Energy Assessment

An assessment of the structure will be completed on homes with income-qualifying applicants using utility approved forms and/or tools. The assessment will identify measures which may be installed through the Program.

5 Program Measures

5.1 Introduction

This section identifies the energy efficiency measures available through the ESA Program and discusses the means by which changes in eligible measures are made over time. Subsection 5.2 focuses on measures offered under the program, while Subsection 5.3 outlines the process that will be used to evaluate measures for inclusion in the Program in future years.

5.2 Program Measures

Table 5-1 indicates the specific Program measures that may be provided to participants for the ESA Program in accordance with the California Installation Standards Manual.

5.3 Consideration of Changes to Measure List

Utilities will jointly evaluate existing Program measures in the course of developing recommendations for programs in subsequent years. The utilities evaluate these measures using all available information on both costs and benefits (including energy benefits as well as non-energy benefits), and develop a set of recommendations for CPUC approval. If warranted by the evidence, these recommendations may vary across climate zones. The utilities will also implement a process for considering new measures to be added to the Program. This process will entail the issuance of a solicitation for recommendations for new measures and the assessment of the cost-effectiveness of these measures.

Table 5-1 Eligible Measures

Measure [1]	PG&E			Avail. to Renters	SDG&E			Avail. to Renters	SCE			Avail. to Renters	SCG			Avail. to Renters
	S/F	M/F	M/H		S/F	M/F	M/H		S/F	M/F	M/H		S/F	M/F	M/H	
Heating, Ventilation & Air Conditioning																
Gas Furnace [4] Repair/Replace CZ 1,2,3,4,5,6,11, 12, 13,14, 16	√	√	√													
Gas Furnace [4] Repair/Replace - CZ -7, 10, 14,15					√	√	√									
Gas Furnace [4] Repair/Replace - CZ –4, 5, 6, 7, 8, 9,10,13,14,15,16													√	√	√	
Forced Air Unit Standing Pilot Light Conversion - All – CZ					√	√	√	√					√	√	√	√
Room A/C Replacement																
-CZ 10					√	√	√	√								
- CZ 10,13,14, 15	√								√	√	√	√				
Central A/C Replacement																
- CZ 14	√															
- CZ 14 & 15									√	√	√	√				
Heat Pump - CZ 14 & 15									√	√	√	√				
AC Time Delay - CZ 1, 2, 3, 4, 5, 6, 11, 12, 13, 14, 16, (Except SF & MF CZ 1,5,6 and MF CZ 3)	√	√	√	√												
Duct Sealing CZ 1, 2, 3, 4, 5, 11, 12, 13, 16	√		√	√												
- CZ 7, 8, 10, 14,15 (Except CZ 8 Gas)					√		√	√								
- CZ 4, 5, 6, 7, 8, 9,10,13,14,15,16													√		√	√
Evaporative Coolers																
-CZ 10,13,14,15,16									√		√	√				
- CZ 1, 2, 3, 4, 11, 12,13, 14, 16 (Except MH CZ 1)	√		√	√												

Table 5-1 Eligible Measures (Continued)

Measure [1]	PG&E				SDG&E				SCE				SCG			
	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters	S/F	M/F	M/H	Avail. to Renters
Maintenance																
Furnace Clean & Tune CZ 4,5, 6,7, 8, 9,10,13,14,15,16													√	√	√	√
- CZ 7,10,14,15					√	√	√	√								
Central A/C Tune-up/Services																
- CZ 2, 4, 6, 11, 12, 13, 14, 16	√	√	√	√												
- CZ 6,7, 8, 14, 15					√	√	√	√								
All CZ									√	√	√	√				
Enclosure																
Envelop/Air Sealing Measures [2]																
- CZ 1, 2, 3, 4, 5, 6,11,12,13,14,16	√	√	√	√												
- CZ 4,5,6,7,8,9,10, 13,14, 15,16													√	√	√	√
- CZ 6,8, 9, 10, 13, 14, 15, 16 Electric Heated Home									√	√	√	√				
- CZ 6, 7, 8,10,14, 15 Electric Heated Home					√	√	√	√								
- CZ 7, 10,14, 15 Gas Heated Home					√		√	√								
Attic Insulation																
CZ 1, 2, 3, 4, 5, 6. 11, 12, 13, 14, 16	√	√		√												
- CZ 4,5,6,7,8,9,10 13, 14, 15, 16													√	√		√
- CZ 6,7,8,10,14,15 Electric					√	√		√								
- CZ 7,10,14,15 Gas					√	√		√								
Minor Home Repairs - All - CZ [3]	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

Table 5-1 Eligible Measures (Continued)

Measure [1]	PG&E			Avail. to	SDG&E			Avail. to	SCE			Avail. to	SCG			Avail. to
	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters	S/F	M/F	M/H	Renters
Domestic Hot Water																
Faucet Aerators All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Low Flow Showerhead All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Water Heater [4] Repair/ Replacement - Gas - All CZ	√	√	√		√	√	√						√	√	√	
Water Heater Blanket All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√[5]	√	√
Water Heater Pipe Insulation All – CZ	√	√	√	√	√	√	√	√	√	√	√	√	√	√[5]	√	√
Thermostatic Shower Valve - All – CZ	√	√	√	√	√	√	√	√					√	√	√	√
Lighting Measures																
CFL Lighting - All – CZ	√	√	√	√	√	√	√	√	√	√	√	√				
Interior Hard wired CFL fixtures - All - CZ	√	√	√	√	√	√	√	√								
Exterior Hard wired CFL fixtures - All - CZ	√	√	√	√	√			√	√			√				
Torchiere All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				
Occupancy Sensors - All C	√	√	√	√												
LED Night Light - All CZ					√	√	√	√								
Appliances																
Refrigerators - All - CZ	√	√	√	√	√	√	√	√	√	√	√	√				
High Efficiency Clothes Washer - All – CZ					√	√	√	√					√	√	√	√
LIHEAP Appliances All CZ	√	√	√	√												
Microwave Ovens - All - CZ	√	√	√	√	√	√	√	√								
Miscellaneous																
Pool Pumps - All CZ									√			√				
Smart Power Strip All - CZ					√	√	√	√	√	√	√	√				

Table 5-1 Footnotes:

[1] Table 5-1 indicates the specific Program measures that may be provided to participants for the ESA Program in accordance with the California Installation Standards Manual

[2] Includes Caulking, Outlet Cover Plate Gaskets, Evaporative Cooler Cover, Air Conditioner Cooler Cover, Attic Access Weather-Stripping Doors and Minor Home Repairs (which include repairs such as ceiling repair, cover plates, door jams, door patch/plate, door replacement, exhaust fan vents, exterior wall repair, foam wall patch, interior wall repair, glass replacements, glazing compounds, lock sets (exterior door) windowsill repair, thresholds, vent repair and alignment, and window repair). For the purposes of qualifying a home for the Program, these measures count as a single measure. If contractors are installing less than three measures in a home, they should refer to Section 2.8.

[3.]There are multiple sub-measures included under minor home repairs. Minor home repairs are constituted by services that either reduce infiltration (e.g., window repairs), mitigate a hazardous condition, or accommodate the installation of Program measures (e.g., attic venting). For the purposes of qualifying a home for the Program, all minor home repairs (combined) count as a single measure.

[4.]For owner occupied, furnace repairs and replacements are provided only when necessary to mitigate NGAT fails and pursuant to the installation of infiltration-reduction measures. Water heater repairs and replacements are also provided only to mitigate NGAT fails or to replace leaking water heater tanks.

[5.]The water heater blanket and water heater pipe insulation measures are not currently approved for installation in owner-occupied multi-family dwellings for SoCalGas.

Note:

In situations where there are questions regarding the interpretation of a certain measure, the Utilities shall use D.12-08-044 as the overriding authority.

6 Minor Home Repairs

6.1 Introduction

This section describes the ESA Program policies and procedures relating to minor home repairs. Section 6.2 discusses the minor home repairs that may be provided through the ESA Program. Section 6.3 describes Program limits on expenditures on general types of minor home repairs. Finally, Section 6.4 describes the prioritization criteria that will be used by Program Managers to prioritize repairs for a specific home when not all needed minor home repairs can be made within the constraints of the budget limits for that home.

6.2 Minor Home Repairs

Minor home repairs are repairs required to enable installation of weatherization measures, to reduce infiltration, or to mitigate a hazardous condition. Minor home repairs shall be done in a manner that maintains accessibility for customers with observed disabilities.

In *owner-occupied* homes receiving infiltration-reduction measures, minor home repairs may be necessary to mitigate natural gas appliance testing (NGAT) fails that cannot be corrected with service by utility gas service personnel (or their designated representative). Such NGAT fails may include, but are not limited to, CO above the action level, inadequate draft, unsafe flue/vent pipe/system, unacceptable flame or flame change when air handler comes on, a non-operable appliance, or the absence of a furnace in cases where another gas appliance is used for space heating.

In *all* homes receiving infiltration-reduction measures, minor home repairs also include other corrections needed to pass the NGAT protocol, including but not limited to, adding combustion and ventilation air (CVA) venting, and other corrections. It is the general policy of the ESA Program that these repairs must be made if they are needed and feasible, subject to budgetary limits.

6.3 Limits on Minor Home Repairs

There are two types of limits on costs incurred for minor home repairs.

- ***Average Cost Limits.*** These are limits on the average cost of categories of service across all homes receiving the service in question. They are designed to provide overall cost control for the provision of these services.
- ***Individual Home Limits.*** These are defined as limits on the cost that can be incurred for an individual home without the specific approval of the utility Program Manager. Individual home limits are meant to provide for equity in the distribution of program funds across individual households but yet provide Program Managers enough flexibility to respond to individual customer needs and hardship situations.

These limits are presented in Table 6-1. It should be noted that the expenditure limits apply to all minor home repairs, including any actions taken to respond to gas leak/carbon monoxide emission problems identified during the utility's gas appliance testing procedures.

Table 6-1 Caps on Minor Home Repairs

Service	Average Cost per Home Receiving Service	Maximum Cost for Individual Home
Minor Home Repairs	$300	$750

6.4 Prioritization of Minor Home Repairs

In the event that a contractor requests permission from the utility Program Manager to exceed the limit on minor home repairs, the Program Manager will base a decision on the status of the Contractor's minor home repair budget, the overall program budget, and the need for the repairs in question. If the Program Manager deems it necessary to limit expenditures on the home, measures will be prioritized using the following general priority list:

- Repairs needed to mitigate immediate hazards (e.g., repairs made to mitigate natural gas appliance testing (NGAT) fails, or door repairs where doors will not close or lock),
- Repairs needed to mitigate major infiltration sources (e.g., broken windows, holes in doors, etc.),
- Repairs required to permit the installation of a measure, and
- Other repairs.

7 Measure Installation Policies and Procedures

7.1 Introduction

This section presents ESA Program policies for Program measures that are covered in the ESA Program Installation Standards Manual. Subsection 7.2 specifies general policies that apply to all measures, including contractor installation, installation standards, safety, site clean up, and other policies.

7.2 General Installation Policies

7.2.1. Introduction

Several general policies relating to the installation of Program measures must be followed by installation personnel. These policies are presented below.

7.2.2. Installation by Contractor

Measures must be installed by the contractor. Dropping off materials for later installation by the customer is not permitted under this Program.

7.2.3. Installation Standards

All measures must be installed in conformance with the ESA Program Installation Standards Manual. These standards are intended to meet or exceed existing codes and regulations, and to conform to accepted building practices. When a conflict exists between these installation standards and local codes, the more stringent requirement shall take precedence. Copies of these Installation Standards Manual may be obtained by using the contact information provided in Section 1.1.

7.2.4. Safety

Contractors must plan and conduct all work in a manner that is consistent with the safety of persons and property. All work shall be conducted in compliance with reasonable and safe working practices and with applicable federal, state, and local laws. For instance, the Contractor is responsible for complete compliance with California Occupational Safety and Health Standards.

It is the responsibility of each program contractor to establish and maintain a safety program for all work undertaken for the ESA Program. It is also the responsibility of each contractor to ensure that all employees observe safety rules by complying with all required safety precautions and regulations. Contractors must ensure that their staff members receive appropriate training in the safe and proper use of the tools associated with the installation of each ESA Program measure.

7.2.5. Installation of Feasible Measures

It is the policy of the CPUC that ESA Program Contractors must install all feasible measures unless after communicating the benefits of installing the new measure(s), the customer specifically refuses the measure(s). If the installer determines that a measure cannot be installed, the reason shall be recorded and made available to the utility or its designee.

7.2.6. Lead-Safe Practices

Contractors shall conduct lead-safe practices when working with pre-1978 painted materials in accordance with federal, state, and local regulations and codes. Lead-safe practices for specific measures are listed in the California Installation Standards Manual.

7.2.7. Site Clean-Up Policies

The Contractor must maintain all work sites and related structures, equipment and facilities in a clean, orderly condition during all work conducted under the ESA Program. Any unused or leftover materials, garbage and debris must be promptly removed from the customer's premises by the Contractor and disposed of at the Contractor's expense. The customer's premises must be left in a clean and orderly condition at the end of each day and at the completion of work.

7.2.8. Recycling and Disposal Policy

The contractor shall properly dispose and recycle replaced measures in an environmentally safe manner and in accordance with federal, state, and local regulations and codes. Specific disposal and recycling policies and procedures of measures are listed in the California Installation Standards Manual.

7.2.9. Weatherization of Mobile Homes

Mobile homes with open combustion furnaces or water heaters drawing air from inside the conditioned space may not have infiltration reduction measures installed under the ESA Program. In addition, attic insulation (and therefore attic duct reconnection) is not a measure for mobile homes.

8 Inspection Policies

8.1 Introduction

This section summarizes the inspection policies used in the ESA Program to ensure safety and quality control in the installation of measures and minor home repairs. Subsection 8.2 discusses the designation of the responsibilities for inspections. Subsection 8.3 describes policies relating to pre-installation inspections. Subsection 8.4 presents policies on post-installation inspections.

8.2 Inspection Personnel

Utilities will use in-house personnel, contract employees, or contractors to conduct inspections. However, each utility will undertake in-house either the prime contractor (administration) function or the inspection function, but not both, with the very limited exceptions discussed in D. 00-07-020.

8.3 Pre-Installation Inspection

The IOUs may implement a pre-installation inspection process for their respective ESA Program. As part of this process, each IOU can select the percentage of homes to be evaluated for program eligibility prior to the installation of measures.

8.4 Post-Installation Inspection

8.4.1. General Polices on Post-Installation Inspection

Post-installation inspections are used to assure that Contractors install measures in accordance with the California Installation Standards of the ESA Program. In this subsection, specific polices relating to post-installation inspections are presented. These policies encompass the types of pass rates used in program administration, the frequency of post-installation inspections, the treatment of failed inspections, resolution of disputes relating to inspections, inspection waivers, and minor job corrections.

8.4.2. Types of Pass Rates

Utilities or their designees will collect information on both per-home and per-measure pass rates. Per-home pass rates will be used for the purposes of determining minimum sample sizes for tracking performance. Per-measure pass rates will be used to tailor training and technical assistance for contractors, as well as to manage programs in a prudent manner.

8.4.3. Post-Installation Inspection Frequency

Utilities or their inspection contractors will select[9] for inspection all attic insulation and furnace replacement jobs. For all other jobs not involving attic insulation or furnace replacement, random inspections will be conducted for a sample of dwelling units.

Suggested minimum sample sizes are shown in Table 8-1. These sample sizes are designed to provide 90% confidence that the true pass rate is within 5% of the estimated value.

Table 8-1: Minimum Sample Sizes for Inspections (90%/□5% precision)

Pass Rate	Number of Homes Completed By Contractor					
	200	500	1000	2000	5000	10000
0.70	140	241	317	377	425	444
0.75	129	210	265	306	337	348
0.80	115	176	213	239	257	264
0.85	98	139	161	175	184	188
0.90	76	97	108	114	118	119
0.95	45	51	54	56	57	57

[9] It is understood that selecting 100% of jobs for inspection does not necessarily mean that 100% of inspections will be completed, since the utilities and their inspection contractors cannot compel program participants to be present for inspection appointments.

Utilities or their inspection contractors may exceed these minimum sample sizes if, in the judgment of the administrator, larger sample sizes are necessary to preserve program quality control. Circumstances that may justify larger sample sizes include, but are not limited to, the following.

1. If the utility's program or the amount of additional post-inspections undertaken is small enough to conduct additional post inspections without substantially increasing total program expenditures.
2. If a particular contractor exhibits a pattern of inspection failures that justifies inspection of a higher percentage of jobs.
3. If a contractor is on a quality improvement plan which requires improvement of its inspection pass rates.
4. If contractor crews are newly trained or new to the program, and require closer field supervision and on-the-job training.
5. If a contractor's installation crews are not sure of program **installation** standards, as shown by failed inspection results.
6. If a contractor's allocation of homes covers multiple counties.
7. If post-inspections are done in conjunction with post-installation natural gas appliance tests, since there are economies associated with conducting post-installation inspections and post-installation natural gas appliance testing **at the same time.**[10]
8. If larger sample sizes are necessary to resolve disputes with contractors over estimated billing fail rates.
9. If a new measure has been added to the Program.

Utilities will keep records of actual inspection frequencies by contractor.

8.4.4. Failed Inspections

If a feasible measure is installed incorrectly or is not installed at all, Contractor may be issued a correction fail which must be resolved as required by the IOU. Hazardous fails must be addressed within 24 hours of notification by the utility and/or its designee.

[10] The rational here is that there are economies associated with conducting post-installation inspections and post-installation natural gas appliance testing.

8.4.5. Failed Inspection Dispute Resolution

In those instances where a dispute arises between inspectors and contractors, the utility and service provider may agree to utilize in-house personnel to hear and determine appropriate action on any unresolved dispute between service providers and inspectors. In the event that an agreement cannot be reached between the utility and service provider, a neutral third party may be utilized. The costs of such service shall be paid by the party that "loses" the arbitration.

8.4.6. Inspection Waivers

Policies on inspection waivers vary between mandatory and non-mandatory inspections, as follows:

- ***Mandatory inspections*** are required for projects which include attic insulation or furnace replacement. For mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. After three such attempts, the inspection provider will send a certified letter to the participant asking for permission to inspect the home. If the participant does not respond to this certified letter within two weeks, the inspection provider need not conduct the inspection but must notify the utility that the inspection could not be completed.

- ***Non-mandatory inspections*** relate to projects not involving attic insulation or furnace replacement. They are non-mandatory in the sense that only a sample of projects must be inspected. For non-mandatory inspections, three attempts will be made to arrange for a post-installation inspection within 30 calendar days of the notification of job completion. A non-mandatory inspection of a sampled project may be waived by the utility after three attempts to contact the participant, provided that attempts are made in an effort to overcome barriers attributable to language preference or disability. The inspection provider shall replace a waived inspection with another inspection and shall complete a sufficient number of inspections as provided in the policy on post inspection frequency (see above).

9 Contractor Eligibility

9.1 Introduction

This section outlines contractor eligibility conditions under the ESA Program. Subsection 9.2 deals with insurance requirements. Subsection 9.3 relates to licensing requirements. Subsection 9.4 relates to workforce, education, and training. The purpose of this section is to provide general information on these requirements. It may not include all of the requirements specified in the contracts between contractors and Program Administrators. Contractors interested in participating in the ESA Program can obtain information at each utilities respective website.

9.2 Insurance Requirements

Contractors shall maintain insurance in full force and effect during the life of the contract with the utility, with responsible insurance carriers authorized to do business in California and having a Best Insurance Guide (or equivalent) rating that meets the guidelines of each utility.

9.3 Licensing Requirements

Any organization or company contracting under the ESA Program must comply with all applicable federal, state and local laws and regulations, as well as with utility guidelines. Contractors and subcontractors must also comply with any applicable CSLB licensing requirements, including current requirements for electrical, plumbing and HVAC, and must remain in good standing with the CSLB.

9.4 Workforce Education and Training (WE&T)

Contractors should make every effort to hire and train from the local low income communities. Additionally the contractors are required to work with the utilities to better track the training and hiring of a low income energy efficiency workforce.

10 Natural Gas Appliance Testing

10.1 Introduction

This section summarizes the statewide policy on ESA Program natural gas appliance testing (NGAT). Subsection 10.2 discusses the circumstances when such testing must be conducted. Subsection 10.3 presents the general protocols that are followed in the course of natural gas appliance testing. Subsection 10.4 addresses the timing of testing. Subsection 10.5 considers actions to be taken when one or more test is failed by appliances in a participating home. Finally, Subsection 10.6 discusses the types of personnel used for the assessments.

Note that specific standards for these natural gas appliance testing (NGAT) protocols are described in the *ESA Program California Installation Standards Manual.*

10.2 Applicability of Natural Gas Appliance Testing

10.2.1. General Applicability

In general, natural gas appliance testing will be conducted for all homes that receive infiltration reduction measures and that have at least one natural gas appliance affecting the living space.[11] In addition, the repair and replacement of a natural gas furnace or water heater involves appliance testing. See the Natural Gas Appliance Testing section in the California Installation Standards Manual, as applicable.

10.2.2. Applicability to Combustion Fuels other than IOU Natural Gas

Homes with non-IOU (e.g., propane) space heating fuels are not eligible for infiltration reduction measures. As a consequence, they are not eligible for natural gas appliance testing. Homes with IOU space heating but which use a non-IOU combustion fuel for another appliance (i.e., water heating) are also ineligible for NGAT due to the inability of the IOUs to service combustion appliances using non-IOU fuels. The IOUs will refer these latter homes to local LIHEAP agencies.

[11] The NGAT section of the ESA Program Installation Standards Manual describes the conditions under which an appliance is determined to affect the living space.

10.3 Natural Gas Appliance Testing Protocols

10.3.1. General Protocols

General natural gas appliance testing (NGAT) protocols are presented below. Note again that detailed procedures are described in the NGAT section of the California *Installation Standards Manual.* The types of checks conducted as part of NGAT are described in this section.

10.3.2. Pre-Weatherization Evaluations of Gas Appliances

In order to avoid cases in which post-weatherization NGAT would discover nonconforming conditions that (a) preclude installation of infiltration reduction measures, and (b) cannot be corrected within the scope of the program, some pre-weatherization evaluations of gas appliances are performed as part of the home assessment.

Required corrections will be performed before weatherization commences. The customer will be informed of conditions that preclude installation of infiltration reduction measures and cannot be remedied by the ESA Program (e.g., exhausting clothes dryers outdoors, and repair or replacement of appliances and gas vents for which repair or replacement is not available).

10.3.3. Post-Weatherization Natural Gas Appliance Testing (NGAT)

After completion of weatherization that includes infiltration reduction measures, NGAT is performed for all natural gas appliances affecting the living space.

10.3.4. Disposition of Appliance Fails/Problems

If a problem is identified through the application of the overall natural gas appliance testing protocol (i.e., elevated CO, inadequate draft, or defect causing an unsafe condition), the case will be referred for resolution to qualified utility-trained personnel or a contractor licensed to repair appliances. Such resolution may involve the use of flue CO testing as well as other procedures.

10.4 Timing of Combustion Appliance Testing

10.4.1. Homes with Natural Gas Appliances

For homes with natural gas appliances, post-weatherization NGAT protocols are conducted after weatherization. Post-weatherization NGAT shall be conducted within five (5) working days from the date that infiltration reduction measures are installed.

10.5 Actions to be Taken When Appliances Fail NGAT

The following actions will be taken when appliances fail NGAT:

- In owner-occupied homes, natural gas space heaters failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment and, if necessary, will be repaired or replaced subject to Program policies and procedures.[12]
- In owner-occupied homes, natural gas water heaters failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment and, if necessary, will be repaired or replaced subject to Program policies and procedures.[13]
- In owner-occupied homes, non-program appliances[14] failing one or more of the tests covered by the NGAT protocols will be provided with Service/Adjustment.[15] If Service/Adjustment does not correct the problem in question, the appliance will be tagged, shut off, and/or capped and reported to the customer.
- In renter-occupied homes, appliances failing one or more of the tests covered by the NGAT protocol will be provided with Service/Adjustment. [16] If Service/Adjustment does not correct the problem in question, the appliance will be tagged, shut off, and/or capped and reported to the customer.
- In *owner-occupied* homes receiving infiltration-reduction measures, furnace repair or replacement and water heater repair or replacement may be necessary to mitigate natural gas appliance testing (NGAT) fails that cannot be corrected with service by utility gas service personnel (or their designated representative). Such NGAT fails may include, but are not limited to, CO above the action level, inadequate draft, unsafe flue/vent pipe/system, unacceptable flame or flame change when air handler comes on, a non-operable appliance, or the absence of a furnace in cases where another gas appliance is used for space heating.

[12] Note that the absence of a furnace in cases where another gas appliance is used for space heating will constitute an NGAT fail.
[13] Water heater repairs and replacements are provided only to mitigate NGAT fails or to replace leaking water heaters.
[14] Appliances for which ESA Program repair or replacement is not available.
[15] In this context, Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.
[16] In this context, Service/Adjustment of an appliance entails providing services that are within the scope of the gas service department for customers in general.

There are cost restrictions to be considered when determining whether to repair the furnace measure. The cost to repair the measure should not be more than the cost to replace the measure as follows:

Central Furnaces - 50% (Does not include the costs of Title 24 compliance.)

Wall/Floor/Direct Vent Furnaces - 40% (Does not include the costs of Title 24 compliance.)

10.6 Personnel Performing Natural Gas Appliance Assessments and Testing

The utilities have the option of conducting natural gas appliance assessments and testing using in-house staff or contracting with third parties to provide these services.

APPENDIX E

Section	Summary of Changes
All	• Editorial and grammatical fixes, rewording for clarity and consistency • Removed "CEC" when referencing climate zones (mostly in preface pages)
Titlepage/Introduction	Reworded some statements to more accurately reflect the content and intent of the document
Abbreviations & Acronyms	• Added additional acronyms as applicable • Removed: ARI, WIS, Weatherization
Definitions	• Added additional definitions as applicable • Removed: UL references (relocated to Referenced Standards)
Referenced Standards	Added UL references from Definitions and other referenced standards as applicable
00: Minor Home Repair Policies (NEW)	Added this section to reflect measure-specific criteria removed from the Statewide P&P manual
01: Caulking (preface)	• Added item 2.3: reference to Prop 65 requirement (relocated from pg. 1-1) • Item 3.1: added installation policy specifying the exception of exterior utility penetration when installing in Mobile Homes
01: Caulking	Removed reference to Prop 65 requirement and relocated criteria to preface page
02: Weatherstripping (preface)	• Item 1.4: modified NFC specifying fire rating greater than 20 minutes; too restrictive • Item 1.8: added NFC (for closet doors) specifying that adequate CVA cannot be added as MHR • Item 2.1: clarified wording • Item 2.2: added installation policy requiring weatherstripping be installed as a complete set and not just a single piece • Item 2.4: clarified wording • Item 2.6: added installation policy for strike plates
02: Weatherstripping	• Items 3: removed fire rating criteria (covered in item 7) • Item 7: removed criteria referencing fire rating over 20 minutes; deferred to terms of listing and manufacturer's instructions re: weatherstripping installation • Item 13: added criteria for installing self-adhesive compression material when pile cannot be installed
03: Attic Insulation (preface)	• Added preface information for Attic Ventilation • Added footnote describing MHR situations for exhaust vents

Section	Summary of Changes
	• Item 1.4: added NFC to make insulation unfeasible when blocking cannot be installed • Item 1.12: specified NF when insulation over K&T wiring is prohibited by utility policy • Item 2.1: added installation policy which prohibits attic assessment when vermiculite insulation is present; H&S issue • Items 2.4-2.7: added to provide guidelines for evaluating existing insulation • Items 2.14-2.17: added policy installation criteria for K&T, protecting the home and furnishings, clarification that HPDs and CVA vents that are inaccessible do not prevent insulating where they are accessible
03: Attic Insulation	Combined Attic Insulation (Part 1) and previous Section 4: Attic Ventilation (Part 2) into one section as attic ventilation is not a stand-alone measure
(previous) 04: Attic Ventilation	Removed as a separate section; not a stand-alone measure, so added criteria to Sec. 3: Attic Insulation
04: Central A/C Tune-up (NEW)	New measure/section added to 2013 IS Manual
05: Water Heater Insulation (preface)	• Added item 1.4: NFC specifying no drain line directed away from front of tank; safety consideration • Added 1.10: NFC specifying unable to install three blanket straps • Added item 1.22: NFC specifying non-FVIR water heater located in garage is not 18" off the floor; code change
06: Water Heater Pipe Insulation	None
07: Cover Plate Gaskets	None
08: Energy-Saver Showerheads and Faucet Aerators (preface)	• Items 1.2.a and 1.4: removed references to specific manufacturers • Item 2.2: specified that replaced showerheads must be left with customer
08: Energy-Saver Showerheads and Faucet Aerators	Added clarification for WaterSense labeling requirement
09: Evaporative Cooler and A/C Vent Covers (preface)	• Added item 1.8: External cover is NF when interior damper is present
10: Duct Testing and Sealing (preface)	• Added NFC for Duct Sealing • Item 1.2: clarified NF when total length of ducts located in unconditioned space is less than 40

Section	Summary of Changes
	linear feet • Removed DTS "as a free-standing measure" • Removed installation policies re: DTS as a means of T24 compliance; added item 2.3 to address meeting T24 requirements when required by code • Added item 2.4 to allow for repair/sealing of obvious duct leaks even when total duct length is 40 feet or less
10: Duct Testing and Sealing	• Combined Duct Testing (Part 1) and previous Section 20: Duct Sealing (Part 2) into one section • Item 1: removed criteria for instrumentation minimum specifications; added reference to T24 instead • Item 9: removed references to specific subsections of Title 24 and replaced with general reference to T24 Residential Compliance Manual Chapter 4 and CMC Chapter 6
11: Exterior Door Replacement (preface)	Clarified that exterior door replacement is allowed only when the existing door is damaged and/or deteriorated to the extent that catastrophic leakage is present or the door will not support installation of jamb weatherstripping or door bottom.
11: Exterior Door Replacement	• Item 1: modified criteria to cite requirements of local code, because door requirements vary considerable, based on location and other factors too numerous to identify in the IS. Clarified that like-for-like replacement is only when allowed by local code. • Item 9: clarified that lockset height is 36" from floor (not 3/16").
12: Window Replacement (preface)	Added installation policy stating that window replacement is allowed only when required to stop catastrophic envelope leakage.
13: Glass Replacement (preface)	Item 2.2b was removed, because it was decided that IGU replacement should not be allowed when the home is NIM.
14: Thread-Based CFLs (preface)	Removed installation policy stating maximum of 5 may be installed, because that number is determined by utility-specific policy.
15: Hard-Wired CFFs (preface)	• Item 2.1: specified that interior and exterior installations are allowed • Removed installation criteria limiting installation to SF non-mobile homes • Removed installation policy stating maximum allowed to install; refer to utility policy • Item 3.1: added installation policy stating not approved for exterior installation in mobile homes
15: Hard-Wired CFFs	• Clarified that both interior and exterior fixtures may be installed, and maximum number to be

Section	Summary of Changes
	installed is based on utility-specific policy. Also added policy not allowing exterior fixtures on mobile homes (based on the possible safety considerations in some types of mobile homes). • Removed criteria regarding dimmers, photosensors and occupancy sensors, because requirements are addressed in manufacturer's instructions.
16: Window/Wall Evaporative Cooler Installation	• Item 11: (a) specified compliance with local code and manufacturer's specifications; (b) for wall mount units, height above floor must be in accordance with manufacturer's specifications and when there are none, IS guidelines are provided based on best practice; (c) setback criteria was changed to allow 1' clearance (instead of 5') between the cooler (not the wall in which it is installed) and the adjacent fence or wall; and (d) for vent termination near a cooler, added exception for space heaters (to match that in Sec. 24), when a cooler vent cover is in place and occupants are advised to install the cover during the heating season.
17: Refrigerator Replacement	Item 7: grounding criteria removed and reference made to Appendix C
18: Natural Gas Central Forced Air Heating System R&R	None
19: Natural Gas Wall and Floor Furnace R&R	None
(previous) 20: Duct Sealing	Removed as a stand-alone section; incorporated into Section 10: Duct Testing and Sealing
20: LED Night Lights (NEW)	New measure/section added to 2013 IS Manual
21: Central HE Air Conditioner and Heat Pump Replacement (preface)	• Added NFC for heat pumps • Items 1.2-1.5 added to be in agreement with utility-specific policy • Removed NFC for thermostats; covered in Section 18
21: Central HE Air Conditioner and Heat Pump Replacement	• Added criteria for heat pumps • Item 1 reorganized and reworded for clarity • Item 1: added clarification of package units and dual packs for A/Cs and heat pumps • References to "ARI" changed to "AHRI Directory" throughout • Condenser "coil" changed to condenser "unit" throughout • Item 9: clearance from condenser: top clearance of 48 inches added, side clearance reduced to 24 inches based on manufacturer's recommendations • Removed criteria for Combustion Units and Wall Thermostat Installation; covered in Section 18 • Item 16: reworded to match same language in Section 18

Section	Summary of Changes
	• Item 16: added criteria re: cabinet plenum: for a split system, the return shall be isolated from combustion air • Removed criteria for Isolation of Return Air-Split Systems; relocated to item 16
22: HE Window/Wall Air Conditioner and Heat Pump Replacement (preface)	Item 3.1: added installation policy stating in metal homes with metal siding, cutting new openings is not allowed
22: HE Window/Wall A/C and Heat Pump R&R	• Added criteria for heat pumps • Item 3: added/reworded criteria for unit to comply with recommendations and guidelines rather than specific information in table; less stringent • Item 6: Changed extension cord maximum length to 6' or maximum allowed by manufacturer. • "Gas meter" changed to "gas meter set assembly" throughout • Item 10: removed criteria for brace supports (deferred to manufacturer's instructions). • Item 17: clarified that wall-mount units in mobile homes may be installed only in existing wall openings.
23: Natural Gas Storage Water Heater Replacement (preface)	Item 1.1: added NFC specifying existing unit is tankless and replacement with storage unit is not feasible or allowed
23: Natural Gas Storage Water Heater Replacement	• Retitled section to Natural Gas "Storage" Water Heater • Removed all references to tankless units throughout; no longer a measure • "Gas meter" changed to "gas meter set assembly" throughout
24: NGAT (preface)	• Removed NFC re: customer refusal • Item 2.1: added installation policy explaining customer notification • Item 2.5: simplified wording to reference IS criteria; items a-k removed because they are covered in the standards • Item 2.6: deleted criteria already covered in the standards • Item 2.7 and 2.8: removed duplication and simplified wording • Item 2.11.b and c: criteria removed from Statewide P&P was inserted into preface
24: NGAT	• Item 1: added requirement of a Nox filter to increase accuracy of flue gas CO readings • Item 3: in accordance with code requirements text was added re: dryer moisture exhaust, modular homes, and in mobile homes: required kitchen exhaust and isolation of return air • Table 24-1: item 3.c added to clarify vent termination requirements; item 8.b added to address

Section	Summary of Changes
	dryer vent passing through an FAU plenum; item 14.b added to address mobile home kitchen exhaust and isolation of return air • Table 24-2: item 2 modified to specify appliances located outdoors; item 2.c criteria added to identify nonconforming vent terminations as advisory conditions; item 8 removed because situation re: open combustion water heater or FAU located in a sleeping room is addressed in Table 24-1, item 5; item 9 added to address condition listed in Item 8 (double wall pipe requirement); item 10.a added criteria re: prohibiting moisture exhaust penetrating an FAU plenum (per Mechanical Code) • Item 7: added clarification that upper CVA vent can begin within 12 inches of the ceiling and lower CVA vent can begin within 12 inches of the floor • Item 8: clarified that vent termination criteria on page 24-14 does not apply to mechanical draft and direct vent appliances or package units; clarified that criteria on page 24-15 applies to package units, mechanical draft appliances, and through the wall terminations, but does not apply to direct vent appliances; criteria added to address 10 foot clearance from a forced air inlet • Item 9: added criteria to address inaccessible appliances; added criteria re: clothes dryer moisture exhaust passing through an FAU plenum • Item 13: added clarification that appliance ambient CO maximum is determined by individual utility policy • Item 24: added upper only CVA criteria for mobile homes
25: Microwave Ovens	Item 5: grounding criteria removed and reference made to Appendix C
26: Furnace Cleaning and Tune-up (preface)	• Items 1.8 and 3.5: removed NFC stating Tune-up is unfeasible if unit is located on a roof
27: Thermostatic Shower Valves (preface)	• Items 1.1.a and 1.2: removed references to specific manufacturers • Item 1.4 reworded to clarify that if hot water is supplied by continuously circulating pump, installation is feasible when allowed by utility policy
27: Thermostatic Shower Valves	• Retitled section to Thermostatic Shower “Valves”
28: HE Clothes Washer Replacement (preface)	Item 1.2: reworded NFC to clarify that the energy source for washer and dryer and/or water heater must be provided by utility providing service
28: HE Clothes Washer Replacement	Item 6: reference made to Appendix C for grounding criteria
29: FAU Standing Pilot Light Conversion	Item 1.8: reworded for clarity

Section	Summary of Changes
(preface)	
30: Energy Efficient Variable Speed Pool Pump Replacement (preface)	• Item 1.7: removed NFC re: separate controller; separate controllers are not installed • Item 2.4: added installation policy for anti-entrapment pool drain cover (relocated from Item 3: General Requirements)
30: Energy Efficient Variable Speed Pool Pump Replacement (preface)	• Retitled section to Energy-Efficient "Variable Speed" Pool Pump ~~and Motor~~ Replacement, because units installed in the program include a motor • Preface 2.4: anti-entrapment criteria moved from standards (Item 3) to the preface. • Item 1: removed criteria for separate controller, because units installed in the program include an integral controller • Items 3 and 8: Separate motor criteria removed, because units installed in the program include a motor • Item 4: (a) revised criteria for "turnover time" from 6-10 hours to be in accordance with manufacturer's guidelines and local regulations; (b) for water velocity and lowest flow rate of pump, deferred to manufacturer's recommendations and changed IS criteria in Table 30-1 to be a "guide"; and (c) removed formulas for TDH and Total Resistance and deferred to manufacturer's instructions. • Removed all criteria for controller, because units installed in the program include an integral controller • Item 7: added criteria clarifying code requirements for the disconnecting means
31: Natural Gas Water Heater Repair (preface)	• Item 1.8: added NFC when water heater compartment floor is structurally unsound and/or the tank is leaning (condition shall be reported to homeowner) • Items 3.1 and 3.2: include installation policy re: water heater enclosure for all homes, not just mobile homes
32: Smart Fan Delay	Retitled section to ~~Efficient HVAC Fan Controller~~ Smart Fan Delay
33: Smart Power Strips (preface)	• Removed items that pertained to training • Transferred items which were more applicable to standards criteria to the installation standards part of the section • Removed table; too specific and may contradict manufacturer's instructions • Made minor editorial changes for clarity and simplification
33: Smart Power Strips	• Removed excessively restrictive criteria; defer to terms of UL listing

Section	Summary of Changes
	• Removed references to receptacle grounding, because manufacturer's instructions must be followed, and grounding will be addressed there if applicable • Simplified and/or moved some standards-related criteria to preface pages
34: Occupancy Sensor Switches (preface)	Items 1.3.c and 2.3.d clarified that occupancy sensors are allowed to be installed in walk-in closets
35: Fluorescent Torchiere Lamp Replacement (NEW)	New measure/section added to 2013 IS Manual
Appendix A: CVA Requirements for Natural Gas Appliances	• Item 3.2: clarified that the upper CVA vent must begin within 12″ of the ceiling, and the lower CVA vent must begin within 12″ of the floor. The change is intended to eliminate the possible misinterpretation that the *entire* vent must be located within the 12 inches. • Added footnote clarifying that CVA venting to outdoors for existing appliances may be upper and/or lower
Appendix B: NFVA Charts	None
Appendix C: Grounding Guidelines for Electric Measures (NEW)	• Removed previous appendix (HDD and CDDs) from 2013 IS manual; no longer relevant • Created Appendix C to address grounding guidelines for electric measures
Appendix D: Methods for Determining Airflow	None
Appendix E: Lead-Safe Wx Risk Factors	Revised Lead-safe Risk Factor Evaluation Table to include new measures/sections added to 2013 IS Manual
Appendix F: Minimum Warranty Requirements (NEW)	• Removed specific warranty criteria from each section of IS manual and added reference to Appendix F • Created Appendix F to address minimum warranty requirements for each measure/category

(END OF APPENDIX B)

APPENDEX C

Addendum to ESAP Cost-Effectiveness Working Group White Paper

Working Group Final Recommendations

The White Paper submitted by the Working Group on February 15, 2013 included five recommendations to modify and improve the cost-effectiveness framework used for the ESA Program. Since that time, the Working Group has continued to discuss these five recommendations. This Addendum to the White Paper contains the Working Group's refined recommendations for Energy Savings Assistance (ESA) Program cost-effectiveness framework modifications. Please note that some of the specific recommendations in this addendum are different than the original recommendations in the White Paper and that **recommendations stated here supersede what was stated in the White Paper.**

Executive Summary

The Working Group's recommendations are summarized as:

1. For the 2015-17 cycle, and all subsequent ESA program cycles, the Commission should base ESA program approval on the cost-effectiveness results of the entire program, rather than at the measure level.
2. For the 2015-17 cycle, and all subsequent ESA program cycles, utilities should categorize all measures as resource or non-resource,[1] depending on their ability to provide significant energy savings. This categorization would be reported in the utilities' ESA program applications and updated each cycle, as needed (e.g., if a new measure is added or an existing measure is retired).
3. For the 2015-17 cycle, and all subsequent ESA program cycles, utilities should use the proposed ESA Cost-effectiveness Test (ESACET) and Resource Measure TRC test, rather than the current tests, to assess cost-effectiveness of the ESA program. Similarly, the Commission should use the results of the proposed ESACET and the Resource Measure TRC test to determine ESA program approval
4. During the 2015-17 cycle, for informational purposes only, utilities should conduct a preliminary, qualitative Equity Evaluation; the results of this preliminary evaluation will be subject to stakeholder comment. The preliminary results and associated stakeholder comments will be used to determine how to proceed in subsequent cycles.
5. For the 2015-17 cycle, the non-energy benefits (NEBs) calculation should remain as it currently is, with the intention to modify the calculation method for future cycles. Prior to the forthcoming Guidance Decision for the 2015-17 cycle, the Working Group will continue to discuss how NEBs could be calculated as a combination of both quantified

[1] As explained in the White Paper Background, the ESA Program, originally created as an 'equity' program, includes measures which may not save energy but provide non-energy benefits such as health, comfort, and safety to program participants. Those measures have been called "equity measures." The Working Group believes changing the term to "non-resource measures" would be more transparent and understandable for decision-makers and the public.

values and an adder. Quantified values will be used for participants' water savings, reduced arrearages for the utility, and fewer customer calls for the utility; the remainder of the NEBs will be valued using an adder.

6. During the 2015-17 cycle, for use in future ESA program cycles, the Commission should fund a study to produce a workable spreadsheet model to replace the currently used modified LIPPT workbook to estimate NEBs and participant bill savings for the ESA program. The study will also address the appropriate value for a NEBs adder and update inputs to the calculations for the three directly estimated NEBs.
7. For informational purposes only, utilities should also report cost-effectiveness results by "household typologies," which could also be thought of as "sub-programs" within the ESA program. The household typologies would cover dwelling type and climate characteristics and will be reported annually. These household typologies would be reported in addition to the cost-effectiveness results of the proposed ESACET and the Resource Measure TRC to better understand ESA program impacts and program design improvements; the household typologies results are informational only and will not be used for program approval purposes.

The Working Group found that several of the recommendations warrant further discussion. As such, the Working Group recommends that we continue to meet on a regular basis with the intent to provide more specific details to the ALJ in this proceeding regarding a few of the recommendations above:

1. Specific thresholds for program approval for the ESACET and the Resource Measure TRC.
2. The appropriate adder value for NEBs.

The Working Group expects to meet monthly, with the potential for additional meetings, as needed, in order to provide additional input prior to the forthcoming ESA program Guidance Decision.

Clarification of Goals

The Working Group was given the goal of making recommendations for improving the ESA Program cost-effectiveness framework. The Working Group has tried to make recommendations that would make the cost-effectiveness framework not only more accurate, but also more transparent to stakeholders. While it is necessary, at times, to use complex models and confidential data, we believe that elements of the ESA cost-effectiveness framework have become overly-complicated, making it difficult for some stakeholders to understand it and thereby making it difficult to achieve full stakeholder participation. Nevertheless, our primary goal remains to increase the accuracy of the cost-effectiveness framework, so as to enable decision-makers to improve the design of the ESA program.

Program Level vs. Measure Level Analysis

Probably the most significant change proposed by the Working Group is the recommendation to base ESA Program approval on the cost-effectiveness of the entire program, rather than approve each ESA measure based on its cost-effectiveness. The Working Group believes that this recommendation will result in a more accurate and realistic analysis of the value of the ESA program. It will allow more flexibility in program design, and should result in a more robust and beneficial ESA Program. It eliminates two major problems in the current cost-effectiveness framework – the difficulty of accurately allocating administrative costs and non-energy benefits (NEBs) to individual measures.

Currently, administrative costs are calculated for the entire ESA Program, and then allocated to individual measures' costs based on the energy savings of that measure. Similarly, NEBs are calculated at the household-level, summed to the program level, and then allocated to individual measures' benefits based on the energy savings of that measure. The Working Group believes that this practice is likely to distort the differences among cost-effectiveness of individual measures. For example, under the current cost-effectiveness framework, measures that provide little or no energy savings but significant health, comfort and safety benefits, are not allocated a significant proportion of administrative costs or NEBs. However, measures with few energy savings are generally included in the ESA program specifically for the NEBs they provide and they theoretically should not cost more to administer than measures with significant energy savings. The Working Group finds that this allocation method does not help decision-makers or the public better understand the cost-effectiveness of the ESA program or measures. Therefore, as further described in the Update of Recommendation 2, the Working Group is recommending that ESA program approval be based on program-level, rather than measure-level, cost-effectiveness analysis so that this distortion no longer occurs and so the ESA program can be considered more holistically by all stakeholders.

Update of Recommendation 1 (Non-Resource/Resource Categorization)

The ESA program includes measures that provide both energy savings and improved quality of life (e.g., NEBs such as health, comfort, and safety). To better understand which benefits the individual measures provide, the Working Group categorized measures as "resource," "equity," or "uncertain" in the White Paper. "Resource" measures are those that are intended to provide energy savings, and bill savings, to participants. "Equity" measures, which we will refer to as "non-resource" measures in this White Paper Addendum, are those that provide little to no energy savings, but significant non-energy benefits, such as health, comfort, and/or safety.[2] "Uncertain resource" measures are those measures that may provide energy savings in some climate zones and/or utility service territories, but not all.

The Working Group recommends that the initial measure classification proposed by SDG&E in the White Paper (Table 2), with one modification, be used as the initial categorization of measures as "resource," "non-resource," and "uncertain." The modification is to categorize air conditioning measures as "uncertain." This leaves only two non-resource measures – furnace repair or replace, and hot water heater repair or replace. The results are shown in Table 1.

Table 1: Measure Categorization

Category	Measure
Non-resource	Furnace repair or replace
Non-resource	Hot water heater repair or replace
Resource	Lighting
Resource	Refrigerators
Resource	Hot water conservation measures
Resource	Clothes washers
Resource	Microwaves
Resource	Smart Strip
Resource	Furnace pilot light conversion
Resource	Central AC Tune-up
Uncertain	Air Sealing
Uncertain	Attic Insulation
Uncertain	Duct Test & Seal
Uncertain	Furnace Clean & Tune
Uncertain	Air conditioning in all climate zones

The Working Group reviewed the measure-level cost-effectiveness from the most recent application and found that SDG&E's initial categorization corresponded to the results. That is, those measures with relatively higher cost-effectiveness values were categorized as resource and

[2] As explained in the White Paper Background (pg. 6-7), the ESA Program, originally created as an "equity" program, includes measures that may not save energy but provide non-energy benefits, such as health, comfort, and safety to program participants. Those measures have historically been called "equity" measures. The Working Group believes that changing the term to "non-resource measures" would be more transparent and understandable for decision-makers and the public.

those with low cost-effectiveness values were categorized as non-resource. Measures categorized as "uncertain" were measures that were cost-effective in some climate zones for some dwelling types, however, the results were not consistent enough to definitively categorize the measures as either resource or non-resource.

It is expected that many, if not most, of the measures defined here as "uncertain" can be categorized as either non-resource or resource measures for certain climate zones or housing types. We recommend, for the purposes of short-term cost-effectiveness analysis, that in the application for the 2015-17 ESA program, each IOU propose those cases for which an uncertain measure should be categorized as a non-resource or resource measure. For example, we expect that in hot climate zones air conditioning measures are likely to be considered non-resource measures.

The Working Group proposes that a tentative definition of a non-resource measure--subject to further discussion among stakeholders--is any measure that mitigates a substantial health or safety hazard.

Update of Recommendation 2 (Test and Thresholds)

The cost-effectiveness evaluation should align with the goals and objectives of the ESA program while incorporating the perspectives of the various actors and the costs and benefits associated with each. The actors of the ESA program include the participants, the utility and non-participating ratepayers. Costs and benefits that accrue to these actors are: avoided costs of energy saved, measure costs, administration costs, participant NEBs, utility NEBs, and bill savings. Table 2 provides additional detail on which costs and benefits are included in each cost-effectiveness test.

The current cost effectiveness tests--the Utility Cost Test (UCT) and the Modified Participant Test (MPT) together--capture all costs and benefits of the ESA program. However, while the UCT accurately reflects the viewpoint of the utility (and non-participants), the MPT does not accurately reflect the viewpoint of the participant. Instead, the MPT measures the cost effectiveness of the transfer of funds from the utility to the participant.

Retirement of the MPT

Additional background on the MPT test provides context for its existence and why parties believe it should be retired. As noted in D.02-08-034, pursuant to D.01-12-020, the Reporting Requirements Manual Working Group and Standardization Project Team appointed a joint Cost-Effectiveness Subcommittee to consider use of new tests and application of NEBs. The Subcommittee recommended that cost effectiveness testing:

> "Calculate UC *[Utility Cost]* and PC *[Participant Cost]* benefit-cost ratios for the program as a whole and for each measure. Because the PC benefit-cost ratio is an undefined

number (participants costs are zero), use a modified PC or 'PCm,' whereby the participant benefits are divided by the utility costs."

The CPUC concurred, writing that:

> " … the Subcommittee's approach to addressing the denominator problem with the PC test produces a benefit-cost ratio that maximizes the participants benefits given the program dollars."

The Subcommittee's recommendation was adopted in D.02-08-034 and remains in use today.[3]

There was general consensus among the Working Group that the MPT should no longer be used as a cost effectiveness test for the ESA program. The MPT deviates from the core Standard Practice Manual (SPM) tests in that it does not fit a single perspective. It uses the costs of the utility and the benefits of the participant in order to measure the cost effectiveness of the utility's funds in producing benefits for the participant. The MPT does not accurately represent the ESA Program's cost effectiveness to the participants as they bear no (or very little) costs. It is important to evaluate program impacts on the participant but the Working Group finds that this may not be best illustrated with a cost-effectiveness benefit cost ratio.

The UCT does not have the structural perspective issues associated with the MPT. While the test does provide a reasonable estimate of the benefit to the program from the perspective of non-participating ratepayers, placing priority on this perspective would not be consistent with the goals and objectives of the ESA program. Thus, the Working Group does not recommend using the UCT to analyze cost-effectiveness for the ESA Program. Instead, the Working Group proposes two new tests, which we believe will better represent all actors and Commission objectives below.

Proposed New Cost Effectiveness Tests

Most Working Group members believe there is a need for new cost-effectiveness tests in order gain consistency with the core energy efficiency portfolio approval and that of other DSM programs. First, the Working Group recommends use of an 'all-in' test or a modified version of the TRC (the ESACET defined below). The ESACET would include all costs and benefits, including participant and utility NEBs, associated with the ESA program and therefore the perspectives of the utility, participant, and non-participant. The second proposed test is a TRC test applied only to "resource" measures (refer to Table 1) and without the inclusion of any NEBs. The Working Group finds that the ESACET and the Resource Measure TRC to be more appropriate than the current tests because one reflects the perspective of all actors in the ESA program and the other reflects the value of the ESA program as a resource procurement program.

[3] D.12-08-034, page 15, "In sum, we find that the Subcommittee's modified PC test is consistent with the purpose defined by this Commission. It makes use of the tests defined in the Standard Practice Manual, while appropriately compensating for the insufficiency of the PC to be defined as a benefit-cost ratio without some modification."

The ESA Cost-Effectiveness Test (ESACET)

The Working Group recommends reporting program cost effectiveness using the ESACET, which includes participant and utility NEBs. In addition, the ESACET includes "copayments," which are the portion of the measure costs that are paid by landlords or third parties. The ESACET would include all the costs and benefits--both energy and non-energy--associated with the ESA program, and it is therefore comparable with the TRC currently used for evaluating other energy efficiency programs. The Working Group finds that it represents the perspective-based analysis that is foundational within the core SPM.

The Working Group believes it is logical to start with the TRC test, then add the participant and utility NEBs to account for health, safety, and comfort benefits--provision of which are also goals of the ESA Program. A test based on the TRC--which is used for all demand-side programs--with modifications appropriate to the ESA program, provides a strong foundation that the Working Group finds will facilitate acceptance of this test as a means to evaluate the total resource efficiency of the ESA Program. Table 2 shows the results of the ESACET using data from the utilities' 2012 program. Please note that because the results in Table 2 are based on 2012 program data, they are for illustrative purposes only to show what the ESACET results would have looked like for the 2012 ESA Program. The results in Table 2 may not reflect program cost-effectiveness of any future ESA Program applications.

Table 2: ESACET Results for 2012 ESA Program

PG&E	SCE	SDG&E	SoCalGas
0.73	0.80	0.86	0.68

The Resource Measure TRC

The Working Group also recommends reporting program cost effectiveness using the Resource Measure TRC. This test is identical to the traditional TRC, but would exclude administrative costs and only be applied to resource measures. The Working Group finds that since the primary purpose of resource measures is to produce energy savings and avoid supply side costs, they should be evaluated without the inclusion of NEBs. The Resource Measure TRC evaluates the ESA program as a resource program, which is consistent with Commission goals.[4]

The Working Group believes that at least one ESA program cost-effectiveness test should focus solely on the resource measures, without administrative costs, because they are designed to produce energy and bill savings, a specific Commission goal. This way the program's energy-

[4] "Today we clarify that the complementary objectives of LIEE *[Low Income Energy Efficiency]* programs are to provide an energy resource for California, consistent with our "loading order" that establishes energy efficiency as our first priority, while reducing low-income customers' bills and improving their quality of life." (D.07-12-051, p. 2)
"The LIEE programs will be an energy resource by delivering increasingly cost-effective and longer-term savings." (California Energy Efficiency Strategic Plan, January 2011 update, Section 2, pp. 23-24)

related benefits are more transparent to decision makers and stakeholders. We believe that the Resource Measure TRC is better suited for assessing impacts of the ESA program as an energy efficiency program.

Based on the illustrative results run using data from the utilities' 2012 programs, the percentage of the ESA program funding supporting "resource measures" is less than half of the cost of the program. Please note that this test does not consider administrative costs.

Table 3: Portion of the ESA Program costs* comprised of "resource measures"

PG&E	SCE	SDG&E	SoCalGas
24%	30%	48%	16%

Table 4: Resource Measure TRC* Results for 2012 ESA Program

PG&E	SCE	SDG&E	SoCalGas
0.75	1.23	1.63	0.67

*Excluding Administrative Costs

Results in Tables 2 and 4 reflect 2012 program data and likely do not reflect program cost-effectiveness in the 2015–2017 program applications for various reasons, including but not limited to possible revisions in measure offerings, the lack of program administrative costs, and revised energy savings impacts for measures based on the Impact Evaluation of the 2011 ESA Program currently underway. These are illustrative examples only, based on data from 2012, and likely do not reflect the cost-effectiveness of any future ESA Program applications.

Presenting the Participants Perspective

Since the Working Group recommends retiring the MPT, we were concerned that the participant's perspective would not be uniquely presented. Since participant well-being remains a program priority, we find that it is important to continue to evaluate program impacts on the participant. The SPM cost-effectiveness test from the participant perspective, the Participant Cost Test (PCT), includes all costs incurred by--and benefits accruing to--program participants. A problem specific to the ESA Program is that participants bear no (or very little) cost. Because participant costs are essentially zero, it is not possible to determine a useful benefit cost ratio using the PCT.

The Working Group recommends that, for informational and tracking purposes only, the IOUs continue to report participant bill savings in the Annual Report. We believe that this will help decision-makers and stakeholders better understand the benefits to the participants and any potential trends in participant bill savings over time. The Working Group does not, however, recommend that the participant bill savings be used for program approval purposes.

Table 5 below details the costs and benefits analyzed in the current and proposed cost-effectiveness tests used in the ESA program. As shown, all costs and benefits analyzed in the current tests would also be analyzed in the proposed tests

Table 5: Costs and Benefits in the ESA Program Cost-effectiveness Framework

	Current Tests			Proposed Tests	
	TRC	**MPT**	**UCT**	**ESACET**	**Resource Measure TRC**
Administrative costs	COST	COST	COST	COST	
Avoided costs of supplying electricity	BENEFIT		BENEFIT	BENEFIT	BENEFIT
Net Bill Reductions		BENEFIT			
Capital (measure) costs to landlords/ 3rd parties	COST*			COST	
Capital (measure) costs to utility	COST	COST	COST	COST	COST
Participant non-energy benefits		BENEFIT		BENEFIT	
Utility non-energy benefits			BENEFIT	BENEFIT	

**Costs of third parties have been included, although not consistently, by some utilities.*

Thresholds

The Working Group recommends that only the ESACET and the Resource TRC test be used in determining the cost-effectiveness of the ESA program. The ESACET test includes all costs and benefits and represents all perspectives. The Resource Measure TRC prioritizes energy savings and evaluates the program as a resource.

The Working Group is continuing to discuss possible combinations of the proposed tests to determine a recommendation regarding the best approach for ESA Program approval. However, we agree that we do not have enough information at this point to set a threshold, given that any threshold could potentially require significant program design modifications. As such, the Working Group proposes that we continue to discuss this issue on a monthly basis and submit a supplemental recommendation to the ALJ before the forthcoming Guidance Decision. This will allow time for the Working Group to consider the results of the Impact Evaluation, the proposed NEBs adder (see below), the Multifamily Study, and how the other recommendations

included in this White Paper Addendum (such as measure categorization) may impact the ESA program.

Outstanding questions include:

- Should the threshold for ESA program approval be "firm" (e.g. the benefit-cost ratio on a particular test or tests must be greater than a certain number), or should it be based on past performance (e.g., the benefit-cost ratio on a particular test or tests must be greater in one year than it was in a previous year), or something else?

- To what extent should the threshold for ESA program approval be based on tests which include only resource measures, and to what extent on tests which include both resource and non-resource measures?

Update of Recommendation 3 (Equity Evaluation)

The intention of the Equity Evaluation is to provide an additional level of analysis of relatively qualitative non-energy benefits (e.g., health, comfort, and safety) and to address the difficulty of monetizing all relevant non-energy benefits. We recognize that there may be some overlap between the Equity Evaluation and the NEBs calculations. However, since we are recommending that tests such as the ESACET be applied on the program level, and the Equity Evaluation applied on the measure level, we do not think that any overlap will result in any sort of double-counting of benefits. Additionally, we recommend that at least for the 2015-17 program cycle, the Equity Evaluation be used for informational purposes only to better understand program impacts and design, and that the Equity Evaluation not be used for ESA program approval.

The White Paper included general recommendations for both the 2015-17 program cycle and for the post-2017 period. This Addendum focuses on the Working Group's recommendation for the 2015-17 program cycle. . We propose that, during the 2015-17 program cycle, all measures be assessed based on the following four criteria:

1. *Eliminates combustion-related safety threat* – Prolonged exposure to high levels of carbon-monoxide (CO) can have adverse effects on human health, including CO poisoning that can lead to severe headaches, fatigue, shortness of breath, dizziness, and nausea. Extended and severe exposure can lead to permanent neurological damage and even death. Ambient air readings in participant homes should not exceed certain maximum ambient air CO levels, both in the center of the room(s) and near combustion appliances. A Natural Gas Appliance Test (NGAT) is performed to check for dangerous levels of CO. Any or all faulty natural gas-fired water heaters or furnaces that contribute to excessive levels of CO in the room(s) are shut off, becoming candidates for ESA repair or replacement. If ventilation/infiltration measures have been installed, a second NGAT

will be conducted to ensure that tightening the building envelope did not adversely affect operation of any gas appliances.

2. *Eliminates fire safety threat/Improves home security (crime prevention) and building integrity* – While not necessarily within the scope of the ESA program at present, non-resource measures may address specific safety issues such as fire safety and improved home security/building integrity. This would include fire safety from hazards in the home with the exception of natural-gas combustion. An on-site property assessment, similar to what is performed as part of the ESA program, would identify fire safety threats and home security issues, including poor exterior lighting, broken/unsecure windows and doors, inadequate/makeshift heating and cooking devices, and structural deficiencies.

3. *Reduces or eliminates extreme temperatures and temperature variations inside the home/improves customer ability to manage in-home temperatures* – Extreme temperatures in the home can lead to significant adverse health effects, including cold stress/hypothermia and heat stress/hyperthermia. Infiltration measures can help reduce temperature variation by minimizing air leakage into and out of the building envelope. Additionally, measures that reduce or eliminate extreme temperatures may also mitigate issues that arise from the use of inadequate, faulty and makeshift heating and cooling devices, leading to increased safety/security and decreased incidences of fire and asphyxiation. Attic insulation may help by decreasing the amount of conditioned air lost in the summer and the winter. Additional measures that address extreme temperatures may include new windows and heating/cooling units.

4. *Improves air quality, ventilation and/or air flow (e.g., reduces drafts and leakage)* – Poor air quality, ventilation and air flow can lead to increased health risks from mold, dust mites, and other contaminants. These risks may be mitigated by reducing the number of entry points for pollen, insects, rodents and other pests. Improved air quality and ventilation may also diminish condensation. Measures in this category, such as new windows and doors, duct sealing, and improved temperature/humidity control, may address one or more air quality issues, and can help reduce temperature variation by minimizing air leakage into and out of the building envelope. Reducing temperature variation within the home may also minimize the flow of warm air to cool spaces.

The Working Group recommends that the Equity Evaluation be performed by rating the extent to which every ESA measure achieves each particular health or safety improvement. A rating of "5" indicates that the measure almost always results in that particular improvement. In other words, almost all homes which receive the measure will see that improvement. For example, a measure which replaces faulty natural gas appliances would receive a "5" on criteria #1. Another way to think about a score of "5" is that it indicates that a measure has an extremely high probability of achieving the improvement in a home when it is installed.

A rating of "3" indicates that the measure results in that particular improvement for about half the homes which receive it. For example, if a measure which provides insulation will likely reduce the occurrence of extreme temperatures in about half the homes where it is installed, that measure would receive a "3" on criteria #3. For certain measures, a more useful way to think about a score of "3" is that it indicates that a measure has about a 50% probability of making the improvement in a home when it is installed. For other measures, it may be more appropriate to think of a score of "3" as a result of a measure that partially achieves the improvement. For example, a measure may result in moderate, but not extreme, improvements in temperature variation in each home.

A rating of "1" indicates that the measure results in that particular improvement for only a small number of homes which receive it. For example, if a measure which replaces non-energy-efficient appliances results in the replacement of appliances which are actually fire hazards about 10% of the time, that measure would receive a "1" on criteria #2. For certain measures, a more useful way to think about a score of "1" is that it indicates that a measure has less than 25% probability of making the improvement in a home when it is installed. For other measures, it may be more appropriate to think of a score of "1" as a result of a measure that somewhat achieves the improvement. For example, a measure may result in a small improvement in temperature variation in each home.

The Working Group recommends that the utilities attempt an Equity Evaluation based on the criteria and rankings identified above for *all* ESA 2015-17 Program measures during the 2015-17 program cycle, whether they are classified as non-resource, resource or uncertain. Utilities will base the Equity Evaluation on their understanding of and experience with the ESA Program measures in their respective territories. We believe that this will provide valuable information about each measure that can assist us in better classifying and analyzing each measure in the future.

The Working Group also recommends that the utilities use their discretion to group the measures for the purpose of the Equity Evaluation. For example, some measures (e.g., lighting) provide the same benefits across the state, and it would not be sensible to provide a separate Equity Evaluation for each climate zone and every type of housing. Some measures are weather-sensitive, or have different impacts in different housing types, and maybe require a more granular evaluation.

The Equity Evaluation, particularly for the 2015-17 program cycle, is likely to be somewhat subjective and clearly experimental. For this reason, the Working Group further recommends that all stakeholders be encouraged to comment on the utilities' Equity Evaluations, and provide their own scores or suggestions for grouping measures. We hope that through this stakeholder process, we can come to better understand the true value of each ESAP measure, and eventually improve the design of both the individual measures and the overall ESA program so as to provide the maximum value to program participants.

The Equity Evaluation results are not intended to be used as the sole determinant of whether a measure should be included in the ESA program because it provides health, comfort, and/or safety benefits. Rather, it is intended to provide additional information about ESA Program measures which, in conjunction with other data, could be used to better understand program impacts, make a determination about measure inclusion in the ESA Program, and/or improve measure or program design.

Update of Recommendation 4 (Non-Energy Benefits)

Recommendations for treating NEBs in the cost-effectiveness calculations are presented below. Where applicable, the recommendations are further specified by short term and long term periods.

In general, the recommendation is to estimate a few specific NEBs directly and to provide an adder that will estimate other NEBs which would be difficult or expensive to quantify. The NEBs recommended to estimate directly include:

- Water savings for the participant household,
- Reduced arrearages costs for the utility, and
- Fewer customer calls for the utility.

Each of these along with the adder is described in more detail below.

Water Savings

Water savings for the participant household are currently calculated in the modified Low Income Public Purpose Test (LIPPT) workbook in the following manner:

- The number of annual gallons of water saved per faucet aerator is added to the number of annual gallons of water saved per showerhead; this amount is then multiplied by the percentage of program participants who received these measures.
- The annual gallons of water saved are divided by 748 to convert them to hundred cubic feet (ccf).
- The ccf are then multiplied by an average water and sewer rate; the original average rate was determined in 2000 and has been escalated each year since then by approximately 38 percent.
- The present value of the savings over the life of the benefit (in this case, three years has been used) is then calculated.

The recommendation is to use the same calculation. In the short term, the calculation will be made with the values that are currently used in the modified LIPPT model. In the long term, the calculation will be modified by making the following updates:

- Estimate the annual gallons of water saved for faucet aerators, showerheads, high efficiency washers and thermostatic shower valves.
- Estimate the average water and sewer rate; this will vary by area.

Reduced Arrearages

Reduced arrearages costs for the utility are calculated in the modified LIPPT workbook in the following manner:

- The average arrearage dollar value for low income customers is estimated by the utility.
- The average arrearage value is multiplied by the percentage of arrearages reduced by the program. This percentage was estimated as 28% when the LIPPT model was developed and is an average of 23 values reported in the literature during the period 1991 through 1999.
- The result is multiplied by an estimated interest rate for the utility to carry the cost (8.15% was used when the LIPPT model was developed).

The recommendation is to use the same calculation. In the short term, the calculation will be made with the values that are currently used in the modified LIPPT model. In the long term, the calculation will be modified by making the following updates:

- Average arrearage dollar value for low income customer; this will vary by utility;
- Program impact on arrearages; and
- Utility interest rate.

Fewer Customer Calls

Fewer customer calls for the utility are calculated in the modified LIPPT workbook in the following manner:

- The average number of calls from low-income customers per year is estimated by the utility.
- The average number of calls is multiplied by the percentage of calls reduced by the program. This percentage was estimated as 25% when the LIPPT model was developed and is an average of 25 values reported in the literature during the period 1990 through 2000.
- The result is multiplied by the marginal cost per customer call as estimated by the utility.

The recommendation is to use the same calculation. In the short term, the calculation will be made with the values that are currently used in the modified LIPPT model. In the long term, the calculation will be modified by making the following updates:

- Average number of calls from low-income customers per year; this will vary by utility;

- Program impact on number of calls; and
- Marginal cost per customer call; this will vary by utility.

Adder to Estimate Remaining NEBs

The recommendation is to develop an adder to estimate the remaining NEBs which are difficult or expensive to estimate. To get an idea of what NEBs are currently being estimated, the results of the cost-effectiveness analyses for the 2012 Annual Report were reviewed. Table 2 shows some selected values from those analyses.

Table 6: Values from ESA Cost Effectiveness Analyses for the 2012 Annual Report (dollars)

	Water NEB	Arrearages NEB	Customer Calls NEB	Remaining NEBs	Electric Avoided Cost Benefits	Gas Avoided Cost Benefits	Total Avoided Cost Benefits
SDG&E	761,087	290,448	665,074	5,343,201	9,262,638	2,234,338	11,496,975
SCG	4,448,053	468,143	3,551,226	36,365,55 4	n/a	9,874,792	9,874,792
PG&E	4,004,747	6,645,918	1,553,654	37,279,741	31,787,104	10,816,705	42,603,808
SCE	141,353	2,830,385	1,104,194	3,957,960	22,459,280	n/a	22,459,280

In reviewing these results, a number of scenarios were considered, including separate adders for electric and gas, for participants and utilities, or for the four IOUs. Other considerations included whether the adder should be a percentage of bill savings or avoided costs and whether it should result in a set of similar estimates or estimates that are larger or smaller than what is currently used. None of the scenarios considered resulted in a basis for NEBs that was not arbitrary or demonstrated to improve the current methodology, and the working group concluded that more discussion and analysis was needed to develop a reasonable basis for the adder.

Therefore, in the short term, the recommendation is for this Working Group to continue to meet on a regular basis for the remainder of 2013 to discuss a working recommendation and basis for developing the adder. In the long term, the recommendation is to fund a study to produce a workable spreadsheet model to replace the currently used modified LIPPT workbook. The study could additionally research what is currently used in other programs, the recent relevant literature, and perform a more in-depth analysis on ESA program data and results from the four ESA studies currently underway,[5] each of which could potentially inform a better understanding of the benefits resulting from the program. It is also recommended that this study review and update the inputs to the three directly estimated NEBs described above. The result of the study would be a report describing the development of the adder and the other updated values, and a spreadsheet for calculating NEBs and participant bill savings that can replace the currently used modified LIPPT model. This study should be funded in the 2015 to 2017 program cycle.

[5] The four studies include an impact evaluation, research on the multi-family sector, an evaluation of energy education, and a comprehensive low-income needs assessment.

Summary of Recommendations for NEBs

Overall: Directly estimate the three NEBs of water savings for participant households, reduced cost of arrearages for utilities, and reduced cost of customer calls for utilities. Develop on adder to estimate the remaining NEBs.

Short-term: Continue to use the modified LIPPT model as needed while the Working Group continues to meet regularly this year to discuss an appropriate basis for a NEBs adder.

Long-term: Fund a study in the 2015 to 2017 program cycle to deliver the following:

- A summary of findings and recommendations related to the estimation of NEBs and cost-effectiveness tests for the ESA program based on current industry practice, recent literature, an in-depth analysis of program data, and results from the four ESA studies completed in the 2012 to 2014 cycle.
- Updated inputs to the calculations for the three directly estimated NEBs;
- Adder(s) to be used for estimating remaining NEBs;
- A spreadsheet model to take the place of the currently used modified LIPPT model for estimating NEBs and participant bill savings for the ESA program.

Update of Recommendation 5 (Household Typology Reporting)

The Working Group recommends reporting program-wide cost-effectiveness results by groups of aggregated measures called "household typologies." Essentially, the total program will be divided according to a few key characteristics such as dwelling type and/or climate area and cost-effectiveness will be reported for these sub-program types. This will allow stakeholders a quantitative overview of select program parts without an overwhelming list of cost-effectiveness values.

The ESA program is statewide and serves a variety of dwelling types. As described in the background section, it is also a comprehensive program in that the program offers building shell services, many appliances, as well as energy education. The utilities currently report cost-effectiveness annually at a program level. Approximately every three years they also report cost-effectiveness at the very granular level of utility, climate zone, dwelling type, owner type, and, in some instances, fuel type. Depending on utility, the number of cost-effectiveness values reported at the granular level is between 70-150 values.

Cost-effectiveness reporting of a few select segments of the program will provide stakeholders additional information about program performance and allow stakeholders to differentiate among more or less cost-effective parts of the program in a simple manner. By segregating cost-effectiveness by program characteristics, stakeholders will have a better idea of where the most costs are accrued. It will give an idea of where the most potential for cost-effective energy efficiency installations is likely to occur. It will allow program evaluators to explore the impact

of overall cost-effectiveness of modifying program characteristics. If the cost-effectiveness values reported for some sub-program types are similar or identical, stakeholders can see that the program characteristics defining sub-programs do not impact costs or benefits.

The proposal is to the segregate the benefits and costs into the following groupings for assessment:

- Dwelling type
- Climate characteristics (e.g., large amount of heating required, minimal cooling required)

The Working Group also explored additional groupings

- Fuel impacted
- Weather-sensitive, non-weather-sensitive measures
- Type of fuel used for heating the dwelling

The Working Group also analyzed the various combinations of groupings and decided that the simplest divisions are the most appropriate at this time.[6] The Working Group recommends two separate divisions of the program, one by dwelling type and one by climate area.

Preliminary examples of this segregated analysis are provided below, using the data from the 2012 program year. The sub-program assessment would utilize the ESACET recommended in this Addendum for overall program approval. However, the ESACET includes administrative costs. If it were to be used for sub-program reporting, the administrative costs would need allocation among the sub-program types. As described in the beginning of this document, in the "Program Level versus Measure Level Analysis" section, the allocation of administrative costs by energy savings creates benefit distortions to various program elements. The administrative (or non-measure costs) comprise approximately 30% of the portfolio. Therefore, the Working Group recommends assessing sub-program components using the ESACET test with and without administrative costs.

Table 7: Illustrative Example of ESACET Cost-effectiveness Results by Dwelling Type

Utility	Multifamily	Single Family	Mobile Home	ESACET without admin costs	*ESACET* with admin costs
PG&E	0.68	1.00	1.11	0.96	0.73
SCE	1.15	1.13	1.01	1.12	0.80
SoCalGas	2.02	0.84	1.36	0.95	0.68
SDG&E	2.63	1.1	1.51	1.29	0.86

[6] The utilities may be able to provide data that allows for additional groupings on an as-needed basis.

The household typology assessment would also segregate values according to climate areas. This Working Group consolidated the California Energy Commission's sixteen building climate zones into three areas for ease of assessment. These three areas are:

Climate Area Description	CEC Climate Zone
Heating & Most Cooling	11 - 16
Some heating & some cooling	6 - 10
Most Heating & Minimal Cooling	1 - 5

These climate areas are based on the number of Heating Degree Days and Cooling Degree Days for four representative cities within each Climate Zone and match the climate areas created for the ESA Impact Evaluation of the 2009 program year.

The Working Group recommends that the household typologies cost-effectiveness results be reported for informational purposes only, in addition to the program level cost-effectiveness results of the ESACET and Resource Measure TRC, discussed in Recommendation 2 of this Addendum. These results would be reported annually on a prospective basis only, beginning with program year 2015.

In conclusion, exploring ways to analyze sub-components of the ESA program may provide several advantages. It will provide information to those interested in particular dwelling types or regions. There may be a particular public interest in certain dwelling types of regions of the state. It may highlight areas of the program to reform or adjust to help the portfolio reach required thresholds. Specifically, it may help demonstrate which parts of the program generate the most benefits, and how this allows other, less cost-effective services and installations to occur.

(END OF APPENDIX C)

Appendix D

1. Do you agree that applying cost-effectiveness tests to the entire ESA Program, rather than to each individual ESA measure, will result in more accurate measurement of ESA cost-effectiveness?

2. Do you agree with basing ESA Program approval on the cost-effectiveness of the entire program, rather than approving individual ESA measure based on the measure's cost-effectiveness?

3. Do you agree that ESA measures should be categorized as "resource" or "non-resource?" Is the categorization proposed in the ESA Program Cost-effectiveness White Paper and Addendum reasonable? If not, how could it be made more accurate?

4. Do you agree that the proposed new cost-effectiveness tests – the ESACET and the Resource Measure TRC – are better metrics of ESA Program cost-effectiveness than the existing cost-effectiveness tests?

5. The ESA Cost-effectiveness Working Group has not yet made a proposal for what threshold should be used for ESA program approval (i.e., what benefit cost ratio on the ESACET and/or Resource Measure TRC must be reached for the ESA program to be approved). Do you have any suggestions for the benefit cost ratio threshold, based on the ESACET and/or Resource Measure TRC, that should be set for the overall ESA program to be considered cost-effective and approved? Or, do you have any suggestions for how to determine this threshold?

6. Do you believe that the proposed equity evaluation can provide useful information about non-resource ESA measures? How do you think this information should be used?

7. Do you think that the proposal to research possible changes to the NEBs calculation, but to leave them as is for the short term, is acceptable? Is there an alternative that would be preferable?

(End of Appendix D)

Attachment T

EVERGREEN ECONOMICS

Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs

Volume 1: Summary Report

Final Report

December 16, 2013

Prepared for: Southern California Edison, Pacific Gas and Electric, Southern California Gas, San Diego Gas and Electric and the California Public Utilities Commission

EVERGREEN
ECONOMICS

Table of Contents

EXECUTIVE SUMMARY III

BACKGROUND III
OVERVIEW OF STUDY OBJECTIVES AND APPROACH III
SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS IV

1 INTRODUCTION 1-1

1.1 BACKGROUND 1-1
1.1.1 CARE Program 1-1
1.1.2 ESA Program 1-5
1.2 STUDY OBJECTIVES 1-7
1.3 ORGANIZATION OF REPORT 1-8

2 STUDY METHODS 2-1

2.1 OVERVIEW OF STUDY APPROACH 2-1
2.2 LITERATURE REVIEW 2-5
2.3 PROGRAM STAFF AND CONTRACTOR IN-DEPTH INTERVIEWS 2-5
2.4 SECONDARY DATA ANALYSES 2-6
2.5 CUSTOMER TELEPHONE SURVEY 2-7
2.6 CARE AND ESA MODELING 2-9
2.6.1 CARE Modeling 2-9
2.6.2 ESA Modeling 2-12
2.7 CONJOINT ANALYSIS 2-15
2.8 IN-HOME VISITS 2-15
2.9 LOW-INCOME PROGRAM REVIEW 2-19

3 SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS 3-1

3.1 OVERVIEW OF SOURCES 3-1
3.2 OVERVIEW OF LOW-INCOME POPULATION CHARACTERISTICS 3-2
3.3 PROGRAM ACCESSIBILITY AND BARRIERS TO PARTICIPATION 3-8
3.3.1 Program Penetration Findings 3-8
3.3.2 Program Outreach Findings 3-9
3.3.3 Program Participation Characteristics and Barriers to Participation Findings 3-10
3.3.4 Conclusions 3-18
3.3.5 Recommendations 3-20
3.4 ENERGY NEEDS 3-27
3.4.1 Energy Burden 3-27
3.4.2 ESA Measure Benefits 3-31
3.4.3 Addressing Energy Needs 3-32
3.4.4 Conclusions 3-39
3.4.5 Recommendations 3-43

Executive Summary

Background

This study was conducted for the joint California investor-owned utilities (IOUs): Pacific Gas and Electric Company, Southern California Edison Company, San Diego Gas and Electric Company and Southern California Gas Company, and the Energy Division of the California Public Utilities Commission. The findings and recommendations are intended to provide the study sponsors with information that may be used to plan and implement the next cycle of low-income energy efficiency programs, the Energy Savings Assistance (ESA) and the California Alternate Rates for Energy (CARE) programs.

The CARE program is offered by all four investor-owned utilities and provides a monthly discount on energy bills for income-qualified households and housing facilities. The ESA program is offered by all four investor-owned utilities and provides no-cost weatherization services to low-income households who meet the income and program guidelines. Services provided include attic insulation, energy efficient refrigerators, evaporative coolers, air conditioners, weatherstripping, caulking, low-flow showerheads, water heater blankets, and door and building envelope repairs. The program also provides energy efficiency education and referrals to other income-qualified programs. The program's objective is to help income-qualified customers reduce their energy consumption and energy bills while increasing their health, comfort and safety in the home.

Overview of Study Objectives and Approach

The overall study objective is to provide updated information to support important program and regulatory decisions related to better addressing the needs of the low-income customers who are eligible for the ESA and CARE programs.

The specific study objectives are to:

1. Report the most recently available estimates of eligible households;
2. Explore the accessibility of the programs to eligible low-income customers;
3. Obtain participating customers' perceptions of the programs;
4. Assess eligible non-participating low-income customers' willingness and barriers to participate;
5. Assess the energy-related needs of low-income customers, which includes an examination of customers' needs for specific energy efficiency measures;
6. Provide data that can be used to support updates of estimates of the energy savings potential remaining among eligible low-income customers' homes;
7. Collect data on energy burden and insecurity from eligible low-income customers; and
8. Assess the non-energy benefits that participants receive from participating in the ESA program.

We used numerous data and information sources for this study including primary and secondary research:

- Literature Review and Program Staff and Contractor In-Depth Interviews;
- Secondary Data Analyses;
- Customer Telephone Survey;
- Multivariate Analyses;
- In-Home Visits; and
- Low-Income Program Review.

Summary of Key Findings and Recommendations

This subsection summarizes the conclusions and recommendations that are presented in more detail in Section 3. In Section 3, we also provide cross-references to the relevant detailed report findings in Volume 2 that supported the development of the conclusions and recommendations.

Below we present the high level results and recommendations as they relate to the key study research questions, which are enumerated below.

1. *What is the current program penetration rate? How many eligible customers have not yet been served?*

Based on 2012 Athens Research data, 32 percent of California IOU households are technically and income-eligible for CARE and ESA. 95 percent of eligible IOU households were enrolled in CARE as of the end of 2012[1], leaving 5 percent or 207,000 California IOU households not enrolled.

59 percent of 2012 eligible California IOU households have been treated by ESA during the period of 2002-2012,[2] leaving 41 percent or 1.7 million untreated California IOU households.[3]

2. *How do most customers get reached by the programs? What methods are the most effective? How does that differ by customer segment?*

Most ESA participants learn about the program from either friends/family/colleagues or from IOU outreach methods, based on our telephone survey. Non-participants who recently became income-eligible for the programs due to a life event were most likely to learn about the

[1] Note that as the IOUs increase post-enrollment verification, the penetration rate is going down as more households are removed from the program.
[2] This estimate includes about 20,000 customers that SCE reported as treated in 2012 that were only enrolled and not treated (since they failed the 3 measure minimum rule). They reported that 68,859 were enrolled and 49,026 were treated.
[3] Note that the 2020 goal for ESA removes homes that have been treated by the Department for Community Services and Development and estimated unwilling homes (which was 5% based on the prior KEMA LINA study.)

program from a social worker or other professional who referred them to support programs, based on our qualitative in-home results. Low-income households learn about the CARE program based on the same methods as ESA, but with IOU bill inserts being more common than learning about the program from friends/family/colleagues. Based on our telephone survey, low-income households overwhelmingly prefer to be reached by mail (this finding does not differ significantly by low-income household segment).

3. *What are the characteristics of eligible customers that have not been reached by CARE and ESA? How do those differ from those who have? Are there concentrations of certain geodemographic characteristics of underserved customers?*
4. *What fraction of ESA non-participants is willing to participate in ESA?*
5. *What are the main barriers preventing ESA non-participants from participating? What were the main drawbacks for ESA participants?*

Based on our modeling effort, the CARE program has been successful in reaching low-income households in areas with higher rates of single-parent households, Spanish-speaking households, households with seniors, larger households, non-English/non-Spanish-speaking households, African-American households and higher population density. The CARE program has been less successful in reaching low-income households in areas with higher rates of renters, households at or below 100 percent of the federal poverty level and higher energy usage[4].

The ESA modeling results indicated that the ESA program, like CARE, has been successful reaching some segments of customers that might have greater needs and/or barriers: seniors, single-parents, the very poor, non-English speakers (Spanish more than other languages) and African-American households. Also like the CARE model, with the exception of PG&E, rural households are less likely to participate than urban households. (Note that only 2 percent of low-income households are in rural areas within the other IOUs' service territories.) Likewise, older homes, households participating in other low-income programs, households on medical baseline and those with longer tenure on CARE and in their present home are also more likely to participate in ESA.

CARE participants who have recertified are more likely to participate in ESA, which may reflect that such customers are more likely to be truly income-eligible. Single-family homes,[5] households located in climate zones where cooling loads are greatest, inland households, households with both electricity and gas service from the IOU(s) and households with electric IOU service (if a SoCalGas or PG&E customers) are more likely to participate in ESA. These results may reflect targeting by the program where the need and/or energy-savings opportunity is perceived to be greater.

[4] Note we looked at CARE customer usage.
[5] Note that this variable was only available for SCE.

Based on our ESA modeling results, the most important drivers of and barriers to ESA participation are:

- (Barrier) Trusting a contractor;
- (Barrier) Getting the landlord's approval;
- (Barrier) Being home for appointments; and
- (Driver/Barrier) Needing something the program offers.

Note that we could not test whether the driver of saving energy was important in the ESA model, because almost every household said that was important. However, other findings presented in this study suggest that saving energy is a primary driver of participation.

Based on multiple methods, we estimate that the willingness to participate in ESA among non-participants is 52 percent. This estimate is adjusted to attempt to correct for the non-response bias inherent in the telephone survey. (The original telephone survey self-report estimate is 72 percent.) Note that if these estimates are used to update ESA program treatment goals, the reasons for not being willing to participate should be factored in. For example, there are customers who are not willing because they do not want to ask their landlord for permission (23% of the 29% of unwilling customers, or about 7% of ESA non-participants), which the program could try to address, along with other barriers identified in this report.

6. *Are the programs designed effectively to reach and enroll non-participants based on their characteristics?*

The ESA and CARE programs are reaching many segments of the low-income population that might be considered hard-to-reach, as described above. The CARE program is not reaching as many renters and rural areas, all else constant, suggesting the CARE program could improve its outreach to these customers. The CARE program may not be reaching as many households that are very low-income, and there may also be customers enrolled in CARE that are not income-eligible, as some of our research may suggest. The ESA program is not reaching households with single-fuel IOU service and households that have been in their homes a shorter period time, all else constant, suggesting the ESA program could improve its coordination across IOUs and its outreach to these customers.

7. *Are the programs designed effectively to reach and enroll non-participants based on their preferences and information channels?*
8. *Are the programs using the appropriate channels to reach all segments of eligible Customers?*

The programs use many methods to reach eligible low-income households, which are consistent with what low-income households say are their preferences for being reached based on our telephone survey. Low-income households overwhelmingly prefer receiving information by mail and prefer to pay their energy bills by mail.

9. *Is the ESA program designed effectively to overcome non-participant barriers? And take advantage of what might drive future participation? And to improve the experience for participants?*
10. *Are enrollment and eligibility requirements preventing participation?*

The ESA program is all else constant, reaching fewer renters, especially multi-family renters, and renters that are concerned about seeking permission from their landlord (particularly those in buildings with 11 or more units). As mentioned below, multi-family have fewer energy needs and lower energy burden due to having less energy-using equipment, smaller homes and lower energy bills. As such, they may be less interested in participating.

Households that only have IOU service for a single fuel[6] are less likely to be treated by the ESA program, though our research did not assess the extent to which other programs such as the Low Income Home Energy Assistance Program (LIHEAP) are able to fill that gap. Some contractors that provide service in overlap areas may contract with both IOUs, but not all do. Additional barriers that impact ESA participation are households having trouble being home for multiple appointments and trusting contractors to be in the home. Our research did not conclusively determine whether having access to and/or being willing to show income documents and trusting the IOU are barriers.

11. *What sources could the programs leverage or leverage more to increase participation?*
12. *What improvements could be made to reduce barriers and increase and improve ESA participation?*
13. *What are the pros and cons of modifying ESA program requirements that might be impeding participation?*

We offer the following recommendations:

- The programs should continue past successful approaches that have lead to higher penetration rates among many hard-to-reach segments.
- The programs should consider ways to overcome barriers to participate for renters, particularly sing-family renters (which have greater energy burden, as explained below) and rural areas, which have unique issues.
- The ESA program should continue the combination campaigns that do outbound calls/direct mail and then door-to-door canvassing.
- To ensure that the newly low-income households are aware of the program, the IOUs could explore how to expand efforts that promote the CARE program through social workers, hospitals, low-income law centers and other agencies that interact with individuals who are going through life changes that might be associated with reductions in household income.

[6] About 74 percent of SCE and 63 percent of SoCalGas's CARE-eligible customers are served by the other single-fuel IOU. Roughly 650,000 CARE-eligible SoCalGas customers do not have IOU electric service.

- The CARE program should explore how to increase the penetration rate in very high poverty areas.
- The ESA program should be able to skip over treating households that do not want to participate in the program because they do not need it or want anything that is offered, such as for multi-family homes that have relatively lower energy burden. The treatment goal for ESA should be updated to make use of the new data provided by this study.
- The ESA program could try to target households that re-enroll in CARE after moving to ensure that the highly transient population (such as renters) participate in the program in greater numbers.
- The ESA program could continue refining its outreach strategies to try to overcome the barrier of households who do not want a "hand out".
- The ESA program could continue refining its implementation strategies to reduce the number of visits so that households that have trouble being home for multiple visits participate in greater numbers.
- The ESA program should continue coordinating with community organizations and contracting with them to conduct outreach to overcome barriers related to lack of trust in contractors.
- The IOUs should continue to coordinate with each other and improve the experience of households that have service with two different IOUs, and coordinate with LIHEAP to improve treatment of homes that use a non-IOU heating fuel source.
- The IOUs should continue to promote the ESA program based on saving energy and improving comfort.
- The program should consider establishing a clearer identity and brand for ESA, by which customers consistently hear about the program and are able to refer to it when discussing with their friends, family and neighbors.
- The IOUs should continue the use of data and targeted post-enrollment verification for the CARE program to reduce incidences of households being on the rate who are not income-qualifying, while not removing customers who truly qualify.
- The IOUs and CPUC should consider focusing resources for a future low-income Needs Assessment study on non-English/non-Spanish speaking low-income households that were excluded from this study's survey research (we estimate to be around 16 percent of the low-income population.) Note that the secondary research is based on population data that includes this segment.

14. *What is the extent of the energy burden among eligible customers? How has that changed since the last LINA study? What segments have the most burden and experience the most insecurity? How do ESA participants v. non-participants differ in terms of their burden?*

The mean energy burden, which is the ratio of energy cost (based on IOU billing data) to reported income (from the telephone survey) for the low-income population is estimated at 8.0 percent.[7] This is likely a higher bound estimate since, relative to the general population,

[7] Based on taking the mean of customer-level ratios of energy burden.

the low-income population tends to have a greater proportion of their essential expenses addressed by subsidies such as government assistance for housing, health care, child care and/or food and earned income credit. The mean energy burden for the low-income population is statistically unchanged from 2007, based on the prior LINA study. The low-income mean energy burden is estimated at 1.8 times the general population's mean energy burden.

Regions with higher mean energy burden among low-income households are:

- The Central Valley (climate zones 11 – 13)
- PG&E's service territory, which has the climate zones and regions with the relatively higher burdens
- The North Coast (climate zones 1-5)
- Households that said that climate or weather was a barrier to saving energy in their home.

Demographic characteristics associated with higher mean energy burden among low-income households are:

- The very poor (by definition, since burden is based on income) – income less than $15,000
- African-American
- Single-family renters
- Speaks a non-English/non-Spanish language[8].

Household characteristics associated with higher mean energy burden among low-income households:

- Reports being sick often due to home conditions
- Income has changed recently due to loss of job or fewer hours
- Presence of a disability.

The mean burden for ESA participants is 9.1 percent, compared to 6.7 percent for ESA (income-eligible) non-participants, due to higher non-participant income. (Non-participant income is on average 30% higher than participants, and non-participant energy usage is 2.5% higher than participants'.)

15. Which ESA measures contribute to the most benefit?

[8] We remind the reader that this is a biased sample of non-English/non-Spanish speakers, since to respond to our survey someone in the household must have spoken English or Spanish. Our survey does not include households that only speak a non-English/non-Spanish language.

A majority of ESA participants said they noticed changes (either "a lot" or "somewhat") in their safety and comfort and reduced bills as a result of ESA participation. We found that HVAC and weatherization measures are most likely to generate improvements in health, comfort and safety. We also found that HVAC and weatherization measures were the most common measures that generated self-reported energy savings and health, comfort and safety benefits among participants and prospective non-participants. The next most beneficial measure was a refrigerator.

16. *What support and services (including energy efficiency measures) do customers need to address their energy-related needs? What is needed most? Do the needs differ by customer segment/characteristics? Which needs are the highest priorities?*

The bulk of the study results related to this research question are too detailed to provide in this synthesis. We refer the reader to Section 3.4.3.1 below and Sections 4.3, 5.5.3 and 5.5.4 in Volume 2 of this report.

Based on telephone survey results, there are few major health, comfort and safety needs among the low-income population[9], though the ESA program makes a notable difference in health, comfort and safety needs among participants.

17. *How are the programs helping low-income customers address their energy burden and insecurity issues?*

The average CARE customer saves $29/month (33% savings) on their electric bill and $6/month (18% savings) on their gas bill. The ESA program results in 81 percent of participants noticing a reduction in their energy bills[10], with 64 percent noticing improvements in safety and 65 percent in comfort, and 44 percent noticing improvements in the health of household members. The energy savings results are consistent with actual changes in bills.

18. *How well aligned are the needs and the measures that are installed by ESA among eligible customer segments?*
19. *Is the ESA program designed effectively to address the needs? Is the ESA program designed effectively to address the needs of the customer segments that have the greatest need?*

ESA currently offers a range of measures that tend to align with what customers need and what they find helpful, with a major focus on weatherization measures, which lead to the greatest benefits. Renters are unable to receive all ESA measures unless they get their landlord's cooperation – the ESA program does not allocate ratepayer funds to subsidize

[9] Households that have major non-response barriers that are largely excluded from the telephone and in-home survey analysis on which this particular need is assessed, who did not respond to our survey, may have different or greater health, comfort and safety issues.

[10] The self-reported change in energy bills was consistent with the change in actual bills, and also with the ESA impact evaluation that found that while many households saved energy, some actually increased their usage.

landlord needs. However, there may be opportunities to expand efforts to address barriers for renters, including gaining more approvals from landlords. Single-family renters in particular have greater barriers, more burden and energy savings potential.

Some customers may have missed opportunities for receiving HVAC and weatherization measures if their heating fuel does not match the fuel of the IOU providing the outreach. There may be additional opportunities in IOU overlap areas (which is the majority of SCE and SoCalGas's CARE-eligible population) for the IOUs to coordinate more. There are additional study results that relate to these research questions, which are too detailed to provide in this synthesis. We refer the reader to Section 3.4.4.2 below and to Section 5.5.5 in Volume 2 of this report.

20. What data are available that may be used to determine the remaining energy savings potential among eligible households?

We estimate based on Navigant Consulting's[11] recent energy efficiency potential study combined with our study's estimates of willingness to participate[12] that:

- Total ESA electric savings potential = 208 kWh x 52% (WTP) x 3,133,942 income-eligible electric IOU customers = 339 MWh.
- Total ESA gas savings potential = 9 therms x 52% (WTP) x 3,714,462 income-eligible gas IOU customers = 17.4 million therms.

21. What could the programs add or modify to better serve the needs?

We offer the following recommendations:

- ESA could explore the tradeoffs associated with screening customers based on energy usage, estimated energy burden and health, comfort and safety criteria to determine priorities for treatment and/or tailor its services to the home.
- The CARE program should continue to require ESA participation for high users and automatic post-enrollment verification for households on CARE that exceed some limit of usage for their region.
- The ESA program should ensure that it is effectively coordinating with the LIHEAP program to address a gap in service to customers that do not use an IOU fuel source for their heating and to offer customers additional measures that ESA does not currently offer.

[11] Analysis to Update Energy Efficiency Potential, goals and Targets for 2013 and Beyond – Track 1 Statewide Investor-Owned Utility Energy Efficiency Potential Study. Prepared for the California Public Utilities Commission. Navigant Consulting, Inc. and Heschong Mahone Group, March 19, 2012.

[12] We are using the estimated willingness to participate from the telephone survey, which does not include some unwilling non-participants whose barriers could be addressed by the program, such as renters who do not want to ask their landlord for permission.

- The IOUs should ensure that in IOU overlap areas (especially SCE and SoCalGas) that as many customers as possible are screened for both IOU measures in an efficient manner to increase the number of customers that pass the modified three measure minimum rule and to provide comprehensive treatment.
- The ESA program should explore the tradeoffs associated with providing energy efficiency education and basic measures during the outreach and assessment visit for homes that are income-qualified but fail the modified three measure minimum rule[13].
- The ESA program should explore the tradeoffs associated with offering certain targeted customers expanded measure eligibility criteria based on the prior recommendation where customers are screened based on higher energy burden and insecurity.
- The ESA program should continue to explore adding additional measures such as solar water heaters, light emitting diode (LED) lamps and fixtures and lighting controls.
- The ESA program should explore the tradeoffs from going back to homes that have received ESA treatment since 2002 to provide additional measures.
- The ESA program should explore the tradeoffs from offering replacement of a second refrigerator, such as for households that demonstrate a need for it (e.g., based on size of household or medical need.) For those that have a second refrigerator that is not needed, the program could offer a significant rebate for surrendering the unit for recycling.
- The IOUs should explore the tradeoffs from lowering the threshold for income self-certification for ESA.
- The IOUs should explore how to increase ESA participation among single-family renter households.
- The IOUs and CPUC should consider conducting an on-site survey with non-participants to collect detailed energy equipment information and energy efficiency values that may be used to develop estimates of remaining potential.
- The IOUs and CPUC should consider augmenting the assessment of energy insecurity in future low-income needs assessment studies.
- This data on varying levels of energy burden and insecurity should be used for future study of the CARE program, since it may be used to help the IOUs and the CPUC to explore the tradeoffs of offering varying rate assistance.

[13] See Section 5.4.1 in Volume 2 of this report for an explanation of this rule.

1 Introduction

This document is Volume 1 (Summary Report) of the Needs Assessment study that Evergreen Economics conducted for the Energy Savings Assistance (ESA) and the California Alternate Rates for Energy (CARE) programs for the joint California investor-owned utilities (IOUs): Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), San Diego Gas and Electric Company (SDG&E) and Southern California Gas Company (SoCalGas), and the Energy Division of the California Public Utilities Commission (CPUC). Our team includes Evergreen Economics, the Energy Center of Wisconsin, Tetra Tech and Wirtshafter Associates (the Evergreen Team).

1.1 Background

On August 23, 2012, the CPUC issued Decision 12-08-044, approving approximately $5 billion for the IOUs' 2012-2014 ESA and CARE programs. The same Decision mandated that the IOUs conduct this Needs Assessment. The CARE program is funded by the public purpose program surcharge that is only applicable to customers who are not on CARE. The ESA program is funded by the public purpose program surcharge on all customers. The CPUC approves budgets and directs the IOUs' administration of the programs, and monitors progress towards the California Long-Term Energy Efficiency Strategic Plan[14] (Strategic Plan) goals.

1.1.1 CARE Program

The CARE program is offered by all four IOUs and provides a monthly discount on energy bills for income-qualified households and housing facilities.

Table 1 shows the current income and household eligibility requirements for CARE, which is based on 200 percent of federal poverty guidelines. To enroll in the program, customers must self-certify that they meet the income and household eligibility requirements on a CARE program application. Customers can enroll online, by mail, over the telephone or through a community based organization (CBO). Through categorical eligibility, customers who are enrolled in one of several public assistance programs, including Medicaid/Medi-Cal, Supplemental Security Income and CalFresh/SNAP (food stamps), are also eligible for automatic enrollment in CARE, regardless of whether they meet the income guidelines. Participants must recertify their eligibility every two years, or every four years if they are on a fixed income. The IOUs are mandated to verify a certain percent of the total CARE residential population annually to ensure that households enrolled do meet the program's income guidelines. Documentation regarding income and/or participation in categorically eligible programs are required as part of this process.

[14] California Energy Efficiency Strategic Plan, California Public Utilities Commission, September 2008. http://www.cpuc.ca.gov/NR/rdonlyres/D4321448-208C-48F9-9F62-1BBB14A8D717/0/EEStrategicPlan.pdf

The CPUC approved nearly $4 billion for the 2012-2014 CARE program cycle, which includes both the subsidy and the operational costs to administer the program. Table 2 below shows the program expenditures for 2012 based on the 2012 IOU CARE Annual Reports.

Table 1: CARE Eligibility Requirements (Effective June 1, 2013 to May 31, 2014)

Size of Household	Income limit (must be at or below)
1	$22,980
2[1]	$31,020
3	$39,060
4	$47,100
5	$55,140
6	$63,180
7	$71,220
8	$79,260
Each Additional Person Add	$8,040

Source: IOU ESA and CARE Programs 2012 Annual Reports

[1] Assembly Bill 327 requires that 1-2 person households qualify at the 2-person income criteria, effective January 1, 2014.

Table 2: 2012 CARE Program Expenditures

IOU	Expenditures
PG&E	$710,765,680
SCE	$346,208,897
SDG&E	$66,925,052
SoCalGas	$111,854,554
Total	$1,235,754,183

Source: IOU ESA and CARE Programs 2012 Annual Reports

There is a 90 percent penetration goal set for the CARE program, which was originally established in CPUC Decision 08-11-031, and retained in Decision 12-08-044. In 2011 and

2012, the IOUs collectively reached the goal, as shown in Table 3 and **Table 4** below. As shown in the tables, PG&E, SCE and SoCalGas met or exceeded the goal, while SDG&E achieved an 85 percent penetration rate.

Table 3: 2011 CARE Penetration Rate

IOU	Eligible Participants	Participants Enrolled	Penetration Rate
PG&E	1,699,660	1,532,692	90%
SCE	1,451,325	1,437,537	99%
SDG&E	362,551	308,596	85%
SoCalGas	1,847,296	1,716,495	93%
Total	5,360,832	4,995,320	93%

Source: CPUC Decision 12-08-044

Table 4: 2012 CARE Penetration Rate

IOU	Participants Enrolled	Eligible Participants	Penetration Rate
PG&E	1,491,413	1,663,059	90%
SCE	1,402,052	1,456,590	96%
SDG&E	309,605	364,424	85%
SoCalGas	1,649,360	1,830,118	90%
Total	4,852,430	5,314,191	91%

Source: IOU ESA and CARE Programs 2012 Annual Reports

Given high penetration rates and questions regarding the remaining potential population, CPUC Decision 12-08-044 identifies the need to attend to and more proactively monitor the eligibility of enrolled customers over time. As part of this effort, the IOUs have enhanced their verification and recertification processes. These processes have resulted in some attrition whereby customers who were formerly on the rate are no longer on the rate.

SDG&E noted in its 2012 Annual Report that 64,000 CARE customers were lost to attrition, either requesting removal or not responding to post enrollment verification requests or recertification requests, and that they are struggling to increase enrollments to exceed that rate. They speculate that the improving economy reduces the likelihood a customer will respond to CARE outreach or a recertification request. Penetration rates for the other IOUs are also expected to decrease given newly implemented practices associated with the verification and recertification processes. The research conducted as part of this study will assist in providing more information to assist the CPUC and the IOU programs in understanding how to best identify and serve the eligible population.

Customers who are on CARE receive at least a 20 percent discount on their electricity and gas bills and are charged a lower rate for electricity usage above baseline. A recent presentation at the California Low-Income Oversight Board meeting[15] noted that these discounts ranged from 30 to 47 percent. Table 5 shows the average monthly electricity bill amount for CARE and non-CARE customers. The average CARE customer uses 547 kWh, pays $58 (after the CARE discount) and saves $29 per month. PG&E CARE customers use more electricity than non-CARE customers,[16] while the other electric IOU CARE customers use less electricity than non-CARE customers.

Table 5: 2012 CARE Electricity Bill Amount (CARE v. Non-CARE) and Average CARE Bill Savings

IOU	CARE				Non-CARE	
	Average Usage (kWh/month)	Average Electricity Bill ($/month)	Average Savings on CARE ($/month)	Average Percent Savings on CARE	Average Usage (kWh/month)	Average electricity bill ($/month)
PG&E	576	$55	$40	42%	546	$101
SCE	540	$62	$20	24%	598	$107
SDG&E	437	$53	$14	21%	511	$98
Overall Average	547	$58	$29	33%	Not available	

Source: IOU ESA and CARE Programs 2012 Annual Reports

Table 6 shows the average gas monthly bill amount for CARE and non-CARE customers. The average CARE customer uses 31 therms, pays $27 (after the CARE discount) and saves $6 per month on their monthly bill. CARE customers use less gas than non-CARE customers.

[15] Low-Income Oversight Board Meeting, CPUC Residential Rate Structure Rulemaking R.12-06-13 Status Update Presentation by Gabe Petlin, Energy Division, August 21, 2013 at the CPUC, San Francisco, California.
[16] PG&E average CARE kWh usage was around 5 percent higher than non-CARE in 2012. Excluding the approximately 70,000 high usage (above 400% of baseline in any monthly billing cycle) customers who will be required to complete the enhanced verification process over the next year, the PG&E average CARE kWh usage drops to around 4 percent lower than non-CARE.

Table 6: 2012 CARE Gas Bill Amount (CARE v. Non-CARE) and Average CARE Bill Savings

IOU	CARE				Non-CARE	
	Average Usage (therms/ month)	Average gas bill ($/month)	Average Savings on CARE ($/month)	Average Percent Savings on CARE	Average Usage (therms/ month)	Average gas bill ($/month)
PG&E	34	$29	$7	20%	38	$42
SDG&E	23	$19	$5	20%	26	$29
SoCalGas	30	$26	$5	16%	40	$34
Overall Average	31	$27	$6	18%	Not available	

Source: IOU ESA and CARE Programs 2012 Annual Reports

1.1.2 ESA Program

The ESA[17] program is offered by all four IOUs and provides no-cost weatherization services to low-income households who meet the income and program guidelines. Services provided may include attic insulation, energy efficient refrigerators, evaporative coolers, air conditioners, weatherstripping, caulking, low-flow showerheads, water heater blankets, and door and building envelope repairs. The program also provides energy efficiency education and referrals to other income-qualified programs. The program's objective is to help income-qualified customers reduce their energy consumption and costs while increasing their health, comfort and safety in the home. The ESA program provides services to both qualified renters and homeowners, in all housing types.

According to Public Utilities Code Section 382(e), the ESA program shall "by no later than December 31, 2020, ensure that all eligible low-income electricity and gas customers are given the opportunity to participate in low-income energy efficiency programs, including customers occupying apartments or similar multiunit residential structures." The ESA program is also intended to evolve into a resource program that garners significant energy savings.

The CPUC approved just over $1 billion for the 2012-2014 ESA program cycle. Table 7 below shows the expenditures for 2012 based on the 2012 IOU ESA Annual Reports.

[17] Prior to 2011, ESA was known as the Low-Income Energy Efficiency program, and was marketed to customers differently by each IOU. Starting in 2011, the program is consistently marketed to customers as the Energy Savings Assistance program.

Table 7: 2012 ESA Program Expenditures

IOU	Expenditures
PG&E	$131,145,519
SCE	$39,378,995
SDG&E	$21,046,806
SoCalGas	$82,252,135
Total	$273,823,455

Source: IOU ESA and CARE Programs 2012 Annual Reports

The CPUC projected that the ESA program should treat 1,093,442 homes during the 2012-2014 program cycle, which is one-third of the remaining untreated homes,[18] with two more program cycles (2015-2017 and 2018-2020) to reach the 2020 goal. Table 8 shows the number of homes that each IOU targeted to treat and the number they actually reported treating in 2012 in their Annual Reports. As shown, the IOUs treated 83 percent of the projected homes target. SDG&E exceeded the number of projected homes target, and PG&E treated 96 percent of the projected homes target. SCE[19] and SoCalGas treated 79 and 71 percent of projected homes target, respectively. SoCalGas attributed this in its Annual Report to uncertainty about program funding during the delay between the end of the previous program cycle (2009-2011) and the approval of the current program cycle (2012-2014). SoCalGas treated a record number of homes in 2011 (161,020), and reportedly, its network of contractors needed time to ramp back up in 2012 once the programs were approved. SCE similarly reported not meeting its 2012 goal of treated homes due to the CPUC delay in issuing the decision that authorized the 2012-2014 programs, creating uncertainty and a late ramp-up of the program year.

[18] Estimated at 2,534,461 in CPUC Decision 12-08-044 (Appendix F).

[19] SCE counts 19,833 homes that were assessed but failed the modified three measure minimum rule, which we describe in Section 5.4.2.1 of Volume 2 of this report.". Excluding those homes, 49,026 were treated. The homes that failed the three measure minimum rule will be eligible for electric measures if SoCalGas provides gas measures to them, and they will be treated by SCE as go-back visits in 2013.

Table 8: 2012 ESA Number of Homes Treated - CPUC Projected versus Actual

IOU	CPUC Projected Number of Homes to be Treated	Actual Number of Homes Treated	% of Planned
PG&E	119,940	115,229	96%
SCE	87,389	68,859	79%
SDG&E	20,316	22,415	110%
SoCalGas	136,836	96,893	71%
Total	364,481	303,396	83%

Sources: CPUC Decision 12-08-044 and IOU ESA and CARE Programs 2012 Annual Reports

Table 9 shows the savings claimed by each IOU for the 2012 ESA program, including energy, demand and gas. The IOUs reported that the ESA program saved a total of 66 million kWh, 15,000 kW and 2.5 million therms in 2012.

Table 9: 2012 ESA Program Savings Claims

IOU	Energy (kWh) Savings	Demand (kW) Savings	Gas (therm) Savings
PG&E	37,479,398	7,824	1,208,745
SCE	19,185,248	6,493	-
SDG&E	8,962,474	642	311,324
SoCalGas	-	-	999,408
Total	65,627,120	14,959	2,519,477

Source: IOU ESA and CARE Programs 2012 Annual Reports

1.2 Study Objectives

The overall study objective is to provide updated information to support important program and regulatory decisions related to the needs of the low-income customers who are eligible for the ESA and CARE programs.

The specific study objectives are to:

1. Report the most recently available estimates of eligible households for CARE and ESA;
2. Explore the accessibility of ESA and CARE programs to eligible low-income customers;
3. Obtain participating customers' perceptions of the CARE and ESA programs;
4. Assess eligible non-participating low-income customers' willingness and barriers to participate;
5. Assess the energy-related needs of low-income IOU customers, which includes an examination of customers' needs for specific energy efficiency measures;

6. Provide data that can be used to support updates of estimates of the energy savings potential remaining among eligible low-income customers' homes;
7. Collect data on energy burden and insecurity from eligible low-income customers; and
8. Assess the non-energy benefits that participants receive from participating in the ESA program.

1.3 Organization of Report

The remainder of Volume 1 of this report contains the following sections:

- Section 2: Study Methods
- Section 3: Summary of Findings, Conclusions and Recommendations

Volume 2 (Detailed Findings Report) of this report contains the following sections:

- Section 4: Low-Income Population and Program Characterization
- Section 5: Low-Income Population and Program Assessment

Volume 3 (Technical Appendix) contains the following:

- Section 6: Energy Needs Detailed Results
- Section 7: Low-Income Population Characterization Detailed Results
- Section 8: Telephone Survey Detailed Results
- Section 9: Detailed Modeling Results
- Section 10: In-Home Interview Detail
- Section 11: Low-Income Program Review Detail
- Section 12: Study Methods Detail
- Section 13: Research Instruments

2 Study Methods

This section describes the methods we used to conduct each of the study research and analysis tasks. More detail is provided in Volume 3 – Section 12.

2.1 Overview of Study Approach

We used numerous data and information sources for this study including primary and secondary research:

- Literature Review and Program Staff and Contractor In-Depth Interviews - We reviewed relevant reports and program information, combined with interviews with program staff and contractors, to provide background on the program and to obtain perspectives from implementers on some of the key study objectives.
- Secondary Data Analyses - We gathered and analyzed secondary data from the U.S. Census and American Community Survey, IOU ESA and CARE program tracking data, IOU customer billing data, Athens Research estimates of CARE and ESA eligibility, geographic data for California IOU and climate zone boundaries, California Residential Appliance Saturation Survey data,[20] and California Lighting and Appliance Saturation Survey data.[21]
- Customer Telephone Survey – We conducted 1,028 surveys with households enrolled in CARE, stratifying CARE enrollees by their ESA participation status (their home was treated by ESA since 2010, their home was treated by ESA between 2002-2009, or their home has not been treated by ESA since 2002[22]) and whether they were aware of the ESA program.
- CARE and ESA Modeling – We developed statistical models to understand drivers of and barriers to enrollment in CARE and participation in ESA.
- Conjoint Analysis – We conducted a conjoint survey to inform our understanding of drivers of and barriers to ESA participation.
- In-Home Visits – We conducted 88 in-home visits with current CARE enrollees whose homes had not been treated by ESA since 2002.
- Low-Income Program Review – We reviewed several low-income energy efficiency programs operating across the country to review enrollment, eligibility and marketing and outreach procedures in an attempt to identify ways in which the California IOU ESA and CARE programs could expand participation and enrollment, reduce barriers and/or increase participating customer benefits.

Table 10 illustrates the study approach, with columns indicating the source (secondary data, primary research, analysis), and rows indicating the detailed results that are reported in

[20] California Statewide Residential Appliance Saturation Study, RASS Reporting Center, KEMA, Inc. http://websafe.kemainc.com/rass2009/

[21] Draft onsite data files provided by KEMA, Inc., to the CPUC on April 9, 2013.

[22] We chose 2002 as a cut-off period since that year is being used as a baseline from which to measure cumulative ESA participation and penetration towards the state's Strategic Plan goal.

Sections 4 and 5 of this report (which are summarized in Sections 3.2 and 3.3). The final column indicates the numbered study objectives that were listed above in Section 1.2. In the table, "LI" refers to "Low-Income" customers.

Table 10: Overview of Study Approach

Report Section:	Data Sources: Secondary data: CLASS	RASS	Census, ACS	IOU program data	IOU billing data	Athens	Primary research: In-home	LI program review	Program staff/ contractor INTVs	Phone survey	Analysis: CARE model	ESA models	Conjoint survey	Study Objectives
4 - LI Pop and Program Characterization														
4.1 - Eligible Population for CARE and ESA				X		X								1
4.2 - CARE and ESA Participation														
4.3 - LI Population Characteristics	X	X	X		X	X				X				
4.3.1 - Demographic Characteristics														
4.3.2 - Home and Equipment Characteristics														
4.4 - ESA Program Measures				X										
4.5 - Remaining ESA Program Energy Savings POTN						X								6
5 - LI Pop Needs and Program Assessment														
5.1 - Overview of Sources														
5.1.1 - Sample Representation														
5.2 - ESA Program Accessibility							X	X	X	X				2
5.2.1 - Overview of ESA Marketing and Outreach														
5.2.2 - Customer Telephone Survey														
5.2.3 - In-Home Visits														
5.3- CARE Program Accessibility									X	X	X			2
5.3.1 - Overview of CARE Program Marketing and Outreach														
5.3.2 - Program Staff Interviews														
5.3.3 - Contractor Interviews														

Report Section:	Data Sources													
	Secondary data						Primary research				Analysis			
	CLASS	RASS	Census, ACS	IOU program data	IOU billing data	Athens	In-home	LI program review	Program staff/ contractor INTVs	Phone survey	CARE model	ESA models	Conjoint survey	Study Objectives
5.3.4 - Customer Telephone Survey														
5.3.5 - In-Home Visits														
5.3.6 - CARE Modeling Results														
5.4 - ESA Participation Drivers and Barriers														
5.4.1 - Overview of Customer Enrollment and Assessment														
5.4.2 - Program Staff Interviews														
5.4.3 - Contractor Interviews														
5.4.4 - Customer Telephone Survey														
5.4.5 -ESA Modeling Results												X		4
5.4.6 - Conjoint Analysis Results														
5.4.7 - In-Home Visits														
5.4.8 - LI Program Review														
5.5 - Energy Needs and LI Program Benefits														
5.5.1 - Energy Insecurity							X							7
5.5.2 - Energy Burden					X									7
5.5.3 - Non-Energy Benefits							X		X	X				8
5.5.4 - Energy Efficiency Measures							X		X	X				5
5.5.5 - CARE Program Benefits										X				3

2.2 Literature Review

We reviewed relevant reports and program documents to inform our understanding of the ESA and CARE programs and our research approach. In particular, we focused on the following sources:

- **The latest ESA (formerly LIEE) program process evaluation** – 2009-2010 Low-Income Energy Efficiency (LIEE) Program Process Evaluation, conducted by Research Into Action for the IOUs and the CPUC, June 10, 2011.
- **The prior low-income needs assessment study** – Final Report on Phase 2 Low-Income Needs Assessment (LINA), prepared by KEMA, Inc., for the CPUC, September 7, 2007.
- **A recent low-income household segmentation research study –** Low-Income Energy Efficiency Household Segmentation Research, prepared by Hiner & Partners, Inc., for Southern California Edison Company and Pacific Gas and Electric Company, December 2011.
- **A recent low-income high usage needs assessment study –** Low-Income Energy Efficiency Household High Usage Needs Assessment, prepared by Hiner & Partners, Inc., for Southern California Edison Company, September 2011.
- **ESA and CARE IOU program monthly and annual reports and CPUC Decisions.**

2.3 Program Staff and Contractor In-Depth Interviews

Evergreen conducted interviews with ESA and CARE program staff and contractors to gain background information on ESA and CARE and obtain implementer perspectives on the study research questions.

Senior staff from Evergreen Economics conducted telephone interviews with each of the four IOU program staff for CARE and ESA in April 2013. Each interview lasted between one and two hours and included the program manager, relevant support staff and the LINA study team IOU representative. These interviews were conducted to provide background information on ESA and CARE and to obtain program staff perspectives on the study research questions.

Evergreen staff completed 17 total in-depth interviews with ESA outreach and assessment[23] and CARE outreach contractors in May and June of 2013, and Table 11 shows how the interviews were distributed by IOU and program. Each interview lasted between 30 minutes and one hour and they were typically conducted with program managers with broad knowledge of program operations, challenges and successes. In some cases, additional information was provided in brief follow-up emails.

[23] We did not interview any ESA installation or inspection contractors.

Table 11: LINA Contractor Interviews Completed

IOU	ESA Program Completions	CARE Program Completions
PG&E	3	1
SCE	3	3
SoCalGas	3	1
SDG&E	2	1
Total	11	6

2.4 Secondary Data Analyses

Evergreen assembled several existing data sources to leverage for the study analyses, from a variety of sources.

- **Athens Research estimates of 2013 ESA and CARE eligibility** – Athens Research provided estimates of the number of IOU customers that are eligible for CARE and ESA in 2013. Athens Research developed these estimates in early 2013 using data from the American Community Survey 2011, the Current Population Survey, and labor market information data from the Employment Development Department. Evergreen received these data from Athens Research on April 11, 2013. We used the Athens data as the primary data source for our CARE modeling task, to estimate the eligible low-income population for CARE and ESA, and for the low-income population characterization.
- **The California Residential Appliance Saturation Survey (RASS) –** The California Energy Commission and the IOUs sponsored a large-volume residential mail survey in 2009/2010 conducted by KEMA, Inc., that provides self-reported demographic, home and equipment information from a representative sample of residents in the California IOU service territories, including low-income residents. The data are available online and may be queried by IOU service territory, by Title 24 climate zone and by various demographic categories including income level and number of people in the home. We used the RASS data to support the ESA modeling effort and the low-income population characterization.
- **The California Lighting and Appliance Saturation Survey (CLASS)** – The CPUC and the IOUs sponsored a comprehensive on-site appliance saturation survey in 2013 that is currently being finalized by KEMA, Inc. The CPUC provided our team with the raw data files from this effort that included IOU service territory and various demographic categories including income level and number of people in the home, which allowed us to approximate whether each sampled home was eligible for CARE and ESA. We used the CLASS data to support the low-income population characterization.
- **US Census and American Community Survey Data (ACS)** – We utilized three data sources available from the US Census Bureau: the 2010 US Census, the 2011 ACS and the 2004 and 2011 ACS Public Use Microdata Sample (PUMS). We compiled demographic and housing characteristic data from the standard pre-tabulated data available for the 2011

ACS and 2010 US Census via the American Fact Finder portal. We used these data to supplement the Athens, RASS, and our study phone survey sample demographic data for the ESA and CARE modeling. The standard pre-tabulated data for the 2011 ACS and 2010 Census did not provide the granularity required for the low-income population characterization task. For this task, we made use of the 2004 and 2011 ACS/PUMS database. The PUMS database is a set of untabulated responses to the ACS about individual people or households from a subset of the total ACS respondents. The structure of the database allowed us to characterize the low-income population by IOU service territory,[24] urban or rural county, primary language and housing type.

- **IOUs' Customer Information System data** – We obtained billing data from each IOU including CARE status, energy usage and cost, and payment and arrearage history. We used these data for the energy burden analysis, for the CARE and ESA models and to characterize the energy usage for the low-income population characterization.
- **ESA program tracking data (2002-2012)** – We obtained historic ESA tracking data going back to 2002. For the period 2010-2012, we obtained measure detail, and for 2002-2010, only basic descriptive information about the homes that were treated. We used these data for the phone survey sample design and the ESA measure characterization.

2.5 Customer Telephone Survey

Tetra Tech conducted 1,028 phone surveys with IOU customers that are on the CARE rate, as a proxy for being income-qualified for both CARE and ESA. Due to the reportedly very high CARE penetration rate (91%, based on the IOU ESA and CARE Programs 2012 Annual Reports), we did not attempt to conduct surveys with CARE non-participants.

We stratified the CARE population based on whether their home had been treated by the ESA program since 2002, with 300 sample points allocated to "Recent ESA Participants (2010-2012)", 315 to "Prior ESA Participants (2002-2009)" and the remaining 385 sample points to "ESA Non-Participants".

Table 12 shows the telephone survey sample allocation. We used the IOU billing and ESA tracking data to develop the telephone survey sample frame. We also stratified by awareness of the ESA program, based on the phone survey screening questions, to ensure a balanced sample. Finally, we stratified by IOU service territory, allocating 375 to PG&E and SCE, 200 to SDG&E and 50 to SoCalGas-only customers. We expected to achieve a much greater number of SoCalGas completes since the majority of SCE customers also have SoCalGas service.

[24] ACS/PUMS geographically identifies households by assigning them to one of 233 Public Use Microdata Areas (PUMAs) in the state of California. We assign ACS/PUMS households to IOU service territory at the Public Use Microdata Area level using information provided in the Athens Research eligibility estimate data.

Table 12: LINA Telephone Survey - Sample Allocation

IOU	Aware of ESA	Recent ESA Participants	Prior ESA Participants	Non-participants	Total
PG&E	Yes	75	75	85	375
	No	35	35	70	
SCE	Yes	75	75	85	375
	No	35	35	70	
SoCalGas only	Yes	10	10	10	50
	No	5	5	10	
SDG&E	Yes	40	40	40	200
	No	20	20	40	
Total		295	295	410	1000

Tetra Tech conducted the surveys in both English and Spanish during the months of July and August, 2013. 93 percent of California's low-income population speaks either English or Spanish, based on our analysis of 2011 ACS/PUMS data (reported below in Section 3.2 and also in more detail in Volume 2 – Section 4.3.1.). Table 13 shows the final disposition of telephone survey completes (1,028 surveys). Awareness of the ESA program was a lot higher than expected, so we increased the quota for "aware of ESA" for all categories.

Table 13: LINA Telephone Survey - Completes

IOU	Aware of ESA	Recent ESA Participants	Prior ESA Participants	Non-participants	Total	Total – SoCalGas Customers
PG&E	Yes	80	78	113	271	0
	No	32	38	48	118	0
SCE	Yes	87	88	91	266	264
	No	25	28	65	118	116
SoCalGas only	Yes	7	12	11	30	30
	No	8	5	9	22	22
SDG&E	Yes	46	42	51	139	0
	No	16	18	30	64	0
Total		301	309	418	1,028	432

2.6 CARE and ESA Modeling

2.6.1 CARE Modeling

We developed and estimated statistical regression models to examine two aspects of the CARE program. The participation (first) model is based on the ratio of CARE customers to total customers in a given census block group. The penetration (second) model is based on the ratio of CARE customers to CARE-eligible customers in a given census block group. The observations are Census block groups (rather than customers). The models are looking at variations in participation and penetration ratios across census block groups, and what variables (that we may observe at the Census block group level) might predict higher or lower rates, all else constant.

- **CARE Participation:** The CARE *Participation* model examines the relationship between the rate of CARE participation at the Census block group level and the demographic and economic characteristics of that block group. We define CARE Participation as the ratio of the number of households on the CARE rate to the total number of households in the block group.

- **CARE Penetration:** The CARE *Penetration* model examines the relationship between the tendency of CARE-eligible households to participate in CARE, also at the block group level. We define CARE Penetration as the ratio of the number of households on the CARE rate to the total number of CARE-eligible households in the block group.

We estimated the regression models using block-group level data provided by the IOUs and produced by Athens Research, as well as data obtained from the U.S. Census Bureau.[25]

Table 14 describes the types of variables we considered for their explanatory contribution in the CARE participation and CARE penetration models, respectively. The final set of explanatory variables included in the regression models are a subset of these variables and were included in the models based on their incremental relationship to the respective dependent variable. Many pairs of variables within the Athens and Census data sets are highly correlated—i.e., have a strong positive or negative linear relationship. Because of this, they have the same or very similar relationship with the dependent variable, which can lead to problems in the estimation of the econometric model.[26] For example, the percent of households with income below 100 percent of the Federal Poverty Level (FPL) is highly correlated with the percent of households below 150 percent of the FPL. Including both of these variables in the regression model would not only be unnecessary, but would likely result in large variances on the coefficient estimates of the collinear variables because the variables provide essentially the same information for predicting the dependent variable (proportion of households on a CARE rate).

[25] A block group is a geographical designation used by the U.S. Census Bureau that consists of a cluster of census blocks having the same first digit of their four-digit identifying numbers within a census tract. Block groups generally contain between 600 and 3,000 people, with an optimum size of 1,500 people. Block groups never cross the boundaries of states, counties, or statistically equivalent entities, except for a block groups delineated by American Indian tribal authorities, and then only when tabulated within the American Indian hierarchy. Block groups never cross the boundaries of census tracts. Source: http://www.census.gov/geo/www/geo_defn.html [May 29, 2012]

[26] The estimation problem, multicollinearity (or simply collinearity), is a condition occurring when two or more independent variables in the same regression model contain high levels of the same information and, consequently, are strongly correlated with one another. When significant collinearity is present, the coefficients of the independent variables in the regression model can be unstable, and even the signs of these coefficients may change when different variables are included, making it difficult to interpret the regression coefficients. In addition, standard errors may be inflated, resulting in insignificant t-statistics and incorrect conclusions regarding the statistical significance of the coefficients.

Table 14: Potential Explanatory Variables for the CARE Penetration Model, Census Block Group

Variable	Source	Description
Income distribution variables	Census/Athens	Summary and descriptive household income statistics (e.g. % of household at or below 100% of poverty)
Population Density and Rural/Urban designations	Census/Athens	Population per square mile; Athens data includes various rural statistics
Household Member Demographics	Census/Athens	Such as persons per home, race/ethnicity, seniors, children and disabled member information, primary languages
Participation in non-energy low-income assistance programs	Census/Athens	Public assistance income, SSI income, food stamp recipients, etc.
Housing stock and related economic data	CIS, Census/ Athens, housing authority	Home type, home size, home vintage, housing starts, vacancy rates, own versus rent, rental rates ($s)/home prices and recent trends, housing starts
Energy use data: gas and electric	CIS/billing	Average usage, usage per square foot, per household member, metrics of seasonal burden/variance (relationship to HDD/CDD)
IOU service territory (elec/gas) and IOU CARE marketing data	CIS	Available data regarding mass market or geographically focused CARE marketing over last three years
IOU Rate and billing information	CIS/billing	Percent of customers on FERA, Medical Baseline. Statistics reflecting rates of billing arrearages and service interruptions
Population eligible for CARE - number and percent of household	Athens	As documented in Athens research

The model results are presented in Section 5.3.6 and details on CARE model specification are provided in Section 12.2.

2.6.2 ESA Modeling

We developed statistical models that will assist the IOUs in better understanding the factors that affect participation in the ESA program. Our modeling approach included individual "Stage 1" models based on large samples of CARE participants for each of the four IOUs and a single "Stage 2" model, which included information on only those 1,028 CARE participants that responded to the phone survey.

For the Stage 1 models, we used logistic regression to develop models that predict the likelihood that a customer on CARE has either participated in the ESA program or lives in a home that was treated through the ESA program. Logistic regression is used when the dependent variable is binary (i.e., is equal to either 0 or 1). It is a non-linear, S-shaped distribution, which constrains the estimated probabilities to lie within the interval zero to one and is by far the most popular method for estimating statistical models when the dependent variable is binary. The dependent variable in each of the four Stage 1 models is equal to "1" for any customer living in a premise that was treated through the ESA program—regardless of whether the current customer is responsible for participation or the premise was treated prior to the current customer living in the home. The dependent variable is equal to "0" if the home has not been treated through the ESA program. Because most customers who are eligible for ESA are also on a CARE rate,[27] the samples of data used for each of the four Stage 1 models include only CARE customers.

We also used logistic regression to estimate the Stage 2 model. The dependent variable was the same as for the Stage 1 models; however, the Stage 2 model differs in that it is based largely (but not entirely) on information provided by respondents to the phone survey. The objective of the Stage 2 model was to explain ESA participation based on attitudinal and behavioral characteristics of customer otherwise unknown to the IOUs.

Table 15 and Table 16 describe the types of variables we considered as explanatory variables in the Stage 1 and Stage 2 ESA participation models. The final set of explanatory variables included in the regression models are a subset of these variables and were included in the models based on their ability to predict the dependent variable (i.e., that a residential premise was treated through the ESA program). Many pairs of variables within the data set are highly correlated—i.e., have a strong positive or negative linear relationship. Because of this, they have the same or very similar relationship with the dependent variable, which can lead to problems in the estimation of the econometric model.[28] Including two (or more) highly correlated explanatory variables in the regression model would not only be unnecessary, but would likely result in large variances on the coefficient estimates of the collinear variables

[27] It is possible, though not likely, that some ESA participants can decline to be on CARE.
[28] Ibid.

because the variables provide essentially the same information for predicting the dependent variable (likelihood that a residence participated in the ESA program).

Table 15: Potential Explanatory Variables for Stage 1 ESA Participation Models

Variable	Source	Level	Description
Location and climate	Census/Athens	Census Block Group	Population per square mile; rural/urban distinctions and climate zone
Household demographic & income, Workforce	Census/ Athens	Census Block Group	Such as persons per home, race/ethnicity, seniors, children and disabled member information, primary languages; median household income; employment statistics
Participation in non-energy low income assistance programs	Athens, Census	Census Block Group	Public assistance income, SSI income, food stamp recipients, etc.
Housing stock and related economic data	CIS, Census, Athens, housing authority	Customer and Census Block Group	Distributions of home type, home size, home vintage, own versus rent,
Energy Usage and IOU territory	CIS/billing	Customer	Monthly kWh and therm consumption, Serviced by kWh/Gas IOU
IOU tariff/rate and payment information	CIS/billing	Customer	FERA, Medical Baseline. Arrearages and service interruptions
ESA Participation	ESA data	Customer	If and when home was –treated through ESA
CARE enrollment characteristics	CARE data	Customer	Household is currently enrolled in CARE; timing of current enrollment; enrollment type (categorical versus income)

Table 16: Potential Explanatory Variables for Stage 2 ESA Participation Model

Variable	Source	Level	Description
IOU service territory	CIS	HH	Electric and Gas utility
Income	Survey	HH	Annual household income, dollar value or range. May be adjusted for local cost of living.
Documentation barriers	Survey	HH	Need for and access to income eligibility documentation (cash wages, no income); is right name on bill; renter/ landlord MM documentation requirements
Scheduling barriers	Survey	HH	Time and flexibility to be home during weekdays/for ESA appointments.
Cultural attributes	Survey	HH	Language isolation and English literacy, trust in IOU/gov't programs, perceptions of LI assistance. Affiliation/membership/participation with CBOs/events
Energy efficiency motivation	Survey	HH	Awareness and knowledge of energy efficiency measures and practices; EE behaviors and recent actions (e.g. turn off lights/TV, buy CFLs, Energy Star appliances); control over energy bill
Household demographics	Survey	HH	Detailed household demographics (persons/home, ages, race/ethnicity, disability, languages), length of time in home
Selected home characteristics	Survey	HH	Home type, vintage, size, pool/spa
Selected home inventories	Survey	HH	CFLs, number of televisions, internet, home computer, air conditioning, heating type/fuel source, age of refrigerator.
Home-related health	Survey	HH	Perceptions and concerns regarding condition of home and operations of

and safety concerns			equipment. E.g.- heating/cooling, window/doors
Energy consumption/ patterns	CIS/billing	HH	kWh and therm consumption, usage per square foot, per HH member, metrics of seasonal energy burden
Energy Burden	Survey/billing	HH	Energy bills as a percent of income, self-reported

2.7 Conjoint Analysis

The primary goal of the conjoint analysis was to collect information on customer preferences for participating in the ESA program. This information identifies participation drivers and barriers and determines the relative importance of several factors that affect willingness to participate.

The conjoint analysis results may also be used to calculate the probability that a customer is willing to participate in the ESA program, and then see how this probability varies with changes in program characteristics. Note that since this probability is estimated using stated preference data on a limited number of factors influencing the participation decision, it has limited value for estimating potential market share. Nevertheless, the nature of conjoint analysis that focuses on tradeoffs made across program attributes makes it a useful tool for gauging the relative importance of various program characteristics.

We developed an online conjoint analysis survey, where respondents were asked to rank various ESA program options. Tetra Tech recruited respondents for the conjoint analysis from the phone survey, offering a $10 gift card for completing the online survey. Phone survey respondents who indicated they were willing to take the conjoint survey provided Tetra Tech with their email addresses, and Evergreen sent them a separate email directing them to the conjoint website including a unique web link. The Energy Center of Wisconsin (ECW) also conducted a small number of conjoint surveys in conjunction with the in-home visits, which are described below. A total of 53 responses were used in the conjoint analysis.

2.8 In-Home Visits

The Energy Center of Wisconsin (ECW) conducted 88 in-home interviews and site visits with ESA non-participants who are enrolled in CARE (and thus likely income-eligible for ESA[29])

[29] Note that to be enrolled in CARE, customers must self-certify their income. A sample of enrolled customers are required to verify their income. To participate in ESA, most customers must show documentation to prove their income. Thus, there may be some households in our sample that may not actually qualify for ESA due to lack of documentation or their income is too high. We relied on self-reported income and number of household members to confirm ESA eligibility from the phone survey for screening in-home visit participants.

July – September 2013. All of the completed visits were with customers who had also completed a telephone survey. The primary purpose of these interviews and site visits was to better understand ESA non-participants who are likely income-eligible to provide insights about the ways they can best be reached and served by the ESA and CARE programs. The in-home visits also afforded an opportunity for a simple walk-through assessment of energy-saving opportunities in the home.

Interview participants were offered a $100 incentive for participating in the 1.5 to 2-hour interview and home walk-through. Our sample frame comprised income-qualified households (i.e., enrolled in CARE) that had not participated in ESA from 2002 through 2012, the ESA participation period we studied.[30] Within this population, we developed a sampling approach to achieve the following objectives:

1. Distribute in-home visits among the service areas of the California IOUs
2. Achieve scheduling efficiencies (i.e., leveraging the phone survey respondents)
3. Achieve travel efficiencies (i.e., cluster in-home visits within geographic boundaries)
4. Conduct interviews in Spanish to willing households that prefer to communicate in Spanish
5. Include a broad range of income-qualified ESA non-participants (i.e., use Census data to inform the selection of geo-demographic clusters to select the sample frame)

Statewide, we targeted about 60 homeowners residing in single-family homes, 15 renters residing in single-family homes and 25 renters residing in multi-family households. We gave preference to moderate and high-energy users, seeking to avoid those with the lowest comparative energy consumption (33th percentile and lower), as they have less opportunity to save through efficiency measures and face a relatively lower energy burden. We targeted between 15-18 Spanish language interviews, though we conducted a higher number of interviews in homes that use Spanish (but speak some English). Spanish interviews were conducted across the clusters (defined below) where there are higher concentrations of Spanish-only homes.

Within the IOU-specific quotas, we identified geo-demographic clusters that, based on Census and IOU data, contain higher densities of low-income residents, represent a variety of geo-demographic characteristics (e.g., inland versus coastal, urban higher density versus suburban or rural) and allow for reasonably efficient travel between interviews. However, we expanded those clusters greatly during recruiting when it became apparent that we would not be able to fill our quotas with tight geographic clusters.

[30] Nevertheless, we encountered 16 households that appeared to have gotten ESA treatments at their present home (or participated in a program that the households said matched our description of ESA), mostly in the months immediately prior to our visit.

We completed 88 in-home visits across the IOU service areas as described in Table 17 below. These in-home visits were conducted by three trained ECW interviewers between August 13 and September 27, 2013.

Table 17: Targeted and Completed In-Home Visits by IOU

IOU	Target Completions	Completed Visits	Targeted Geographic Clusters
PG&E w/out SCE	22-33	28	Bay Area, northern Central Valley, Fresno
PG&E w/ SCE		1*	
SCE with SoCalGas	22-33	30	Los Angeles County, western Riverside County
SCE w/out SoCalGas		6	
SoCalGas-only	(no target set)	7	Los Angeles (city & county), western Riverside County
SoCalGas - total	22-33	37*	
SDG&E	11-22	17	San Diego, Chula Vista
Statewide	100	88	

* Not counted in total because these sites also appears in SCE and/or SoCalGas-only tally

Recruitment challenges, participant cancellations, and no-shows left us with 88 completions by the end of September. To facilitate timely reporting, the team chose to end fieldwork and shift to analysis and reporting at that time.

Figure 1 illustrates the geographic distribution of the in-home visits by housing type and language in which the interview was conducted. In all, we completed visits to 49 single-family homes, 36 multi-family homes and 3 mobile homes. 36 of the single-family homes were owner-occupied; 13 were rented. 72 of our visits were conducted in English, and 16 were completed in Spanish. Table 18 shows housing types by language in which the interview was conducted.

Figure 1: Distribution of In-Home Visits by Housing Type and Language

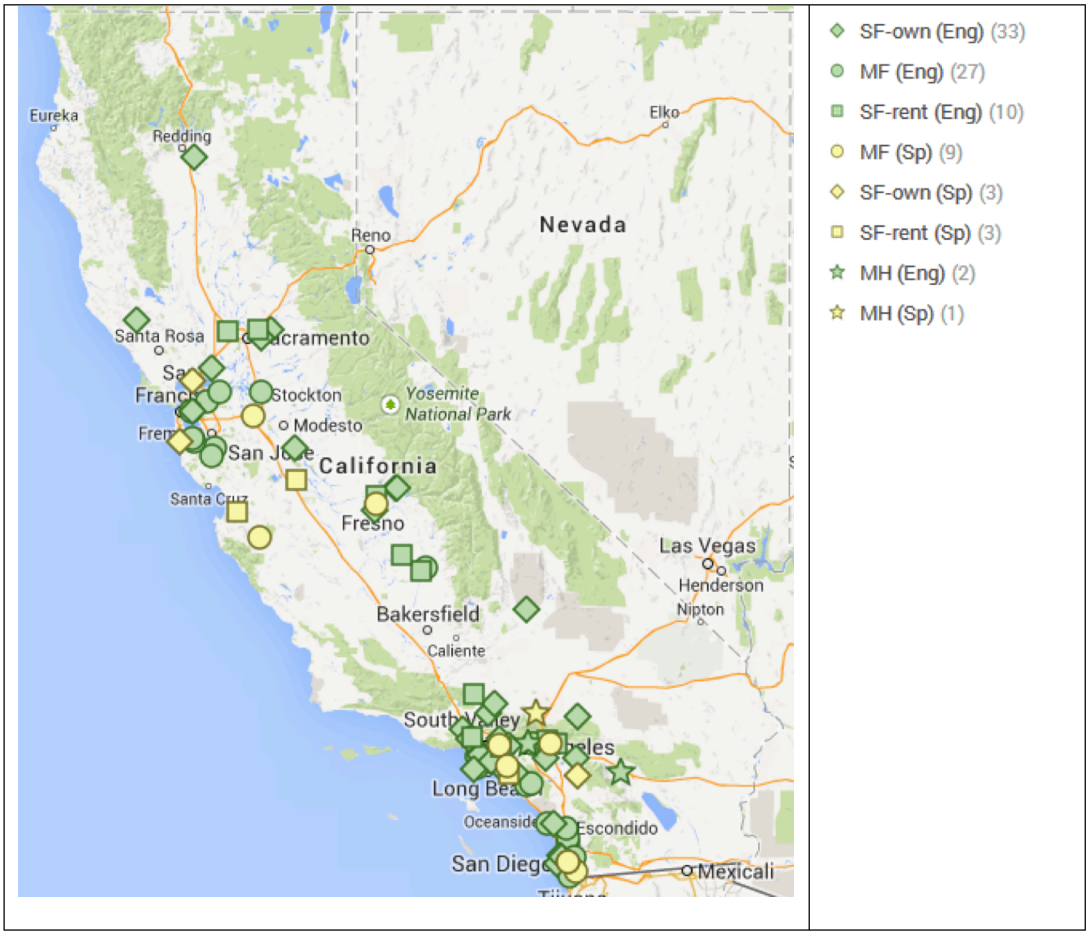


Table 18: In-Home Visits: Housing Types and Language

Home Type	Ownership	Language	Total
Single family	Owner-occupied	English	33
		Spanish	3
	Rented	English	10
		Spanish	3
Multi-family		English	27
		Spanish	9
Mobile home		English	2
		Spanish	1
Total		English	72
		Spanish	16
		All	88

2.9 Low-Income Program Review

The Energy Center of Wisconsin (ECW) conducted a low-income program review based primarily on secondary research and program staff interviews about selected parameters of low-income programs that are considered to be well-designed and effective at obtaining broad participation and reducing energy burden for low-income customers through efficiency interventions. The main purpose of the program review was to provide context and perspectives for interpreting results from this study and for framing recommendations. Emphasis of the program review was on programs that perform efficiency interventions (i.e.,

that are similar to the ESA program) rather than those that only reduce bills or help to offset them through cash transfers (i.e., the CARE program).

We focused primarily on customer eligibility and enrollment issues and program offerings (such as measures) with a secondary focus on outreach/marketing, program delivery and performance. We also attempted to identify best practices based on the success of these programs. We developed a matrix of program characteristics along one dimension and example programs along another. The program characteristics we tracked are:

- Primary Priority:
    - Program eligibility criteria;
    - Participant enrollment process and requirements, including eligibility verification;
    - How eligible measures are/were selected for inclusion in the program (i.e., measure inclusion at the program level); and
    - How measures are selected for individual homes (i.e., measure selection at the participant level).

- Secondary Priority:
    - Program outreach and marketing;
    - Other programs that exist alongside (for context);
    - Coordination with other programs (if at all);
    - How delivery models are used; and
    - Where their main energy savings or other impacts come from (measures or types of homes, etc.).

Our process for conducting the program review comprises three steps:

- Identifying exemplary programs;
- Reviewing publicly available documentation that describes the programs; and
- Interviewing program staff to fill in information not available from public documents.

We identified exemplary programs based on (1) our knowledge of low-income energy efficiency programs from ECW's work on the national Weatherization Assistance Program evaluation, (2) nominations from our partners and contacts who conduct many of the state- and utility-specific low-income evaluations, and (3) recommendations from program staff we interview. We developed an initial list of 5-10 programs that provide efficiency interventions in the homes of low-income households.

For the selected programs, a member of our research staff identified publicly available documentation to begin to populate the matrix described above. Mostly, this step was an online search of program documentation posted by the program itself or its funders.

Thereafter, the research staff person called the program director or other applicable program staff to conduct a telephone interview that provided any information in the matrix not sufficiently explained in program materials. We leveraged the relationships we already had with all state weatherization programs and many local agencies throughout the country as an entry point or to obtain a referral to the appropriate contact to interview. The interview was conversational in nature (i.e., not scripted) and focused on understanding the program's characteristics and approaches to the issues of interest. In these interviews, the researcher also inquired about the program representative's perceptions about the key drivers of the program's success. In some cases we collected additional documents available from our program contact. The research staff person completed the matrix based on the information provided by program staff. In total, we contacted seven program staff, obtaining information for a total of six programs.

3 Summary of Findings, Conclusions and Recommendations

This section presents a summary of the study findings, conclusions and recommendations. The discussion is organized around 21 sets of research questions that were identified in the study research plan as the focus on this study. For more detailed study findings, please see Volume 2 of this report.

3.1 Overview of Sources

We used a variety of sources to develop the study findings, described below along with important caveats to consider when reviewing the findings.

- **2004 and 2011 ACS/PUMS data** that provide demographic characteristics based on a large sample of the state's general and low-income population.
- **2013 CLASS data** that provide household and energy-using equipment characteristics of the state's general and low-income population based on a sample of on-site surveys conducted by KEMA, Inc.
- **1,028 telephone surveys of CARE customers**[31] including ESA participants (from 2002–2012) and ESA non-participants. We conducted both English and Spanish language surveys, representing 93 percent of the state's low-income population (the remaining 7 percent do not speak English or Spanish). The sample is biased, where respondents represent English and Spanish-speaking customers who are willing to talk with a surveyor on the phone about energy issues. The CARE and ESA modeling (Stage 1), described below, are based on the low-income population and are used in conjunction with the telephone survey results to address the study objectives.
- A nested sample of **88 in-home visits** within the ESA non-participant telephone survey sample, providing a fuller picture of ESA non-participants' characteristics and energy needs. These findings are qualitative due to the small sample size, and have similar bias issues as the telephone survey.
- **A review of several low-income programs** similar to ESA offered in other states, providing insights from other similar programs; and
- **Modeling and analysis** of IOU, Athens Research and Census data, informing CARE program participation and penetration, ESA participation and ESA willingness to participate.
    - **CARE modeling**: We developed statistical regression models to understand the drivers of and barriers to CARE program participation based on Athens Research data. The models examine variations in participation and penetration ratios across census block groups, and what variables (that we may observe at the Census block group level) might predict higher or lower rates, all else constant.

[31] Due to the CARE program's high penetration rate (see Section 2.1.1) and the consistent income and household size eligibility criteria for CARE and ESA (see Section 2.1), CARE customers are a proxy for customers who are income-eligible for both CARE and ESA.

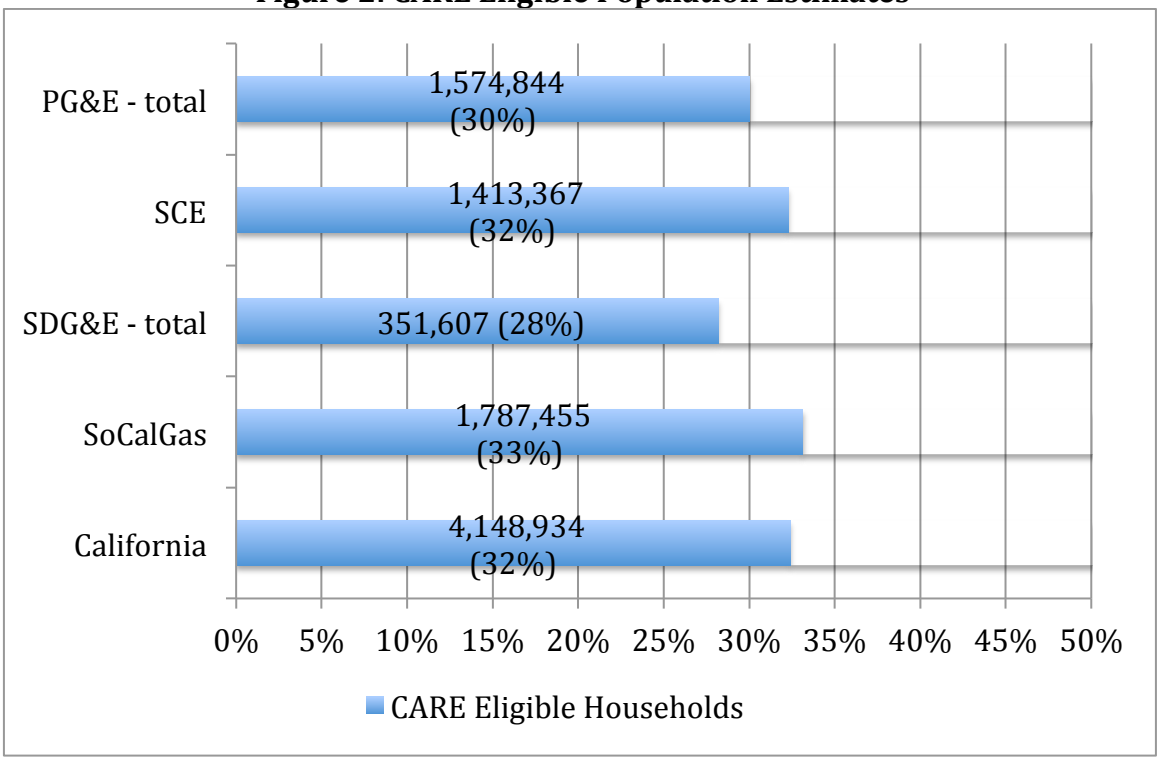
- **ESA modeling**: Similar to the CARE modeling, we developed regression models to understand drivers of and barriers to ESA program participation. We used customer level data from the IOUs (Stage 1) supplemented with telephone survey data (Stage 2).
- **Conjoint analysis:** We used a stated preference survey technique that involves having respondents sort through and rank options that reflect different choices. For this analysis, participants responded to an online/onsite survey where they were first asked to rank choices that reflected different types of ESA program scenarios. For all these scenarios, each choice was defined by several attributes, and respondents were asked to rank the options from most to least preferred based on these attributes, and then to indicate which scenarios they would actually participate in.

3.2 Overview of Low-Income Population Characteristics

This subsection provides a summary of the demographic characterization that is presented in Volume 2 – Section 4.3.1.

Figure 2 below shows the number and percent of households in each IOU service territory, and for the state, that are estimated as eligible for CARE based on Athens Research analysis. Statewide, 32 percent (4.1 million households) are technically and income-eligible for the CARE program.

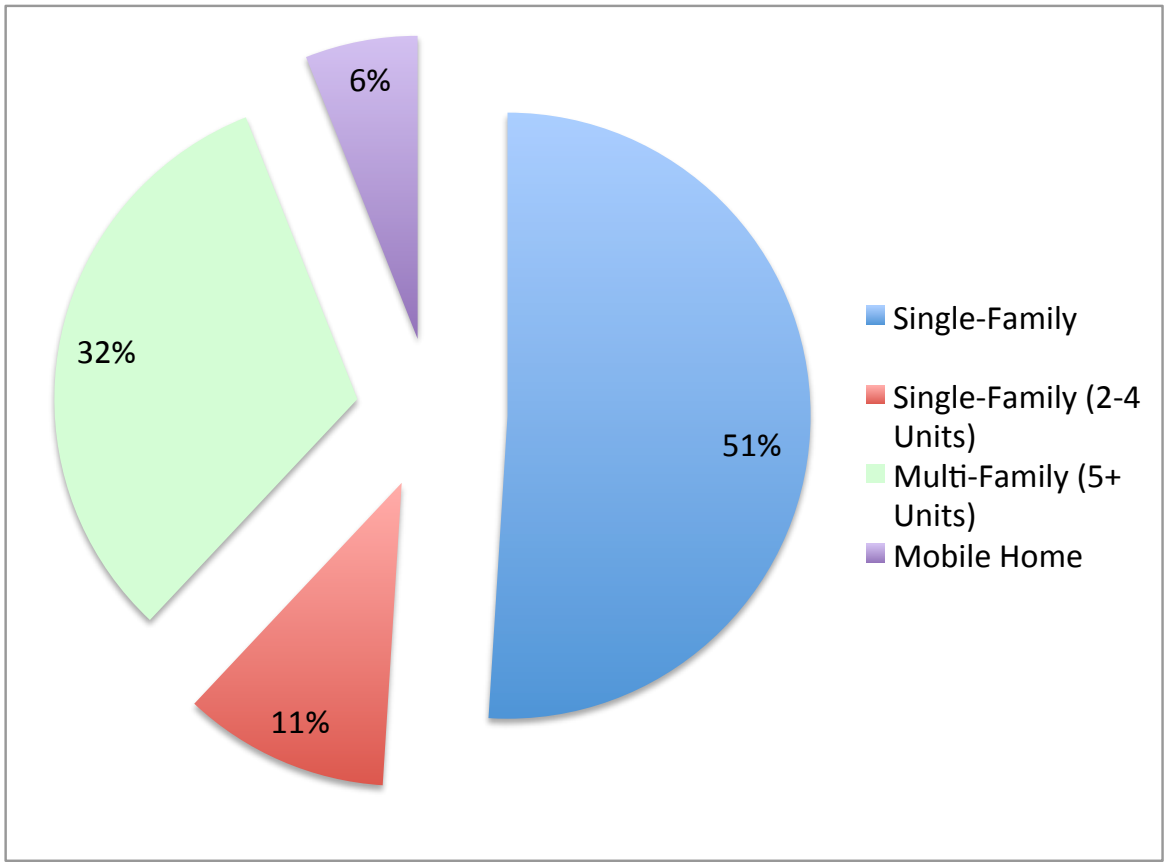
Figure 2: CARE Eligible Population Estimates



Source: 2012 data developed by John Peterson of Athens Research under subcontract to the IOUs.

As shown in Figure 3 below, 32 percent of the low-income market resides in multi-family dwellings (as defined by the ESA program as having 5 or more units.) 62 percent reside in single-family dwellings (11% in 2-4 unit buildings and 51% in single-unit structures.) The remainder (6%) live in mobile homes.

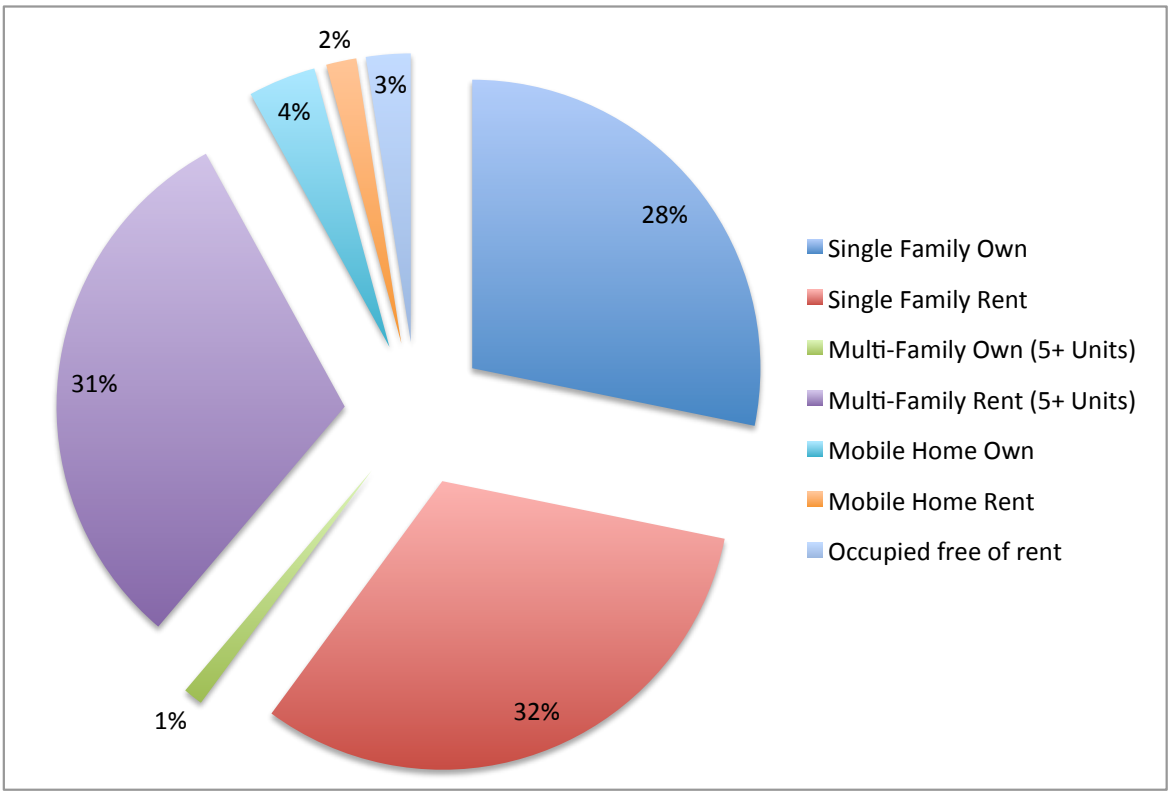
Figure 3: Home Type for California Low-Income Population



Source: 2011 PUMS.

64 percent of low-income households rent their homes, compared to 55 percent of the general population. The renter market is about evenly split between multi-family (5 units or more) and single-family dwellings (including homes in 2-4 unit buildings), as shown in Figure 4 below. Single-family renter homes comprise the largest segment of the low-income market (at 32%), followed closely by multi-family rented homes (at 31%) and single-family owned homes (at 28%).

Figure 4: Home Ownership by Type for California Low-Income Population

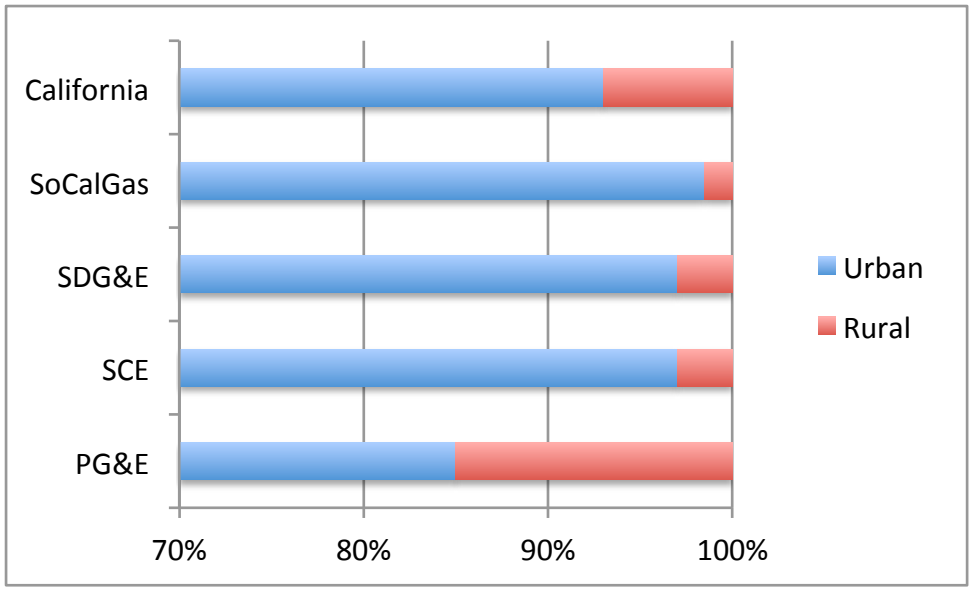


Source: 2011 PUMS.

As shown in Figure 5 below, 93 percent of the state's low-income households reside in counties that are classified as urban, and 7 percent are in rural counties.[32] This varies by IOU service territory, with PG&E having a higher percentage of low-income homes located in counties designated as rural (15%).

[32] If a home was in a county that was in a metropolitan area with population of 250,000 or greater, as identified by the 2013 USDA Rural Urban Continuum Code, the home was considered to be in an urban area. Otherwise it was considered rural. We defined rural based on county since that was the lowest geographic area available in the ACS/PUMS that could be associated with a rural or urban designation. This approach may lead to an under statement of rural residents.

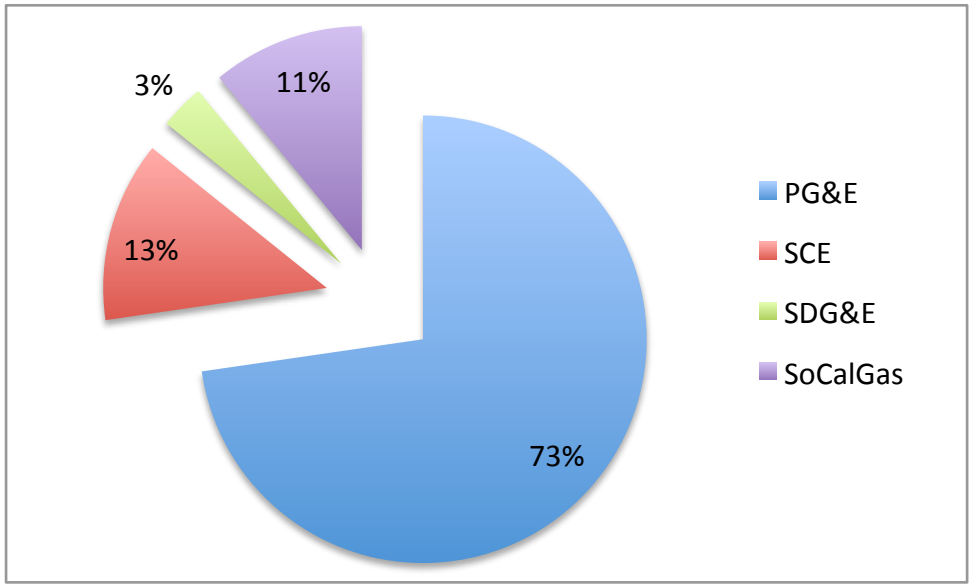
Figure 5: Urban Versus Rural for California Low-Income Population



Source: 2011 PUMS.

Figure 6 below shows how the rural[33] low-income population is distributed by IOU service territory, with 73 percent located within PG&E's service territory.

Figure 6: Distribution of Rural Low-Income Population By IOU Service Territory

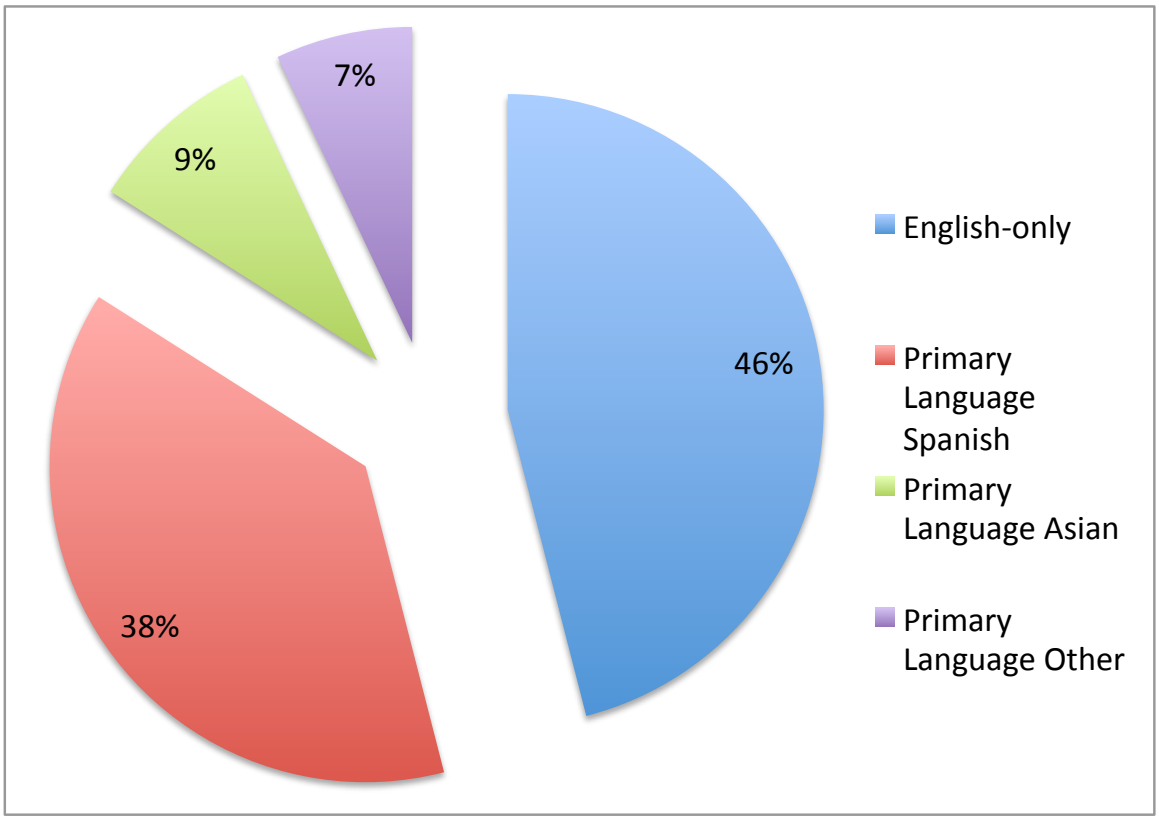


Source: 2011 PUMS.

[33] Ibid.

The majority of low-income households speak a language other than English, with 46 percent only speaking English. As shown in Figure 7 below, 38 percent use Spanish as the primary language, followed by 9 percent that use an Asian language primarily.[34] A complementary finding that we report on in Volume 2 – Section 4.3.1 is linguistic isolation, which is defined a household in which no one in the household aged 14 and over speaks English only or English very well. 20 percent of low-income households are linguistically isolated, as compared to 10 percent of the general population.

Figure 7: Languages Spoken in Household for California Low-Income Population

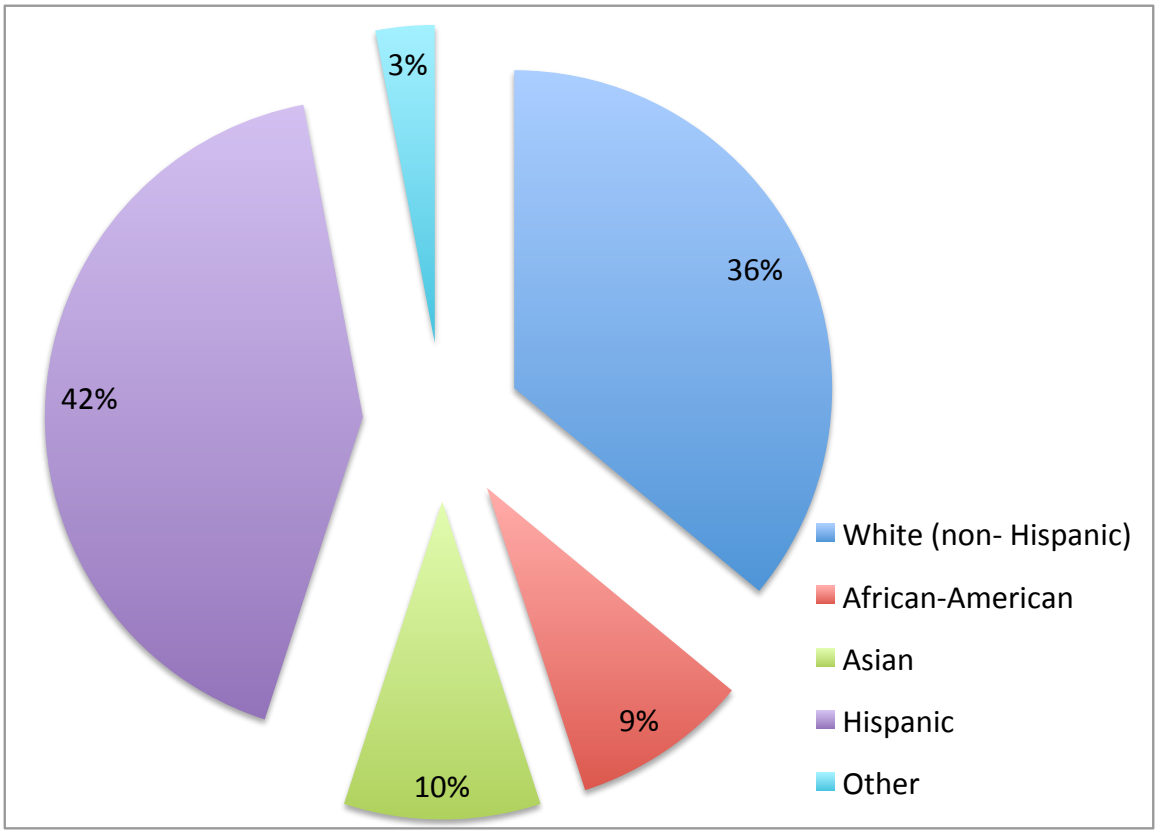


Source: 2011 PUMS.

There is no majority race among California low-income households as shown in Figure 8 below. 42 percent of heads of households reporting Hispanic ethnicity, followed by 36 percent white and 10 percent Asian.

[34] The ACS asks respondents if they speak a language other than English, and if so, what language (allowing only one).

Figure 8: Ethnicity of Head of Household for California Low-Income Population

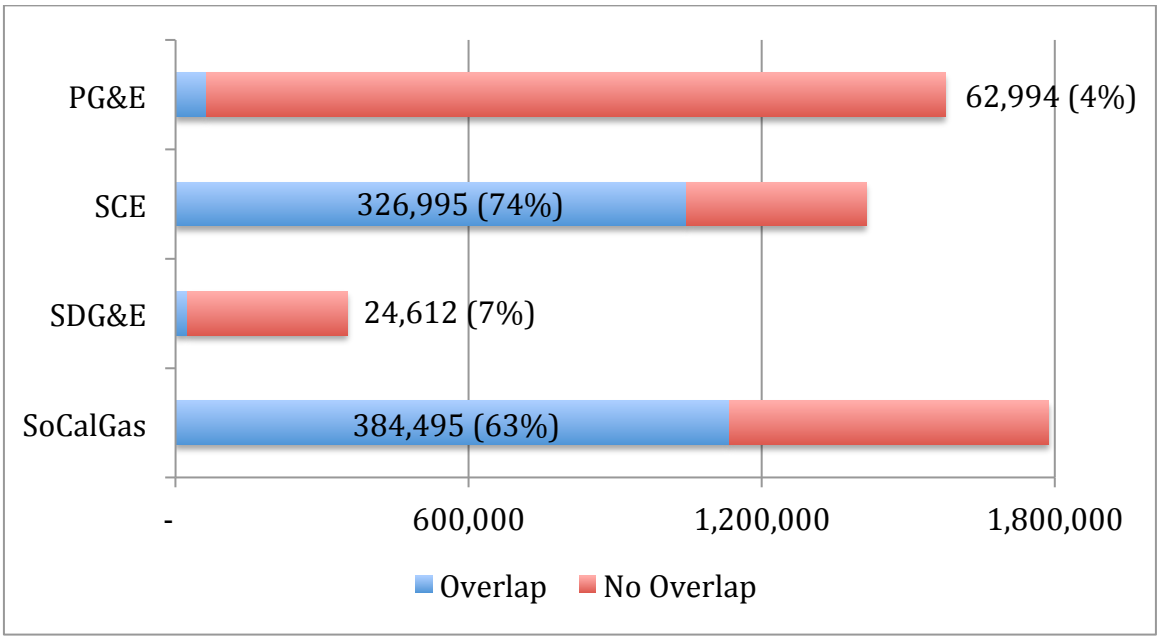


Source: 2011 PUMS.

Figure 9 shows the number and percent of the CARE eligible population for PG&E, SCE and SDG&E that overlaps with SoCalGas; and for SoCalGas, the number and percent that overlaps with the other three IOUs. (The overlap between PG&E, SCE and SDG&E is relatively miniscule[35]). 4 percent of PG&E's, 74 percent of SCE's and 7 percent of SDG&E's CARE-eligible population has gas service with SoCalGas. 78 percent of SoCalGas's CARE-eligible population has electric service with another IOU, predominantly SCE.

[35] Based on our analysis of utility service territories by census block group, the overlap between SCE and PG&E is 1 percent and the overlap between SDG&E and SCE is less than 0.5 percent. There is no overlap between PG&E and SDG&E.

Figure 9: Overlap of IOU Service Territories for CARE Eligible Population



Sources: Athens Research data (for CARE eligible population) and KEMA Inc. RASS data (for percent of households that overlap with SoCalGas service territory)

3.3 Program Accessibility and Barriers to Participation

This subsection summarizes findings and presents conclusions and recommendations related to ESA and CARE program access and barriers. The next and final subsection addresses energy needs.

3.3.1 Program Penetration Findings

This section answers the research questions:

1. *What is the current program penetration rate? How many eligible customers have not yet been served?*

The detailed results are found in Volume 2 – Sections 4.1 and 4.2.

Based on 2012 Athens Research data, 32 percent of California IOU households are technically and income-eligible for CARE and ESA. 95 percent of eligible IOU households were enrolled in CARE as of the end of 2012[36], leaving 5 percent or 207,000 California IOU households not enrolled.

[36] Note that as the IOUs increase post-enrollment verification, the penetration rate is going down as more households are removed from the program.

59 percent of 2012 eligible California IOU households have been treated by ESA during the period of 2002-2012,[37] leaving 41 percent or 1.7 million untreated California IOU households.[38]

3.3.2 Program Outreach Findings

This section answers the research questions:

2. *How do most customers get reached by the programs? What methods are the most effective? How does that differ by customer segment?*

The detailed results are found in Volume 2 – Section 5.2.

3.3.2.1 Program Awareness

Prompted ESA awareness has increased significantly over time based on our phone survey; 68 percent of low-income households are aware of the ESA program and the services it provides (based on a prompted question that included a general program description)—up from 27 percent in 2007, based on the prior LINA study. There is higher awareness of the ESA program and its services among low-income households where English is the primary language based on our telephone survey (73% versus 57% among low-income households where English is not the primary language). However this study's modeling results, discussed below in Section 3.3.3.4, indicate that this does not translate to higher participation.

There is low awareness of the specific brand "Energy Savings Assistance" based on our phone and in-home surveys, which is not surprising given that it is a fairly new name. However, there is much higher awareness of the services offered by the program. Based on the in-home results, ESA non-participants who are not located within low-income communities and lack social contacts are much less likely to know about ESA program services. This finding is consistent with related findings that will be discussed below in Section 3.3.3.1, that rural households[39] are less likely to enroll in CARE based on the CARE penetration model and participate in ESA (with the exception of PG&E) based on the ESA population model.

We could not assess CARE awareness among the low-income population since the sample frame of the telephone survey was based on CARE enrollees. However, we did find that 77 percent of those on the CARE rate are aware of it, with households whose primary language is English having slightly higher awareness of the rate (84% v. 65% among low-income

[37] This estimate includes about 20,000 customers that SCE reported as treated in 2012 that were only enrolled and not treated (since they failed the 3 measure minimum rule). They reported that 68,859 were enrolled and 49,026 were treated.

[38] Note that the 2020 goal for ESA removes homes that have been treated by the Department for Community Services and Development and estimated unwilling homes (which was 5% based on the prior KEMA LINA study.)

[39] The definition of urban and rural is based on county, since that is the geographic information provided for the PUMS data. If a home was in a county that was in a metropolitan area with population of 250,000 or greater, the home was considered to be in an urban area. Otherwise it was considered rural.

households where English is the primary language). Some households have been on the rate for some time, and may not recall that they are still on it, or someone else in the household is enrolled.

3.3.2.2 Program Outreach

Most ESA participants learn about the program from either friends/family/colleagues or from IOU outreach methods, based on our telephone survey. Non-participants who recently became income-eligible for the programs due to a life event were most likely to learn about the program from a social worker or other professional who referred them to support programs, based on our qualitative in-home results.

Low-income households learn about the CARE program based on the same methods as mentioned above for ESA, but with IOU bill inserts being more common than learning about the program from friends/family/colleagues.

Program staff say that with such high CARE penetration rates, it is difficult to find the pockets of remaining eligible customers where they are increasingly relying on data to locate customers and inform targeted marketing strategies. But contractors and program staff report that many of the hardest to reach are often not home and are very difficult to contact. The CARE modeling results, presented below in Section 3.3.3.1, have a consistent finding where penetration is relatively lower in the highest poverty census blocks, where barriers are greatest.

Based on our telephone survey, low-income households overwhelmingly prefer to be reached by mail (this finding does not differ significantly by low-income household segment). This finding is supported by the additional telephone survey result that 82 percent of low-income households receive a paper bill and 62 percent of CARE enrollees mailed in their application. Though these trends may shift due to IOU efforts to expand online bill pay, only a small percentage of low-income households currently pay their bill online or go to the IOU website.

3.3.2.3 Motivations for ESA Participation

Low-income households are most likely to have participated or want to participate in ESA to save money and/or lower their energy bills, based on our telephone survey. The second most common driver is the need for something the program offers.

3.3.3 Program Participation Characteristics and Barriers to Participation Findings

This section answers the research questions:

3. *What are the characteristics of eligible customers that have not been reached by CARE and ESA? How do those differ from those who have? Are there concentrations of certain geodemographic characteristics of underserved customers?*
4. *What fraction of ESA non-participants is willing to participate in ESA?*

5. *What are the main barriers preventing ESA non-participants from participating? What were the main drawbacks for ESA participants?*

The detailed results are found in Volume 2 – Section 5.3 and 5.4.

3.3.3.1 CARE Participation Characteristics and Barriers to Participation

As mentioned above, we developed two models to examine access to the CARE program. We used Athens Research data at the Census block group level that contained rates of CARE eligibility and participation and demographic information. The CARE models examined differences in demographic characteristics of Census block groups that had varying rates of CARE participation and penetration (which is equal to the ratio of participating to eligible customers). The modeling allows the examination of each characteristic, while holding all other characteristics constant. This is a useful tool since many of the characteristics we are attempting to explore are correlated with each other. The modeling helps to tease out what is the most important factor.

We found that census block groups with higher concentrations of the following households have, all else constant, relatively higher CARE participation rates:

- Single-parent households,
- Spanish-speaking households,
- Households with seniors,
- Poverty-level households (income less than 100% of federal poverty level),
- Larger households,
- Non-English/non-Spanish-speaking households,
- Households on public assistance, and
- African-American households.

Census block groups with relatively higher concentrations of higher-income households (with annual incomes of $200,000 and greater) and homeowners have, all else constant, relatively *lower* CARE participation rates. This first model largely reflects characteristics of census block groups that are 200 percent of federal poverty level or below, which is the CARE income-eligibility threshold. The results are not surprising, but do show the program has enrolled larger percentages of customers in census block groups that have characteristics that may be associated with greater needs and/or barriers.

A second model that examined CARE penetration by census block group (the rate of enrolled customers to eligible customers) found that census block groups with a higher percentage of the following households had higher CARE penetration rates:

- Single-parent households
- Spanish-speaking households,
- Households with seniors,
- Larger households,

- Non-English/non-Spanish-speaking households,
- African-American households,
- Households in higher population density areas, and
- Homeowners.

Census block groups with a higher percentage of the following households had *lower* penetration rates:

- Higher-income households (with annual incomes of $200,000 and greater),
- Households at or below 100 percent of the federal poverty level, and
- Higher CARE customer energy usage.

This second model reflects characteristics of census block groups that have higher CARE penetration rates. Some of the characteristics are consistent with the first model; for example, the results suggest that the CARE program has had success enrolling eligible customers that speak non-English languages, likely due to its broad outreach approaches.

However, the second model indicates that the program may need to focus on areas with higher rates of renters (who tend to be more transient and may not pay as close attention to their energy bills and advertising about energy programs such as CARE). However, as we explain below, multi-family renters have relatively lower energy burden and need for the program and may be aware and just not interested in participating since they lack the need.

There may be a need for the program to focus on rural households (who may be less trusting of the IOU and less likely to know they are eligible and/or take assistance) and households at or below 100 percent of the federal poverty level (who may have greater barriers to participating, be less likely to read their energy bills and follow through with a CARE application).

The results also identify that the CARE program may not be reaching as many households that are very low-income. Also, there are areas with high CARE participation rates relative to eligibility (which are by definition medium and higher-income areas) that could warrant further study to ensure enrolled households are actually eligible.

3.3.3.2 ESA Program Willingness to Participate

Based on the telephone survey, we estimate that 52 percent of current ESA non-participants are willing to participate in ESA. This estimate is adjusted to attempt to correct for the non-response bias inherent in the telephone survey. (The original telephone survey self-report estimate is 72 percent.)

The conjoint analysis, based on an addition web-based survey administered to a smaller sample of telephone survey respondents, estimates willingness to participate at 60 percent.[40]

The in-home visits with ESA non-participants estimated that about 66 percent or two-thirds would be willing to participate in ESA. These samples are even more biased than the telephone survey, since telephone survey respondents selected themselves into follow-up surveys. However, they help corroborate the range of estimates from the telephone survey.

Note that if these estimates are used to update ESA program treatment goals, the reasons for not being willing to participate should be factored in. E.g., there are customers who are not willing because they do not want to ask their landlord for permission (23% of the 29% of unwilling customers, or about 7% of ESA non-participants), which the program could try to address, along with other barriers identified in this report. Whereas the CPUC could consider whether customers that do not have a need for the program that are unwilling (which accounts for the vast majority of the remaining unwilling non-participants) could be skipped.

3.3.3.3 ESA Participation Characteristics

We compared the characteristics of ESA participants v. non-participants based on telephone survey self-reported demographics. Households occupying homes that have been treated by ESA[41] are more likely to be or have the following characteristics as compared to households occupying homes that have not been treated by ESA:

- Hispanic
- Lower-income
- Have one or more disabled member(s)
- Lower education
- Longer tenure
- Seniors

Note that 63 percent of participants said they have a disabled member(s) in the home (compared to 54 percent of non-participant homes) – a much higher percent than what is reported by the ESA program (less than 15%). This may be an upper bound based on an expansive definition (see Section 13 for the telephone survey instrument, questions D15a-15e), but it helps illustrate the difference between what a contractor is able to report based on the current rules and the actual disabled rate (which we reported as 31%, in Section 4.3, based on 2011 ACS/PUMS, compared to 34% in 2004).[42]

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[40] Based on an expectation of $10 savings per month, which is about twice the savings that the average participant realized based on the 2013 ESA Impact Evaluation Study (Evergreen Economics).

[41] For the purpose of this study, "treated by ESA" is defined as treated through the ESA program since 2002.

[42] As reported in Section 5.2.1.2, the prior KEMA LINA study estimated that 14 percent of LI households have disabled members and an additional 13 percent have both elderly and disabled members for a total of 27 percent of households that have disabled members. (Based on the study's on-site survey that looked at physical,

There are no statistically significant differences in home ownership, home age, population density, building type, children, number of members in the household, language spoken and employment status.

Note that this is a simple two-dimensional analysis, with many variables being correlated with one another. The ESA modeling results, presented below in the next subsection, help tease out the most important drivers of variation in ESA participation. We also remind the reader that the telephone survey results do not include non-English/non-Spanish speakers.

3.3.3.4 ESA Barriers to Participation

According to our telephone survey, the main reasons that non-participants are not interested in participating in ESA are:

- Needing their landlord's permission, which is reported more often by multi-family renters than single-family renters (more often reported by multi-family residents in buildings with 11 or more units, which might indicate that the issue is related to landlords of larger buildings, or residents of larger buildings).
- No need for the program/appliances are working well, which is reported mostly by single-family homeowners and mobile home occupants.
- Trust/skepticism, which is reported mostly by households in mountain and/or rural areas.

The most commonly cited barriers to participation reported by participants and non-participants who were willing to participate based on the phone survey are:

- Being home during the day/taking time off work, which is reported more often by Spanish-speakers, single-family homeowners and mobile home occupants.
- Having contractors in the home.
- Trusting the contractor, which is reported more often by multi-family renters as compared to single-family renters (which may be because multi-family occupants are less likely to have experience with a contractor).
- Getting landlord's permission, which is reported more often by multi-family renters than single-family renters.

Trusting the IOU and trouble producing income documents were reported as problems the least often. However, these barriers might impact those who did not respond to our telephone survey the most. The ESA population modeling could not explicitly include these barriers since these are not things we could observe from the population data.

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emotional and mental disabilities.) We think that these results may have been misinterpreted, such that the 14 percent estimate of LI households that have disabled members but do not have elderly members was used to support the development of the 15 percent target.

Anecdotally, the in-home non-participant surveys suggested that some non-participants have trust issues, had difficulty keeping their appointments and/or letting someone in their home. These issues were more likely to be observed in our small sample among PG&E customers, seniors and women living alone. The in-home non-participant sample respondents had very positive attitudes towards IOUs (though the sample is biased towards households who are willing to conduct surveys related to IOU energy programs).

The ESA modeling Stage 1 results, based on customer-level population data, allow us to examine each characteristics that might impact ESA participation one by one, holding all other characteristics constant. This approach allows us to determine which factors matter most, since many of the variables that might predict participation are correlated with one another. We are using population data in this analysis, thus we may represent all low-income households. The limitation is that there are only so many variables we may observe in the population data, based on Athens Research, Census and IOU data. The Stage 2 results incorporate self-reported survey data on barriers to participate, but those results do not reflect the population. Together, however, the two sets of modeling results provide a fairly comprehensive picture of barriers to ESA participation. (We offer recommendations for future research to address this study's gaps in Section 3.3.5.)

The Stage 1 modeling results suggest that the ESA program, like CARE, has been successful reaching some segments of customers that might have greater needs and/or barriers: seniors, single-parents, the very poor, non-English speakers (Spanish more than other languages), African-American. Also like the CARE model, with the exception of PG&E, rural households are less likely to participate than urban households. (7 percent of low-income homes are in rural areas, 73 percent of which are in PG&E's service territory. We assume it is likely that that PG&E has had more success reaching rural low-income customers in its service territory because there are many more of them, so it may have been more of a priority. The other IOUs have few rural low-income customers.)

The ESA Stage 1 model also offers some common sense observations about program targeting, with older homes, households participating in other low-income programs, on medical baseline and those with longer tenure on CARE and in their present home being more likely to participate.

CARE participants who have recertified are more likely to participate, which may reflect that such customers are more likely to be truly income-eligible. Higher electricity usage customers are less likely to participate, which might reflect regional or housing stock variables that we were not able to include in the model.

ESA Stage 1 results relating to the housing stock include single-family homes,[43] households located in climate zones where cooling loads are greatest, inland households, households with

[43] Note that this variable was only available for SCE. The Stage 2 model included a variable across all IOUs based on the survey data with home type, but was not statistically significant. We do note that the Stage 2 model is

both electricity and gas service from the IOU(s) and households with electric IOU service (if a SoCalGas or PG&E customers) being more likely to participate. These results may reflect both targeting by the program where the need and/or energy-savings opportunity is perceived to be greater.

There are some inconsistent results related to bill payment delinquency, with customers having a higher number of disconnects and failed payments (except for PG&E) being less likely to participate in ESA, and those with higher numbers of overdue payments, IOU calls related to payment issues and for PG&E, failed payments, being more likely to participate in ESA. We obtained these data late in the study schedule, and with more time we could have analyzed the underlying data to better understand these results. For example, there are very few disconnects and failed payments by CARE participants reported by PG&E and SDG&E (mean of 0.1 or less), but much higher incidence of failed payments reported by SCE (mean of 2.3). SDG&E reports a much higher number of overdue payments (mean of 8.8) compared to SCE (mean of 2.3.

The ESA modeling Stage 2 results are based on the survey data sample, so we can incorporate self-reported information that we lacked in the Stage 1 model. However, this model has the same non-response bias issues as the telephone survey on which it is based. These results are reported in conjunction with the Stage 1 results to try to retain the best of both modeling approaches and reduce the impact of the phone survey bias.

In this model that accounts for self-reported barriers such as lack of trust of a contractor, difficulty being home for appointments and providing income documents, we did not find that non-English speakers, African-American, single-family and single-parent households participate at higher levels. These results may suggest that once those barriers are accounted for, there are no significant differences in treatment rates (even after accounting for self-reported barriers) amongst these segments. The exception is that households that took our Spanish language survey were found to be less likely to participate than those that took the English survey.

However, we did find that "other race" households (Native Hawaiian, Other Pacific Islander, American Indian or Alaskan Native, Guamanian or Chamorro, Samoan or some other race) are more likely than White, Asian and Hispanic households to participate. Similar to the CARE and ESA Stage 1 models, lower-income households (of all households on the CARE rate) and larger households were more likely to participate, and again, lower electricity usage was correlated with enrolling in CARE.

Households that have a member with a chronic medical condition are more likely to participate in ESA, likely due to the effort of the program to target disabled customers. Respondents that said they turn down the heat or cooling to keep their bill down were more

based on the phone survey data that excludes non-participants who would not respond to a telephone survey, so home type may be an important barrier, though our results are not conclusive.

likely to participate in ESA, complementing the telephone survey results presented previously showing that the program is having a substantial impact on improving participants' home comfort.

Consistent with the ESA Stage 1 model result related to length of time being on the CARE rate, we found that tenure predicts participation, with a greater likelihood of participating for households that have been in their home longer.

The most important drivers of and barriers to ESA participation, based on the Stage 2 modeling results, are:

- (Barrier) Trusting a contractor;
- (Barrier) Getting the landlord's approval;
- (Barrier) Being home for appointments; and
- (Driver/Barrier) Needing something the program offers – if the household perceives the program offers something they need, this is a driver of participation, while this factor may be a barrier to those who do not perceive (correctly or not) that the program will provide them with something they believe they need.

Note that we could not test whether the driver of saving energy was important, because almost every household said that was important. While we are not able to say in the context of this particular ESA modeling effort how important saving energy is as a driver, the survey result itself, in addition to other complementary findings presented in this study, suggests that saving energy is a primary driver of participation. (There is just no variation to explore in the model.) However, we did not examine how much energy savings is worth the hassle factor of participating.

The conjoint modeling is a complementary effort to help tease out the motivations and barriers to ESA program participation. It is based on a smaller sample of telephone survey respondents (all ESA non-participants) who agreed to respond to a web-based survey. It has non-response bias issues, but helps to corroborate the previous findings on barriers to participation. The analysis requires respondents to trade off attributes of participation based on a consistent metric—in this case, dollar savings. The respondent is presented with sets of options, and is essentially forced to determine which are the one or two most important factors that they care about.

In this analysis, we found that energy savings and increased comfort are the primary drivers, which is consistent with the phone survey results of ESA motivations for participating. Note that we did not include options that varied the measures that the program would provide, which is not part of the conjoint analysis of potential drivers and barriers.

Providing income documents was not found to be a major barrier among this sample, which is consistent with the phone survey and ESA modeling Stage 2 results. But these are not conclusive results that this is not a barrier; this issue may be important among non-

participants that were less likely to respond to our surveys (above, we mentioned that anecdotally program staff and contractors mentioned this as a barrier to ESA participation).

The ESA non-participant in-home surveys also explored barriers to participation in our smaller qualitative sample. The primary barrier in that sample was lack of program awareness. Though the program has not had problems having enough leads (the IOUs are restricted by budgets each year), this barrier has not been a problem. As penetration increases in the near and mid-term, this could become an issue.

The second most important barrier was lack of perceived need—respondents who did not use much energy, lived in homes that were already efficient, or sometimes had a non-IOU heating source. This barrier was also noted in the phone survey and program staff and contractor interviews, but is not a true barrier for homes that do not need the program. It is more of an explanation as to why some homes are unwilling to participate. However, homes that use a non-IOU heating source do face real barriers, and the ESA Stage 1 modeling results reinforce this finding.

The in-home surveys found that renters mentioned issues with getting their landlord's permission, consistent with the other research methods, and that providing income documents would not be a barrier. Though as we mentioned previously, households that would not respond to our surveys may have trouble providing documentation; this barrier should be not be dismissed based on our research.

Finally, being home for multiple visits was cited as a potential barrier by non-participants in our in-home sample. This result is consistent with the ESA stage one modeling results.

3.3.4 Conclusions

We offer conclusions on ESA and CARE program accessibility below in the following three subsections, organized around five research questions.

3.3.4.1 ESA and CARE Program Participation by Low-Income Population Characteristics

This section answers the following research question, based on our population models, which are not biased:

6. *Are the programs designed effectively to reach and enroll non-participants based on their characteristics?*

The ESA and CARE programs are reaching many segments of the low-income population that might be considered hard-to-reach such as non-English speakers, African-American households, seniors, larger households, single-parents, and, for ESA, reaching those with a

chronic medical condition, suggesting that the programs are effectively designed to reach those segments.

The CARE program is not reaching as many renters and rural areas, all else constant, suggesting the CARE program could improve its outreach to these customers. Note that two-thirds of low-income renter households reside in multi-family properties, which is 41 percent of the total low-income population (including residents in 2-4 unit buildings).[44] Renter-occupied households are less likely to read their IOU bill inserts and also less likely to stay in their home for as long as homeowners (average tenure of around 6 years compared to 17 years for homeowners). Multi-family renters also have relatively lower energy bills and energy burden, and may less motivated to respond to an IOU request to participate. Rural residents have greater trust issues and also may not be as likely to accept assistance or to know they are qualified.

The CARE program may not be reaching as many households that are very low-income (i.e., households living in small areas with high percentages of households that are below 100% of federal poverty), which might have more major barriers to reaching them (e.g., characteristics we could not include in our CARE model, not related to race, language and household composition, but may be related to immigration status, fear or trust issues). There may also be customers enrolled in CARE that are not income-eligible, as some of our research may suggest.

The ESA program is not reaching as many rural households (except PG&E, which accounts for the nearly three-quarters of the low-income rural population), households with single-fuel IOU service, and households that have been in their homes a shorter period time, all else constant, suggesting the ESA program could improve its outreach to these customers.

The ESA program is reaching many more disabled customers than is being reported (67% of participants report having a disabled household member), suggesting the program is much more successful in reaching households with disabled members than it is able to report.

3.3.4.2 ESA and CARE Program Outreach and Marketing Strategies

This section answers the research questions:

7. *Are the programs designed effectively to reach and enroll non-participants based on their preferences and information channels?*
8. *Are the programs using the appropriate channels to reach all segments of eligible Customers?*

The programs use many methods to reach eligible low-income households, with friends/family/colleague and IOU outreach methods being the most common way that low-

[44] Classifying 2-4 unit buildings as "single-family", about half the renter low-income households reside in multi-family properties, which is 31 percent of the total low-income population.

income households learn about CARE and ESA. The broader marketing methods likely build a foundation of awareness, such that once a direct IOU outreach method is used, the customer is more likely to respond. The programs also coordinate with community organizations, and some IOUs contract with community organizations and private contractors to do targeted door to door outreach. These methods are consistent with what low-income households say are their preferences for being reached based on our telephone survey. However, we do not know if this is true for non-English/non-Spanish speaking households. However, both the ESA and CARE programs have successfully reached those other language speakers, based on the population model results.

3.3.4.3 Addressing Barriers to ESA Participation

This section answers the research questions:

9. *Is the ESA program designed effectively to overcome non-participant barriers? And take advantage of what might drive future participation? And to improve the experience for participants?*
10. *Are enrollment and eligibility requirements preventing participation?*

The ESA program is all else constant, reaching fewer renters, especially multi-family renters, and renters that are concerned about seeking permission from their landlord (particularly those in buildings with 11 or more units). The program is also reaching fewer low-income rural residents in SCE, SoCalGas and SDG&E service territories (which only account for 2 percent of the total low-income population). Households that only have IOU service for a single fuel[45] are less likely to be treated by the ESA program, though our research did not assess the extent to which other programs such as LIHEAP are able to fill that gap. Some contractors that provide service in overlap areas may contract with both IOUs, but not all do.

Additional barriers that impact ESA participation, based on the Stage 2 modeling results, are households having trouble being home for multiple appointments and trusting contractors to be in the home.

Our research did not conclusively determine whether having access to and/or being willing to show income documents and trusting the IOU are barriers. This is a gap in our study that we recommend a future study address, below.

3.3.5 Recommendations

We offer recommendations on ESA and CARE program accessibility below in the following three subsections, addressing the following three research questions:

11. *What sources could the programs leverage or leverage more to increase participation?*

[45] About 74 percent of SCE and 63 percent of SoCalGas's CARE-eligible customers are served by the other single-fuel IOU. Roughly 650,000 CARE-eligible SoCalGas customers do not have IOU electric service.

12. *What improvements could be made to reduce barriers and increase and improve ESA participation?*
13. *What are the pros and cons of modifying ESA program requirements that might be impeding participation?*

3.3.5.1 General Program Outreach Methods

We offer the following recommendations related to program outreach that apply to both programs.

- The programs should continue past successful approaches that have lead to higher penetration rates among many hard-to-reach segments.

The programs have conducted marketing and outreach using a wide variety of channels, attempting to reach customers who speak different languages and those with disabilities that may have additional barriers to accessing the programs. Our research, based on population data, indicates that the programs have been successful in enrolling many hard-to-reach low-income population segments including those that speak non-English languages, African-American households, single-parent households and households with seniors.

- The programs should consider expanding outreach channels to address renters, particularly sing-family renters (which have greater energy burden, as explained below) and rural areas, which have unique issues.

The ESA program is already aware of the barriers to reaching renters, and they are working to improve landlord and tenant forms. Some IOUs offer renters basic measures even if they lack permission from their landlord. We offer recommendations around attempting to better meet the energy-related needs of renters in Section 3.4.5. We specifically focus on single-family renters, since they have a higher energy burden (presented in Section 3.4.1) than multi-family households and also because a concurrent study has just been released on the multi-family low-income sector that offers recommendations specifically for that sector.

Renters move around more than homeowners (average tenure of around 6 years compared to 17 years for homeowners), and the IOUs could explore increasing the follow-up with households on CARE that move. They could do research to determine if it would be effective to automatically enroll a household that moves, and then do post-enrollment verification for households that moved into an area with a higher average income than the area in which they previously lived. Since renters are less likely to read their bill inserts, the IOUs could look into outreach campaigns specifically for renters, or at least bill inserts that are targeted to renters.

For CARE, to reach rural residents may require more outreach with churches and senior centers (rural low-income households attend church more frequency than urban low-income households), since the low-income residents in lower population density areas are spread out and may not hear about the program via word-of-mouth as often. Rural residents also tend not to trust the IOU as often, tend to be unaware they are eligible and are less likely to accept assistance.

For ESA, since the majority of rural low-income households are located in PG&E's service territory (only 2 percent of low-income households live in rural areas served by IOUs other than PG&E), there may be a low priority placed on the other IOUs to reach the remaining rural low-income residents.

- The ESA program should continue the combination campaigns that do outbound calls/direct mail and then door-to-door canvassing, since those are common methods that participants learned about the program, and could be a good strategy to reach "pockets" of low-income households that are outside the more core areas that are reached by low-income community-based organizations.

Our study showed low-income households in general prefer to be contacted by mail about programs such as ESA. Also, we found that participants learn about ESA based on word of mouth, IOU bill inserts, phone calls and visits. The IOUs have increasingly relied on combination campaigns that make use of data such as recent CARE enrollments to identify potential ESA participants. The IOUs have not had a problem identifying enough prospective customers to meet their goals. The logistics of implementing ESA are more of a constraint, and the IOUs have honed their methods for effectively managing program implementation.

- To ensure that the newly low-income households are aware of the program, the IOUs could explore how to expand efforts that promote the CARE program through social workers, hospitals, low-income law centers and other agencies that interact with individuals who are going through life changes that might be associated with reductions in household income.

Through our in-home visits, we found some ESA non-participants that had learned about the CARE program from a social worker or other agency worker that they had encountered while getting assistance for a major life change such as a death in the family or a divorce. These channels may not lead to major increases in enrollment, but could provide assistance to needy households. It also may help address low-income households that are in rural areas or otherwise outside the urban core, where they would be less likely to learn about assistance programs based on word of mouth.

3.3.5.2 Overcoming CARE Barriers to Participation

We offer the following recommendation related to addressing remaining barriers to CARE participation.

- The CARE program should explore how to increase the penetration rate (i.e., the ratio of the number of customers enrolled to the number that are estimated eligible) in very high poverty areas.

This study found that the quartile of census block groups with the highest rates of households below the federal poverty level have the lowest CARE penetration rates. (Note that they have the highest participation rates, but the lowest penetration rates.) There may be greater barriers to reaching these customers, including safety issues for contractors doing outreach.

The IOUs already partner with many community groups, but they could explore ways to increase the impact that those partnerships have. The IOUs could continue or perhaps expand the use of the Athens Research data to identify specific census block groups that have high poverty but relatively lower penetration rates and determine characteristics that might inform marketing and outreach strategies. These strategies could be tested, measuring success by increases in penetration rates for those targeted areas.

Below we recommend further research be conducted to fill the gaps that were not addressed by this study (i.e., non-English/non-Spanish speakers and those with major outreach barriers), and such research might be helpful to provide more detail on the barriers associated with very high poverty areas.

Two of the IOUs are using paid contractors for CARE canvassing, providing the contractors with data on which customers are enrolled or not. We did not assess the effectiveness of this strategy. It might be useful to explore the cost-effectiveness of using contractors to increase CARE participation in specific areas. (The IOUs all informally coordinate with many community-based organizations, and pay a "capitation" fee for enrollments, but organizations do not formally contract with the IOUs and receive IOU data. Thus the impact of this arrangement is not significant, but anecdotally was much greater in the past when penetration rates were lower. However, we do not recommend any changes to it since it is an approach that seems to strike an appropriate balance: the organizations have one more program to offer their clientele, yet they do not have to meet rigorous data or other contractual requirements with the IOUs, that might limit the participation of organizations or take away from their broader missions.)

- The IOUs could research higher user customers, which have lower rates of CARE enrollment relative to estimated eligibility.

We found that higher usage customers were less likely to enroll in CARE relative to the eligibility rates that were predicted in small areas. When we examined this issue, we found it was the top 10 percent of higher users that were associated with lower penetration rates, so it may be anomalous situations that do not lend themselves to easy (and cost-effective) solutions. In Section 3.4.1, we present results on energy burden, which incorporates income, and is probably a better way to screen customers for program need.

3.3.5.3 Overcoming ESA Barriers to Participate

We offer the following recommendations related to addressing remaining barriers to ESA participation.

- The ESA program should be able to skip over treating households that do not want to participate in the program because they do not need it or want anything that is offered, such as for multi-family homes that have relatively lower energy burden. The goal for ESA treatment should be updated to make use of the new data provided by this study.

Willingness to participate in ESA is estimated at 52. Some of these households are not willing to participate due to barriers the ESA program could try to address, such as getting permission from the landlord (7% of non-participants). But there are other households who say they do not need the program that should be skipped. There are also households that though they may qualify, have a lower energy burden, and the program could consider that when developing priorities for treatment. We offer a more comprehensive set of recommendations around energy burden in Section 3.4.5.

The IOUs are already starting to track refusals, though such data was not available for this study, it could be used in the future to refine goals and program strategies for addressing barriers.

- The ESA program could try to target households that re-enroll in CARE after moving to ensure that those that move around a lot (such as renters) participate in the program in greater numbers.

These households could be placed higher on the ESA treatment queue to ensure that households that move get more equitable treatment.

- The ESA program could continue refining its outreach strategies to try to overcome the barrier of households who do not want a "hand out".

Our qualitative research based on program staff interviews and in-home visits with ESA non-participants found that this is a barrier, and the IOUs have tried to market the program as providing benefits (i.e., saving energy and the environment) that will benefit everyone. These efforts should be continued. Sharing information about how many homes in their neighborhood have participated and how much energy has been saved might also be explored, since often people are motivated to do what they perceive is the norm.

- The ESA program could continue refining its implementation strategies to reduce the number of visits so that households that refuse to enroll due to difficulties being home for subsequent visits may participate in greater numbers.

The IOUs have honed their implementation strategies over the years to try to reduce the number of visits, but there are still households that may refuse enrolling if there is going to be one or more follow-up visits. Our telephone survey research found that this was the most commonly cited difficulty associated with participation, based on participants' actual experience and non-participants' expectation of participation after we described the program. The ESA modeling also found that being home for visits was a potential barrier to participation.

The IOUs could explore offering those households more limited participation based on measures that could be installed during their outreach visits, such as energy education, lighting and basic weatherization measures. Such homes could be recorded as partially

treated and put on a list for contact to try to schedule follow-up visits. The IOUs could track data to determine the cost-effectiveness of such a practice.

- The ESA program should continue coordinating with community organizations and contracting with them to conduct outreach to overcome barriers related to lack of trust in contractors.

The IOUs use both private and non-profit contractors to implement the ESA program, and they should continue their partnerships with community-based organizations for outreach to help reach households who lack trust in contractors and are more likely to sign up with a trusted individual from their own neighborhood. Co-branding with the IOUs should continue, since at least among our telephone survey sample, trust of the IOU was not found to be a barrier.

- The IOUs should continue to coordinate with each other and improve the experience of households that have service with two different IOUs, and coordinate with LIHEAP to improve treatment of homes that use a non-IOU heating fuel source.

This recommendation is further fleshed out in Section 3.4.5.

3.3.5.4 ESA Messages for Marketing

We offer the following recommendation related to ESA marketing.

- The IOUs should continue to promote the ESA program based on saving energy and reducing energy bills/cost, since our study found that to be the main participation driver. Marketing messages should also emphasize comfort and the measures that the program offers, which are also perceived as benefits by participants and are participation drivers.

Though it is difficult to market the program based on measures, since it is never clear which measures the customer will be eligible for until after an individual assessment, the programs could market the programs based on tangible benefits of reducing their energy bills and improving the comfort of their home.

3.3.5.5 ESA Brand Awareness

We offer the following recommendation related to ESA brand awareness.

- The program should consider establishing a clearer identity and brand for ESA, by which customers consistently hear about the program and are able to refer to it when discussing with their friends, family and neighbors.

The most common way that customers learn about ESA is through word of mouth, but awareness of the actual program name is low. Once explained about the program, awareness is high. Currently the programs are not suffering for lack of leads, but that could change as penetration increases. And such marking efforts take time to build effectiveness, so once it becomes an issue it may be too late to build an effective marketing campaign.

It may have been shortsighted to change the name of the program to something consistent statewide that is difficult for contractors, program staff and likely customers to refer to. We found that only one stakeholder during our research effort used the full name of the program (and only once, when informing us that the program is not supposed to be referred to by its acronym), while all others that we interacted with (the researchers included) used the acronym "ESA".

3.3.5.6 ESA Disabled Target

We offer the following recommendation related to the ESA disabled target.

- The program should consider updating its ESA disabled target based on this study's data. However, any goal for reaching disabled customers should also take into account the discrepancy our study reveals between what the program reports (which is based on observation of an obvious disability during assessment) versus what a participating household reports about all the members in the home.

Our study reports that 31 percent of low-income household have one or more members that are disabled, based on the ACS/PUMS data (Section 4.3.1). The program goal is currently 15 percent, and the program has not quite met that goal. Our participant telephone survey results indicate that 63 percent of households treated by ESA since 2002 report that they have at least one or more member who the respondent reported as disabled.

3.3.5.7 ESA High Users

We offer recommendations related to high users in Section 3.4.5.

3.3.5.8 CARE Post Enrollment Verification

We offer the following recommendations related to CARE post enrollment verification (PEV):

- The IOUs should continue the use of data and targeted post-enrollment verification for the CARE program to reduce incidences of households being on the rate who are not income-qualifying, while not removing customers who truly qualify.

There is a balance that must be struck to try to remove customers who do not qualify, while not impeding the participation of customers who do qualify. The IOUs are increasingly relying on data and more sophisticated verification of CARE enrollees. These efforts should be continued and their effects monitored. It is very difficult to do research with customers who do not respond to such requests, but the IOUs could consider conducting research with customers who do not respond to PEV requests to better understand the implications of verification efforts (e.g., how many actually qualify for the program of those that do not respond to requests) to inform future efforts.

3.3.5.9 Further Study of Barriers to Participate in ESA

We offer the following recommendations related to further study to address gaps in this study.

- The IOUs and CPUC should consider focusing resources for the next low-income needs study on non-English/non-Spanish speaking low-income households that were excluded from this study's primary research (around 16 percent of the low-income population.)

While our population modeling efforts addressed all low-income customers, we could not include telephone survey results on self-reported barriers for the ESA program for non-English/non-Spanish low-income households, which comprise 7 percent of the state's low-income population.[46] These customers may have unique barriers that were not identified by this study. For example, contractors and program staff indicated that lack of or unwillingness to provide income documentation is a barrier for some households, which we did not corroborate with our primary research. This is anecdotal evidence that this is a barrier at least for some low-income households that we did not uncover with our study approach.

We excluded these customers from our primary research due to the cost and time required to address the many languages that low-income households speak in California, so such research will be relatively expensive and require more time than this study's approach.

- Future research efforts could consider including a general population survey, which our study did not include.

Such a survey could allow for comparisons with low-income households for such issues as energy insecurity (presented in Section 3.4.1) and also include some CARE non-participants. However, for the latter issue, it may not be a representative sample unless considerable efforts are made to address non-response bias since the CARE penetration rate is so high (even if it is actually lower than reported, it is still a relatively high rate among the eligible population for this type of research).

3.4 Energy Needs

This final subsection summarizes findings and presents conclusions and recommendations around energy needs, including energy burden.

3.4.1 Energy Burden

This section answers the research questions:

14. What is the extent of the energy burden among eligible customers? How has that changed since the last LINA study? What segments have the most burden and experience the most insecurity? How do ESA participants v. non-participants differ in terms of their burden?

[46] This is based on combining the linguistic isolation variable (which is households where no one over 14 speaks English very well) with the primary language variable from the ACS/PUMS to identify households that are linguistically isolated and whose primary language is not Spanish.

The detailed results are found in Volume 2 – Sections 5.5.1 and 5.5.2.

There are three different sources from our study that inform energy burden and energy insecurity: two sources based on the phone survey sample, and a third source from the ESA non-participant in-homes.

First, we calculated mean energy burden for the phone survey sample (weighted to reflect the low-income population) based on self-reported annual income and IOU billing data, equal to the ratio of energy cost to reported income. Second, we assessed energy insecurity for the phone survey sample (weighted to reflect the low-income population) based on respondent self-reported incidence of behaviors that demonstrate the extent to which the household is facing a hardship due to the cost of their energy usage. Third and finally, ECW qualitatively assessed the degree of financial constraints based on observation and respondent self-report for the sample of ESA non-participant in-homes.

The methods are internally consistent:

- Low-income households that we classified as "highly" energy insecure based on their responses to an energy insecurity battery have a higher mean burden (13.4% compared to the average of 8.0%).
- Respondents to the in-home survey who had greater self-reported and observed "financial constraints" had higher levels of both burden and insecurity.

3.4.1.1 Mean Energy Burden

We calculated the mean energy burden for low-income customers by calculating the ratio of energy expenditures (based on actual IOU billing data) to self-reported annual income based on our study's telephone survey.[47]

The mean energy burden for the low-income population is estimated at 8.0 percent.[48] This is likely a higher bound estimate since the low-income population would tend to have a greater proportion of their expenses covered by subsidies such as government assistance for housing, child care and/or food and earned income credit.

The mean energy burden for the low-income population is statistically unchanged from that reported in the prior LINA study published in 2007.[49] The low-income mean energy burden is estimated at 1.8 times the general population's mean energy burden.[50]

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[47] The telephone survey collected income in ranges. That is, customers reported having an annual household income in a range (e.g. "Less than $5,000 per year"). Please see telephone survey in Volume 3 Section 13, Question D12 for question wording and income range categories.
[48] Based on taking the mean of customer-level ratios of energy burden.
[49] Although the prior LINA was published in 2007, the data reported therein were collected in 2005.
[50] We calculated the general population's energy burden based on Census income data and IOU billing data at the zip code level.

The mean burden for ESA participants is 9.1 percent, compared to 6.7 percent for ESA (income-eligible) non-participants, due to higher non-participant income. Non-participant income is on average 30% higher than participants, and non-participant energy usage is 2.5% higher than participants'. This difference may also be due to participants "self-selecting" themselves for participation in ESA based on having a higher energy burden and thus a greater need for the program.

We also found that households that try to save energy in their home "most or all of the time" have about the same mean energy burden than households that try "sometimes" (7.6 percent).

Regions with higher mean energy burden among low-income households are (as compared to 8.0% across the low-income population):

- The Central Valley (climate zones 11-13) (11.2% annual, 13.6% winter)
- PG&E's service territory, which has the climate zones and regions with the relatively higher burdens (9.9% annual burden)
- The North Coast (climate zones 1-5) (9.7% winter burden)
- Households that said that climate or weather was a barrier to saving energy in their home (19.5% annual burden).

Demographic characteristics associated with higher mean energy burden among low-income households are:

- The very poor (by definition, since burden is based on income) – income less than $15,000 (16.4%)
- African-American (10.7%)
- Single-family renters (9.7%)
- Speaks a non-English/non-Spanish language[51] (9.1%).

Household characteristics associated with higher mean energy burden among low-income households:

- Reports being sick often due to home conditions (13.6%)
- Income has changed recently due to loss of job or fewer hours (9.4%)
- Presence of a disability (9.3%).

3.4.1.2 Energy Insecurity

We developed a summary energy insecurity measure based on the frequency with which respondents said they or others in their home do the following – a lot, sometimes or never:

[51] We remind the reader that this is a biased sample of non-English/non-Spanish speakers, since to respond to our survey someone in the household must have spoken English or Spanish. Our survey does not include households that *only* speak a non-English/non-Spanish language.

- Cut back on food or medicine in order to pay utility bill.
- Borrow money to pay utility bill.
- Receive a disconnection notice for utility service.
- Had utility service shut off.
- Use heat or cooling less than needed to keep utility bill lower.
- Use kitchen stove or oven to heat home.

We classified a household as having "high" energy insecurity if they said they experience at least two of the insecurity measures "a lot" and "never" experience two or fewer measures. We classified a household as having "low" energy insecurity if they said they "never" experience at least three of the measures and did not say they experience any of the measures "a lot". The remainder is classified as having "medium" energy insecurity.

Based on this classification, we estimate that 6 percent of the low-income population is highly energy insecure, 37 percent has "medium" levels of energy insecurity and 57 percent have low energy insecurity. While we could compare energy burden to the general population, we could not do so for energy insecurity since the study did not include a general population survey.

Similar to energy burden, participants are more likely to be highly energy insecure – 7 percent v. 4 percent of non-participants (another 41% of participants have medium energy insecurity v. 33% of non-participants).

Segments within the low-income population that have higher insecurity are:

- Single-family renters are more likely to be insecure (7% are highly insecure and 39% have medium insecurity).
- "Other" language speakers[52] are more likely to be insecure (10% are highly insecure and 48% have medium insecurity).

3.4.1.3 Qualitative Assessment of In-Home Non-Participant Sample

We assessed the degree to which ESA non-participants experienced financial constraints based on a combination of self-report and auditor observation. We developed three categories based on this combination. The in-home visits with ESA non-participants estimated that just over half faced "elevated financial constraints"; 20 percent had a "substantially elevated level of financial distress" and about 25 percent "appeared more like a middle class household than a low-income one". We compared this assessment with phone survey burden and insecurity analyses for the same sample:

- Those with no financial constraints had an average energy burden of 6 percent, none were highly energy insecure and 10 percent had medium insecurity.

[52] Ibid.

- Those with small financial constraints had an average energy burden of 7 percent, 5 percent were highly energy insecure and 34 percent had medium insecurity.
- Those with medium financial constraints had an average energy burden of 10 percent, 5 percent were highly energy insecure and 47 percent had medium insecurity.
- Those with large financial constraints had an average energy burden of 6 percent, 7 percent were highly energy insecure and 43 percent had medium insecurity. This somewhat inconsistent result (with lower energy burden for households with larger financial constraints) is due to two outlier households that have very high burden that are in the moderate category. The median burden across the two groups is about the same (and is higher for the large financial constraint group, if the two outliers are removed).

Characteristics of ESA non-participants that we found to be correlated with higher financial distress, based on our qualitative assessment of the in-home sample, are:

- Presence of medical condition or disability
- Large number of children
- Multi-family[53]
- Households with seniors
- Households managed by young adults.

3.4.2 ESA Measure Benefits

This section answers the research question:

15. Which ESA measures contribute to the most benefit?

The detailed results are found in Volume 2 – Section 5.5.3.

A majority of ESA participants said they noticed changes (either "a lot" or "somewhat") in their safety (64%) and comfort (65%) and reduced bills (81%) as a result of ESA participation. 44 percent said they noticed an improvement in their health as a result of participating in ESA.

We found that HVAC and weatherization measures are most likely to generate improvements in health, comfort and safety. Larger households and homes with children were more likely to

[53] Multi-family households have lower incomes than single-family households, but they also have lower energy usage due to less energy-using equipment and smaller sized homes as reported below in Section 3.4.3.1 and in more detail in Volume 2 – Section 4.3.2, resulting in multi-family households having lower energy burden than single-family households (with single-family renters having the highest energy burden compared to single-family homeowners and multi-family low-income households). As noted above, energy insecurity was also highest for single-family renters compared to the other home type/ownership segments.

mention they noticed these benefits. (There are more members to experience benefits, and as presented in the next section, there are greater energy needs among larger households.)

We also found that HVAC and weatherization measures were the most common measures that generated benefits among participants and prospective non-participants. The next most beneficial measure was a refrigerator. There were no measures that ESA offers that we found were not beneficial based on our research methods, either to those who participated and received them, or non-participants who responded about the usefulness. (We did not look at measure cost-effectiveness. Our assessment of "needs" and "benefits" was also largely based on self-report with some observation by in-home auditors, but it was not a robust effort.) We did find in the low-income home and equipment characterization that there not much need for water heater replacement, with only 78 percent less than 10 years old.

3.4.3 Addressing Energy Needs

This section answers the research questions:

16. *What support and services (including energy efficiency measures) do customers need to address their energy-related needs? What is needed most? Do the needs differ by customer segment/characteristics? Which needs are the highest priorities?*

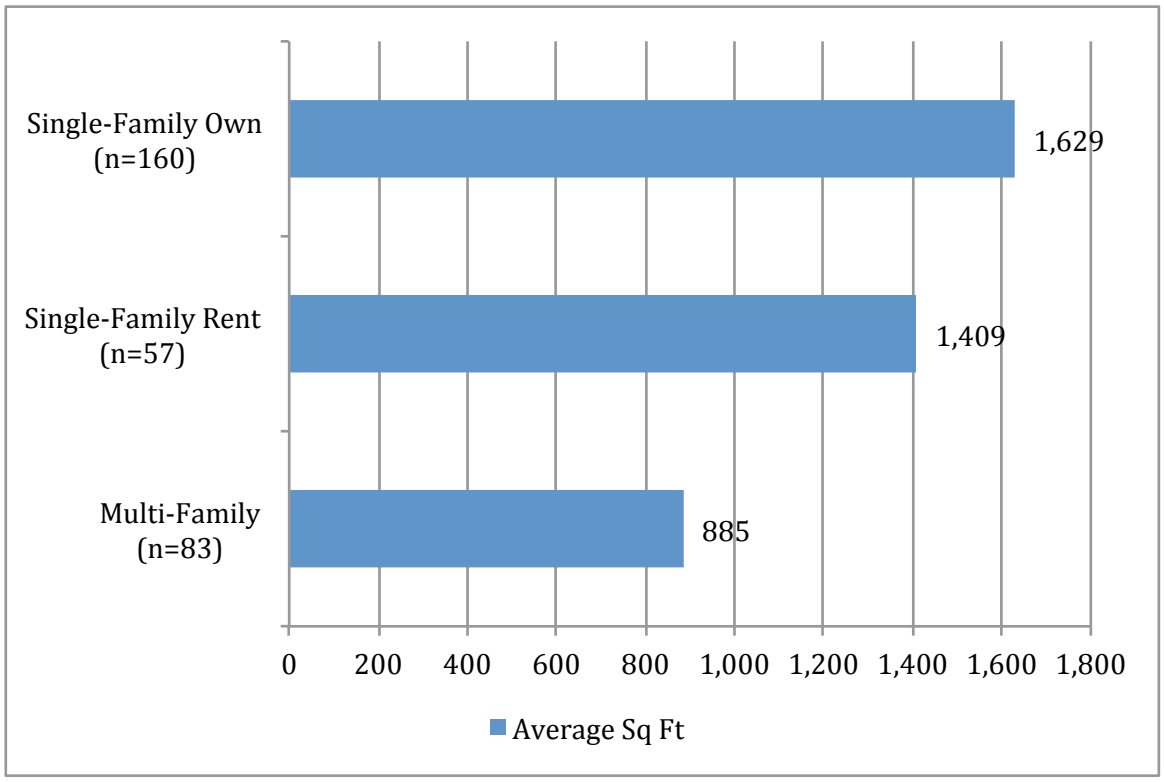
The detailed results are found in Volume 2 – Sections 4.3, 5.5.3 and 5.5.4.

3.4.3.1 Characterization of Low-Income Homes and Energy-Using Equipment

Based on our analysis of KEMA's on-site survey CLASS data, we were able to characterize the major energy-using equipment for the IOUs' low-income population. We supplemented these findings with additional information from our telephone survey.

We used these data to estimate the average home square footage for the low-income population, which is 1,311 square feet, compared to 1,643 square feet for the state's general population. As shown in Figure 10 below, single-family homes are larger than multi-family homes, with single-family homeowners having the largest homes.

Figure 10: Average Square Footage of Home – By LI Home Type For California LI Population



Source: 2013 CLASS.

Below we summarize the main findings from Section 4.3.2 to provide context to the assessment of energy needs. Note that the equipment age data is based on 2013 research (the CLASS and our study's telephone survey). We often used 10 years as a category of equipment age to report, even though the effective useful life of most equipment is longer. This is because many decisions that are made about measures do not impact programs right away, so we wanted to include all the potential equipment that could be considered for replacement over the mid- to long-term.

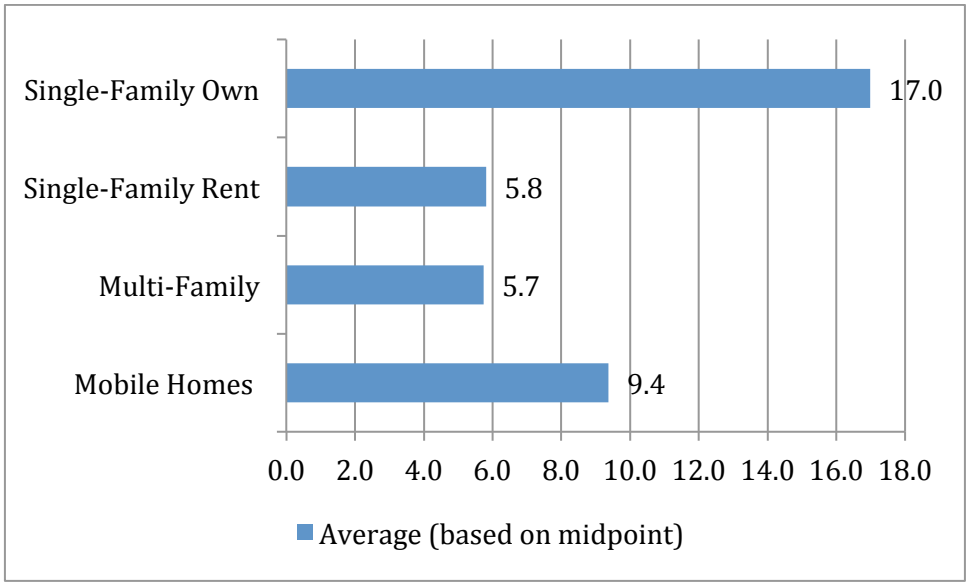
- Heating systems:
  - 11 percent of low-income household's primary heating systems are electric which is equivalent to the general population, with SDG&E having a higher proportion (25%) and SoCalGas having very few (3%) low-income households with electric primary heat.
  - Multi-family households are more likely to have electric primary heating.
  - Almost half low-income households (47%) use a natural gas furnace compared with 61 percent in the general population.
  - 27 percent of low-income households use a natural gas space or wall heater compared with 14 percent in the general population.

- 6 percent of low-income households use propane, wood or coal for their primary heat versus 5 percent in the general population.
- Based on our telephone survey, more than half of low-income homes have a furnace that is over 10 years old – suggesting some energy savings potential for early furnace replacement, though programs have found that measure not to be cost-effective.

- Cooling systems:
  - 32 percent of low-income households have central air conditioning and another 25 percent have room air conditioning (most prevalent in SCE and SoCalGas service territories), about half (53%) of which is over 10 years old as of 2013.
  - This compares with 47 percent of general population households with a central air conditioning and 15 percent with a room AC, with 60 percent over 10 years old.
  - Single-family owners most likely to have central air conditioning (45% v. 26% of single-family renters), but combining central and room air conditioning, it is about the same across single-family renters v. owners (around 75%).
  - Multi-family households are less likely to have central air conditioning (23%) and room air conditioning (24%).
  - Evaporative coolers are primarily found in single-family homes – 9% (1% of multi-family homes have evaporative coolers).
- Water heating:
  - 81 percent of low-income households use natural gas for water heating compared to 84 percent in the general population (of those that have their own system) with 8 percent using electric in low-income households versus 6 percent in the general population.
  - 22 percent of low-income household water heating units is 10 years old or older versus 16 percent in the general population.
  - 1 percent uses solar water heating, which is equivalent to the general population.
- Insulation:
  - 35 percent of low-income households have no wall insulation (note this particular result is based on a small and possibly biased sample size), compared to 26 percent in the general population.
  - 46 percent of low-income single-family renter homes and 32 percent of multi-family homes have no wall insulation. (Note that multi-family homes are less of a concern since most are interior walls).
- Refrigerators:
  - 22 percent of low-income households have 2 or more refrigerators compared with 29 percent in the general population.
  - 18 percent of all refrigerators, including both primary and secondary units, are between 11-15 years of age and 13 percent are 16 years of age or older.
  - Refrigerators in the general population tend to be slightly older with 24 percent between 11-15 years old and 16 percent older than 16 years old in 2013.

- Appliances:
  - 50 percent of low-income households have a dishwasher (74% in general population), 68 percent have a clothes washer (81% in general population) and 66 percent have a clothes dryer (79% in general population) – mostly fueled by natural gas.
  - Based on the telephone survey, about half of these appliances are likely more than 10 years old.
- Lighting:
  - 41 percent of bulbs in low-income households are CFLs – more than in the general population (34%). This is corroborated by phone survey results, where 47 percent of low-income homes reported that they have more than half or all CFLs.
  - Even though the saturation is fairly high among low-income households, there is still potential to install CFLs (or potentially LEDs), since an estimated 41 percent are incandescent.
  - There exists potential for lighting controls including dimmer switches, occupancy sensors and timers, since 86 of fixtures in low-income homes lack controls.
- Windows/doors:
  - Based on our telephone survey, 37 percent of low-income population says one or more windows are either not working or in need of repair.
  - Based on our telephone survey, 30 percent of low-income population says one or more doors are either not working or in need of repair.
- Cooking:
  - Based on our telephone survey, 25 percent of low-income population says their stove and/or oven are either not working or in need of repair.
  - Based on our telephone survey, 16 percent of low-income population says their microwave oven is either not working or in need of repair.
- Tenure:
  - Average tenure for low-income households is 9.2 years compared to 9.5 years for the general population based on the ACS/PUMS data. Figure 11 below shows how that varies significantly by home type and ownership. Homeowners in general have the longest tenure.

Figure 11: Length of Time Residing at Present Address - By Housing Type and Ownership For California LI Population



Source: 2011 PUMS.

Based on our telephone survey, ESA participants still have remaining unmet needs:

- Between 20 and 40 percent of ESA participant homes have windows, doors, stove/oven, furnace, microwave ovens, refrigerators that they say need repair or are not working.
- Between 10 and 20 percent of ESA participant homes have clothes washers, central air conditioning, water heaters, dishwashers, clothes dryers or room air conditioners that need repair or are not working.

We found that single-family renters have greater energy-related needs and barriers to participation, based on our telephone survey and population models. Also, our modeling results found that renters who feel that getting their landlord's permission is a barrier are less likely to participate in ESA, all else equal. Multi-family tenants also have barriers since they are renters – but they have lower energy usage, energy insecurity and mean energy burden since they have smaller homes, their systems are more likely to be centrally provided and there is less need for insulation at least for interior units. (Average annual fuel costs based on the ACS/PUMS data, which uses a representative sample, for multi-family low-income households is $918 compared to $1,699 for single-family renter low-income households.) The Multi-Family Segmentation Study that is being released this year provides greater characterization and assessment of multi-family low-income households' needs.

Below we provide a summary of characteristics of the renter low-income population, and specifically for single-family renters, based on the CLASS and ACS/PUMS data reported in

Section 4.3 of Volume 2 of this report (with more detail provided in Sections 7 and 8 of Volume 3 of this report.)

- 64 percent of low-income households are renter-occupied compared with 44 percent in the general population; 23 percent of low-income homes are renters in single-family homes and 41 percent are renters in multi-family homes.
- Single-family renters annual fuel costs are among the highest (with single-family owners).
- Single-family renters have older homes on average (46.5 v. 41.7 in the low-income population and 40 years in the general population as of 2011) and have much shorter tenure than single-family owners and mobile homes – multi-family and single-family renters have been at their homes on average 6 years v. 17 years for single-family own and 9 years for mobile homes as of 2011). They are a more transient population that is harder to reach.
- Single-family renters and multi-family more likely to have space/wall heating than a central heater (26% and 40% v. single-family own 15%) – which may be more difficult to provide comfort throughout the home, and may cost more to heat the home if they aren't in all the zones
- Single-family renter low-income households have a larger fraction of Hispanic household members (52% v. 42% in all low-income households v. 28% in general population households).
- Single-family renters are twice as likely to be linguistically isolated than the general population (19% v. 10%) but slightly less likely to be linguistically isolated than the low-income population in total (19% v. 20%), more likely to speak Spanish (46% v. 38% in the low-income population and 25% in general population).
- Multi-family households even more likely to be linguistically isolated (25% v. 20% in low-income population).
- Single-family renters have larger household sizes – 3.78 (v. 2.98 in the low-income population and 2.77 in the general population) and are much more likely to have children (65% v. 46% in the low-income population v. 37% in the general population). Our telephone survey indicated that larger households accrue more energy benefits from participating in ESA, a consistent finding.
- Single-family renter households much less likely to have senior(s) in the home (13% v. 26% in the low-income population and 25% in the general population), slightly less likely to have disabled member(s) (28% v. 31% in low-income population v. 22% in the general population) and the head of household is more likely to be working (50% v. 43% v. 63% in the general population). These households are probably less likely to be home and harder to reach.
- Single-family renters' head of households have less education than the other home types except mobile homes (9% have their bachelor's degree or higher v. 14% of all low-income households v. 34% in the general population).

Our population modeling results found that rural households are less likely to participate in CARE and outside of PG&E's service territory, less likely to participate in ESA. Characteristics of rural households are provided below.

- Rural households are more likely to reside in single-family homes (60% v. 51%) and less likely to be rent their homes (53% v. 64%).

- Rural households are much more likely to be English-only (71% v. 46%) – only 9 percent are linguistically isolated (v. 20%) – 61% are white v. 20%.

- Rural households are less likely to have children in the home (39% v. 46%), more likely to have a disabled household member (40% v. 31%).

- Rural households have much higher fuel costs ($1731 v. $1425), only 39% have natural gas heating – v. 59% - harder for IOUs to serve.

Since our telephone survey excluded non-English/non-Spanish speaking households, we summarize the unique characteristics of linguistically isolated households[54] from the ACS/PUMS data. Twenty-percent of low-income households are linguistically isolated, versus 10 percent of the general population.

- The majority of linguistically isolated low-income households lives in multi-family homes (55% v. 43% in low-income population vs. 31% in the general population) and are renters (76% v. 64% in low-income population v. 44% in the general population).
- 64 percent of linguistically isolated households are Hispanic / Spanish speaking.
- Linguistically isolated low-income households have slightly more employed heads of household (46% v. 43% in the low-income population) and fewer unemployed (8% v. 11% in the low-income population).
- Linguistically isolated households have significantly less formal education with 58 percent having less than a high school graduate level of education as compared to 31 percent in the low-income population and 15 percent in the general population.
- Linguistically isolated household energy costs are less than the average low-income home ($1,097 v. $1,425), likely reflecting that the majority live in multi-family homes, which tend to have lower energy costs ($918).
- A higher proportion of linguistically isolated homes use no heating fuel (8% v. 5% in the low-income population).

3.4.3.2 Energy Needs

Our assessment of energy needs is based on the telephone and in-home survey results. Based on telephone survey results, there are no major health, comfort and safety needs among the low-income population – with 10 percent or less saying they experienced health, comfort and

[54] A linguistically isolated household is a household in which no one in the household aged 14 and over speaks English only or English very well.

safety issues “a lot”. However, we did find that the improvement in comfort associated with ESA participation may help sell the program (based on the conjoint analysis and telephone survey results). Even though there may not be major needs in this area, low-income households report benefits from improvements in comfort that ESA provides and non-participants report that that their health, comfort and safety would benefit from participating.

Households that have major non-response barriers that are largely excluded from the telephone and in-home survey analysis on which this particular need is assessed, who did not respond to our survey, may have different or greater health, comfort and safety issues.

We did not find a difference in health, comfort and safety needs across ESA participants and non-participants, but participants told us they noticed improvements in health, comfort and safety as a result of participating in ESA. These results might support a prior finding that non-participants have lower energy burden and insecurity than participants (i.e., participants had more health, comfort and safety issues before participating in ESA). This is an important point to consider, that we are comparing participants after they have been treated by ESA to non-participants who have not been treated.

We found that presence of energy-related health issues that could be addressed by ESA as reported by telephone survey non-participants and participants that did not recall participating, is correlated with certain characteristics: households with non-English speakers, elderly, no children, no disabled members, larger households and mountain areas. The potentially surprising finding that households with disabled members may not notice a substantial difference in their health due to energy-related issues may be because the impact from energy-related issues may be small compared to more significant day to day challenges they are facing.

The in-home visits with ESA non-participants found comfort issues in one-third of homes based on interview identification or respondent self-report. We found that those with comfort issues were much more likely to have higher energy insecurity and energy burden. However, homes that responded to our in-home may have more issues than the phone survey sample, since they are more motivated to discuss energy issues and low-income assistance programs as evidenced by their willingness to participate in our in-home survey, since they may have greater need for them. The in-home assessment suggested that cultural issues may be at play, with recent immigrants and Spanish-speaking households less likely to mention comfort issues.

The in-home assessment found that ESA non-participants are most likely to need water heater wrap, pipe insulation, CFLs and faucet aerators, based on our in-home basic assessment.

3.4.4 Conclusions

We offer conclusions on energy needs below in the following three subsections, organized around four research questions.

3.4.4.1 Reducing Energy Burden

This section answers the research question:

17. How are the programs helping low-income customers address their energy burden and insecurity issues?

More detailed results are provided in Volume 2 - Section 5.5.5.

The average CARE customer saves $29/month (33% savings) on their electric bill and $6/month (18% savings) on their gas bill, based on the 2012 IOU CARE Annual Report (previously reported in Section 1.1.1 of this volume). Twenty-five percent of low-income households on CARE say their bill is "a lot less" after being on CARE, and 52 percent say "somewhat less", based on our telephone survey.

Low-income households that reported higher energy insecurity are less likely to notice an impact from CARE (11% of highly energy insecure households said their bill is "a lot less" and 56% said their bill is "somewhat less"). It may be that since they are facing a greater hardship due to energy costs, the discount is not making as much of an impact as for those that have less hardship.

The ESA program results in 81 percent of participants noticing a reduction in their energy bills, with 64 percent noticing improvements in safety and 65 percent in comfort, and 44 percent noticing improvements in the health of household members.

The energy savings results are consistent with actual changes in bills based on our analysis of IOU billing data, with participants that said they noticed their bills going down "a lot" experiencing a 10 percent decrease; those that said "somewhat" a 4 percent decrease; those that said "no change" a 11 percent increase; and those that said "bills have gone up" having a 41 percent increase in their bills. These results are also consistent with the recent ESA impact evaluation, which found net positive average savings from ESA participation, but variations across participants with some experiencing an increase in energy usage after participation.

3.4.4.2 Addressing Energy Needs

This section answers the research questions:

18. How well aligned are the needs and the measures that are installed by ESA among eligible customer segments?
19. Is the ESA program designed effectively to address the needs? Is the ESA program designed effectively to address the needs of the customer segments that have the greatest need?

ESA currently offers a range of measures that tend to align with what customers need and what they find helpful, with a major focus on weatherization measures. ESA participants experienced improvements in their health, comfort and safety more often due to weatherization and HVAC measures, while non-participants stated those types of measures as

likely to be the most helpful. The program is constrained based on budgets and cost-effectiveness to offer more measures such as early furnace replacement that could benefit a significant number of households (since half of the low-income households said their furnace is 10 years or older, based on our telephone survey). Also, not all IOUs offer all appliances, and there are climate zones where certain equipment such as central air conditioning is not available but could be useful for certain customers.

Renters are unable to receive all ESA measures unless they get their landlord's cooperation – the program does not allocate ratepayer funds to subsidize landlords. However, there may be opportunities to expand efforts to address barriers for renters, including gaining more approvals from landlords. Single-family renters in particular have greater barriers and burden and energy savings potential.

Maintenance measures may be useful for all customers on their heating and cooling systems combined with education about how to use their systems optimally. The program offers maintenance for cooling and heating equipment, but not all IOUs offer both types of tune-ups. As mentioned above, half of low-income households said their furnace is 10 years or older, and KEMA observed a similar percentage with 10-year or older cooling equipment.

Some customers may have missed opportunities for receiving HVAC and weatherization measures if their heating fuel does not match the fuel of the IOU providing the outreach. The program cannot address insulation needs of a house that uses only wood for heating. But there may be opportunities to expand coordination with the LIHEAP program to addresses this gap. Assessing how well ESA is coordinated with LIHEAP was outside the scope of this study. There may be additional opportunities in IOU overlap areas (which is the majority of SoCalGas and SCE service territories) for the IOUs to coordinate more. There have been major efforts along this front especially between SCE and SoCalGas – likely much of what can be done within IOUs has been done or assessed. However, contractors that provide service in these areas have asked for a single assessment form to be used for both IOUs, which could be explored. And contractors that work in the overlap areas who only assess for a single IOU could be encouraged (or barriers removed) to contract with both IOUs to eliminate the gap or at least the inefficiencies or delays associated with treating these customers by referrals cross-IOU.

We found that ESA participants have remaining unmet needs that could be met by going back to the home, if budget was available. This may not be a high priority at this time, but there may be screening that could be done to identify participants that have the most pressing needs. When new measures are added, their equipment ages enough to become eligible for replacement, or other changes are made to rules that would open up more measures for those households, they could be targeted identified.

We also found that there is a need among between 5 and 10 percent of low-income households that have a second refrigerator older than ten years old to replace or surrender

their second unit. The program does not currently allow replacement of secondary refrigerators.

There may also be a need for furnace repair and replacement beyond what is currently done by the program to address old or broken furnaces. The program currently only repairs or replaces a furnace for safety reasons. The measure was not found to be cost-effective, so adding this measure would be based on need, not cost-effectiveness. About half of furnaces in low-income households are ten years or older.

There may be a need for more expansive window and door repair and replacement, with 30 percent of low-income households that responded to our telephone survey saying they have one or more doors that need repair or replacement, and 37 percent saying that about one or more windows. Currently, the program does minor repairs such as if window glass is broken in conjunction with installing weatherization measures. These measures have not been found to be cost-effective in the past, so expanding window or door replacement would have to be considered for other reasons besides saving energy cost-effectively.

Lighting controls and solar water heaters are measures that could be tested for feasibility, since there is energy savings potential for these measures. Solar water heaters require technical installation skills and the specifications vary depending on the household. The state of Hawaii installs solar water heaters for low-income households, since there is a lack of need in that state for heating or cooling measures, and the program could be reviewed to see how it overcame issues related to customized installation specifications.

3.4.4.3 Energy Savings Potential

This section answers the research question:

20. What data are available that may be used to determine the remaining energy savings potential among eligible households?

More detailed results are provided in Volume 2 - Section 4.5.

This study provides data on the number of eligible and willing non-participating low-income households and the types of equipment that they have in their homes. The recent ESA impact evaluation provides current energy savings estimates that together could be used to inform estimates of energy savings potential.

We can also combine the technical potential estimates from Navigant Consulting's recent energy efficiency potential study[55] with our study's estimates of willingness to participate to yield estimates of energy savings market potential. For low-income households, market

[55] Analysis to Update Energy Efficiency Potential, goals and Targets for 2013 and Beyond – Track 1 Statewide Investor-Owned Utility Energy Efficiency Potential Study. Prepared for the California Public Utilities Commission. Navigant Consulting, Inc. and Heschong Mahone Group, March 19, 2012.

potential is the technical potential[56] per household multiplied by the fraction of households that would be willing to participate (WTP)[57] in the ESA program. Based on this approach, we estimate that:

- Total ESA electric savings potential = 208 kWh x 52% (WTP) x 3,133,942 income-eligible electric IOU customers = 339 MWh.
- Total ESA gas savings potential = 9 therms x 52% (WTP) x 3,714,462 income-eligible gas IOU customers = 17.4 million therms.

Note that the energy savings estimates underlying Navigant's technical potential estimates may not reflect what remaining non-participants homes will save, since impacts have declined over time. A more reliable estimate of technical potential would be based on on-site research with current ESA non-participants, which was not part of this study due to resource constraints. We offer a recommendation (below) to address this issue by conducting more research.

3.4.5 Recommendations

We offer recommendations on how the programs can better meet low-income households' energy needs below in the following two subsections, addressing this research question:

21. What could the programs add or modify to better serve the needs?

We also offer a recommendation on gathering more data to inform questions about the remaining energy-savings potential and on energy insecurity in a third (and final) sub-section below.

3.4.5.1 Reducing Energy Burden

We offer the following recommendations related to reducing low-income customers' energy burden.

- The ESA program could explore the tradeoffs associated with screening customers based on energy usage, estimated energy burden (e.g., using Census data on income combined with IOU billing data) and health, comfort and safety criteria (e.g., based on individual household screening) to determine priorities for treatment and/or tailor its services to the home. These types of approaches might focus resources to homes that

[56] Technical potential is defined as the amount of energy savings that would be possible if all technically applicable and feasible opportunities to improve energy efficiency were taken, including retrofit measures, replace-on-burnout measures, and new construction measures. It does not take into account whether such retrofits are economically feasible (economic potential) or what fraction would be likely to occur given the current market conditions (market potential).

[57] We are using the estimated willingness to participate from the telephone survey, which does not include some unwilling non-participants whose barriers could be addressed by the program, such as renters who do not want to ask their landlord for permission.

need it most. However, these approaches are not equitable across homes and have tradeoffs that must be considered. There are also two assumptions that would need to be tested: that the IOU data may be used to effectively screen and target customers, and that the ESA program can provide assistance that lowers customers' energy burden.

Currently, the ESA program is required to treat every eligible home, and offers that home a set of measures based on eligibility criteria that is consistent within each IOU. The program is not –expected to prioritize homes based on need or energy savings criteria, though those issues are factored into the measure eligibility.

Based on the research presented in this study, there are homes that have a greater energy burden that could be screened based on location and/or energy usage. These homes could be prioritized for treatment under the existing measure eligibility criteria, and/or offered an expanded set of measures based on greater need and/or energy savings potential. There are tradeoffs associated with this approach. The upside is that homes with greater need and energy savings potential will be prioritized. The downside is that this approach may not be considered equitable, and may even reward some households for not conserving.

Based on the research in this study, there are varying degrees of energy insecurity and health, comfort and safety. The ESA program could screen households on an individual basis based on their level of insecurity and/or health, comfort and safety to identify households who are in greater need for program support, such as by delivering a household questionnaire that adapts this study's survey batteries related to insecurity and health, comfort and safety. The program could then offer an expanded set of measures (e.g., such as relaxed measure eligibility criteria) to improve their health, comfort and safety. There are also tradeoffs associated with this approach. The upside is that homes that have sacrificed to keep their energy usage low, who would not be rewarded by the higher energy burden screening recommended above, would receive help. The downside is that this type of approach may not be cost-effective and in fact may be associated with negative energy savings.

These approaches could tested together and research conducted on the targeted households to determine whether the first approach leads to greater energy savings per household, which might offset the negative (or at least lower) energy savings associated with the second approach. There may be the potential for striking a balance between the two approaches to address the burden and insecurity issues, while preserving some level of equity and cost-effectiveness. The test would also help the IOUs determine how well their data may be used to screen effectively.

- The CARE program should continue to require ESA participation for high users and automatic post enrollment verification for households on CARE that exceed some limit of usage for their region.

This practice should help ensure that high users on CARE are provided with ESA program assistance to help them try to address their energy burden and also ensure that the CARE program is providing assistance to households that are truly eligible. Our research indicated that there are census block groups that are on average above the CARE income requirements that have many more households than are estimated as eligible on the rate. This practice is one way to attempt to address that issue.

3.4.5.2 Addressing Energy Needs

We offer the following recommendations related to how ESA addresses low-income customers' energy needs.

- The ESA program should ensure that it is effectively coordinating with the LIHEAP program to address a gap in service to customers that do not use an IOU fuel source for their heating and to offer customers additional measures that ESA does not currently offer.

Our research shows that are is a small but significant number of low-income households who use non-IOU fuel sources for their heating. Many of these customers are located in rural areas that we found to be under-served (except for PG&E service territory) and in climate zones that we found to have higher energy burden.

The LIHEAP program offers some measures that ESA does not, and provides an opportunity to provide additional measures to households that have a need.

Our study did not examine the extent to which ESA coordinates with LIHEAP, though we know from talking to program staff and contractors that there is coordination.

- The IOUs should ensure that in overlap areas (especially SCE and SoCalGas) that as many customers as possible are screened for both IOU measures in an efficient manner to increase the number of customers that pass the modified three measure minimum rule[58] and to provide comprehensive treatment.

Our study did not extensively study this issue, however we did identify that there are significant numbers of low-income customers living in the overlap area (the majority of SCE and SoCalGas CARE-eligible customers). We also identified that not all contractors that work for the IOU(s) in the overlap areas assess measures for both IOUs. There are processes where the IOUs share data and homes that are treated by only one IOU are put into a list for the other IOU to later treat, but it is unclear how quickly the home is treated by the other IOU. We also heard anecdotally from contractors that customers in overlap areas can fail the modified 3 measure minimum rule based on a single fuel.

[58] See Section 5.4.1 in Volume 2 of this report for an explanation of this rule.

- The ESA program should explore the tradeoffs associated with providing energy efficiency education and basic measures during the outreach and assessment visit for homes that are income-qualified but fail the modified three measure minimum rule.

Our study did not assess whether it would be cost-effective, but we did identify that there are many homes being income-qualified but not receiving any measures based on SCE's recording of this information. It may be found to be cost-effective to install basic measures on that first visit and/or deliver energy efficiency education. The costs of such services should be looked at incrementally to the outreach visit (i.e., just the cost of the measures and the contractor's labor), since the costs of identifying and income qualifying the customer is already sunk.

- The ESA program should explore the tradeoffs associated with offering certain targeted customers expanded measure eligibility criteria based on the prior recommendation where customers are screened based on higher energy burden and insecurity.

Our research found that there are significant numbers of customers with older furnaces who might benefit from repair or replacement. Currently, this measure is not cost-effective and only offered for safety purposes. The IOUs could explore if there are certain customers where this measure might be cost-effective, such as based on a certain level of winter gas usage, or for customers living in certain regions where heating degree days exceed a certain threshold.

There may also be different criteria where this measure is offered to customers solely based on need (e.g., based on a health, comfort and safety and/or energy insecurity screening.) The IOUs could track such services in a separate database so that the impact evaluation does not include these homes, bringing down the whole program's cost-effectiveness.

The same approach could be considered for central air conditioning replacement outside the climate zones where it is currently allowed, and for more extensive window and door replacement work. These measure restrictions are currently based on cost-effectiveness, but that has not been based on attempting to screen higher-energy savings potential customers, which could be justified based on cost-effectiveness. This measure could also be based on need, which would have to be evaluated based on different criteria.

- The ESA program should continue to explore adding additional measures such as solar water heaters, light emitting diode (LED) lamps and fixtures and lighting controls.

The program has not added solar water heaters, even though there may be some customers that could benefit and the measure might be cost-effective in some areas, because it requires technical installation that varies from household to household. The state of Hawaii currently offers solar water heaters to low-income customers in conjunction with the state's weatherization assistance program. They partner with the energy efficiency program administrator, who provides inspections of the installations. These programs could be examined to see if the California IOUs could try a pilot program to test feasibility and cost-

effectiveness. The individualized installation requirements could be justified for certain regions and/or to help reduce high energy burden.

Even though the saturation of CFLs among low-income households is high, there are still opportunities to replace inefficient lighting. As the federal lighting legislation continues to phase in and CFLs become the baseline for more wattage categories, the IOUs could explore whether LED replacement lamps and/or fixtures are cost-effective. The prices are coming down rapidly, improving cost-effectiveness for energy efficiency programs. The program could also explore whether there are lighting control measures that could be used to save energy, such as for households where occupants are home all day and who use a lot of lighting. Our study found there are few low-income households who use controls.

- The ESA program should explore the tradeoffs from going back to homes that have received ESA treatment since 2002 to provide additional measures, either as new measures are added to the program, eligibility requirements are modified and/or the treated homes' equipment ages to now be qualified for replacement.

Currently, the program goes back to previously treated homes only very rarely, with a focus on meeting the 2020 goal of treating all eligible homes. However, there may be cost-effective energy savings from going back to homes and providing new measures (e.g., that are added to the program or where eligibility requirements have been expanded) and/or the treated homes' equipment ages to now be qualified for replacement. The program may need to collect additional data or improve how it records and accesses that data to be able to do this. The program could test this approach to determine the cost-effectiveness.

- The ESA program should explore the tradeoffs from offering replacement of a second refrigerator, such as for households that demonstrate a need for it (e.g., based on size of household or medical need.) For those that have a second refrigerator that is not needed, the program could offer a significant rebate for surrendering the unit for recycling.

Our study indicated there are significant numbers of low-income households that have second refrigerators, many of which are older than ten years. Some households may need the second unit due to a large household or medical need for additional refrigeration. The older units in those cases could be replaced and offer energy savings opportunity. Other households that use the unit mostly for convenience could be offered a rebate to recycle the unit. The IOUs' energy efficiency programs typically have such a program, which could be tapped or augmented with an additional rebate.

- The IOUs should explore the tradeoffs from lowering the threshold for income self-certification.

Currently, customers are allowed to self-certify their income in census block groups where 80 percent or more households are estimated as eligible for the ESA program. Based on anecdotal interviews with program staff and contractors, this currently impacts only a small number of

customers. The IOUs could look at whether the threshold should be lowered and identify the tradeoffs.

Our research did not identify that providing income documents is a significant barrier to ESA participation, however the research that explored such barriers was based on the telephone survey sample, which excludes households that do not speak English or Spanish and those that have major outreach barriers. Anecdotally, contractors and program staff said that providing income documents is a barrier for some households.

In the previous subsection, we recommended further research to try to understand more of the barriers among households that are the most difficult to reach, which could inform this issue.

- The IOUs should explore how to increase the participation among single-family renter households.

Our research showed that this segment of the low-income population has barriers associated with being a renter, but also faces greater energy burden and need for measures due to larger homes and more energy-using equipment.

The program could look at developing a package of measures across the low-income and energy efficiency programs that could be offered to landlords to increase the likelihood of engaging with the ESA program.

The program could also look at whether it could expand the basic measures that can be installed without landlord agreement. We did not study this program design issue thoroughly, but we did hear anecdotally that at least some IOUs install CFLs and other basic measures, and refrigerators that are owned by the tenant. The program has tried and should continue to strike a balance between helping renters with their energy burden, but not using ratepayer funds to subsidize improvements to private property owned by non-low income landlords.

- The IOUs that do not offer clothes washers, PG&E and SoCalGas, should explore the tradeoffs of adding this measure.

Our study found that many low-income households have clothes washers and a significant fraction are 10 years or older. There may be energy-savings potential to expand this measure to the other IOUs.

We heard anecdotally that PG&E did a pilot test with this measure and found it not to be cost-effective. However, if screening is allowed, households that have very old clothes washers or a large number of residents might lead to cost-effective energy savings. This measure could also be considered for households that pass a health, comfort and safety and/or energy burden/insecurity screening to help reduce their burden, even though it may not provide cost-effective energy savings.

3.4.5.3 Further Study of Energy Needs

We offer the following recommendations related to addressing the gap in data to inform energy savings potential for the ESA program.

- The IOUs and CPUC should consider conducting an on-site survey with low-income ESA non-participants, as representative as possible, to collect detailed energy equipment information and energy efficiency values that may be used to develop estimates of remaining potential.

This study did not have enough resources to include this component. A future study could focus on collecting data from a representative sample of income-qualified ESA non-participants, possibly including income verification. It is very difficult to address the non-response bias issue, though, as we have described in this study. The study design could include resources to attempt to address it partially, but the sponsors should be advised that non-response bias efforts are very expensive on a per unit basis. Moreover, any such efforts would probably still exclude the very hard-to-reach, who may have different equipment holdings and barriers than those that respond to a non-response follow-up effort. However, such households will probably also not ever respond to an ESA outreach contractor so could be excluded from the study without major implications.

- The IOUs and CPUC should consider augmenting the assessment of energy insecurity in future low-income needs assessment studies.

We did not include a general population survey, which could provide a comparison to the low-income levels of energy insecurity. A future study could also try to analyze the IOU delinquency data. We collected such data but lacked sufficient time and budget to make full use of it. The energy insecurity summary measure could include actual IOU delinquency data. The insecurity battery could also include questions about the household's lifestyle to understand the context with which they are making sacrifices to pay their energy bill.

- This data on varying levels of energy burden and insecurity should be used for future study of the CARE program, since it may be used to help the IOUs and the CPUC to explore the tradeoffs of offering varying rate assistance.

The CARE program currently offers tiered rate assistance that combines a flat rate discount plus a reduction in the impact of higher-usage tiers. This design offers varying rate assistance based on customers' usage, as indicated in this study (e.g., the average electricity rate reduction is 33%).

Even with the rate assistance, a small percentage (6%) of households report being highly insecure. Likewise, there are regions whose low-income households have a relatively higher burden due to climate. Conversely there are households on CARE that report little to no energy insecurity and households with very low energy burden.

There are tradeoffs to providing less assistance to lower burden households or greater additional assistance to higher burden households. If more assistance was to be provided to those with higher energy burden, the upside is that households that live in more extreme climates and/or have greater energy needs will get more support that would lower their energy burden (i.e., by increasing their CARE subsidy). The downside is that some households that have increased energy usage will be rewarded for using more, and households that have a lower burden based on sacrificing health, comfort and safety may not get the additional assistance.

We note that our study does not support a recommendation to *increase* CARE assistance. Instead, our research identified a range of burden and insecurity among low-income households who are enrolled in CARE, which we noted could be used to further study how the CARE program helps customers to reduce their energy burden. There are questions that our data can not answer, such as does equitable treatment mean that every household gets the same level of assistance, or does it mean that households with relatively higher energy burden and/or insecurity get relatively more assistance. And conversely, that households with relatively lower (or no) energy burden and/or insecurity get relatively less or even no assistance.

There are additional considerations to incorporating energy usage, burden and/or insecurity in the consideration of CARE rate assistance, including verification of eligibility and the reliability and accuracy of measures of energy insecurity and burden. The ability of the IOUs to confirm assistance goes to those who are truly eligible and of measuring true energy burden both impact the equity considerations mentioned above.

The purpose of this recommendation is to ensure that the CPUC and the IOUs make use of the data to consider such questions, if they are a priority for planning of the next program cycle.

EVERGREEN ECONOMICS

Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs

Volume 2: Detailed Findings

Final Report

December 16, 2013

Prepared for: Southern California Edison, Pacific Gas and Electric, Southern California Gas, San Diego Gas and Electric and the California Public Utilities Commission

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Table of Contents

4 LOW-INCOME POPULATION AND PROGRAM CHARACTERIZATION 4-1

4.1 Eligible Population for CARE and ESA 4-1
4.2 CARE Enrollment and ESA Participation 4-3
4.3 Low Income Population Characteristics 4-8
4.3.1 Demographic Characteristics 4-9
4.3.2 Home and Equipment Characteristics 4-37
4.4 ESA Program Measures 4-51
4.5 Remaining ESA Program Energy Savings Potential 4-57

5 LOW-INCOME POPULATION NEEDS AND PROGRAM ASSESSMENT 5-1

5.1 Overview of Sources 5-1
5.1.1 Sample Representation 5-3
5.2 ESA Program Accessibility 5-5
5.2.1 Overview of ESA Marketing and Outreach 5-6
5.2.2 Customer Telephone Survey 5-8
5.2.3 In-Home Visits 5-16
5.3 CARE Program Accessibility 5-20
5.3.1 Overview of CARE Program Marketing and Outreach 5-20
5.3.2 Program Staff Interviews 5-22
5.3.3 Contractor Interviews 5-23
5.3.4 Customer Telephone Survey 5-25
5.3.5 In-Home Visits 5-30
5.3.6 CARE Modeling Results 5-30
5.4 ESA Participation Drivers and Barriers 5-35
5.4.1 Overview of Customer Enrollment and Assessment 5-35
5.4.2 Program Staff Interviews 5-37
5.4.3 Contractor Interviews 5-40
5.4.4 Customer Telephone Survey 5-42
5.4.5 ESA Modeling Results 5-56
5.4.6 Conjoint Analysis Results 5-69
5.4.7 In-Home Visits 5-73
5.4.8 LI Program Review 5-77
5.5 Energy Needs and LI Program Benefits 5-77
5.5.1 Energy Insecurity 5-77
5.5.2 Energy Burden 5-84
5.5.3 Non-Energy Benefits 5-100
5.5.4 Energy Efficiency Measures 5-107
5.5.5 CARE Program Benefits 5-141

This document is Volume 2 (Detailed Findings Report) of the Needs Assessment study that Evergreen Economics conducted for the Energy Savings Assistance (ESA) and the California Alternate Rates for Energy (CARE) programs for the joint California investor-owned utilities (IOUs).

This volume contains the following sections:

- Section 4: Low-Income Population and Program Characterization
- Section 5: Low-Income Population Needs and Program Assessment

The study report contains three volumes. Volume 1 is the Summary Report and Volume 3 is the Technical Appendix.

4 Low-Income Population and Program Characterization

This section characterizes the state of California's low-income (LI) population, and measures and savings potential for the ESA program. First, we estimate the eligible population for the CARE and ESA programs in Section 4.1. Next, we characterize cumulative CARE and ESA participation and estimate 2012 program penetration in Section 4.2. In Section 4.3, we present an updated characterization of the LI population including demographics and home and equipment characteristics. In Section 4.4, we discuss the ESA program measure eligibility and provide current energy savings estimates by measure category. Finally, in Section 4.5 we discuss how much of the data in this section could be used to inform questions about the remaining ESA program energy savings potential, identify caveats to using the available data and recommend research that could be conducted to fill critical data gaps.

4.1 Eligible Population for CARE and ESA

We used Athens Research data, introduced in Section 3.4 above, to generate the eligible population for both the 2012 CARE and ESA programs. Athens Research produced estimates for the California IOUs based on analysis of Census and other data sources. As shown in Table 1 and Table 2, Athens Research produced estimates of the total number of households that are technically eligible for each program, followed by the number and percent of households that meet certain thresholds of federal poverty levels. Currently, both CARE and ESA are using 200 percent of the federal poverty level (the fourth columns in the tables below) to be income-eligible for the programs. Statewide, 32 percent (4.1 million households) are technically and income-eligible for the CARE and ESA programs.

Table 1: CARE Eligible Population Estimates for IOUs (2012)

	Total Households Technically Eligible for CARE [1]	CARE Eligible Households				Percent of Total Households Eligible for CARE			
		175% of Poverty	200% of Poverty	225% of Poverty	250% of Poverty	175% of Poverty	200% of Poverty	225% of Poverty	250% of Poverty
Statewide [2]	12,811,083	3,597,993	4,148,934	4,668,707	5,163,877	28%	32%	36%	40%
PG&E (total)	5,246,113	1,361,181	1,574,844	1,782,675	1,978,906	26%	30%	34%	38%
PG&E (electric and gas)	3,269,167	809,149	934,939	1,058,830	1,174,837	25%	29%	32%	36%
PG&E (electric only)	1,183,408	328,958	380,410	430,133	476,620	28%	32%	36%	40%
PG&E (gas only)	793,538	223,073	259,495	293,713	327,448	28%	33%	37%	41%
SCE	4,379,538	1,214,701	1,413,367	1,599,507	1,777,677	28%	32%	37%	41%
SCG	5,393,233	1,545,847	1,787,455	2,009,173	2,224,406	29%	33%	37%	41%
SDG&E (total)[3]	1,246,898	303,793	351,607	397,987	442,194	24%	28%	32%	36%
SDG&E (electric accounts)	1,246,898	303,793	351,607	397,987	442,194	24%	28%	32%	36%
SDG&E (gas accounts)	838,523	202,514	234,813	266,275	296,395	24%	28%	32%	35%

[1] Technical eligibility refers to household eligibility based on the home metering arrangement, irrespective of other eligibility requirements. The CARE and ESA programs have different technical eligibility requirements for sub-metered and master metered households. Master metered, sub-metered and individually metered households are technically eligible for the ESA program. Only sub-metered and individually metered households are eligible for the CARE program. Athens Research cannot distinguish differences in technically eligible households at the statewide level but do provide this distinction for each utility.

[2] The statewide estimates of eligible households for CARE (Table 17) and ESA (Table 18) are equal. The Athens Research statewide estimates are developed by aggregating third party vendor data for all regions of California including areas served by non IOU utilities. Unlike the utility specific estimates, this data does not make the distinction between households technically eligible for ESA and the smaller number technically eligible for CARE. This results in the same number of households technically eligible for both programs in the statewide results.

[3] The SDG&E total is based on electric tariff counts.

Source: 2012 data developed by John Peterson of Athens Research under subcontract to the IOUs.

Table 2: ESA Eligible Population Estimates for IOUs (2012)

	Total Households Technically Eligible for ESA [1]	ESA Eligible Households				Percent of Total Households Eligible for ESA			
		175% of Poverty	200% of Poverty	225% of Poverty	250% of Poverty	175% of Poverty	200% of Poverty	225% of Poverty	250% of Poverty
Statewide [2]	12,811,083	3,597,993	4,148,934	4,668,707	5,163,877	28%	32%	36%	40%
PG&E (total)	5,767,701	1,523,992	1,758,164	1,986,244	2,200,969	26%	30%	34%	38%
PG&E (electric and gas)	3,533,851	885,098	1,020,618	1,154,003	1,278,602	25%	29%	33%	36%
PG&E (electric only)	1,010,746	285,079	330,480	374,234	415,183	28%	33%	37%	41%
PG&E (gas only)	1,223,104	353,815	407,066	458,006	507,184	29%	33%	37%	42%
SCE	4,408,691	1,225,731	1,425,901	1,613,339	1,792,693	28%	32%	37%	41%
SCG	5,970,138	1,759,003	2,027,605	2,273,100	2,511,005	30%	34%	38%	42%
SDG&E (total)[3]	1,261,216	308,534	356,943	403,916	448,645	25%	28%	32%	36%
SDG&E (electric accounts)	1,261,216	308,534	356,943	403,916	448,645	25%	28%	32%	36%
SDG&E (gas accounts)	904,151	224,208	259,173	293,234	325,642	25%	29%	32%	36%

[1] Technical eligibility refers to household eligibility based on the home metering arrangement, irrespective of other eligibility requirements. The CARE and ESA programs have different technical eligibility requirements for sub-metered and master metered households. Master metered, sub-metered and individually metered households are technically eligible for the ESA program. Only sub-metered and individually metered households are eligible for the CARE program. Athens Research cannot distinguish differences in technically eligible households at the statewide level but do provide this distinction for each utility.

[2] The statewide estimates of eligible households for CARE (Table 17) and ESA (Table 18) are equal. The Athens Research statewide estimates are developed by aggregating third party vendor data for all regions of California including areas served by non IOU utilities. Unlike the utility specific estimates, this data does not make the distinction between households technically eligible for ESA and the smaller number technically eligible for CARE. This results in the same number of households technically eligible for both programs in the statewide results.

[3] The SDG&E total is based on electric tariff counts.

Source: 2012 data developed by John Peterson of Athens Research under subcontract to the IOUs.

4.2 CARE Enrollment and ESA Participation

We used IOU reports combined with the previous LINA study to generate annual CARE enrollment and ESA participation estimates from 1993 to 2012. The IOUs have ramped up enrollment in the CARE program over time, as shown in Table 3 below, reaching a peak during the last two to three years. As discussed previously in Section 2.1.1, the CPUC set a 90 percent penetration goal for the CARE program in Decision 08-11-031. The IOUs achieved that goal in 2011 and 2012 across the IOU service territories.

Table 3: Summary of Annual CARE Program Participation by IOU (1993-2012)

Year	PG&E	SCE	SCG	SDG&E
1993	328,491	326,526	441,831	111,510
1994	350,605	414,828	610,170	103,672
1995	344,149	455,188	737,410	111,218
1996	317,998	466,296	673,553	129,831
1997	282,701	491,045	614,942	119,508
1998	257,945	507,188	533,362	120,548
1999	284,276	496,271	519,511	123,137
2000	350,194	542,175	549,158	145,764
2001	545,175	729,367	655,446	151,121
2002	731,107	817,637	790,592	170,815
2003	812,204	899,148	957,602	181,028
2004	900,264	977,760	1,049,767	193,524
2005	1,037,618	972,188	1,148,334	203,292
2006	1,133,663	1,055,710	1,264,264	220,010
2007	1,107,733	1,024,148	1,332,614	229,759
2008	1,136,237	1,104,556	1,435,938	241,196
2009	1,351,415	1,235,123	1,560,543	269,517
2010	1,499,942	1,381,109	1,720,017	296,430
2011	1,532,692	1,437,537	1,716,495	308,596
2012	1,491,413	1,402,052	1,649,360	309,605

Sources: LINA Study (KEMA 2007) for data through 2006, IOU ESA and CARE Annual Reports for data from 2007-2011, and IOU ESA and CARE Monthly Reports for 2012 data.

Table 4 below presents CARE annual program participation by small multi-jurisdictional utilities (SMJUs). Program participation increased over the last few years for the SMJUs, in conjunction with similar increases achieved by the IOUs.

Table 4: Summary of Annual CARE Program Participation by SMJU (2003-2011)

	Alpine Natural Gas	Bear Valley Electric	PacifiCorp	Sierra Pacific	Southwest Gas	West Coast Gas
2003	23	1,569	3,336	1,108	22,576	40
2004	26	1,559	4,445	1,277	25,487	45
2005	31	1,302	5,346	1,507	32,200	38
2006	38*	1,059	7,576	1,604	38,939	34
2007		1,062	8,917	2,364	37,266	41
2008		1,477	10,500*	2,496*		46*
2009	68	2,181	9,149	3,147*		50*
2010		2,405	10,224	3,023	50,888	54*
2011		2,599	10,442	2,889*	53,804	58*

*Estimates.
Sources: LINA Study (KEMA 2007) for data through 2006, 2007 – 2011 data from the Low Income Oversight Board website (www.liob.org/documents).

Table 5 below presents annual IOU ESA program participation from 1994 through 2012. The IOUs ramped up participation for ESA during the same timeframe that the CARE program experienced increased enrollment. As described previously in Section 2.1.2, the IOUs were responding to the long-term vision of the ESA program outlined in the state's Strategic Plan: to have 100 percent of all eligible and willing LI customers receive all cost-effective ESA program measures by 2020. CPUC Decision 12-08-044, which approved the 2009-2011 program cycle, set ESA participation goals equal to one-third of the remaining untreated homes (1,093,442 homes). The expectation was that the IOUs would treat the remaining two-thirds of untreated homes in the next two program cycles. The IOUs treated 303,396 homes in 2012, 83 percent of the 364,481 projected for that year by the CPUC.

Table 5 shows annual average and cumulative participation counts during the entire period and also for the period 2002-2012. The year 2002 is being used as a baseline from which to measure cumulative ESA participation and penetration towards the state's Strategic Plan goal. During the period 2002-2012, the IOUs treated 2,444,679 homes.

Table 5: Summary of Annual ESA Program Participation by IOU (1994-2012)

Year	PG&E	SCE	SCG	SDG&E
1994	42,189	95,896	16,075	9,453
1995	41,837	42,977	16,327	7,395
1996	45,015	69,236	20,664	9,824
1997	45,033	69,569	21,073	9,931
1998	30,391	68,056	21,686	10,838
1999	40,604	74,694	25,390	10,993
2000	42,038	81,401	22,429	13,660
2001	32,740	85,509	28,457	19,315
2002	56,698	29,685	42,667	14,089
2003	38,631	33,348	46,900	15,706
2004	42,380	37,341	54,221	17,431
2005	52,648	36,419	40,477	11,266
2006	58,250	53,004	36,852	13,965
2007	63,319	44,323	44,048	13,074
2008	61,034	54,635	58,773	20,804
2009	81,308	61,834	83,493	20,927
2010	133,329	121,016	120,358	21,593
2011	128,071	93,771	161,020	22,575
2012	115,229	68,859*	96,893	22,415
Annual Average (1994 – 2012)	60,565	64,293	50,411	15,013
Cumulative Total (1994 – 2012)	1,150,744	1,221,573	957,803	285,254
Annual Average (2002 – 2012)	75,536	57,658	71,427	17,622
Cumulative Total (2002 – 2012)	830,897	634,235	785,702	193,845

*49,026 customers were treated; 68,859 customers were enrolled.
Sources: LINA Study (KEMA 2007) for data through 2006, 2007 – 2011 data from the Low Income Oversight Board website (www.liob.org/documents).

Table 6 below presents annual ESA program participation for the SMJUs, where the data were available. Participation levels are fairly low, but increasing, for most SMJUs.

Table 6: Summary of Annual ESA Program Participation by SMJU (2003-2011)

	Alpine Natural Gas	Bear Valley Electric	PacifiCorp	Sierra Pacific	Southwest Gas	West Coast Gas
2003	n/a	n/a	92	160	843	n/a
2004	14	65	15	119	913	n/a
2005	16	85	70	119	738	n/a
2006	Not available	6	29	84	798	n/a
2007	45*	70	81	150	Not available	n/a
2008	54*	105*	90*	115*	Not available	n/a
2009	Not available	163*	110*	125*	Not available	n/a
2010	Not available	163*	115*	140*	Not available	n/a
2011	Not available	163*	120*	150*	Not available	n/a

* Participation projections from program applications.
n/a=The ESA programs for Alpine Natural Gas and Bear Valley Electric were not in effect until 2004. West Coast Gas does not offer the ESA program.
Sources: LINA Study (KEMA 2007) for data through 2006, 2007 – 2011 data from the Low Income Oversight Board website (www.liob.org/documents).

Table 7 below presents CARE and ESA program penetration rates for 2012, based on a combination of participation and eligibility data presented earlier in this section. These data compare to the 2006 penetration data reported in the previous KEMA LINA study (below in Table 8) for the LIEE program (as the ESA program was formerly known). As shown, both programs have experienced a major increase in penetration rates (doubling for ESA/LIEE and increasing by 22 percent for CARE).

Table 7: Estimates of Annual CARE and ESA Program Penetration (2012)

	CARE Eligible Households (200%)	CARE Participants	Annual CARE Penetration	LIEE Eligible Households (200%)	LIEE Participants	Annual LIEE Penetration
PG&E	1,574,844	1,491,413	95%	1,758,164	115,229	7%
SCE	1,413,367	1,402,052	99%	1,425,901	68,859	5%
SoCalGas	1,787,455	1,649,360	92%	2,027,605	96,893	5%
SDG&E	351,607	309,605	88%	356,943	22,415	6%
Total	5,127,273	4,852,430	95%	5,568,613	303,396	5%

Sources: Participant data from CARE Programs 2012 Annual and Monthly Reports and eligibility data from 2012 data developed by John Peterson of Athens Research under subcontract to the IOUs.

Table 8: Estimates of Annual CARE and LIEE Program Penetration (2006)

	CARE Eligible Households (200%)	CARE Participants	Annual CARE Penetration	LIEE Eligible Households (200%)	LIEE Participants	Annual LIEE Penetration
PG&E	1,601,238	1,133,663	71%	1,868,594	58,250	3%
SCE	1,351,845	1,055,710	78%	1,365,633	53,004	4%
SCG	1,762,569	1,264,264	72%	2,005,118	36,852	2%
SDG&E	335,015	220,010	66%	394,242	13,965	4%
Total	5,050,667	3,673,647	73%	5,633,587	162,071	3%

Source: LINA Study (KEMA 2007).

4.3 Low Income Population Characteristics

This section presents characteristics of the state's LI population[1] as compared to the total population, and by IOU service territory. We also compared characteristics across LI population segments such as by home type and ownership, depending on data availability.

We used a number of sources[2] to develop the estimates in this subsection, which were introduced in Section 3.4:

- 2004 and 2011 ACS/PUMS data, and
- 2013 CLASS data.

Section 7 in this report's appendix presents more detail on these results, including results on weather-sensitive energy-using equipment by climate zone from the 2010 California RASS.

Section 4.3.1 presents the demographic results from the ACS/PUMS data. Section 4.3.2 presents the home and equipment characteristics results from the CLASS data. In each subsection, for each result, we present up to two exhibits. First, we present a table that shows the result for the California population, the overall California LI population and by IOU (for the LI population). For only the demographic data, we provide time series data from 2004 for the

[1] 2004 and 2011 ACS/PUM, CLASS and RASS data households are considered low income if their household income below 200% of Federal Poverty Guidelines. We provide more detail on how this was determined for each data source in section Section 7.1.

[2] As described in more detail in Section 7.1.2, we compared the demographic characteristics of each source's LI sample. We assumed that the ACS/PUMS data were the most reliable, including the most robust sample sizes. We found that the RASS and CLASS LI sub-samples have more homeowners than the PUMS LI sub-sample, with nearly half the sample owning their home compared to 33 percent in PUMS. The CLASS also over-represents households whose primary language is English (this variable was not available for RASS). We did not adjust the RASS and CLASS samples, but we do provide all the home and equipment characteristic results by homeowner versus renter and for households whose members speak Spanish or another non-English language in Section 7.3.

overall state and LI population. Next, we include a chart that highlights any substantial differences that we noted across additional segments of the LI population, including home type and ownership, language and urban versus rural.[3] If we did not find any substantial differences across any segments, we do not include a follow-up chart.

Any differences across segments that we describe in the text are statistically significant[4] unless indicated otherwise.

4.3.1 Demographic Characteristics

We used 2004 and 2011 ACS/PUMS data to describe the California total and California LI population's demographic characteristics. We included 2004 data to allow for comparisons over time.[5] The columns of the first table of each result, and the PUMS sample size, are:

- Percent of California population – 2011 (n=146,280);
- Percent of California population – 2004 (n=43,413);
- Percent of California LI population – 2011 (n=38,293);
- Percent of California LI population – 2004 (n=11,046);
- All remaining columns are for 2011:
    - Percent of PG&E's California LI population (n=16,786);
    - Percent of SCE's California LI population (n=26,033);
    - Percent of SDG&E's California LI population (n=8,052); and
    - Percent of SoCalGas's California LI population (n=26,382).

The segments that we selected within the PUMS 2011 LI sub-sample are home type, home ownership, language and rural versus urban. The specific segments we reviewed, and the PUMS sample size for each segment, are:

- Single-family home occupied by homeowners (n=13,696);
- Single-family home occupied by renters (n=7,850);
- Multi-family homes[6] (n=14,683);
- Mobile homes (n=1,000);
- English-only (n=17,973);

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[3] The rural versus urban distinction was available only for the ACS/PUMS data.
[4] We referred to the approximate sampling error estimates for each source (shown in Section 7.1) for PUMS. For the CLASS data, we calculated confidence bounds or referred to standard errors for means for each result noted in the text.
[5] The prior needs assessment study conducted the majority of its primary research with 2004. In Section 5, we make some comparisons to the prior study, so we chose 2004 for the time series data in this section for consistency.
[6] Multi-family homes are defined as any housing structure with two or more units. This differs from the 2007 KEMA study were multi-family homes are defined as housing structures with five or more units. This also differs from the concurrent Cadmus multi-family LI study which also defines multi-family homes as housing structures with five or more units.

- Spanish[7] (n=14,087);
- Other language (n=6,233);
- Urban[8] (n=35,269); and
- Rural (n=3,024).

In selected exhibits, we also include results for the linguistically isolated segment of the population. The ACS defines a linguistically isolated household as a household in which no one in the household of age 14 and over speaks English only or English very well.

For most results, we present a follow-up chart that compares results across one or more of these segments of the LI population, where we identified substantial differences. Sampling error information is provided in Section 7.1.1 and standard errors for means is included in the detailed results in Section 7.2.

Table 9 below shows the distribution of home types for the state as a whole, for the state's LI population, and for the LI population by IOU service territory. About half of LI homes are single-family, a smaller proportion than the total population. PG&E has a larger fraction of single-family LI homes than the other IOUs.

Figure 1 presents the distribution of LI home types within the primary language segments of the population, households that speak primarily English, primarily Spanish or primarily some other non-English language, and the rural and urban segments of the population. There is a slightly higher proportion of LI single-family homes in rural areas and among homes whose primary language is Spanish or English, while there is a lower proportion (39%) of LI single-family homes among linguistically isolated households.

[7] The ACS asks respondents if they speak a language other than English, and if so, what language (allowing one response per household member). The PUMS data includes a household language variable that has rolled up the individual household member data into the household level (allowing one response per household).
[8] The definition of urban and rural is based on county, since that was the lowest geographic area available in the ACS/PUMS that could be associated with a rural or urban designation.. If a home was in a county that was in a metropolitan area with population of 250,000 or greater, the home was considered to be in an urban area. Otherwise it was considered rural. This approach may lead to an under statement of rural residents.

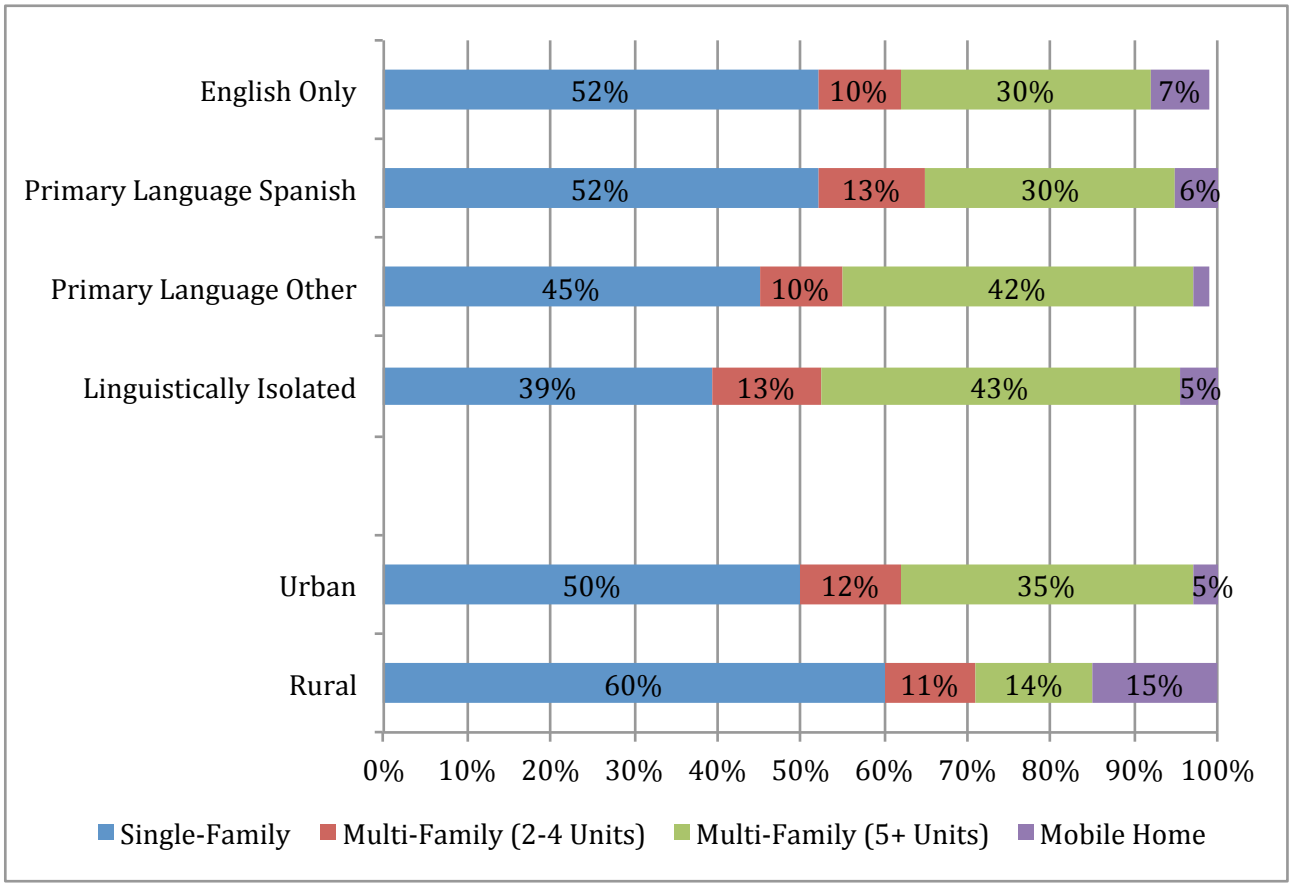
Table 9: Housing Type - By Population and IOU[9]

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Single-Family	66%	66%	51%	49%	55%	51%	45%	50%
Multi-Family (2-4 Units)	8%	8%	11%	12%	13%	11%	10%	11%
Multi-Family (5+ Units)	23%	22%	32%	32%	26%	32%	40%	33%
Multi-Family (Total)*	31%	30%	43%	44%	39%	43%	50%	44%
Mobile Home	4%	4%	6%	6%	7%	6%	5%	6%

* The definition of multi-family homes in this study is a housing structure with 2 or more units. In this table, we provide a sub-total for housing structures with 5 or more units to allow for comparison with the 2007 KEMA Low Income Needs Assessment and the concurrent Cadmus LI multifamily study.
Sources: 2004 and 2011 PUMS.

[9] We compared our estimates to the Multifamily LI Study being concurrently conducted by Cadmus, and found that our statewide estimate of the percent of LI households that are in multi-family homes with 5+ Units is within 1 percent. The IOU estimates are within 2 percent for all IOUs but SCE, where we are within 5 percent. We used ACS/PUMS as did Cadmus, however they used both the 3-year and 5-year data, while we used only 3-year data. Each team used a slightly different approach to access the data for LI households by geographic segments such as IOU service territories. Our results are estimates with associated error, and we believe that the two sets of results are consistent and differences are within expected error bounds.

Figure 1: Housing Type - By Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

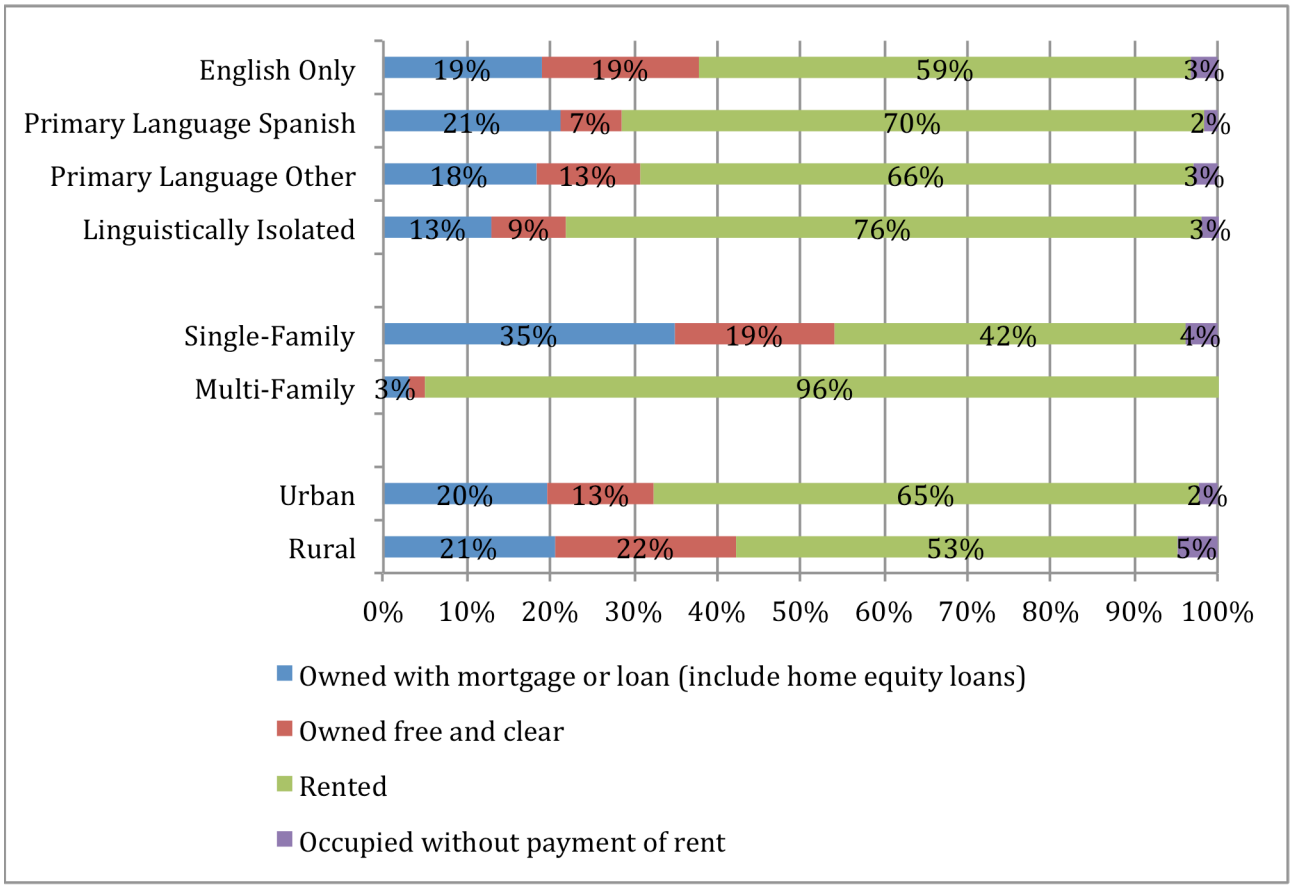
Table 10 below shows the distribution of home ownership for the state and its LI population. Only 33 percent of LI homes are owned as compared to 55 percent of all homes. There is little difference across IOUs in the rate of LI home ownership. Figure 2 shows the same distribution by LI primary language and urban versus rural segment, with English-only and rural LI homes being more likely to be owned and linguistically isolated homes more likely to be rented.

Table 10: Home Ownership - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Owned with mortgage or loan (include home equity loans)	41%	44%	20%	20%	20%	22%	19%	21%
Owned free and clear	14%	15%	13%	14%	16%	13%	13%	12%
Rented	44%	40%	64%	63%	62%	63%	65%	65%
Occupied without payment of rent	2%	1%	3%	2%	3%	2%	2%	2%

Sources: 2004 and 2011 PUMS.

Figure 2: Home Ownership - By Language, Home Type and Urban/Rural For California LI Population



Sources: 2011 PUMS.

Table 11 shows the distribution of urban and rural homes, with 93 percent of LI homes located in urban areas, similar to the 94 percent of total homes. As described above in the introduction to this section, the definition of urban and rural is based on county, since that is geographic information provided for the PUMS data. If a home was in a county that was in a metropolitan area with a population of 250,000 or greater, the home was considered to be in an urban area. Otherwise, it was considered rural.

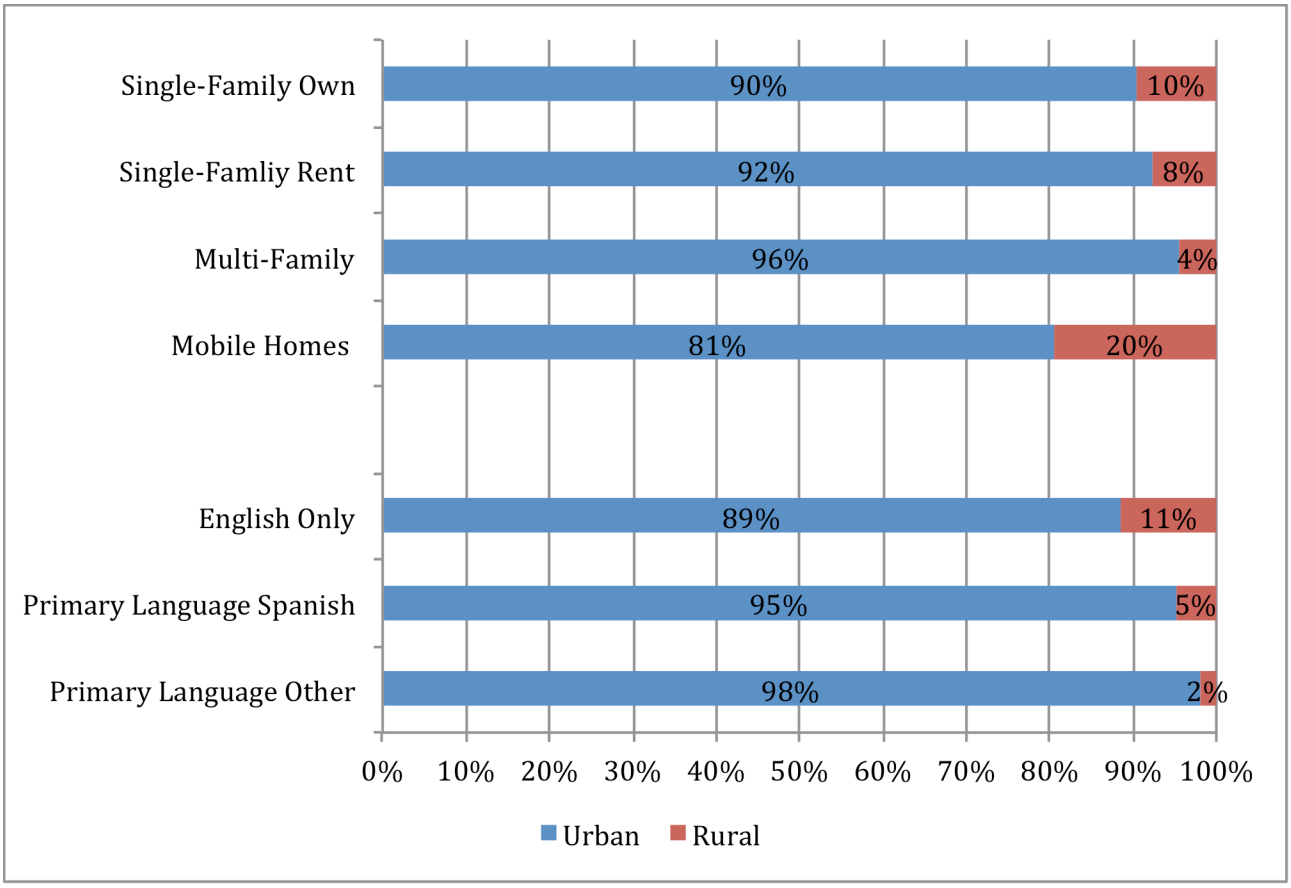
PG&E has a greater proportion of rural LI homes (15%). Figure 3 shows the distribution by home type, ownership and primary language segment. As shown, there are greater proportions of mobile homes and English-only homes in rural areas.

Table 11: Urban/Rural Status – By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Urban	94%	N/A	93%	N/A	85%	97%	97%	99%
Rural	6%	N/A	7%	N/A	15%	3%	3%	2%

Sources: 2004 and 2011 PUMS.

Figure 3: Urban/Rural Status – By Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 12 shows the language spoken in homes, either English-only, or if a non- English language is spoken, the primary non-English language. As mentioned above in the introduction to this section, the ACS asks respondents if they speak a language other than English, and if so, what language (allowing only one). The PUMS data includes a household language variable that assigns a single language to each household. Where one or more people in a household reported speaking a language other than English at home, the non-English language spoken by the first person in a preassigned ranking system was assigned to the household as the household language. The ranking scheme listed household members in the following order: householder, spouse, parent, sibling, child, grandchild, other relative, stepchild, unmarried partner, housemate or roommate, and other non-relatives[10].

There is a lower proportion of LI English-only speaking homes (46%) as compared to all homes (58%). PG&E has fewer Spanish-speaking LI homes than the other IOUs. There has been a slight increase in homes speaking other languages besides English since 2004, among LI and all homes.

Figure 4 below shows the same distribution by LI home type and rural versus urban segment, with more LI urban, single-family, renter-occupied and multi-family homes speaking a primary language other than English.

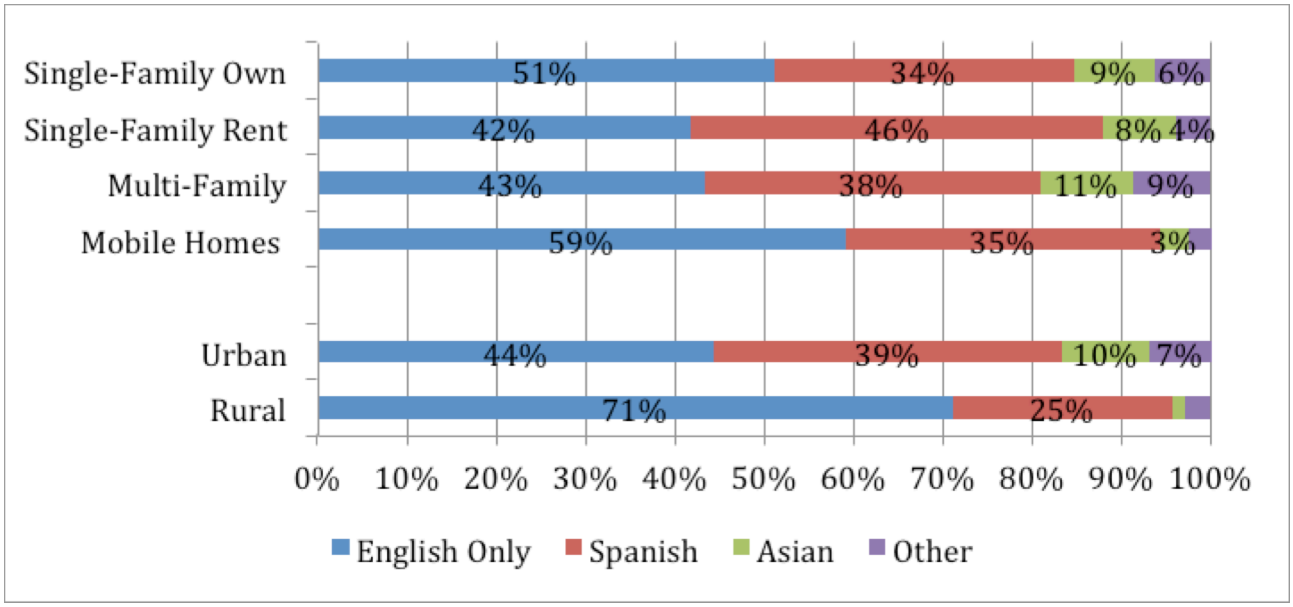
Table 12: Language Spoken in Household - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
English-only	58%	61%	46%	48%	55%	41%	52%	40%
Spanish	25%	24%	38%	37%	30%	45%	32%	46%
Asian	10%	9%	9%	9%	10%	8%	7%	8%
Other	7%	6%	7%	6%	6%	6%	9%	6%

Sources: 2004 and 2011 PUMS.

10 Social Explorer; U.S. Census Bureau; American Community Survey 2011 Summary File: Technical Documentation.
http://www.socialexplorer.com/data/ACS2011/documentation/49d2e728-46a6-430c-aef7-2b4282b76327#88f99dfa-a802-4151-a52e-3334e65af9b4

Figure 4: Language Spoken in Household – By Housing Type and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 13 below presents the proportion of households that report being linguistically isolated. As described above, a linguistically isolated household is a household in which no one in the household aged 14 and over speaks English only or English very well. Double the proportion of LI to total households are linguistically isolated (20% compared to 10%). This percentage has dropped slightly since 2004, from 23 percent for LI and from 11 percent for the total population, even though as reported above there are more non-English speakers. This result suggests that the additional households that speak a language other than English are more likely to also speak English. Slightly more SCE and SoCalGas LI households are linguistically isolated compared to the other IOUs.

Table 13: Linguistic Isolation - By Population and IOU

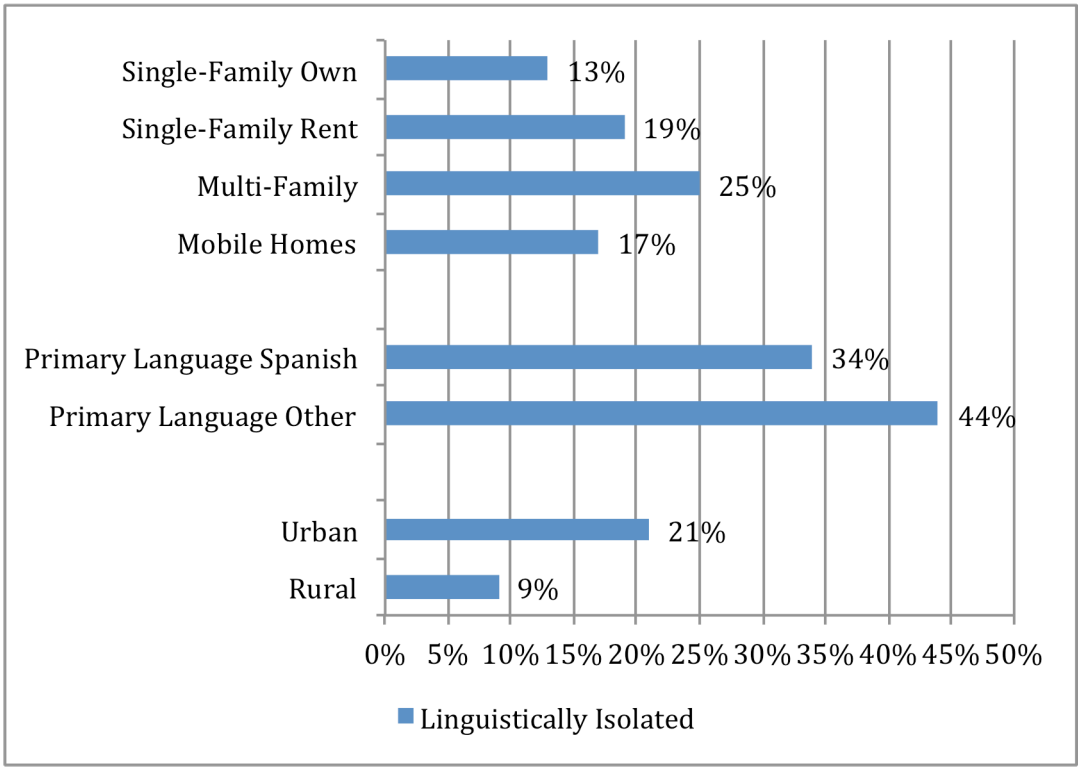
	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Linguistically Isolated	10%	11%	20%	23%	17%	21%	18%	22%

Sources: 2004 and 2011 PUMS.

Figure 5 below shows linguistic isolation by LI home type, primary language and rural versus urban segments, with a greater proportion of multi-family and urban homes reportedly isolated. The language segments represent the portion of the population of households whose

primary language is Spanish or another non-English language. These segments are correlated with linguistic isolation. 34 percent of households with Spanish as the primary language are linguistically isolated. 44 percent of households with another non-English language are linguistically isolated.

Figure 5: Linguistic Isolation - By Housing Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 14 below presents the distribution of ethnicities of the head of household, with 20 percent of LI homes in the state lead by a White householder, compared to 40 percent of all homes. 42 percent of LI homes are led by a Hispanic householder, compared to 28 percent of all homes. The ethnicities of California households have shifted since 2004, with more homes led by Hispanic householders. PG&E and SDG&E have greater proportions of White LI households compared to the other IOUs. Both SCE and SoCalGas have approximately 50 percent (49% SCE, 50% SoCalGas) of LI households headed by a Hispanic.

Table 14: Race/Ethnicity of Householder - By Population and IOU

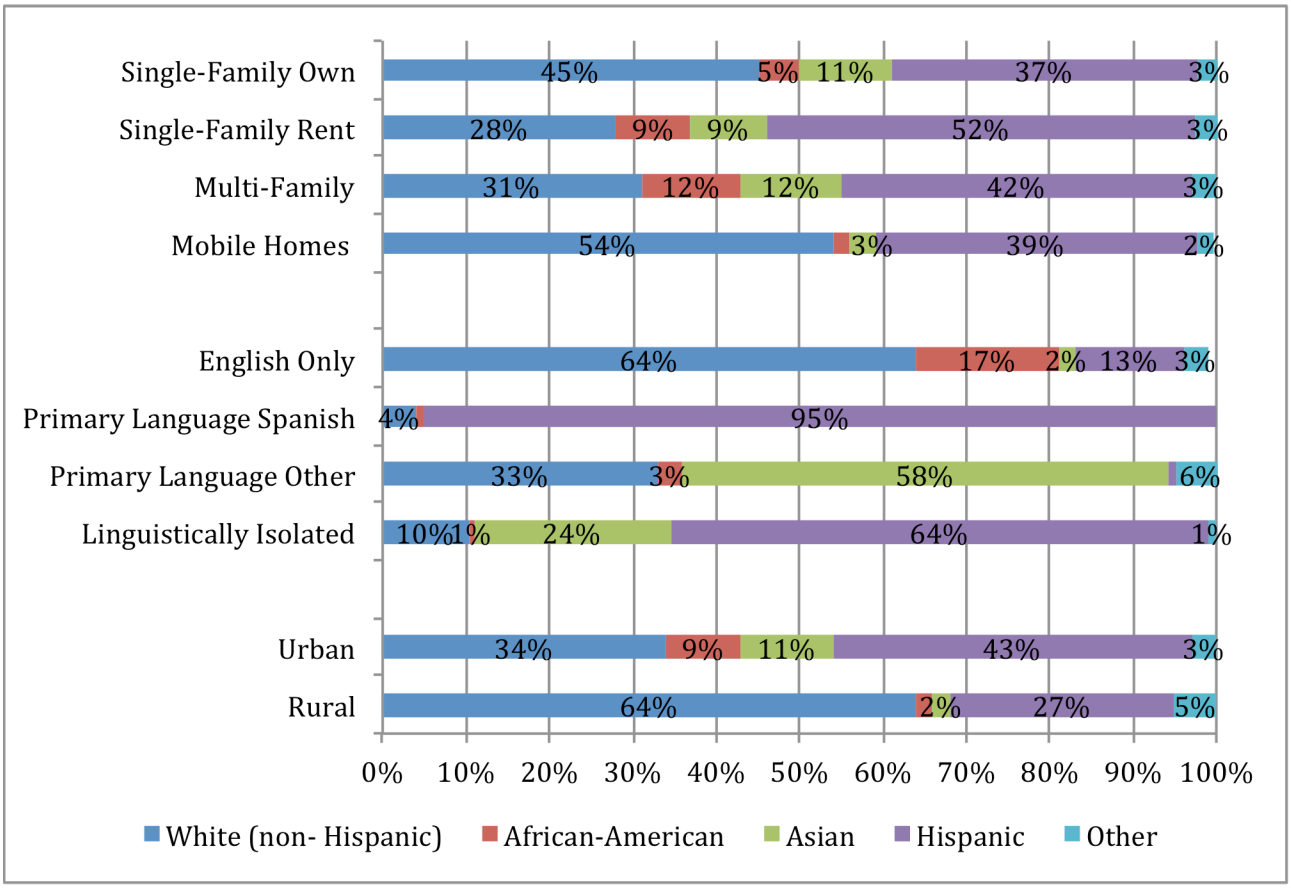
	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
White (non- Hispanic)	51%	62%	36%	46%	44%	31%	48%	30%
African-American	6%	5%	9%	7%	8%	9%	6%	9%
Asian	12%	11%	10%	10%	11%	9%	8%	9%
Hispanic	28%	20%	42%	33%	34%	49%	36%	50%
Other	3%	2%	3%	4%	3%	3%	3%	3%

Sources: 2004 and 2011 PUMS.

Figure 6 presents ethnicity by LI home type, primary language and rural versus urban segment, showing pronounced differences by home type, ownership, language and urban versus rural.

- The majority of single-family rental households are Hispanic (52%), with 28 percent White.
- Of LI homes speaking a primary language other than Spanish or English, 58 percent are Asian.
- 61 percent of rural LI homes are White, compared to only 18 percent of urban LI homes.

Figure 6: Race/Ethnicity of Householder - By Housing Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 15 shows the distribution of household size, with 30 percent of LI homes having a single resident compared to 25 percent for the state. LI homes have slightly more occupants on average than all homes. PG&E and SDG&E LI homes have slightly fewer occupants on average than the other IOUs. Household size has remained stable over time.

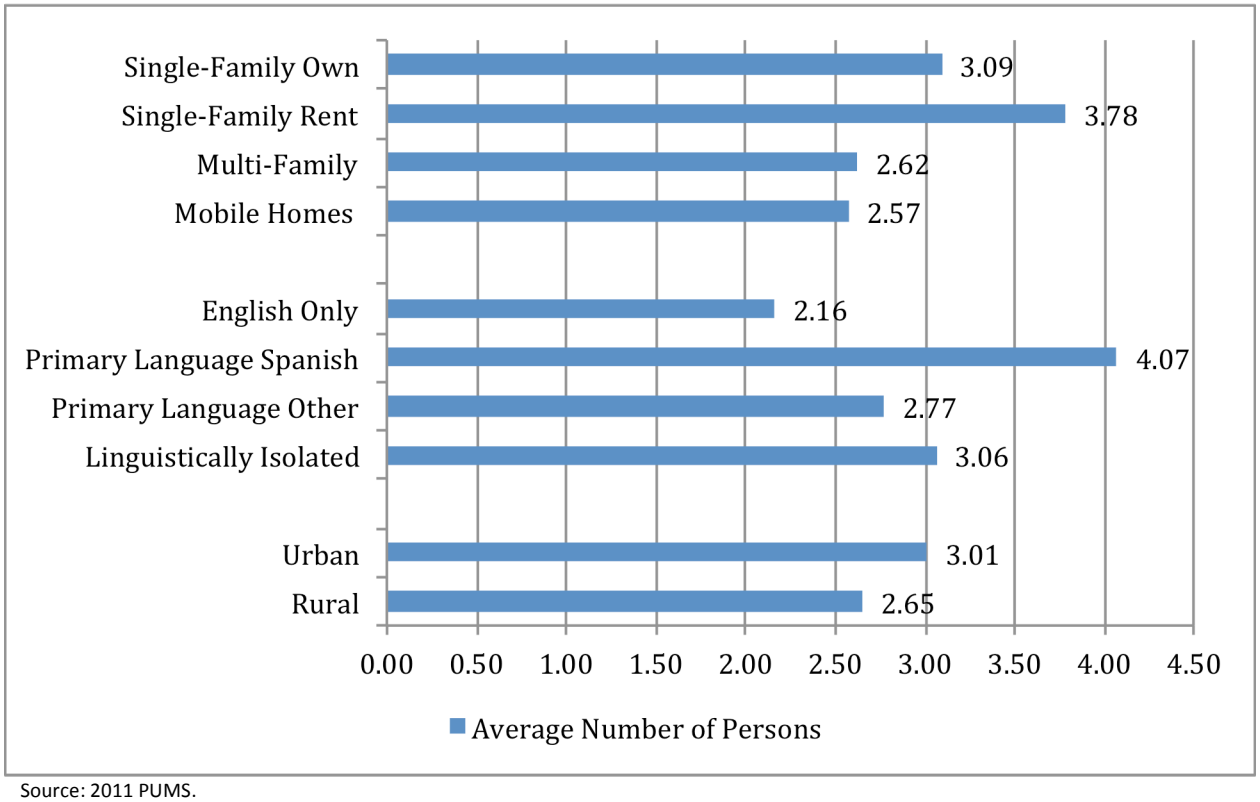
Table 15: Number of Persons per Home - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
1 person	25%	25%	30%	29%	32%	27%	32%	27%
2 persons	30%	30%	21%	21%	22%	20%	24%	20%
3 or more persons	46%	45%	50%	49%	46%	53%	44%	53%
Average Persons	2.77	2.75	2.98	2.98	2.85	3.15	2.73	3.15

Source: 2004 and 2011 PUMS.

Figure 7 shows the same distribution by LI home type, primary language and rural versus urban segment, with single-family renters, urban and Spanish speakers having the largest number of occupants.

Figure 7: Number of Persons per Home – By Home Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 16 shows the household composition, with a greater proportion of LI households having children in the home (46% compared to 37% of all households). There has been a small increase (2%) in the proportion of homes with children since 2004 across LI and all households.

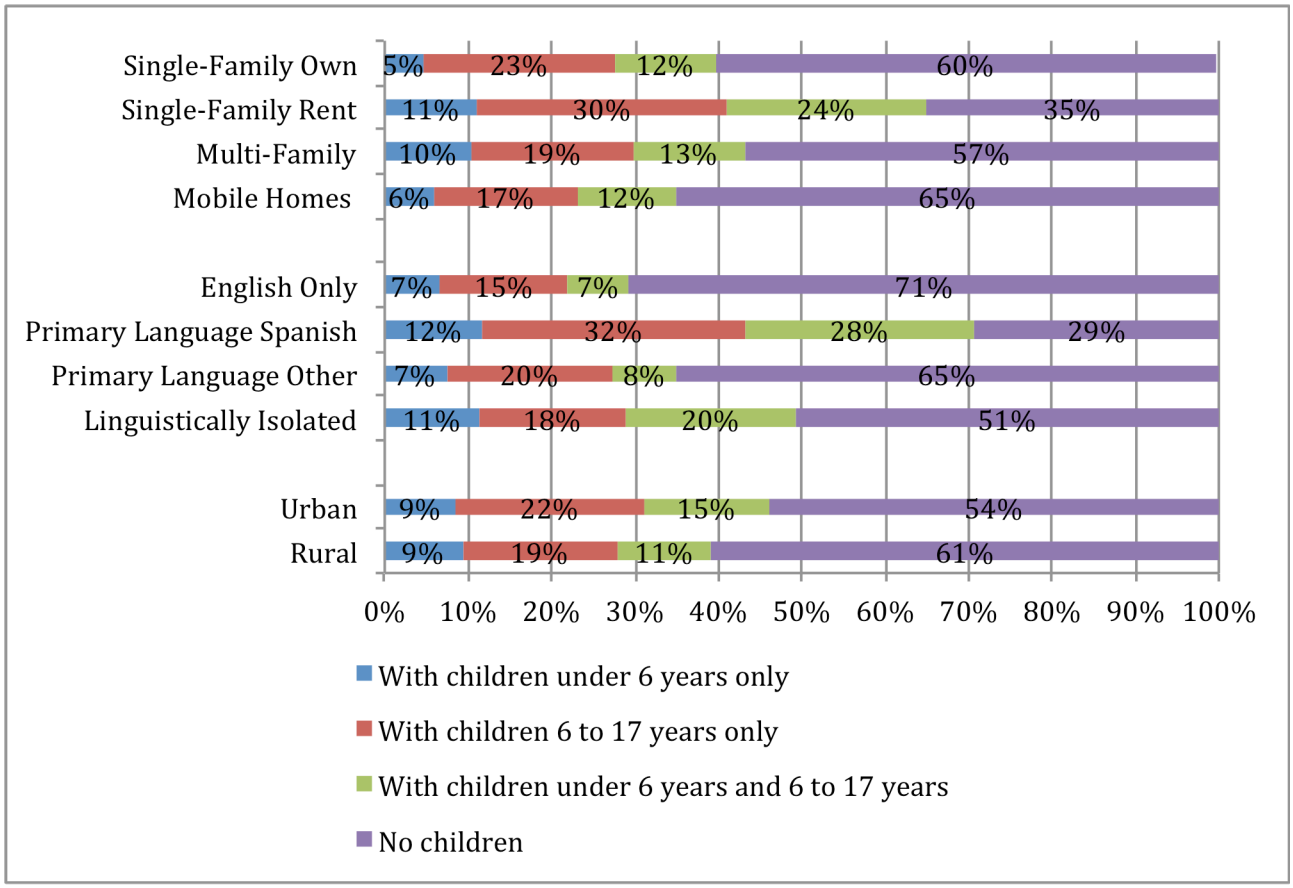
Table 16: Presence of Children in Home - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCal Gas 2011
With children under 6 years only	8%	8%	9%	10%	9%	9%	8%	9%
With children 6 to 17 years only	20%	21%	22%	22%	20%	24%	22%	24%
With children under 6 years and 6 to 17 years	9%	9%	15%	16%	14%	16%	12%	16%
No children	63%	61%	54%	52%	56%	51%	59%	51%

Sources: 2004 and 2011 PUMS.

Figure 8 below presents household composition by LI home type, primary language and rural versus urban segment, with major differences based on home ownership and primary household language. 65 percent of single-family renter-occupied homes have children, compared to only 40 percent of single-family owner-occupied homes. Households that speak Spanish primarily are much more likely than other households to have children (71%). There is a small but significant difference in household composition between urban and rural households, with urban households more likely to have children (46% compared to 39%).

Figure 8: Presence of Children in Home - By Housing Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 17 below presents the proportion of homes with either an elderly or disabled[11] household member, with a similar proportion of elderly household members across LI and all homes, but more LI homes (22% compared to 31%) with disabled members. As shown in Figure 9, these proportions vary substantially and consistently by LI segment, with some exceptions:

- Single-family owner-occupied LI homes are much more likely to have elderly members.
- LI households living in mobile homes are more likely to have disabled members, but are not as likely to have elderly members.
- Other primary language speaking LI households are the most likely to have an elderly member.
- There are only small differences between the proportions of elderly household members but there are more disabled household members across rural LI homes than in urban LI homes.

Table 17: Elderly or Disabled Household Member - By Population and IOU

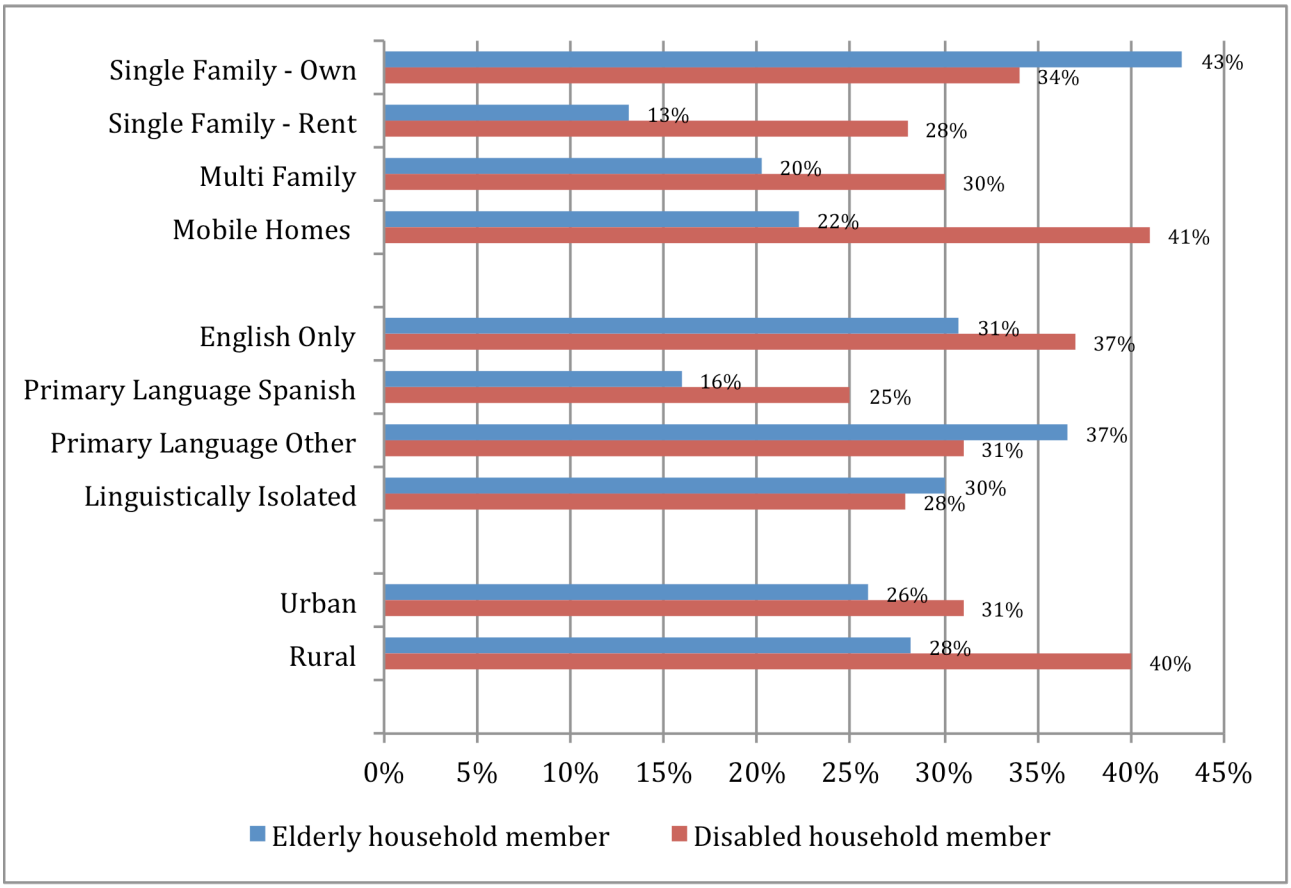
	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Elderly household member	25%	22%	26%	24%	26%	26%	25%	26%
Disabled household member	22%	25%	31%	34%	33%	31%	27%	30%

Sources: 2004 and 2011 PUMS.

[11] The ACS/PUMS classifies a household as having (a) disabled member(s) if anyone in the household said yes to any of the following questions:

Is this person deaf or does he/she have serious difficulty hearing?
Is this person blind or does he/she have serious difficulty seeing even when wearing glasses?
Because of a physical, mental, or emotional condition, does this person have serious difficulty concentrating, remembering, or making decisions? (5 years of age or over)
Does this person have serious difficulty walking or climbing stairs?
Does this person have difficulty dressing or bathing? (15 or over).

Figure 9: Elderly or Disabled Household Member – By Housing Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 18 below presents the average household income for LI and all California homes. We defined LI homes based on 200 percent of the federal poverty level, which varies based on the size of the household (see Section 1.1.1.). The average income of homes that are at or below 200 percent of the federal poverty level is $20,621, almost equal to the 2004 average. In contrast, the average household income for the state has increased from $69,596 to $80,684.

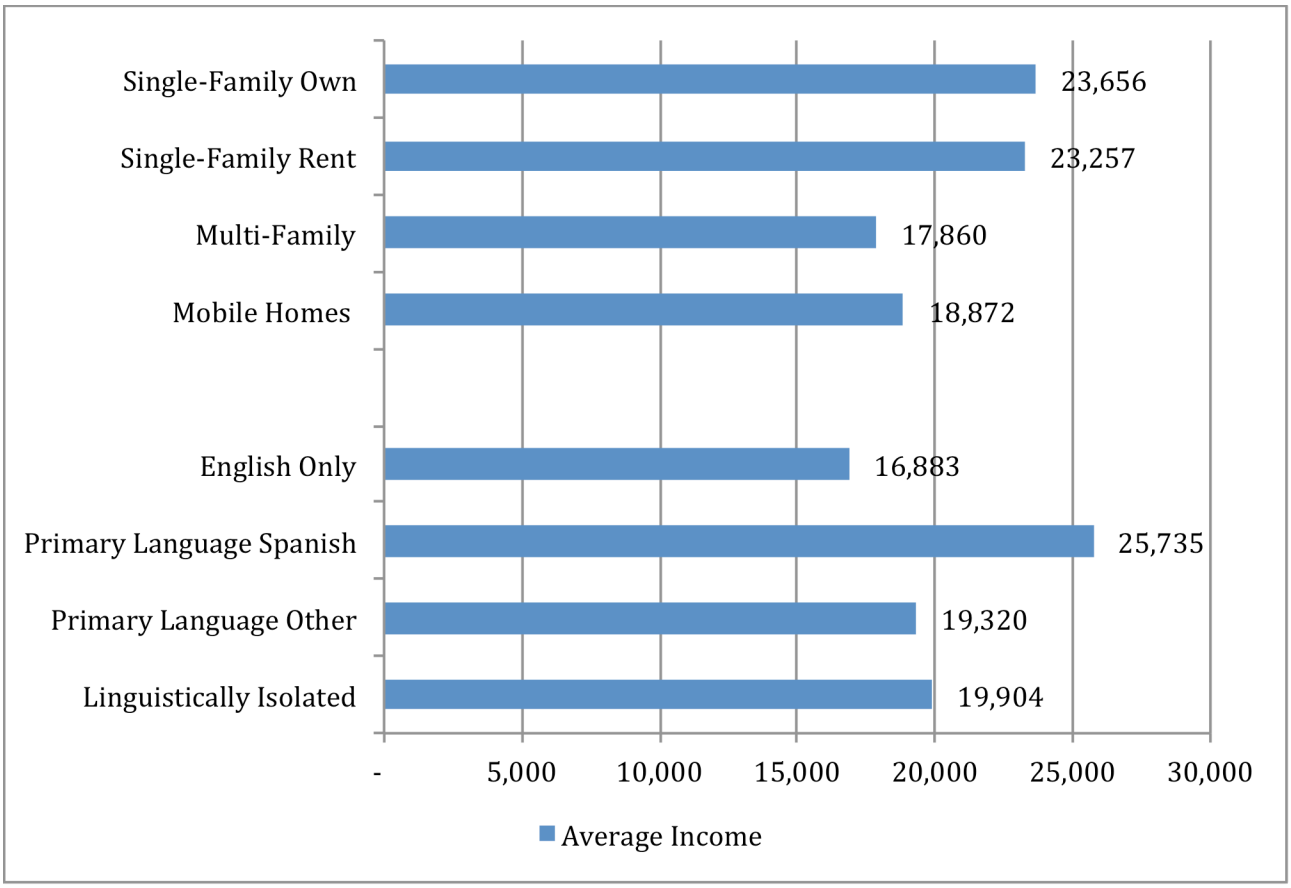
Table 18: Average Household Income - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Average Household Income	$80,684	$69,596	$20,621	$20,427	$20,075	$21,446	$18,607	$21,432

Sources: 2004 and 2011 PUMS.

Figure 10 shows the average household income by LI home type, primary language and rural versus urban segment. Much of the differences observed are due to differences in the number of occupants by segments (as shown in Figure 7 above), with single-family and Spanish-speaking homes having the highest average income. As reported elsewhere in this section, Spanish-speaking households have relatively more occupants, on which the income requirements are based.

Figure 10: Average Household Income ($) - By Housing Type and Language For California LI Population



Source: 2011 PUMS.

Table 19 presents employment status of the head of household, with a much higher proportion of LI householders being unemployed as compared to the overall population. The rate of employment has dropped since 2004 as a result of the recession, impacting LI households slightly more than the population as a whole.

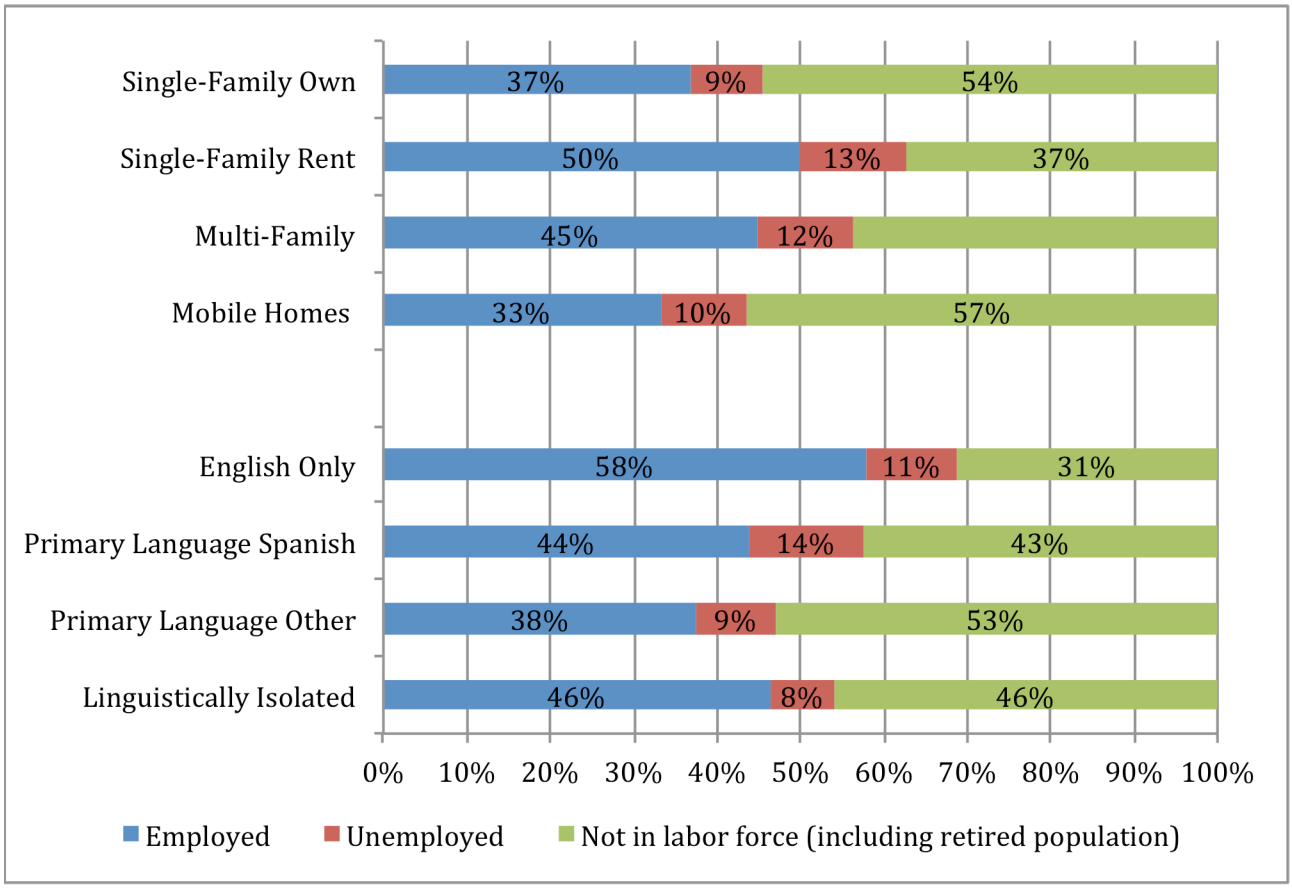
Table 19: Employment Status of Head of Household - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Employed	63%	65%	43%	46%	41%	40%	42%	45%
Unemployed	6%	4%	11%	7%	12%	11%	10%	11%
Not in labor force (including retired population)	30%	31%	46%	47%	47%	46%	50%	45%

Sources: 2004 and 2011 PUMS.

Figure 11 shows employment status by LI home type and primary language segments, with single-family renters and multi-family households more likely to be employed, likely because single-family homeowners (and mobile home dwellers) are more likely to be retired. Households speaking languages other than English have lower employment rates than English-only households, and households speaking another language besides Spanish have the largest proportion of heads of household out of the labor force.

Figure 11: Employment Status of Head of Household - By Housing Type and Language For California LI Population



Source: 2011 PUMS.

Table 20 presents the distribution of education reported by the head of household, with a substantial difference in the highest level achieved for LI versus all heads of household. While one-third of California heads of household have a bachelor's degree or higher, only 14 percent do of LI households. There has been a slight increase in education since 2004, with a greater increase occurring among non-LI households.

SCE and SoCalGas LI households on average have the lowest educational attainment across the IOUs, where 35 percent of householders have not graduated from high school, compared to 31 percent for the average LI householder.

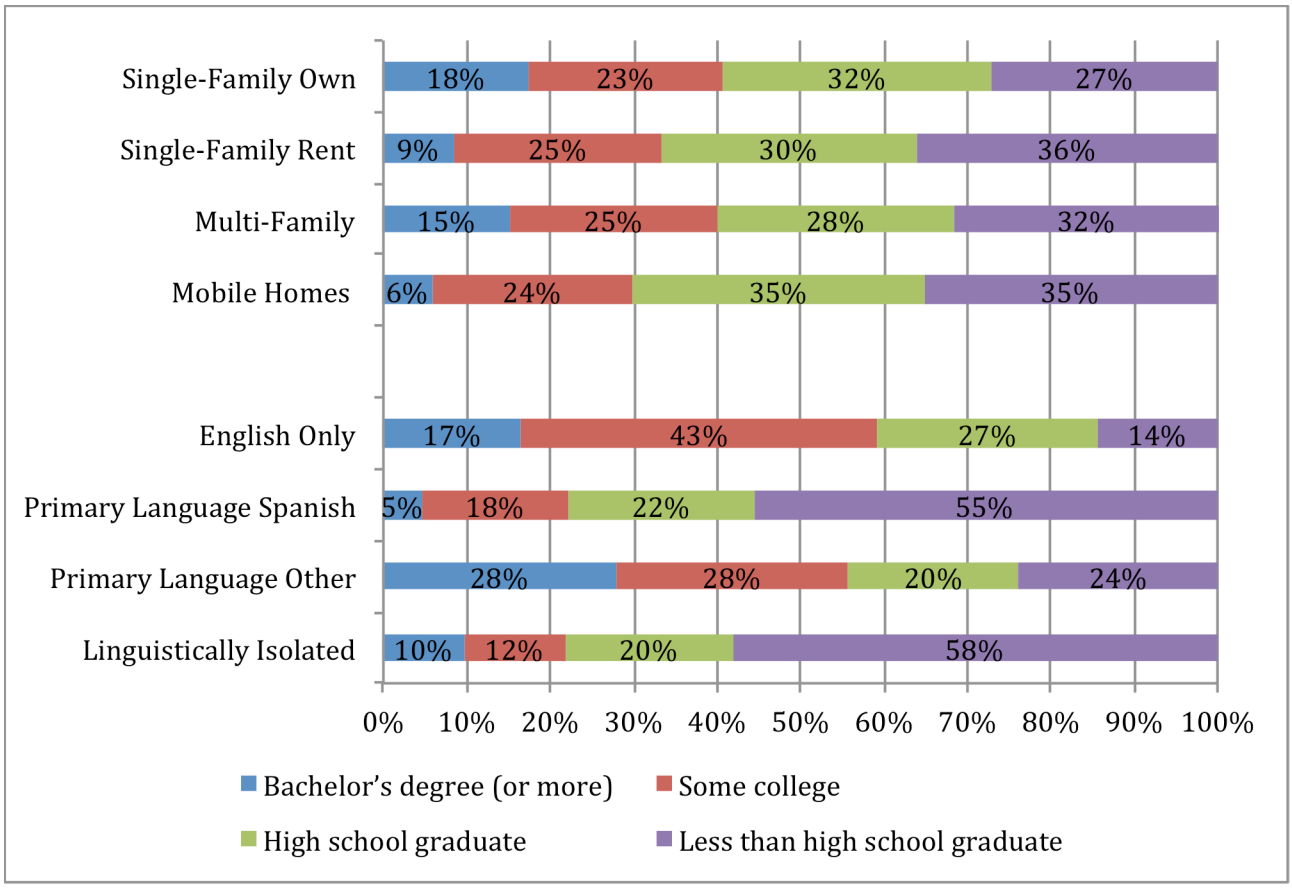
Table 20: Education of Head of Household - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Bachelor's degree (or more)	34%	31%	14%	13%	14%	13%	20%	13%
Some college	32%	32%	31%	28%	33%	29%	35%	29%
High school graduate	18%	20%	24%	25%	25%	24%	22%	23%
Less than high school graduate	15%	16%	31%	34%	28%	35%	23%	35%

Sources: 2004 and 2011 PUMS.

Figure 12 below shows education by LI home type and primary language segment, with some pronounced differences. The LI segments with the highest proportion of heads of households that have a bachelor's degree are single-family owner-occupied, multi-family and other language (besides Spanish) speakers. The primary language Spanish and linguistically isolated segments are more likely to be headed by someone with less than a high school graduate education.

Figure 12: Education of Head of Household - By Housing Type and Language For California LI Population



Source: 2011 PUMS.

Table 21 below shows the average annual household self-reported energy costs as reported by ACS respondents. Since 2004, self-reported energy costs have risen 19 percent since 2004, to an average of $1,782 for all households and $1,425 for LI households. PG&E LI households report the highest energy costs, and SDG&E the lowest. Section 5.5.2 reports on the energy burden (the ratio of energy costs to income) for the LI population compared to the total population, based on actual IOU billing data, self-reported income for our telephone survey respondents and self-reported income at the Census block group level for the population.

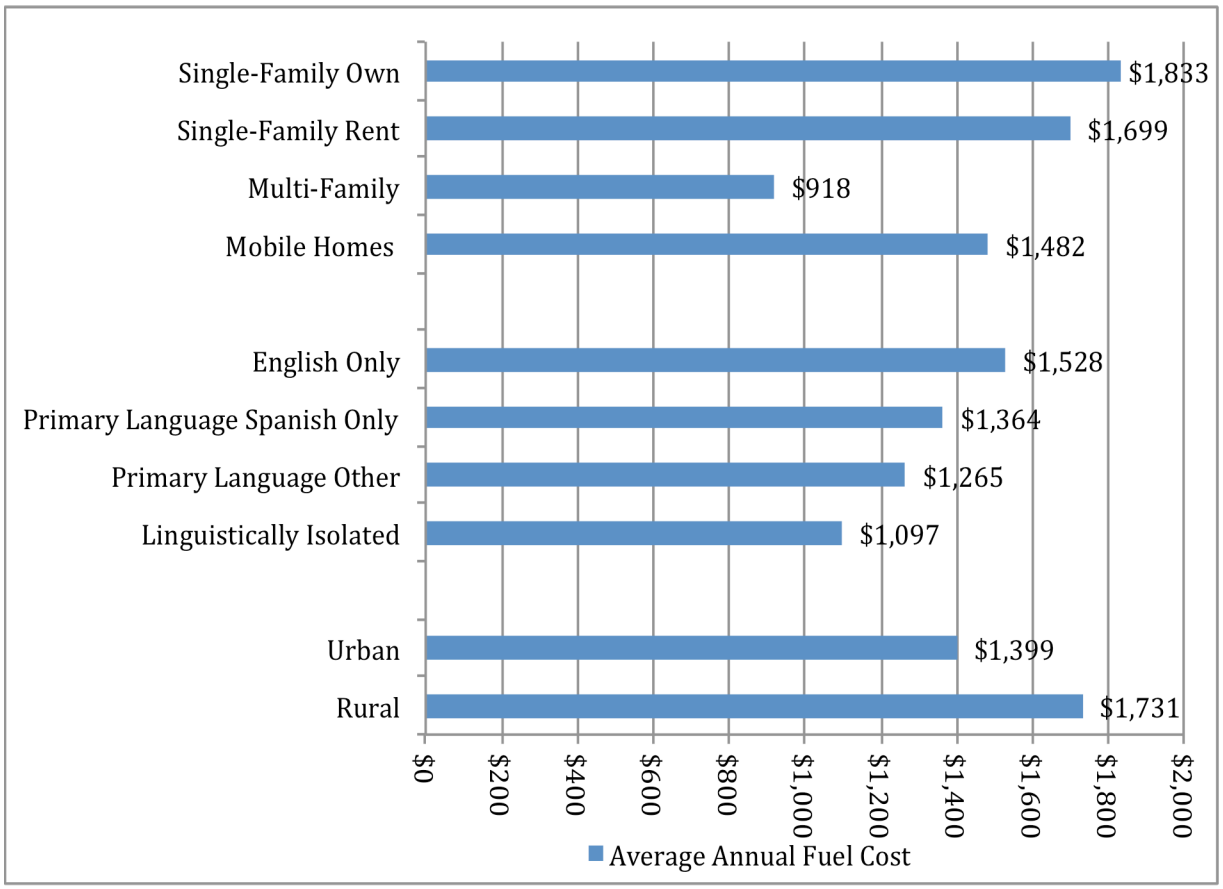
Table 21: Annual Household Energy Costs - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
$1 – $249	2%	2%	4%	5%	5%	3%	7%	3%
$250 – $499	9%	9%	13%	15%	12%	11%	21%	11%
$500 – $749	12%	14%	16%	18%	14%	16%	20%	16%
$750 – $999	12%	14%	14%	15%	13%	16%	14%	15%
$1,000 – $1,249	11%	12%	12%	12%	12%	12%	10%	12%
$1,250 – $1,499	9%	9%	8%	8%	8%	9%	6%	9%
$1,500 – $1,999	14%	14%	12%	11%	13%	13%	7%	13%
$2,000 or greater	32%	25%	21%	16%	24%	21%	14%	21%
Average Annual Energy Cost	$1,782	$1,502	$1,425	$1,200	$1,483	$1,437	$1,110	$1,446

Source: 2004 and 2011 PUMS.

Figure 13 shows the variation in self-reported energy costs by LI home type, primary language and rural versus urban segment, with higher costs for single-family homes (which are generally larger and do not use shared systems), rural homes and English-only speaking households. Linguistically isolated homes tend to have lower energy costs, which we would expect, given the high proportion of linguistically isolated households that live in multi-family structures (Figure 2) and who are renters (Figure 3).

Figure 13: Annual Household Fuel Costs – By Housing Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

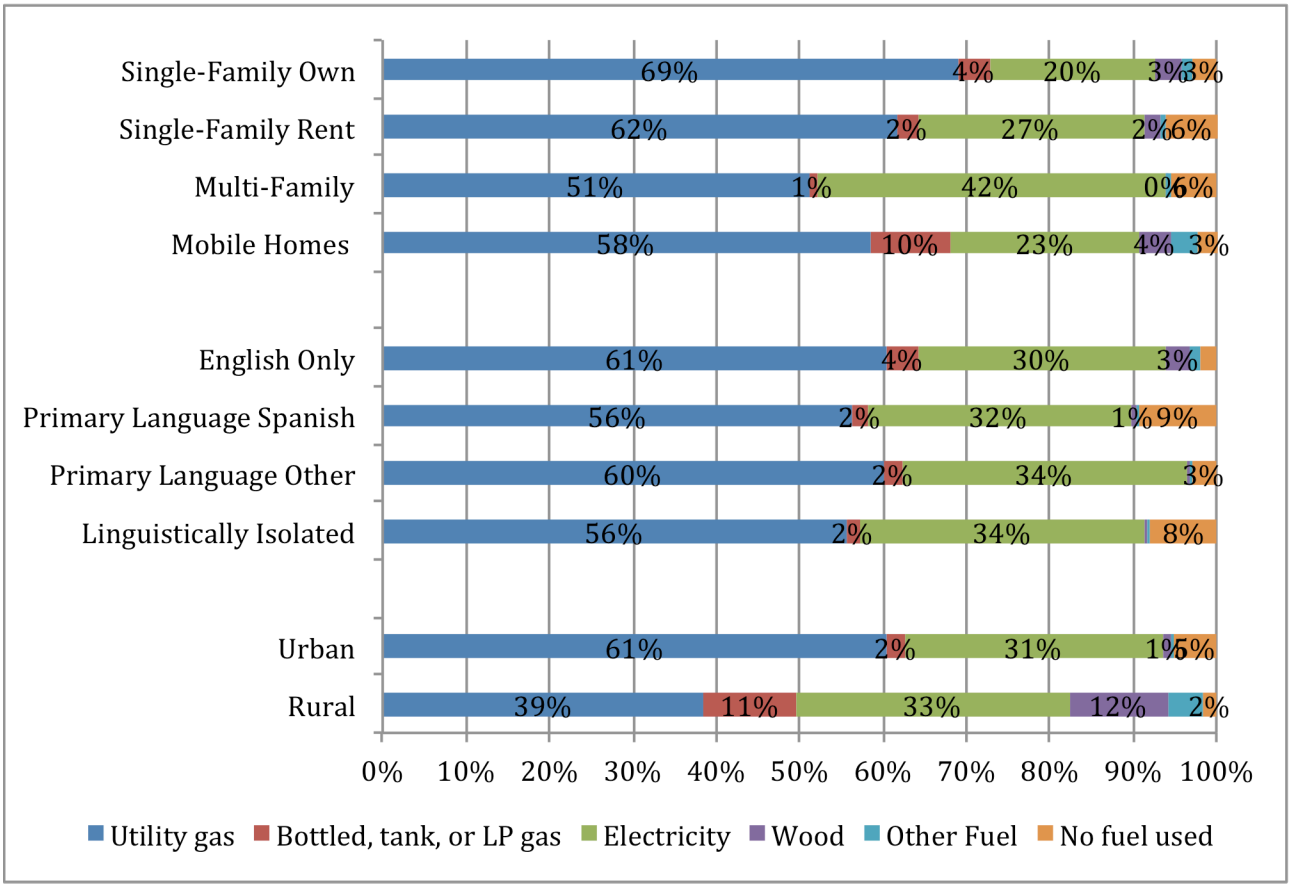
Table 22 shows the fuel that is used most for heating homes, with some differences in the use of heating fuels between the LI and total population and for the LI population, across IOUs. The majority of homes use natural gas (or utility gas, per the ACS survey) to heat their homes—66 percent of all homes and 59 percent of LI homes. This proportion has dropped by 7 percent for all homes since 2004 (and by 5% for LI homes). As shown in Figure 14, rural homes are much less likely to use natural gas to heat their homes, likely because natural gas service is not offered as often in remote and/or mountain locations.

Table 22: Heating Fuel Type - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
Utility gas	66%	69%	59%	64%	56%	62%	52%	63%
Bottled, tank, or LP gas	3%	4%	3%	3%	4%	3%	2%	2%
Electricity	25%	22%	31%	25%	33%	27%	40%	27%
Wood	2%	2%	2%	2%	3%	1%	1%	1%
Other Fuel	1%	1%	1%	1%	1%	1%	1%	1%
No fuel used	3%	2%	5%	5%	2%	7%	4%	7%

Source: 2004 and 2011 PUMS.

Figure 14: Heating Fuel Type - By Housing Type, Language and Urban/Rural For California LI Population



Source: 2011 PUMS.

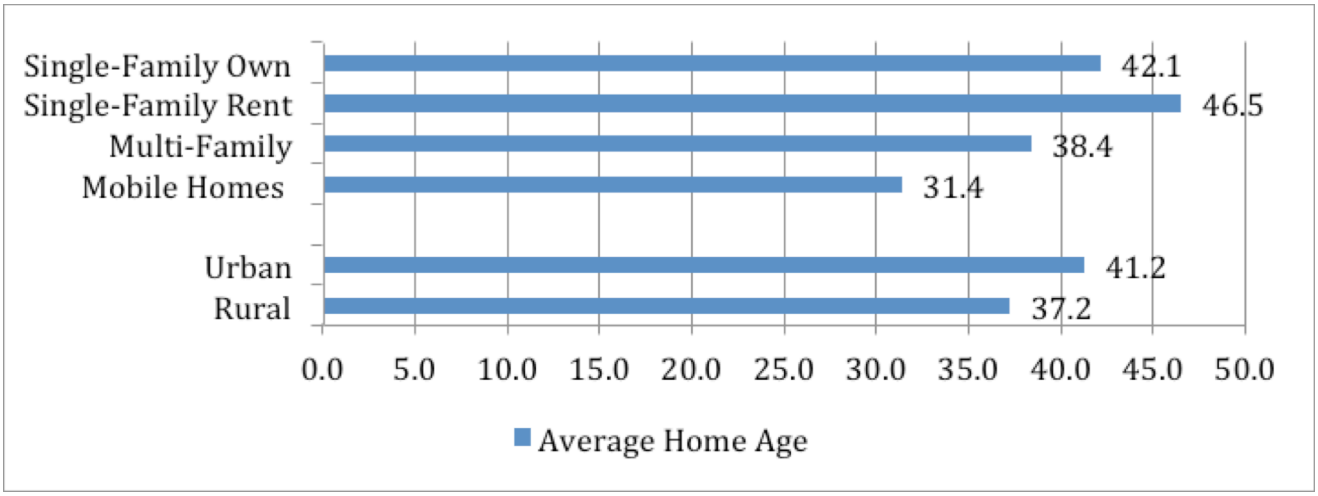
Table 23 shows the distribution and average age of homes, with only small differences between home vintage for LI versus all homes (LI homes are on average 42 years old compared to all homes, which are on average 40 years old). SDG&E's LI housing stock is the youngest, with an average age of 36 years. There are some differences in vintage across LI segments as shown in Figure 15, with renter-occupied single-family homes an average of five years older than owner-occupied single-family homes, and urban homes an average of four years older than rural homes.

Table 23: Age of Home - By Population and IOU

	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
1949 or earlier	16%	17%	17%	20%	16%	18%	8%	18%
1950 to 1969	28%	30%	29%	32%	26%	31%	26%	31%
1970 to 1989	33%	37%	34%	36%	35%	33%	45%	32%
1990 to 1999	11%	11%	9%	9%	10%	9%	11%	9%
2000 to 2011*	12%	5%	10%	3%	12%	9%	10%	9%
Average Home Age	39.9	N/A	41.7	N/A	40.1	42.5	35.9	42.6

Sources: 2004 and 2011 PUMS.

Figure 15: Age of Home – By Home Type and Urban/Rural For California LI Population



Source: 2011 PUMS.

Table 24 below shows the length of time households have resided at their current residence (tenure), with LI households reporting tenure 2 years shorter than the overall average (9 versus 11 years). Tenure has changed over time, but in a different direction for LI versus non-LI homes. LI homes have a shorter average tenure (by one year) compared to 2004, while the average for all homes is longer (by one year).

Table 24: Length of Time Residing at Present Address - By Population and IOU

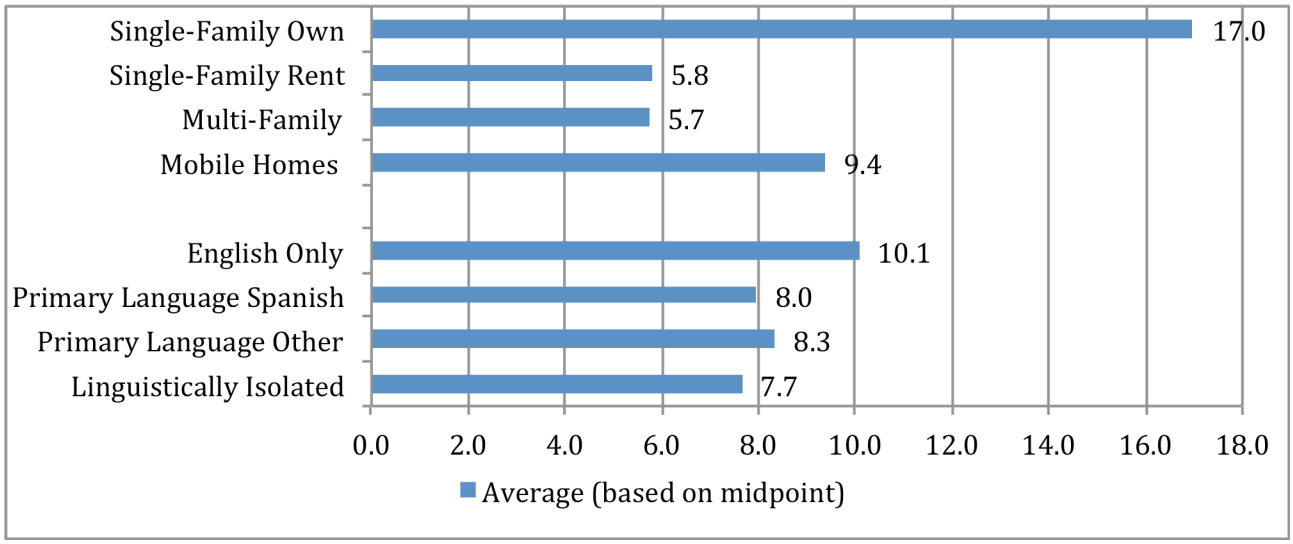
	Percent of California Population		Percent of California Low Income Population		Percent of California Low Income Population			
Year	Total 2011	Total 2004	Total 2011	Total 2004	PG&E 2011	SCE 2011	SDG&E 2011	SoCalGas 2011
23 months or less	23%	25%	28%	25%	30%	26%	29%	26%
2 to 4 years	19%	22%	22%	22%	22%	21%	25%	21%
5 to 9 years	19%	19%	18%	19%	17%	19%	19%	19%
10 to 19 years	20%	18%	17%	18%	16%	19%	15%	19%
20 to 29 years	9%	8%	7%	8%	7%	7%	6%	7%
30 years or more	9%	8%	8%	8%	9%	8%	7%	8%
Average (based on midpoint)	10.6	9.5	9.2	9.5	9.3	9.5	8.5	9.5

Source: 2004 and 2011 PUMS data.

Figure 16 shows tenure by LI segment, with single-family homeowners having a much longer average tenure than single-family renters and multi-family dwellers. Households speaking a

primary language other than English have a shorter average tenure than English-speaking households.

Figure 16: Length of Time Residing at Present Address - By Housing Type and Language For California LI Population



Source: 2011 PUMS.

4.3.2 Home and Equipment Characteristics

We used the 2013 CLASS data to describe the California total and California LI population's home and equipment characteristics. (In Section 7.3.2, we also present RASS equipment characteristic data by climate zone categories.) The columns of the first table of each result are:

- Percent of California population (including the LI population);
- Percent of California LI population;
- Percent of PG&E's California LI population;
- Percent of SCE's California LI population;
- Percent of SDG&E's California LI population; and
- Percent of SoCalGas's California LI population.

The segments that were relevant to this study, and were available and had sufficient sample sizes within the 2013 CLASS LI sub-sample are home type, home ownership and language. The specific segments we reviewed are:

- Single-family home occupied by homeowners;
- Single-family home occupied by renters;

- Multi-family homes;[12]
- Spanish is the primary language; and
- English-only.[13]

For most results, we present a follow-up chart that compares results across one or more of these segments of the LI population, where we identified substantial differences. The sample size (n) for the LI population segment is indicated in the caption of each exhibit. The sample size for each LI segment is indicated in the label for each segment within each chart.[14] More detailed sample size information (including standard errors for means) is provided in Section 7.3.

Table 25 below presents the average home size, with LI homes being an average of 332 square feet smaller than the average California home. Figure 17 compares the average LI home size by home type and ownership, with single-family homes occupied by owners being the largest, and multi-family homes being the smallest.

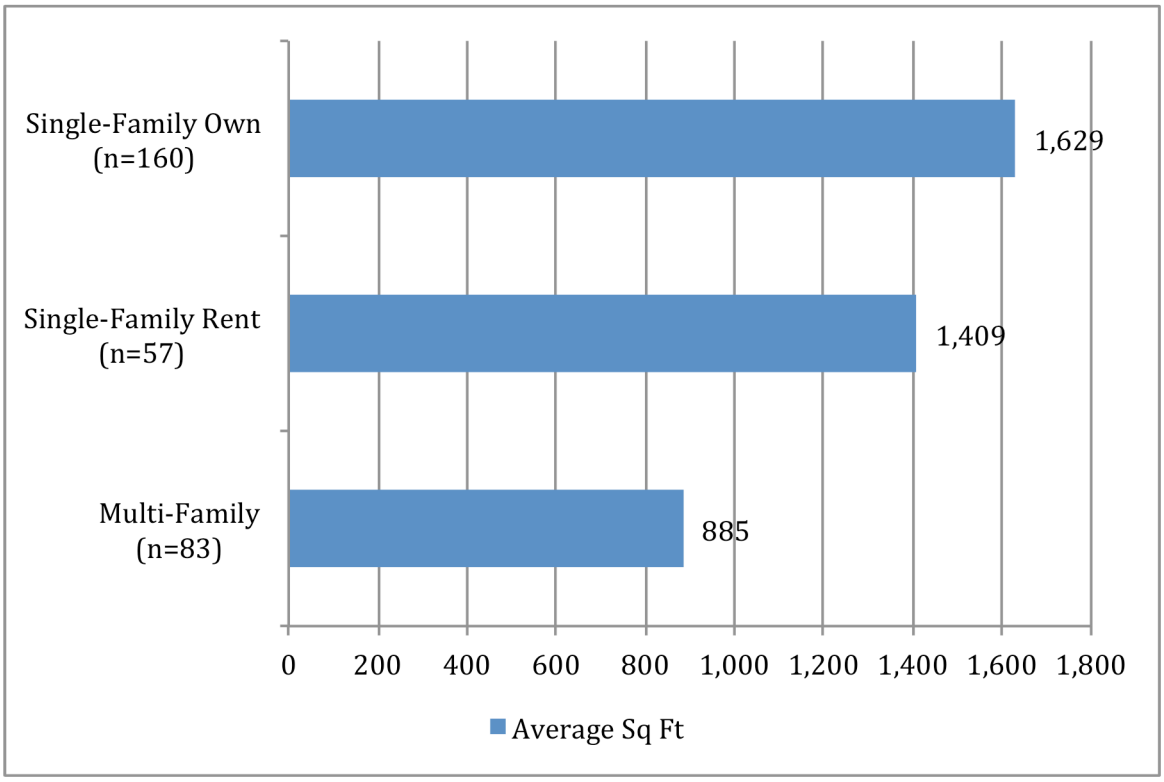
Table 25: Average Square Footage of Home – By Population Segment and IOU (LI Population n=311)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Average Sq Ft	1,643	1,311	1,332	1,298	1,292	1,330

Source: 2013 CLASS.

[12] Multi-family homes are defined as any housing structure with two or more units. This differs from the 2007 KEMA study were multi-family homes are defined as housing structures with five or more units. This also differs from the concurrent Cadmus multi-family LI study which also defines multi-family homes as housing structures with five or more units. We excluded mobile homes as a segment category due to the small sample size in CLASS.
[13] The non-English/non-Spanish sample was too small to include as a segment for the CLASS data.
[14] Please note, in some cases the sum of the sample sizes of the LI segments do not match the total LI sample size as some categories in each segment were excluded, for example, mobile homes or other languages.

Figure 17: Average Square Footage of Home – By LI Home Type (LI Population n=311) For California LI Population



Source: 2013 CLASS.

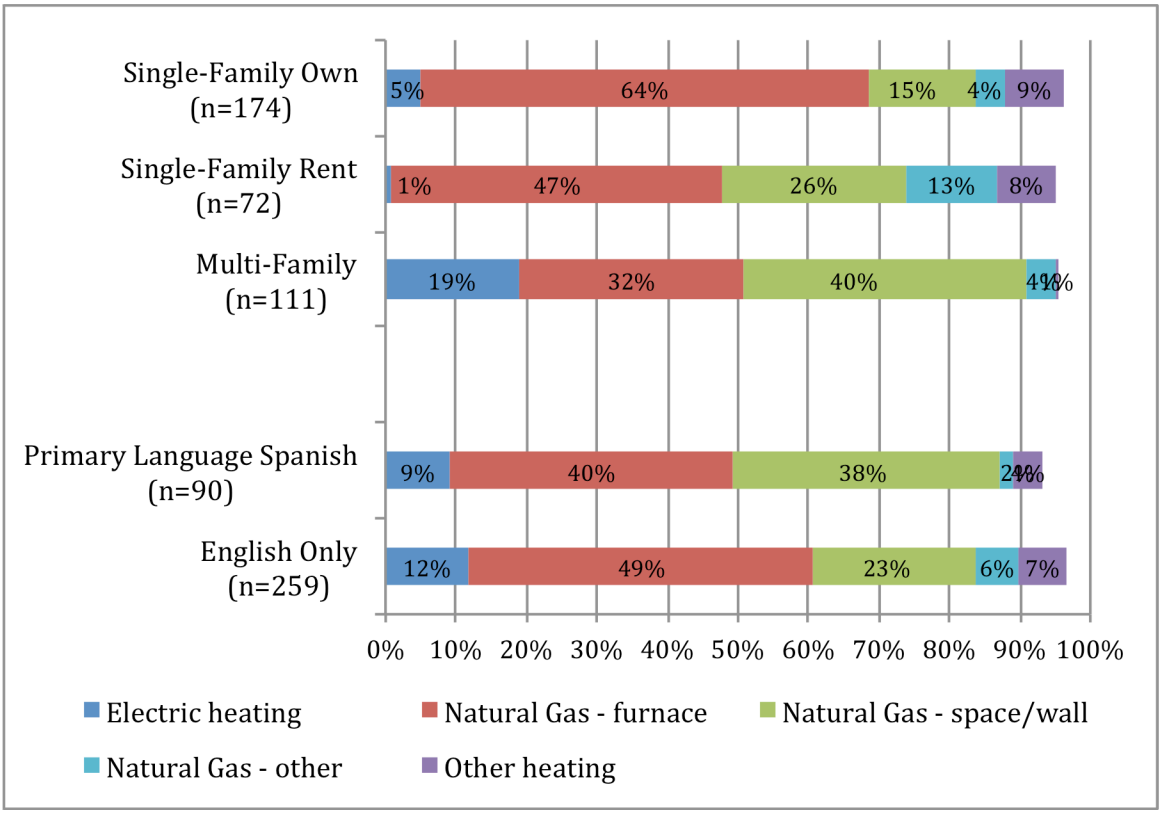
Table 26 shows the type of heating equipment and fuel used by California homes. The majority of equipment uses natural gas, with furnaces being the most common equipment type. As shown, LI homes are more likely to use wall or space heaters as compared to all California homes. SDG&E LI homes are less likely to use central heating and more likely to use portable or wall/baseboard heating, likely due to relatively milder winters. Figure 18 compares heating equipment by home type and ownership, with multi-family homes more likely to have electric heat.

Table 26: Heating Equipment and Fuel Type – By Population Segment and IOU (LI Population n=388)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Electric Portable Heaters	2%	2%	1%	1%	3%	1%
Electric Resistance/Baseboard	2%	3%	4%	1%	9%	0%
Other Electric	7%	6%	4%	6%	13%	2%
Natural Gas Hot Air Furnace	61%	47%	48%	48%	46%	55%
Natural Gas Space Heaters/Wall Units	14%	27%	27%	30%	8%	31%
Other Gas	8%	5%	2%	7%	12%	7%
Propane	4%	2%	3%	2%	1%	0%
Wood or Coal	1%	4%	7%	1%	2%	0%
No Heating Equipment	2%	4%	4%	4%	7%	4%

Source: 2013 CLASS.

Figure 18: Heating Equipment and Fuel Type – By LI Home Type and Primary Language (LI Population n=388) For California LI Population



Source: 2013 CLASS.

Table 27 below shows cooling equipment type and age. As shown, LI homes are less likely to have central air conditioning as compared to the overall population. However, cooling equipment in LI homes is newer compared to the overall population's cooling equipment. As shown later in this section, multi-family homes are younger than single-family homes.

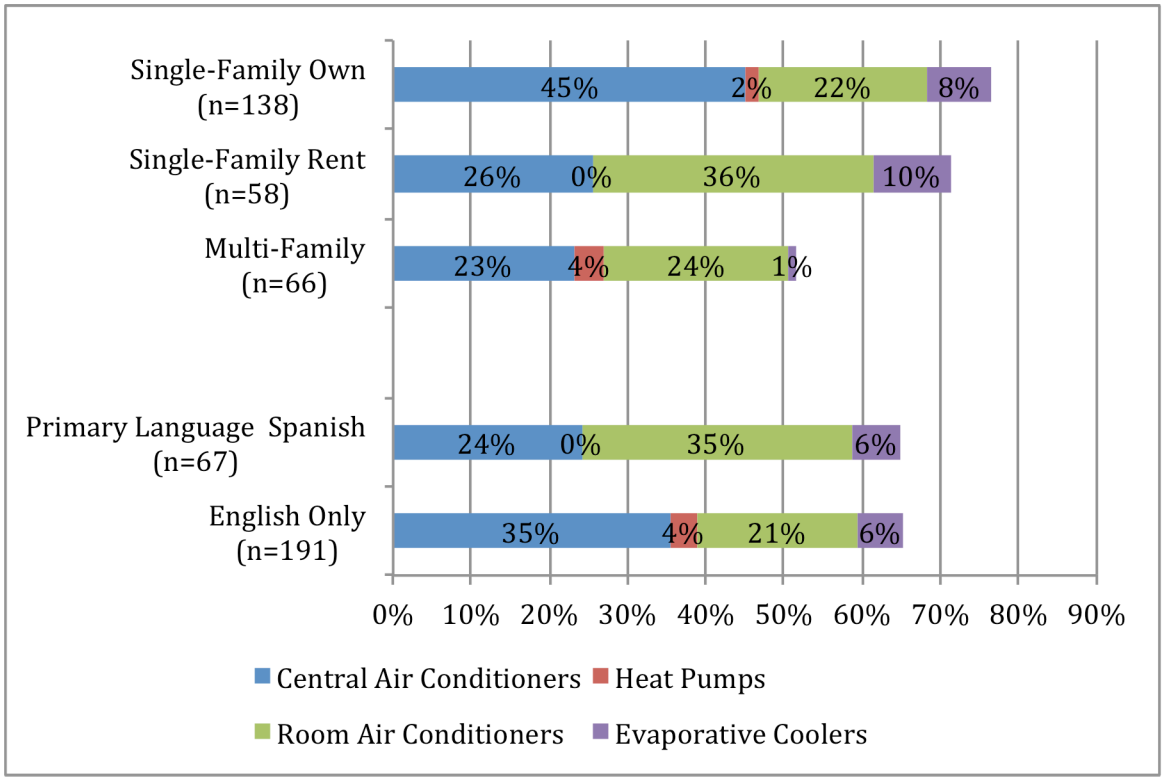
Figure 19 below shows cooling equipment by home type and language spoken, with single-family homeowners and English-only homes being the most likely to have central air conditioning. The difference between English-only and Spanish-speaking homes is not statistically significant.

Table 27: Cooling Equipment Type and Age – By Population Segment and IOU (LI Population n=388 for equipment; n=53* for age)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Type of Cooling Equipment/Systems						
Central Air Conditioners	47%	32%	29%	38%	24%	41%
Heat Pumps	2%	2%	3%	3%	0%	1%
Room Air Conditioners	15%	25%	16%	36%	17%	32%
Evaporative Coolers	2%	6%	5%	7%	0%	6%
No Cooling Equipment	34%	35%	48%	17%	59%	20%
Age of Cooling Equipment						
<10 years	40%	53%	47%	62%	46%	57%
10-19 years	34%	27%	39%	23%	36%	27%
20-29 years	25%	20%	14%	16%	18%	15%
30 or more years	1%	0%	0%	0%	0%	0%
Average Age	12.7	10.0	10.1	9.5	12.1	9.8

* The sample size n=53 for cooling equipment age reflects the number of cooling equipment units with valid age data.
Source: 2013 CLASS.

Figure 19: Cooling Equipment – By LI Home Type and Primary Language (LI Population n=388) For California LI Population



Source: 2013 CLASS.

There is very little difference between the total population and LI total water heating equipment fuel type and age, as shown in Table 28 below. Most homes use natural gas for their water heating.

Table 28: Water Heating Equipment Type and Age – By Population Segment and IOU (LI Population n=388 for equipment; n=135* for age)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Water Heating Fuel						
Electricity	6%	8%	10%	7%	3%	2%
Natural Gas	84%	81%	74%	90%	74%	96%
Propane	4%	3%	5%	1%	2%	0%
Solar	1%	1%	1%	1%	0%	1%
Unknown	5%	8%	11%	2%	21%	2%
Age of Water Heating Equipment						
1-5 years	35%	33%	27%	37%	42%	37%
6-10 years	48%	45%	55%	37%	48%	37%
11-15 years	7%	9%	10%	9%	4%	8%
16-20 years	5%	8%	4%	12%	6%	12%
More than 20 years	4%	5%	4%	6%	0%	6%
Average Age	7.8	8.2	8.2	8.5	6.9	8.5

* The sample size n=53 for water heating equipment age reflects the number of water heating equipment units with valid age data.
Source: 2013 CLASS.

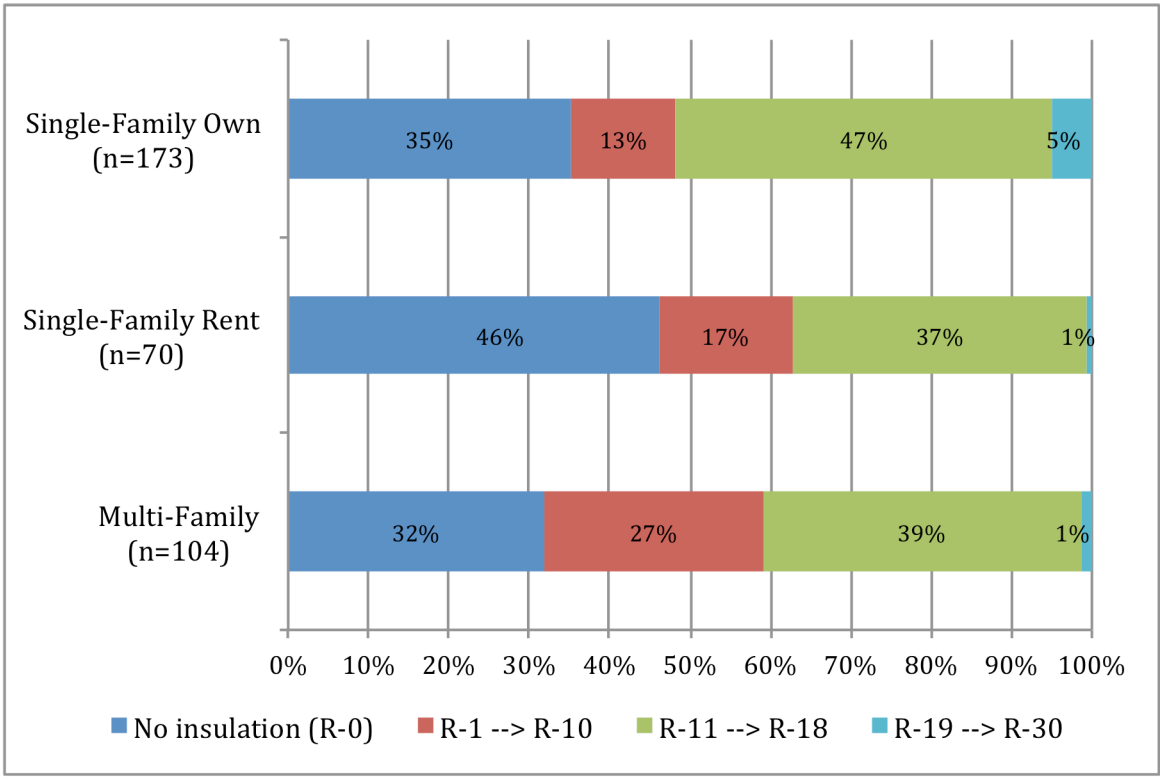
Table 29 shows the type of wall insulation that is present in California and LI homes, with the most common type between R-11 and R-18. LI homes typically have less wall insulation, with 35 percent having no insulation compared to 26 percent for the overall population. Figure 20 shows the same information by home type and ownership for the LI population, with single-family renters being the most likely (46%) to have no wall insulation—though this result is not statistically significant.

Table 29: Existing Wall Insulation R-Value – By Population Segment and IOU (LI Population n=358)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
No insulation (R-0)	26%	35%	36%	33%	49%	32%
R-1 --> R-10	15%	20%	23%	20%	9%	20%
R-11 --> R-18	54%	44%	37%	45%	41%	47%
R-19 --> R-30	5%	0%	5%	1%	1%	1%

Source: 2013 CLASS.

Figure 20: Existing Wall Insulation R-Value – By LI Home Type (LI Population n=358) For California LI Population



Source: 2013 CLASS.

Table 30 shows the foundation type of California homes, with just over half having a slab foundation. Figure 21 shows foundation type for LI homes by home type and ownership, with multi-family homes most likely (62%) to have a slab foundation, though this result is not statistically significant. A high proportion of slab foundations could be an area of potential energy savings if slab edge insulation is lacking. The US Department of Energy's Office of Building Technology indicates that exterior edge slab insulation can reduce winter heating bills by 10 – 20 percent.[15]

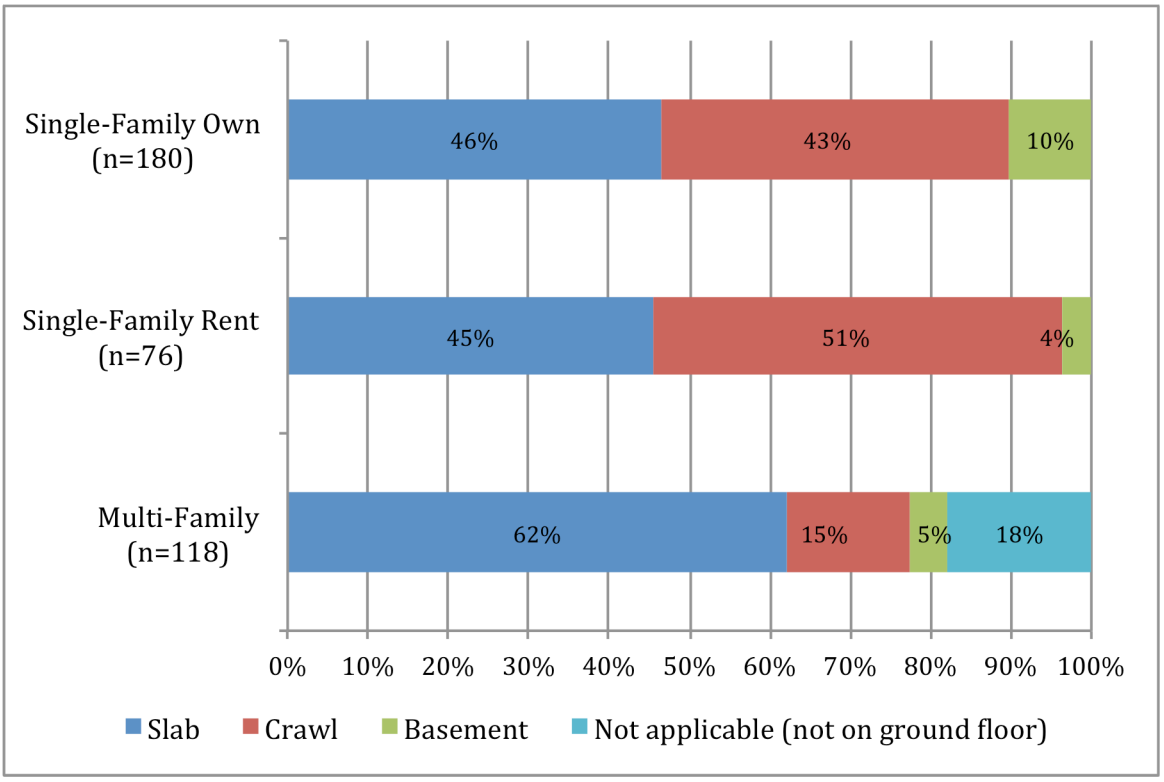
[15] Office of Building Technology. Technology Fact Sheet Slab Insulation. http://web.ornl.gov/sci/roofs%2Bwalls/insulation/fact%20sheets/slab%20insulation%20technology.pdf

Table 30: Foundation Type – By Population Segment and IOU (LI Population n=387)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Slab	55%	52%	42%	59%	70%	60%
Crawl	31%	34%	39%	32%	15%	33%
Basement	7%	7%	10%	3%	7%	3%
Mobile home skirting	<1%	<1%	1%	0%	0%	0%
Not applicable (not on ground floor)	7%	9%	9%	6%	8%	4%

Source: 2013 CLASS.

Figure 21: Foundation Type – By LI Home Type (LI Population n=387) For California LI Population



Source: 2013 CLASS.

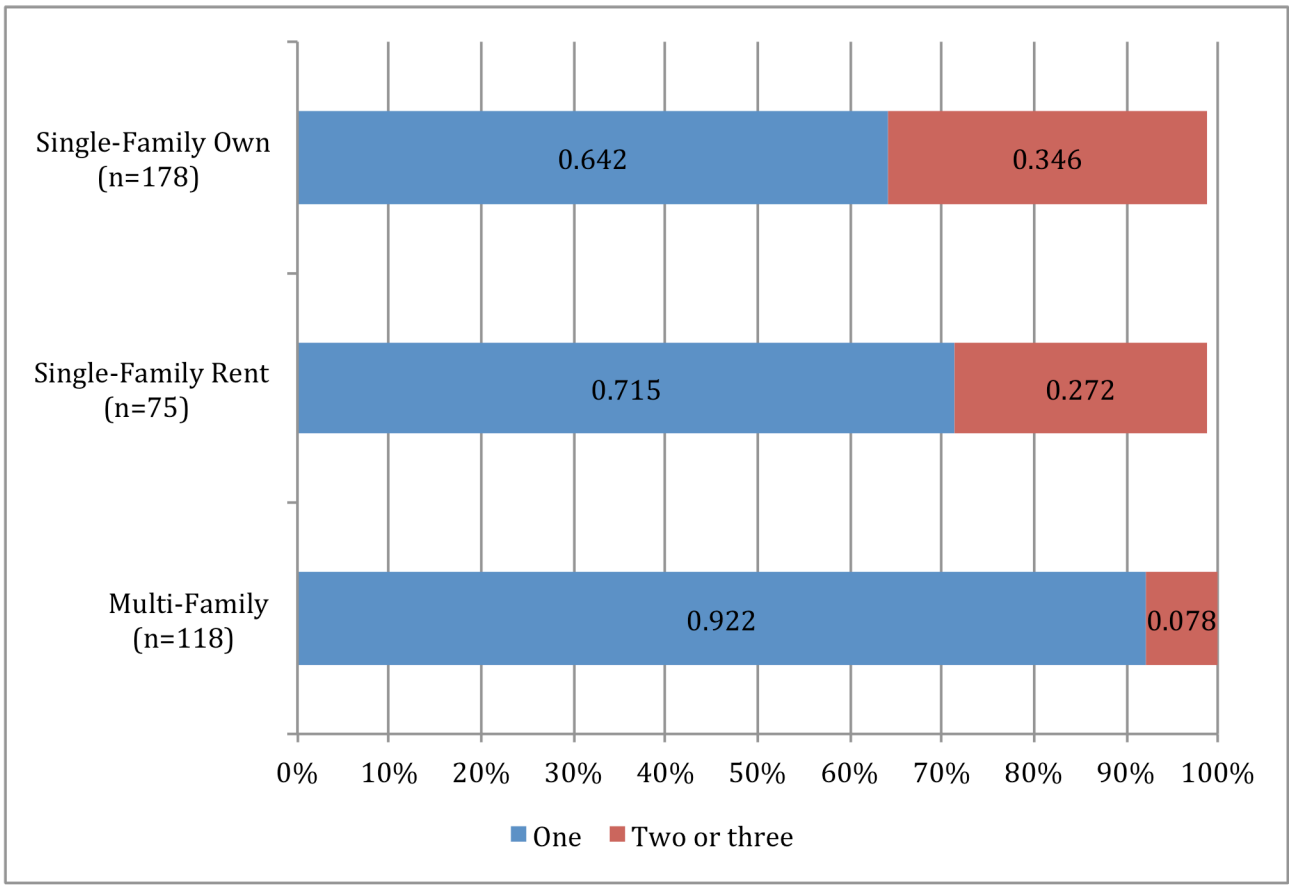
Table 31 below shows the number of refrigerators and their age. LI homes are more likely to have only one refrigerator, and their refrigerators are on average one year newer as compared to the overall population. Figure 22 shows the same information for the LI population by home type and ownership, with single-family homes much more likely to have a second or third refrigerator.

Table 31: Refrigerator Characteristics – By Population Segment and IOU (LI Population n=388 for equipment; n=268* for age)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Number of Refrigerators						
One	70%	77%	82%	73%	74%	73%
Two or three	29%	22%	18%	26%	26%	24%
Age						
<6 years	24%	28%	27%	28%	43%	28%
6-10 years	37%	42%	42%	41%	37%	40%
11-15 years	24%	18%	20%	17%	8%	21%
16+ years	16%	13%	10%	15%	12%	12%
Average Age	9.8	8.8	8.8	9.0	7.3	8.5

* The sample size n=53 for refrigerator age reflects the number of refrigerator units with valid age data.
Source: 2013 CLASS.

Figure 22: Refrigerator Quantity – By LI Home Type (LI Population n=371) For California LI Population



Source: 2013 CLASS.

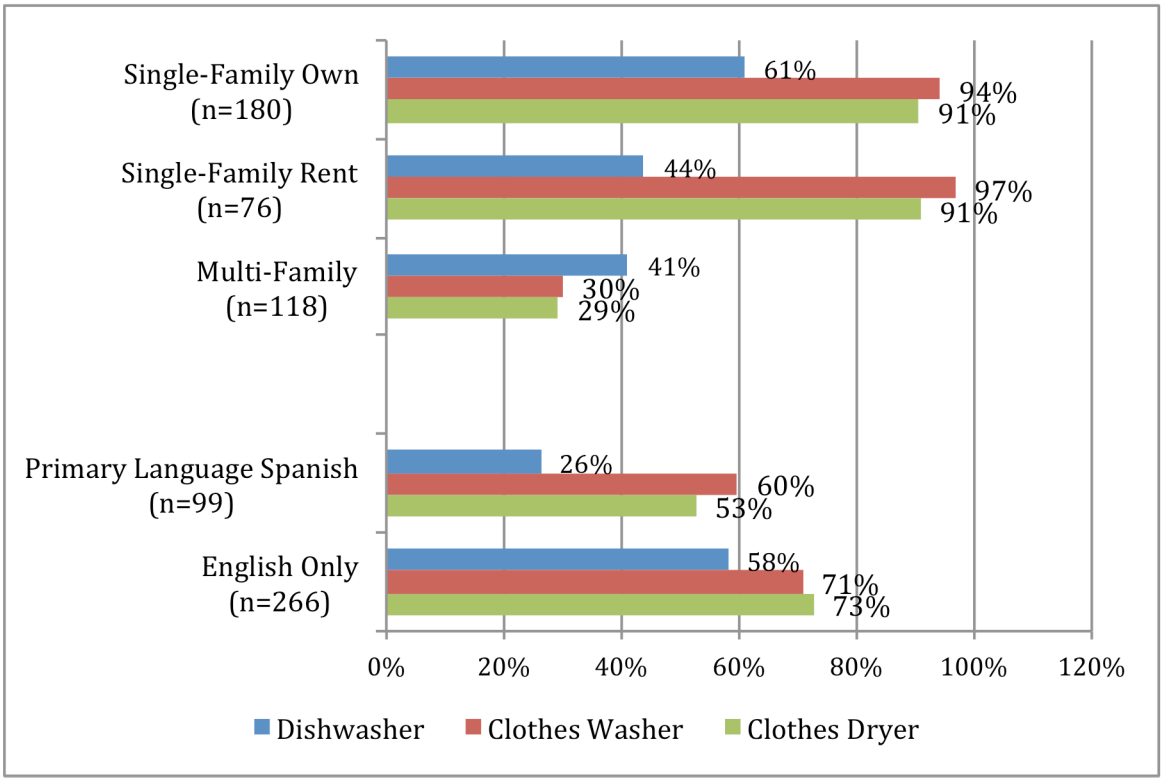
Table 32 shows the presence of appliances and for clothes dryer, fuel type. LI homes are less likely to have clothes washers, dryers and dishwashers than the total population. As shown in Figure 23, single-family homes are more likely to have clothes washers and dryers, and single-family homeowners and English-only homes are more likely to have dishwashers.

Table 32: Home Appliance Types – By Population Segment and IOU (LI Population n=388)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Dishwasher	74%	50%	45%	54%	56%	52%
No Dishwasher	26%	50%	55%	46%	44%	48%
Clothes Washer	81%	68%	68%	70%	63%	74%
No Clothes Washer	19%	32%	32%	30%	37%	26%
Clothes Dryer	79%	66%	65%	68%	60%	72%
Electric	28%	24%	42%	8%	17%	7%
Gas	49%	40%	21%	59%	43%	65%
Propane	2%	2%	2%	1%	1%	0%
No Clothes Dryer	21%	35%	35%	32%	40%	28%

Source: 2013 CLASS.

Figure 23: Home Appliance Presence – By LI Home Type and Language (LI Population n=388) For California LI Population



Source: 2013 CLASS.

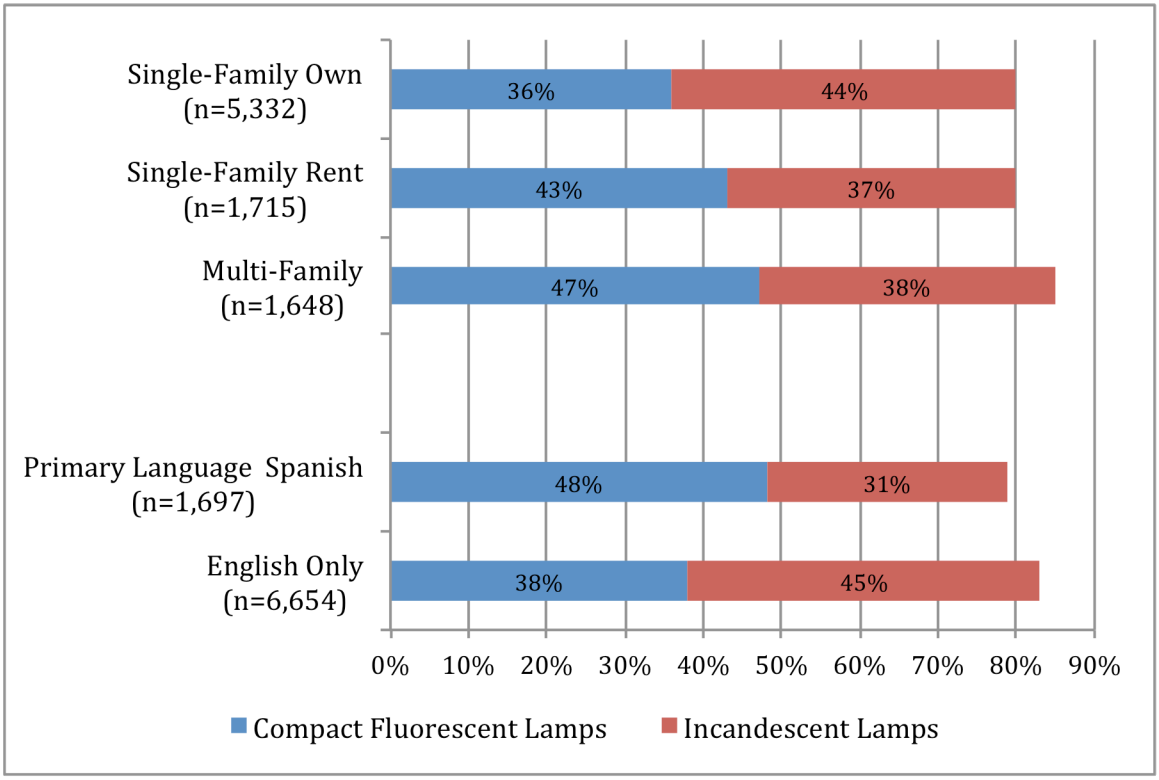
Table 33 shows the distribution of lamp types installed in homes, with only small, but statistically significant, differences in the fraction of CFLs and incandescent lamps in use in LI and all homes (34% for California homes and 41% for California LI homes). Only a small fraction of homes use lighting controls (18% of total and 14% of LI homes.) Spanish-speaking and multi-family LI homes have more CFLs on average than single-family and English-only LI homes, as shown in Figure 24. This may be a reflection of the many LI programs, including ESA, that have been in operation since the early 2000s that have provided CFLs at low or no cost to hard-to-reach communities.

Table 33: Lighting Types – By Population Segment and IOU (LI Population n=8,982)

	Percent of California Population	Percent of California Low Income Population	Percent of California Low Income Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Lighting Type						
Incandescent Lamps	47%	41%	40%	41%	41%	42%
CFLs	34%	41%	42%	39%	40%	39%
Fluorescent Fixtures	7%	8%	7%	9%	11%	9%
Halogen Lamps	7%	4%	3%	4%	3%	4%
Other	4%	7%	7%	7%	5%	6%
Lighting Controls Installed	18%	14%	15%	14%	12%	14%
No Lighting Controls	82%	86%	85%	86%	88%	86%

* The sample size n=8,982 represents the total quantity of lighting fixtures in LI households.
Source: 2013 CLASS.

Figure 24: Lighting Types – By LI Home Type and Language (LI Population n=8,982*) For California LI Population



* The sample size n=8,982 represents the total quantity of lighting fixtures in LI households.
Source: 2013 CLASS

4.4 ESA Program Measures

Table 34 below indicates the measures available to customers participating in ESA. The CEC Climate Zone eligibility is shown in the second column and the final column indicates additional eligibility requirements based on IOU, home ownership and home type.

Table 34: ESA Program Measure Eligibility

Measure	CEC Climate Zone Eligibility	Other Eligibility
HVAC		
Gas Furnace Repair/Replace[1]	All	Homeowners only; safety measure only
Forced Air Unit Standing Pilot Light Conversion	All	SDG&E and SoCalGas only
Furnace Clean & Tune	5, 6, 7, 8, 9, 10, 13, 14, 15, 16	SDG&E and SoCalGas only
Room A/C Replacement	10, 13, 14, 16	For PG&E – single-family homeowners only
Central A/C Replacement	13 (PG&E only), 14, 15	For PG&E – single-family homeowners only
Central A/C Tune-up	2, 4, 6, 10, 11, 12, 13, 14, 15, 16	
Heat Pump	14, 15	SCE only
Evaporative Coolers	1-4, 10, 11, 12, 13, 14, 15, 16	PG&E and SCE only; no multi-family
Evaporative Cooler Tune-up	All	
Infiltration and Space Conditioning		
Envelope and Air Sealing Measures	All	
Duct Sealing	All	No multi-family
Attic Insulation	All	No mobile homes
Water Heating Measures		
Water Heater Conservation Measures	All	
Water Heater Replacement - Gas	All	Homeowners only
High Efficiency Clothes Washer	All	SDG&E and SoCalGas only
Thermostatic Shower Valve	All	No SCE
Lighting Measures		
CFL Lighting	All	
Interior Hard-wired	All	No SCE

Measure	CEC Climate Zone Eligibility	Other Eligibility
CFL fixtures		
Exterior Hard-wired CFL fixtures	All	SCE and SDG&E – no multi-family or mobile homes
Torchiere	All	
Occupancy Sensors	All	PG&E only
LED Night Light	All	SDG&E only
Other		
Refrigerators	All	
Pool Pumps	All	SCE single-family homes only
Microwave Ovens	All	PG&E and SDG&E only
Minor Home Repairs	All	
AC Time Delay	Varies based on home type	PG&E only
Smart power strips	All	SDG&E and SCE only

[1]Some exclusions for climate zones 6 and 8 for gas-heated homes.
[2]This measure is only for furnaces that are unsafe (e.g., fail a natural gas safety check), it is not intended as an energy efficiency measure.
Source: ESA measure eligibility table (approved on July 15, 2013) provided via email by the CPUC on August 12, 2013.

Table 35, Table 36, Table 37 and Table 38 below show the number of participating households that received each ESA measure (electric and gas measures, respectively) and the total electricity and gas savings by measure for 2011, based on the recent ESA impact evaluation. We used this information to understand the distribution of measure installations and savings contributions across IOUs.

Table 35: Electric ESA Measures Installed in 2011

Measure	Number of Households that Received the Measure			
	PG&E	SCE	SDG&E	Total
HVAC				
Room AC	3,202	931	305	4,438
Central AC	79	4,877	30	4,986
Central AC Tune-Up	12,123	32	59	12,214
Evaporative Cooler	5,841	15,970	0	21,811
Evaporative Cooler Tune-Up	0	9	0	9
Infiltration and Space Conditioning				
Weatherization	64,751	531	16,756	82,038
Duct Test Seal	3,007	4,499	937	8,443
Insulation	6,290	0	789	7,079
Water Heating Measures				
Faucet Aerator	0	397	1,271	1,668
Low Flow Showerhead	0	420	449	869
Thermostatic Shower Valve	0	0	272	272
Water Heater Blanket	0	63	52	115
Water Heater Pipe Insulation	0	64	87	151
Water Heater Repair/Replace	0	0	6	6
Water Heater Conservation Measures	8,450	0	0	8,450
High Efficiency Clothes Washer	0	0	1,668	1,668
Lighting Measures				
CFL	99,402	68,053	16,488	183,943
Hard-wired Lights	87,276	0	6,641	93,917
LED Night Lights	0	0	20,452	20,452
Torchiere	0	2,582	6,612	9,194
Lighting	26,414	835	0	27,249
Other				
Microwaves	0	0	1,524	1,524
Refrigerator	16,773	16,758	1,810	35,341
Pool Pump	0	1,912	0	1,912

Source: 2011 ESA Impact Evaluation, Appendix D (Evergreen Economics, August 30, 2013).

Table 36: Gas ESA Measures Installed in 2011

Measure	Number of Households that Received the Measure			
	PG&E	SoCalGas	SDG&E	Total
HVAC				
Furnace Clean & Tune	0	20,199	5,224	25,423
Furnace Repair/Replace	3,415	15,676	3,010	22,101
Pilot Light Conversion	0	109	310	419
Infiltration and Space Conditioning				
Duct Test Seal	3,578	2,616	929	7,123
Weatherization	69,585	109,070	7,011	185,666
Insulation	7,165	8,236	726	16,127
Water Heating Measures				
High Efficiency Clothes Washer	0	4,680	1,585	6,265
Faucet Aerator	0	0	10,370	10,370
Low Flow Showerhead	0	0	10,144	10,144
Thermostatic Shower Valve	0	0	3,816	3,816
Water Heater Blanket	0	0	787	787
Water Heater Pipe Insulation	0	0	503	503
Water Heater Repair/Replace	1,326	1,819	1,236	4,381
Water Heater Conservation Measures	79,662	114,139	0	193,801

Source: 2011 ESA Impact Evaluation, Appendix D (Evergreen Economics, August 30, 2013).

Table 37: 2011 ESA Electricity Savings by Measure

Measure	First-Year Electricity Savings (kWh)			
	PG&E	SCE	SDG&E	Total
HVAC				
Room AC	356,399	52,757	8,323	417,479
Central AC	11,182	782,397	425	794,004
Central AC Tune-Up	2,788,718	5,462	13,519	2,807,699
Evaporative Cooler	1,531,214	7,150,369	0	8,681,583
Evaporative Cooler Tune-Up	0	334	0	334
Infiltration and Space Conditioning				
Weatherization	10,887,753	29,273	830,475	11,747,501
Duct Test Seal	337,597	92,381	52,210	482,188
Insulation	920,493	0	76,691	997,184
Water Heating Measures				
Faucet Aerator	0	64,344	4,199	68,543
Low Flow Showerhead	0	44,184	2,541	46,725
Thermostatic Shower Valve	0	0	20,079	20,079
Water Heater Blanket	0	5,460	173	5,633
Water Heater Pipe Insulation	0	5,460	34	5,494
Water Heater Repair/Replace	0	0	0	0
Water Heater Conservation Measures	2,309,384	0	0	2,309,384
High Efficiency Clothes Washer	0	0	205,255	205,255
Lighting Measures				
CFL	7,484,304	4,848,777	1,848,447	14,181,528
Hard-wired Lights	12,719,484	0	778,420	13,497,904
LED Night Lights	0	0	60,017	60,017
Torchiere	0	247,252	225,195	472,447
Lighting	3,710,458	41,191	0	3,751,649
Other				
Microwaves	0	0	101,370	101,370
Refrigerator	10,992,293	12,970,606	1,159,157	25,122,056
Pool Pump	0	2,080,256	0	2,080,256
Total	**54,049,279**	**28,420,503**	**5,386,530**	**87,856,312**

Source: 2011 ESA Impact Evaluation, Appendix D (Evergreen Economics, August 30, 2013).

Table 38: 2011 ESA Gas Savings by Measure

Measure	First-Year Gas Savings (therms)			
	PG&E	SoCalGas	SDG&E	Total
HVAC				
Furnace Clean & Tune	0	114,174	50,885	165,059
Furnace Repair/Replace	4,030	0	0	4,030
Pilot Light Conversion	0	4,830	4,680	9,510
Infiltration and Space Conditioning				
Duct Test Seal	61,582	40,218	13,500	115,300
Weatherization	658,546	432,161	23,152	1,113,859
Insulation	318,832	218,406	19,313	556,551
Water Heating Measures				
High Efficiency Clothes Washer	0	144,531	25,166	169,697
Faucet Aerator	0	0	7,647	7,647
Low Flow Showerhead	0	0	9,600	9,600
Thermostatic Shower Valve	0	0	15,318	15,318
Water Heater Blanket	0	0	376	376
Water Heater Pipe Insulation	0	0	23	23
Water Heater Repair/Replace	7,355	6,402	8,405	22,162
Water Heater Conservation Measures	1,109,099	377,331	0	1,486,430
Total	**2,159,444**	**1,338,053**	**178,065**	**3,675,562**

Source: 2011 ESA Impact Evaluation, Appendix D (Evergreen Economics, August 30, 2013).

4.5 Remaining ESA Program Energy Savings Potential

This report contains data that could be used in combination with the recent 2011 ESA impact evaluation to inform the development of estimates of the remaining ESA program energy savings potential.

In particular, these study results could be used to inform ESA program energy savings potential:

- In Section 4.1, we report Athens Research estimates of the remaining ESA eligible population;
- In Section 4.2, we report KEMA RASS and CLASS data that indicate the types of energy-using appliances and equipment that LI (i.e., likely ESA eligible) customers have;
- In Section 4.3, we report Evergreen Economics 2011 ESA impact evaluation results by IOU and measure category; and
- In Section 5, we report phone survey and in-home visit results that indicate the types of measures that customers who are enrolled in CARE (who are likely income-eligible for ESA) who have not yet participated in ESA say they need (based on the phone survey) and we observed they need (based on the in-home visit).

The most critical data that could be used to inform energy savings potential for the ESA program is robust current data on the energy equipment characteristics of non-participating homes. The prior KEMA LINA study collected such data and developed estimates of remaining potential, but those estimates are based on data collected in 2004. This current study lacked the resources to include a large representative sample of non-participants, with auditors spending several hours per home collecting detailed (e.g., name plate) data on all the energy-using equipment.

In addition to the critical data gap, there are caveats associated with using past data to inform estimates of future energy savings potential, including:

- The remaining ESA non-participants are different than recent or past ESA participants —as evidenced in this study, which our telephone survey data highlight (see summary in Section 5.4.5). However, there is likely non-response bias in our telephone survey so the ESA non-participants we conducted surveys with do not represent all the remaining ESA non-participants (refer to the discussion in Section 5.1.1.2 below); they represent those remaining ESA non-participants who may be contacted by phone and are willing to talk to a surveyor about LI-related issues. There are additional ESA non-participants who may have different home characteristics and needs and savings potential.
- ESA impact savings estimates are not consistent over time, possibly reinforcing the issue raised in the previous bullet that ESA participants are not the same and the programs have probably reached those with the most savings potential in earlier program cycles, leaving those with less savings potential (and perhaps more barriers to reaching them).

A recent energy efficiency potential study, conducted by Navigant Consulting,[16] used California IOU data combined with estimates from the prior KEMA LINA study to develop estimates of remaining energy efficiency potential in the LI sector. They estimated technical potential[17] per household of 208 kWh and 9 therms. These estimates are close to other available estimates on average per household ESA energy savings, as shown in Table 39 below.

[16] Analysis to Update Energy Efficiency Potential, goals and Targets for 2013 and Beyond – Track 1 Statewide Investor-Owned Utility Energy Efficiency Potential Study. Prepared for the California Public Utilities Commission. Navigant Consulting, Inc. and Heschong Mahone Group, March 19, 2012.

[17] Technical potential is defined as the amount of energy savings that would be possible if all technically applicable and feasible opportunities to improve energy efficiency were taken, including retrofit measures, replace-on-burnout measures, and new construction measures. It does not take into account whether such retrofits are economically feasible (economic potential) or what fraction would be likely to occur given the current market conditions (market potential).

Table 39 – ESA Potential Estimates

Source	Per LI Household Electricity Savings (kWh/year)	Percentage Savings (based on CARE customer consumption)	Per LI Household Gas Savings (therms/year)	Percentage Savings (based on CARE customer consumption)
2012 Navigant Energy Efficiency Potential Study	208	3%	9	2%
2013 Evergreen Economics ESA Impact Evaluation – PG&E	367	6%	22	6%
2013 Evergreen Economics ESA Impact Evaluation – SCE	279	4%	NA	NA
2013 Evergreen Economics ESA Impact Evaluation – SDG&E	279	4%	26	7%
2013 Evergreen Economics ESA Impact Evaluation – SoCalGas	NA	NA	13	3%
2007 KEMA LINA Study	150	2%	22	6%
Average IOU CARE customer annual consumption (based on IOU 2012 CARE/ESA Annual Reports)	6,564	100%	372	100%

We may combine the technical potential estimates with our study's estimates of willingness to participate to yield estimates of market potential, which for LI households is the technical potential combined with the fraction of households that would be willing to participate in the ESA program. As presented in Section 5.4.4.1, we estimate that 52 percent of income-eligible non-participant homes are willing to participate in ESA. Note that this estimate does not include some unwilling non-participants whose barriers could be addressed by the program, such as renters who do not want to ask their landlord for permission.

We may apply the technical potential estimates and the willing to participate estimates to the 2012 estimates of the number of income-eligible non-participant homes from Table 2 in Section 4.1 above by fuel[18] as follows:

[18] Based on Athens Research analysis.

- Total ESA electric savings potential = 208 kWh x 52% (WTP) x 3,133,942 income-eligible electric IOU customers = 339 MWh.
- Total ESA gas savings potential = 9 therms x 52% (WTP) x 3,714,462 income-eligible gas IOU customers = 17.4 million therms.

We provide recommendations for filling data gaps in Section 3 of this report that are intended to guide the development of a future study that could more accurately and robustly determine the remaining energy savings potential for the ESA program.

5 Low-Income Population Needs and Program Assessment

This section describes the needs of the state of California's low-income (LI) population, how the programs are meeting those needs and whether there exist unmet needs.

5.1 Overview of Sources

We used a variety of sources to support the assessment in this report section (see Section 3 for a description of the research methods). We used the following sources to develop a brief overview for each subsection that provides program context:

- **Program staff in-depth interviews** with each of the IOU program staff for CARE and ESA that provided information about how the programs are implemented and feedback on barriers to participation and meeting customers' energy needs;
- **ESA contractor in-depth interviews** with 11 contractors that do ESA outreach and assessments[19] that provided feedback from contractors on customer outreach, enrollment and eligibility screening;
- **CARE contractor in-depth interviews** with interviews with six contractors that conduct outreach for the CARE program (including those that target Chinese, Vietnamese, Pacific Islanders, Hispanic, Korean and vision-impaired customers), typically offering a wide range of service referrals (e.g., on substance abuse, health care, domestic violence) to LI clients, on customer outreach and barriers to participation; and
- **Literature review** of numerous LI studies and information sources to obtain an understanding of the policies governing the programs and program implementation details, with a focus on customer outreach, enrollment and eligibility and meeting customers' energy needs.

We relied on the following primary research and data analysis to develop the assessments:

- **1,028 telephone survey of CARE customers**[20] including ESA participants (from 2002 – 2012) and ESA non-participants, with highlights of the main findings found in this section including comparisons to prior KEMA LINA study where possible, with more detailed findings provided in the Appendix, Section 8;[21]

[19] We did not interview any ESA installation or inspection contractors.
[20] Due to the CARE program's high penetration rate (see Section 2.1.1) and the consistent income and household size eligibility criteria for CARE and ESA (see Section 2.1), CARE customers are a proxy for customers who are income-eligible for both CARE and ESA.
[21] Section 4.3 also leverages the customer telephone survey to present some demographic information about LI customers, based on their ESA participation status.

- We examined differences in the phone survey results by a number of program categories and LI population segments, including but not limited to CARE participants (which is the basis of the sample frame), ESA participants, ESA non-participants (that are enrolled in CARE), home type, home ownership, language, urban versus rural and climate zone categories. We provide highlights of the telephone survey results throughout this section, with more detailed results provided in Section 8.
- We collapsed home type and home ownership when breaking out results by those categories in this section, showing "single-family owners", "single-family renters" and "multi-family". Mobile homes only accounted for 42 respondents (3% of the sample), not a large enough sample to break out results. 95 percent of multi-family homes are occupied by renters.
- Any differences across segments that we describe in the text are statistically significant[22] unless indicated otherwise. We provide the sample size for the total column in the caption of each result in this section, and more detailed sample size information (and standard errors for means) in Section 8.

- A nested sample of **88 in-home visits** within the ESA non-participant telephone survey sample, providing a fuller picture of ESA non-participants' characteristics and energy needs.
- **A review of several LI programs** similar to ESA offered in other states, providing insights from other similar programs; and
- **Modeling and analysis** of IOU, Athens Research and Census data, informing CARE program participation and penetration, ESA participation and ESA willingness to participate.
  - **CARE modeling**: We developed statistical regression models to understand the drivers of and barriers to CARE program participation based on Athens Research data. The models examine variations in participation and penetration ratios across census block groups, and what variables (that we may observe at the Census block group level) might predict higher or lower rates, all else constant.
  - **ESA modeling**: Similar to the CARE modeling, we developed regression models to understand drivers of and barriers to ESA program participation. We used customer level data from the IOUs (stage one) supplemented with telephone survey data (stage two).
  - **Conjoint analysis:** We used a stated preference survey technique that involves having respondents sort through and rank options that reflect different choices. For this analysis, participants responded to an online/onsite survey where they were first asked to rank choices that

[22] We calculated confidence bounds or referred to standard errors for means for each result noted in the text.

reflected different types of ESA program scenarios. For all these scenarios, each choice was defined by several attributes, and respondents were asked to rank the options from most to least preferred based on these attributes, and then to indicate which scenarios they would actually participate in.

5.1.1 Sample Representation

Below we discuss some important implications of our research approach that the reader should consider when reviewing the results contained in this section.

5.1.1.1 Customer Telephone Survey

There are two implications to consider regarding our approach to the customer telephone survey, based on the sampling and survey approach.

The basis of the customer telephone survey sample frame was IOU tracking data on CARE enrollees during the period 2010 – 2012. If a household was on the CARE rate during any month of that period, they were considered a "CARE enrollee" and part of the sample frame. The rationale for this approach was that estimated CARE program penetration is so high (91% for 2012, as reported previously in Section 1.1.1) that CARE enrollees could serve as a proxy for the LI population (based on the CARE program income guidelines.) This approach was also highly practical since the IOU CARE participant records required relatively less resources to obtain and process, compared to the alternative of attempting a general population survey with screening for income-eligibility.

However, there may be customers enrolled in the CARE program that are not actually income-eligible, because to enroll in CARE, customers are required to self-report their income qualification; they do not actually have to prove their eligibility (see Section 1.1.1 for a description of the CARE program). While the IOUs are aware that there are probably some instances where this is occurring (such as due to confusion about eligibility or households that do not remove themselves from CARE when their income increases), there is no current estimate of how many.

The major research implication of this sampling approach is that some of the customers we considered as income-qualified who responded to our survey may actually have higher incomes and not qualify for the programs. We asked respondents to tell us their income at the end of the survey (a response was not required), but that is not a valid way to confirm their eligibility. We lacked the resources to attempt to more definitively confirm customers' incomes, which would have been very costly and created secondary issues related to non-response bias. Our CARE modeling effort, described in Section 5.3.5 below, provides some insights on this issue.

The second implication stems from our telephone survey approach, which is associated with some level of bias, where our respondents represent the customers who are willing

to talk with a surveyor on the phone about energy issues. (Our telephone call center disposition indicated [see Section 12.2] that we had to dial about twice as many customers as the number of completes, suggesting our results represent about half the ESA non-participants, the half that is reachable by phone. The other half is very difficult to reach by phone by a surveyor who is discussing energy issues.) While we used standard industry practices to ensure the most representative sample possible (calling at different times of the day and week, using trained interviewers and well-vetted screening scripts and conducting Spanish-language surveys), there are some customers who are not able or willing to talk to a surveyor by phone. We had the advantage of using updated IOU customer contact information including phone numbers from the CARE applications and/or billing records, but not all customers are willing to provide their phone number to the IOU and those that move around a lot are less represented since for a larger fraction of those customers, the phone numbers will not be updated.

This issue of non-response bias should be considered in the context of the ESA and CARE programs, which also use telephone calls (either automated or with a live representative) as one major approach to program outreach (see Sections 5.2.1 and 5.3.1 for a description of CARE and ESA marketing and outreach approaches). Our telephone survey sample represents customers who are more likely to respond to CARE and ESA program outreach.

We compared the demographic composition of our telephone survey sample to the ACS/PUMS LI-subsample (see Section 8.1), which is a much more robust and less biased sample,[23] to understand the extent of the CARE income-eligibility and survey non-response bias issues on the representativeness of the telephone survey sample. Across the state, we found that our telephone survey sample has a much higher proportion of homeowners, White and English speakers as compared to the ACS/PUMS LI sample. (When examined by IOU, we noted a difference for SDG&E with our sample having a greater proportion of multi-family homes.) We developed adjustment weights by IOU, home type and homeownership to correct for the difference in the rate of homeowners and home type. We did not attempt to adjust our sample to correct for underrepresenting non-English speakers and non-White ethnicities since due to resource constraints we did not talk to non-English/non-Spanish customers. (For similar reasons we also did not attempt to reach households where non-standard forms of telecommunication are used.) The sample of customers who we interviewed who are non-White and/or speak a language other than English or Spanish should not be weighted to reflect a broader segment of the population who do not speak English or Spanish. Note that the telephone survey is one piece of the broader resources we drew

[23] The Census Bureau institutes several measures to control for sampling and non-sampling error, including non-response bias. The ACS uses a combination of mail, CATI and CAPI data collection efforts to maximize response rates to the mandatory survey, including follow up interviews to mail non-respondents. The response rate for 2011 was 97.6%. Specific details on accuracy of ACS data can be found at http://www.census.gov/acs/www/data_documentation/documentation_main .

from to develop the assessments in this section; the LI population characterization in Section 4.3, the CARE modeling in Section 5.3.6 and the ESA modeling in Section 5.4.5 draw from ACS/PUMS and Athens Research data that reflect the total LI population, including non-English/non-Spanish speakers and households that require non-standard forms of telecommunication. In particular, the CARE models and the first stage ESA models provide insight into the characteristics of likely income-eligible customers who have not enrolled in CARE or participated in ESA, based on what we could observe in the available data (for CARE – at the census block group level, and for ESA – at the individual level based on IOU data).

5.1.1.2 ESA Non-Participant In-Home Sample

The ESA non-participant in-home survey sample was recruited from the telephone survey. The sample represents customers who are on CARE (and are likely income-eligible[24]), have not had ESA treatment in their homes since 2002, who are willing to talk to a surveyor by phone about energy issues and who will allow a researcher into their home[25] for an in-person interview and walk-through observation of their energy-using equipment. As such, the in-home sample represents the subset of telephone respondents who were willing to participate in the visits.

Our telephone survey results showed that about half the ESA non-participants were willing to be recruited for an in-home interview, and of those, around one-quarter that we attempted to visit had issues arise that prevented us from doing the visit.

What we learned in reaching out to customers to participate in the in-home visits will also apply to program outreach. Households that answer the telephone regarding ESA and agree to in-person visits are also more likely to be accessible to the program. As such, our discussion of non-participants could be considered to be the next cadre of participants. They do not necessarily represent the full population of non-participants, as some eligible households are more difficult to reach for either a research study or program participation and are underrepresented in our study sample.

5.2 ESA Program Accessibility

This subsection presents study results on ESA program awareness and outreach. First, we provide an overview of program marketing and outreach, followed by customer telephone survey in-home visit results. Feedback provided by program staff and contractors and additional telephone and in-home survey results are included in Section 5.4, where we discuss ESA drivers of and barriers to participation.

[24] We reviewed the self-reported income of ESA non-participant telephone survey respondents and screened out any customers who were likely ineligible based on their response.
[25] Customers were given a $100 Visa gift card.

5.2.1 Overview of ESA Marketing and Outreach

The IOUs use automated phone calls, email campaigns and periodic direct mail combined with data mining to identify likely eligible customers for the ESA program. The IOUs track who has participated in ESA in the past and who has not, CARE enrollment status, and income levels for geographic areas in order to identify likely eligible customers. There is additional data sharing across IOUs and other utilities for other income-qualified programs.

There are a number of other methods that the IOUs have used to identify eligible households:

- Leveraging IOU data on CARE enrollments, since income-eligibility is consistent across the two programs;
- Accessing additional IOU marketing and customer data;
- Accessing the CIS database to identify customer language preference to tailor outreach strategies;
- Purchasing third-party data and combining with IOU data; and
- Tracking ethnicity and language preferences of ESA program participants and using that information to guide marketing efforts to groups with a lower percentage of participation.

The ESA marketing and outreach teams develop and implement a variety of marketing strategies, such as direct mailing, outbound calling, e-mailing and leveraging grass roots through community involvement, developing collateral for the specific events in multiple languages to enroll and educate customers.

In general, all the IOUs are moving toward highly customized messaging targeted to hard-to-reach populations. To support this development, they collect, track, purchase and analyze detailed geographic and demographic characteristics of their service territories' eligible population. Messages may be customized or timed to the appropriate season for specific measures. IOUs develop customized messaging for seniors and disabled populations as well as a variety of multi-cultural/multi-lingual communities.

The ESA program involves a number of in-person visits by assessment and installation contractors, requiring travel. For this reason the implementation teams find it useful to employ tactics that lead to geographic clustering of enrollment/installations. Some IOUs batch potentially eligible customers for contractors in clustered areas to minimize travel costs and time (in some cases, IOUs leave the logistical planning to the contractors). Managing program operations requires substantial logistical planning, looking at where remaining eligible customers are located, contractor service territories and ability to ramp up or down based on the number of leads, and batching the leads for contractors.

The IOUs coordinate automatic voice message (AVM) outbound calling to support geographic clustering of installations. If a customer responds to an AVM, they can be directly connected with contractors, and in some cases, schedule an appointment during the phone call. In other cases, they can indicate their interest and the lead will be passed on to the appropriate contractor. These are targeted campaigns developed geographically in coordination with contractors. Some contractors conduct door-to-door canvassing and direct customer calls, while others rely on leads provided by IOUs.

The IOUs and their contractors attempt to accommodate non-English language speakers using a number of tactics, including providing multiple language options on AVM, matching contractors with language capabilities to geographic areas with those language needs, using in-language direct mail and advertisements in local ethnic media.

Outreach and assessment contractors[26] supplement IOU outreach strategies, but mostly rely on IOU referrals (including direct customer calls in response to IOU AVM campaigns, mostly based on customers enrolled in CARE who have self-reported that they are income-eligible). Some conduct their own advertising and/or conduct door-to-door canvassing. Community organizations, property managers and word-of-mouth also generate customer leads. Contractors also do outreach at community events and senior centers. They typically have a specific customer enrollment goal provided by the IOU for a specific geographic area.

5.2.1.1 High-Usage Customers on CARE

New CPUC direction requires high usage customers on the CARE rate to be subject to income verification processes (i.e., post-enrollment verification or PEV) and take steps to reduce their energy usage. High usage customers—or customers exceeding 400 percent of baseline usage—must provide income documentation and participate in the ESA program in order to stay on the CARE rate. CARE customers exceeding 600 percent of baseline must do these things and also reduce their usage to 400 percent or they will be dropped from the CARE rate.

The IOUs are using communication and notification strategies to high usage customers, giving them an opportunity to opt out of CARE before the requirements are implemented.

[26] ESA outreach and assessment contractors are responsible for identifying and assessing income-eligibility of customers for the ESA program. They also perform a basic measure assessment, which is used to determine initial measure eligibility. Installation contractors (including HVAC, weatherization and plumbers) schedule subsequent appointments to do a more formal measure eligibility assessment before installing measures.

5.2.1.2 Tracking Disabled Customer Participation

The IOUs are required to report the percentage of ESA participants that they observe to be disabled, with a target of 15 percent.[27] The IOUs are no longer allowed to ask the customer for their disabled status (as of the 2009-2011 program cycle). Customers can volunteer the information or the contractor can observe it if it is very obvious. However, there may be other household members that are not present and/or the disability(ies) may not be observable so the actual penetration is probably higher than what is presently reported.

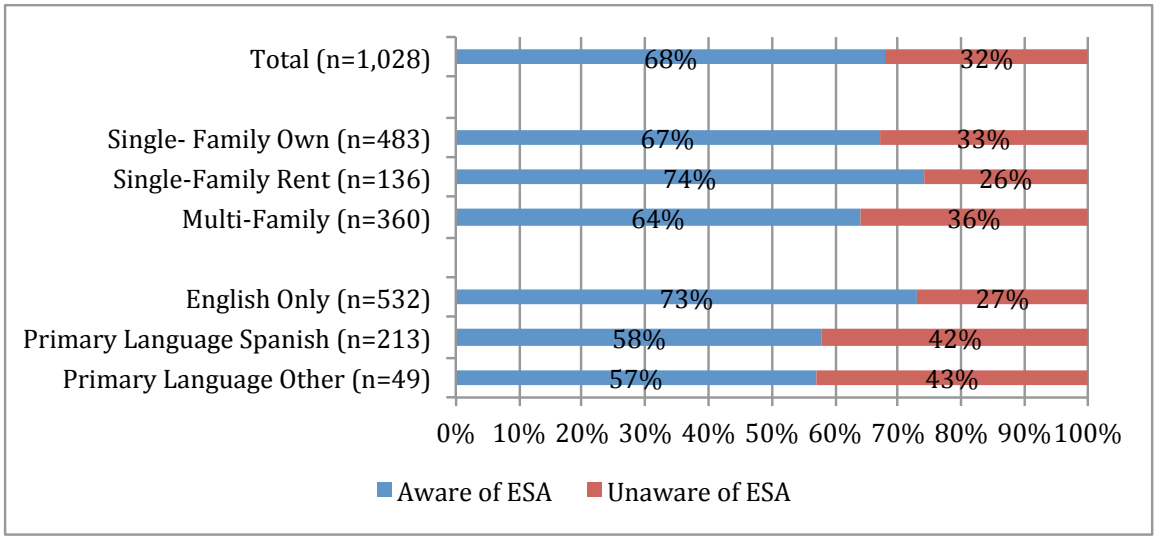
The IOUs typically partner with organizations that outreach to disabled customers, but both IOUs and contractors report that are issues with confidentiality, that the organizations do not always want to share their customer lists. In addition, IOUs partner with agencies that serve senior communities and conduct outreach events that target the visually impaired.

5.2.2 Customer Telephone Survey

We asked telephone survey respondents whether they are aware of ESA, providing them with a general description of the program. Since the program has recently changed its name, we did not expect unprompted awareness of "Energy Savings Assistance Program". As shown in Figure 25 below, two-thirds of respondents are aware of the ESA program. English-only households have a higher level of awareness (73%) than other households. Single-family homeowners have a higher level of awareness than renters or multi-family residents, but this difference is not statistically significant. (As reported in Section 5.1, 95 percent of multi-family homes are occupied by renters, so we do not break out that home type by home ownership.) We did not attempt to distinguish between awareness of the ESA program and other programs such as LIHEAP that provide similar services to the state's LI households.

[27] Note that the prior KEMA LINA study estimated that 14 percent of LI households have disabled members and an additional 13 percent have both elderly and disabled members for a total of 27 percent of households that have disabled members. (Based on the study's on-site survey that looked at physical , emotional and mental disabilities.) We think that these results may have been misinterpreted, such that the 14 percent estimate of LI households that have disabled members but do not have elderly members was used to support the 15 percent target.

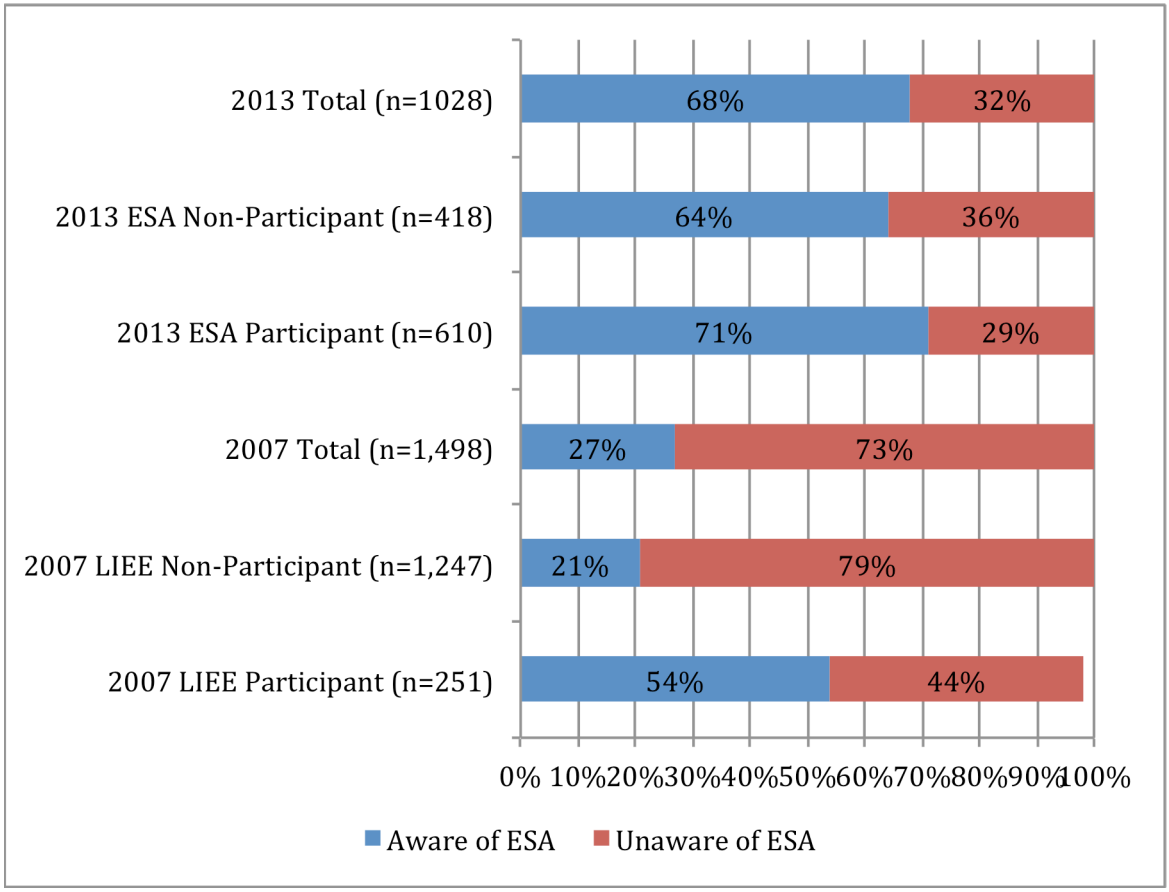
Figure 25: ESA Awareness (Aided) by LI Population Segments (S17) For California LI Population



Source: 2013 CARE Participant Telephone Survey

Figure 26 below compares ESA program awareness over time, using data from the prior KEMA LINA study. Program awareness has increased substantially since the last study, from 27 to 68 percent of the LI population, and also among the program participants and non-participants. Recall that "participants" are households that are living in a home that has been treated by ESA, and they may not be aware that the home has been treated or may not recall that it was treated (if they were living in the home when the program installed measures). There may also be cases where even though we attempted to talk to the head of household, that the person responding to the survey was not the person who participated in the program.

Figure 26: ESA/LIEE Awareness by ESA Participation Over Time (S17) for California LI Population

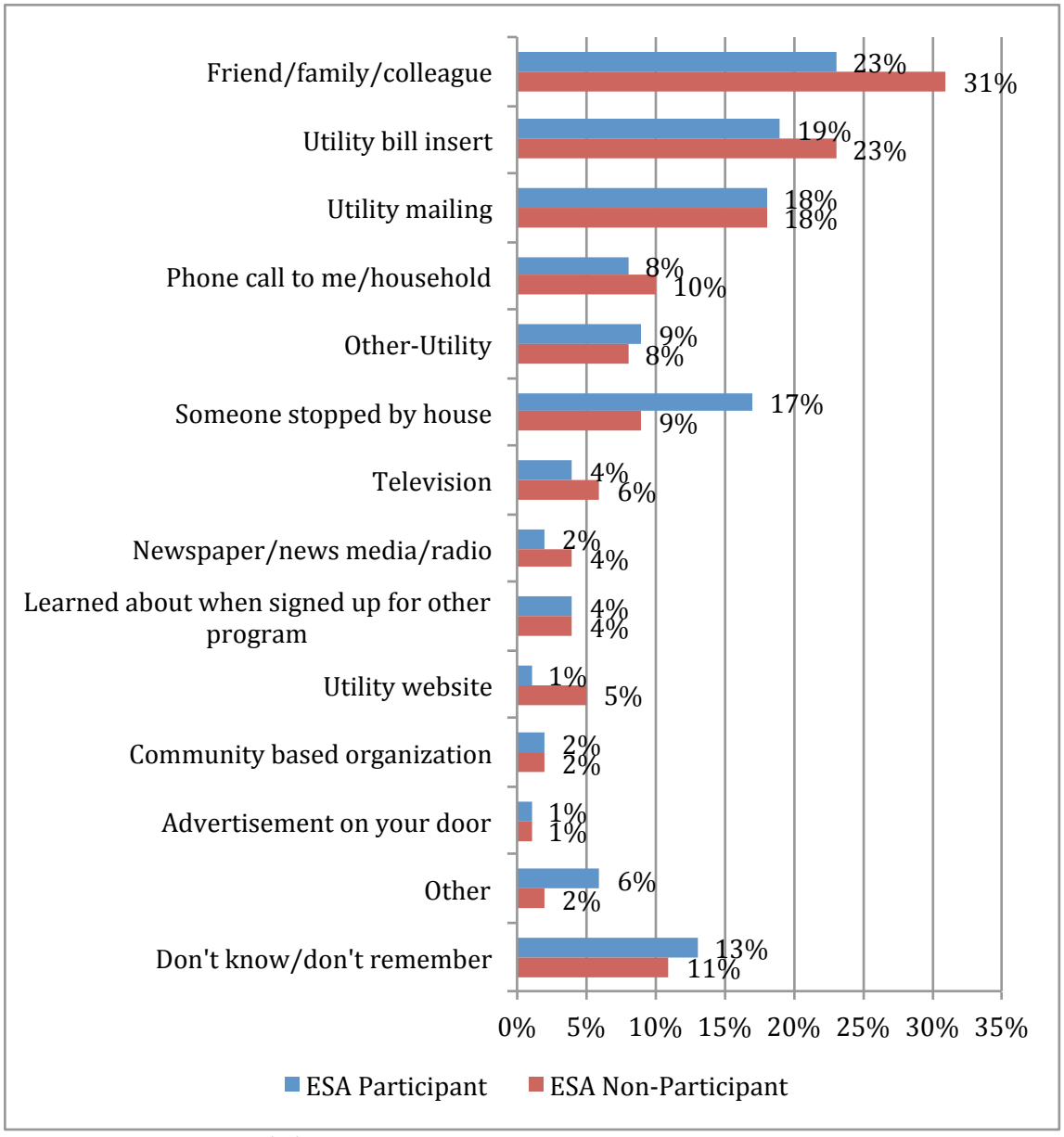


2007 source: p. 5-56 of KEMA report
2013 source: 2013 CARE Participant Telephone Survey

Figure 27 below describes how survey respondents learned about the ESA program (of those that were aware)—with hearing about it from a friend, family member or colleague being the most common method (27% of all aware respondents), closely followed by an IOU bill insert (21%) and mailing (18%). A greater proportion of ESA participants (17%) learned about the program from someone stopping by their home than non-participants (9%). We remind the reader that the sample is biased towards households who are willing to talk to a telephone and in-person surveyor about energy issues and the CARE program. Those that did not respond might have lower awareness and for those who are aware, different source of awareness.

Advertising via television, radio and newspaper or other media was mentioned by few respondents – though they were only able to respond with the primary source of their awareness. The IOUs do not rely on media advertising as a primary marketing delivery channel, and when they do use these channels it is often in conjunction with another targeted campaign such as phone calls or door-to-door canvassing. The advertising serves as a foundation that the more personal outreach leverages to facilitate households' awareness and participation.

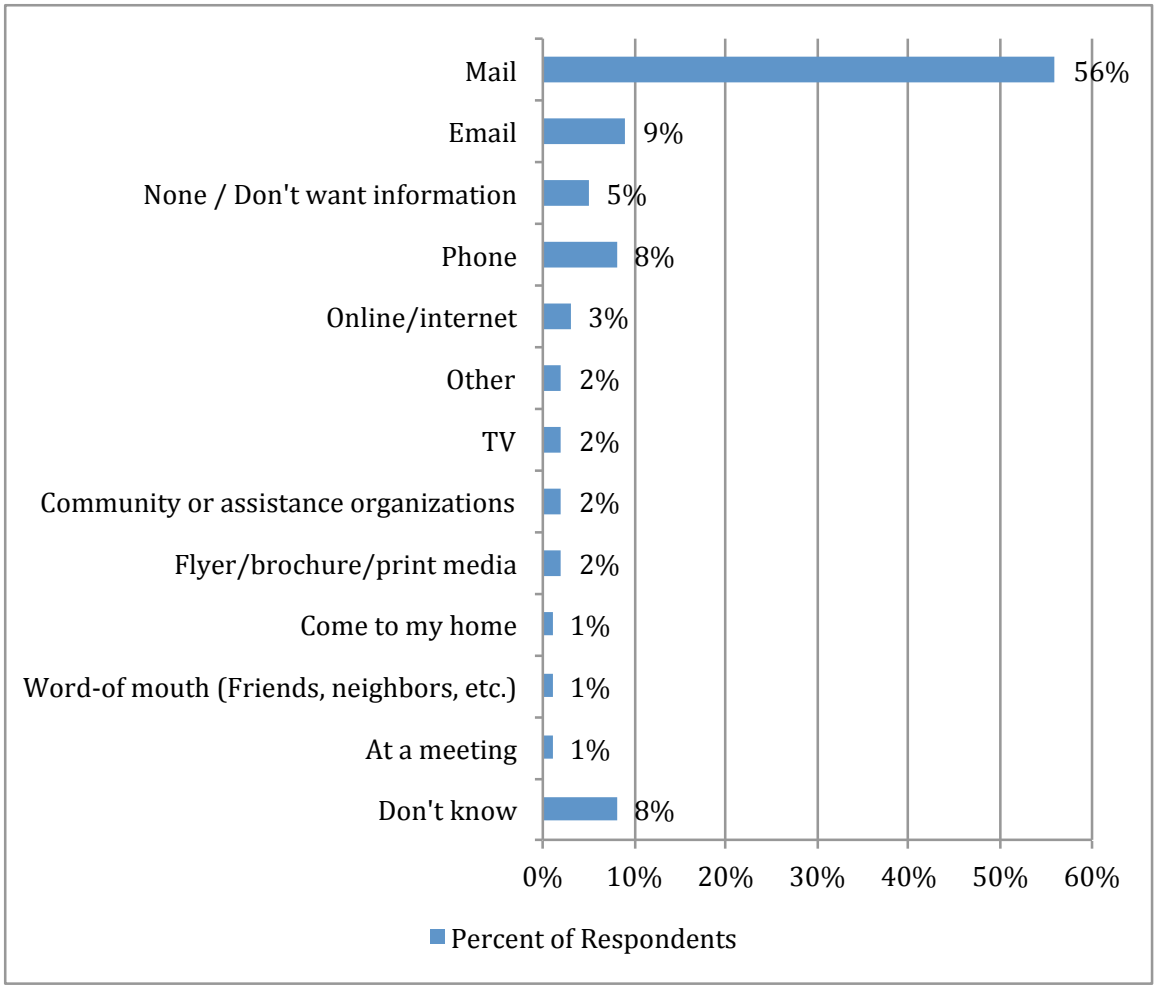
Figure 27: How ESA Participants and Non-Participants Heard of ESA Program (E1) (n=619) for California LI Population



Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

We asked survey respondents how they prefer to hear about programs that may be helpful to households like theirs (unprompted), as shown in Figure 28 below. The majority (56%) said they prefer mail, with 9 percent saying they prefer email or phone and 3 percent preferring online. There were no substantial differences in preferences across LI population segments or ESA participation status.

Figure 28: How Respondents prefer to hear about Programs that May be Helpful (FOa) (n=863) for California LI Population



Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

The next figure (Figure 29) summarizes results from several questions related to IOU contact with customers, including:

- How customers receive their bill
- Whether customers have access to Internet service
- How often customers use the IOU website
- How often customers pay their bill online
- How often customers call their IOU
- Whether customers read IOU emails (for those who said they pay their bill online) and bill inserts (for those who say they receive their bill by mail)

Of those surveyed, 82 percent of customers receive a paper bill, and 67 percent of those read the bill inserts. Only 15 percent receive their bill online, though 69 percent have Internet access and 35 percent pay their bill online sometimes or a lot. A high proportion (57%) say they "sometimes" call their IOU. Even with the increasing use of the Internet, mail and phone are still tried and true methods for outreaching to customers, at least for now. That may change in the near future as the IOUs expand their online bill payment efforts.

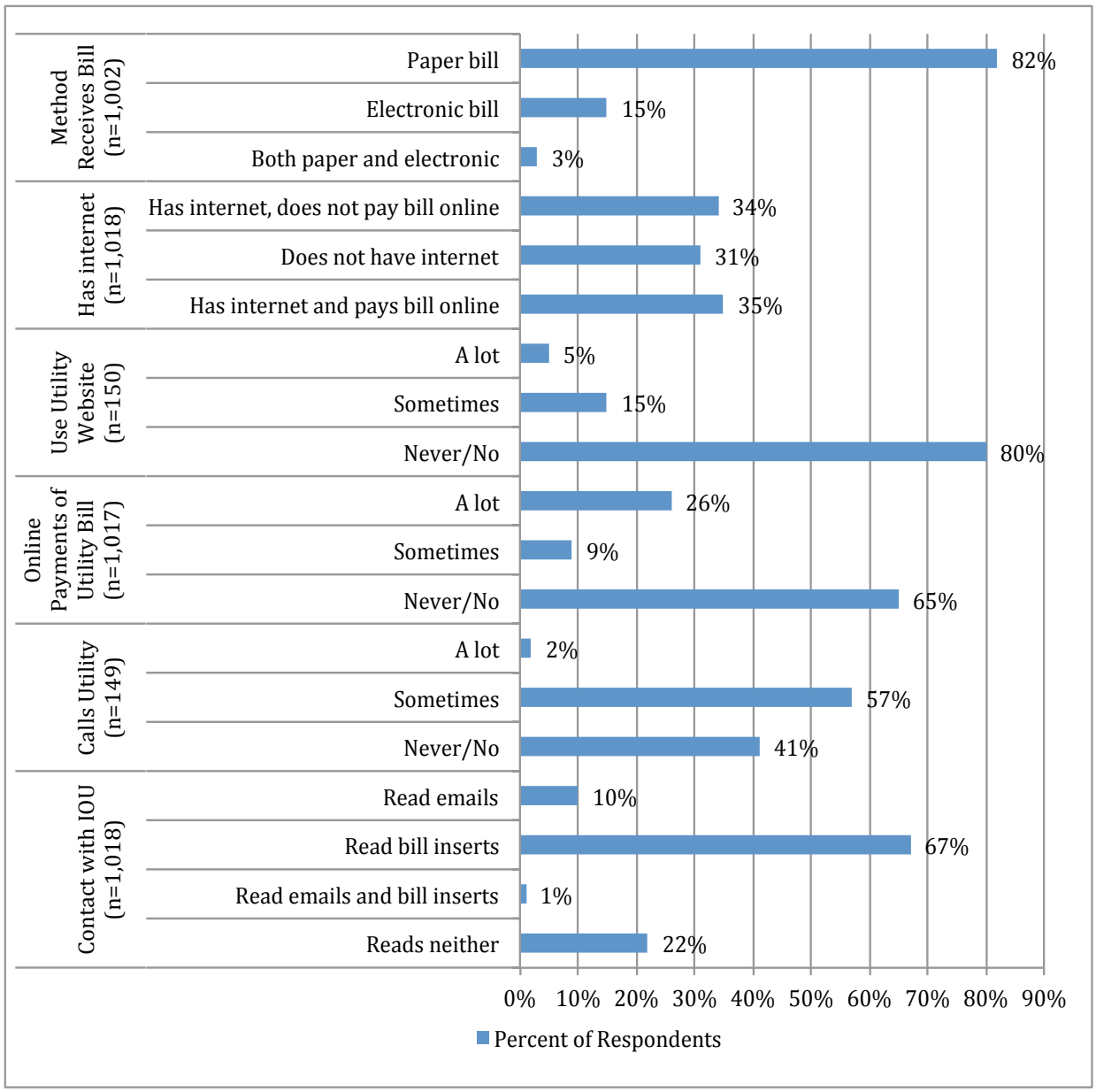
There are some differences in IOU contact across LI population segments. The following segments are more likely to pay their bill online:

- ESA non-participants (41%)
- English-only households (36%)
- Single-family renters (43%)

The following segments are more likely to read bill inserts:

- Single-family homeowners (73%)
- Mobile home dwellers (84%)
- Spanish-speaking households (74%)

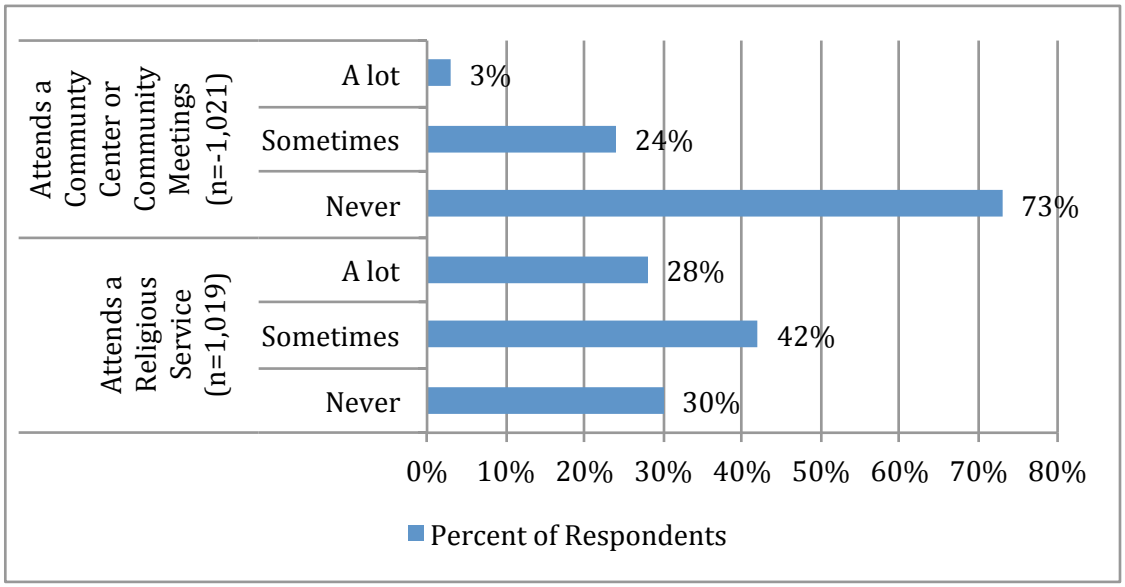
Figure 29: IOU Contact (I1a, I1aa, I1b, I1c, I1d) for California LI Population



Source: 2013 CARE Participant Telephone Survey.
Note: the "calls utility" and "utility website" questions were removed after the survey was already in the field, so they have a lower sample size as a result.

Figure 30 below presents self-reported attendance of religious or community meetings and events, which may be avenues that the ESA program (and CARE program) use to outreach to customers. 27 percent of LI customers go to a community center or meeting, while 70 percent attend church (an increase of 10 percent since the last study, which reported that 60% of LI customers attend church). A higher proportion of LI households located in rural and mountain geographic areas report going to church "a lot" (38% and 41%, respectively, compared to 28% for urban/coastal LI households.)

Figure 30: Community/Religious Involvement (F14a, F14b) for California LI Population



Source: 2013 CARE Participant Telephone Survey.

5.2.3 In-Home Visits

Households expressed nearly uniformly positive perceptions of their IOUs and think of them as good and trustworthy sources of information about ways to save on energy, although IOUs aren't necessarily top-of-mind about energy savings for a share of households. Customers mostly think of their electric provider more than their gas provider because, in most homes, annual electricity costs greatly exceed natural gas costs. We remind the reader that the sample is biased towards households who are willing to talk to a telephone and in-person surveyor about energy issues and the CARE program, so they may be more trusting of their IOU.

Several of the customers who had received ESA[28]—including those who received individual measures they ultimately disabled or that didn't work for them—showed appreciation for the IOU efforts and assistance.

Non-participants tend to rely on and suggest many typical outreach channels—television, radio, bill inserts, and presence on the Internet as important sources for program and energy efficiency related information—but deeper conversations with some interviewees pointed to a few channels that may offer the opportunity for more targeted outreach, as we describe below.

5.2.3.1 Ways Households Currently Hear of ESA

Those who were aware of the program tended to hear about it either directly from their IOU (or an IOU contractor) or by word of mouth from friends, family members or neighbors who had participated. Few people knew of ESA by its name or acronym, however, and seemed uncertain what to call the program. Sometimes they referred to it as "the program that provides free refrigerators." The lack of name recognition was true even of those customers who had participated previously or had recently had contact with the program.

In contrast, nearly all interviewees were aware of the CARE rate and most recognized it by its acronym. (Interestingly, people seemed more likely to find out about CARE than ESA from bill stuffers, whereas it seemed that direct calls or personal visits were a more common way for people to hear about ESA.)

While more widespread awareness of CARE was to be expected, the differences in the identities between the two programs were striking. Therefore, we think there are opportunities to better market ESA by*:*

- ***linking ESA marketing consistently with existing outreach efforts for CARE whenever that is not already done***—for example, customers could be offered ESA or pre-screened for interest and applicability at the time of CARE enrollment (although differences in the enrollment processes may still require separate administrative approaches).
- ***establishing a clearer identity and brand for ESA***—Establishing a brand identity by which customers consistently hear about the program and are able to refer to it themselves would facilitate word-of-mouth information dissemination and formal marketing by the IOUs and their contractors. Furthermore, it would help make the connection between these two types of outreach.

As noted, word-of-mouth remains an important information path about programs that are useful for people. Mostly, people talk to their social contacts about everyday life

[28] We targeted non-participating homes based on IOU tracking data through 2012. 16 of our respondents reported participating in ESA very recently, likely during 2013.

issues and social matters. Programs like CARE and ESA don't necessarily come up in these conversations, but there are some exceptions.

For LI households, making ends meet is a topic that does come up. We heard specifically of information sharing about ways to make ends meet—and sometimes even about CARE and ESA—among single mothers who compare notes at kids' activities or through school communications, family members who sometimes talk about ESA participation with each other, and amongst neighbors in some communities. In one LI neighborhood in particular, we heard from multiple people who said that everyone knows about ESA and CARE (apparently because eligibility and participation rates are high).

5.2.3.2 Opportunities to Reach Households during Key Life Events

Several interviewees discussed the circumstances that led them to become income eligible for LI programs and what other programs they use. While every household's story is unique, there are some common threads that point to opportunities for IOUs to reach out to customers at a moment when they are seeking assistance or transitioning toward program eligibility. Specifically, we heard numerous stories of households becoming income eligible as a result of:

- Retirement;
- Divorce;
- Major medical incidents;
- Job loss; and
- The addition of new dependents into the household.

A few people remarked that they were referred to a social worker at those times through whom they found out about resources to help them through their transition. Others commented that medical staff referred them to programs, such as WIC or Medi-Cal. These remarks highlighted the opportunity IOUs may have to disseminate information about ESA and CARE through the professionals likely to have contact with households as they transition to LI status, including divorce lawyers, hospital discharge personnel, human resources staff and unemployment offices.

Furthermore, some interviewees volunteered other need-based programs from which they receive assistances. In addition to Medi-Cal and WIC, these programs include Section 8 housing, welfare/food stamps, food pantries and church programs. Often, households eligible for these programs are also eligible for ESA and CARE. Cross-marketing with these programs may offer opportunities to reach more people and increase awareness of ESA.

5.2.3.3 Hard-to-Reach Groups

Two distinct groups may be more difficult to reach: immigrants and households outside LI neighborhoods.

The first group, immigrant populations, sometimes forms their own distinct communities and social networks through which they exchange information. We interviewed at least 10 households led by people who identified themselves as having come from another country. The national origin of LI households in California is very diverse. Our interviewees included people from El Salvador, Germany, Iran, Japan, Korea, Mexico, Pakistan, the Philippines, Russia, Somalia and Vietnam.

Reaching Spanish-speaking households, whether immigrants or not, was a focus for us and these households provide insights on the importance of communicating in the household's native language. The Spanish-speaking households we visited often emphasized the need for marketing materials to be in their language. Telephone, radio, television and direct-mail were often cited as communication modes that would be effective for Spanish-speaking households, although some households lacked cable access so telephone or direct mail would likely be the most encompassing mode. Only a few Spanish-speaking households mentioned the Internet as a means of accessing information; for a couple of the families that said they had internet access in the home, they cited their children's education as a reason for paying for internet access. There were a couple of Spanish-speaking households that expressed concern about potential language barriers in the ESA program process, specifically pertaining to the visiting contractor's language; they indicated a preference for contractors with whom they can communicate in Spanish and were not sure such contractors were available.

Among non-Hispanic immigrants, we noted some that seemed well integrated into the mainstream English-speaking aspects of California's social fabric and completely fluent in English, while others either encountered some language barriers or opted to associate mostly in ethnic communities connected with their country of origin.

We note that the ESA and CARE modeling indicated that Spanish-speaking households are more likely to participate in ESA than those that do not speak Spanish, suggesting that the programs' efforts to reach this particular demographic have been successful.

The second group, eligible households that are not closely connected with LI neighbors or other social contacts, seems to be less likely to hear about the program by word of mouth. Mostly, these households are located outside traditionally LI neighborhoods. They rely more heavily on IOU marketing. The ESA and CARE modeling efforts complement these findings, with households in less dense areas less likely to participate.

5.2.3.4 The Harder-to-Reach Households

While we recognize that we were not able to reach the "hardest-to-reach" eligible customers for the reasons noted above, a few of our recruited households that ultimately did not participate in the in-home visit may offer some glimpses into challenges of reaching the harder-to-reach non-participants (refer to the ESA stage one and CARE modeling results for more information on barriers and drivers of participate among the

population, since those were population, not survey sample, models). Among our scheduled homes, we encountered:

- *some homes that needed to cancel their appointments because of medical issues*—While we were on a tight timeline and couldn't always reschedule, programs will need to be able to accommodate rescheduling.
- *some households that never answered their telephone when we tried to confirm the appointment and did not have any way for us to leave a message*—Some of these households were present when we appeared at the scheduled time for our visit; some were not.
- *two households at which the person with whom we had made an appointment was never available when we called to confirm or appeared for our appointment, but other household members seemed leery of us or just uninterested*. In both cases, the household members with whom we interacted seemed suspicious of outsiders.

In addition, numerous households—some that participated in the visits and some that did not after being scheduled—were very cautious about letting people into their homes. Several said they had called the IOU call center to verify that the visit was legitimate, which highlights the importance of ensuring that the visits are clearly branded and identified by a name the household will recognize and be able to use if they call to validate the program with the IOU call center. While we do not have hard data on this issue, we noted it more often in PG&E's service territory, among women respondents, who were usually seniors living alone.

5.3 CARE Program Accessibility

This subsection presents study results that assess how well the CARE program is reaching eligible customers, preceded by an overview of program marketing and outreach. The CARE modeling was the basis of this assessment, since the primary customer research excluded CARE non-participants. As mentioned in Section 3.5, due to the reportedly very high CARE penetration rate (91%, based on the IOU ESA and CARE Programs 2012 Annual Reports), we did not attempt to conduct surveys with CARE non-participants. Instead, we conducted analysis incorporating data on CARE enrollment and eligibility combined with census data to inform an assessment of how well the CARE program is reaching eligible customers. We also leveraged the program staff/contractor in-depth interviews.

5.3.1 Overview of CARE Program Marketing and Outreach

The IOUs rely on Athens Research data to identify small geographic areas with high probability of CARE eligibility, and SoCalGas also uses PRIZM codes[29] to try to cost-effectively reach the remaining eligible population. The IOUs also benefit from data

[29] A widely used customer segmentation system for marketing in the United States, developed by Claritas Inc., which was then acquired by Nielsen Company.

sharing with other IOUs' CARE programs (for areas where the service territories overlap), as well as the Low Income Home Energy Assistance Program (LIHEAP),[30] ESA and water utilities. In addition, they will sometimes purchase third party data to help them identify and market to hard-to-reach segments of the targeted population.

The IOUs are required to include an annual solicitation in the June bill with a CARE program application for all non-CARE customers, timed to the updated income qualifications on June 1 (online billing customers receive an electronic version). In addition to the June mailing, the IOUs all deploy a variety of marketing and outreach methods to promote the CARE program, CARE awareness and enrollment, including:

- Working with communications agencies and third-party contractors to develop and deploy ethnic/targeted media such as community newspapers, radio and television advertisements tailored to specific hard-to-reach segments;
- Automated telephone systems (such as Automated Voice Message (AVM) or Interactive Voice Response (IVR)) that call customers or allow customers who call in to access automated menus and in some cases, if they select a certain option, to be directly connected to an IOU representative;
- A variety of mail tactics (direct mail, bill inserts and onserts, which prints information on the utility bill);
- E-mail to customers who are not already on the rate who are living in areas with high probability of eligibility;
- Enrollments by trained IOU call center staff, such as when customers call in to set up or change service;
- IOU branch (local) offices and payment kiosks (through advertisements and collateral at the kiosk);
- Community events – either attended by IOU staff, or community organizations that are hired by the IOU to target market to specific communities;
- Contractors to canvass neighborhoods;
- Online web enrollments; and
- Electronic data sharing with all of the major IOUs and nine water utilities.

The IOUs use source codes so they can track the effectiveness of most of their M&O strategies. However, some strategies are hard to track, such as community events, mass media and community organization outreach. These efforts drive customers to enroll online or by phone through the call center, or increase their likelihood of filling out the mailed application.

[30] A federally funded program that provides assistance to LI households to help them manage their energy costs, including weatherization and cash assistance. In California, LIHEAP is administered by the Department of Community Services Development.

Under the Capitation Fee program, the CPUC has authorized the IOUs to pay a flat fee to participating organizations for each new customer they help to enroll in the CARE program, but these contractors bring in a relatively low volume of new enrollments. These organizations do not have access to customer data, e.g., to target customers who are not already enrolled. They can use online enrollment and they can find out if the customer is already on the rate, or ask to see the customer's bill. Many of these contractors do "inreach" (not outreach) for clients that visit their organization for a range of potential services, including CARE, and this was the initial impetus for the capitation contractors.

Originally, all capitation contractors were community agencies already providing other services to their LI clients, and the small capitation fee was incremental, intended to offset the few extra minutes that the intake worker would need to help their eligible customers fill out the CARE enrollment form during the intake process that was already occurring, and to send the form to the IOU. The capitation fee is only paid for new enrollments, and since many qualified customers are already on CARE and the capitation contractors do not have access to IOU databases, fewer of their customers qualify. Some capitation workers take proactive steps to find and enroll eligible customers. For instance, some capitation contractors attend community events, church services, and senior center events and offer a variety of services for LI attendees including CARE.

Some IOUs hire contractors to do outreach for CARE, providing them with customer data including CARE status. This is a limited effort with a small number of contractors who typically do door-to-door canvassing, attend events and leverage their existing clientele, much like the capitation contractors. (But in contrast to capitation contractors, these contractors use updated IOU data on who is on and not on the CARE rate, often resulting in much higher enrollment rates.)

The IOUs offer applications and staff call centers with representatives covering multiple languages. When a customer dials an IOU call center or responds to automated calls and speaks a language not supported by the staff, a translation service is used that accommodates 100+ languages. This service provides an interpreter who is conferenced into the phone line and facilitates the conversation.

The IOUs track the language preference of customers who apply (online, call center, paper application)—or respond to automated calls—using a different language and then use that preferred language for follow-up communications (including re-certifications and post-enrollment verifications). Observed trends are used to guide development of new in-language collateral or marketing messages.

5.3.2 Program Staff Interviews

The CARE program reports very high penetration rates, as described in Section 1.1.1. Remaining barriers to enrollment cited by IOU program staff include:

- Language;
- Literacy;
- Lack of trust, fear: 'nothing is free';
- Issues providing necessary documentation;
- Pride/don't think they need the help;
- Mild winters and lower gas prices anecdotally making enrollment a harder value proposition (gas customers only); and
- Master Meter/Sub Metered customers who may be difficult to target and may encounter resistance from landlord/manager.

One program manager mentioned that an area of Southern California is a difficult area in which to increase penetration due to a "marbled" concentration of LI customers. These areas are hard to identify using PRIZM codes, zip-9 data mining. They start with the data to try to identify small areas that have lower relative penetration rates, and then partner with CBOs and attend small events such as food banks to find the pockets of need. The low-hanging fruit is gone and what remains will be challenging to address.

One of the difficulties in understanding barriers, raised by two IOUs, is that community responses to marketing efforts aren't readily translated into a success rate. Eligibility of each individual customer is not known, and low response rates may reflect lower-than-expected eligibility, or it may reflect real barriers.

5.3.3 Contractor Interviews

We conducted interviews with six contractors that conduct outreach for the CARE program, most of which are "capitation contractors" that do not hold formal contracts with the IOUs and lack information on whether customers are signed up for CARE. We did talk to two contractors that do hold contracts with an IOU to conduct outreach using IOU data on who is already enrolled. Note that these results are qualitative and not intended to represent all of the contractors that support the CARE program or the eligible customer base.

Most of the contractors that we interviewed have a regular client base that are LI and/or disabled. A challenge for contractors is finding customers that are not already signed up for CARE, due to broad-based IOU marketing and their own outreach/inreach efforts over the years. Overall, the respondents do not think many ineligible homes are actually getting signed up by them or through the IOUs, although none had actual data to confirm this. For some contractors that we spoke to, a key challenge is that their clients do not know if they are already on the CARE rate, and the contractors cannot easily help the clients to confirm.

All of the contractors reported high enrollment rates once customers were informed of the program; few customers decline the opportunity to get on the CARE rate and there are no distinct patterns reported regarding those that do enroll immediately. For the

"door-to-door" contractors, most customers sign up without asking any questions, and the enrollment process is very easy. Customers that proactively approach firms doing inreach have already self-selected so trust issues are not common. Overall, enrollment does not depend on the method of lead generation, but rather on other cultural and logistics factors. Anecdotally, we heard the following from one or more contractors that we interviewed:

- Pacific Islanders, who come from many places (Guam, Marshall Islands, Cook Islands, Western and Polynesian Samoa, etc.), have multiple barriers;
    - A culture of self-sufficiency, and desire to keep others from knowing they are receiving help
    - Diverse languages and high translation needs (Hawaiians are an exception as they mostly speak English)
    - Low education levels and preferences for visual learning
    - Initial distrust of free assistance and products
    - Frequent residence changes
- Many Muslim men will not speak with women contractor staff, and Muslim women are not supposed to seek assistance in general;
- Senior citizens cannot always read printed program materials;
- Non-English speakers not comfortable enrolling by phone;
- Gaining trust among Koreans, "who go to churches and community centers for help"; and
- Difficulty reaching potential customers at home. The contractor estimated that 60 percent of outreach targets from IOU lists cannot be reached at home, despite canvassing early mornings, evenings, workdays and weekends.

The contractors are using a range of diverse strategies to address the aforementioned challenges:

- For Pacific Islanders:
    - Using volunteers (often university students) to translate materials for Micronesian customers (a small group of Pacific Islanders.
    - Conducting home visits to provide privacy. Contractor visitation services are described in church newsletters and households call them up to arrange visits, where the applications are translated and completed in person at home. Laptops computers provided by SCE have been particularly helpful for this work.
    - Utilizing community elders to intermediate between contractors and community members to build trust.

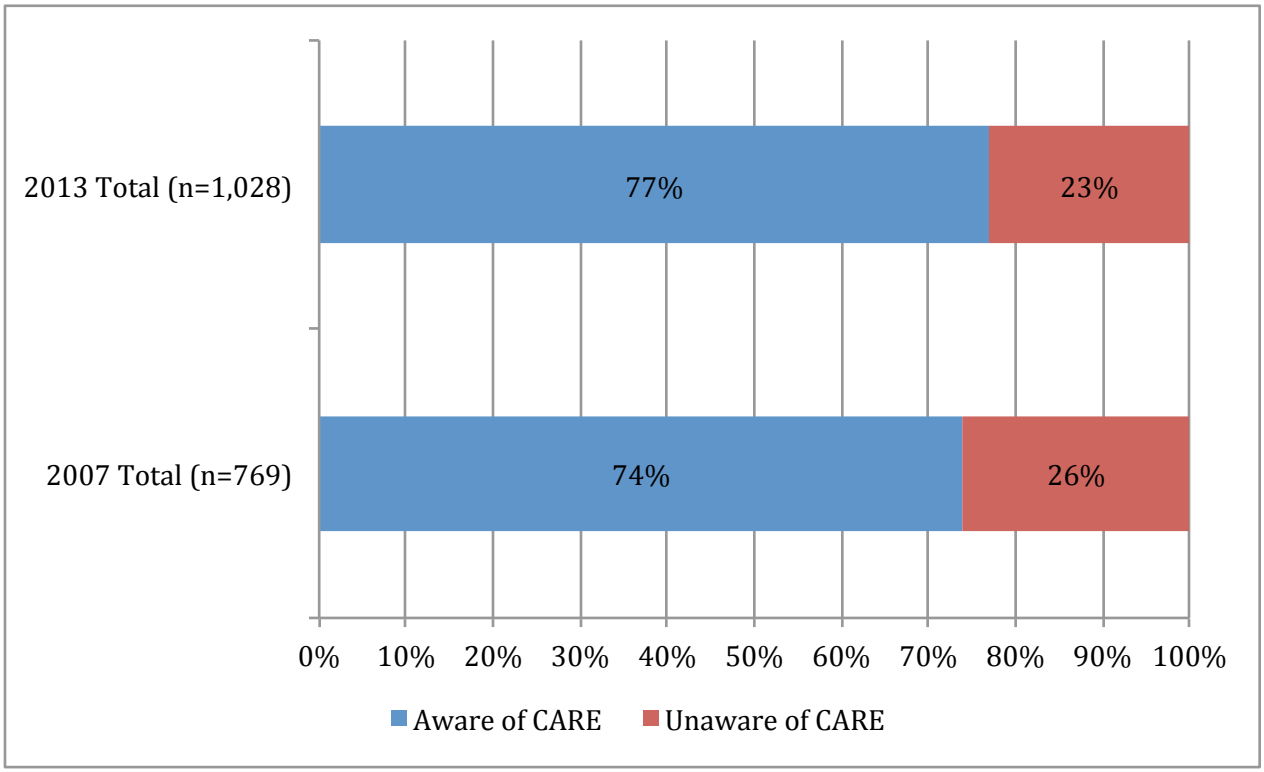
    - Not volunteering information about contractor reimbursement arrangements (i.e., per customer sign-up).
    - Proactively instructing clients "to check in" with other IOUs if they are likely to move to enroll in CARE.
- For door-to-door recruitment:
    - Using leave-behind door hangers.
    - Giving subcontractors badges with IOU and company logos.
    - Hiring subcontractors with friendly, engaging personalities to build rapport and trust, and training them to know the CARE product well.
    - Utilizing ethnic subcontractors and deploying them in matching ethnic communities.
- Provide additional, personalized assistance to seniors with vision limitations.
- Proactively describing the CARE rate to Asian callers if only other assistance needs are mentioned on phone calls.

5.3.4 Customer Telephone Survey[31]

We asked telephone survey respondents (all of which are enrolled in CARE) whether they had heard of the CARE program, explaining that it provides a monthly discount on their utility bills for income-qualified customers. As shown in Figure 31 below, 77 percent said they had heard of CARE, slightly higher (but not a statistically significant increase) than the rate of awareness reported by the prior study (74%). The IOUs have made efforts to alert customers that they are on the CARE rate by adding messages and/or increasing visibility of the discount on the bill. Even with those efforts, there are still some respondents who are not aware their household is on the CARE rate. Someone else in the household may have signed up or it may have been awhile since they signed up or recertified.

[31] Note that the customer telephone survey sample frame is based on CARE participants. Due to the very high reported penetration rates and study resource constraints, we did not conduct a non-participant survey.

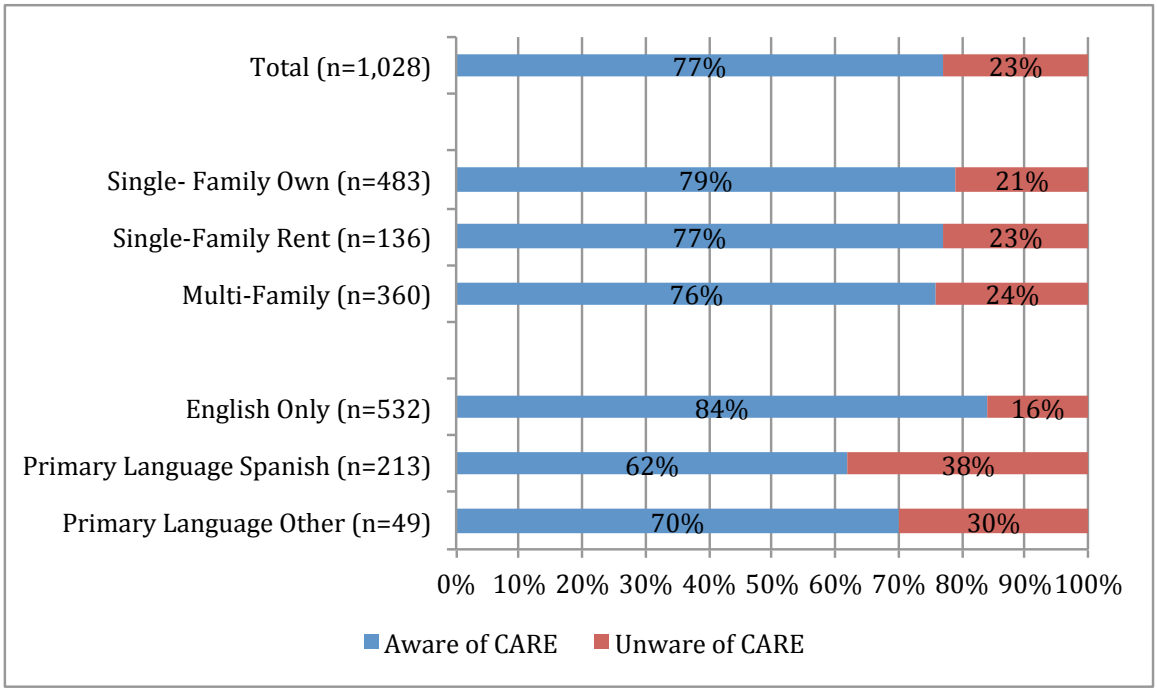
Figure 31: CARE Program Awareness Over Time (S9-S12) for California LI Population



2007 source: Table 5-40 in KEMA LINA report (the "total" reported here is of CARE participants, which is comparable to our survey sample total, since our sample frame is based on CARE participants.)
2013 Source: 2013 CARE Participant Telephone Survey.

Figure 32 shows CARE awareness by LI segments, with English-only households having higher awareness (85%) than other households. (As reported in Section 5.1, 95 percent of multi-family homes are occupied by renters, so we do not break out that home type by home ownership.)

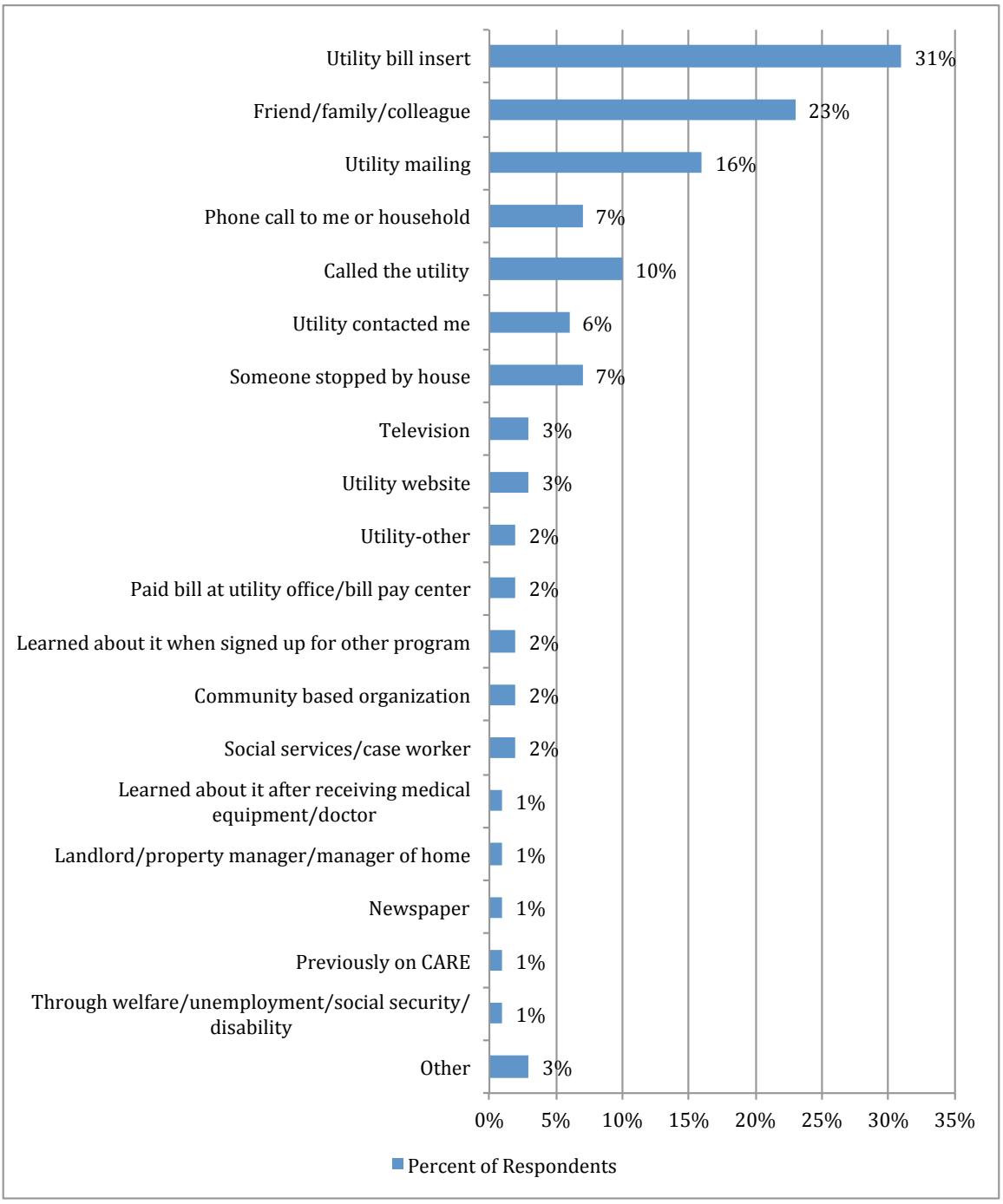
Figure 32: CARE Program Awareness by LI Segments (S9-S12) for California LI Population



Source: 2013 CARE Participant Telephone Survey.

Figure 33 below shows how respondents who are aware of CARE learned about the program. The most common method is the IOU bill insert (31%), followed by friend, family or colleague (which was the most common method that respondents learned about ESA). The other most common responses were IOU mailings, phone calls and general (IOU) contacts. We note that the IOUs use many methods to build awareness of CARE, and so while television ads or some of the other less commonly cited methods may not be at the top of mind, they may have helped to build a foundation that made some customers pay closer attention to a bill insert or IOU phone call about the program. It is difficult to attribute awareness of a brand or program to one single source, when multiple marketing methods are being used simultaneously. Also, as mentioned above regarding the ESA program, the IOUs do not rely on media advertising as a primary marketing delivery channel for CARE.

Figure 33: How Customers Found Out About CARE, of Those Aware of CARE (E22) (n=602) for California LI Population



Note: multiple mentions allowed
Source: 2013 CARE Participant Telephone Survey.

The next few tables report on how survey respondents who said they were aware that they are on CARE[32] submitted their application. We asked these questions to understand how customers prefer to enroll in CARE. We looked at the responses by LI population segments to determine if there are differences in the methods used, as shown in Table 40 below. There are minor differences across the segments, none of which are statistically significant. The most commonly cited method is mailing in an application, which is consistent with the previous finding that the most common method that customers find out about CARE is an IOU bill insert. A total of 16 percent used the phone, about half of those with support from an IOU customer service representative.

Table 40: How Customers Submitted Their CARE Applications, of Those Aware They Are on CARE (E30) for California LI Population

	LI Eligible Population								
	Total	Single-Family Own	Single-Family Rent	Multi-Family	English Only	Primary Language Spanish	Primary Language Other	Rural	Urban
How CARE Enrollee (Aware of Participation) Submitted Application									
Mailed in	62%	64%	60%	63%	60%	66%	64%	57%	62%
Phone	9%	9%	6%	7%	9%	11%	2%	8%	9%
Online	9%	9%	7%	11%	10%	5%	15%	14%	9%
My utility customer service representative helped me	7%	7%	8%	7%	6%	11%	10%	6%	7%
At a billing processing center/kiosk	3%	2%	1%	4%	1%	3%	8%	2%	3%
Through a community organization	1%	1%	4%	0%	2%	0%	0%	0%	1%
Faxed in application	0%	1%	1%	0%	0%	0%	0%	0%	0%
Turned in application to the office	1%	1%	2%	1%	2%	1%	0%	2%	1%
Other	2%	0%	3%	2%	2%	1%	1%	0%	2%
Don't know*	6%	6%	7%	5%	8%	3%	0%	11%	6%
Total	624	293	93	208	338	106	29	34	589

*Includes those who said that someone else in their household submitted the application
Source: 2013 Care Participant Telephone Survey

[32] 87 percent of those who said they were aware of CARE (77% of total respondents) knew they were on CARE.

5.3.5 In-Home Visits

As mentioned above under the ESA program access (Section 5.2), households expressed nearly uniformly positive perceptions of their IOUs and think of them as good and trustworthy sources of information about ways to save on energy, although IOUs aren't necessarily the information source that comes to mind for people when asked about energy savings. Customers mostly think of their electric provider more than their gas provider because, in most homes, annual electricity costs greatly exceed natural gas costs. As we did in the previous section, we remind the reader that the sample is biased towards households who are willing to talk to a telephone and in-person surveyor about energy issues and the ESA program, so they may be more trusting of their IOU.

Those customers who know that they are on the CARE rate or are aware of LI efficiency programs seemed to appreciate these efforts.

5.3.6 CARE Modeling Results

We developed and estimated statistical regression models to examine two aspects of the CARE program based on Athens Research data at the Census block group. The participation (first) model is based on the ratio of CARE customers to total customers in a given Census block group. The penetration (second) model is based on the ratio of CARE customers to CARE-eligible customers in a given census block group. The observations are Census block groups. The models are looking at variations in participation and penetration ratios across census block groups, and what variables (that we may observe at the Census block group level) might predict higher or lower rates, all else constant.

In the participation model, the dependent variable is the rate of CARE enrollment for a given Census block: the number of customers enrolled in the CARE program divided by the number of customers living in a given Census block group. In the penetration model, the dependent variable is the rate of CARE penetration for a given Census block: the number of customers enrolled in the CARE program divided by the number of customers estimated as eligible for the CARE program in a given Census block group. More detail on the model results is provided in Section 9.1 and on the model methods in Section 12.4.

Table 41 provides the key results translated to allow for relative comparisons across the models' explanatory variables. The columns are:

a. The row number;
b. The variables used in the CARE participation and penetration models;
c. The median value of each variable;
d. The 60th percentile of each variable;
e. The change in CARE participation associated with a hypothetical change in the variable shown in column b from the median (column c) to the 60th percentile value (column d), *holding all else constant*; and

f. The change in CARE penetration associated with a change in the variable shown in column b from the median (column c) to the 60th percentile value (column d), *holding all else constant*.

Table 41: Estimated Impact on CARE Participation and Penetration Associated with a Change in the Value of Each Independent Variable For California LI Population

a.	b.	c.	d.	e.	f.
Row	VARIABLE	Median (50th %tile)	60th %tile	Delta CARE Participation	Delta CARE Penetration
1	% HHs Living in Poverty (< 100% of FPL)	10.7%	14.0%	0.75%	-5.84%
2	Persons Per HH	2.9	3.0	0.73%	0.60%
3	% HHs with Person >= 65	19.1%	21.8%	0.84%	0.84%
4	% Spanish Speaking HHs	17.7%	24.4%	1.49%	1.97%
5	% Home Ownership	44.8%	51.7%	-1.34%	0.35%
6	% Non English/Spanish HHs	10.9%	14.5%	0.27%	0.55%
7	% Single Parent HHs	8.5%	10.1%	1.91%	3.59%
8	% HHs on Public Assistance	1.8%	2.9%	0.25%	0.62%
9	% HHs with Income > $200K	3.0%	5.2%	-2.53%	-2.20%
10	% African-American HHs	2.6%	3.7%	0.20%	0.53%
11	Avg. 2012 Energy Use CARE HHs (MMBTU)	64.8	69.3	NA	-0.92%
12	Pop Density (1,000 pers. per sq. mile)	2.9	3.7	NA	0.21%

Source: 2013 CARE Participant Telephone Survey.

Key takeaways from the CARE participation model results are presented below in order of magnitude on CARE participation rates by census block group. The CARE participation model largely reflects the characteristics of block groups that tend to have a higher fraction of households that are income-eligible for CARE. The results are not surprising, but do show the program has enrolled larger percentages of customers in block groups that have characteristics that may be associated with greater needs and/or barriers – seniors, single-parents, the very poor, non-English speakers (Spanish more than other languages), African-American.

We are examining block group-level ratios and interpreting these ratios as the probability of a randomly drawn household. The results of this analysis are intended to inform about spatial averages and trends, not about individual households.

All else constant, households living in small areas (i.e., census block groups) that have relatively higher rates of:

- (-) Higher-income households (income greater than $200,000) – are less likely to be enrolled in CARE;
- (+) Single-parent households – are more likely to be enrolled in CARE;
- (+) Spanish-speaking households – are more likely to be enrolled in CARE;
- (-) Home ownership – are less likely to be enrolled in CARE;
- (+) Seniors in the home – are more likely to be enrolled in CARE;
- (+) Poverty (income less than 100% of federal poverty guidelines) – are more likely to be enrolled in CARE;
- (+) Larger households (number of members) – are more likely to be enrolled in CARE;
- (+) Non-English/non-Spanish speaking households– are more likely to be enrolled in CARE;
- (+) Households on public assistance – are more likely to be enrolled in CARE; and
- (+) African-American households – are more likely to be enrolled in CARE

than households in other small areas.

Key takeaways from the CARE penetration model are presented below in order of magnitude on CARE penetration rates by block group. The CARE penetration model reflects both the characteristics of block groups that tend to have a higher fraction of households that are eligible for CARE and enrolled in CARE. However, just because a household is enrolled in CARE does not mean they are actually eligible, so the participation rate may include households who might be estimated as ineligible.

The implications of this are demonstrated by the explanatory variable, *% of homes below FPL*, in the CARE penetration model—small areas with relatively higher rates of very poor households (income less than 100% of federal poverty guidelines) are associated with *lower* CARE penetration rates (i.e., number of households enrolled in CARE as a fraction of households that are estimated by Athens Research to be eligible for CARE.), all else held constant. We hypothesize that this result is due to relatively higher-income small areas having larger numbers of households on CARE that are not actually eligible for CARE, thus resulting in higher (including above 100%) penetration rates. In addition, the lowest-income areas have very high (e.g., near or at 100%) eligibility rates and, though they may have high participation rates, they are likely to not be 100 percent of eligible due to the difficulty of signing-up every household in the given area. There may also be additional barriers in the highest poverty areas that might impede outreach and participation such as higher rates of crime, households lacking documents or not trusting IOUs and contractors.

We examined the correlation between poverty, CARE participation and CARE penetration across block groups. Below, we show the distribution of the poverty variable in quartiles along with the corresponding CARE participation and CARE penetration rates (based on Athens Research data), with penetration capped at 200 percent. These data show that the quartile of block groups with the lowest poverty rates have the lowest CARE *participation* rates, but the highest CARE *penetration* rates. Conversely, the quartile of block groups with the highest rates of poverty has the highest CARE participation rates, but the lowest CARE penetration rates. These data support our hypotheses from above.

Table 42: Poverty Rate (FPL) Correlation with CARE Participation and Penetration

Poverty Rate Quartile	CARE Participation	CARE Penetration
1	15.5%	126.4%
2	24.2%	97.1%
3	34.9%	90.4%
4	52.5%	86.7%
Total	**31.8%**	**100.1%**

The coefficient for higher-income (income greater than $200,000) households is negative, suggesting this effect is not occurring in higher-income areas. Households may be enrolling in CARE who are just above the income threshold or are staying on CARE even after their income increases, rather than high-income households enrolling. The IOU targeting of higher-income areas for more post-enrollment verification may also be showing an impact, though our data is from 2012 and prior.

Energy usage is another surprising result, with higher energy usage of CARE participants associated with a *lower* CARE penetration rate. This variable has a much greater impact on CARE participation than the other geographic variable in this model, population density (which is strongly correlated with energy usage). We believe that this variable is picking up on regional (which includes climate zone[33]) differences in program outreach and customer willingness to enroll.

We examined the correlation between energy usage, CARE participation and CARE penetration. Below, we show the distribution of CARE customer energy usage (based on IOU consumption data) in deciles along with the corresponding CARE participation and

[33] E.g., climate zone 16 has very high-energy usage but very low CARE penetration. It is a climate zone encompassing the very northern region of the state and the sierras, typically rural and remote with at least heating and often also cooling needs, but with unique geographic characteristics and participation barriers.

CARE penetration (based on Athens Research data). Decile 1 represents the 10 percent of CARE customers with the lowest average daily energy use, decile 2 represent the 10 percent of CARE customers with the next highest average daily energy use, and so forth. The data show that CARE participation differs little between the four deciles with the lowest average daily energy use, but as the average daily energy use of CARE participants increases, CARE participation drops significantly. Comparatively, CARE penetration increases between the lowest decile of energy use to the next lowest decile. Between the 20th percentile through the 80th percentile, CARE penetration is relatively constant and then drops over the two deciles of greatest energy use (the top 20% of CARE customers).

Table 43 – CARE Customer Energy Usage Correlation with CARE Participation and Penetration

CARE Customer Energy Usage (BTUs)	CARE Participation	CARE Penetration
1	37.2%	78.5%
2	38.5%	83.8%
3	38.7%	85.1%
4	37.3%	84.9%
5	34.7%	84.3%
6	33.9%	85.3%
7	31.5%	84.6%
8	28.0%	83.4%
9	22.9%	81.0%
10	13.6%	69.0%
Total	**31.8%**	**82.1%**

Home ownership has a reverse impact on CARE penetration as CARE participation, with small areas with more homeowners who are eligible having *higher* penetration rates than small areas with more renters. This is likely because it is easier to engage a homeowner about their utility bill; they are much less transient than renters and pay for all their energy usage (whereas renters may not pay for usage associated with shared systems).

Other results complement the CARE participation model, indicating the program has had success in reaching many of the targeted customer segments that are perceived to have greater need and/or burden. The coefficients for single parents, households on public assistance and African-Americans are larger in the CARE penetration model (compared

to the participation model), suggesting that the program is even more impactful with these segments among the eligible population. As noted following the first CARE model results, we are examining block group-level ratios and interpreting these ratios as the probability of a randomly drawn household. The results of this analysis are intended to inform about spatial averages and trends, not about individual households.

All else constant, small areas (i.e., census block groups) of households that have relatively higher rates of:

- (-) Poverty (income less than 100% of federal poverty guidelines) – have ***lower*** CARE penetration rates;
- (+) Single-parent households – have higher CARE penetration rates;
- (-) Higher-income households (income greater than $200,000) – have lower CARE penetration rates;
- (+) Spanish-speaking households – have higher CARE penetration rates;
- (-) High energy usage (average CARE 2012 MMBTU) – have ***lower*** CARE penetration rates;
- (+) Seniors in the home – have higher CARE penetration rates;
- (+) Households on public assistance – have higher CARE penetration rates;
- (+) Larger households (number of members) – have higher CARE penetration rates;
- (+) Non-English/non-Spanish speaking households – have higher CARE penetration rates;
- (+) African-American households – have higher CARE penetration rates;
- (+) Home ownership – have higher CARE penetration rates; and
- (+) Higher residential population density – have higher CARE penetration rates

than other small areas of households.

5.4 ESA Participation Drivers and Barriers

This subsection describes study results related to ESA drivers and barriers to participation, preceded by an overview of the enrollment and assessment process. We drew upon all the study primary and secondary research sources for this subsection.

5.4.1 Overview of Customer Enrollment and Assessment

Customers must provide documents proving their income (e.g., income tax return, paycheck, social security, etc.) or that they are enrolled in another qualified LI program to participate in ESA, even if they are enrolled in CARE (which does not require proof of income). In addition to proving their income, customers must also prove they either own their home (i.e., showing the title) or for renters, get their landlord to sign a waiver allowing ESA measure installations and agreeing to make a small copayment for certain

measures. There is an exception for renters who do not qualify for any services that require changes to the home and who own their refrigerator, who may qualify for a new refrigerator.

The IOUs are working to create a joint improved property owner waiver consistent across the state and to expand the languages the waiver forms are offered in. SCE modified the waiver in 2012 so the landlord could agree to participate only for measures that do not require a co-pay so it's not an all or nothing proposition (unlike before when they had to sign something that said they would be liable for co-pays).

Customers must also be eligible for three measures or if less than that, measure(s) that will yield at least 125 kWh or 25 therm savings to be eligible to participate in ESA. This rule affects the single-fuel utilities more since they sometimes assess homes for their single-fuel only. If a customer is being assessed by a contractor who does ESA for both SCE and SoCalGas, they can assess electric and gas measures, but if the contractor only works for SCE or SoCalGas, the customer is only assessed for electric or gas and could fail the three-measure minimum requirement. If they don't fail the three measure minimum requirement, through data sharing the other IOU could then follow up with the customer and provide additional measures covering the other fuel.

Contractors that are also LIHEAP providers can leverage ESA and LIHEAP towards the three measure minimum requirement – for LIHEAP measures that are also offered under ESA. LIHEAP has a dollar cap and the contractors try to maximize dollars from both programs, so they may enroll customers in both programs. LIHEAP also offers measures that ESA does not.

For customers with natural gas service, there is the potential for an additional barrier to participate, based on how much combustion ventilation is present since any weatherization measures will tighten the home and reduce ventilation and could create a carbon monoxide problem.

5.4.1.1 Eligibility Requirements of Other Programs Nationwide

Based on our review of LI programs nationwide, other LI programs also have an income threshold under which a household is eligible. The threshold varies by state and also varies by size of household. Most programs use the Federal Poverty Level as a point of reference and set the threshold as a percentage of the FPL (i.e. 150% of the FPL, 200% of the FPL, etc). Some programs base the income eligibility thresholds on the state median income levels.

Eligibility for an LI weatherization program may be granted if a household also qualifies for another LI program, such as bill-pay assistance or a percent of income program. Some programs, such as the Ohio Energy Partnership Program (EPP), require that a household participate in the weatherization program if they are part of a bill-pay assistance program; by requiring participation in the program, both the recipients of the

assistance (who reduce their bills) and the ratepayers (who subsidize the bill-pay assistance program) benefit from the energy cost savings.

All programs require some proof of income either through the application process for the specific program or for the other LI programs through which the participants were referred. Providing proof of income did not appear to be a substantial barrier to participation, although program staff expressed the need to make the application process simple. The NYSERDA EmPower program accepts verification of income by a utility, the Weatherization Assistance Program or another approved entity; verification is only requested if not already verified. For participants that have already provided proof of income, allowing verification across programs makes for a more streamlined process which may reduce barriers to participation.

5.4.1.2 Targeting Strategies Used by Other Programs Nationwide

Based on our review of LI programs nationwide, in addition to income eligibility, LI programs often prioritize higher energy users or may limit eligibility to those customers that reach a minimum usage amount. When combined with other programs, such as bill-pay assistance, targeting high-users becomes a direct way to sign up participants; program implementers can sort the list of those households on bill-pay assistance by amount of energy used per home and use that list to prioritize and target future participants.

Targeting high users offers an advantage when trying to maximize energy savings, as higher users often have more opportunities to save energy. The most energy impacts come from those homes that have poor building insulation and sealing or inefficient equipment; their baseline energy usage is higher so energy upgrades make a stronger impact than those households that have a higher baseline efficiency level. At similar incomes, high users also face higher energy burdens. However, considerations should be made to not overlook those low energy users who are not using energy using equipment as a means to reduce costs.

For those energy efficiency programs that are implemented through a utility, acquiring usage data is straightforward. However, for those non-utility based programs that do not have access to utility data, acquiring household usage data can be an insurmountable barrier to targeting high users. For example, the NYSERDA EmPower program attempts to acquire utility data from a number of utilities across the state, yet each utility has different data privacy requirements (and confidentiality issues are ballooning), which prevents some utilities from sharing their customers' data, making it difficult to identify high user customers.

5.4.2 Program Staff Interviews

We spoke with IOU program staff about ESA program outreach and barriers to participation. They offered their opinions on remaining barriers to participation based on their experience managing the program and working with outreach and assessment

contractors. These findings are qualitative and help round out the customer research reported on this section. These results are not intended to reflect a comprehensive characterization of the programs.

Customer barriers to ESA participation noted by program staff include the following:

- Disabled customers - the IOUs have trouble meeting the disabled customer target of 15 percent since they are not allowed to ask about disabilities, so they may only report disabilities that are visible to them at the time of enrollment.
- Pride/others are more deserving of help.
- Cell phone-only customers – the IOUs have to match cell phones (but not land lines) to the do not call list, so a lot are screened out. Cell phone-only customers are increasing so this is becoming more of an issue. There are some developments at the IOU corporate levels to allow customers to opt in to be contacted by the IOU via their cell phone, but this won't be an easy or fast fix.
- Suspicion of fraud; customers that don't believe it's really free or that it's an actual program
- Newly income qualified: Some previously middle-income households may have fallen on harder financial times or taken in a number of new occupants into their home. Since they have not historically been eligible for income-qualified programs it often does not occur to them that programs providing these types of free energy-saving measures and services might be an option.
- Remote locations/rural barriers. Interviewees noted that sometimes it takes a face to face encounter to reach a household – that direct mailing has limitations that can be addressed with in-person efforts. They also note that these are very expensive.
- Master-metered customers that are not sub-metered and do not pay their electric bill, so the program has to sell the customer only on health, comfort and safety.
- Trouble providing required income documents (e.g., undocumented income, no income, or concerns over having to share immigration status).
- Don't have enough time.
- Language barriers – customers that do not understand program informational and marketing material, or have trouble filling out forms.
- Identity/social perception issues e.g. customers that don't want to participate in a "government" program, or take "hand-outs".
- Requirement of multiple appointments with contractors – by the 2nd or 3rd visit, the customer may drop off – especially for customers that work outside the home.

- Customers with no access to a bank account or knowledge of how to adequately leverage the banking system adequately may face additional barriers in managing their energy costs and bills.
- Renter/Landlord:
    - Must give permission but have a lack of incentive to do so. Property manager may not pay the electricity bill and therefore may not perceive a direct benefit from participation (participation unless the appliances are part of the building property.)
    - Fear the IOU will find a problem with building not meeting codes / standards.
    - Fear they will be liable for a co-payment.

The IOUs are working to create a joint improved property owner waiver consistent across the state and to expand the languages the waiver forms are offered in. The IOUs are developing a fact sheet and have done direct mail campaigns targeted to property owners/mangers, to help them understand the program and the benefits of participating.

5.4.2.1 Modified 3-Measure Minimum

Customers must be eligible for three measures or if less than that, measure(s) that will yield at least 125 kWh or 25 therm savings to be eligible to participate in ESA—this affects the single-fuel IOUs more, and in areas where the dual-fuel IOUs only provide a single commodity, where homes may only be assessed for a single fuel. Though in the SCE and SoCalGas overlap area, often the contractors may assess a customer's home for both fuels if they hold contracts with both IOUs.

Contractors that are also LIHEAP providers can leverage ESA and LIHEAP towards the three measure minimum rule—for LIHEAP measures that are also offered under ESA. LIHEAP has a dollar cap and the contractors try to maximize dollars from both programs, so they may enroll customers in both programs. LIHEAP also offers measures that ESA does not.

Homes that fail the three measure minimum rule may be losing out on energy-savings opportunities. The IOU has to pay the contractor to conduct the home assessment and enroll the customer and confirm income qualification. Customers who then fail due to lack of at least three measures are not allowed to get any measures, including energy education or CFLs. This rule may be impacting multi-family homes more often.

5.4.2.2 Measure-related Barriers

Program staff reported that ESA implementation contractors encounter some customer resistance to certain measures—or barriers to measure acceptance. This resistance is encountered during both the home assessment visit, and again during the measure

installation(s). During assessment the customer may be reluctant to sign up because they do not believe they will get "free" measures, and assume the big ticket items must be sub-standard. For SoCalGas, the main benefit/service is weatherization, and that can be a hard sell to customers – especially when compared with a refrigerator that is more tangible benefit of the electric program. Contractors explain to customers that there are health, safety and comfort benefits and their home will be cheaper to heat/cool, but *"..the message doesn't always "click"".*

During installation some customers may object to the way the new equipment looks or sounds or express disappointment that they didn't receive the measures they had expected. For example, a customer may be disappointed if they only qualified for water-saving measures such as aerators and showerheads and didn't get a new refrigerator or attic insulation or other big ticket items.

Lack of sufficient combustion ventilation air (CVA) can be a barrier to installing infiltration measures, both at the assessment and installation phases. If there is not sufficient CVA detected at assessment phase, the customer will only be assessed for non-infiltration measures and the three measure minimum becomes more probable and may result in the customer not being eligible for measures. (This most often occurs when there is a wall furnace and no place to obtain additional air, e.g., a multi-family interior unit or a small home.) For owner-occupied homes, the ESA program may be able to repair or replace the problem appliance, but for renter-occupied homes, the landlord must do the necessary repairs.

5.4.3 Contractor Interviews

We also obtained information from ESA outreach and assessment contractors on their opinions regarding remaining barriers to ESA participation. As we noted previously, the sample of contractors is not representative of all contractors and these findings are qualitative and intended to round out the customer research reported in this section.

The contractors that we interviewed reported that (and program staff corroborated) they are generally able to reach adequate numbers of income-eligible customers based on IOU referrals and supplemental outreach in order to meet their goals. However, even though a customer is enrolled in the CARE program, to participate in ESA they must provide documents proving their income or that they are enrolled in another CPUC-accepted means-tested LI program. Contractors indicate that for some customers, proving income-eligibility can be challenging. In this regard, contractors that provide multiple services to LI clients can have an advantage, since customers often come in with SSI or CalFresh documentation, which proves categorical eligibility.

The most commonly mentioned challenge is that many prospects are hesitant to provide private information (e.g., pay stubs or Social Security information), seniors and rural customers in particular (seniors also need more time to locate acceptable documentation).

In addition to proving their income, customers must also prove they either own their home (i.e., showing the title) or for renters, get their landlord to sign a waiver allowing ESA measure installations and agreeing to pay for certain measures that are not allowed to be installed for renters under the ESA program. For customers with natural gas service, there is the potential for an additional barrier to participate, based on how much combustion ventilation is present since any weatherization measures will tighten the home and reduce ventilation and could create a carbon monoxide problem.

Following are the enrollment barriers that the contractors described:

- Obtaining apartment owner permissions (i.e., split incentives, out of state and cannot reach or risk averse). This is a key barrier and the contractors did not describe any patterns regarding engaged and non-engaged, in-state owners.
- Suspicion of free measures and services. This is another key barrier; seniors are especially skeptical about whether measures are really free, and some apartment owners are wary of free assessments. More established contractors have fewer trust issues as their "brand" becomes accepted over time in the communities where they work.
- Transient customers. This is another key barrier, as many customers on IOU lists have changed/disconnected phone numbers or have moved.
- Seniors can be more wary of new technology.
- Customers lose interest when they cannot get the measures they want most (often refrigerators that are less than 15 years old, water heaters, ovens and AC units in certain climate zones where they are restricted).
- Some neighborhoods are not safe to visit.
- Contractor uncertainty regarding which measures the CPUC is funding at the end of program cycles and during bridge funding periods.

The contractors reported that they are using a range of diverse strategies to address the aforementioned challenges:

- Door-to-door canvassing:
    - Door to door enhances credibility and trust compared to phone canvassing. Contractors can and do show customers IOU authorizations and 1-800 numbers for questions or concerns.
    - The IOU lists and databases often have outdated phone numbers.
    - According to one contractor, "a higher percent of people open their doors than answer the phones (if they are home)."
    - For manufactured homes, it is easier to find new units that have not been recruited before.

    - Canvassing with ethnic apartment managers present (particularly Hispanic) leverages their rapport and enhances customer trust.
- Canvassing/telemarketing and doing projects in large contiguous areas to increase visibility, build awareness and gain trust
- Using translated materials and interpreters:
- Emphasizing improved home safety to seniors, who are often concerned about potential gas leaks.
- Encouraging word of mouth referrals by previous participants.
- Using routing software to increase efficiency of canvassing travel (i.e., can visit more homes).
- Equipping staff with uniforms with badges (which are required by the IOUs).
- Encouraging seniors to verify contractors with the IOU's by providing a 1-800 number and company and staff names (ideally visible on a badge too).
- IOU branding on fliers and door hangers.

We asked contractors how the IOU could help overcome barriers. Not surprisingly, some asked for additional mass marketing, which though it may help some customers overcome barriers, is not usually the most cost-effective way to address participation barriers. These suggestions are reported here without an assessment of their cost-effectiveness, and without comparing against current IOU marketing strategies and available budgets.

Contractors noted some areas where additional IOU assistance could improve their enrollment, mostly regarding marketing (one would like to see a simplified joint application for SCE and SoCalGas). One PG&E contractor would like to see more billboards and posters with 1-800 numbers to supplement the household mailers and 60-second phone messages that PG&E already delivers. Another PG&E contractor reported that having the IOU logo on their shirts used to enhance their credibility a lot, and would like PG&E to allow this again. Lastly, one SDG&E contractor would like to see more marketing in rural areas, where they perceive energy efficiency awareness still lags.

Regarding the marketing content, one contractor would like more "specifics" that describes contractors' involvement, so households are not subsequently skeptical of their offers of free measures. Another contractor perceived that, "customers have no clue about equipment, they don't see the ducts holes, they only know they have high electric bills, low comfort and always need to run the AC - that's what they relate to."

5.4.4 Customer Telephone Survey

This subsection includes telephone survey results on willingness to participate in ESA, ESA participation drivers and barriers.

5.4.4.1 Willingness to Participate in ESA

We asked ESA non-participants how willing they would be to participate in the ESA program. We provided as much information as we could to the respondent so their response would be based on some understanding of the various steps they would need to take and requirements they would have to meet in order to receive program services. The description varied for homeowners and renters, since they have different requirements:

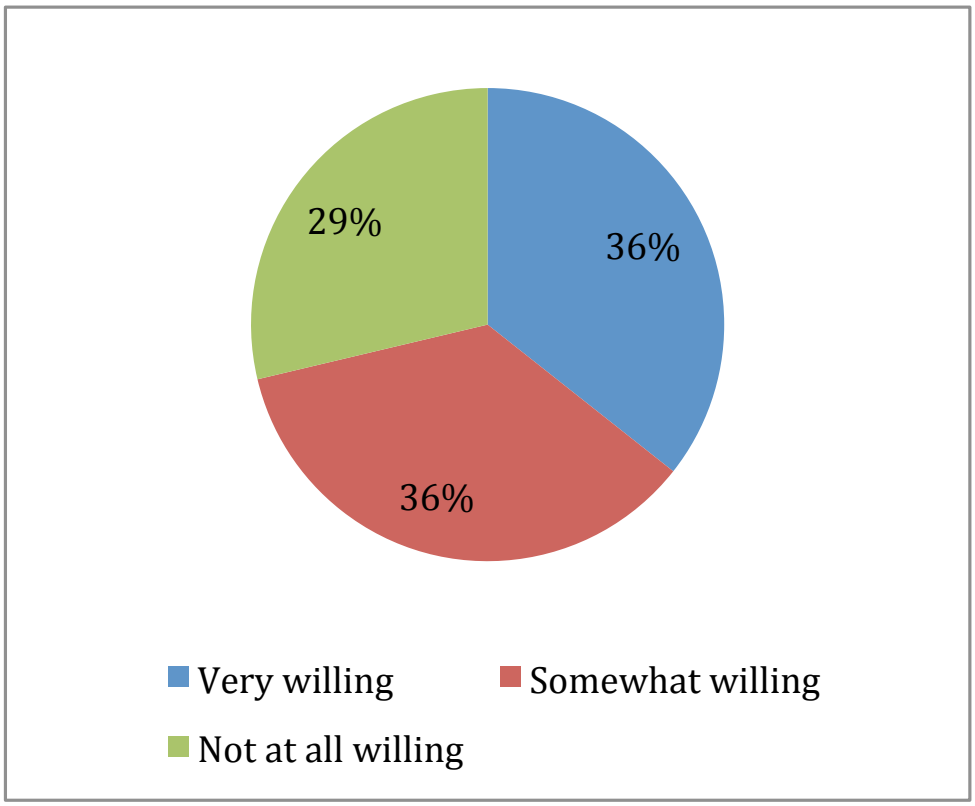
> "If you sign up for Energy Savings Assistance, a contractor will visit your home and look at your income [owners only: and home ownership documents] and fill out an application with you. [Renters only: The contractor will also need to have papers signed by your landlord approving the work.] A different contractor will come on another day and look at your home to see what home improvements you may qualify for, such as energy efficient light bulbs, weather stripping around doors and windows and sometimes new appliances or equipment to replace old or broken ones. These home improvements would be installed by another contractor during another visit or two to your home." [34]

As shown in Figure 34 below, 36 percent said they would be very willing to participate in ESA, after hearing that description. Another 36 percent said they would be somewhat willing (for a total of 72% that are willing), and the remainder (29%) said they were not willing.[35]

[34] Note that this description is not exactly how customers would participate in the program. E.g., some fraction will undergo an additional visit for inspection of measures, some will have the assessment take place during the enrollment visit, etc.

[35] The prior LINA estimated 95 percent of ESA (referred to as LIEE at that time) non-participants were very or somewhat wiling to participate in ESA, but they did not include a detailed description of the program. The prior estimate was an upper bound estimate. Many more households have participated since the time of that study, leaving a harder to reach non-participant pool that may be less willing than the non-participant population in 2004, when the prior research was conducted.

Figure 34: ESA Non-Participant Willingness to Participate (O2) for California LI Population (n=400)

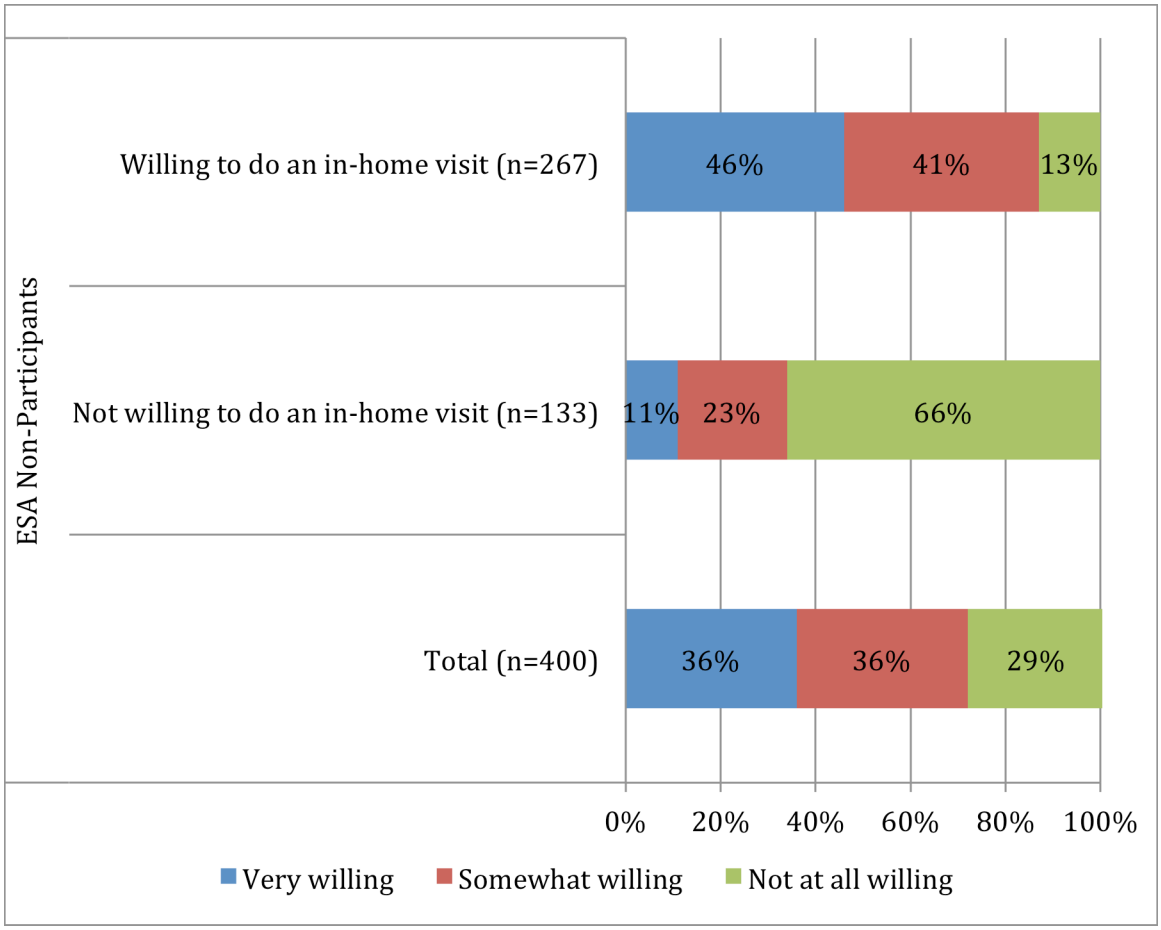


Source: 2013 Care Participant Telephone Survey.

We remind the reader to consider the sample bias when interpreting this result. We believe our telephone survey sample represents roughly half the ESA non-participant population that lacks major outreach barriers (i.e., is willing and able to respond to a telephone survey sponsored by their IOU related to energy issues.) The other half of the population that is not represented by our sample probably as much lower willingness to participate and must be considered when using these results for developing program plans and policies.

We examined willingness to participate based on the respondent's willingness to be in our recruitment pool for the in-home visit, which was recruited from the ESA non-participant respondents. In Figure 35 below, we show how willingness to participate in ESA is strongly correlated with willingness to do an in-home survey. Only 34 percent that declined to be in the in-home pool are "very" or "somewhat willing" to participate in ESA, versus 87 percent of those who joined our recruitment pool.

Figure 35: ESA Non-Participant Willingness to Participate, by Willingess to do Onsite Visit (O2/R1a) for California LI Population



Source: 2013 CARE Participant Telephone Survey.

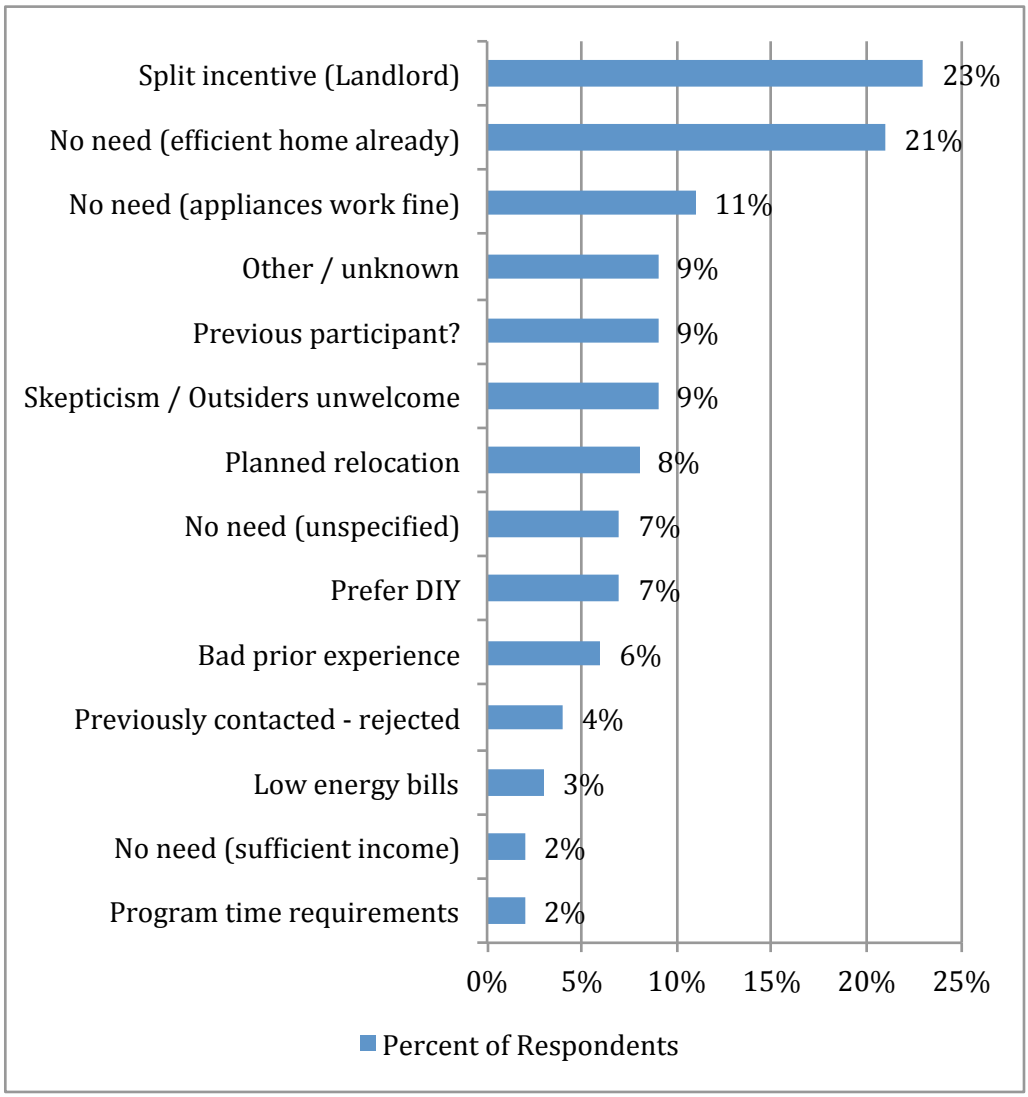
If we assumed that the ESA non-participants that we could not reach by telephone had the same willingness to participate as those respondents who declined to join our in-home pool, the percent who are willing to participate (summing the "very" and "somewhat") drops from 72 percent to 52 percent. We do not really know whether the non-respondents are the same as those who declined to join the in-home pool, but lacking better data, this adjusted willingness estimate is a proxy for a population estimate.

We asked respondents who said they were unwilling to participate in ESA (29% of non-participants) to tell us why they were unwilling (Figure 36 below), and the primary reason (only cited by renters) was that their landlord would not let them or they did not want to ask their landlord (23% of total unwilling respondents) – 28 percent of single-family renters and 42 percent of multi-family households. The next most commonly

cited reason was that they have no need for the program (21%), followed by a similar response that their appliances are working well (11%).

Note that if the willingness to participate estimates presented above (e.g., the 52% adjusted estimate) are used to update ESA program treatment goals, the reasons for not being willing to participate should be factored in. For example, the estimate could include LI customers who said they were unwilling to participate (which is 7% of LI customers) due to having to get permission from their landlord, which is a barrier that the program may want to address and attempt to serve those customers.

Figure 36: Reason Non-Participants Are Unwilling to Sign up for ESA (O2a) (n=79) for California LI Population



Note that there were likely a few respondents, similar to the in-home visit sample, which may have participated in ESA in 2013 that were in our sample (which explains the "previous participant" responses). Our sample frame was based on ESA participation through 2012.
Source: 2013 CARE Participant Telephone Survey.

We looked at segments of non-participants to determine if there are differences in their reasons for being unwilling to participate in ESA. We found that households in rural and mountain geographic areas were more likely to cite skepticism and trust issues (outsiders unwelcome) than other households (64% and 76% respectively, compared to only 9% of total unwilling respondents.) Rural and mountain households were also less likely to cite their landlord as the reason for their unwillingness (46% and 51%,

respectively, compared to 22% of urban respondents), though this particular difference is not statistically significant.

Mobile home dwellers (91%) and single-family homeowners (56%) were more likely to say they have no need than single-family renters (18%) and multi-family (36%) households. English-only households were also more likely to say they have no need (53% compared to 20% of Spanish-speaking households).

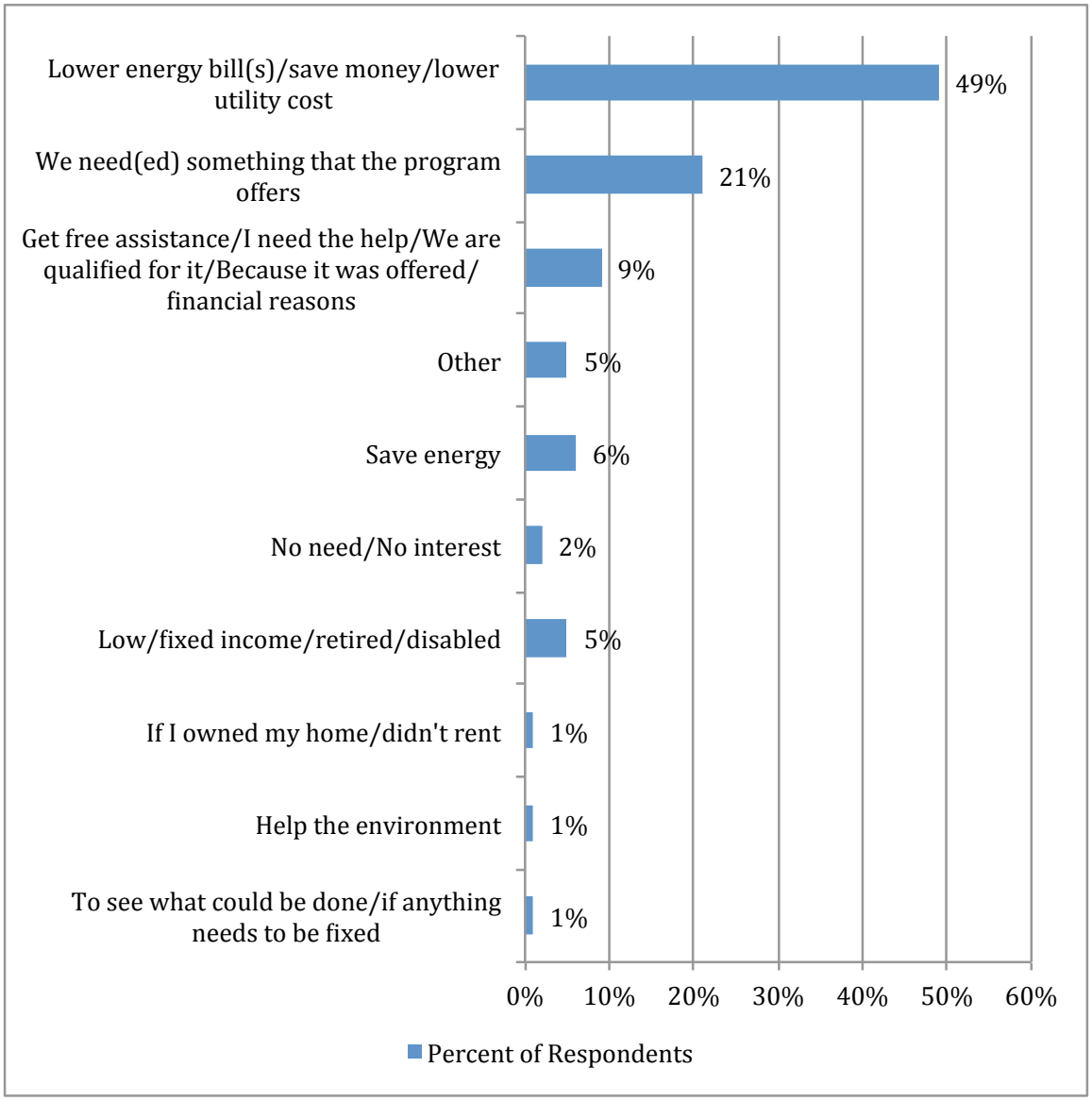
5.4.4.2 ESA Participation Drivers and Barriers

We asked telephone survey respondents a series of questions related to drivers of participation. We adapted the questions to apply to both ESA participants and non-participants. First, we asked (unprompted) why they participated in ESA (for participants) or why would they participate in ESA (for non-participants who said they were willing to participate, after reading them a description of the program and steps they would go through to participate). Next we presented a list of potential participation drivers and asked how important each of these were in deciding to participate (for participants) or might be (for willing non-participants). We followed with a similar set of questions regarding potential barriers to participation – first asking an unprompted question about what, if anything, was difficult (or might be difficult) about participation, followed by reading a list of potential barriers and asking how easy or hard they were (or might be).[36]

Figure 37 below presents the open-ended responses to what made them decide to (participants) or why they would decide to (non-participants) participate in ESA. The most commonly cited reason was to lower their bills/save money, cited by 49 percent of respondents. The next most commonly cited reason was that they needed something the program offered, cited by 21 percent of respondents. These results do not differ across LI population segments, or by ESA participation status.

[36] Recent participants who did not recall participating were not asked this series.

Figure 37: Why Respondents Did/Would Decide to Participate in ESA – Unprompted (E1a) (n=925) for California LI Population



Source: 2013 Care Participant Telephone Survey.

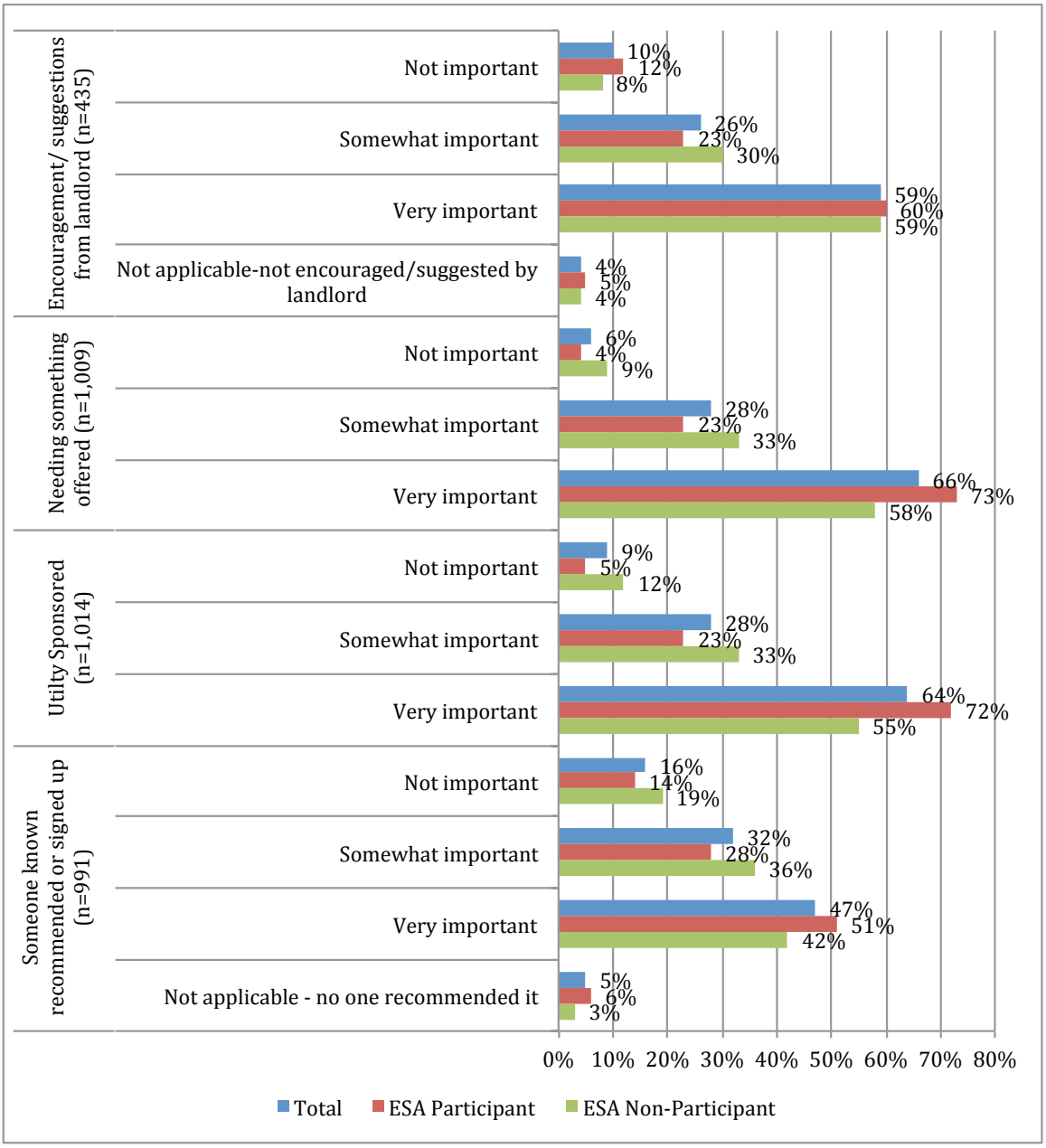
Figure 38 shows the results from the prompted question series, where respondents were asked how important various factors were or would be in deciding to participate. Between one-half and two-thirds of respondents said each of the factors were "very important":

- Encouragement / suggestion from their landlord (renters only)
- Needing something the program offers
- IOU sponsorship
- Someone they know recommended it or already signed up

The last driver, having a recommendation, was cited as "very important" the least.

ESA participants were more likely to say that needing something the program offered and IOU sponsorship was very important than non-participants. These were the top two drivers for ESA participants. The ESA modeling that included the phone survey data (stage two, see Section 5.4.5) indicated that these potential drivers were not significant in predicting participation, suggesting that these two drivers reflect underlying differences between participants and non-participants. The top driver for ESA non-participants was landlord encouragement, but almost as many non-participants also cited needing something the program offers and IOU sponsorship.

Figure 38: Importance of Various Factors in Considering ESA Participation – Prompted (E2) for California LI Population



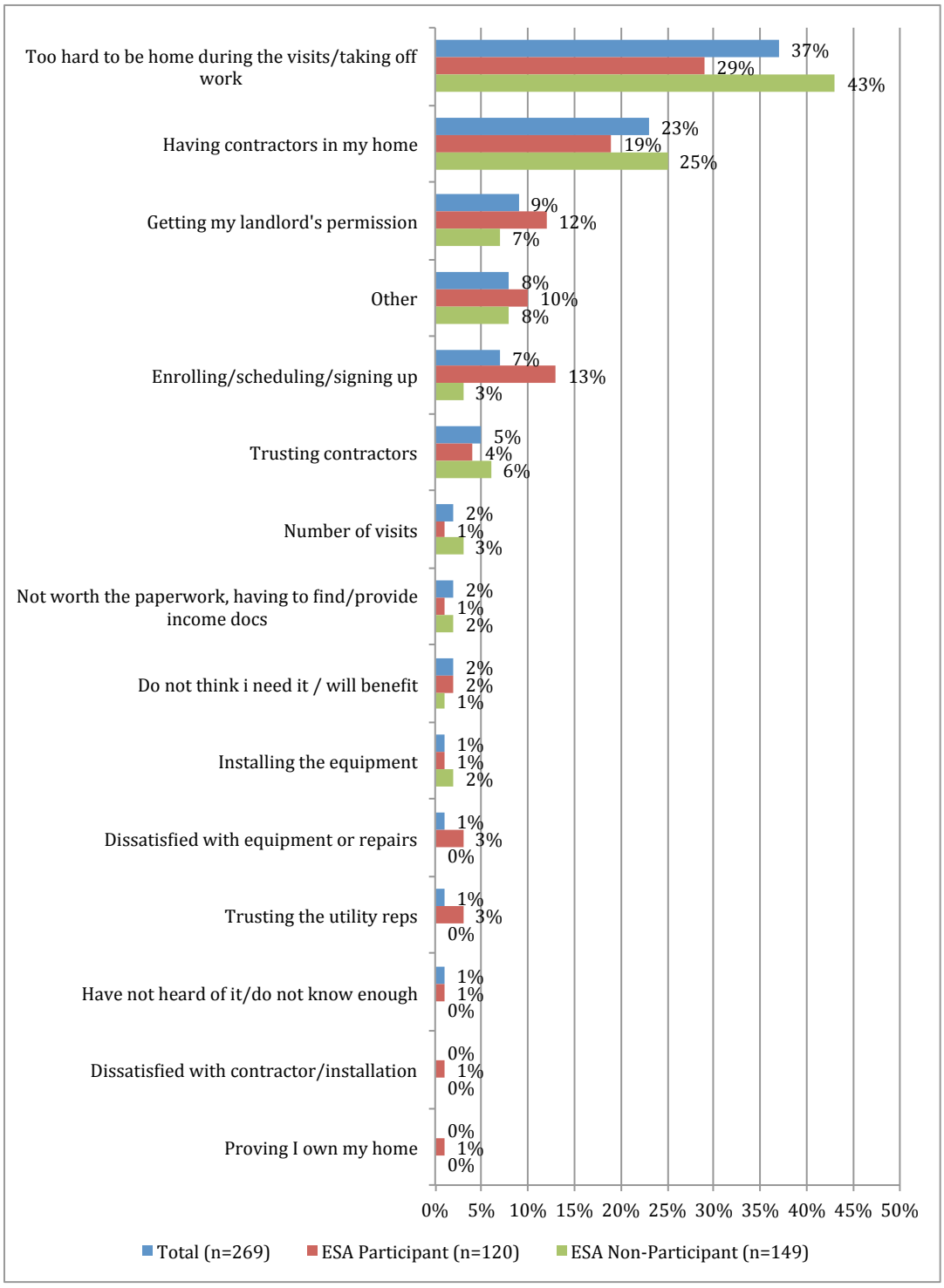
Source: 2013 CARE Participant Telephone Survey

We asked respondents whether they had any problems (participants) or anticipate having problems (non-participants, after having been read a description about the program) signing up for ESA. 25 percent said of total respondents said yes, and 17 percent of participants and 33 percent of non-participants said yes. Rural and mountain

respondents were more likely to say they would have or did have problems – 43 percent and 48 percent, respectively.

Figure 39 presents the open-ended responses regarding what was (participants) or would be (non-participants) most difficult about ESA participation, for the 25 percent that said they had or would have a problem. Being home during the day/taking time off work was the most commonly cited barrier, mentioned by 43 percent of non-participants and 29 percent of participants (not a statistically significant difference). Households where Spanish is the primary language were more likely to cite this barrier than homes where English is the primary language (54% versus 34%). 'Having contractors in my home' was the next most commonly cited barrier, cited by 23 percent respondents who mentioned they had or would have a problem participating in ESA. 9 percent mentioned getting permission from their landlord, and excluding homeowners, 12 percent of renters cited that reason.

Figure 39: ESA Participation Components that Were/Would be the Most Difficult – Umprompted (B1) for California LI Population



Source: 2013 CARE Participant Telephone Survey.

Figure 40 shows the results of prompted barriers that we asked participants and non-participants about, including:

- Providing documentation of home ownership (for owners only);
- Providing income documentation such as a tax return;
- Trusting the utility;
- Filling out a program application with a contractor;
- Arranging to be home for contractor visits;
- Getting the landlord's permission (for renters only); and
- Trusting the contractor.

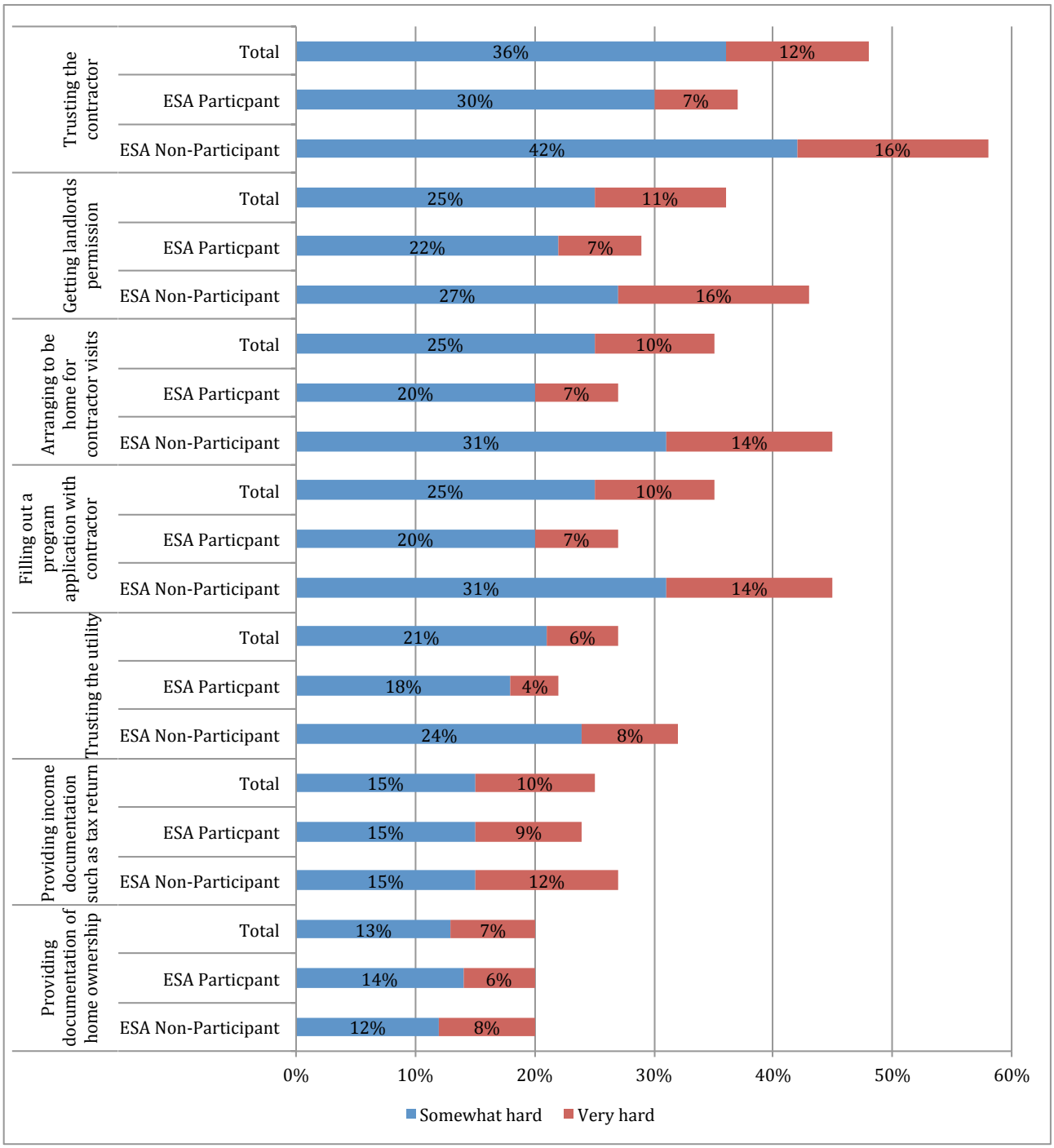
We asked respondents whether those potential barriers would be easy, somewhat hard or very hard. The potential barriers that respondents said would be very or somewhat hard most often was trusting the contractor and getting landlord's permission (tied at 47%). Single-family owners and other primary language households were more likely to say that trusting the contractor would be hard (55% and 65%, respectively). More multi-family respondents said that getting their landlord's permission would be hard (55%). These prompted potential barriers elicited a higher percentage of respondents that said they would be problematic, as compared to the previous question that we reported, which was unprompted and allowed only one response. In the prompted series, respondents could mention more than one potential barrier as problematic.

Arranging to be home for contractor visits and filling out an application with a contractor were tied for third and fourth (35% said these would be very or somewhat hard). All of those barriers except filling out an application were cited more often as "hard" by non-participants than participants. Non-English as a primary language households were more likely to say that filling out an application would be hard.

Trusting the IOU was not much of a potential barrier, with only 26 percent saying that would be hard – though more non-participants said this would be hard (32% versus 21% of participants).

Homeowners were not very likely to mention providing proof of ownership documents (80%), and only 25 percent of respondents said that providing income documents would be hard. (More single-family renters [57%] said that would be hard than other home types.) We remind the reader again that our sample is biased towards non-participants that would talk to us about IOU programs and energy usage, so our sample is likely more trusting and willing to share information.

Figure 40: How Hard ESA Participation Components Were/Would Be – Prompted (B2) for California LI Population[1]



[1]Sample sizes: total = 1,021, participant = 607, non-participant = 414; for landlord barrier: total = 475, participant = 253, non-participant = 204.
Source: 2013 CARE Participant Telephone Survey.

5.4.5 ESA Modeling Results

As described previously in this subsection, participation in the ESA program is dependent upon a number of factors and is often not simply a choice made by an eligible customer. Each of the IOUs engages in outreach activities, which influence the number and characteristics of customers that enroll in the ESA program, such as neighborhood canvasing, marketing through community or religious institution, or inserts in monthly bills intended to appeal to a particular socio-demographic segment of the customer base.

We conducted two types of models to assess drivers of and barriers to ESA participation. For "Stage 1", we used population data and developed four IOU-specific models, taking advantage of whatever data the IOUs could provide.[37] For "Stage 2", we developed one cross-IOU model using IOU data combined with telephone survey data.

We examined differences between participant and (likely income-eligible, since they are enrolled in CARE) non-participant characteristics, to provide context for the analysis that follows of drivers of and barriers to participating in ESA. We based these comparisons on the self-reported demographic survey battery of our telephone survey (which are included in Section 7.2, within the demographic characteristics detailed results tables.)[38]

Characteristics that differ across ESA participants and non-participants (technically, across homes that have been treated by ESA[39] and have not) are:

- Race: 35 percent of respondents living in homes that have been treated by ESA are White; comparatively 44 percent of respondents living in homes that have *not* been treated by ESA are White. 42 percent of respondents living in homes that have been treated by ESA are Hispanic; comparatively 34 percent of respondents living in homes that have *not* been treated by ESA are Hispanic.
- Income: Respondents living in homes that have been treated by ESA have an average income of $20,377; comparatively respondents living in homes that have *not* been treated by ESA have an average income of $25,886.
- Disabled: 63 percent of respondents living in homes that have been treated by ESA have a disabled household member;[40] comparatively 54 percent of

[37] If one IOU had certain variables but the others did not, this approach allowed us to use the variable in the model. In Stage 2, we had to restrict the cross-IOU model to whatever variables the IOUs had in common (the least common denominator). (We were able to impute missing values for some incomplete variables, but we could not use a variable that was completely missing from one or more IOUs.)

[38] Note that we determined ESA participation based on "home", while the survey was conducted with the current household residing in the home, which may or may have not been treated by ESA. Technically, we are reporting characteristics of households that live in ESA treated homes versus those that lie in homes that have not been treated by ESA.

[39] For the purpose of this study, "treated by ESA" is defined as treated through the ESA program since 2002.

respondents living in homes that have *not* been treated by ESA have a disabled household member.

- Education: 16 percent of respondents living in homes that have been treated by ESA have received a bachelor's degree or higher; comparatively 22 percent of respondents living in homes that have *not* been treated by ESA have received a bachelor's degree or higher. 27 percent of respondents living in homes that have been treated by ESA have not completed high school; comparatively 18 percent of respondents living in homes that have *not* been treated by ESA have not completed high school.
- Tenure: 29 percent of respondents living in homes that have been treated by ESA have lived at their home for 20 years or more; comparatively 16 percent of respondents living in homes that have *not* been treated by ESA have lived at their home for 20 years or more.
- Presence of elderly member(s): 54 percent of respondents living in homes that have been treated by ESA have one or more elderly household member(s); comparatively 45 percent of respondents living in homes that have *not* been treated by ESA have one or more elderly household member(s).

These results should be viewed as "zero-order" associations in that they do not control for other characteristics that may influence participation in the ESA program. Comparatively, the logistic regression models presented in this report control for the various factors that influence participation in ESA, which allows us to derive estimates of the marginal impacts associated with various characteristics and factors.

Characteristics of households living in homes that have and have not been treated by ESA that do *not* differ are:

- Home ownership
- Home age
- Population density (urban v. rural)
- Building type (single-family versus multi-family)
- Presence of children
- Household size
- Language spoken
- Employment status

These comparisons (based on cross-frequencies) provide a simple, two-dimensional view of the relationship between ESA participation and another variable that, while

[40] See the telephone survey instrument in Section 13, questions D15a-15e. If the respondent said "yes" to any of those questions related to household member(s) disability(ies), the household was coded to have a disabled member.

instructive, can be misleading because cross-frequencies do not account for other characteristics important in the decision by or opportunity for a household to participate in CARE. For example, while participant households are more likely to be White than non-participant households, White households are also more likely to be homeowners, to have longer tenure within their home, and to be over 65 years of age or live in a community with a high percentage of households with persons over 65 years of age. These are all factors that have a positive influence on ESA participation, but which cannot be considered within a simple cross-frequency. The (multivariate) logistic regression model will estimate the impacts that each of these factors has on ESA participation while controlling for other confounding factors.

Comparatively, regression analysis allows us to measure the marginal relationship between ESA participation and each explanatory variable, while controlling for ("holding constant") all other explanatory variables. The result is that after controlling for all other factors, White households are not more likely to participate in ESA than other, non-White households.

5.4.5.1 Stage 1

Using customer-level data provided by the IOUs for CARE customers and supplemented with block-group level data from the U.S. Census Bureau and Athens Research, we developed and estimated independent logistic regression models for each of the four IOUs. For each model, the dependent variable is equal to 1 if the customer is living in a premise treated through the ESA program since 2002, else 0 if the premise was not treated through the ESA program (but is assumed to be income-eligible since the household is on the CARE rate).[41]

The independent variables in the models include characteristics of the household (e.g. number of persons) and neighborhood (e.g. percent Spanish speaking households), and relationship with the respective IOU (e.g. length of time the service account has been active, number of late payments).

The purpose of the models is to quantify the effect that these various characteristics have on the likelihood that a customer will participate in the ESA program. Section 9.2 provides additional details on the Stage 1 ESA model results and Section 6.1 provides additional details on the methods used to develop those models.

Table 44 provides the key results translated to allow for relative comparisons across the models' explanatory variables for each IOU. Note that not all variables were available for each IOU, and even when available, some were not significant (shown as a blank cell in the table). The columns are described below, and are similar to the CARE modeling described previously:

[41] Note: we do not account for, nor do we know if the customer was living in the premise when the residence when it was treated through the ESA program.

a. The row number;
b. The variables used in the ESA participation models; and
c-f. The change in ESA participation associated with a hypothetical change in the variable shown in column b from the median to the 60th percentile value (for continuous variables), from the mid-point to mid-point plus one for discrete variables and from 0 to 1 for binary variables, *holding all else constant* for each IOU.

Table 44: Estimated Impact on ESA Participation Associated with a Change in the Value of Each Independent Variable for California LI Population

a.	b.	c.	d.	e.	f.
		Delta ESA Participation			
Row	VARIABLE	SDG&E	SoCalGas	SCE	PG&E
Continuous variables:					
1	Median Income for the block group (divided by 1000)	-2.01%	-1.39%	-0.63%	-0.57%
2	% HHs in the block group with Person >= 65	0.17%	0.35%	0.31%	0.84%
3	% Spanish Speaking HHs in the block group	0.42%	2.10%	2.31%	1.54%
4	% Non English/Spanish HHs in the block group	-0.66%	1.01%	0.26%	0.60%
5	% Single Parent HHs	2.70%	0.22%	0.77%	0.60%
6	% HHs on Medicaid in the block group	3.78%			1.76%
7	% African-American HHs in the block group		0.62%	0.56%	
8	Avg. 2012 Electricity Use (daily kWh)	-1.32%		-1.44%	-0.46%
9	Avg. 2012 Gas Use (daily therms)		-0.02%		
10	Pop Density (1,000 pers. per sq. mile) of the block group	0.37%		0.11%	-0.15%
11	Service account age (Occupant tenure)	-0.21%	0.45%	2.30%	0.77%
12	Building age (imputed where missing based on block group)	0.30%		0.63%	0.68%
13	Time on CARE rate (years)		0.87%	0.49%	
Discrete variables:					
14	Persons Per HH		1.49%	1.68%	
15	Number of failed bill payments	1.87%		0.32%	-2.85%
16	Number of overdue payments	0.07%		0.55%	
17	Calls to customer re delinquent bill	0.35%			
18	Number of disconnects	-2.4%			-3.89%
Binary variables:					
19	Medical baseline (0/1)		17.61%	13.65%	5.33%
20	Coastal location (0/1)	-2.7%	-14.34%	-5.60%	
21	Has IOU Electricity (0/1)		8.56%		5.33%

a.	b.	c.	d.	e.	f.
			Delta ESA Participation		
Row	VARIABLE	SDG&E	SoCalGas	SCE	PG&E
22	Has IOU Electricity and Gas (0/1)				17.57%
23	Single-family dwelling (0/1)			18.65%	
24	Has recertified for CARE (0/1)			13.97%	
25	Categorical CARE enrollment (0/1)			3.84%	
26	Located in climate zones 10-16[1] (0/1)			15.84%	
27	Located in climate zones 13-15[2] (0/1)			18.50%	

[1] Eligible for Central and Room AC during program years 2009-2011
[2] Eligible for Room AC but not Central AC during program years 2009-2011
Source: 2013 CARE Participant Telephone Survey.

Key takeaways from the ESA participation model results are presented below by the three categories of variables (continuous, discrete and binary) along with an interpretation of the result. We sorted by ascending magnitude of the variable on delta ESA participation across the four IOUs. Where applicable, we indicate whether the results are consistent with the CARE models.

Continuous variables:

- (+) Spanish-speaking households – the more households that speak Spanish as their primary language in the block group, the more likely households have participated in ESA – the programs have made substantial efforts to target Spanish-speaking households (this result is consistent with the CARE model) - it is also possible that concentration of Spanish speaking households is positively related to concentration of income-eligible customers;
- (+) Households on Medicaid – the more households that are enrolled in Medicaid in the neighborhood, the more likely a household has participated in ESA – similar interpretation as the median income variable above (this result is consistent with the CARE model); and
- (-) Median income – the lower the income of the neighborhood, the more likely the household is enrolled in ESA – the ESA program targets customers based on CARE enrollment and neighborhoods based on income level (this result is consistent with the CARE model, which looked at a similar variable: income less than 100% of federal poverty guidelines);
- (+) Single-parent households – the more single-parent households in the neighborhood, the more likely a household has participated in ESA – these households may have an easier time qualifying for CARE and ESA since they have

only one income to report, and the IOUs typically conduct outreach for ESA based on CARE enrollees;

- (+/-) Service account age/occupant tenure – for all but SDG&E,[42] the longer the household has lived in their current home the more likely they are to have participated in ESA – households that move around are harder to reach [43]
- (-) Electricity usage – the lower the electricity usage the more likely the household has participated in ESA – this is consistent with the CARE model; we hypothesize that customers with very high electricity usage either may not truly be eligible for CARE or may have other resources available to them that makes them less likely to respond to ESA program outreach, and conversely, those with lower usage may be actively trying to conserve and more interested in participating in ESA;
- (+/-) Non-English/non-Spanish speaking households– the more households where a language other than Spanish or English is their primary language in the block group, the more likely households have participated in all IOUs' ESA programs with the exception of SDG&E[44] (this result is consistent with CARE, with the exception of SDG&E);
- (+) Seniors in the home – the more seniors living in the neighborhood, the more likely households are enrolled in CARE and income-eligible and the more likely someone will be home at the household and available to participate in the ESA program (this result is consistent with the CARE model);
- (+) Building age – the older the building, the more likely it has been treated by ESA – older homes typically have more savings potential and are probably targeted by the IOUs;
- (+) Time on CARE – the longer that a household has been on the CARE rate, the more likely their home has been treated by ESA – they have had a longer amount of time to be on an outreach list developed by the IOU based on CARE enrollees;

[42] The impact on SDG&E ESA participation is very small. SDG&E has fewer older homes than the other IOUs.

[43] We recognize that many of the homes currently occupied by LI customers that have been treated through the ESA program were actually treated prior to the current residence living in the home. Therefore, the explanatory variables in the regression models that are specific to the customer do not explain why a prior resident chose to participate in the ESA program. Nevertheless, the measure of success for the ESA program is that the premise lived in by a LI customer be treated through the ESA program—regardless of who made the decision to participate when. We, therefore, set as a 'success' any CARE participant living in a premise treated through the ESA program, regardless of whether the premise was treated by a prior residence.

[44] SDG&E has significantly fewer Spanish-speaking households than SoCalGas and SCE (14% compared to around 30%), but about the same as PG&E (which has 17%).

- (+) African-American households – the more households that are African-American in the block group, the more likely households have participated in ESA – the programs have made substantial efforts to target segments that were considered hard-to-reach such as through working with community organizations, this result might reflect the success of those efforts (this result is consistent with the CARE model);
- (+/-) Population density – for all but PG&E, the more dense the block group the more likely the home has been treated by ESA – though this variable has a relatively small impact on ESA participation for all IOUs; and
- (-) Gas usage – for SoCalGas, households with higher gas bills have lower ESA participation rates, but the impact of this variable on participation is very small.

Discrete variables:

- (-) Number of disconnects and number of failed payments – households with more of these payment issues (with the exception of PG&E for failed payments) are less likely to have participated in ESA - these measures of negative behavior on the part of the customer may indicate a lack of engagement on the part of the customer to work with the IOU to find a solution to their inability to pay their bill;
- (+) Number of people per household – the more people in the household, the more likely the home has been treated by ESA – since households qualify based on income and number of people in the home, households with more people are more likely to quality for CARE and ESA (this result is consistent with the CARE model); and
- (+) Number of overdue payments, number of IOU calls to customer regarding delinquent bills and number of failed payments (for PG&E only)– the more of these payment issues, the more likely the customer is to participate in ESA – this is probably the desired result, where the program is helping customers with bill payment issues.

Binary variables:

- (+) Medical baseline – households that are on a medical baseline rate are more likely to participate in ESA, which is likely a desired result;
- (-) Coastal location – homes located in coastal areas are less likely to participate in ESA, likely because there is less need for it and less potential savings, so contractors may target these areas less often and households in these areas may perceive fewer participation benefits;

- (+) Single-family dwelling[45] – single-family homes are more likely to have participated in ESA, multi-family homes are very likely to be rented and require landlord cooperation;
- (+) Located in climate zones 13-15 – homes that are in these climate zones are more likely to participate, these are climate zones where customers are eligible for Central ACs, where there may be more need and energy savings potential;
- (+) Has IOU gas and electricity service – homes that have both services from their IOU are more likely to participate, likely due to more available measures so these homes may be more likely to be targeted by contractors and more likely a household would agree to participate;
- (+) Located in climate zones 10-16 – homes that are in these climate zones are more likely to participate, these are climate zones where customers are eligible for Room ACs, where there may be more need and energy savings potential; note that these homes are less likely than those in just climate zones 13-15 to participate;
- (+) Has recertified for CARE – households that have recertified for CARE are more likely to participate in ESA, likely because they are able and willing to respond to IOU requests for a response and may be more likely to be truly income-eligible for CARE and thus willing and able to provide income documents for ESA;
- (+) Has IOU electricity – for PG&E and SoCalGas, homes that have electricity from PG&E or SCE are more likely to participate in ESA; and
- (+) Categorically enrolled in CARE – households that categorically enrolled in CARE are more likely to have participated in ESA – these homes may be more likely to be income-eligible and willing to participate in ESA and have an easier time providing income or other qualification documents; they also may lack trust issues since they have opted to take assistance in other formats.

Note that we did not include an indicator variable of renter status, which was significant in the CARE model, since the stage one model is at the customer level and we lacked a variable that would tell us if the home was rented or not. (We had block group level data, but while such data may help with other indicators such as race and income, there may be less likely to be trends in home ownership at the neighborhood level.) We tried a home ownership variable in the stage two model, but it was insignificant (as discussed below). However, the self-reported barrier of getting a landlord to sign paperwork is

[45] Note that this variable was only available for SCE. The stage two model included a variable across all IOUs based on the survey data with home type, but was not statistically significant. We do note that the stage two model is based on the phone survey data that excludes non-participants who would not respond to a telephone survey, so home type may be an important barrier, though our results are not conclusive.

significant. In addition, the incentive for a renter to participate in the ESA program would be influenced by whether their dwelling is individually metered.

5.4.5.2 Stage 2

Using data gathered from the telephone survey of CARE participants and supplemented with customer-level data for CARE customers from the IOUs and block-group level data from the U.S. Census Bureau and Athens Research, we developed and estimated a logistic regression model that attempts to explain the factors affecting participation in the ESA program. The dependent variable in the model is equal to 1 if the customer is living in a premise treated through the ESA program since 2002, else 0 if the premise was not treated through the ESA program (but is assumed to be income-eligible since the household is on the CARE rate).[46]

The independent variables in the models include characteristics of the household and residence gathered through the telephone survey, as well as neighborhood characteristics and household electricity usage. The purpose of the model is to quantify the effect that these various characteristics have on the likelihood that a customer will participate in the ESA program.

While this model is closely related to the Stage 1 models developed for each of the respective IOUs, it differs substantively from those models in that it is primarily based on information gathered from CARE participants through the telephone surveys. While this model has the advantage of incorporating additional customer-level variables that we could not obtain in the IOU and Census/Athens data, it has two limitations. One, the telephone survey data are biased towards non-participants that lack major outreach barriers, as previously discussed. The interpretation of the presence and lack of barriers to ESA participation factors in this issue. Two, the model is cross-IOU (due to the much smaller number of observations) and we are limited to variables present across the IOUs (as mentioned above, the lowest common denominator). Section 9.2 provides additional details on the Stage 2 ESA model results and Section 6.1 provides additional details on the methods used to develop the model.

Table 45 provides the key results translated to allow for relative comparisons across the models' explanatory variables, similar to the Stage 1 table, but across IOUs. In this table we also include the median and 60th percentile of each variable (for Stage 1 that information is included in the appendix due to space constraints). Note that we included all the variables that were common across IOUs and that were comparable across participants and non-participants from the telephone survey, however, many variables were not significant. The columns are described below, and are equivalent to the CARE modeling described previously:

[46] Note: we do not account for, nor do we know if the customer was living in the premise when the residence when it was treated through the ESA program.

a. The row number;
b. The variables used in the ESA participation model;
c. The median value of each continuous and discrete variable;
d. The 60th percentile of each continuous variable/median value plus one for discrete variables; and
e. The change in ESA participation associated with a hypothetical change in the variable shown in column b from the median (column c) to the 60th percentile value/median plus one (column d), *holding all else constant*.

Table 45: Estimated Impact on ESA Participation Associated with a Change in the Value of Each Independent Variable for California LI Population

a.	b.	c.	d.	e.
	VARIABLE	Median	60th %tile[1]	Delta ESA Participation
1	AvgDailyKWH	16.18	17.99	-1.12%
2	PopDensity1000	3.54	4.54	-0.70%
3	HomeTenure	12.00	16.00	4.01%
4	Income1000	22.50	27.50	-1.70%
	Discrete & Countable			
5	HHsize	3.00	4.00	3.70%
	Binary Variables			
6	Male	0.00	1.00	-8.15%
7	Married	0.00	1.00	-11.80%
8	EnglishProficient	0.00	1.00	-9.31%
9	Home1970_1989	0.00	1.00	8.39%
10	OtherRace	0.00	1.00	10.01%
11	NotEnglishSpanishPrimary	0.00	1.00	-15.36%
12	ChronicMedical	0.00	1.00	8.25%
13	careaware	0.00	1.00	-7.57%
14	ReportedTurnOffHeat	0.00	1.00	12.76%
15	NeedESA	0.00	1.00	10.20%
16	BarrierLandlordEasy	0.00	1.00	11.37%
17	BarrierBeHomeEasy	0.00	1.00	11.18%
18	BarrierDocumentEasy	0.00	1.00	-6.78%
19	BarrierContractorEasy	0.00	1.00	14.89%
20	Constant			

[1]For discrete variables, the 60th percentile value is rounded to the nearest place. For binary variables, we compute delta ESA participation based on a change from "on" (or 0) to "off" (1).
Source: 2013 CARE Participant Telephone Survey.

Key takeaways from the ESA participation model results are presented below by the three categories of variables (continuous, discrete and binary) along with an interpretation of the result. We sorted by descending significance, accounting for the magnitude of the variable on delta ESA participation. Where applicable, we indicate whether the results are consistent with the ESA Stage 1 and CARE models.

Continuous variables:

- (+) Tenure – the longer that a household has been in their home, the more likely their home has been treated by ESA – they have had a longer amount of time to be on an outreach list developed by the IOU based on CARE enrollees (this variable is similar to "time on CARE", which was significant and positive in the ESA Stage 1 model);
- (-) Median income – the lower the income of the neighborhood, the more likely the household is enrolled in ESA – the ESA program targets customers based on CARE enrollment and neighborhoods based on income level (this result is consistent with the CARE and ESA Stage 1 models);
- (-) Electricity usage – the lower the electricity usage the more likely the household has participated in ESA or lives in a premise treated through the ESA program – this result is consistent with the CARE and ESA Stage 1 models; we hypothesize that customers with very high electricity usage either may not truly be eligible for CARE or may have other resources available to them that makes them less likely to respond to ESA program outreach, and conversely, customers with lower usage may be more interested in conserving energy and interested in participating in ESA. There may be third, unmeasured variable that explains why households that tend to have low kWh also have high ESA participation (e.g., a variable that measures a household's interest in energy conservation). It is also possible that households that participated in ESA lowered their kWh usage due to the installation of the energy efficiency measures; and
- (-) Population density – the less dense the block group the more likely the home has been treated by ESA – this outcome is the opposite of the Stage 1 model, except for PG&E.

Discrete variable:

- (+) Number of people per household – the more people in the household, the more likely the home has been treated by ESA – since households qualify based on income and number of people in the home, households with more people are more likely to quality for CARE and ESA (this result is consistent with the CARE and ESA Stage 1 models); an alternative explanation is that the greater the

number of household members, the greater the opportunity for the customer to be aware of the program (e.g. through school, church, community organization, work, etc.).

Binary variables:

- (-) Non-English/non-Spanish speaking households– households with "other" language as their primary language are less likely to participate in ESA, though our survey data does not represent this population, instead just a fraction of "other" language speakers who are proficient in either English or Spanish, the two languages we used to conduct the survey; while this result is the opposite sign (except for SDG&E in ESA Stage 1) of the CARE and ESA Stage 1 model results, those models were examining population data; and are more reliable sources for explaining participation among this population;
- (+) It was or would be easy to trust a contractor – households that said they thought it was or would be easy to trust a contractor in order to participate in ESA were more likely than those that did not trust a contractor to participate in ESA;
- (+) Turn off heat or cooling to keep the bill down – households that use less heating or cooling to try to keep their bill down are more likely to have participated in ESA;
- (-) Married households – are less likely to participate than unmarried;
- (+) It was or would be easy to get my landlord's approval - households that said they thought it was or would be easy to get their landlord's approval in order to participate in ESA were more likely to participate in ESA; note that being a renter was not a significant variable, suggesting that for non-participants that we are able to talk to on the phone (i.e., they trust the IOU sufficiently and may be reached by phone), renters in general are not less likely than owners to participate, but only the renters that worry about getting their landlord's approval;
- (+) It was or would be easy to be home for appointments – households that said they thought it was or would be easy to be home were more likely to participate in ESA;
- (+) Need something that ESA offers – households that said that needing something in particular that ESA offered was important are more likely to participate in ESA;
- (+) Other race – households that are a race other than White, African-American, Asian and Hispanic are more likely to participate – however we lack other racial households that speak languages other than English, so more precisely it is that

other racial households that speak English or Spanish are more likely to participate;

- (-) English survey – households that conducted the survey in English versus Spanish were more likely to participate; this is inconsistent with the CARE and ESA Stage 1 results, where Spanish language households were more likely to be treated; however, this model includes variables related to specific barriers (landlord permission, being home, trusting a contractor), such that once those barriers are accounted for, Spanish-speaking households that lack those barriers are less likely to participate;
- (+) Building age between 1970 and 1989 – homes built between those years are more likely to have participated, which could be a reflection of the program targeting older housing stock, or perhaps the concentration of that age of housing stock in urban areas such as multi-family buildings;
- (+) Chronic medical condition – households that report that at least one member has a chronic medical condition are more likely to participate;
- (-) Male survey respondent – households where a male respondent conducted the telephone survey (which might indicate the household is headed by a male or that a male is more likely to be home) are less likely to have participated;
- (-) Aware of the CARE rate - this result is counter-intuitive, that those who have heard of the CARE rate are less likely to participate in ESA; and
- (-) It was or would be easy to provide income documents – this result is counter-intuitive, that those who would find it easy to provide income documents are less likely to participate in ESA.

5.4.6 Conjoint Analysis Results

For the conjoint exercise, telephone survey respondents were recruited to participate in a brief web-based survey where they were provided with a general description of the ESA program:

> The Energy Savings Assistance (ESA) Program is a program offered by [utility] to help low income households save money on their energy bills. This is accomplished by scheduling a home inspection to establish eligibility and identify what types of efficiency equipment should be installed, followed by additional home visits to install the equipment. Depending on the needs of the household, customers can receive a variety of things such as information on safety and ways to save energy, energy efficient light bulbs, refrigerators, attic insulation, caulking, maintenance services for some appliances, and in some areas heating and air conditioning systems. The ESA Program pays 100 percent of the cost of the energy efficiency equipment – there is no charge to the customer.

With this program description as context, respondents are asked to rank eight possible options for the ESA program.[47] Each program option is defined as a combination of energy savings, number of home visits, income verification requirements, etc. The various attribute levels for each of these characteristics are shown in Table 46. These attribute levels are randomly assigned to create 18 possible programs that the respondent then ranked during the on-line conjoint session. Descriptions of these program attributes given to respondents during the survey are as follows:

- **Monthly Energy Savings:** Amount that households can expect to save on their monthly energy bill if they participate in the ESA program.
- **Income verification:** Whether or not customers must provide income verification such as a tax return to prove program eligibility.
- **Number of home visits:** Number of times that someone from the ESA program (both initial visit and measure installation) will visit the home, with each visit requiring some sort of scheduling and coordination on the part of the homeowner.
- **Timing of home visits:** Installation work done during the day (requiring that someone be at the home), evenings, or a combination of evenings and weekends.
- **Duration of home visits:** Total amount of time that program staff will spend at the home (both initial visit and installations).
- **Comfort:** Change in comfort level due to participation, defined as home being less drafty during cold weather and cooler during warm weather.

The values used to describe each choice option are randomly assigned, which forces the respondent to choose which attributes to focus on to rank the choices.

The conjoint analysis resulted in the following findings:

- **Energy savings and an increase in home comfort are dominant factors.** Not surprisingly, energy savings, in the form of ongoing cost reductions through bill savings, and changes in comfort are the most important factors driving customer preferences in both sets of program scenarios.

- **An increase in comfort is most likely to induce program participation.** Excluding monthly bill savings, an increase in home comfort was consistently found to have the highest equivalent monthly bill savings amount due to the large coefficient associated with his attribute in both participation models.

[47] Respondents are first given a practice conjoint exercise to complete using a non-energy example in order to get them familiar with the online conjoint ranking process.

- **For each additional home visit, and each additional hour home visits take, participants must be compensated with an increased amount of monthly bill savings to maintain the same likelihood of program participation.** In the ESA Program Option 1 scenario, for example, every home visit is worth an equivalent $8 in monthly bill savings, and each hour of home visits is worth $7 in bill savings. More detail on the tradeoffs customers make between monthly bill savings and other program features is included in Table 46 below.

Table 46: Equivalent Monthly Bill Savings Amounts[1] for California LI Population

ESA Program Option	Attributes	Equivalent Monthly Bill Savings Amount
1	Comfort Improvement	$28
	Income Verification Requirement	$9
	Additional Home Visit	$8
	Additional Hour of Home Visit	$7
2	Comfort Improvement	$28
	Additional Home Visit	$16
	Nights/Weekends vs. Day Home Visits	$9
	Income Verification Requirement	$4

Source: 2013 CARE Participant Telephone Survey.

- **The current program design should result in 60 percent ESA eligible non-participants' future program enrollment – based on those who responded to our telephone and web-based conjoint survey.** Our analysis finds that a program offering $10 of monthly bill savings,[48] achieving a significant improvement in household comfort, and requiring one daytime home visit lasting one hour as well as income verification documentation should result in the enrollment of slightly more than 60 percent of current program eligible non-participants. This result is analogous to the willingness to pay estimate, which was 72 percent based on telephone survey respondents. We estimated that that was the upper bound of a range from 52 to 72 percent, once we attempt to address the non-response bias. Thus, 60 percent is the upper bound of the conjoint analysis' independent estimate of willingness to participate.

[48] This is about twice the savings that the average participant realized based on the 2013 ESA Impact Evaluation Study (Evergreen Economics).

5.4.6.1 ESA Program Option 1 Conjoint Analysis

The first conjoint model is for the ranking of a first set of ESA program options. Respondents were asked to rank eight options of program designs with varying attributes for the monthly energy savings, number of home visits, income verification, change in home comfort, and the duration of home visits. The results of the discrete choice model are shown below in Table 47.

As shown in Table 47, three of the five variables in the regression are statistically significant at the 5 percent level or better. As expected, the coefficient on Monthly Energy Savings and Comfort are positive, indicating that respondents prefer higher monthly energy bill savings and an increased level of comfort, holding all other program attributes constant. Coefficients on the Number of Home Visits and Total Time In Home, and Income Verification variables are negative, as expected, indicating that respondents prefer a lower number of shorter visits and no income verification, all else constant.

The far right column of Table 47 shows the relative importance statistics calculated for each of the attributes, with higher numbers indicating a greater influence on the stated preferences for efficiency programs. From these results, Monthly Energy Savings was the most important (Relative Importance = 56 percent) followed by Comfort (Relative Importance = 26 percent). Total Time in Home was also fairly influential (Relative Importance = 12 percent). Finally, Income Verification and Number of Home Visits had the least influence (Relative Importance = 6 and 1 percent, respectively).

Table 47: Conjoint Results – ESA Program Option 1 for California LI Population

Attribute	Estimate	Standard Error	Significance	Relative Importance
Monthly Energy Savings	0.03477486	0.00322339	< 1%	56%
Number of Home Visits	-0.01560082	0.0598945	79%	1%
Income Verification	-0.17274521	0.11819362	14%	6%
Comfort	0.79417172	0.125864	< 1%	26%
Total Time in Home	-0.122632	0.03930942	< 1%	12%

Source: 2013 CARE Participant Telephone Survey.

5.4.6.2 ESA Program Option 2 Conjoint Analysis

A second conjoint model was created for the ranking of a second set of ESA program options. Respondents were asked to rank a further eight options of program designs with varying attributes for the monthly energy savings, number of home visits, income verification, change in home comfort, and the timing of home visits. The results of the discrete choice model are shown below in Table 48.

As shown in Table 48, two of the five variables in the regression are statistically significant at the 5 percent level or better. As expected, the coefficient on Monthly

Energy Savings, Comfort, and Timing of Home Visits are positive, indicating that respondents prefer higher monthly energy bill savings, an increased level of comfort, and evening or weekend visits, holding all other program attributes constant. The coefficient on the Number of Home Visits variable is negative, as expected, indicating that respondents prefer fewer home visits, all else constant. Somewhat unexpectedly, the coefficient on Income Verification is positive indicating that participants prefer if program staff review the participants' most recent tax return; however, the Income Verification variable not statistically significant so no inference on the variables effect on rank can be made from this model (this also holds true for Number of Home Visits and Timing of Home Visits).

The far right column of Table 48 shows the relative importance statistics calculated for each of the attributes, with higher numbers indicating a greater influence on the stated preferences for efficiency programs. From these results, monthly energy bill savings were again the most important (Relative Importance = 60 percent) followed by home comfort (Relative Importance = 25 percent). Income verification (Relative Importance = 6 percent) and the number of home visits (Relative Importance = 5 percent) were of approximately equal importance, and the timing of home visits had the least influence (Relative Importance = 2 percent).

Table 48: Conjoint Results – ESA Program Option For California LI Population 2

Attribute	Estimate	Standard Error	Significance	Relative Importance
Monthly Energy Savings	0.04003287	3.48E-03	< 1%	60%
Number of Home Visits	-0.08662811	0.06026407	15%	5%
Income Verification	0.21521317	0.12772561	9%	6%
Comfort	0.84530115	0.13143862	< 1%	25%
Timing of Home Visits	0.08033601	0.12185039	51%	2%

Source: 2013 CARE Participant Telephone Survey.

5.4.7 In-Home Visits

Willingness to participate in ESA among the non-participants we interviewed appeared to be high. But we remind the reader that the sample of in-home interview respondents is biased towards those willing to respond to a telephone survey and participate in an in-home interview. These customers lack major outreach barriers. We judged around two-thirds of the households we visited to be open to participate in ESA and likely to do so if the opportunity availed itself. In fact, 16 of them appeared to have already participated in their present home, mostly in the few months preceding our visit.

Drivers behind people's interest appeared to be the combination of:

- reducing energy costs through efficiency
- upgrading their appliances or home at no cost

- improving comfort by the increasing the affordability of heating or cooling their home.

These results are consistent with the conjoint results (obtained from ESA non-participants that responded to the telephone survey, so a similar bias issue is present, where the sample lacks major outreach barriers) that were discussed below in Section 5.4.5.1.

Interestingly, willingness to participate was evenly distributed among those in high, "normal," and low levels of apparent financial distress. Interest in the program was higher in primarily or exclusively Spanish-speaking households than those in which we conducted the interview in English. These results are consistent with the ESA modeling results discussed above in Section 5.4.5, where Spanish-speaking households are more likely to participate in ESA.

Among those households we identified as unlikely to participate in ESA, we encountered three distinct barriers.

5.4.7.1 Program Awareness

The most pervasive barrier was lack of program awareness. We classified 61 households as likely to participate.[49] As noted, sixteen of them appeared to have already participated. Of the remaining likely participants, most (33 of 45) did not seem to be aware of the program until we described it to them. (We discuss information sources and opportunities for outreach below.) Interestingly, those who seemed uninterested in the program were aware of it at similar rates.

As mentioned above in Section 2.1.2, the program recently changed its name to the Energy Savings Assistance program, whereas in prior years the program was branded differently by each IOU. (The program was referred to consistently as the Low Income Energy Efficiency Program or "LIEE" in regulatory reports.) The IOUs have not had much time to build awareness of the new program name.

Moreover, the IOUs have responded to household goals and budget constraints, and have not lacked sufficient customer leads (usually from CARE enrollees) to market ESA. This situation may change in the coming years as the program reaches higher penetration rates. At that time, program awareness and branding may become more important.

5.4.7.2 Lack of Perceived Opportunity

Among those we classified as unwilling or uninterested in participating, we heard two key themes. Nine households didn't think there was much the program would be able to do for them. These respondents tended to explain that they did not use much energy or

[49] Of the remaining households, we thought 22 were unlikely to participate and received inconsistent information from five.

that their homes and appliances were already as efficient as they could be. In some cases, this appeared to be correct, or the opportunities were not measures that ESA would be likely to address under current program rules. Some of these homes had primarily electric opportunities, but were served by municipal providers and would qualify for ESA only for natural gas measures. One of the households appeared to spend substantial amounts of energy to pump well water for irrigation of vegetation around the house in an area prone to wildfires.

5.4.7.3 Renter-Specific Barriers

Eleven of the households we classified as unwilling were renters who described renter-specific barriers to participation. These barriers comprised:

- uncooperative landlords (6);
- the belief that the program is not for renters (3); and
- thinking that addressing building and appliance issues is the landlord's responsibility (2).

These results complement the ESA modeling results, discussed previously in Section 5.4.5. Renting a home was not a significant variable in the model, but renters who felt that getting their landlord's approval was found to be a significant factor for ESA participation. Being a renter was a barrier for CARE participation, from the CARE model.

As a result of these barriers, several renters dismissed thoughts of participation upon hearing of the program. Hence, obtaining participation among willing renters will take more effort than just increasing awareness. IOUs will need to clearly specify that renters are eligible too when marketing the program or reaching out in a targeted way to renters. One other option would be to work through property managers of rental units with high concentrations of eligible households as well as Section 8 housing offices.

As noted, landlord participation stood out as one of the main barriers for renters. We heard about a range of perceived landlord willingness to participate in ESA. Some renters thought their landlords would be cooperative and foresee no issues with obtaining landlord approval, while others commented that their landlords do the minimum needed and worried that it may be difficult to get their approval or involvement.

Even among cooperative landlords, renters described barriers and potential obstacles. One highly motivated apartment renter was familiar with ESA and had made efforts in recent years to obtain ESA treatment for a prior apartment. She said that her efforts failed after the property manager was unable to provide a copy of the deed, which the ESA contractor was requiring before the unit could be treated. The customer said that the property managers at both that apartment and her current home would have been happy to provide approval for treatment, but are not in a position to offer copies of deeds. As a result, she has given up on ESA participation and is concentrating on other

sources of assistance to help meet her expenses while she finishes her education and raises her two children.

It wasn't clear to us whether copies of deeds are required by the program or just part of that particular contractor's process. Either way, keeping requirements for property managers to a minimum would facilitate renters' ability to participate.

One other renter described her landlord as struggling financially to keep the Section 8 qualified property. (The property was in some disrepair.) She described the landlord in positive terms, saying that he does what he can to address issues. However, she was very sensitive to initiating anything that would cost her landlord any funds or that has the potential to cause any problems for him.

5.4.7.4 Miscellaneous Other Barriers

Other reasons provided included dislike of social programs that redistribute wealth, not thinking of oneself as LI, and not wanting to give up the household's refrigerator.

5.4.7.5 Participation Requirements

Other than getting landlord approval and cooperation, none of the program requirements appeared to be a substantial barrier to participation. Households told us that providing proof of income eligibility would not be a major barrier. In fact, the substantial share of households that have participated in other income-qualified programs are used to these requirements. Homeowners said they could provide proof of ownership.

Being home for a series of contractor visits is a bit more challenging for those households that don't consistently have an adult home during regular working hours, but most households we visited—including those that opted for evening and weekend appointments for the in-home visit—indicated that they would be able to accommodate such visits. Flexibility by program contractors would help these customers participate, however.

The conjoint analysis, discussed in Section 5.4.5.1, indicated fairly complementary results. Providing income documents was not a significant barrier. The total time required for contractors to be in the home was a slight barrier, while the number of home visits was the lowest barrier.

The conjoint and in-home interviews were conducted with telephone survey respondents, which lack major outreach barriers. They are able to find time to talk to a telephone surveyor and/or to be available for an in-home visit lasting more than an hour. These respondents are also probably more likely to be income-eligible for the CARE program, since those that are not income-eligible would be less likely to talk to a surveyor.

5.4.8 LI Program Review

Even though all these programs are offered to LI households as a free service, there are still non-financial barriers that prevent households from participating. These barriers are varied in nature but can include a lack of knowledge of the program, a distrust of utility companies or general apathy towards social service programs. Some people would prefer not to have a stranger come into their home; our contact at the Massachusetts WAP program likened some people's perception of the audit as a "benevolent invasion" of a household that may deter some people from participation. The contractor visit may be perceived as an intrusion into their space. These barriers are consistent with the barriers we noted from our research of California's ESA program.

The community agencies that administer the programs can often work to allay concerns about such an "invasion" of the home. Effective agency outreach can inform future participants to the benefits of the energy efficiency work on their home and be an advocate in the process. Some energy efficiency programs work with other kinds of community agencies, such as elderly assistance organizations, to reach out and work with populations that may be most wary of a home audit and energy efficiency work. These strategies are currently being used by the ESA program.

As mentioned above, some utilities like the Ohio EPP require customers who receive bill-pay assistance to also participate in energy-efficiency programs, which results in high participation rates.

5.5 Energy Needs and LI Program Benefits

This subsection describes study results related to energy insecurity, energy burden and energy needs among the eligible population. We drew upon all the study primary and secondary research sources for this subsection.

5.5.1 Energy Insecurity

We asked telephone survey respondents a series of questions that we used to determine their level of self-reported energy insecurity. This measure is designed to make it as objective as possible, based on self-reported behaviors that indicate difficulty managing energy bills. In the next subsection, we present results on energy burden, which is based on self-reported household income and energy bill cost based on IOU billing data. In the following subsection, we present study results related to non-energy benefits, which include health, comfort and safety, which are additional aspects of the impact that energy bills and home energy equipment has on LI households.

5.5.1.1 Customer Telephone Survey

We asked survey respondents how often they or others in their home do the following – a lot, sometimes or never:

- Cut back on food or medicine in order to pay utility bill

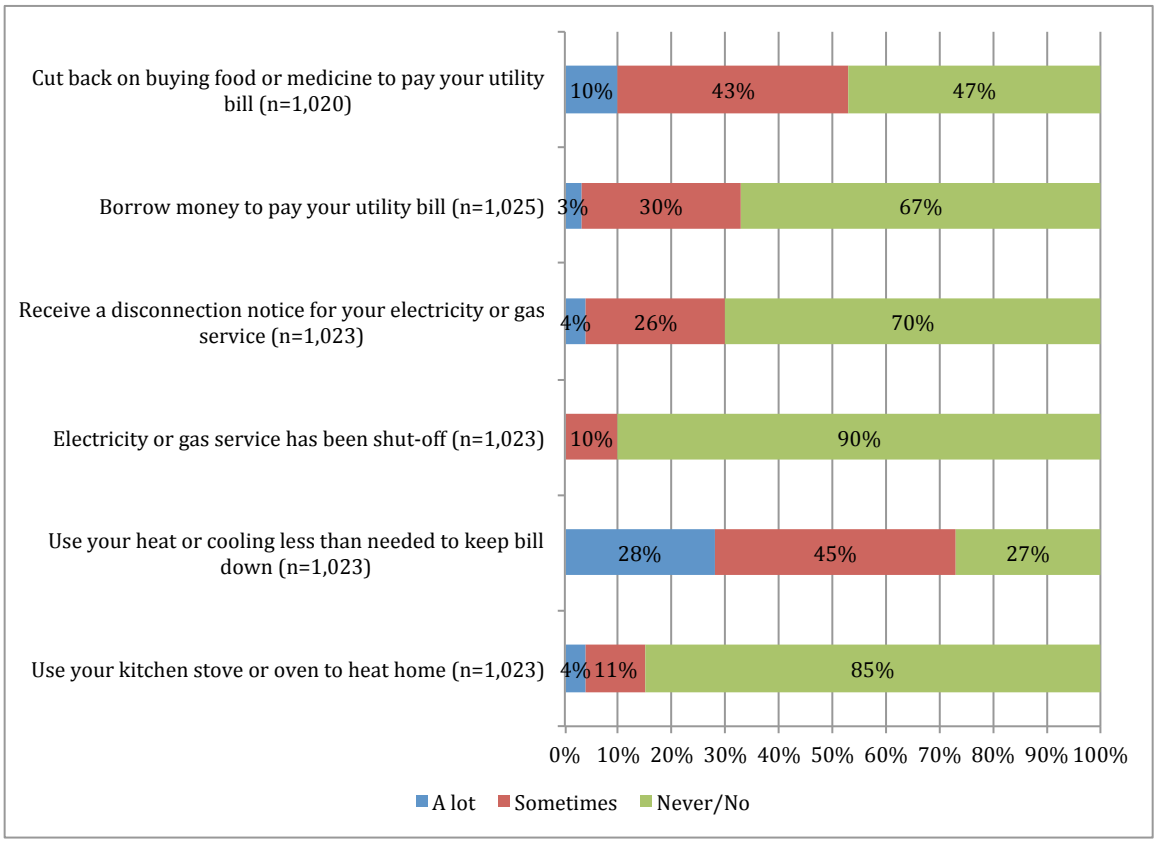
- Borrow money to pay utility bill
- Receive a disconnection notice for utility service
- Had utility service shut off
- Use heat or cooling less than needed to keep utility bill lower
- Use kitchen stove or oven to heat home

Below, we report the frequency with which respondents self-report that they take these measures, and an "energy insecurity" summary based on all of their responses.

As shown in Figure 41 below, the most common measure that respondents take is using heating or cooling less than needed (with 28% of the total reporting they do that "A lot" and 45% "Sometimes"), accounting for half of all the energy insecurity reported by respondents.

The second most commonly-cited measure is cutting back on food or medicine to pay the utility bill, with 10 percent saying they do this "A lot" and 43 percent saying they do this "Sometimes". 4 percent or fewer respondents reported that they took any of the other energy insecurity measures "A lot".

Figure 41: Energy Insecurity Measures (I1e, I1f, I1g, I1h, I1j) for California LI Population

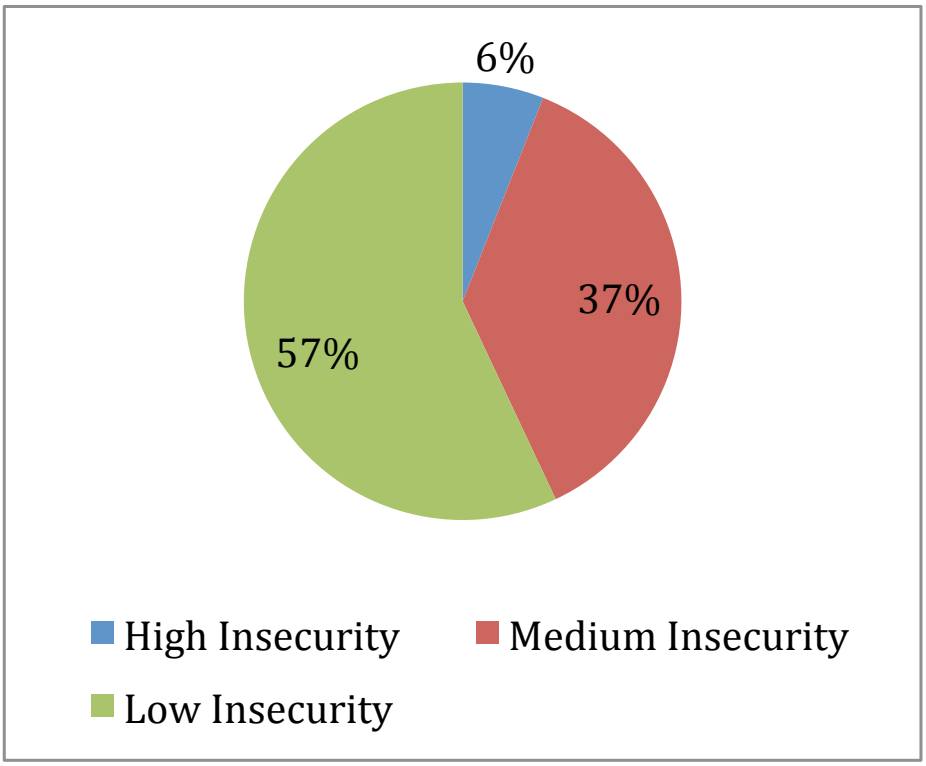


Source: 2013 CARE participant telephone survey data.

We created a summary variable based on responses to the set of six insecurity questions. We categorized respondents as having a high level of energy insecurity if they responded "A lot" to two of the questions and responded "Never" no more than twice. We categorized respondents as having a low level of energy insecurity if they answered "Never" to at least three of the questions, and never answered "A lot." We categorized the remaining respondents as having a medium level of insecurity.

Figure 42 shows the results of this summary of energy insecurity variable. 6 percent of LI households are highly energy insecure, 37 percent have medium energy insecurity and 57 percent have low energy insecurity.

Figure 42: Energy Insecurity Summary Variable for California LI Population (n=1,020)

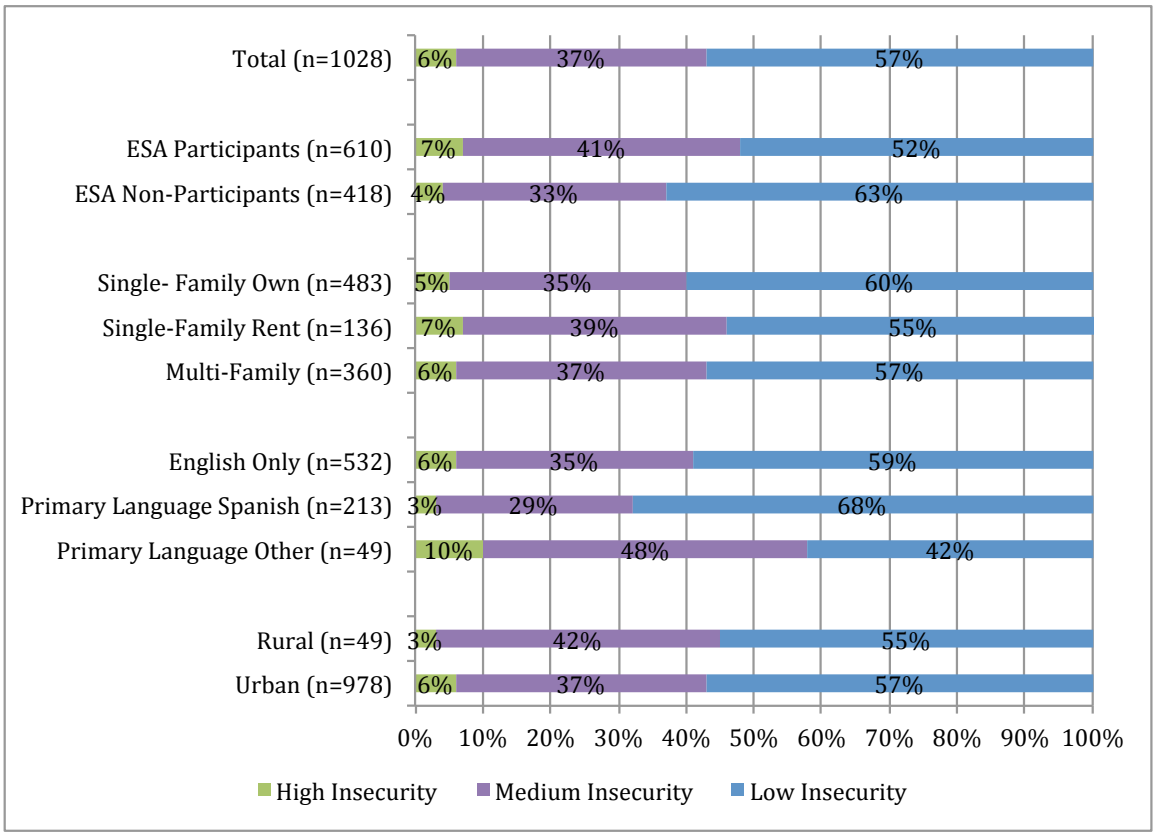


Source: 2013 CARE participant telephone survey data.

Figure 43 shows the results of the summary energy insecurity variable. Single-family renters and households whose primary language is not English or Spanish[50] are more energy insecure than other home types and households that speak English or Spanish primarily. 7 percent of ESA participants have high insecurity as compared to 4 percent of non-participants. (As reported in Section 5.1, 95 percent of multi-family homes are occupied by renters, so we do not break out that home type by home ownership.)

[50] We remind the reader that the sample of "other" language households is not representative of the populations since we only conducted surveys in English and Spanish.

Figure 43: Summary Measure of Energy Insecurity by Home Type, Language, and Rural/Urban (I1e, I1f, I1g, I1h, I1j) for California LI Population



Source: 2013 CARE participant telephone survey data.

Table 49 shows the more detailed energy insecurity survey responses by LI population segment. Single-family renters are most likely to have to cut back on food or medicine, borrow money to pay bills and to receive a notice of disconnection. Multi-family households are more likely to borrow money to pay bills. Non-English speaking households are more likely to cut back on buying food or medicine and borrow money to pay bills.

Table 49: Energy Insecurity by Home Type, Language, and Rural/Urban (I1e, I1f, I1g, I1h, I1j) for California LI Population

	LI Eligible Population							
	Single-Family Own	Single-Family Rent	Multi-Family	English Only	Primary Language Spanish	Primary Language Other	Rural	Urban
Cut back on buying food or medicine to pay your utility bill								
A lot	10%	8%	11%	11%	9%	16%	11%	10%
Sometimes	37%	53%	42%	37%	47%	40%	39%	43%
Never/No	53%	38%	48%	51%	44%	43%	51%	47%
Total (n)	480	134	357	528	210	49	49	970
Borrow money to pay utility bill								
A lot	4%	2%	2%	3%	2%	3%	0%	3%
Sometimes	24%	35%	34%	23%	40%	32%	17%	31%
Never/No	72%	63%	64%	74%	59%	65%	83%	66%
Total (n)	482	136	358	531	213	48	49	975
Receive a disconnection notice for your electricity or gas service								
A lot	5%	3%	4%	5%	3%	5%	5%	4%
Sometimes	21%	33%	26%	25%	32%	16%	26%	26%
Never/No	74%	64%	70%	70%	66%	79%	69%	70%
Total (n)	482	136	357	528	213	48	49	973
Electricity or Gas service has been shut off								
A lot	1%	0%	0%	0%	1%	1%	0%	0%
Sometimes	8%	13%	10%	8%	9%	3%	10%	10%
Never/No	92%	87%	90%	92%	91%	96%	90%	90%
Total (n)	481	135	358	529	213	48	48	974
Use heat or cooling less than needed to keep bill down								
A lot	27%	31%	27%	27%	15%	42%	37%	28%
Sometimes	42%	43%	48%	43%	53%	43%	26%	45%
Never/No	32%	26%	26%	29%	31%	15%	37%	27%
Total (n)	478	134	356	526	212	48	49	966
Use kitchen stove or oven to heat home								
A lot	2%	4%	6%	4%	2%	10%	0%	4%
Sometimes	11%	13%	11%	9%	10%	19%	14%	11%
Never/No	88%	83%	84%	87%	88%	71%	86%	85%
Total (n)	483	136	360	532	213	49	49	978
Energy Insecurity Summary Variable								
High	5%	7%	6%	6%	3%	10%	3%	6%
Medium	35%	39%	37%	35%	29%	48%	42%	37%
Low	60%	55%	57%	59%	68%	42%	55%	57%
Total (n)	483	136	360	532	213	49	49	978

Source: 2013 CARE participant telephone survey data.

5.5.1.2 In-Home Visits

The self-reported incomes of the households ranged from less than $5,000 to the $50,000-$60,000 range with a correspondingly wide range of household sizes of one to nine people, although the median household size was three. Some households live on their incomes and accumulated resources—including the equity in their homes—while others draw upon various forms of formal and informal assistance.

Assistance some people mentioned included Medi-Cal, Section 8 housing, food stamps, food pantries, scholarships to offset expenses for children's activities, and informal support from other family members. For example, one single mother who had been suffering an extended period of underemployment prided herself on being resourceful to ensure her daughter has a full childhood. She manages to pull together many different forms of assistance and cost management strategies that enable her to let her daughter participate in Girl Scouts and soccer. One elderly woman simply commented that she has children that "love their mama."

Others focus on keeping costs very low, citing a variety of strategies to make ends meet. Watching expenses closely was a very common theme, while for others timing their expenditures is a key strategy to make ends meet.

Some households live from check to check, while others have more steady access to resources. Among those that live check to check, some phase their expenses in order to pay bills, sometimes deferring purchases of basic necessities like food and living instead on what they have accumulated in their pantries. Others allow bills to accumulate, but make arrangements to pay them off over time.

We classified the degree of overall financial distress the households appeared to be in based on our observations at the interview and customer descriptions of their situation. Factors we considered included the kinds of tradeoffs they make to pay bills, the difficulty they said they have in paying bills, the condition of their home and appliances (if owner-occupied), and occasionally other clues we could observe such as the car(s) they own and the food (or absence thereof) in the refrigerator.

The apparent degree of financial distress is more complicated than just a function of their income and income stream. Some households with low levels of income are managing reasonably well, while other households are clearly struggling. Based on our observation and interview responses, we classified a slim majority of households as facing the sort of elevated financial constraints one might expect among LI households, we found that about a fifth of the homes we visited communicated a substantially elevated level of financial distress,[51] and about a quarter seemed to be managing their financial constraints in a way that made them appear more like a middle class household than a low income one.

[51] See the customer profile for "Sharon" below.

Households that appeared to face greater levels of financial distress included:

- Households in which a medical condition or disability is affecting costs or income;
- Households caring for a larger number of dependents, including those with adult children or parents in the home;
- Those in multi-family and mobile homes; and
- Seniors and households managed by young adults (below), although seniors were also disproportionately represented among those with no obvious level of distress.

Households that tended to be less financially distressed included:

- Households whose LI status was recent and perhaps temporary, such as those who experienced a recent job loss;
- Seniors living on fixed incomes, but who were living simple lifestyles by choice with modest expenses or had savings to draw upon; and
- Households that managed to draw upon formal or informal sources of assistance, be it aid programs or help from family members.

Refer to Section 10 for more descriptions of characteristics of the in-home ESA non-participant sample including illustrative profiles of some of the respondents.

5.5.2 Energy Burden

This section presents an analysis of energy burden, which is defined as the portion of total household income that goes toward paying utility bills. Specific questions addressed in this section include:

- What portion of annual household income is used to cover energy bills among California's LI population?
- How does the LI energy burden compare with that of the general population?
- What are the characteristics of the LI population that have the highest energy burden?
- How is energy burden related to energy insecurity?

The telephone survey (discussed in Section 8) serves as the primary source for the LI population data used to calculate energy burden and includes information on annual household income along with the other demographic information. Income was collected in the telephone survey in ranges,[52] (e.g. Is your total household income less than $5,000, between $5,000 and $10,000, etc.)

[52] See telephone survey in Volume 3 Section 13, Question D12 for question wording and response categories.

5.5.2.1 A Methodological Note on the Energy Burden Calculation

We examined two approaches for calculating average energy burden, each of which can produce substantially different results. For convenience, we define these two metrics as "overall energy burden" and "customer energy burden". The calculation method used for each is defined as follows:

- "Customer Energy Burden" is calculated by dividing the customer energy bill amount by annual income to get an energy burden ratio for each customer. The mean of these customer ratios is taken to get an overall average energy burden number.
- "Overall Energy Burden" is calculated by taking the overall average annual bill amount and dividing by the overall average income. That is, the average of the bill amount and income is calculated first, and then the ratio is calculated.

Note that household size is not explicitly factored into either estimation method.[53]

The "overall energy burden" approach was used in the 2007 LINA and is the only method available to estimate burden for the general population. We use the "overall energy burden" approach in order to make comparisons to the prior 2007 estimate and to the general population. However, we believe that the "Customer Energy Burden" provides a better estimate of average energy burden. The intent of energy burden is to understand portion of income spent on energy by individual households. This is best represented by the ratio of household-specific income to household-specific energy expense. This ratio and its distribution in the low income population represents the energy burden as experienced by member households, rendering it more accurate than metrics reflecting the ration of mean income and mean energy bill. Consequently, we use that metric to present the LI population's energy burden results. The other method is used only for comparison purposes, to show relative differences over time and with the general population.

[53] Though it is implicitly factored into the average income, since CARE-eligibility is based on the household size.

When interpreting either the overall energy burden or the customer energy burden, we caution the reader to bear in mind the following important caveats:

- Income comes in more forms than simply dollars. There are food stamps, family services and other forms of assistance, directed largely at the lowest dollar income groups;
- Income is self-reported and may contain errors; and
- Poverty and qualification for the CARE and ESA LI programs are a function of both income and size of household.

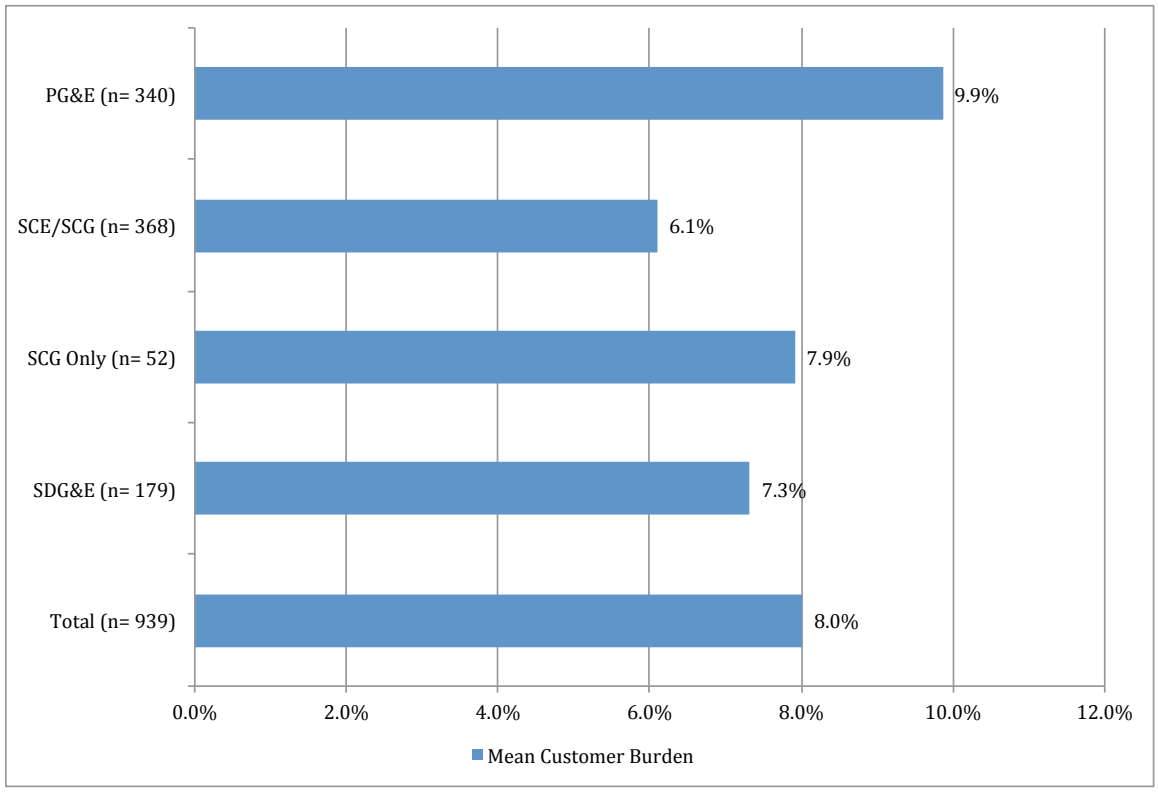
5.5.2.2 Customer Energy Burden

In this section, we present the customer energy burden results. As discussed previously, the "customer burden" is calculated differently from the "overall energy" burden. Customer burden is calculated by first taking the ratio of annual energy bills to household income for each customer, and then, in a second step, calculating an average of this ratio across all customers.

Since this calculation is different from the overall energy burden calculation used in the 2007 LINA study, the results presented below are not directly comparable with the previous research. However, while the previous LINA was published in 2007 the data was collected in 2005, so is more reflective of 2005 conditions than 2007.

Figure 44 presents the mean customer burden for the California LI population, for each IOU service territory and for the state as a whole. PG&E has the highest mean customer burden at 9.9 percent. The lowest is found within the SCE/SoCalGas territory, 6.1 percent. The result for the entire state is 8.0 percent.

Figure 44: Mean Customer Burden, 2013 California LI Population, by IOU Service Territory



Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

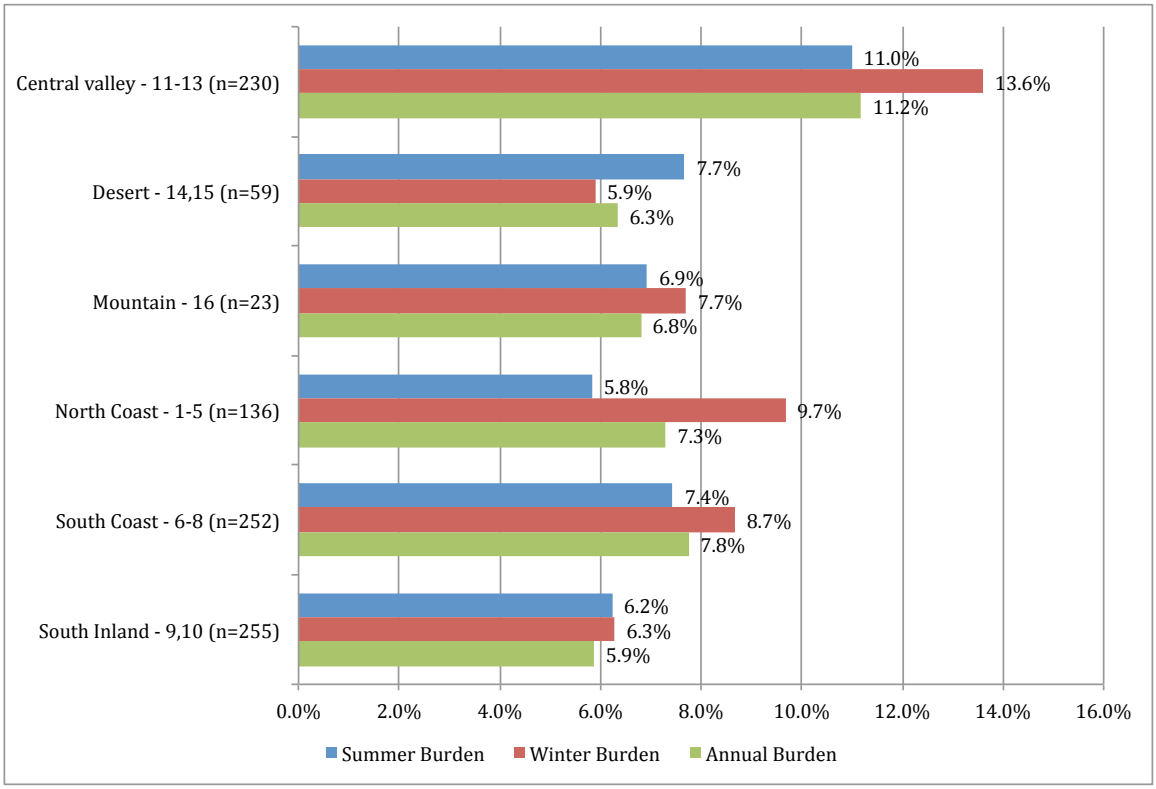
5.5.2.2.1 Differences in Customer Energy Burden by Climate

In this section, we explore differences in customer energy burden by climate. Climate areas in California differ dramatically in their cooling and heating needs, with coastal areas generally providing more temperate variations, and the inland, northern and mountain areas experiencing more heat in summer and cold in winter; and southern areas generally experiencing higher temperatures year round versus northern areas.

Figure 45 below presents mean customer burden by climate zone region, annually and for summer and winter seasons (note that the seasonal burdens are annualized for ease of comparison). The Central Valley (11.2%) has substantially higher customer burden than any other region—at 1.4 times its runner up, the South Coast (7.8%). For all regions except the Desert, winter burden exceeds summer burden. The difference is pronounced

for the North Coast where winter burden is nearly 1.7 times the summer burden. The South Inland and Mountain climates have fairly equivalent winter and summer energy burdens.

Figure 45: Mean Energy Burden by Climate Zone Region and Season



Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

5.5.2.2.2 High Energy Burden Segment Characterization

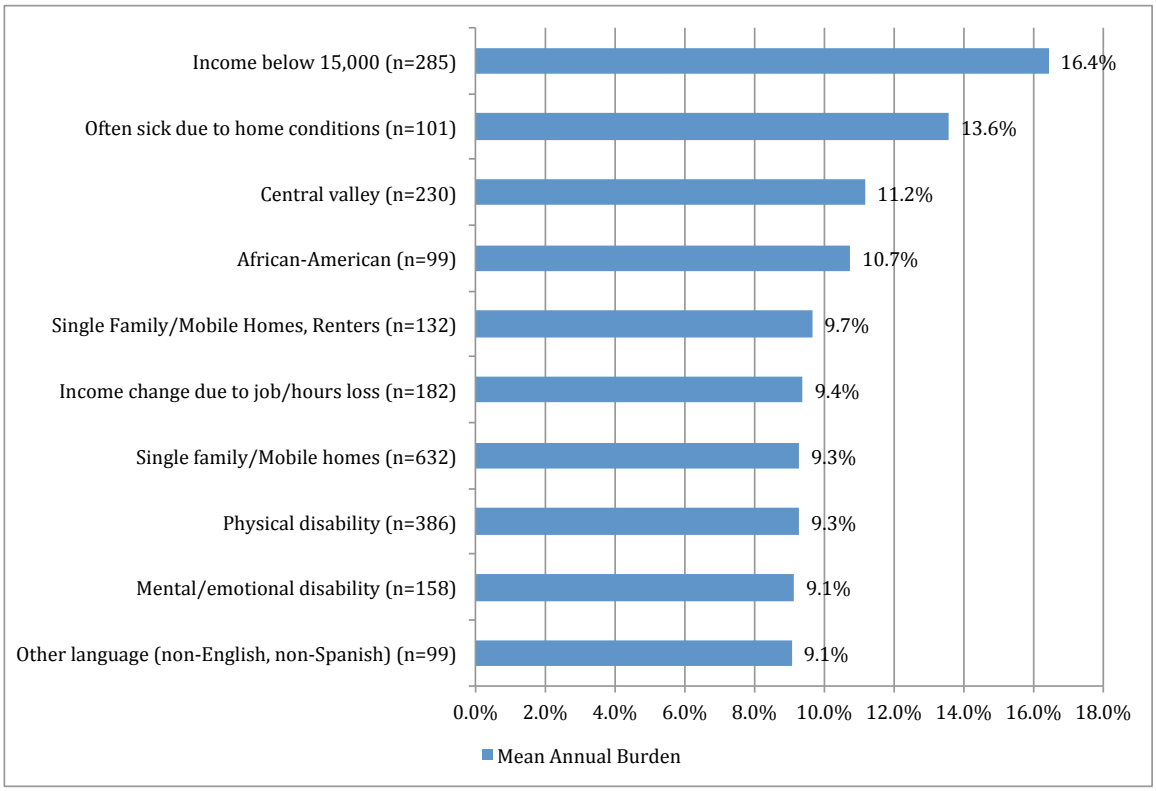
This section presents the characteristics of the highest energy burden households. The process of identifying high burden customer segments began by creating 20 ways to differentiate the population, using demographic, geographic household and home characteristics collected via the telephone survey or present in IOU databases. This resulted in 80 segment-specific annual customer energy burden values, which were ranked from highest to lowest with the top ten selected for further examination. This section presents characteristics of these high burden segments. The intent of this section is to offer information that lends insight to high burden customers, which may allow for better program customization for these segments.

Figure 46 below presents the mean customer burden for the highest burden segments of the LI population. Six of the ten segments shown below have a mean customer burden

between 9 percent and 10 percent. The remaining four segments have the highest burdens, ranging from 10 percent to 16 percent.

- The highest burden is measured for households with annual household income of $15,000 or less. As detailed later in this section, these households make up more than one-third of the LI population.
- Households that report members are often sick due to home conditions have the second highest customer burden, 13.6 percent, and comprise 11 percent of the LI population. The high burden observed in this sector is related to the use of electrically powered medical equipment. About one-third (35%) of those customers also report using electrically powered medical equipment daily to manage illness or disability. In contrast, 17 percent of those reporting they are 'sometimes' or 'never sick due to home conditions report using electric medical equipment daily.

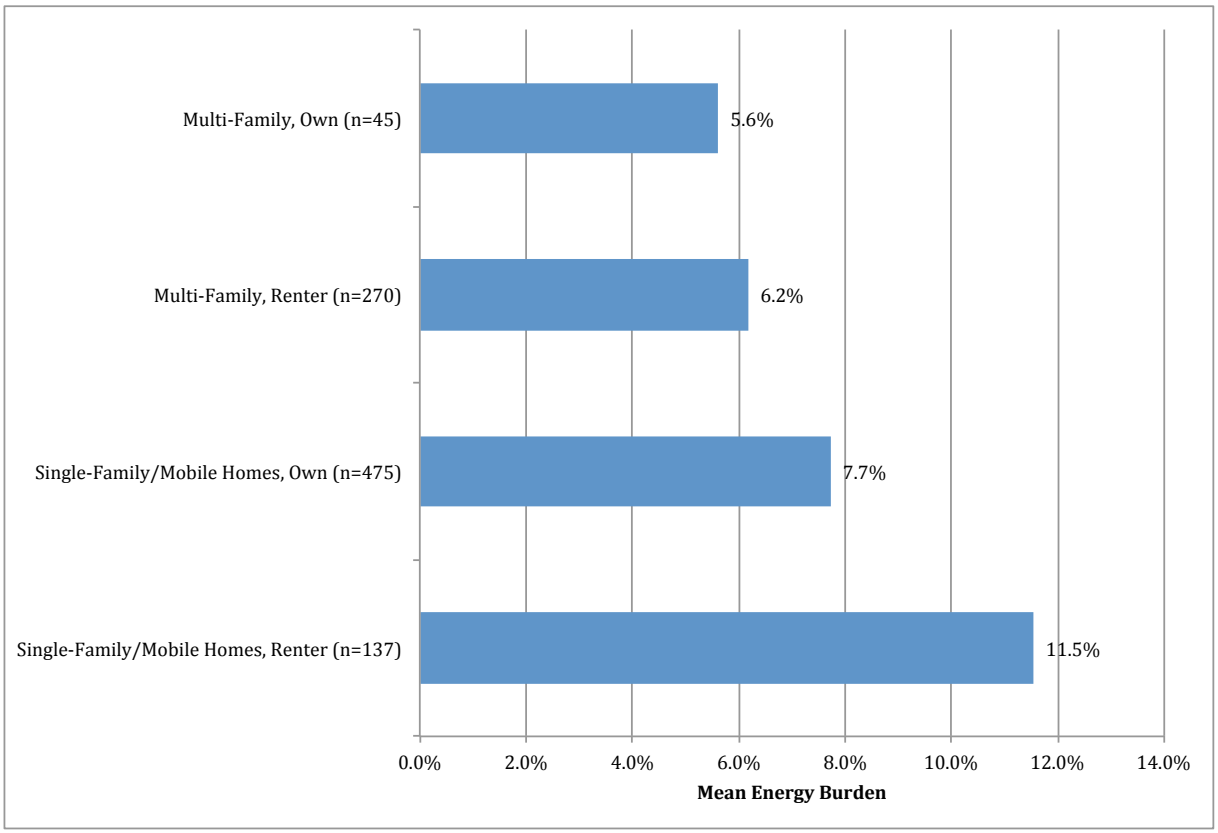
Figure 46: High Energy Burden Households, Mean Customer Energy Burden for Highest Burden Segments



Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data (D12, PB10, D8, S6, S5, D13, D13a, D11-D15, D5), 2012 Athens data, and 2011 PUMS data.

Home type and home ownership are associated with energy burden levels, with renters and single-family homes showing higher mean burden. Figure 47 below shows mean customer energy burden by home type and home ownership, illustrating this relationship. We find that single-family and mobile home renters have a relatively high mean energy burden of 9.7 percent. For comparison purposes, single-family mean energy burden is 9.4 percent and multi-family mean energy burden is 6.1 percent.

Figure 47: Mean Customer Energy Burden by Home Type and Home Ownership



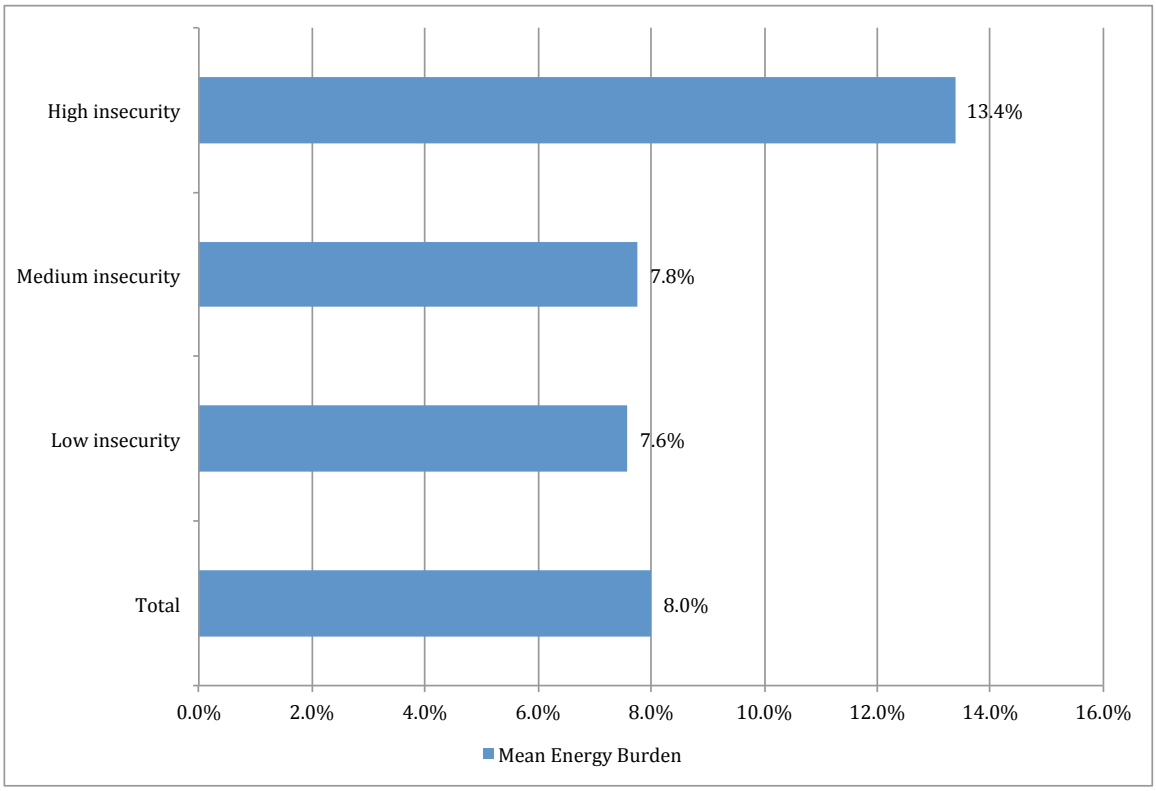
Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data (S6, S5), 2012 Athens data, and 2011 PUMS data.

5.5.2.2.3 Energy Burden and Energy Insecurity

This section presents the results of an examination of customer energy burden by level of energy insecurity. The energy insecurity level is determined by responses to survey questions that probe various areas of vulnerability, such as having power disconnected for not paying bills, or using a stove for heat. Insecurity is categorized into three levels, high, medium and low, which represent the frequency at which the vulnerabilities arise. A more detailed discussion of energy insecurity is presented in the section preceding this one, Section 5.5.1.

As shown in Figure 48 below, there is little difference in the burden of those with 'medium' or 'low' insecurity, at 7.8 percent and 7.6 percent, respectively. Those with 'high' insecurity make up 5.7 percent of the LI population and have a notably higher mean customer burden, at 13.4 percent.

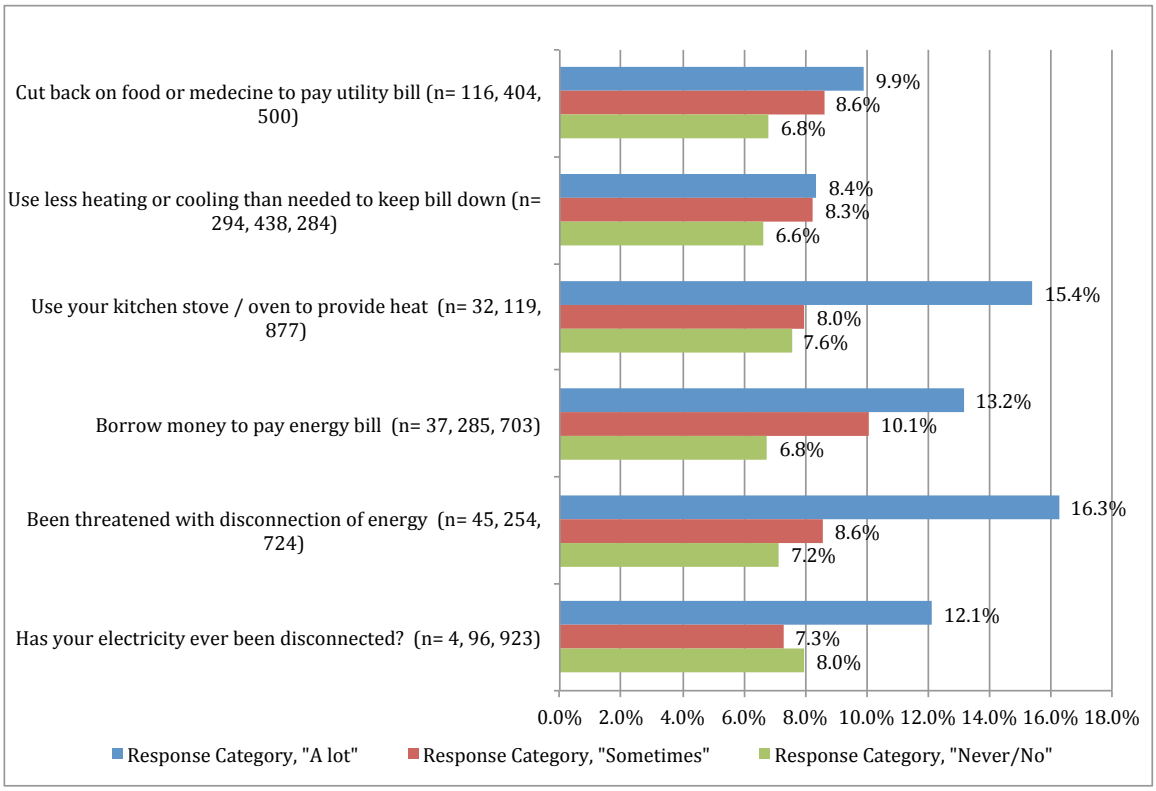
Figure 48: Mean Customer Energy Burden by Level of Energy Insecurity, Annual for California LI Population



Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data (I1e-I1j), 2012 Athens data, and 2011 PUMS data.

Figure 49 below summarizes the annual energy burden across the insecurity survey questions. The figure shows the mean customer burden for each question and response category. The questions with the greatest correlation to high energy burden are also those with the lowest rate of occurrence: whether the respondent borrows money to pay the bill, uses kitchen stove for heat, or has often been threatened with power disconnection. The mean burden for those that experience these events 'a lot' is between 13 percent and 16 percent.

Figure 49: Mean Customer Energy Burden By Insecurity Question and Response Category



Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data (I1e-I1j), 2012 Athens data, and 2011 PUMS data.

5.5.2.3 Comparison of 2013 Study Results to 2007

These results are intended to provide a comparison to the prior LINA study only. The customer energy burden presented above provides our estimates of the LI population mean energy burden.

In the 2007 LINA, the "overall energy burden" approach was used. The 2007 study measured the average bill to be about $950 per year and average income to be $23,000, yielding an overall burden of 4.2 percent. In comparison, the current study finds average income to be $23,721 and the average bill to be $970, yielding an overall burden of 4.1 percent, down slightly from figures reported in 2007. Note that the 2007 study reflects data collected in 2005, so should be considered reflective of 2005 conditions rather than 2007.

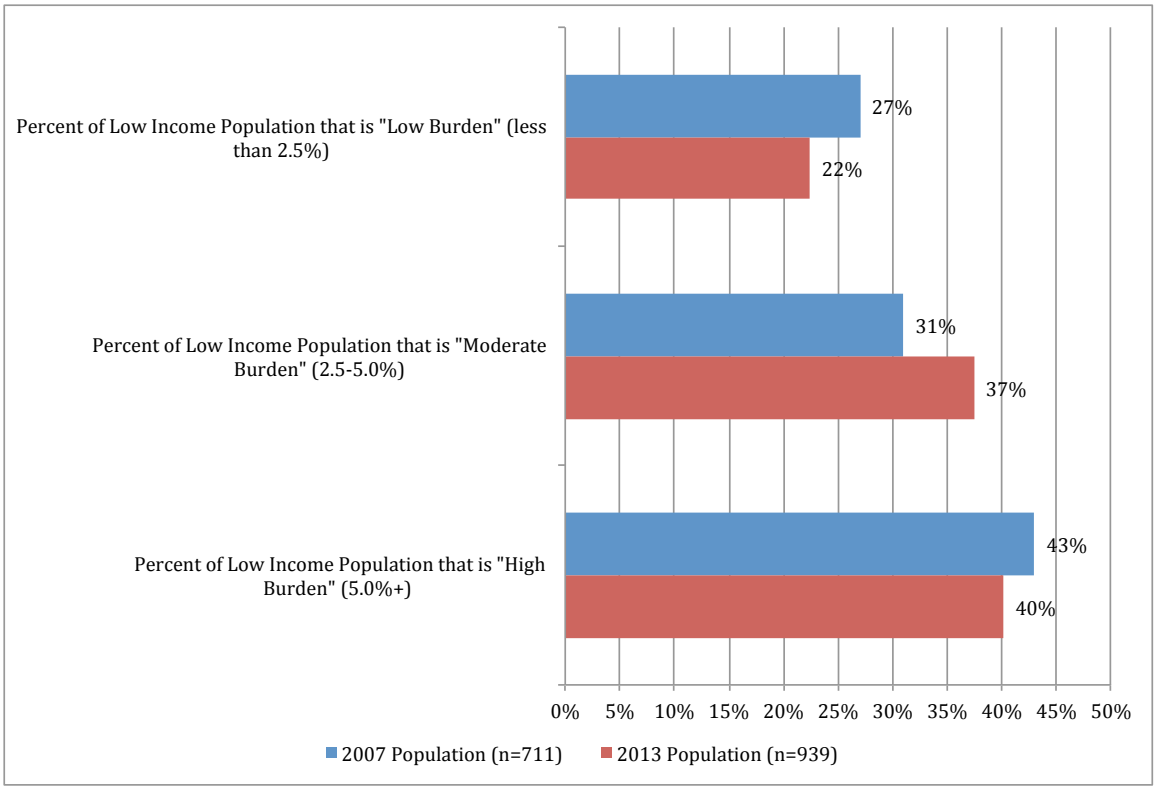
Our current energy burden analysis indicates that 80 percent of LI households spend less than 7 percent of their annual income on energy, and 60 percent of LI households spend 5 percent or less on their energy bill. Similar to the approach taken in the 2007

LINA, we classify the LI population into three burden categories, based on annual household income and energy expenditures:

- High Burden customers are those that spend 5 percent or more of their household income on energy, on an annual basis.
- Moderate Burden customers are those that spend between 2.5 and 5 percent of income on energy.
- Low Burden customers spend less than 2.5 percent of income on energy.

Figure 50 below shows the distribution of the LI population across the three burden classifications and compares current results to those presented in the 2007 LINA. Relative to the 2007 study findings, there are slightly fewer customers in the low burden segment (22% versus 27%) and also fewer customers in the high burden segment (40% versus 43%).

Figure 50: Energy Burden Classification and Overall Burden by Classification, 2013 versus 2007 for California LI Population – for Comparison Purposes Only

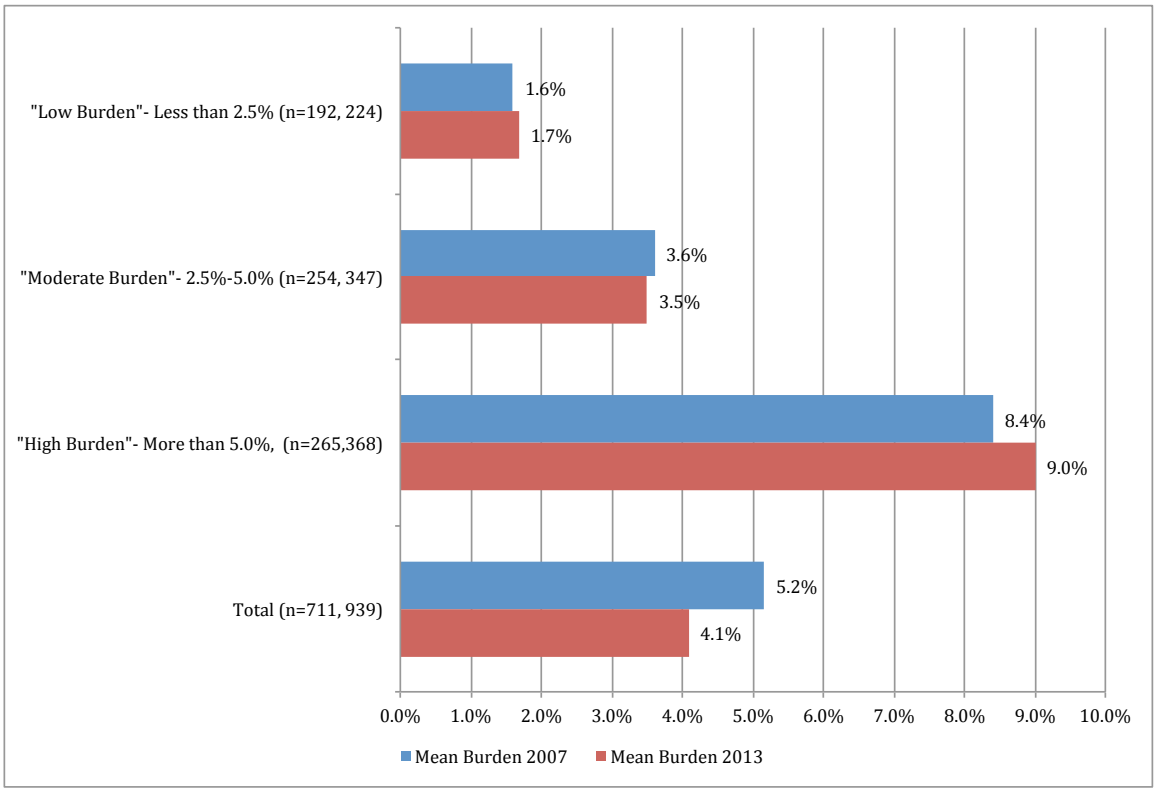


Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

The mean burden within each burden classification and for the total LI population is shown in below, for both 2007[54] and 2013. The mean burdens within the low and moderate classifications are similar to 2007; the mean burden within the high burden classification rose moderately, from 8.4 percent to 9.0 percent. Overall, the mean LI energy burden in 2013 is very similar to results published in the 2007 study (4.1% versus 4.2%, respectively).

[54] Although the previous LINA was published in 2007, the data were collected in 2005 and should be interpreted as reflective of 2005 conditions.

Figure 51: Overall Energy Burden by Classification, 2007 Versus 2013 – for Comparison Purposes Only

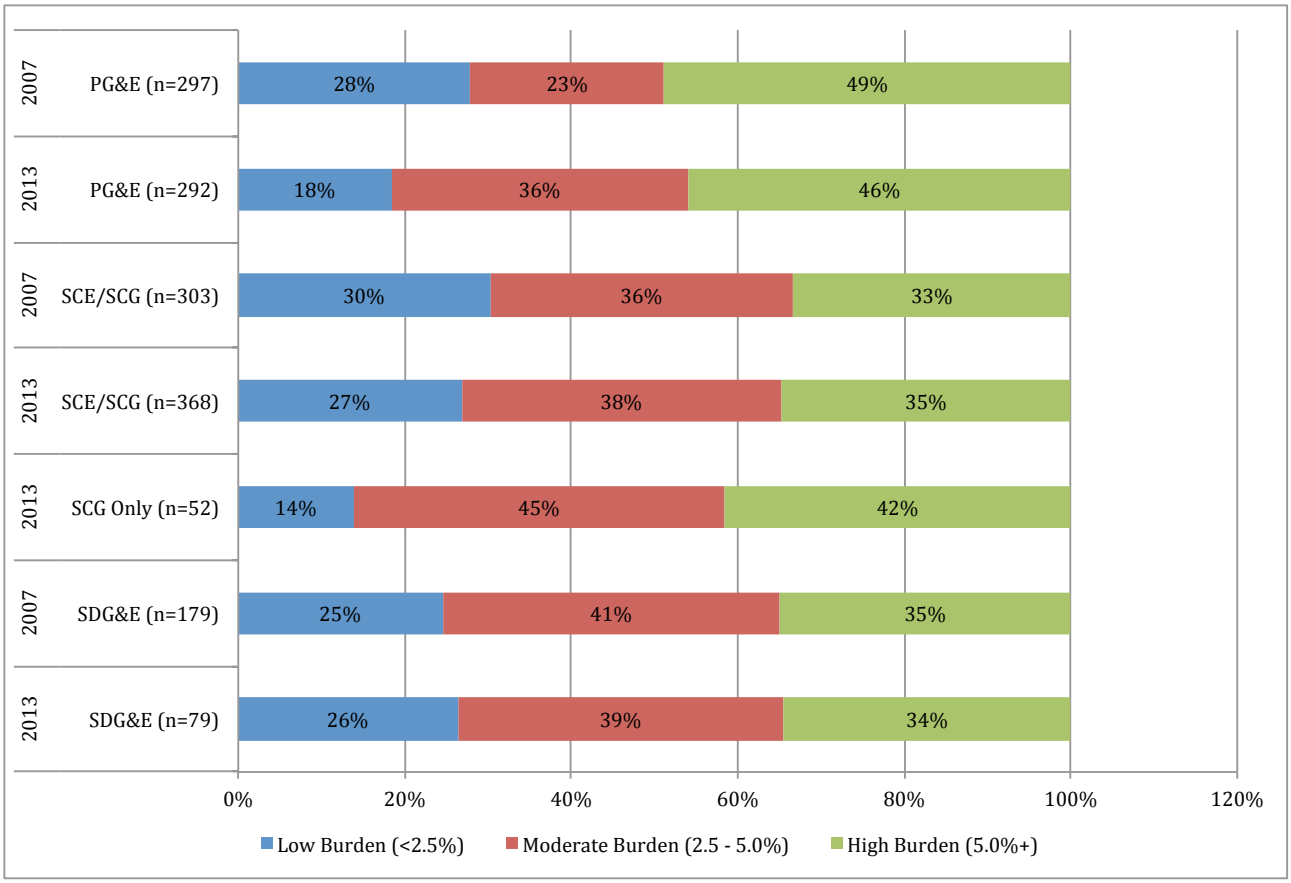


Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Figure 52 below shows the distribution of high, moderate, and low energy burden classifications within each IOU service territory, and compares the current findings to those of the 2007 LINA.

- Overall, PG&E has the highest portion of customers in the high burden segment at 46 percent. PG&E also had the highest portion in 2007, when it was measured to be 49 percent. A more significant change for PG&E relative to 2007 is the reduction (by 10%) of low burden customers. Both of these changes are reflected in a 13 percent increase in the moderate burden category.
- The SoCalGas-only territory (i.e. SoCalGas territory that does not overlap with SCE) has the second-highest portion of high burden households, 42 percent.
- The distribution for SDG&E is stable over the period, showing no changes in excess of 2 percent in the size of each burden category. The SCE/SoCalGas territory has made small adjustments over the period toward higher burden levels, including a slightly larger high burden segment (35% versus 33%) and a slightly smaller low burden segment (27% versus 30%).

Figure 52: Overall Energy Burden Classification Distribution by IOU, 2013 versus 2007 for California LI Population – for Comparison Purposes Only



Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

5.5.2.4 Energy Burden of LI Versus General Population

Table 50 compares the overall energy burden of the LI population to the general population (which includes the LI population). This comparison provides greater context for interpreting the magnitude and the patterns of the LI population energy burden. These results are intended to provide a comparison to the general population only. The customer energy burden presented previously provides our estimates of the LI population mean energy burden.

In the table below, the left most column includes (a) the general population overall burden, the next column is (b) the LI population overall burden and the final column is (c) the ratio of the two results. The first two columns (a) and (b) are interim calculations only (providing "relative" estimates of burden) to produce the ratios shown in the (c) results. The previous subsections presented the LI customer energy burden results. We are unable to produce absolute customer energy burden results for the general population given the data constraints described herein.

As shown below, the ratio of LI to general population burden is 1.8 (the ratio of 2.3% to 4.1%).

Table 50: Energy Burden for IOU Customers by Population and IOU

	General Population (a) ^					Low Income (b) ^^					Ratio of LI to GenPop (c=b/a)				
	PG&E	SCG	SCE	SDG&E	Total	PG&E	SCG	SCE	SDG&E	Total	PG&E	SCG	SCE	SDG&E	Total
Annual Burden	2.6%	2.2%	2.2%	1.8%	2.3%	4.7%	3.6%	3.5%	3.8%	4.1%	1.8	1.6	1.6	2.1	1.8
Sample Size (n)	178*	704*	187*	64*	1,132*	340	420	368	179	939					

* Thousands of records

^Source: 2013 IOU customer billing data, 2012 Athens data, and 2011 PUMS data.

^^Source IOU Customer billing data, CARE/ESA tracking databases, LINA telephone survey data.

5.5.3 Non-Energy Benefits

5.5.3.1 Contractor Interviews

Not surprising, most of the respondents noted that energy/bill savings was a primary benefit of the program; according to one, "even $10 per month is a big deal for LI homes." The respondents also described a wide range of other benefits that customers receive in different combinations depending on their personal circumstances:

- Home safety – Seniors in particular value fixed natural gas leaks and electric fire hazards, carbon monoxide testing and information on how to respond to gas leaks (i.e., education).
- New appliances and equipment – Customers benefit from reduced capital costs and higher quality of life. Older homes benefit most from weatherization and generally get the largest energy savings. Mobile homes with combustion ventilation air can also get more measures than other mobile homes. New refrigerators confer health benefits via better-preserved food.
- Improved indoor comfort.
- Helping the environment - some customers are glad "to help the environment".
- Energy efficiency education – many customers are not aware of the potential for energy efficiency in their home and contractors leave various educational materials with them. One contractor said they spend 30 minutes with each participant covering an energy guide that teaches multiple energy saving techniques (e.g., placing different wattages in areas).
- Awareness of other IOU programs – ESA customers often learn about CARE and debt payment plans, particularly in rural areas where the IOUs may have historically done less marketing.

5.5.3.2 Customer Telephone Survey

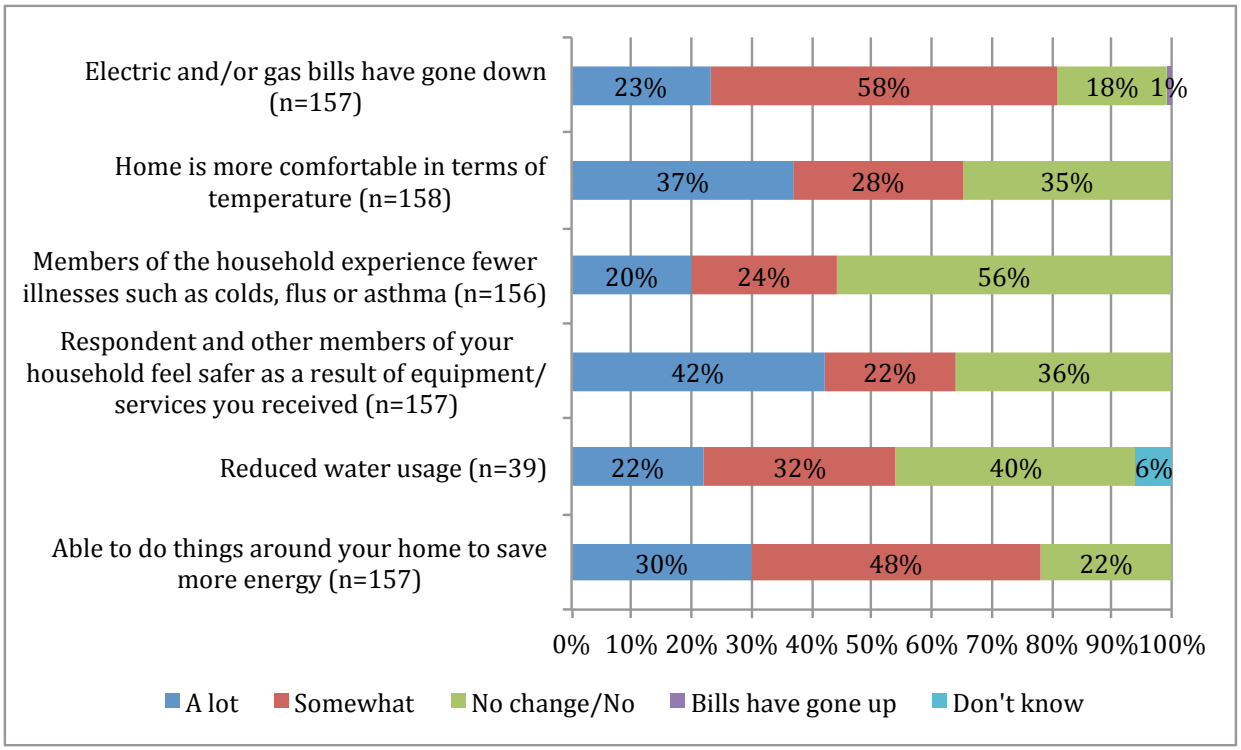
We asked participants what type of health, comfort and safety changes they noticed as a result of their participation in ESA. We also asked non-participants about their current levels of health, comfort and safety (reported after the participant results).

As shown in Figure 53 below, participants report substantial benefits from participating in ESA. Note that we asked these questions only of recent participants (2010-2012)[55]

[55] We did not ask prior participants (2002-2009) about their ESA participation experience. We based participation on the home, not the household, so not only would it be difficult for prior participants to recall participating since four or more years has passed, but they may not be the same household that participated.

that could recall participating, about half the recent participants. More than half and up to 81 percent of participants said they noticed “a lot” or “somewhat” of a change in comfort (65%), bill reduction (81%), a reduction in water usage (54%) and ability to save energy around the home (78%). Just under half (44%) reported reduced illnesses. These results tend to vary somewhat based on measures received, with those receiving HVAC measures more likely to report reductions in bills and increases in comfort and health.

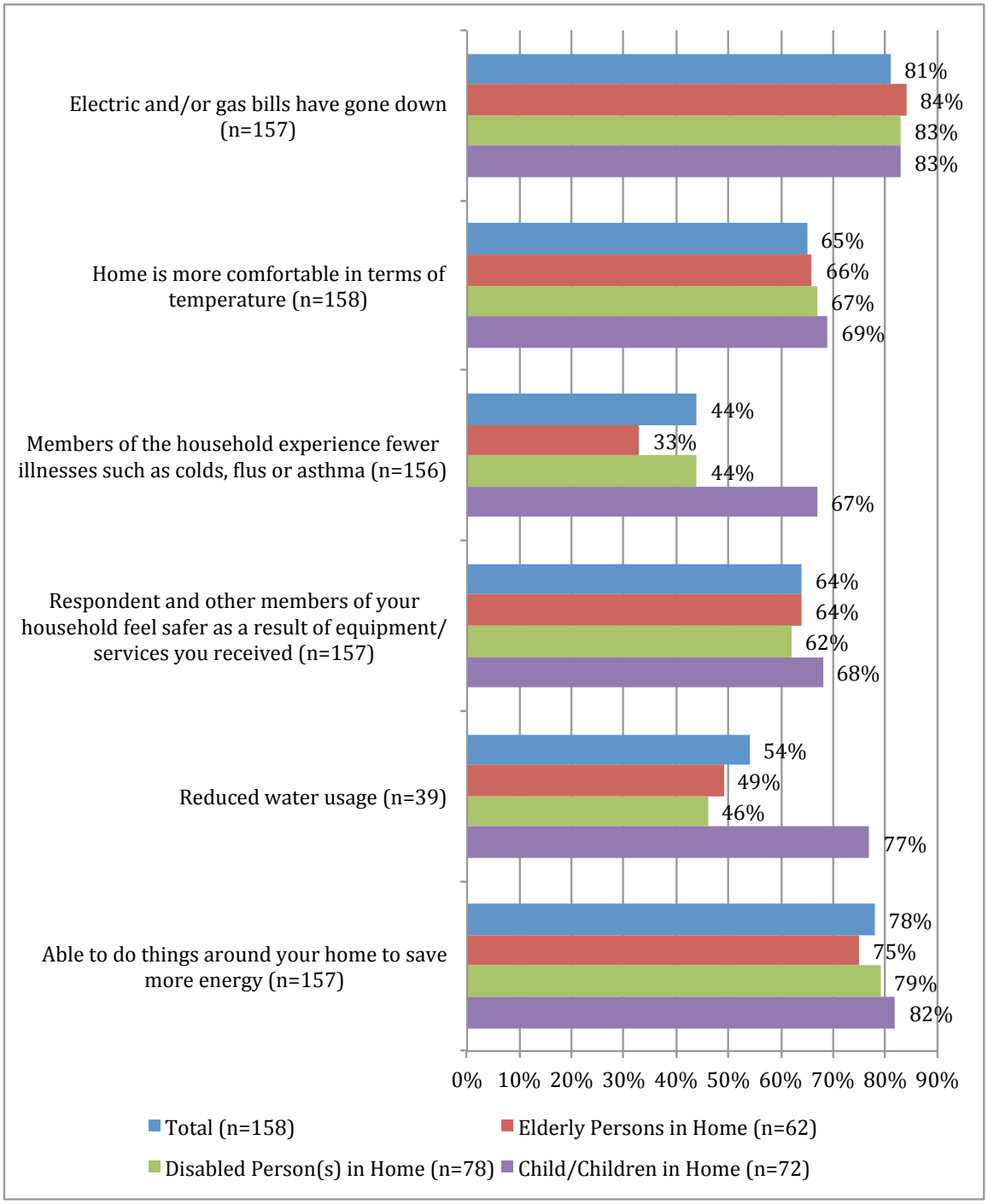
Figure 53: Health, Comfort and Safety Changes Noticed by Recent ESA Participants (PB8a-g) for California LI Population



Note: water usage question only asked of those that received water saving measure(s).
Source: 2013 CARE participant telephone survey data.

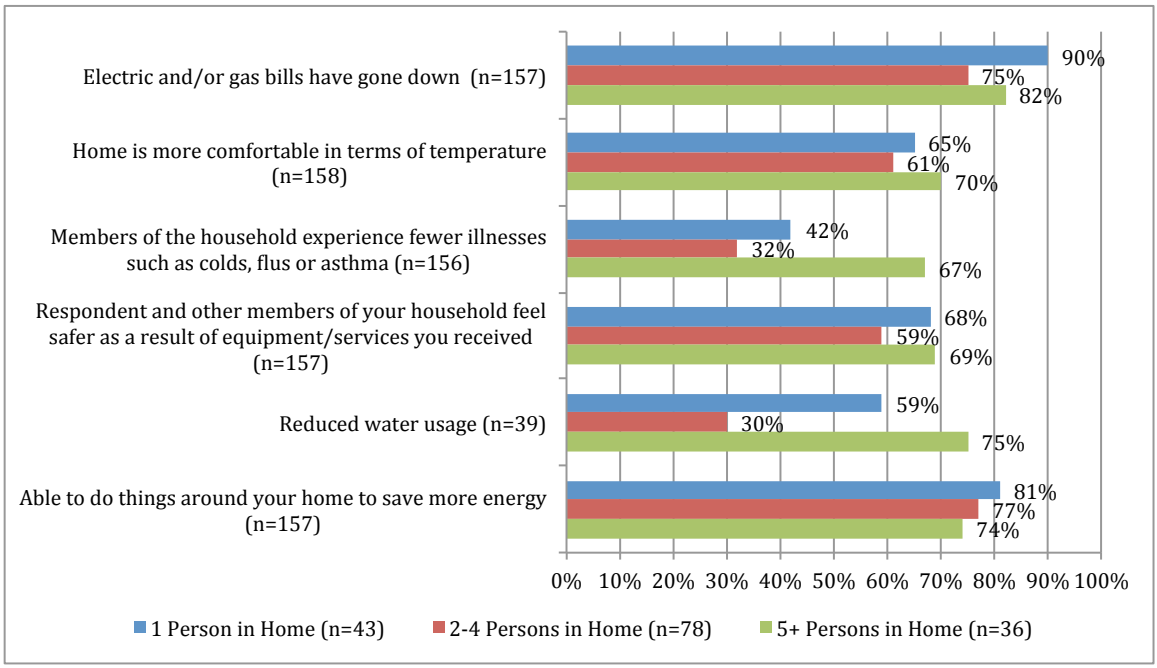
There are some differences in participant benefits based on the household composition and size, with homes with children and larger households more likely to notice fewer illnesses and reduced water usage. Households with elderly member(s) were less likely to notice fewer illnesses. This difference may be based on expectations with younger respondents expecting to be healthy and older respondents being more used to health issues. Figure 54 below shows ESA participation benefits (the percentage that said they noticed "a lot" or "somewhat" of a change) by household composition, and Figure 55 by household size.

Figure 54: Health, Comfort and Safety Changes Noticed by Recent ESA Participants, by Household Composition (PB8a-g) for California LI Population



Source: 2013 CARE participant telephone survey data.

Figure 55: Health, Comfort and Safety Changes Noticed by Recent ESA Participants, by Household Size (PB8a-g) for California LI Population



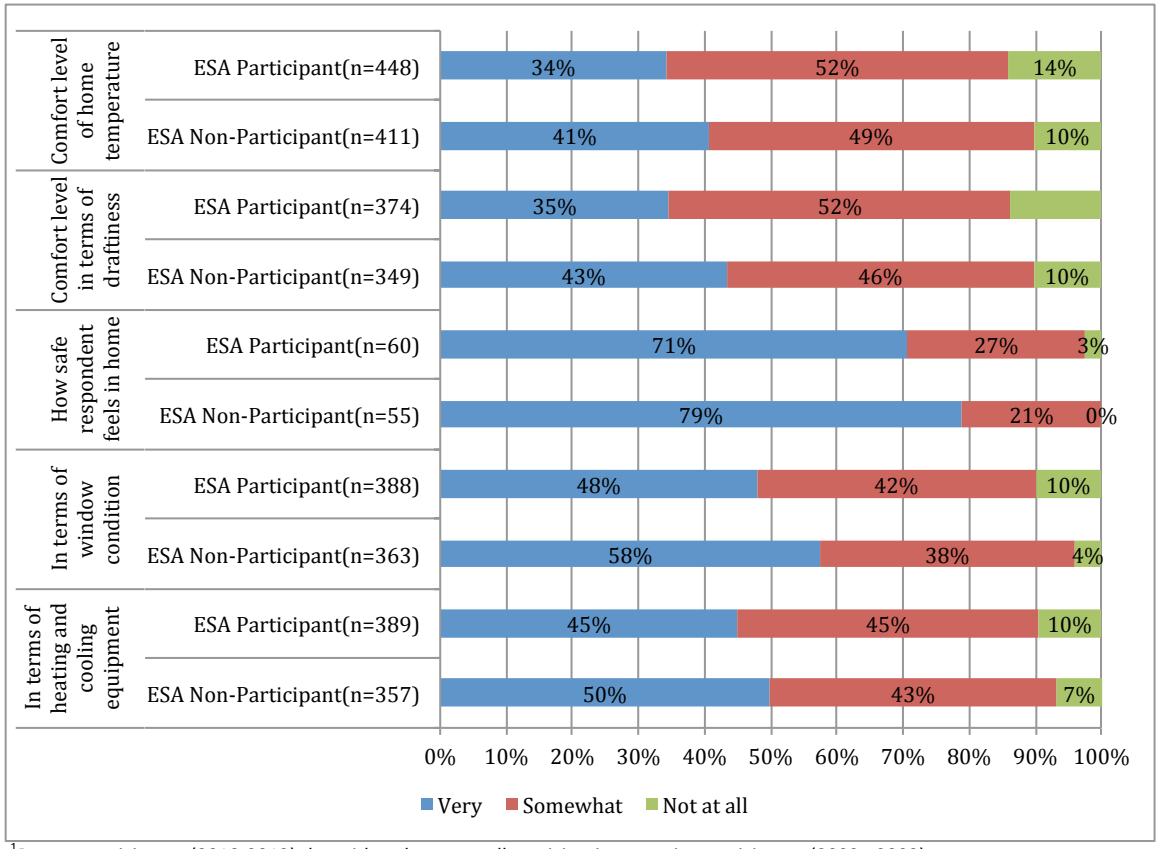
Source: 2013 CARE participant telephone survey data.

Next, we present current levels of health, comfort and safety for non-participants, prior participants (2002-2009) and recent participants (2010-2012) who did not recall participating. We remind the reader that we determined participation based on the home, so the participants who were asked this sequence of questions may not have participated themselves (or recall participating if they were the household in the home at the time of participating). Even though we did not ask this subset of participants (who make up about half of all participant survey respondents) directly about changes in health, safety and comfort, we could ask them about current levels and compare them to non-participants. This sequence does not measure immediate health, comfort and safety benefits, but instead sustained benefits combined with underlying differences between participants and non-participants.

As shown in Figure 56 below, upwards of 87 percent of survey respondents report that their homes are very or somewhat comfortable and safe. Very few non-participants indicate they have substantial comfort and safety needs. There are few differences in report comfort and safety levels across LI segments. Households with elderly member(s) and of a relatively smaller size were more likely to say they are "somewhat" or "very" comfortable with the temperature in their home, and households with elderly member(s) were also more likely to say they are comfortable with the (lack of) draftiness of their homes.

There are some differences between participants and non-participants as shown, with participants generally reporting slightly lower levels of comfort and safety. This could be because they (participants where the household was in the home during treatment) self-selected themselves into the program because they either had greater comfort and safety issues or that they are more perceptive to comfort and safety issues. However, the differences are slight and only the difference in safety associated with the condition of their windows is a statistically significant result.

Figure 56: Level of Health, Comfort and Safety, by ESA Non-Participants and Participants[1] (PB9a-d) for California LI Population

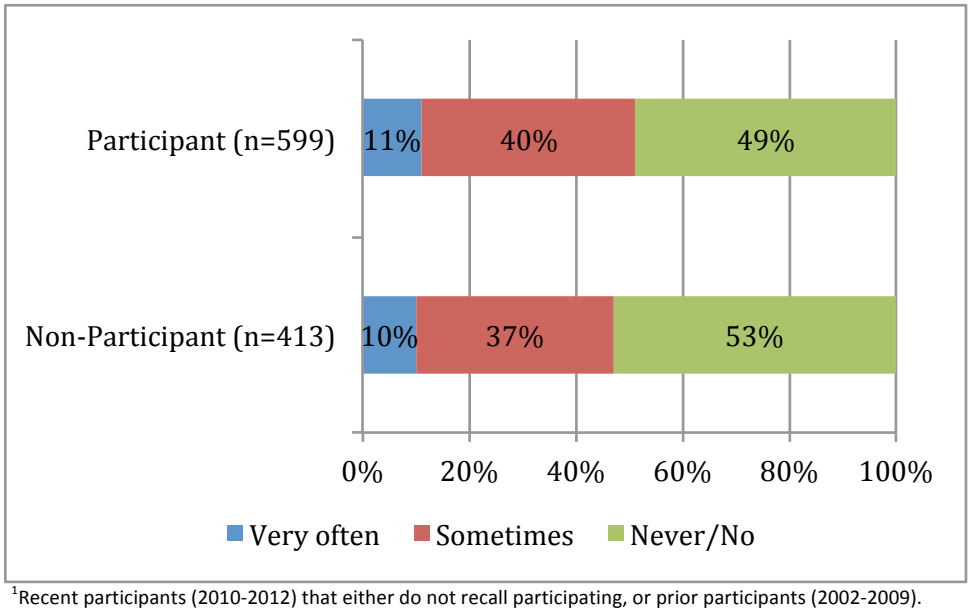


[1]Recent participants (2010-2012) that either do not recall participating, or prior participants (2002 - 2009).
Source: 2013 CARE participant telephone survey data.

We asked the same set of non-participants and participants about how often their household members get sick or have asthma due to their home's condition or the home's temperature when trying to keep costs down, as reported in Figure 57 below. Based on this self-reported assessment, few households have these issues "very often", but around half report their household "sometimes" or "very often" has these issues. Similar to the comfort and safety results, more participants are reporting health issues than non-participants, but this difference is not statistically significant.

There are some differences in the self-reporting of energy-related health issues across LI population segments; households with non-English as a primary language, elderly, no children, no disabled, relatively more members and homes located in the mountain climate zone are more likely to cite these issues. As mentioned above, this difference may be based on expectations with younger respondents expecting to be healthy and older respondents being more used to health issues.

Figure 57: How Often Members of Household Get Sick/Asthma Due to Home's Condition or Temperature When Trying to Keep Costs Down, by ESA Non-Participants and Participants[1] (PB10) for California LI Population



[1]Recent participants (2010-2012) that either do not recall participating, or prior participants (2002-2009).
Source: 2013 CARE participant telephone survey data.

5.5.3.3 In-Home Visits

We specifically sought to understand the degree to which non-participants are maintaining comfort or sacrificing comfort for cost savings (see Table 51 below). We found this analysis to be challenging to do because comfort is a highly person-specific characteristic and the threshold at which someone will think of himself as uncomfortable varies greatly. Some people self-reported discomfort at temperatures that are within the ranges typically recommended for energy savings by IOUs and the Department of Energy (68 degrees Fahrenheit in winter and 78 degrees in summer when home and awake). Others did not complain of comfort at substantially higher or lower interior temperatures. When asked about that, one respondent who happened to be an immigrant simply said "it's good enough" while another said that her family's living conditions are much better than those of people in developing countries.

That said, a third of the homes we visited either complained of comfort issues or described conditions that the interviewer identified as a comfort issue. The bulk of these

comfort issues are based on self-reports. The presence of comfort issues were evenly distributed among the service territories of the IOUs that provide ESA, across all housing types, and among home owners and renters. Not surprisingly, those households we had identified as being particularly stressed financially were much more likely to have comfort issues; nearly all of them did. Conversely, households that are predominately Spanish-speaking and those who identified themselves as immigrants spoke of comfort problems less frequently, which may be the result of differing expectations between cultural groups or foreign- and U.S.-born individuals.

Hence, it may not be surprising that the degree to which households use their heating and cooling system varied, even within the same climate zones. Some people in temperate climates were comfortable in their homes with minimal heating and cooling. Others (in temperate coastal climates and those inland) need more substantial heating and cooling to be comfortable. Whether or not they actually heat and cool to comfortable conditions depends on the equipment available to them, the cost trade-offs they choose to make, and their perception of what is the most cost-effective way to heat and cool their home.

Table 51: Number of Households Experiencing Comfort Issues for California LI Population

Comfort issue	Who identified	Reason for comfort issue		
		Cost constraints	Equipment/ Structural Issues	Both
Identified	self-reported	11	4	8
	interviewer-identified	3	0	0
	both	1	1	4
None identified	n/a	56		

Source: 2013 CARE participant telephone survey data.

5.5.4 Energy Efficiency Measures

The program offers weatherization, water savings measures, lighting, new appliances and appliance repairs or tune-up. Section 4.4 provides a summary of measure eligibility. Overall lighting, weatherization and water savings measures are most common, but many customers receive new clothes washers, refrigerators, air conditioners and/or furnace repairs and replacements as well.

Cost-effectiveness issues are considered when adding or removing a measure or establishing or updating measure eligibility. For example, SCE is no longer able to

replace old, inefficient Central ACs in climate zone 13 due to lower energy savings. Whether installation procedures may be standardized and deployed on a large-scale are also considered for ESA measures. For example, solar water heaters are not offered due to the customized nature of the installation. However, the state of Hawaii installs solar water heaters for LI customers.

5.5.4.1 Measure Eligibility for Programs Nationwide

The mix of measures for each program researched here depends on whether the program is a utility-specific or statewide program. For those utilities that provide both natural gas and electric service, a comprehensive set of measures is typically offered which include both weatherization-based measures and electric reduction measures. The Ohio EPP only includes electric base load measures, such as lighting and refrigeration, since the program was established during the statewide electric restructuring; gas energy efficiency measures are administered through utility programs or WAP.

The program staff of the New Jersey Comfort Partners believe that a reason behind their program's success is the cooperation among all utilities throughout the state to make the same measures eligible, even though each utility administers the program within its territory. This provides consistency throughout the state.

Some programs, like NJ Comfort Partners and WI WAP, include health and safety measures in addition to weatherization or electric reduction measures. These health and safety measures can include such measures as adding ventilation to kitchens and bathrooms to manage moisture and other indoor pollutants, checking water heaters for incomplete combustion, and installing smoke/CO detectors. They do not necessarily have an energy impact but do increase the well-being of the household residents.

5.5.4.2 Weatherization Assistance Program (WAP) Relationships

Utility-based programs can operate together with—or independently from—the federal Weatherization Assistance Program. For those states we researched that have independent LI energy efficiency programs (Ohio, New York, New Jersey, and Pennsylvania), the interaction between the program and WAP is a defining characteristic. The Ohio EPP program only targets electricity-using equipment and electrically heated homes. This way, the program complements the WAP program, which targets natural gas heated homes. The NYSERDA program operates in parallel to the WAP effort; sometimes the WAP agencies refer homes to the NYSERDA program and other times there are duplicative efforts, where the NYSERDA program auditors arrive at a home where there are no opportunities due to WAP implementation.

The Massachusetts WAP program is implemented by local weatherization agencies that also take advantage of additional funding by utility companies. This appears to be an effective way to leverage funding to maximize energy savings opportunities. For example, while the Massachusetts WAP program only funds base load-heating measures,

households can take advantage of utility programs for electric base load opportunities such as lighting and refrigeration.

5.5.4.3 In-home Audits and Education Offered by Programs Nationwide

All the LI weatherization programs that we examined conduct free in-home audits to identify energy savings opportunities and determine the measures that would be implemented on a household level. The auditors generally take advantage of their time at the household for some direct installs, such as changing out light bulbs and replacing showerheads with low-flow versions. Installation crews implement more complex energy efficiency measures, such as insulation and air sealing.

Participant education is another integral component of the in-home audits. The auditors often request that the resident accompany them on the walk-through so that they become familiar with the energy-consuming equipment in their home. One program, PECO's LIURP, provides a personalized educational leave-behind that describes the resident's current energy use and energy costs and provides a detailed explanation of energy efficiency measures the program will implement; they also set a realistic energy savings goal that the residents need to meet. The goal is aligned with the household's current energy use and the measures to be implemented. Our contact at LIURP stated that evaluation results show energy consumption usage for those customers who were audited but found not to have energy saving opportunities and thus were simply provided an educational packet of information; simply providing participant education had an effect on energy consumption. After repeated requests for documentation of this evaluation result, we have not been able to secure the report demonstrating these results.

5.5.4.4 Program Staff Interviews

We talked to IOU program staff about the measures that ESA offers, including customer dissatisfaction with measures. They reported that some customers complain about the white freezer on top refrigerator (either at the enrollment or assessment phase, or occasionally when the truck rolls up), preferring their old style/color or saying that it doesn't match the rest of their appliances. Some customers are dissatisfied with the low flow showerheads, and some have complained about evaporative coolers – stating that they are ugly or they don't understand how they work.

Some customers don't like the doors that the program installs – maybe they had a decorative door that was no longer safe/tight, or had the metal door shoes. Also, if the program replaces one or a few windows but often not all, a customer may not like that they don't all match or they don't like the newer window materials.

Program staff say that measures being considered for the program must have a standard specification for the equipment and the installation. The equipment cannot require customization for the home– e.g., solar thermal water heating is rejected due to the complexity of installation.

Some measures that would provide benefit to the customer but program staff say are too expensive and don't pass a cost-effectiveness screen are LED big screen TVs, double-pane windows and stoves.

Some new measures that have been added by one or more IOU(s) recently include the following:

- PG&E and SDG&E offer microwaves to customers that do not already have one, as a relatively less energy consumptive cooking technique. The measure offers a relatively high-energy savings per unit, particularly when supplementing electric cooking equipment.
- SDG&E is offering LED nightlights – 58,000 were installed in 2012
- SoCalGas and SDG&E are offering energy efficient clothes washers (about 6,000 in 2012 altogether).
- Thermostatic shower valves and occupancy sensors have also gained some traction in PG&E service territory.

CAC replacement for Climate Zone 13

SCE is no longer able to replace old, inefficient Central ACs in climate zone 13 (as of the last program cycle), even though it contends that that area is hotter than some areas of climate zone 14, which is eligible for this measure; it contends that this is a case where customer's needs are not being met. Staff report that some customers complain because their friend, family or neighbor got a new AC through the program when it was still allowed, or the customer calls in on a really hot day for help and they are told they cannot have that measure. The measure was disallowed due to cost-effectiveness (it is very expensive), though SCE contends it provides a real health/comfort/safety benefit for the customer.

5.5.4.5 Contractor Interviews

Greatest Customer Needs

Over half of the respondents reported that LI homes' greatest needs are for fixed/replaced doors and windows, and new weather stripping. Furnace and AC tune-ups and replacements are also a common need. Some of the less commonly mentioned needs were:

- Ductwork leak repairs in manufactured homes;
- (Enhanced) Energy education;
- Attic insulation in older homes; and
- New, larger refrigerators for larger families.

ESA Effectiveness

The respondents described only a few gaps in program services, with most noting that the program is very comprehensive. Most think ESA is an excellent program, and acknowledge that the IOUs need to balance program costs, critical needs and the large population needing services. Following are some desired program changes:

- Two respondents would like to do projects with "no material changes" (e.g., water heater insulation) that are currently disallowed.
- One would like to allow more attic insulation, "above the bare minimum," which would still yield benefits.
- One emphasized that the program needs to retain window ACs in Climate zones 13 and 14 for comfort and safety, or there will be a critical gap.
- One stated that the CPUC and IOUs should allow contractors to still deliver the education component even if homes do not have the required three measures needed to qualify. The contractor could still tell them about low-cost measures (e.g., faucet aerators, low flow shower heads) and affect long-term behavior change (e.g., turning off lights).
- One would like to see SCE allow clothes washer and dryer upgrades.

5.5.4.6 Customer Telephone Survey

We asked telephone survey respondents a series of questions about the energy efficiency equipment they either received from the program (ESA participants[56]) or might receive (ESA non-participants) to find out how helpful those were (or would be) to helping them control their energy bills and improve the comfort and safety of their home. First we asked the question unprompted, followed by a prompted series of questions asking about the helpfulness (or potential helpfulness) of each measure they received or might receive.

Figure 58 below shows the measures that survey respondents told us (unprompted, one response allowed) either were the most helpful (participants who recalled participating) or would be the most helpful (for all other respondents). ESA participants were most likely to mention weatherization measures (23%), followed by a new refrigerator (15%) and then generally helping them to lower their bill (9%). Few mentioned windows/doors (which not all receive) and CFLs—though each respondent was only allowed to mention one measure—the one that was the most helpful.

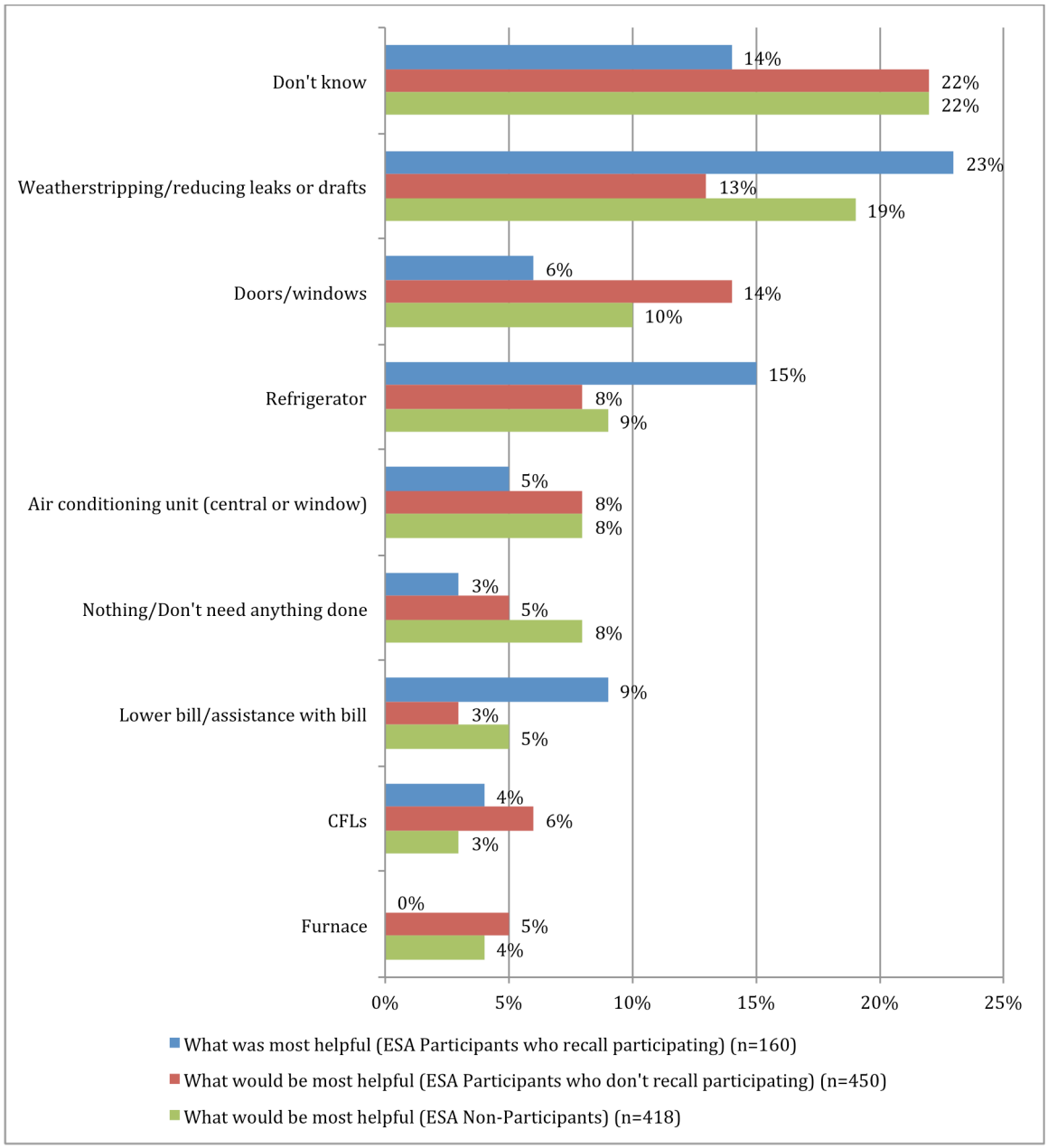
ESA participants who did not recall participating were asked what would be most helpful, so their responses should reflect what measure they think they need most. Non-participants were asked the question the same way. ESA participants who didn't recall

[56] Technically, we only prompted participants who recalled participating (about half of participants) with the list of measures they had received.

participating were significantly less likely to say they need some type of weatherization measure than non-participants, likely reflecting the program's impact on addressing that potential need at least among a subset of prior participants since many receive weatherization. ESA participants who did not recall participating were most likely to say they "didn't know" what would be most helpful (22%), followed by doors/windows (14%), weatherization measures (13%) and refrigerators (8%).

Non-participants were also most likely to say they "didn't know" what would be most helpful (22%), and 19 percent said that weatherization measures would be most helpful. Another 10 percent mentioned windows/doors, and 9 percent mentioned a refrigerator.

Figure 58: Most Useful Items by ESA Participants for California LI Population (EN1)



Source: 2013 CARE Participant Telephone Survey.

The next series of figures (Figure 59, Figure 60 and Figure 61) show the prompted responses to a series of measures that we asked respondents whether they were helpful (for ESA participants who recalled participating and received a given measure) and would be helpful (for ESA participants who did not recall participating and non-participants). The first figure covers HVAC and weatherization measures; the second, appliances; and the third, water-related and other measures. There is a second set of figures showing the same results but by home type instead of participation category.

As shown in Figure 59 below, almost all participants said that the measures they received were very or somewhat helpful. The sample sizes are too small for any differences across participants to be statistically significant (though as indicated below, there are significant differences across participant categories). The participants who could not recall participating and the non-participants who were asked whether the measures would be helpful were less likely to report they would be very or somewhat helpful as participants (but due to small sample sizes, these differences are not significant). This could be because either the measures are not needed as often among prior participants and/or the measures are perceived as more helpful once they are actually in place.

Non-participants were most likely to say that repairs to windows/doors, walls or floors would be very helpful (53%), followed by sealing leaks to reduce drafts (48%). 25 percent or fewer non-participants said that any of the HVAC or weatherization measures would not be helpful at all.

The participants who did not recall participating were more likely to say that measures would be helpful than the non-participants, possibly because participating households have more needs than non-participants and/or they may have received some of these measures and valued them.

These general trends across participant groups, and the magnitude of "very and somewhat helpful" responses, hold true for the other measures shown in Figure 60 and Figure 61 below, with the exception of efficient light bulbs and fixtures and energy information. (Across all the measures, 65 percent of participants who recalled participating said measures were "very helpful", compared to 57 percent of participants who did not recall and 45 percent of non-participants. The difference between the latter two estimates is statistically significant.)

Participants who do not recall participating were more likely to say that both efficient lighting and energy information would be helpful than the other participant categories. It is difficult to know if these participants value these measures more because they likely received them, or if they have a greater current need for them.

We looked at the self-reported helpfulness of measures across home types, and found that for all the measures, single-family renters were more likely to find them "very helpful" than multi-family dwellers and single-family homeowners.[57] (Across all the measures, 60 percent of single-family renters said measures were "very helpful", compared to 52 percent of multi-family dwellers and 44 percent of non-participants. The difference between the first two estimates is statistically significant.)

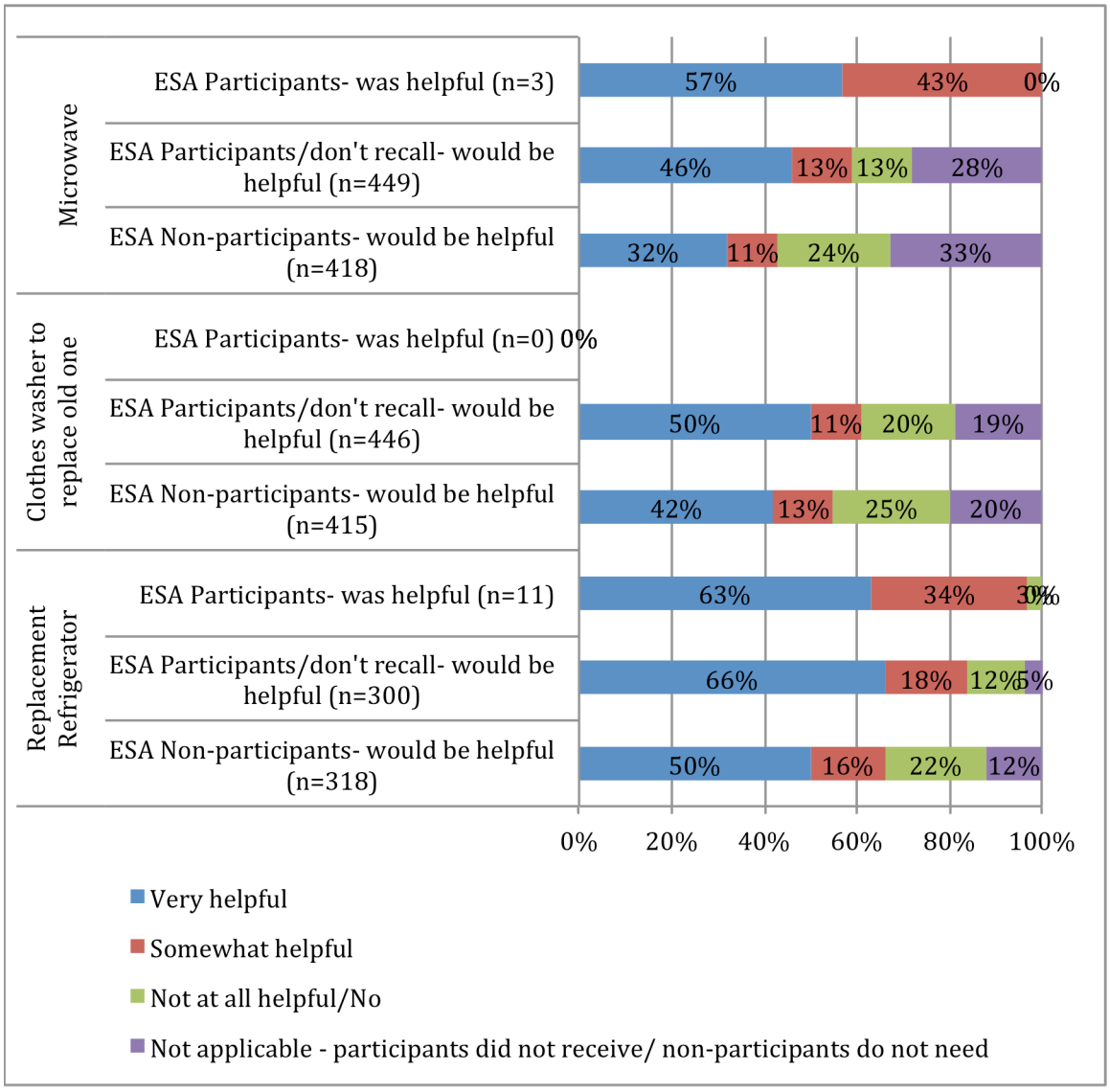
[57] As reported in Section 5.1, 95 percent of multi-family homes are occupied by renters, so we do not break out that home type by home ownership.

Figure 59: Helpfulness of HVAC and Weatherization Measures for California LI Population (EN2)



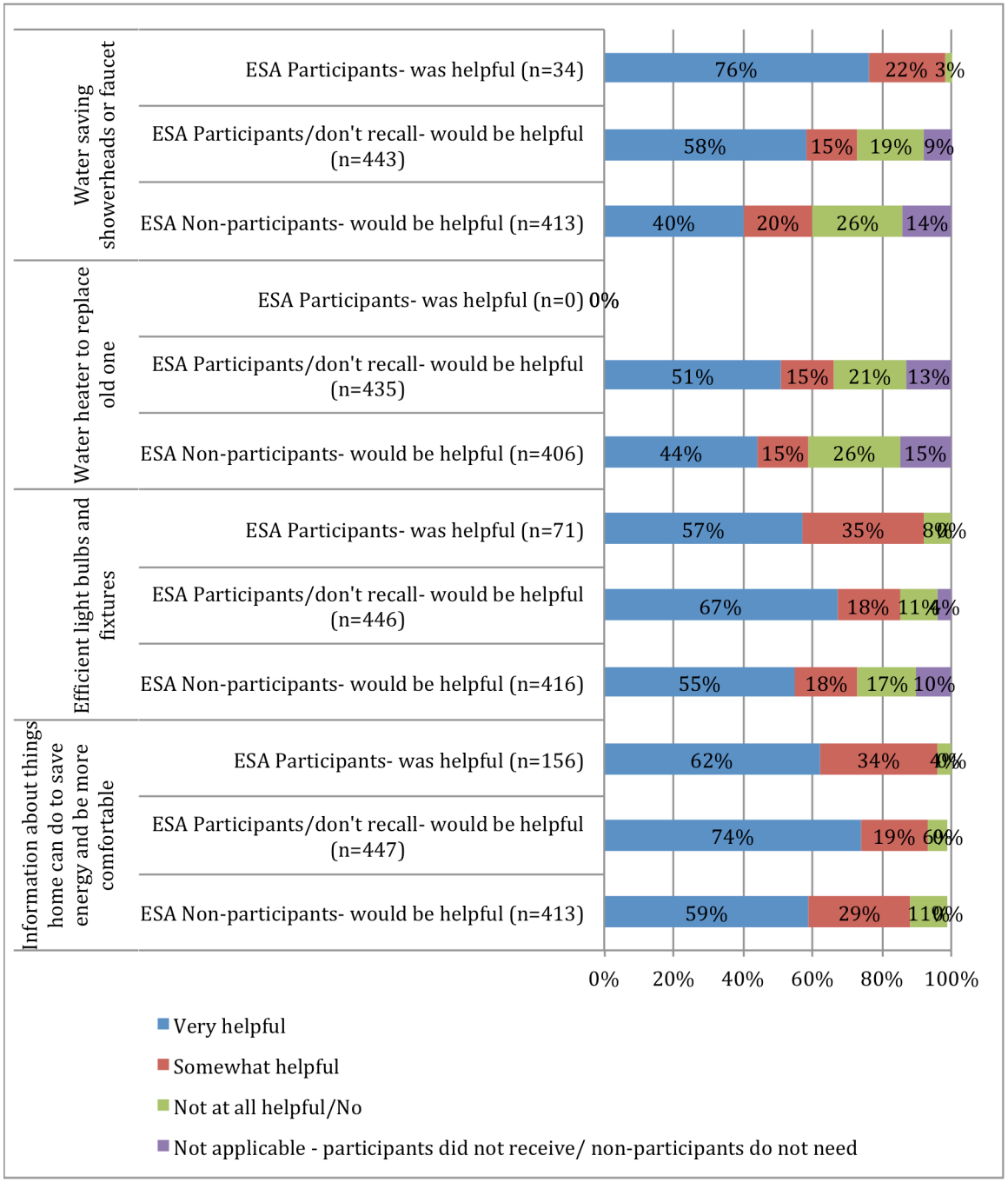
Source: 2013 CARE Participant Telephone Survey.

Figure 60: Helpfulness of Appliance Measures for California LI Population (EN2)



Source: 2013 CARE Participant Telephone Survey.

Figure 61: Helpfulness of Water and Other Measures for California LI Population (EN2)



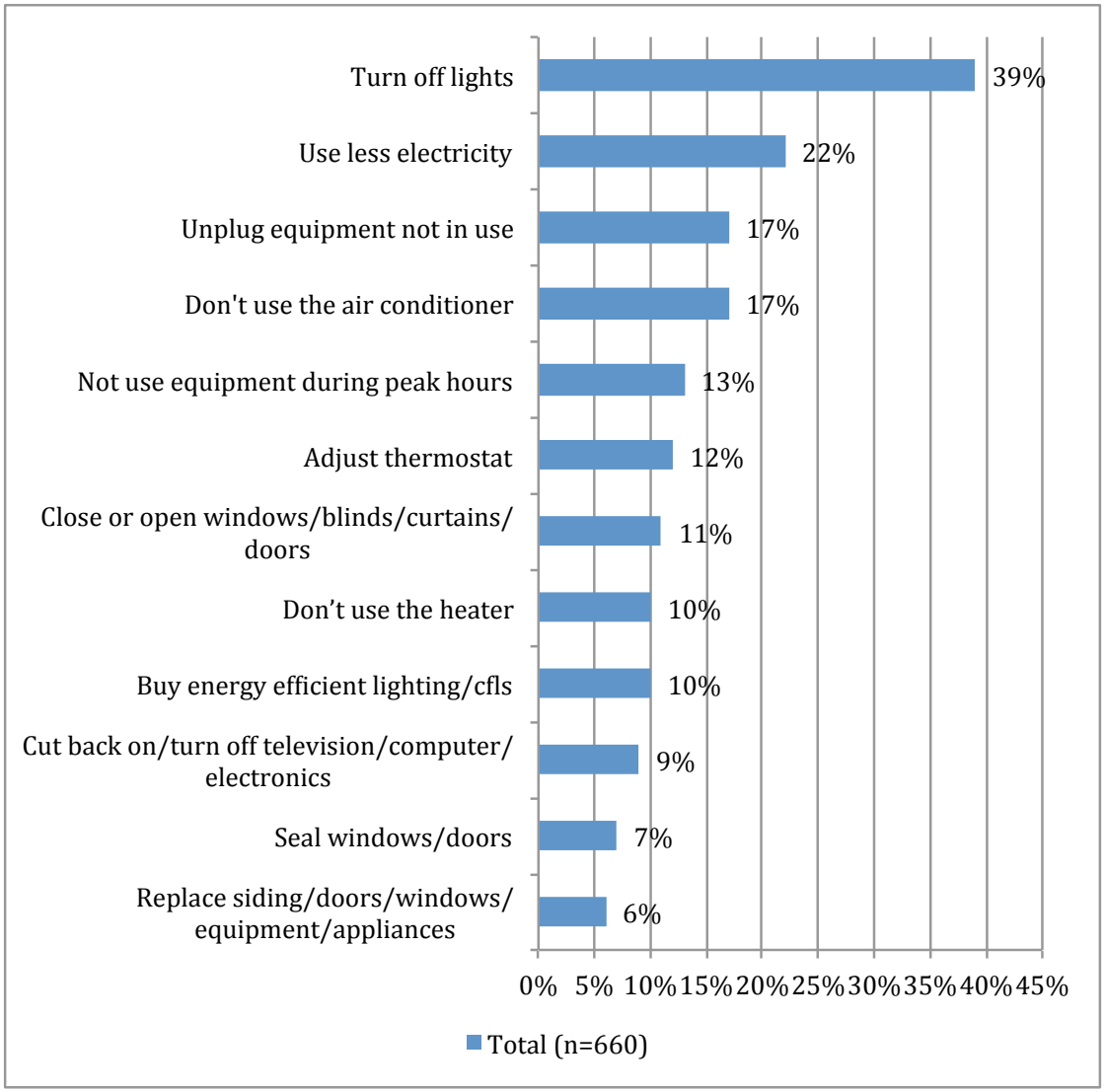
Source: 2013 CARE Participant Telephone Survey.

Next, we asked telephone survey respondents questions about their energy efficiency knowledge, actions and attitudes. We asked respondents if they wanted to lower their

energy bill, would they know what to do? For those that said yes or that they were not sure, we asked them what would they do (unprompted).

62 percent of respondents said they would know what to do to save energy, a percentage that is not statistically significant by participation category. As shown in Figure 62 below, the most commonly cited energy efficiency action that respondents would take is turning off lights (cited by 39% of those who say they know how to save energy), followed by generally using less electricity and unplugging equipment.

Figure 62: Ways California LI Households Try to Reduce Their Energy Bill (Self-Reported), of Those That Say They Know How (EN5)



Source: 2013 CARE Participant Telephone Survey.
Note: Responses greater than five percent presented here. In the appendix we show all responses.

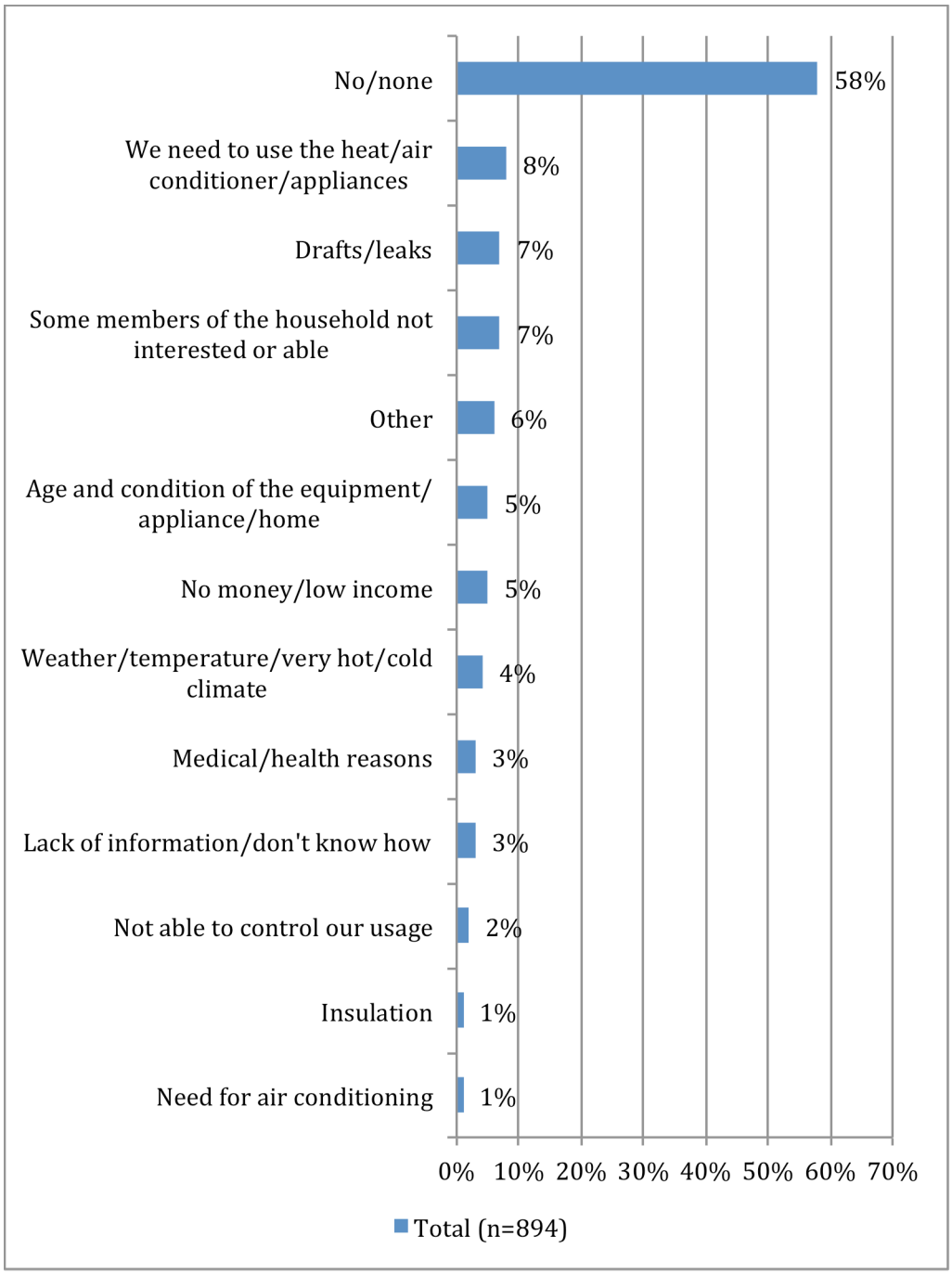
We followed up by asking respondents how often they try to save energy (survey question EN6), with 77 percent saying they try to save energy most or all of the time, and 20 percent saying sometimes. These self-reported results are not significantly different by participation category. Note that we examined the mean energy burden by responses to survey question EN6, and found that the average ratio of energy cost to income for those that said they try to save "most or all of the time" is 7.7 percent versus 9.1 percent for those that try to save "sometimes".

We then asked respondents if there was anything making it hard for them to try to save energy (unprompted, allowing multiple mentions). As shown in Figure 63 below, about half said nothing kept them from trying to save energy. We believe this high percentage is because most respondents were thinking about behavioral things, not all the possible energy equipment and retrofit options they could do. This question followed other questions that elicited behavioral responses, such as the responses to question EN5, where respondents reported turning off lights and not using equipment during peak hours to reduce energy.

42 percent of respondents said there was something making it hard for them, with most of the reasons related to home conditions or need to use energy-using equipment to maintain comfort or health: presence of drafts/leaks, older equipment, outside temperature, need to use air conditioning, or medical or health reasons. Less commonly cited reasons were attitude/knowledge barriers including members of the household not interested or able, and inability to control usage and lack of information. While this result could be taken to mean that households do not need energy education to be able to save energy in their home, some may not know that such education is available and may not be aware that there are actions they are not aware of (e.g., hard to say you need something if you don't know you need it.) These results do not differ significantly by participation category or other segment.

The mean energy burden of households that said that weather/climate was a barrier to saving energy is 13.9 percent, compared to the average mean burden of 8 percent.

Figure 63: Things That Make it Hard to Try to Save Energy (Unprompted), for California LI Population (EN8)



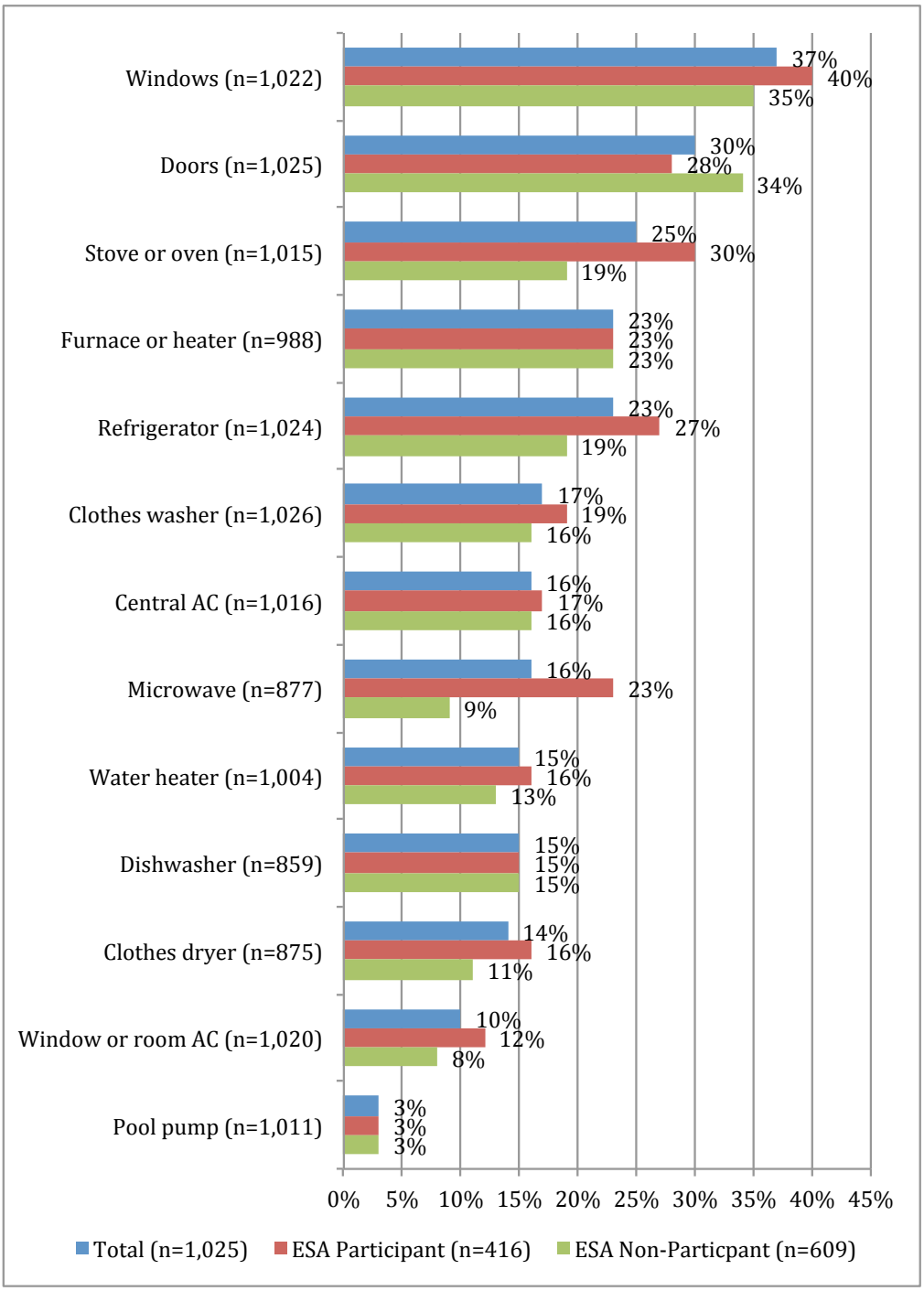
Source: 2013 CARE Participant Telephone Survey.
Notes: this question was added after the survey was already in the field, and has a slightly lower sample size as a result – though it was asked of all respondents once it was added; multiple mentions allowed.

The final series of questions in this section asked about the condition of energy-using equipment in the home, identifying (based on self-report) old, broken and not working equipment. Note that we did not ask respondents about equipment that was recently provided by the ESA program, but we did include those respondents in the base of responses in the exhibits below. The intent is to show the fraction of equipment that might have energy-savings potential among the full LI population. (Note that in Volume 3, Section 7, we provide a second set of results where we exclude respondents that are "not applicable", e.g., those who do not have a pool.) We ended with a question about how many light bulbs in their home are compact fluorescent lights or CFLs to complete the assessment of home equipment.

Figure 64 below shows a summary table of equipment that respondents reported is either not working or in need of repair. The most commonly cited equipment was windows (37%), followed by doors (30%), stove or oven (25%), refrigerator (23%) and furnace/heater (23%). Note that this is self-reported, so there is likely a range of equipment conditions included in these results, since respondents may use different criteria to report that certain equipment is broken or not working, especially equipment like windows and doors.

ESA participants are more likely than non-participants to say their refrigerator, stove/oven or microwave is not working (a reminder that this excludes participants who received a refrigerator or microwave from the ESA program).

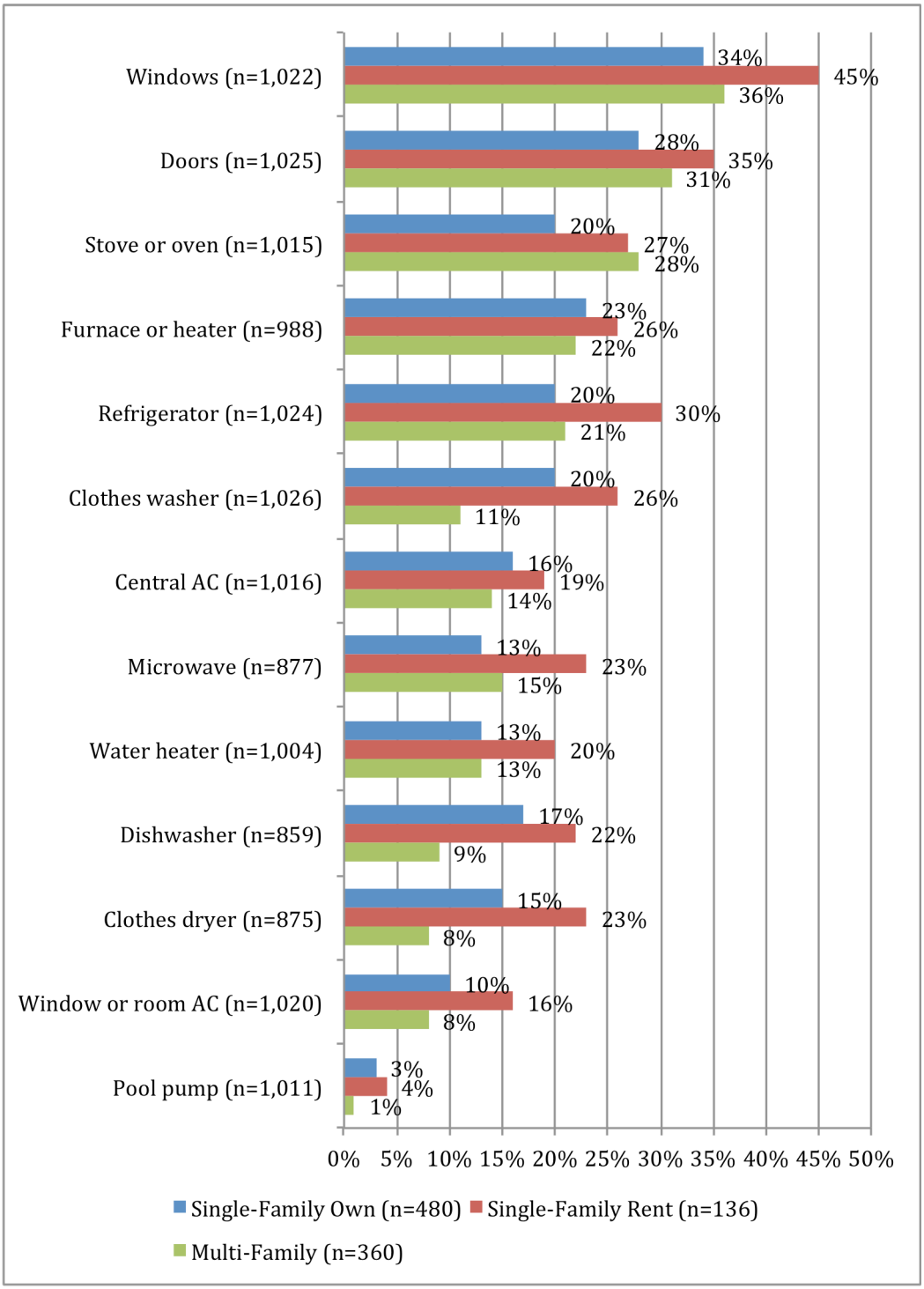
Figure 64: Percent of Measures in Household That are Either Not Working or Need Repair (Self-Reported), for California LI Population (EN11)



Source: 2013 CARE Participant Telephone Survey.
Note: we added additional equipment to this survey battery after the survey was in the field (after pre-test results), which is why some of the sample sizes are relatively low. This figure is intended to represent the LI population.

There are also differences in the condition of energy-using equipment across home types, as shown in Figure 65. Single-family renters are more likely to report their equipment is not working or needs repair, with higher rates of need for a new window/room AC, refrigerator and microwave. Single-family owners are more likely to need a clothes washer and dryer, which is probably only because they are more likely to own their own laundry equipment.

Figure 65: Percent of Measures in Household that are Either Not Working or Need Repair (Self-reported), for California LI Population by Home Type (EN11)



Source: 2013 CARE Participant Telephone Survey.

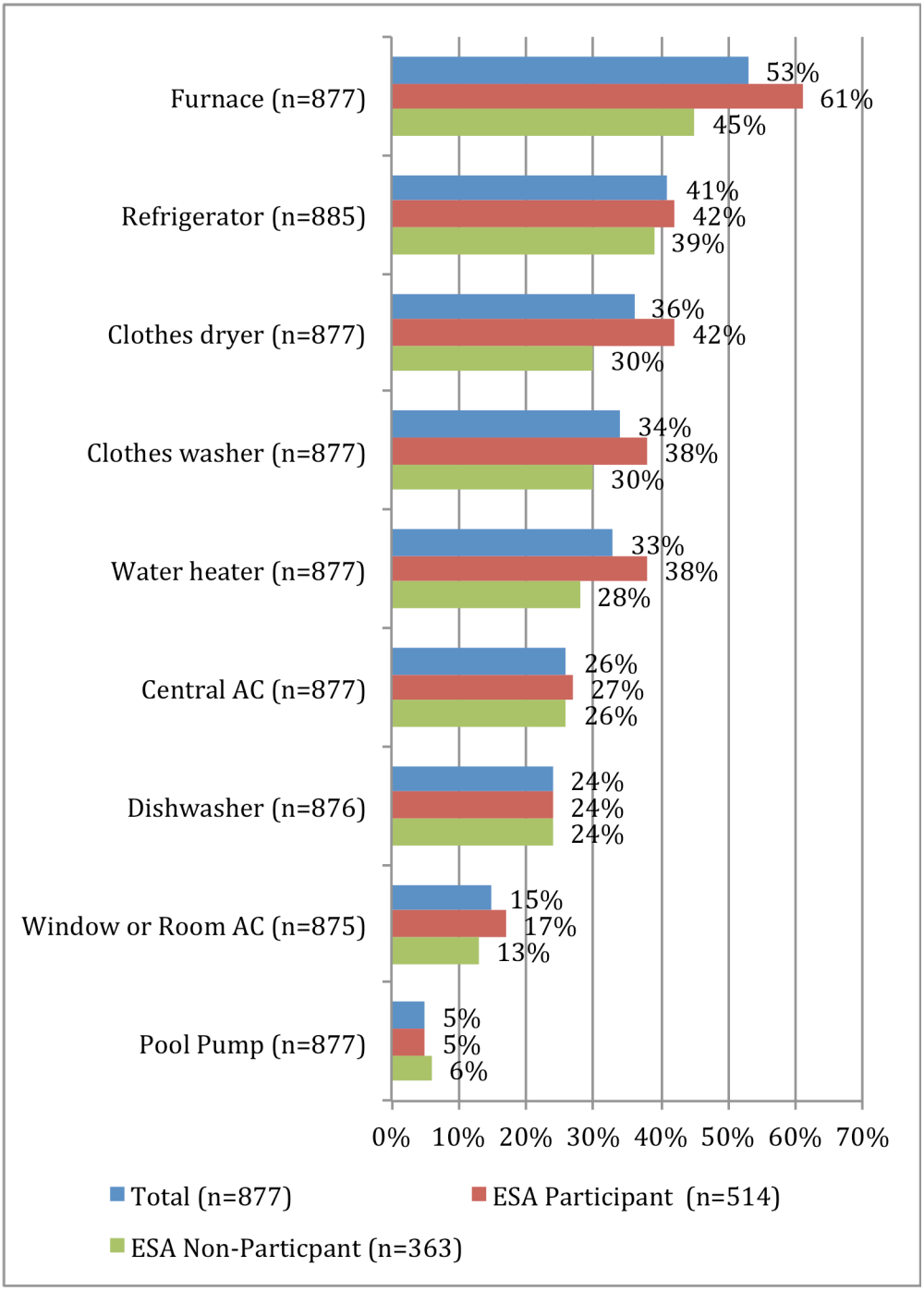
Note: we added additional equipment to this survey battery after the survey was in the field (after pre-test results), which is why some of the sample sizes are relatively low. This figure is intended to represent the LI population.

Figure 66 below presents the percent of equipment in LI households that is greater than 10 years of age, based on telephone survey respondents' self-report.[58] According to respondents, about half of LI households have a furnace that is more than 10 years old, and one-third or more have 10-year old refrigerators, clothes dryers, clothes washers or water heaters. There are fewer 10-year old or more central ACs, dishwashers and pool pumps in LI households. Note that these percentages are for the weighted LI population, not just those that have the equipment. These data provide rough estimates for determining the potential for early replacement of major energy-using equipment. However, the data are not verified by an auditor. We rely mostly on the CLASS data to determine age of equipment for our study conclusions, but where there are gaps in the CLASS data we use these data to provide general ballpark estimates.

ESA participants are more likely to have 10-year or older furnaces, windows, clothes washers and dryers than non-participants.

[58] We used 10 years as a category of equipment age to report, even though the effective useful life of most equipment is longer. This is because many decisions that are made about measures do not impact programs right away, so we wanted to include all the potential equipment that could be considered for replacement over the mid- to long-term. The more detailed results on energy-using equipment from the CLASS data provide the distribution of equipment ages (see Section 4.3.2).

Figure 66: Percent of Measures in Household That are More than 10 Years Old (Self-reported), for California LI Population (EN11)



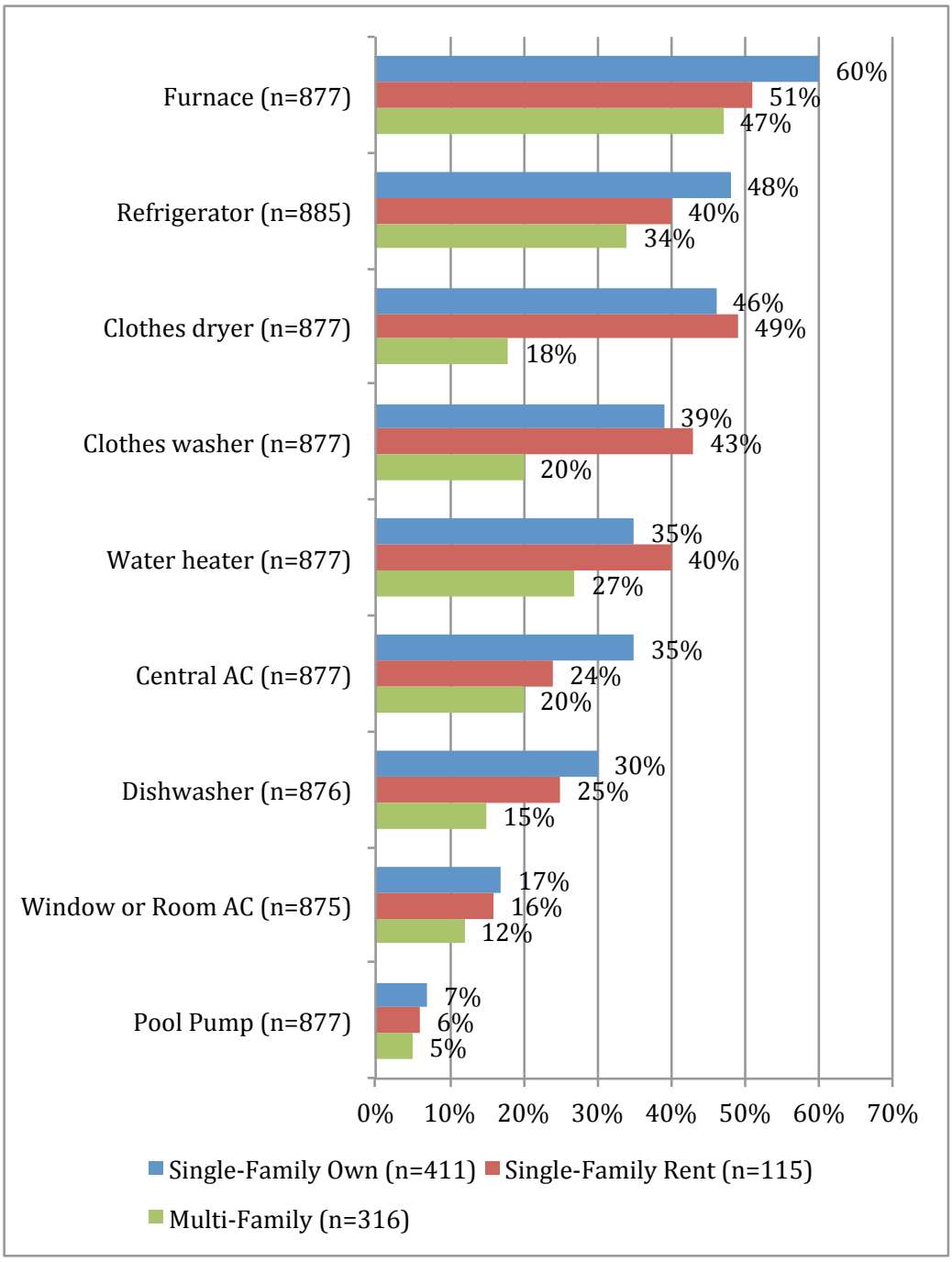
Source: 2013 CARE Participant Telephone Survey.

Note: we added this survey battery after the survey was in the field (after pre-test results), which is why the sample sizes are relatively low. This figure is intended to represent the LI population.

Figure 67 shows the same results but by home type, illustrating that multi-family LI homes have less old equipment compared to single-family LI homes.[59] These results are consistent with the CLASS data presented in Section 4. This is likely because the average age of multi-family LI homes is younger than single-family homes (37 versus 45 years) and that multi-family LI homes have less equipment in general.

[59] As reported in Section 5.1, 95 percent of multi-family homes are occupied by renters, so we do not break out that home type by home ownership.

Figure 67: Percent of Measures That are More Than 10 Years Old, for California LI Population by Home Type (EN11)



Source: 2013 CARE Participant Telephone Survey.

10 percent of respondents said that they could think of some other type of equipment that we had not asked them about that needs repair or replacement. Table 52 below shows the responses. As shown, 16 percent (or 1.6 percent of the LI population) said they needed a new tub or toilet (which do not use energy), followed by 14 percent that mentioned an electrical problem and 13 percent a plumbing problem. Please note that most of the measures identified below are not covered and offered through the ESA program; and not all of these measures are energy efficiency-related.

Table 52: Equipment That Needs to be Repaired or Replaced, of Ten Percent of California LI Population Who Mentioned Other Equipment (EN12b)

	Low Income Eligible Population
Toilet or bathtub	16%
Electrical	14%
Plumbing	13%
Ceiling fan(s)	8%
Flooring	6%
Lighting	6%
Infiltration	5%
Ceiling	4%
Freezer	4%
Roof	4%
Showerhead	4%
Stove fan / hood	4%
Fireplace issues	3%
Garbage disposal	3%
Gate / Fence	3%
Kitchen appliance	3%
Screens	3%
Swamp cooler	3%
Weather-strip	3%
Carpet	2%
Faucet(s)	2%
Garage door	2%
Hot tub	2%
Insulation	2%
Kitchen cabinets	2%
Sprinkler system	2%
Thermostat	2%
Lighting (exterior)	1%
N/A	1%
Water cooler	1%
Yard / Driveway	1%

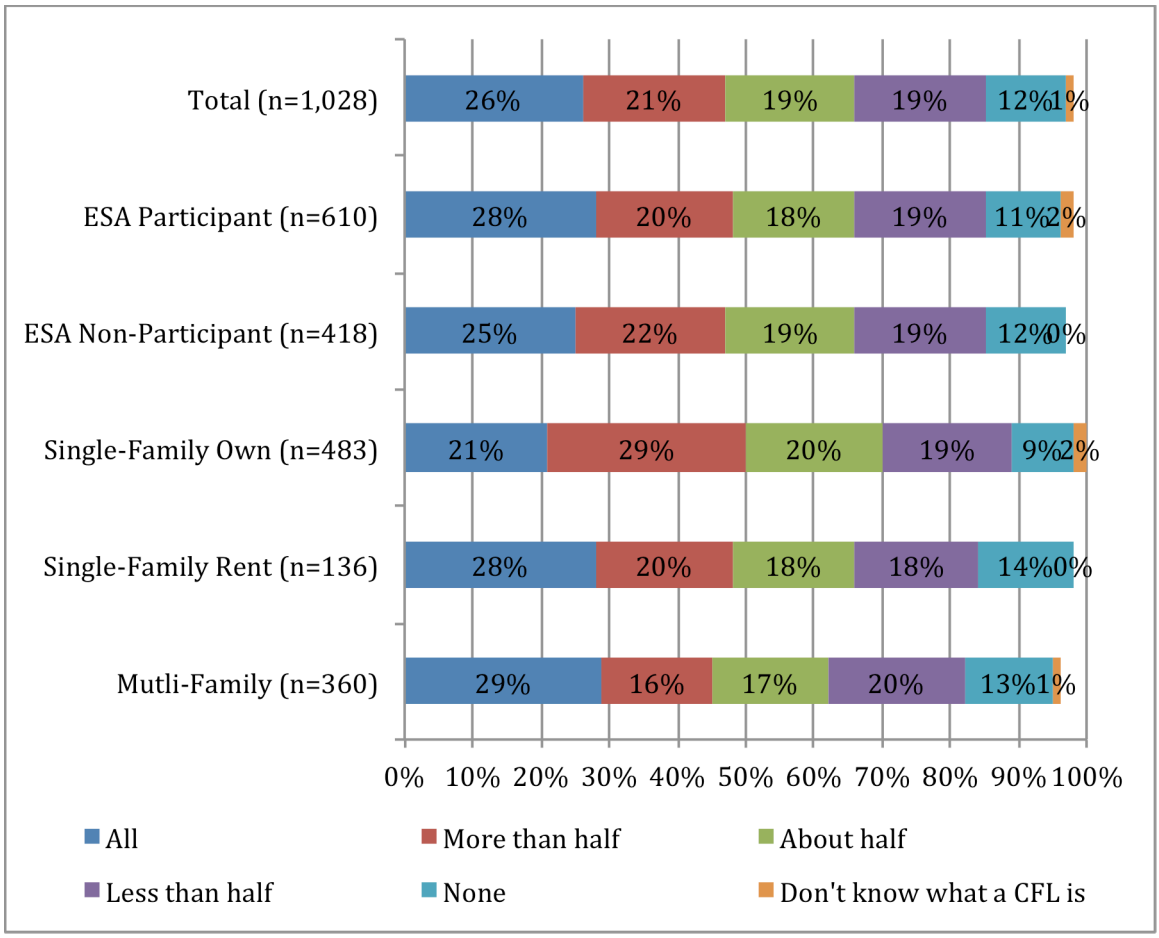
	Low Income Eligible Population
Other	<1%

Source: 2013 CARE Participant Telephone Survey.

The final question in this survey battery was for respondents to estimate how many bulbs in their home are compact fluorescent bulbs. As shown in Figure 68 below, 26 percent of LI households report that "all" of their bulbs are CFLs, 21 percent said "more than half" and 19 percent said "about half". These estimates are not statistically different across participation categories, but they are across home type. Single-family renters and multi-family households report having more CFLs than single-family homeowners.[60] This may be due to IOU CFL programs that targeted multi-family properties and hard-to-reach segments such as renters through giveaways at events and deeply discounted CFLs at discount stores. It may also reflect the different demographics of LI single-family homeowners that may not accept CFLs as much, such as having a greater proportion of homes with seniors and disabled members.

[60] As reported in Section 5.1, 95 percent of multi-family homes are occupied by renters, so we do not break out that home type by home ownership.

Figure 68: Amount of Bulbs in Household That are CFLs (Self-Reported), for California LI Population (EN14)



Source: 2013 CARE Participant Telephone Survey.

5.5.4.7 In-Home Visits

Households' energy practices varied, but our visits were notable for the frugality with which most households addressed the energy consumption over which they feel that they have control. Median monthly average electrical usage among the households for which we have actual billing data was 300 kWh for those in multi-family units and 570 kWh for those in single-family homes with usage as low as 112 and 202 kWh, respectively. For those who use natural gas, median monthly usage was 20 therms in multi-family units and 33 therms in single-family homes. (Note that these estimates of average usage are consistent with the 2012 IOU Annual Report estimates of the average CARE customer's monthly bill: 547 kWh and 31 therms.)

When we arrived for our in-home visits, we found that lights were turned off universally, and the unattended operation of televisions, radios, and other electronic devices was

relatively uncommon. (Unattended operation of devices tended to coincide with the presence of children, but then too was moderate in frequency.)

While most households try to use only what they need, some do go further and sacrifice on home comfort for the sake of cost savings or defer other needs to pay energy bills, as we described in separate discussions above on comfort (Section 5.5.3.3) and deferring necessities (Section 5.5.1.2).

We did encounter a few high-energy users too. Four households averaged monthly electricity consumption above 1,000 kWh. Three of these households live in large single-family homes that they bought or had built when they were better off financially, which may have locked them into above average consumption. Two of these homes are in the foothills of the Sierra Nevada Mountains and address perennial fire danger by operating water pumps to keep the vegetation on their properties well hydrated. Both of these households also comprise a large number of dependents, which contributes to higher usage as well. The third single-family home with high usage was a large home in which an elderly woman was taking care of her retirement age son with Alzheimer's. This was a large, newly remodeled home with many energy saving measures installed. All three of these homes have already undergone homeowner-initiated efficiency efforts. The lone multi-family unit with average usage above 1,000 kWh had no natural gas service. They used electric water heat and stove, and the husband also ran multiple Internet servers in the home that he kept running constantly.

Using the information gathered during the walk-throughs of the home and the characterization of the major energy-using systems, we analyzed potential energy saving measures in light of the ESA program requirements. We looked at both measures included in the program as well as unconstrained measures that are not part of the ESA program but may offer additional potential opportunities.

Current Measures

We assessed each site for a number of ESA measures. The measures selected were those that were amenable to assessment from information collected by non-technical interviewers, and included:

- Furnace repair/replacement;
- Furnace clean & tune;
- Central AC repair/replacement;
- Central AC tune-up;
- Room AC replacement;
- Evaporator cooler installation;
- Programmable thermostat;[61]

[61] Assessed in conjunction with furnace replacement, and as a non-ESA opportunity for households with evidence of relatively high heating or central cooling usage.

- Water heater repair/replacement;
- Water heater wrap;
- Water heating pipe insulation;
- Low-flow showerhead;
- Faucet aerators;
- Primary refrigerator replacement;[62]
- Microwave oven installation;
- Clothes washer replacement;
- CFL installation;
- Torchiere replacement;
- Weatherstripping;
- Door/window repairs; and
- Pool pump replacement (for SCE only).

Our assessments of measure opportunities accounted for the fact that some measures are not offered by some IOUs or in some climate zones. We separately tallied opportunities that would not qualify under current ESA IOU and/or climate-zone restrictions, but might nonetheless provide meaningful savings; for example, an air conditioning tune-up for a heavily-used air conditioner in a coastal climate zone.

Our assessments of individual opportunities took into account major non-feasibility criteria that would preclude an apparent measure opportunity from being implemented, but not what we considered to be minor ones. For example, we considered clothes washer replacement only for households with four or more household members in a building with non-central hot-water service, but we did not assess the site for non-feasibility criteria such as suitable water supply and drain lines or presence of a grounded outlet. As such, our estimates of incidence rates for ESA measure opportunities are likely somewhat on the high side.

The results of the exercise are summarized in Table 53. The left-hand columns in this table show the incidence of ESA measure opportunities under current program rules and utility- and climate zone-specific variations in what measures are available to individual households. The right-hand columns show the incidence of additional cases where there appeared to be an opportunity to implement measures, but either the household is not served by an IOU, the utility does not offer the measure, or the utility does not allow the measure in that climate zone. In each case we show both the overall incidence and the incidence among households where the measure might conceivably be applicable; for example, while the ESA central AC tune-up measure has an 11 percent incidence among all households, not all household have central AC. Among those that do, the incidence of a tune-up opportunity is 25 percent.

[62] Based on the program's current policy of allowing replacement for units manufactured on or before 1998.

The results show that nearly all (93%) of households had at least one identified ESA opportunity, and more than two-thirds (70%) had at least three. Six in ten households in the sample had at least three measure opportunities that would provide savings for the same utility—a prerequisite when ESA eligibility is not assessed across fuels. High incidence opportunities included water heater wrap, pipe insulation, CFLs and faucet aerators.

Table 53: ESA Measure Opportunities Among Visited Households for California LI Population

Measure	ESA Opportunity		Opportunity, but not under current ESA IOU and climate zone eligibility	
	% of all households	% of households where measure is applicable	% of all households	% of households where measure is applicable
Furnace repair/replacement	6%	7%	0%	0%
Furnace Clean & Tune	28%	29%	6%	7%
CAC replacement	2%	5%	2%	5%
CAC repair	1%	2%	0%	0%
Central AC tune-up	11%	23%	4%	8%
Room AC replacement	2%	11%	2%	11%
Evaporative cooler installation	24%	28%	9%	11%
Programmable t-stat	4%	4%	5%	6%
Water heater replacement/repair	0%	0%	0%	0%
Water heater wrap	68%	79%	3%	3%
Water heater pipe insulation	70%	77%	3%	3%
Showerhead	13%	14%	0%	0%
Aerators	60%	60%	0%	0%
Refrigerator replacement	16%	16%	2%	2%
Microwave oven	6%	6%	0%	0%
Clothes washer replacement	21%	22%	5%	5%
CFLs	55%	55%	2%	2%
Torchiere replacement	5%	5%	0%	0%
Caulking and weatherstripping	38%	38%	1%	1%
Window repair or replacement	16%	16%	0%	0%
Door repair or replacement	20%	20%	0%	0%
Structural repairs	1%	1%	0%	0%
Pool pump replacement	0%	0%	0%	0%
Any three measures providing savings for the same utility	60%			
Any three measures (all utilities)	70%			
Any single measure	93%			

Source: 2013 CARE participant telephone survey data.
Note: multiple mentions allowed.

Thinking Beyond the Current Program Measures and Approach

The variation in how households address their energy issues and usage highlighted for us the fact that program rules and procedures can sometimes result in missed opportunities and mismatches between measures and household practices. Program assumptions do not always match in-home realities, creating situations where participants are not served optimally. We do not know to what extent this is the case with ESA necessarily because we did not directly assess how flexibly ESA can or does tailor measures to a household's unique circumstances. We are aware that the IOUs implement their programs in response to budget constraints and household penetration goals, and they likely take advantage of the implicit relative flexibility in their measure offerings. However, to help California's IOUs consider whether current program rules strike the proper balance between flexibility and consistency, we are highlighting some of the circumstances below in which we saw the need for household specific situations to be taken into account by ESA or any other efficiency program.

Actual Use (and Non-Use) of Heating and Cooling Equipment

As noted earlier, the use of heating and cooling systems varied, even within the same climate zones. The degree to which households use their heating and cooling systems may be a factor worth incorporating into the solutions offered to treated households. We even encountered homes with natural gas heating systems they did not use at all, often using electric space heaters or living in cooler environments—either out of choice or economic necessity. Hence, changes in energy consumption derived from equipment upgrades or replacements may not result in high savings if the baseline use of that equipment is low or would be low after the measure is implemented.

Exploring these factors with the household could lead to more tailored (and effective) solutions than merely following a standard protocol, if that is currently done for some measures. Sometimes, the solution may be heating or cooling measures that are not currently prescribed by the program, and other times the most effective assistance for a home might be to provide education and advice on the most cost-effective way to keep warm or cool on a highly constrained budget.

Ineffective Cooling

A few households—particularly those in the eastern Los Angeles suburbs near the beginning of the high desert—wondered whether their cooling systems were working correctly. They said that their electric bills increase substantially in summer and fall, but their cooling systems didn't produce air that was as cold as they would expect and didn't cool the home as much as they would like. The majority of these households appeared to have evaporative coolers. Check-ups of their cooling systems and feedback on what they should expect from their cooling systems would provide valuable information to them that they are unlikely to get on their own.

Refrigeration Equipment and Practices

Households' refrigeration needs vary greatly, which means the best refrigeration solution will vary as well, ranging from energy education to replacement. The range of refrigeration issues we encountered included:

- Old primary and secondary refrigerators where standard replacement would help the household save on their energy usage and costs;
- Older refrigerators that appear not to qualify for ESA standards, but whose usage is likely to afford substantial savings potential;
- Partially used—and even completely empty—second refrigerators that were plugged in and one home with *two* secondary refrigerators that were partially empty;[63]
- Second refrigerators located on porches and exposed to direct sunlight, including one in the high desert that received direct sunlight until midday and did not cool properly in the summer months (yet was plugged in year-round);[64]
- One refrigerator with a broken gasket that could warrant a repair; and
- Two households that would not want their old refrigerators to be replaced with a different style (i.e. a side-by-side or bottom freezer refrigerator) because what they had was high quality when they initially purchased it and they are accustomed to that style.

Compact Fluorescent Light Bulbs

A few interviewees indicated that they knew about CFLs—and sometimes even already have CFLs—but are replacing light bulbs with incandescent light bulbs upon burn-out because they can't afford CFLs. For these homes, the installation of CFLs would be a good measure that will have a temporary effect unless the program can continue to provide replacements or convince the household that the added cost of CFLs is worth the energy savings. (Installing fixtures that only accept CFLs are another option, but one that could cause participant frustration at being forced to purchase light bulbs they consider to be too expensive.)

ESA Measures That Are Reversed (or Carried Forward)

The limited number of homes we visited that appear to have just participated in ESA also suggested that measures are occasionally reversed or not used by the household. For example, we heard of participants who:

- Replaced the microwave given to them by the program because it was of poor quality;

---

[63] About a quarter of the homes we visited had a second refrigerator plugged in. Most were used, but as noted, a few were either entirely or mostly empty on our visit.

[64] This same refrigerator served as a depot only for nonperishables, possibly because the owner cannot rely on it in summer. Hence, it is an opportunity for refrigerator consolidation as well.

- Switched to heating with space heaters after the program installed a programmable thermostat that neither the occupant nor her landlord could figure out how to operate;
- Replaced the showerhead installed by the program because the preexisting showerhead had a feature that helped relieved some minor physiological issues; and
- Were not able to use lights given to them because they lacked the space for the particular standing lamps provided.

Conversely, one household had participated in ESA in a previous apartment and, took the ESA-supplied showerhead with them when they moved to another apartment.

See Section 10 in Volume 3 for information about the energy-using equipment we observed in in-home interview respondents' homes.

5.5.5 CARE Program Benefits

We asked survey respondents who knew they were on the CARE rate whether their energy bills are now a lot less, somewhat less, somewhat more, a lot more or about the same as before they were on the CARE rate.

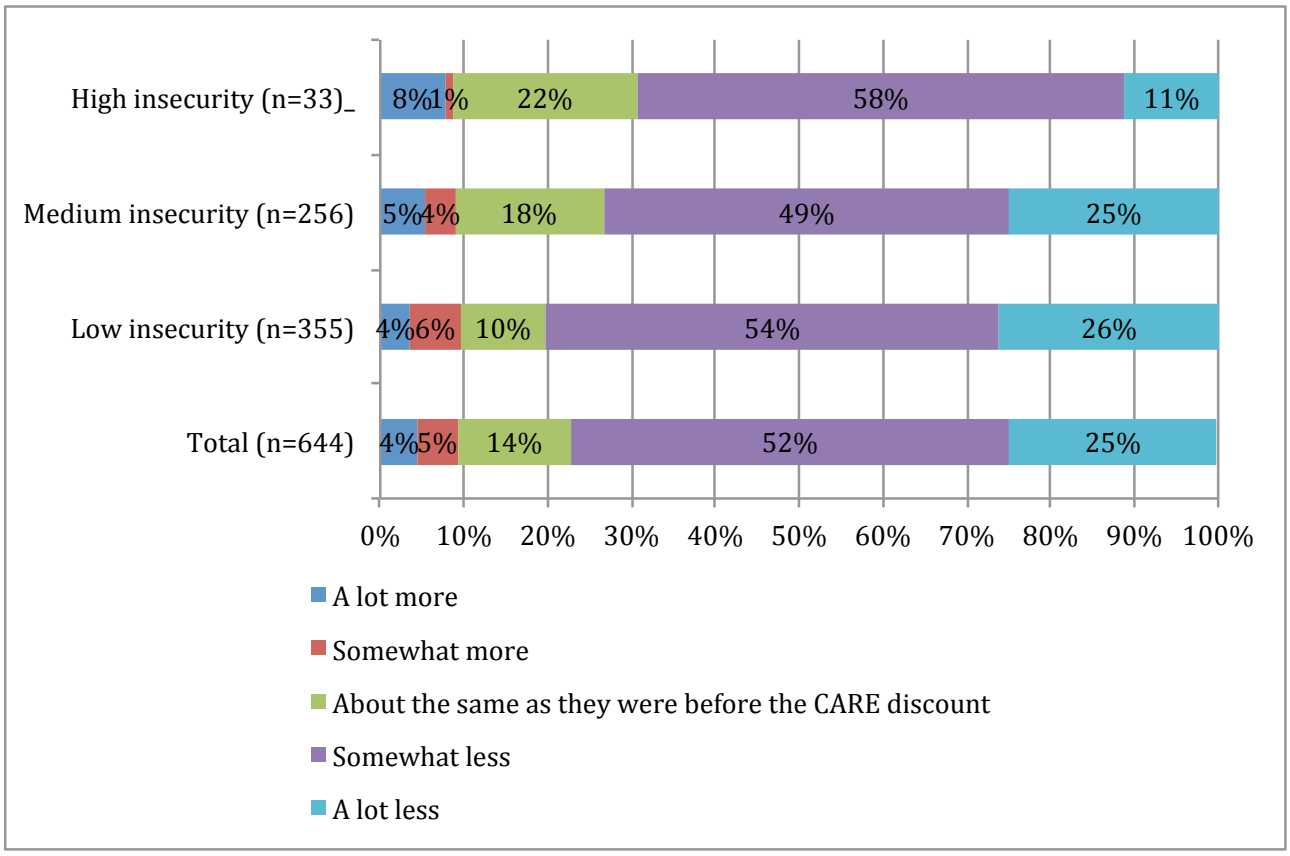
As shown in Figure 69 below (refer to the total row), 25 percent said their bill is "a lot less" and another 52 percent say it is "somewhat less". 14 percent say it is "about the same", while 9 percent say it is more than before they were on the CARE rate. Bills fluctuate over time due to seasonality, changes in electricity and gas prices and household usage. These self-reported results reflect all of those changes including the impact the CARE rate has had on the household, as interpreted by the respondent during a telephone survey (i.e., without having the time and information available to actually compare their bills.)

While these data do not directly reflect satisfaction with the CARE rate, recent research indicates that CARE customers overall are more satisfied with their rate options and rate communications than are the general population of IOU customers.[65]

The figure below shows changes in the energy bill based on energy insecurity categories, with the high energy insecurity segment being less likely to notice that their bill is "a lot less" now that they are on the CARE rate. This result might be because being on the CARE rate has made an impact on the household and moved them to a lower energy insecurity segment. Respondents with higher insecurity levels also have higher energy usage on average.

[65] Residential Rate OIR Customer Survey Research, June 21, 2013 Prepared for the California electric IOUs, Prepared by HINER & Partners, Inc., Page 44.

Figure 69: Change in Energy Bill Since on CARE, by Energy Insecurity Segments (E22a) for California LI Population

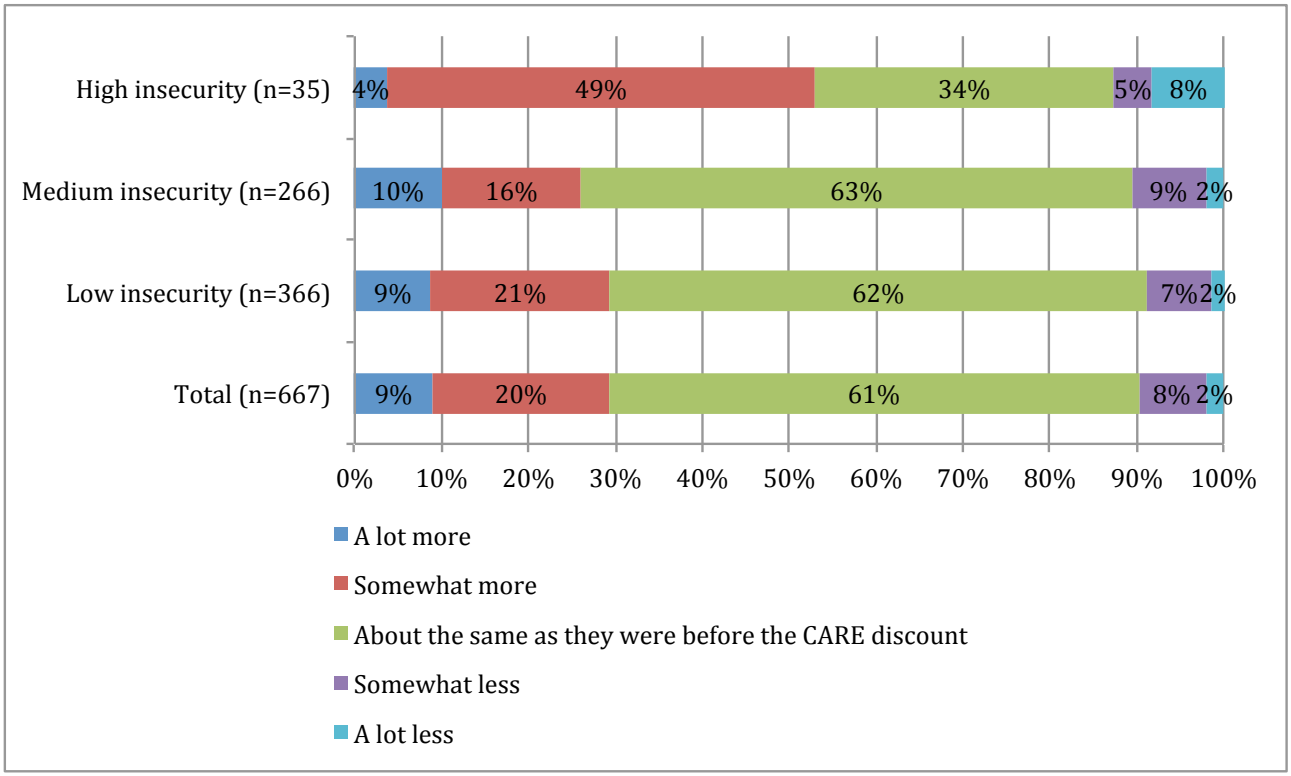


Source: 2013 CARE participant telephone survey data.

Next, we asked those same survey respondents whether they use a lot more, somewhat more, somewhat less, a lot less or about the same amount of energy as before they were on the CARE rate.

As shown in Figure 70 below (refer to the total row), 2 percent said they use "a lot less" energy and another 8 percent say they use "somewhat less". 20 percent say they use somewhat more and another 9 percent say they use "a lot more". Most (61%) say they use about the same. The figure below shows the high energy insecurity segment being more likely to notice that they use energy "somewhat more" and less likely to notice that they use energy "about the same" now that they are on the CARE rate. As noted above, these self-reported results reflect all of those changes including the impact the CARE rate has had on the household, as interpreted by the respondent during a telephone survey (i.e., without having the time and information available to actually compare their bills during the survey.) As mentioned above, respondents with higher insecurity levels also have higher energy usage on average.

Figure 70: Change in Energy Use since on CARE, by Energy Insecurity Segments (E22b) For California LI Population



Source: 2013 CARE participant telephone survey data.

EVERGREEN ECONOMICS

Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs

Volume 3: Technical Appendix

Final Report

December 16, 2013

Prepared for: Southern California Edison, Pacific Gas and Electric, Southern California Gas, San Diego Gas and Electric and the California Public Utilities Commission

Appendix

APPENDIX I

6 ENERGY BURDEN DETAILED RESULTS 6-1
6.1 METHODS 6-1
6.2 CUSTOMER ENERGY BURDEN DETAILED RESULTS 6-5
6.3 ENERGY BURDEN OF LOW-INCOME VERSUS GENERAL POPULATION 6-20

7 LI POPULATION CHARACTERIZATION DETAILED RESULTS 7-1
7.1 SOURCES FOR LI POPULATION CHARACTERIZATION 7-1
7.1.1 Sample Sizes and Statistical Significance 7-3
7.1.2 Comparison of Sources 7-6
7.2 DEMOGRAPHIC CHARACTERISTICS RESULTS 7-8
7.3 HOME AND EQUIPMENT CHARACTERISTICS RESULTS 7-40
7.3.1 CLASS Data 7-40
7.3.2 RASS Data 7-53

8 TELEPHONE SURVEY DETAILED RESULTS 8-1
8.1 COMPARISON TO CENSUS 8-1
8.2 TELEPHONE SURVEY RESULTS 8-4
8.2.1 Program Accessibility-ESA 8-5
8.2.2 Program Accessibility - CARE 8-27
8.2.3 ESA Drivers 8-33
8.2.4 ESA Barriers 8-64
8.2.5 WTP in ESA 8-98
8.2.6 Energy Insecurity 8-103
8.2.7 NEBs 8-116
8.2.8 Energy Efficiency Measures 8-142
8.2.9 Demographics 8-221

9 DETAILED MODELING RESULTS 9-1
9.1 CARE MODELING 9-1
9.1.1 Other Variables Considered for the CARE Models 9-4
9.2 ESA MODELING 9-6
9.3 CONJOINT ANALYSIS 9-16
9.3.1 ESA Program Option Participation Probabilities 9-17

10 IN-HOME INTERVIEW DETAIL 10-1
10.1.1 Household Types 10-1
10.1.2 Major Energy-Using Equipment 10-2
10.1.3 Selected Illustrative Profiles 10-5

11 LI PROGRAM REVIEW DETAIL 11-1
11.1 RESULTS TABLE 11-1

12 STUDY METHODS DETAIL 12-1
12.1 TELEPHONE SURVEY DETAILED METHODS 12-1
12.1.1 Sample Frame 12-1
12.1.2 Call Disposition 12-3

12.1.3 Weights *12-9*
12.2 CARE MODELING DETAILED METHODS 12-12
12.2.1 Interpreting Coefficients from a Logit Model *12-17*
12.2.2 Transforming from Proportion to Log-odds *12-18*
12.3 ESA MODELING DETAILED METHODS 12-19
12.3.1 ESA Methods *12-19*
12.4 CONJOINT ANALYSIS DETAILED METHODS 12-23
12.4.1 Sample Design and Recruitment *12-25*
12.4.2 Conjoint Discrete Choice Models *12-25*
12.4.3 Relative Importance *12-26*
12.4.4 Participation Probabilities *12-27*
13 RESEARCH INSTRUMENTS 13-1

This document is Volume 3 (Technical Appendix) of the Needs Assessment study that Evergreen Economics conducted for the Energy Savings Assistance (ESA) and the California Alternate Rates for Energy (CARE) programs for the joint California investor-owned utilities (IOUs).

This volume contains the following sections:

- Section 6: Energy Burden Detailed Results
- Section 7: Low-Income Population Characterization Detailed Results
- Section 8: Telephone Survey Detailed Results
- Section 9: Detailed Modeling Results
- Section 10: In-Home Interview Detail
- Section 11: Low-Income Program Review Detail
- Section 12: Study Methods Detail
- Section 13: Research Instruments

The study report contains three volumes. Volume 1 is the Summary Report and Volume 2 is the Detailed Findings.

6 Energy Burden Detailed Results

This section presents detailed results on energy burden. Section 6.1 provides an overview of the methods used to estimate energy burden, Section 6.2 provides detailed results on mean low-income (LI) customer energy burden and Section 6.3 presents general population energy burden compared to LI customer energy burden.

6.1 Methods

Our assessment of energy-related burden is focused on the magnitude of energy expenditures faced by LI households relative to income. More specifically, LI energy burden was defined as the portion of total household income that goes toward paying electric and gas utility bills, over the period of one year. LI energy burden was calculated for the telephone survey sample, which was drawn from the population of IOU CARE participants, which we assume are income-qualified and thus "low-income".

To support these calculations, estimates of bill amount and income were required. To form estimates of bill amount, the four California IOUs provided a sample of household energy billing data representing 5 percent of total active residential accounts. Three of the four IOUs provided histories extending from January 2010 through December 2012; SoCalGas provided a 12-month history extending from January 2012 to December 2012. Bill summaries for three of the four IOUs included energy consumption (kWh and therms as applicable) and dollar amount of the bill. SDG&E provided kWh and therm consumption values.[1] IOU billing histories were used to create an average bill for each account, for each month of the year, which were then combined to form an average seasonal bill. For the survey sample, the customer-specific bill history was the source for energy expenditure estimates for the purposes of burden analyses. For the general population, burden analysis was based on aggregated values across IOU zip codes. That is, the seasonal bills were aggregated across IOU zip code areas to form a representative general population seasonal bill size for the zip code area.

Income figures were developed for the survey sample and the general population using different methods. General population income figures were developed using a combination of Census (2011 ACS/PUMS) and Athens data. Census data provides median income at the Census block group level. These data were aggregated to the IOU zip code level by calculating a weighted median per zip code, using Athens' based counts of households for a given IOU service territory and block group. Estimates of household income for the survey sample were based primarily on self-reports, though

[1] Prices estimated using data from surrounding territories with similar climate were used to estimate bill size for SDG&E

CARE and ESA databases were used to fill in gaps where necessary and where data were available.[2]

For the general population, the zip code level median income and bill statistics were combined to form estimates of general population burden. For the survey sample, the customer specific billing history and self-reported household income were combined to form the burden estimate.

Importantly, the technique used here to form general population burden estimates involves taking average measurements of bill size and income before taking a ratio. This approach effects the statistics' underlying distribution when considered in contrast to the measure of burden used for the survey sample that aggregates *customer-specific* ratios of expenditure to income. In fact, the difference is so substantial as to render statistics assembled these two ways largely incomparable. The next section describes this difference and its implications in greater detail. To form burden statistics for the survey sample that can be compared to the general population statistics, mean values for energy expenditures and household income are calculated first, and a ratio of the mean values is taken second.

6.1.1.1 Overall Energy Burden Versus Customer Energy Burden

Energy Burden has been calculated in two different ways, in this study and in the previous LINA. The two calculation methods are as follows:

- "Customer Energy Burden:"
  - This is calculated by *first* computing the ratio of household annual energy expense to household annual income *for each customer*, and *second*, taking an average of the resulting ratio over the population—or sample—of households.
- "Overall Energy Burden:"
  - This is calculated by *first* computing the average annual energy expenditure amount over the population—or sample—of households, *then* computing the average annual household income amount, and *third*, taking the ratio of the average expense to average income.

Note that household size is not explicitly factored into either estimation method.[3]

The "Overall Energy Burden" approach was used in the 2007 LINA and is the only method available to estimate burden for the general population. We use the "Overall Energy Burden" approach in order to make comparisons to the prior 2007 estimate and to the general population. However, we believe that the "Customer Energy Burden" provides a better estimate of average energy burden. Consequently, we use that metric to present the LI population's energy burden results. The other method is

[2] The CARE and ESA income figures were adjusted moderately to better represent the observed relationship between self-reported income and CARE/ESA database income.
[3] Though it is implicitly factored into the average income, since CARE-eligibility is based on the household size.

used only for comparison purposes, to show relative differences over time and with the general population.

When interpreting either the overall energy burden or the customer energy burden, we caution the reader to bear in mind the following important caveats:

- Income comes in more forms than simply dollars. There are food stamps, family services and other forms of assistance, directed largely at the lowest dollar income groups;
- Income is self-reported and may contain errors; and
- Poverty and qualification for the CARE and ESA LI programs are a function of both income and size of household.

Table 1 below presents an example to illustrate the difference in results that can occur applying these two different methods to the same sample of customers. As shown in column 2 of the table, the average annual income across the three hypothetical customers X, Y and Z is $24,167. The average annual bill amount for customers X, Y and Z is $1,233. The "overall energy burden" is the ratio of the average bill amount to the average income, or $1,233/$24,167, i.e. 5.1 percent.

The ratio of annual energy expense to annual energy for customers X, Y and Z are 36, 5 and 3 percent, as shown in the right-most column in the table below. The "customer energy burden" is the average of these three values, or 14.7 percent—almost three times "overall energy burden."

Table 1: Example, Results Using Different Burden Calculation Methods

Example Customer Set	Annual Income (A)	Annual Energy Bill (B)	Ratio of Customer-Bill to Customer HH Income (B/A, or "Customer Energy Burden")
Customer X	$2,500	$900	36%
Customer Y	$25,000	$1,300	5%
Customer Z	$45,000	$1,500	3%
Average for Customers X, Y, Z	$24,167	$1,233	14.7%
"Overall Energy Burden"	5.1%		
"Customer Energy Burden"	14.7%		

- The 2007 LINA used the "overall energy burden" method to calculate the LI population burden estimates. However, when classifying customers as "low", "moderate" or "high" burden, the "customer energy burden" was used.

- In this study we use consistent methodology to the 2007 LINA for the purposes of comparing 2013 to 2007 findings.
- The energy burden of California's general population is presented in this study for comparison to the LI population. We did not have household-specific annual income data for the general population sample, only representative figures from the U.S. Census. Thus, "overall energy burden" was calculated for the general population, and compared with the "overall energy burden" of the 2013 LI population.
- In all cases outside of comparisons to 2007 or the general population, the "customer energy burden" is presented.

6.1.1.2 Missing Data

Missing Income Data: Of the 1,028 completed telephone surveys with LI customers, 129 did not provide a household annual income. We looked to utility CARE and ESA databases as a secondary source to fill some of this missing data in. There were a total of 372 surveyed customers with income data in the CARE/ESA ("program") database. Among these, 326 also had provided a self-reported income, and 46 were among those that did not provide an income figure.

Self-reported data and program data related to income likely have distinct underlying distributions based on reporting bias. For this reason, we examined the 326 points with income data in both the survey and the program database to assess the relationship. The overall mean difference between self-reported and across the 326 customers was $1,337, with the program database containing higher values. However, we also found that the relationship between the two sources changed consistently with the size of the program database income—where those with lower database income tended to report higher incomes during the survey, and those with higher database income tended to report lower income during the survey. Our solution was to divide the sample into five categories based on the size of the program database[4] income. The mean difference between the program database and survey income figures was applied as an adjustment factor to the 46 customers for whom we had only program database income. That is, for different income levels, the ratio of self-reported income to database income was applied to the database income before it was adopted as the estimate of income.

Missing Energy Bill Data: For SDG&E customers, we had usage data but not bill amount. In these cases we applied an average price observed for a sample with close geographic proximity. In other cases, we had gas bills but not electric or vice-versa. For these cases, we applied a mean bill based on geographic proximity and home type.

[4] Less than $10,000; $10,000 to $20,000; $20,000 to $30,000; $30,000 to $40,000 and $40,000 and up

6.2 Customer Energy Burden Detailed Results

This section presents the LI customer energy burden detailed results.

Table 2: Seasonal Energy Burden For Electric & Gas Customers for California LI Population

		Low Income				
		PG&E	SoCalGas	SCE	SDG&E	Total
Population segment size		31.1%	54.8%	41.3%	8.3%	94.4%
Mean Annual Burden	Summer	9.1%	7.1%	6.4%	6.5%	7.8%
	Winter	12.1%	7.0%	6.3%	9.1%	9.1%
	Fall	8.4%	6.8%	6.1%	6.9%	7.4%
	Spring	9.5%	5.8%	5.1%	7.2%	7.3%
	Annual	9.9%	6.7%	6.1%	7.3%	8.0%
Mean Electric Burden	Summer	7.1%	5.6%	5.1%	4.9%	6.1%
	Winter	7.0%	3.6%	3.0%	5.3%	5.0%
	Fall	6.2%	5.2%	4.7%	5.3%	5.6%
	Spring	5.8%	3.5%	3.0%	4.7%	4.5%
	Annual	6.8%	4.6%	4.1%	5.0%	5.4%
Mean Gas Burden	Summer	2.0%	1.5%	1.3%	1.6%	1.7%
	Winter	5.1%	3.4%	3.3%	3.8%	4.1%
	Fall	2.2%	1.5%	1.3%	1.5%	1.8%
	Spring	3.6%	2.2%	2.1%	2.5%	2.8%
	Annual	3.2%	2.2%	2.0%	2.4%	2.6%
n		254	418	368	179	853

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 3: Seasonal Energy Burden by Urban/Rural, by Electric-Only Customers for California LI Population

		Low-Income Electric-Only	Low-Income Urban	Low-Income Rural
Population segment size		-	95.9%	4.1%
Mean Annual Burden	Summer	5.5%	7.8%	6.0%
	Winter	7.8%	9.2%	9.2%
	Fall	5.5%	7.4%	5.6%
	Spring	5.8%	7.4%	6.8%
	Annual	6.1%	6.8%	8.1%
Mean Electric Burden	Summer	5.5%	6.1%	4.7%
	Winter	7.8%	5.1%	5.7%
	Fall	5.5%	5.7%	4.3%
	Spring	5.8%	4.5%	4.5%
	Annual	6.1%	4.9%	5.5%
Mean Gas Burden	Summer	5.5%	1.7%	1.4%
	Winter	7.8%	4.2%	3.5%
	Fall	5.5%	1.8%	1.3%
	Spring	5.8%	2.9%	2.3%
	Annual	6.1%	2.1%	2.6%
n		54	909	45

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 4: Seasonal Energy Burden by ESA Participation Type for California LI Population

		ESA Participation		
		Prior Participants	Recent Participants	Non-Participants
Population segment size		28.8%	22.2%	49.1%
Mean Annual Burden	Summer	7.5%	8.8%	6.4%
	Winter	10.1%	10.5%	7.5%
	Fall	7.4%	8.2%	6.0%
	Spring	7.9%	8.4%	5.8%
	Annual	8.3%	9.1%	6.5%
Mean Electric Burden	Summer	5.8%	6.9%	5.1%
	Winter	5.7%	5.4%	4.1%
	Fall	5.5%	6.1%	4.7%
	Spring	4.9%	5.0%	3.6%
	Annual	5.5%	6.1%	4.5%
Mean Gas Burden	Summer	1.8%	1.8%	1.3%
	Winter	4.4%	5.1%	3.4%
	Fall	1.9%	2.1%	1.3%
	Spring	3.0%	3.4%	2.3%
	Annual	2.7%	3.1%	2.1%
n		294	277	384

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 5: Seasonal Energy Burden by Climate Zone for California LI Population

Category Description		T24 Climate Zone Region- LI					
		Central Valley - 11-13	Desert - 14,15	Mountain - 16	North Coast - 1-5	South Coast - 6-8	South Inland - 9,10
Population segment size		24.7%	5.9%	2.1%	16.3%	23.4%	27.6%
Mean Annual Burden	Summer	11.0%	7.7%	6.9%	5.8%	7.4%	6.2%
	Winter	13.6%	5.9%	7.7%	9.7%	8.7%	6.3%
	Fall	9.6%	6.8%	6.0%	6.2%	7.8%	5.8%
	Spring	10.6%	5.0%	6.5%	7.5%	7.1%	5.1%
	Annual	11.5%	6.7%	6.1%	7.2%	7.7%	6.0%
Mean Electric Burden	Summer	9.3%	6.6%	5.0%	3.7%	5.6%	5.0%
	Winter	7.7%	2.9%	5.1%	5.5%	4.8%	3.2%
	Fall	7.5%	5.5%	4.6%	4.0%	5.8%	4.7%
	Spring	6.7%	3.4%	4.5%	4.1%	4.4%	3.2%
	Annual	8.3%	4.9%	4.9%	4.2%	5.1%	4.1%
Mean Gas Burden	Summer	1.7%	1.1%	2.0%	2.2%	1.9%	1.3%
	Winter	5.9%	3.0%	2.7%	4.2%	3.9%	3.0%
	Fall	2.0%	1.3%	1.4%	2.2%	2.0%	1.2%
	Spring	3.8%	1.7%	2.0%	3.4%	2.7%	2.0%
	Annual	3.3%	1.7%	2.2%	3.0%	2.6%	1.9%
n		230	59	23	136	252	255

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 6: Seasonal Energy Burden by ESA Measure Eligibility for California LI Population

		Low Income	
		RAC replace and evap cooler install - 10-16	CAC replacement - 13-15
Population segment size		44.3%	13.2%
Mean Annual Burden	Summer	9.5%	10.2%
	Winter	11.0%	8.6%
	Fall	8.5%	8.2%
	Spring	8.7%	6.8%
	Annual	9.7%	9.1%
Mean Electric Burden	Summer	8.0%	8.6%
	Winter	6.1%	3.9%
	Fall	6.8%	6.5%
	Spring	5.5%	4.0%
	Annual	6.9%	6.3%
Mean Gas Burden	Summer	1.5%	1.5%
	Winter	4.9%	4.7%
	Fall	1.7%	1.7%
	Spring	3.2%	2.8%
	Annual	2.8%	2.7%
n		455	127

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 7: Seasonal Energy Burden by Home Type for California LI Population

		Home Type	
		Single Family/Mobile Homes	Multi-Family Homes
Population segment size		58.7%	41.3%
Mean Annual Burden	Summer	8.8%	6.2%
	Winter	11.2%	6.4%
	Fall	8.4%	5.8%
	Spring	8.7%	5.4%
	Annual	9.4%	6.1%
Mean Electric Burden	Summer	7.0%	4.8%
	Winter	6.2%	3.6%
	Fall	6.5%	4.3%
	Spring	5.4%	3.2%
	Annual	6.4%	4.1%
Mean Gas Burden	Summer	1.8%	1.5%
	Winter	5.0%	2.9%
	Fall	1.9%	1.5%
	Spring	3.3%	2.2%
	Annual	3.0%	2.0%
n		632	323

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 8: Seasonal Energy Burden by Home Ownership for California LI Population

		Home Ownership	
		Own	Rent
Population segment size		30.4%	22.7%
Mean Annual Burden	Summer	7.1%	9.8%
	Winter	9.3%	10.9%
	Fall	6.8%	9.3%
	Spring	7.1%	8.7%
	Annual	7.7%	9.8%
Mean Electric Burden	Summer	5.7%	7.5%
	Winter	4.9%	5.7%
	Fall	5.2%	7.0%
	Spring	4.3%	5.2%
	Annual	5.2%	6.5%
Mean Gas Burden	Summer	1.4%	2.2%
	Winter	4.4%	5.2%
	Fall	1.6%	2.3%
	Spring	2.8%	3.5%
	Annual	2.5%	3.3%
n		455	132

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 9: Seasonal Energy Burden by Primary Language for California LI Population

		Primary Language		
		English	Spanish	Other non-English language
Population segment size		68.6%	22.2%	9.1%
Mean Annual Burden	Summer	8.1%	6.5%	8.5%
	Winter	10.0%	6.8%	11.0%
	Fall	7.7%	6.1%	8.4%
	Spring	7.9%	5.6%	8.4%
	Annual	8.5%	6.3%	9.1%
Mean Electric Burden	Summer	6.5%	4.7%	6.9%
	Winter	5.6%	3.5%	6.3%
	Fall	5.9%	4.4%	6.8%
	Spring	4.9%	3.3%	5.2%
	Annual	5.9%	4.1%	6.4%
Mean Gas Burden	Summer	1.6%	1.8%	1.6%
	Winter	4.4%	3.3%	4.6%
	Fall	1.8%	1.7%	1.7%
	Spring	3.0%	2.3%	3.2%
	Annual	2.7%	2.3%	2.8%
n		709	201	99

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 10: Seasonal Energy Burden by Ethnicity for California LI Population

		Ethnicity				
		White (Non-Hispanic	African-American	Asian	Hispanic	Other
Population segment size		39.2%	12.0%	3.5%	38.7%	6.6%
Mean Annual Burden	Summer	7.1%	10.1%	9.0%	7.6%	7.8%
	Winter	9.8%	12.9%	8.2%	8.0%	8.0%
	Fall	6.9%	10.2%	8.7%	7.0%	6.5%
	Spring	7.7%	9.8%	6.8%	6.6%	6.2%
	Annual	7.9%	10.8%	8.2%	7.5%	7.4%
Mean Electric Burden	Summer	5.8%	7.8%	7.3%	5.6%	6.5%
	Winter	5.6%	7.5%	4.4%	4.1%	4.4%
	Fall	5.5%	7.7%	7.0%	5.0%	5.1%
	Spring	5.0%	6.0%	4.0%	3.8%	3.8%
	Annual	5.6%	7.3%	5.8%	4.8%	5.3%
Mean Gas Burden	Summer	1.3%	2.3%	1.7%	2.0%	1.3%
	Winter	4.1%	5.4%	3.7%	3.9%	3.6%
	Fall	1.4%	2.6%	1.7%	2.0%	1.4%
	Spring	2.7%	3.8%	2.8%	2.8%	2.4%
	Annual	2.4%	3.4%	2.5%	2.7%	2.1%
n		385	99	38	344	63

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 11: Seasonal Energy Burden by Presence of Children in Home for California LI Population

		Children in Home	
		One or more children	No children
Population segment size		43.0%	57.0%
Mean Annual Burden	Summer	8.6%	7.1%
	Winter	9.4%	9.1%
	Fall	7.9%	6.9%
	Spring	7.5%	7.3%
	Annual	8.5%	7.6%
Mean Electric Burden	Summer	6.7%	5.6%
	Winter	5.5%	4.8%
	Fall	6.1%	5.2%
	Spring	4.8%	4.3%
	Annual	5.9%	5.1%
Mean Gas Burden	Summer	1.9%	1.5%
	Winter	3.9%	4.3%
	Fall	1.9%	1.7%
	Spring	2.7%	2.9%
	Annual	2.6%	2.6%
n		386	567

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 12: Seasonal Energy Burden by Historical Household Type for California LI Population

		Household Groups--Historical Match				
		Adults (Age 35-59)	Large Family (5+ people)	Seniors Only	Small Family (2-4 people)	Young Adults (Age 18-34)
Population segment size		8.7%	25.5%	26.2%	38.7%	0.9%
Mean Annual Burden	Summer	7.1%	8.7%	6.1%	8.4%	5.4%
	Winter	9.2%	10.0%	8.4%	9.5%	4.3%
	Fall	7.0%	8.3%	5.8%	7.9%	3.8%
	Spring	7.9%	8.1%	6.6%	7.4%	3.9%
	Annual	7.8%	8.8%	6.8%	8.4%	4.8%
Mean Electric Burden	Summer	5.7%	6.8%	4.7%	6.6%	4.3%
	Winter	5.9%	6.1%	4.0%	5.1%	2.5%
	Fall	5.4%	6.4%	4.3%	6.1%	3.0%
	Spring	5.3%	5.4%	3.7%	4.4%	2.1%
	Annual	5.6%	6.3%	4.3%	5.7%	3.3%
Mean Gas Burden	Summer	1.4%	1.9%	1.4%	1.8%	1.1%
	Winter	3.4%	3.9%	4.4%	4.3%	1.8%
	Fall	1.6%	1.9%	1.5%	1.9%	0.9%
	Spring	2.6%	2.8%	2.9%	2.9%	1.8%
	Annual	2.2%	2.6%	2.5%	2.7%	1.4%
n		74	237	275	361	6

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 13: Seasonal Energy Burden by Presence of Elderly or Disabled Persons in Home for California LI Population

		Age and Disability						
		One or more elderly person in home	One or more disabled person in home	One or more elderly and disabled person in home	One or more person with hearing/vision/ physical disability	One or more person with a mental/emotional disability	No disabled people in home	No elderly people in home
Population segment size		48.8%	59.0%	37.6%	39.1%	17.1%	41.0%	51.2%
Mean Annual Burden	Summer	6.8%	7.9%	7.1%	9.0%	8.7%	7.3%	8.6%
	Winter	8.9%	9.7%	9.1%	10.8%	10.8%	8.3%	9.6%
	Fall	6.6%	7.5%	6.9%	8.5%	8.3%	7.0%	8.1%
	Spring	7.1%	7.7%	7.4%	8.8%	8.8%	6.6%	7.6%
	Annual	7.4%	8.3%	7.7%	9.4%	9.2%	7.5%	8.6%
Mean Electric Burden	Summer	5.4%	6.3%	5.7%	7.2%	7.2%	5.7%	6.7%
	Winter	4.7%	5.5%	4.9%	5.9%	6.6%	4.5%	5.5%
	Fall	5.0%	5.8%	5.3%	6.5%	6.6%	5.3%	6.1%
	Spring	4.4%	4.8%	4.6%	5.4%	5.8%	4.0%	4.7%
	Annual	5.0%	5.7%	5.2%	6.5%	6.7%	5.0%	5.9%
Mean Gas Burden	Summer	1.4%	1.6%	1.4%	1.8%	1.6%	1.7%	1.9%
	Winter	4.2%	4.3%	4.2%	4.9%	4.2%	3.8%	4.1%
	Fall	1.6%	1.8%	1.6%	2.0%	1.7%	1.7%	1.9%
	Spring	2.7%	2.9%	2.8%	3.3%	2.9%	2.6%	2.9%
	Annual	2.4%	2.6%	2.4%	3.0%	2.6%	2.4%	2.7%
n		516	585	388	386	158	357	435

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 14: Seasonal Energy Burden by Reasons for Recent Changed Income for California LI Population

		Reasons for recent changed income		
		Due to job loss or cut in hours	Due to increase in hours	Due to move or job change
Population segment size		34.1%	2.4%	11.7%
Mean Annual Burden	Summer	9.1%	3.6%	6.6%
	Winter	11.3%	4.5%	7.4%
	Fall	8.8%	3.3%	6.2%
	Spring	8.4%	3.6%	5.9%
	Annual	9.4%	3.8%	6.7%
Mean Electric Burden	Summer	7.1%	2.9%	5.1%
	Winter	6.3%	2.7%	3.5%
	Fall	6.7%	2.5%	4.6%
	Spring	5.0%	2.4%	3.3%
	Annual	6.4%	2.7%	4.2%
Mean Gas Burden	Summer	2.0%	0.7%	1.5%
	Winter	5.0%	1.8%	3.9%
	Fall	2.1%	0.8%	1.6%
	Spring	3.4%	1.2%	2.6%
	Annual	3.1%	1.1%	2.4%
n		182	14	55

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 15: Seasonal Energy Burden by Sickness due to Home Conditions for California LI Population

		Sickness due to home conditions		
		Very often sick due to home conditions	Sometimes sick due to home conditions	Never sick due to home conditions
Population segment size		10.6%	39.5%	50.0%
Mean Annual Burden	Summer	12.7%	6.7%	7.5%
	Winter	16.3%	8.1%	8.7%
	Fall	12.0%	6.4%	7.2%
	Spring	13.4%	6.2%	7.0%
	Annual	13.8%	6.9%	7.7%
Mean Electric Burden	Summer	10.6%	5.3%	5.8%
	Winter	10.6%	4.4%	4.5%
	Fall	9.6%	4.9%	5.3%
	Spring	9.4%	3.7%	4.2%
	Annual	10.3%	4.7%	5.1%
Mean Gas Burden	Summer	2.2%	1.5%	1.7%
	Winter	5.6%	3.7%	4.2%
	Fall	2.4%	1.5%	1.9%
	Spring	4.0%	2.5%	2.8%
	Annual	3.5%	2.3%	2.6%
n		101	349	492

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

Table 16: Seasonal Energy Burden by Yearly Income for California LI Population

		Yearly Income				
		Less than $15,000	$15,000-$30,000	$30,000-$45,000	$45,000-$60,000	$60,000+
Population segment size		35.0%	41.2%	15.1%	5.4%	3.4%
Mean Annual Burden	Summer	15.8%	4.3%	3.3%	3.1%	1.8%
	Winter	19.4%	5.0%	3.4%	3.1%	2.2%
	Fall	15.0%	4.1%	3.2%	2.8%	1.8%
	Spring	15.5%	4.0%	2.8%	2.4%	1.8%
	Annual	16.7%	4.3%	3.2%	2.9%	1.9%
Mean Electric Burden	Summer	12.3%	3.4%	2.7%	2.6%	1.5%
	Winter	10.7%	2.8%	1.9%	1.8%	1.3%
	Fall	11.3%	3.1%	2.6%	2.3%	1.5%
	Spring	9.5%	2.4%	1.8%	1.6%	1.3%
	Annual	11.2%	3.0%	2.3%	2.1%	1.4%
Mean Gas Burden	Summer	3.5%	0.9%	0.6%	0.5%	0.3%
	Winter	8.7%	2.3%	1.5%	1.3%	0.9%
	Fall	3.7%	0.9%	0.6%	0.5%	0.3%
	Spring	6.0%	1.6%	1.0%	0.8%	0.6%
	Annual	5.4%	1.4%	0.9%	0.8%	0.5%
n		285	369	150	52	41

Source: 2013 Analysis of IOU customer billing data, CARE participant telephone survey data, 2012 Athens data, and 2011 PUMS data.

6.3 Energy Burden of Low-Income Versus General Population

The table analysis compares the overall energy burden of the LI population to the general population (which includes the LI population). This comparison provides greater context for interpreting the magnitude and the patterns of the LI population energy burden. These results are intended to provide a comparison to the general population only. The customer energy burden presented previously provides our estimates of the LI population mean energy burden.

In the table below, the left most column includes (a) the general population overall burden, the next column is (b) the LI population overall burden and the final column is (c) the ratio of the two results. The first two columns (a) and (b) are interim calculations only (providing "relative" estimates of burden) to produce the ratios shown in the (c) results. The previous section (6.2) presented the LI customer energy burden results. We are unable to produce absolute customer energy burden results for the general population given the data constraints described herein.

Table 17: Seasonal Energy Burden For Electric & Gas Customers by Population and IOU

		General Population (a) ^					Low Income (b) ^^					Ratio of LI to GenPop (c=b/a)				
		PG&E	SCG	SCE	SDG&E	Total	PG&E	SCG	SCE	SDG&E	Total	PG&E	SCG	SCE	SDG&E	Total
Mean Energy Burden	Summer	2.4%	2.2%	2.2%	1.6%	2.2%	4.4%	3.9%	3.9%	3.3%	4.1%	1.8	1.8	1.8	2.1	1.9
	Winter	3.2%	2.5%	2.4%	2.1%	2.7%	5.9%	3.7%	3.6%	4.7%	4.7%	1.8	1.5	1.5	2.2	1.7
	Fall	2.3%	2.2%	2.2%	1.8%	2.2%	4.1%	3.7%	3.6%	3.6%	3.9%	1.8	1.7	1.7	2.0	1.8
	Spring	2.4%	2.0%	1.9%	1.8%	2.1%	4.6%	3.1%	2.9%	3.7%	3.7%	1.9	1.5	1.5	2.1	1.8
	Annual	2.6%	2.2%	2.2%	1.8%	2.3%	4.7%	3.6%	3.5%	3.8%	4.1%	1.8	1.6	1.6	2.1	1.8
Mean Electric Burden	Summer	2.0%	1.8%	1.8%	1.4%	1.8%	3.4%	3.2%	3.1%	2.6%	3.3%	1.7	1.8	1.7	1.8	1.8
	Winter	1.9%	1.7%	1.6%	1.5%	1.7%	3.3%	2.0%	1.9%	2.8%	2.6%	1.7	1.2	1.2	1.8	1.5
	Fall	1.8%	1.8%	1.8%	1.5%	1.8%	3.0%	3.0%	2.9%	2.8%	3.0%	1.7	1.7	1.6	1.9	1.7
	Spring	1.6%	1.5%	1.4%	1.3%	1.5%	2.8%	1.9%	1.8%	2.4%	2.3%	1.7	1.3	1.3	1.9	1.5
	Annual	1.8%	1.7%	1.7%	1.4%	1.7%	3.1%	2.5%	2.4%	2.6%	2.8%	1.7	1.5	1.4	1.9	1.6
Mean Gas Burden	Summer	0.5%	0.4%	0.4%	0.3%	0.4%	1.0%	0.8%	0.7%	0.8%	0.8%	1.9	1.9	1.8	2.6	2.1
	Winter	1.3%	0.9%	0.8%	0.7%	1.0%	2.6%	1.8%	1.7%	1.9%	2.1%	2.0	1.9	2.1	2.7	2.1
	Fall	0.5%	0.4%	0.4%	0.3%	0.4%	1.1%	0.8%	0.7%	0.8%	0.9%	2.1	1.9	1.8	2.5	2.2
	Spring	0.9%	0.6%	0.5%	0.5%	0.6%	1.8%	1.1%	1.1%	1.3%	1.4%	2.0	1.9	2.2	2.5	2.3
	Annual	0.8%	0.5%	0.5%	0.4%	0.6%	1.6%	1.1%	1.1%	1.2%	1.3%	2.0	2.2	2.1	2.9	2.2
Sample Size (n)		178*	704 *	187 *	64*	1,132*	340	420	368	179	939					

* Thousands of records

^Source: 2013 IOU customer billing data, 2012 Athens data, and 2011 PUMS data.

^^Source IOU Customer billing data, CARE/ESA tracking databases, LINA telephone survey data,

7 LI Population Characterization Detailed Results

This section provides detailed results from the LI population characterization, including demographic and home and equipment characteristics.

7.1 Sources for LI Population Characterization

We compiled data from four main sources for this characterization task, which are summarized below. In Section 2.4, we provide more information about the secondary sources and in Section 2.5, we provide more information about the customer telephone phone survey.

- ACS/PUMS – 2011 and 2004 ACS data that provided the demographic characteristics for the state of California, the LI population, and within the LI population, by various categories such as IOU service territory, home type and primary language
- CLASS – 2013 California on-site survey data that provided the home and equipment characteristics for the state of California, the LI population, and within the LI population, by various categories such as IOU service territory, home type and primary language
- RASS – 2010 California mail survey data that provided the climate zone breakdowns for the home and equipment characteristics
- Telephone survey – The customer telephone survey was used to provide data on the ESA participants and ESA non-participants, in order to compare demographic and home/equipment characteristics across these two groups

A LI household is defined as a household that has a household income that is at or below 200% of federal poverty according to the 2012 Federal Poverty Guidelines[5] shown in Table 18 below. We chose this definition as it is the same metric that determines eligibility for both the CARE and ESA programs.

[5] 2012 Poverty Guidelines. U.S. Department of Health & Human Services. http://aspe.hhs.gov/poverty/12fedreg.shtml

Table 18: 200% 2012 Federal Poverty Guidelines

Household Size	Income Eligibility Upper Limit*
1	$22,340
2	$30,260
3	$38,180
4	$46,100
5	$54,020
6	$61,940
7	$69,860
8	$77,780
Each Additional Person	$7,920

* Upper Limit Calculation = 200% of Federal Poverty Guidelines

Whether a household was at or below 200% federal poverty was determined differently for each secondary data source depending on the level of detail of household income provided. The ACS/PUMS data provides a specific dollar value for household income allowing us to identify if the household falls below the income threshold limits in the table above depending on the household size. The CLASS and RASS data provides household income within a range as detailed in Table 19. Households were designated as low-income in these datasets if the midpoint of their income range fell below the Income Eligibility Upper Limit given the number of persons in the household. For example, if a CLASS household had three people and an income range of $30,000 - $40,000 it would be considered low income because the midpoint $35,000 is less than the Income Eligibility Upper Range of $38,180.

Table 19: CLASS & RASS Income Ranges

CLASS Income Ranges	RASS Income Ranges
< $20,000	< $25,000
$20,000-30,000	$25,000-35,000
$30,000-40,000	$35,000-$50,000
$40,000-50,000	> $50,000
$50,000-60,000	
$60,000-75,000	
$75,000-100,000	
$100,000-150,000	
$150,000-200,000	

The telephone survey sample was drawn from the population of IOU CARE participants. Given that the eliginibilty threshold for CARE is based on 200% of Federal Poverty, we assume that all CARE households are low income by our definition above.

7.1.1 Sample Sizes and Statistical Significance

This section presents samples sizes and estimates of sampling error for each source used to develop the LI population characterization summarized in Section 4.3 and presented in more detail below in Sections 7.2 and 7.3. The exception is the CLASS data, where the sample size varied by each result since it reflects inventories of equipment. The other data sources are based on households, and the sample size varied little across results, allowing a more simplified approach to presenting sample size and sampling error estimates.

The precision of the data can be represented by the approximate estimates of sampling error shown in Table 20 and Table 21 below, which shows the half-length of the "approximate" 90 percent confidence intervals for parameters estimated for various sample segments for each of the sources.[6] The first column, “Percent value”, refers to the percentage value for which the sampling error is being examined. These values can be used when interpreting the results in this report, by applying the interval to a percentage estimate.

For example, if looking at an estimated percentage that is near 50 percent for the California total population based on the PUMS data, the lower (upper) bound of the 90 percent confidence interval for the true value of the percentage would be equal to the estimated

[6] We refer to the confidence interval as "approximate" because they are based on survey data, which are “complex” in that the surveyed households (by design) do not perfectly represent the population of interest and, therefore, parameter estimates must be computed using weights. Methods do exist to calculate (near) exact standard errors; however, the development of individual standard errors for each parameter of interest requires extensive analysis. Because of this, results from large-scale surveys such as this generally compute approximate standard errors based on sample size and assumptions about the sampling distribution.

percentage minus (plus) 0.2 percentage points. Thus, we are approximately 90 percent confident that the true—but unknown—percentage is between 49.8 percent and 50.2 percent.[7] (The PUMS sample sizes are very large, with associated very small sampling error.) This interval can be applied to the same estimate for a different sub-group (e.g., California's LI population) to determine if there is a statistically significant difference (at the 90% level of confidence) between the two groups.

Note that there may also exist measurement errors associated with auditors and respondents making errors in recording information that cannot be estimated and are not reflected in the sampling error estimates below.

Table 20: 2004 and 2011 PUMS Data Sample Sizes (and Telephone Survey Sample for ESA Participants and Non-Participants) and 90% Confidence Intervals for California LI Population[1]

Sample Segment	Total 2011*	Total 2004*	LI Population 2011*	LI Population 2004*	ESA Participants** (Phone Survey)	ESA Non-participants **(Phone Survey)
Percent value	Confidence Interval					
10/90%	0.1%	0.2%	0.3%	0.5%	2.0%	2.4%
25/75%	0.2%	0.3%	0.4%	0.7%	2.9%	3.5%
50%	0.2%	0.4%	0.4%	0.8%	3.3%	4.0%
Sample Size	146,280	43,413	38,293	11,046	610	418

[1]Unless otherwise indicated, sample segment is for 2011, LI-population
Sources: (*)2004 and 2011 PUMS; (**)2013 CARE Participant Telephone Survey.

[7] Stated another way, if we drew the same size sample from the population 100 times and each time calculated a 90 percent confidence interval for the true value of the percentage, 90 of the 100 estimated ranges would actually contain the true value of the percentage.

(Table 20 continued)

Sample Segment	PG&E	SCE	SDG&E	SoCalGas	Urban	Rural
Percent value	Confidence Interval					
10/90%	0.4%	0.3%	0.6%	0.3%	0.3%	0.9%
25/75%	0.6%	0.4%	0.8%	0.4%	0.4%	1.3%
50%	0.6%	0.5%	0.9%	0.5%	0.4%	1.5%
Sample Size	16,786	26,033	8,052	26,382	35,269	3,024

[1]Unless otherwise indicated, sample segment is for 2011, LI-population
Source: 2011 PUMS.

(Table 20 continued)

Sample Segment	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Primary Language Spanish	Primary Language Other
Percent value	Confidence Interval						
10/90%	0.4%	0.6%	0.4%	1.6%	0.4%	0.4%	0.6%
25/75%	0.6%	0.8%	0.6%	2.3%	0.5%	0.6%	0.9%
50%	0.7%	0.9%	0.7%	2.6%	0.6%	0.7%	1.0%
Sample Size	13,696	7,850	14,683	1,000	17,973	14,087	6,233

[1]Unless otherwise indicated, sample segment is for 2011, LI-population
Source: 2011 PUMS.

Table 21: 2010 RASS Data Sample Sizes and 90% Confidence Intervals by Climate Zone Group and ESA Measure Eligibility for California LI Population

Sample Segment	Central Valley (11-13)	Desert (14,15)	Mountain (16)	North Coast (1-5)	South Coast (6-8)	South Inland (9,10)
Percent value	Confidence Interval					
10/90%	2%	3%	4%	2%	2%	2%
25/75%	1%	2%	2%	1%	1%	1%
50%	2%	3%	4%	2%	2%	2%
Sample Size	1463	724	394	1121	2166	2102

Source: 2010 RASS.

(Table 21 continued)

Sample Segment	RAC Replace and Evap. Cooler Install (10-16)	CAC Replacement (13-15)
Percent value	Confidence Interval	
10/90%	1%	1%
25/75%	1%	2%
50%	1%	2%
Sample Size	3476	1504

Source: 2010 RASS.

7.1.2 Comparison of Sources

We assumed that the PUMS data are the most robust and representative source, with nearly 150,000 records. We compared the LI population sub-samples from CLASS and RASS, and customer telephone survey, to the PUMS as shown in Table 22 below. Section 8.1 discusses how the customer telephone survey compares to PUMS, and adjustment weights that we developed to correct for the difference between home ownership rates.

The RASS and CLASS LI sub-samples have more homeowners than the PUMS LI sub-sample, with nearly half the sample owning their home compared to 33 percent in PUMS. The CLASS also over-represents households whose primary language is English (this variable was not available for RASS).

We did not adjust the RASS and CLASS samples, but we do provide all the home and equipment characteristic results from CLASS by homeowners versus renters and for households whose primary language is Spanish or English.

Table 22: Comparison of Demographic Characteristics Across Secondary Sources and the Customer Telephone Survey for California LI Population

	Data Source			
Demographic Characteristic	2011 PUMS LI Sample	2013 LINA Telephone Survey	2010 RASS	2013 CLASS
% own	33%	51%	48%	49%
% with seniors*	26%	53%	31%	35%
Primary language is English	46%	76%	Not available	65%
Respondent is white	36%	46%	Not available	Not available
% Single-family home	51%	56%	57%	56%
% Multi-family home	43%	40%	33%	41%
Average # people in the home	3.0	3.0	3.9	3.5
Average age of home	47	41	37	45
*Definition of senior	Over 65 years	Over 60 years	Over 65 years	Over 65 years

Sources: 2010 RASS; 2011 PUMS; 2013 CLASS; 2013 CARE Participant Telephone Survey.

7.2 Demographic Characteristics Results[8]

This section contains demographic data from the 2004 and 2011 ACS/PUMS. The ACS/PUMS data were introduced in Section 2.4. The segments shown in the tables were introduced in Section 4.3. Note we also included two columns for ESA participants versus non-participants based on the telephone survey data, where the data were available. These data are referenced in Section 5.

[8] Multi-family homes are defined as any housing structure with two or more units. This differs from the 2007 KEMA study were multi-family homes are defined as housing structures with five or more units. This also differs from the concurrent Cadmus multi-family LI study which also defines multi-family homes as housing structures with five or more units.

Table 23: Home Tenure Status - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Owned with mortgage or loan	41%	44%	20%	20%	34%	35%	20%	22%	19%	21%
Owned free and clear	14%	15%	13%	14%			16%	13%	13%	12%
Rented	44%	40%	64%	63%	62%	65%	62%	63%	65%	65%
Occupied without payment of rent	2%	1%	3%	2%	4%	0%	3%	2%	2%	2%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 24: Home Tenure Status - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population							
	Single-Family	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Owned with mortgage or loan (include home equity loans)	35%	3%	16%	19%	21%	18%	20%	21%
Owned free and clear	19%	2%	53%	19%	7%	13%	13%	22%
Rented	42%	96%	32%	59%	70%	66%	65%	53%
Occupied without payment of rent	4%	0%	0%	3%	2%	3%	2%	5%

Source: 2011 ACS/PUMS.

Table 25: Urban/Rural Status[9] – By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Urban	94%	NA	93%	NA	4%	5%	85%	97%	97%	99%
Rural	6%	NA	7%	NA	96%	95%	15%	3%	3%	2%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

[9] The definition of urban and rural is based on county, since that is the geographic information provided for the PUMS data. If a home was in a county that was in a metropolitan area with population of 250,000 or greater, the home was considered to be in an urban area. Otherwise, it was considered rural.

Table 26: Urban/Rural Status – By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Urban	90%	92%	96%	81%	89%	95%	98%	NA	NA
Rural	10%	8%	4%	20%	11%	5%	2%	NA	NA

Source: 2011 ACS/PUMS.

Table 27: Building Type – By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Mobile home or trailer	4%	4%	6%	6%	4%	2%	7%	6%	5%	2%
One-family house detached	59%	58%	44%	42%	58%	56%	49%	45%	36%	56%
One-family house attached	7%	7%	7%	7%	7%	6%	6%	6%	10%	6%
2 Apartments	3%	2%	4%	3%	7%	6%	4%	3%	3%	6%
3-4 Apartments	5%	6%	8%	9%			8%	8%	7%	8%
5-9 Apartments	6%	6%	8%	10%	9%	11%	8%	8%	9%	11%
10-19 Apartments	5%	5%	7%	7%	4%	6%	6%	8%	11%	6%
20-49 Apartments	5%	5%	7%	7%	12%	13%	5%	7%	8%	13%
50 or more apartments	7%	6%	9%	8%			8%	9%	12%	9%
Boat, RV, van, etc.	0%	0%	0%	0%	NA	NA	0%	0%	0%	NA

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

[1] Note: categories vary slightly. Those shown in the "5-9 Apartments" row may actually contain between 5 and 10 units, while those in the "10-19 Apartments" row may contain between 11 and 20 units. Finally, those in the merged row containing 20 units and above actually contain 21 units and above.

Table 28: Building Type - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Mobile home or trailer	0%	0%	0%	96%	7%	6%	2%	5%	14%
One-family house detached	93%	80%	0%	0%	46%	45%	37%	43%	56%
One-family house attached	7%	20%	0%	0%	6%	7%	8%	7%	4%
2 Apartments	0%	0%	8%	0%	3%	4%	3%	4%	4%
3-4 Apartments	0%	0%	18%	0%	7%	9%	7%	8%	7%
5-9 Apartments	0%	0%	19%	0%	8%	9%	8%	9%	5%
10-19 Apartments	0%	0%	17%	0%	7%	8%	8%	8%	3%
20-49 Apartments	0%	0%	17%	0%	6%	7%	10%	8%	3%
50 or more apartments	0%	0%	21%	0%	9%	6%	16%	10%	3%
Boat, RV, van, etc.	0%	0%	0%	4%	0%	0%	0%	0%	1%

Source: 2011 ACS/PUMS.

Table 29: Household Size - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
1 person	25%	25%	30%	29%	28%	25%	32%	27%	32%	27%
2 persons	30%	30%	21%	21%	19%	21%	22%	20%	24%	20%
3 persons	16%	16%	14%	13%	16%	15%	13%	14%	15%	14%
4 persons	15%	15%	14%	15%	12%	15%	13%	15%	13%	15%
5 or more persons	14%	14%	21%	21%	26%	25%	20%	24%	16%	24%
Average persons per home	2.77	2.75	2.98	2.98	2.89	2.95	2.85	3.15	2.73	3.15
Standard Error	0.00	0.00	0.01	0.00	0.07	0.07	0.01	0.01	0.03	0.01

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 30: Household Size - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
1 person	28%	15%	36%	39%	46%	11%	28%	29%	33%
2 persons	25%	16%	21%	22%	25%	14%	27%	21%	26%
3 persons	12%	16%	15%	12%	13%	15%	16%	14%	13%
4 persons	12%	20%	13%	10%	9%	20%	14%	14%	12%
5 or more persons	24%	33%	15%	17%	9%	40%	15%	22%	15%
Average persons per home	3.09	3.78	2.62	2.57	2.16	4.07	2.77	3.01	2.65
Standard Error	0.02	0.02	0.01	0.04	0.01	0.02	0.02	0.01	0.03

Source: 2011 ACS/PUMS.

Table 31: Race/Ethnicity of Householder - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
White (Non-Hispanic)	51%	62%	36.1%	46%	35%	44%	44%	31%	48%	30%
African-American	6%	5%	8.6%	7%	13%	11%	8%	9%	6%	9%
Asian	12%	11%	10.3%	10%	3%	5%	11%	9%	8%	9%
Other Race Alone	1%	1%	1.0%	2%	7%	6%	1%	1%	1%	1%
Two or More Races	2%	1%	2.0%	2%			2%	2%	2%	2%
Hispanic	28%	20%	42.1%	33%	42%	34%	34%	49%	36%	50%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 32: Race/Ethnicity of Householder - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
White (Non-Hispanic)	45%	28%	31%	54%	64%	4%	33%	34%	64%
African-American	5%	9%	12%	2%	17%	1%	3%	9%	2%
Asian	11%	9%	12%	3%	2%	0%	58%	11%	2%
Other Race Alone	1%	1%	1%	1%	1%	0%	2%	1%	2%
Two or More Races	2%	2%	2%	1%	3%	0%	4%	2%	3%
Hispanic	37%	52%	42%	39%	13%	95%	1%	43%	27%

Source: 2011 ACS/PUMS.

Table 33: Language Spoken in Household - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
English	58%	61%	46%	48%	73%	72%	55%	41%	52%	40%
Spanish	25%	24%	38%	37%	25%	22%	30%	45%	32%	46%
Asian	10%	9%	9%	9%	1%	3%	10%	8%	7%	8%
Other	7%	6%	7%	6%	2%	4%	6%	6%	9%	6%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 34: Language Spoken in Household – By Housing Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
English	51%	42%	43%	59%	100%	0%	0%	44%	71%
Spanish	34%	46%	38%	35%	0%	100%	34%	39%	25%
Asian	9%	8%	11%	3%	0%	0%	58%	10%	2%
Other	6%	4%	9%	3%	0%	0%	8%	7%	3%

Source: 2011 ACS/PUMS.

Table 35: Household Income - By Population and IOU

Year	Percent California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Less than $5,000	3%	3%	10%	11%	11%	6%	10%	9%	13%	9%
$5,000 to $9,999	3%	4%	10%	15%	9%	5%	10%	10%	11%	10%
$10,000 to $14,999	6%	5%	18%	18%	18%	14%	20%	18%	18%	18%
$15,000 to $19,999	5%	5%	17%	17%	12%	13%	18%	17%	18%	17%
$20,000 to $24,999	5%	6%	14%	11%	14%	15%	14%	14%	14%	14%
$25,000 to $29,999	5%	5%	10%	8%	10%	9%	10%	10%	10%	10%
$30,000 to $34,999	5%	5%	7%	6%	5%	6%	6%	7%	6%	7%
$35,000 to $39,999	4%	5%	5%	5%	3%	8%	4%	5%	4%	5%
$40,000 to $45,999	5%	6%	4%	4%	2%	4%	4%	5%	4%	5%
$46,000 to $49,999	3%	3%	2%	1%	3%	3%	1%	2%	2%	2%
$50,000 or more	56%	51%	4%	4%	3%	7%	3%	4%	3%	4%
Average Household Income ($)	80,684	69,596	20,621	20,427	20,377	25,886	20,075	21,446	18,607	21,432
Standard Error ($)	244.5	334.1	70.6	158.5	671.0	852.7	103.3	99.8	228.2	96.0

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 36: Household Income - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Less than $5,000	9%	8%	11%	8%	13%	5%	13%	10%	9%
$5,000 to $9,999	7%	9%	12%	10%	12%	8%	11%	10%	10%
$10,000 to $14,999	14%	15%	22%	22%	22%	13%	18%	18%	20%
$15,000 to $19,000	16%	15%	18%	21%	19%	14%	18%	17%	19%
$20,000 to $24,999	14%	14%	14%	14%	14%	14%	13%	14%	14%
$25,000 to $29,999	11%	11%	9%	11%	8%	12%	9%	10%	9%
$30,000 to $34,999	7%	9%	6%	5%	4%	10%	7%	7%	6%
$35,000 to $39,999	6%	7%	4%	4%	3%	8%	5%	5%	4%
$40,000 to $45,999	6%	6%	3%	3%	2%	7%	4%	4%	3%
$46,000 to $49,999	3%	2%	1%	1%	1%	3%	2%	2%	2%
$50,000 or more	7%	5%	2%	2%	1%	7%	3%	4%	3%
Average Household Income ($)	23656	23257	17860	18872	16883	25735	19320	20694	19701
Standard Error ($)	140.1	167.1	94.8	224.4	81.5	130.1	174.6	74.2	221.4

Source: 2011 ACS/PUMS.

Table 37: Family Size - By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Single Person	25%	25%	30%	29%	28%	25%	32%	27%	32%	27%
Small families (2-4)	61%	61%	49%	49%	46%	50%	48%	49%	53%	49%
Large families (5+)	14%	14%	21%	21%	26%	25%	20%	24%	16%	24%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 38: Family Size - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Single Person	28%	15%	36%	39%	46%	11%	28%	29%	33%
Small families (2-4)	49%	52%	49%	44%	46%	50%	57%	49%	51%
Large families (5+)	17%	24%	13%	15%	9%	40%	15%	22%	15%

Source: 2011 ACS/PUMS.

Table 39: Elderly or Disabled Household Member - By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
No elderly household member	74%	78%	74%	76%	46%	55%	74%	74%	75%	74%
Elderly household member	25%	22%	26%	24%	54%	45%	26%	26%	25%	26%
Disabled household member	22%	25%	31%	34%	67%	59%	33%	31%	27%	30%

Sources: 2004 and 2011 ACS/PUMS; 2013 CARE Participant Telephone Survey.

Table 40: Elderly or Disabled Household Member - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
No elderly household member	57%	87%	80%	78%	69%	84%	63%	74%	72%
Elderly household member	43%	13%	20%	22%	31%	16%	37%	26%	28%
Disabled household member	34%	28%	30%	41%	37%	25%	31%	31%	40%

Source: 2011 ACS/PUMS.

Table 41: Employment Status of Head of Household - By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Employed	63%	65%	43%	46%	NA	NA	41%	40%	42%	45%
Unemployed	6%	4%	11%	7%	NA	NA	12%	11%	10%	11%
Not in labor force (including retired population)	30%	31%	46%	47%	NA	NA	47%	46%	50%	45%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 42: Employment Status of Head of Household - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Employed	37%	50%	45%	33%	58%	44%	38%	43%	38%
Unemployed	9%	13%	12%	10%	11%	14%	9%	11%	11%
Not in labor force (including retired population)	54%	37%	44%	57%	31%	43%	53%	46%	51%

Source: 2011 ACS/PUMS.

Table 43: Education of Head of Household - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Bachelor's degree (or more)	34%	31%	14%	13%	16%	22%	14%	13%	20%	13%
Some college	32%	32%	31%	28%	30%	35%	33%	29%	35%	29%
High school graduate	18%	20%	24%	25%	27%	25%	25%	24%	22%	23%
Less than high school graduate	15%	16%	31%	34%	27%	18%	28%	35%	23%	35%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 44: Education of Head of Household - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Bachelor's degree (or more)	18%	9%	15%	6%	17%	5%	28%	14%	12%
Some college	23%	25%	25%	24%	43%	18%	28%	30%	39%
High school graduate	32%	30%	28%	35%	27%	22%	20%	24%	25%
Less than high school graduate	27%	36%	32%	35%	14%	55%	24%	32%	24%

Source: 2011 ACS/PUMS.

Table 45: Annual Household Fuel Costs - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
$1 – $249	2%	2%	4%	5%	NA	NA	5%	3%	7%	3%
$250 – $499	9%	9%	13%	15%	NA	NA	12%	11%	21%	11%
$500 – $749	12%	14%	16%	18%	NA	NA	14%	16%	20%	16%
$750 – $999	12%	14%	14%	15%	NA	NA	13%	16%	14%	15%
$1,000 – $1,249	11%	12%	12%	12%	NA	NA	12%	12%	10%	12%
$1,250 – $1,499	9%	9%	8%	8%	NA	NA	8%	9%	6%	9%
$1,500 – $1,999	14%	14%	12%	11%	NA	NA	13%	13%	7%	13%
$2,000 or greater	32%	25%	21%	16%	NA	NA	24%	21%	14%	21%
Average ($)	1,782	1,502	1,425	1,200	NA	NA	$1,483	$1,437	$1,110	$1,446
Standard Error ($)	4.2	6.0	6.7	10.2	NA	NA	10.6	8.9	19.4	8.6

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 46: Annual Household Fuel Costs - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
$1 – $249	1%	1%	9%	1%	4%	3%	7%	4%	3%
$250 – $499	6%	6%	23%	10%	12%	12%	15%	13%	8%
$500 – $749	11%	12%	22%	15%	14%	17%	16%	16%	13%
$750 – $999	13%	14%	16%	17%	13%	16%	15%	15%	12%
$1,000 – $1,249	12%	13%	10%	14%	11%	12%	11%	12%	12%
$1,250 – $1,499	10%	10%	7%	7%	9%	8%	8%	8%	8%
$1,500 – $1,999	15%	16%	7%	14%	12%	13%	11%	12%	14%
$2,000 or greater	33%	29%	7%	22%	25%	18%	17%	21%	31%
Average ($)	1833	1699	918	1482	1528	1364	1265	1399	1731
Standard Error	12.1	14.4	7.1	43.8	10.5	9.9	15.9	6.8	26.9

Source: 2011 ACS/PUMS.

Table 47: Age of Home - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
1939 or earlier	9%	10%	10%	11%	23%	18%	10%	10%	4%	10%
1940 to 1949	6%	7%	7%	9%			7%	8%	4%	8%
1950 to 1959	14%	15%	15%	16%	30%	28%	12%	17%	10%	17%
1960 to 1969	14%	15%	15%	16%			14%	15%	16%	15%
1970 to 1979	18%	20%	19%	20%	34%	31%	21%	17%	26%	17%
1980 to 1989	15%	17%	15%	16%			14%	15%	19%	15%
1990 to 1999	11%	11%	9%	9%	8%	12%	10%	9%	11%	9%
2000 to 2004	6%	5%	5%	3%			6%	5%	5%	5%
2005	2%	NA	2%	NA			2%	2%	1%	1%
2006	1%	NA	1%	NA			1%	1%	1%	1%
2007	1%	NA	1%	NA	5%	9%	1%	1%	1%	1%
2008	1%	NA	1%	NA			1%	1%	1%	1%
2009	1%	NA	1%	NA			1%	1%	1%	1%
2010	0%	NA	0%	NA			0%	0%	0%	0%
2011	0%	NA	0%	NA	0%	1%	0%	0%	0%	0%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

[1] Note: categories vary slightly. Those shown in the "1990 to 1999" row have homes built between 1990 and 2000, and those in the merged row said to be built between 2000 and 2010 may have actually been built between 2001 and 2010.

Table 48: Age of Home - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
1939 or earlier	10%	14%	9%	1%	10%	11%	9%	10%	8%
1940 to 1949	9%	11%	5%	1%	7%	9%	5%	7%	6%
1950 to 1959	20%	20%	10%	4%	14%	16%	13%	15%	11%
1960 to 1969	13%	13%	17%	14%	14%	15%	14%	15%	12%
1970 to 1979	14%	15%	22%	39%	20%	18%	19%	19%	22%
1980 to 1989	14%	11%	17%	21%	16%	13%	16%	15%	16%
1990 to 1999	10%	7%	10%	11%	10%	8%	11%	9%	12%
2000 to 2004	6%	4%	5%	5%	5%	5%	6%	5%	6%
2005	2%	1%	1%	2%	2%	1%	2%	2%	2%
2006	1%	1%	1%	1%	1%	1%	1%	1%	2%
2007	1%	1%	1%	%	1%	1%	1%	1%	1%
2008	0%	1%	1%	%	1%	1%	1%	1%	1%
2009	0%	0%	1%	0%	1%	1%	1%	1%	1%
2010	0%	0%	0%	0%	0%	0%	1%	0%	0%
2011	0%	0%	0%	0%	0%	0%	0%	0%	0%

Source: 2011 ACS/PUMS.

Table 49: Heating Fuel Type - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Utility gas	66%	69%	59%	64%	NA	NA	56%	62%	52%	63%
Bottled, tank, or LP gas	3%	4%	3%	3%	NA	NA	4%	3%	2%	2%
Electricity	25%	22%	31%	25%	NA	NA	33%	27%	40%	27%
Fuel oil, kerosene, etc.	0%	0%	0%	0%	NA	NA	1%	0%	0%	0%
Coal or coke	0%	0%	0%	0%	NA	NA	0%	0%	0%	0%
Wood	2%	2%	2%	2%	NA	NA	3%	1%	1%	1%
Solar energy	0%	0%	0%	0%	NA	NA	0%	0%	0%	0%
Other fuel	0%	0%	0%	0%	NA	NA	1%	0%	0%	0%
No fuel used	3%	2%	5%	5%	NA	NA	2%	7%	4%	7%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 50: Heating Fuel Type - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
Utility gas	69%	62%	51%	58%	61%	56%	60%	61%	39%
Bottled, tank, or LP gas	4%	2%	1%	10%	4%	2%	2%	2%	11%
Electricity	20%	27%	42%	23%	30%	32%	34%	31%	33%
Fuel oil, kerosene, etc.	1%	0%	0%	1%	1%	0%	0%	0%	3%
Coal or coke	0%	0%	0%	0%	0%	0%	0%	0%	0%
Wood	3%	2%	0%	4%	3%	1%	0%	1%	12%
Solar energy	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other fuel	0%	0%	0%	1%	1%	0%	0%	0%	1%
No fuel used	3%	6%	6%	3%	2%	9%	3%	5%	2%

Source: 2011 ACS/PUMS.

Table 51: Presence of Children in Home - By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
With children under 6 years only	8%	8%	9%	10%	7%	9%	9%	8%	9%	9%
With children 6 to 17 years only	20%	21%	22%	22%	21%	20%	24%	22%	24%	20%
With children under 6 years and 6 to 17 years	9%	9%	15%	16%	13%	14%	16%	12%	16%	14%
No children	63%	61%	54%	52%	60%	56%	51%	59%	51%	56%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 52: Presence of Children in Home - By Home Type, Language and Urban/Rural

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
With children under 6 years only	5%	11%	10%	6%	7%	12%	7%	9%	9%
With children 6 to 17 years only	23%	30%	19%	17%	15%	32%	20%	22%	19%
With children under 6 years and 6 to 17 years	12%	24%	13%	12%	7%	28%	8%	15%	11%
No children	60%	35%	57%	65%	71%	29%	65%	54%	61%

Source: 2011 ACS/PUMS.

Table 53: Length of Time Residing at Present Address - By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
23 months or less	23%	25%	28%	25%	7%	12%	30%	26%	29%	26%
2 to 4 years	19%	22%	22%	22%	20%	38%	22%	21%	25%	21%
5 to 9 years	19%	19%	18%	19%	17%	16%	17%	19%	19%	19%
10 to 19 years	20%	18%	17%	18%	27%	19%	16%	19%	15%	19%
20 to 29 years	9%	8%	7%	8%	29%	16%	7%	7%	6%	7%
30 years or more	9%	8%	8%	8%			9%	8%	7%	8%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.
Note: Categories vary slightly. The row listed as "2 to 4 years" actually includes tenants who have stayed between 2 and 5 years, and those in the "5 to 9 years" may have resided at the same address between 6 and 10 years. Similarly, the "10 to 19 years" category includes those who stayed between 11 and 20 years.

Table 54: Length of Time Residing at Present Address - By Home Type, Language and Urban/Rural

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
12 months or less	4%	27%	28%	14%	21%	19%	20%	20%	21%
13 to 23 months	3%	10%	10%	5%	7%	8%	9%	8%	7%
2 to 4 years	11%	29%	26%	21%	20%	25%	21%	22%	21%
5 to 9 years	20%	17%	17%	25%	16%	20%	19%	18%	17%
10 to 19 years	25%	12%	14%	22%	16%	19%	19%	17%	17%
20 to 29 years	14%	4%	3%	9%	8%	5%	7%	7%	8%
30 years or more	23%	2%	2%	4%	12%	5%	5%	8%	10%

Source: 2011 ACS/PUMS.

Table 55: Linguistic Isolation - By Population and IOU

	Percent of California Population		Percent of California LI Population							
Year	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
At least one person in the household 14 and over speaks English only or speaks English 'very well'	90%	89%	80%	77%	NA	NA	83%	79%	82%	78%
No one in the household 14 and over speaks English only	10%	11%	20%	23%	NA	NA	17%	21%	18%	22%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.

Table 56: Linguistic Isolation - By Home Type, Language and Urban/Rural

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
At least one person in the household 14 and over speaks English only or speaks English 'very well'	87%	81%	75%	83%	100%	66%	56%	79%	91%
No one in the household 14 and over speaks English only	13%	19%	25%	17%	NA	34%	44%	21%	9%

Source: 2011 ACS/PUMS.

Table 57: Other Languages Spoken - By Population and IOU

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
English	**90.0%**	**88.9%**	**80.0%**	**77.1%**	**95.3%**	**94.5%**	**83.0%**	**79.0%**	**82.0%**	**79.0%**
Spanish	**19.3%**	**15.0%**	**38.1%**	**31.5%**	**42.6%**	**36.5%**	**30.3%**	**44.6%**	**40.7%**	**44.8%**
Other European	**4.0%**	**4.6%**	**3.1%**	**3.5%**	**3.3%**	**4.8%**	**5%**	**2.6%**	**2.5%**	**2.6%**
German	0.8%	1.0%	0.4%	0.5%	0.3%	0.7%	0.5%	0.4%	0.4%	0.4%
Pennsylvania Dutch	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Yiddish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Dutch	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Swedish	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Danish	0.1%	0.1%	0.0%	0.0%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%
Norwegian	0.0%	0.1%	0.0%	0.1%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%
Italian	0.4%	0.6%	0.2%	0.3%	0.2%	0.7%	0.3%	0.2%	0.2%	0.2%
French	0.8%	1.0%	0.5%	0.6%	0.7%	1.9%	0.4%	0.5%	0.4%	0.5%
Patois	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
French Creole	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Portuguese	0.4%	0.3%	0.3%	0.4%	0.5%	0.3%	0.4%	0.2%	0.1%	0.2%
Romanian	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Irish Gaelic	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Greek	0.1%	0.2%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%
Albanian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Russian	0.5%	0.4%	0.7%	0.6%	0.2%	0.2%	0.9%	0.6%	0.3%	0.6%
Ukrainian	0.0%	0.0%	0.1%	0.1%	0.6%	0.0%	0.2%	0.0%	0.0%	0.0%
Czech	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%
Polish	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Slovak	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Bulgarian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Macedonian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Serbo Croatian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Croatian	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Serbian	0.0%	0.0%	0.0%	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
Lithuanian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Latvian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Finnish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hungarian	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.1%
Other European languages	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%
Asian	**13.7%**	**11.6%**	**12.2%**	**11.5%**	**2.9%**	**8.2%**	**11.9%**	**11.2%**	**9.7%**	**11.1%**
Armenian	0.5%	0.4%	0.9%	0.7%	0.1%	1.7%	0.1%	1.3%	0.1%	1.3%
Persian	0.7%	0.5%	0.7%	0.6%	0.0%	1.1%	0.6%	0.7%	0.9%	0.7%
Pashto	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%
Kurdish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Indian	0.0%	0.0%	0.0%	0.1%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%
Hindi	0.6%	0.3%	0.2%	0.2%	0.3%	0.0%	0.4%	0.1%	0.1%	0.1%
Bengali	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%
Punjabi	0.3%	0.2%	0.3%	0.3%	0.1%	0.0%	0.5%	0.2%	0.2%	0.2%
Marathi	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Gujarati	0.2%	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
Urdu	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Nepali	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pakistani	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sinhalese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Turkish	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Telugu	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kannada	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Malayalam	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tamil	0.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Chinese	1.9%	1.9%	1.8%	2.1%	1.1%	1.7%	2.1%	1.4%	0.9%	1.3%
Cantonese	0.7%	0.5%	0.9%	0.6%	0.3%	0.6%	1.3%	0.4%	0.2%	0.4%
Mandarin	0.8%	0.5%	0.6%	0.3%	0.1%	0.9%	0.5%	0.6%	0.4%	0.6%
Formosan	0.1%	0.2%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Burmese	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Thai	0.2%	0.2%	0.2%	0.1%	0.4%	0.3%	0.1%	0.2%	0.1%	0.2%
Miaoyao Mien	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Hmong	0.1%	0.0%	0.3%	0.2%	0.0%	0.0%	0.5%	0.2%	0.1%	0.2%
Japanese	0.8%	0.9%	0.5%	0.8%	0.2%	1.0%	0.4%	0.4%	0.2%	0.5%
Korean	1.2%	1.0%	1.5%	1.3%	0.0%	0.5%	0.6%	1.8%	1.2%	1.8%
Laotian	0.1%	0.1%	0.2%	0.1%	0.0%	0.3%	0.3%	0.2%	0.2%	0.2%
MonKhmer Cambodian	0.2%	0.1%	0.3%	0.2%	0.0%	0.0%	0.3%	0.3%	0.2%	0.3%
Vietnamese	1.3%	1.0%	1.7%	1.6%	0.3%	0.8%	1.7%	1.4%	3.1%	1.4%
Indonesian	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%
Malay	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tagalog	2.9%	2.6%	1.3%	1.5%	0.6%	1.5%	1.4%	1.1%	1.3%	1.1%
Bisayan	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sebuano	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ilocano	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%
Other Asian languages	0.0%	0.1%	0.0%	0.1%	0.1%	0.3%	0.1%	0.0%	0.0%	0.0%
Pacific Island Languages	**0.2%**	**0.1%**	**0.2%**	**0.1%**	**0.0%**	**0.0%**	**0.3%**	**0.1%**	**0.1%**	**0.1%**
Chamorro	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
Samoan	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%
Tongan	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.1%	0.0%	0.1%	0.0%
Hawaiian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other PacificIsland languages	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Middle Eastern Languages	**0.8%**	**0.6%**	**1.1%**	**0.7%**	**1.0%**	**1.5%**	**0.8%**	**1.1%**	**1.6%**	**1.1%**
Arabic	0.4%	0.3%	0.7%	0.5%	1.0%	1.5%	0.4%	0.8%	1.0%	0.8%
Hebrew	0.2%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Syriac	0.1%	0.0%	0.1%	0.0%	0.5%	0.0%	0.2%	0.1%	0.2%	0.1%
Amharic	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.2%	0.1%
Cushite	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%
African Languages	**0.2%**	**0.1%**	**0.1%**	**0.1%**	**0.5%**	**0.0%**	**0.1%**	**0.1%**	**0.2%**	**0.1%**
Swahili	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.1%	0.0%	0.0%	0.0%
Bantu	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Mande	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fulani	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
KruIbo/Yoruba	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.1%
African	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other specified African languages	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Native American Languages	**0.0%**	**0.0%**	**0.1%**	**0.1%**	**0.1%**	**0.0%**	**0.1%**	**0.1%**	**0.1%**	**0.1%**
Other Algonquian languages	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Apache	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Navaho	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dakota	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Keres	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cherokee	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
American Indian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Year	Percent of California Population		Percent of California LI Population							
	Total 2011*	Total 2004*	Total 2011*	Total 2004*	ESA parts 2013**	ESA non-parts 2013**	PG&E 2011*	SCE 2011*	SDG&E 2011*	SoCalGas 2011*
South/Central American Indian languages	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other North American Indian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Languages	0.0%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%

Sources: *2004 and 2011 ACS/PUMS; **2013 CARE Participant Telephone Survey.
This table presents the proportion of households that speak each language independent of whether other languages are spoken. As this table allows for multiple languages to be spoken per household, the column totals will sum to greater than 100%.

Table 58: Other Languages Spoken - By Home Type, Language and Urban/Rural for California LI Population

	Percent of California LI Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile Homes	English Only	Spanish	Other	Urban	Rural
English	**87.3%**	**81.0%**	**74.6%**	**82.8%**	**100.0%**	**66.1%**	**55.7%**	**79.3%**	**90.9%**
Spanish	**33.8%**	**46.4%**	**37.8%**	**35.4%**	**0.0%**	**100.0%**	**1.4%**	**39.2%**	**24.6%**
Other European	**3.6%**	**1.3%**	**3.1%**	**2.0%**	**0.0%**	**0.0%**	**19.3%**	**3.0%**	**1.7%**
German	0.8%	0.1%	0.4%	0.4%	0.0%	0.0%	2.8%	0.5%	0.3%
Pennsylvania Dutch	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Yiddish	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%
Dutch	0.1%	0.1%	0.0%	0.2%	0.0%	0.0%	0.5%	0.1%	0.1%
Swedish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Danish	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%	0.1%
Norwegian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Italian	0.4%	0.1%	0.2%	0.1%	0.0%	0.0%	1.4%	0.2%	0.1%
French	0.6%	0.3%	0.5%	0.2%	0.0%	0.0%	3.0%	0.5%	0.5%
Patois	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
French Creole	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Cajun	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Portuguese	0.4%	0.2%	0.2%	0.3%	0.0%	0.0%	1.6%	0.3%	0.1%
Romanian	0.1%	0.0%	0.1%	0.2%	0.0%	0.0%	0.6%	0.1%	0.0%
Irish Gaelic	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Greek	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.5%	0.1%	0.0%
Albanian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Russian	0.4%	0.3%	1.3%	0.2%	0.0%	0.0%	4.6%	0.8%	0.2%
Ukrainian	0.2%	0.1%	0.1%	0.0%	0.0%	0.0%	0.7%	0.1%	0.1%
Czech	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Polish	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.5%	0.1%	0.0%
Slovak	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Bulgarian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%

	Percent of California LI Population								
	Single-Family Own	**Single-Family Rent**	**Multi-Family**	**Mobile Homes**	**English Only**	**Spanish**	**Other**	**Urban**	**Rural**
Macedonian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Serbo Croatian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Croatian	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Serbian	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.3%	0.0%	0.1%
Lithuanian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Latvian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Finnish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hungarian	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.5%	0.1%	0.1%
Other European languages	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Asian Languages	11.4%	10.0%	14.4%	3.4%	0.0%	0.1%	76.8%	13.0%	2.2%
Armenian	0.3%	0.6%	1.6%	0.0%	0.0%	0.0%	5.9%	1.0%	0.0%
Persian	0.6%	0.4%	1.1%	0.0%	0.0%	0.0%	4.6%	0.8%	0.1%
Pashto	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.1%	0.1%
Kurdish	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Indian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Hindi	0.2%	0.1%	0.3%	0.0%	0.0%	0.0%	1.5%	0.2%	0.2%
Bengali	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
Panjabi	0.5%	0.3%	0.2%	0.1%	0.0%	0.0%	1.9%	0.3%	0.3%
Marathi	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Gujarati	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%
Urdu	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.7%	0.1%	0.1%
Nepali	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Pakistani	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sinhalese	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Turkish	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
Telugu	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Kannada	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Malayalam	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

	Percent of California LI Population								
	Single-Family Own	**Single-Family Rent**	**Multi-Family**	**Mobile Homes**	**English Only**	**Spanish**	**Other**	**Urban**	**Rural**
Tamil	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Chinese	2.4%	1.2%	1.9%	0.5%	0.0%	0.0%	11.4%	1.9%	0.2%
Cantonese	0.8%	0.8%	1.0%	0.1%	0.0%	0.0%	5.4%	0.9%	0.0%
Mandarin	0.7%	0.4%	0.8%	0.0%	0.0%	0.0%	4.0%	0.7%	0.0%
Formosan	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.6%	0.1%	0.0%
Burmese	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Thai	0.2%	0.1%	0.2%	0.0%	0.0%	0.0%	1.0%	0.2%	0.1%
MiaoyaoMien	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
Hmong	0.3%	0.4%	0.2%	0.0%	0.0%	0.0%	1.6%	0.3%	0.2%
Japanese	0.5%	0.3%	0.5%	0.2%	0.0%	0.0%	2.9%	0.5%	0.2%
Korean	1.0%	0.7%	2.4%	0.1%	0.0%	0.0%	9.4%	1.6%	0.1%
Laotian	0.1%	0.2%	0.2%	0.0%	0.0%	0.0%	1.1%	0.2%	0.0%
MonKhmer Cambodian	0.2%	0.6%	0.3%	0.0%	0.0%	0.1%	1.8%	0.3%	0.1%
Vietnamese	1.5%	2.7%	1.3%	1.6%	0.0%	0.0%	10.5%	1.8%	0.2%
Indonesian	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
Malay	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Tagalog	1.5%	0.8%	1.5%	0.6%	0.0%	0.0%	8.3%	1.4%	0.2%
Bisayan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Sebuano	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Ilocano	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.1%	0.0%
Other Asian languages	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.3%	0.0%	0.1%
Pacific Island Languages	0.0%	0.2%	0.2%	0.0%	0.0%	0.0%	1.2%	0.2%	0.4%
Chamorro	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%
Samoan	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.5%	0.1%	0.2%
Tongan	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.4%	0.1%	0.0%
Hawaiian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Other Pacific Island languages	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Middle Eastern Languages	0.6%	0.6%	1.7%	0.0%	0.0%	0.0%	6.7%	1.0%	0.0%

	Percent of California LI Population								
	Single-Family Own	**Single-Family Rent**	**Multi-Family**	**Mobile Homes**	**English Only**	**Spanish**	**Other**	**Urban**	**Rural**
Arabic	0.5%	0.5%	1.0%	0.0%	0.0%	0.0%	4.1%	0.7%	0.0%
Hebrew	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.7%	0.1%	0.0%
Syriac	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.8%	0.1%	0.0%
Amharic	0.0%	0.0%	0.2%	0.0%	0.0%	0.0%	0.8%	0.1%	0.0%
Cushite	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%
African Languages	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.9%	0.1%	0.0%
Swahili	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%
Bantu	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Mande	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Fulani	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Krulbo/Yoruba	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.5%	0.1%	0.0%
African	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other specified African languages	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Native American Languages	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.3%	0.0%	0.1%
Other Algonquian languages	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
Apache	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Navaho	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Dakota	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Keres	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Cherokee	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
American Indian	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
South/Central American Indian languages	0.0%	0.0%	0.0%	0.2%	0.0%	0.0%	0.2%	0.0%	0.0%
Other North American Indian	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%
Other Languages	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Source: 2011 ACS/PUMS.

This table presents the proportion of households that speak each language independent of whether other languages are spoken. As this table allows for multiple languages to be spoken per household, the column totals will sum to greater than 100%.

7.3 Home and Equipment Characteristics Results

This section contains home and equipment characteristic data from two sources: the KEMA CLASS (2013) and RASS (2010). RASS was used to provide data on weather-sensitive energy-using equipment by climate zone categories.

7.3.1 CLASS Data[10]

The following series of tables presents the more detailed home and equipment data from the 2013 CLASS (KEMA). The CLASS data were introduced in Section 2.4. The segments shown in the tables were introduced in Section 4.3.

[10] Multi-family homes are defined as any housing structure with two or more units. This differs from the 2007 KEMA study were multi-family homes are defined as housing structures with five or more units. This also differs from the concurrent Cadmus multi-family LI study which also defines multi-family homes as housing structures with five or more units.

Table 59: Average Square Footage of Home – By Population Segment and IOU

	Percent of California LI Population					
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Average Sq Ft	1,643	1,311	1,332	1,298	1,292	1,330
Standard Error	24	40	64	63	87	63
Sample Size (n)	1,810	311	116	146	49	145

Source: 2013 CLASS.

Table 60: Average Square Footage of Home – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Average Sq Ft	1,629	1,409	885	1,240	1,284
Standard Error	60	70	34	60	49
Sample Size (n)	160	57	83	64	230

Source: 2013 CLASS.

Table 61: Heating Equipment Type – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Electric	**11%**	**10%**	**9%**	**9%**	**25%**	**3%**
Portable Heaters	2%	2%	1%	1%	3%	1%
Heat Pump	2%	2%	2%	2%	4%	1%
Wll/Floor Heaters	1%	0%	0%	0%	0%	0%
Hot Air Furnace	2%	1%	0%	2%	2%	1%
Resistance/Baseboard	2%	3%	4%	1%	9%	0%
Other Electric	2%	2%	1%	2%	7%	0%
Natural Gas	**83%**	**79%**	**78%**	**85%**	**66%**	**93%**
Hot Air Furnace	61%	47%	48%	48%	46%	55%
Space Heaters/Wall Units	14%	27%	27%	30%	8%	31%
Hot Water Radiator/Baseboard	0%	0%	0%	0%	0%	0%
Other Gas	8%	5%	2%	7%	12%	7%
Oil	**0%**	**0%**	**0%**	**0%**	**0%**	**0%**
Fireplace	0%	0%	0%	0%	0%	0%
Steam	0%	0%	0%	0%	0%	0%
Stove/Stove Insert	0%	0%	0%	0%	0%	0%
Space Heaters	0%	0%	0%	0%	0%	0%
Other Oil	0%	0%	0%	0%	0%	0%
Propane	**4%**	**2%**	**3%**	**2%**	**1%**	**0%**
Hot Air Furnace	3%	1%	2%	1%	1%	0%
Space Heaters	0%	0%	0%	0%	0%	0%
Hot Water Radiator/Baseboard	0%	0%	0%	0%	0%	0%
Fireplace	0%	0%	0%	0%	0%	0%
Steam	0%	0%	0%	0%	0%	0%
Other Propane	1%	1%	1%	1%	1%	0%
Wood or Coal	**1%**	**4%**	**7%**	**1%**	**2%**	**0%**
Fireplace	1%	2%	5%	0%	2%	0%
Stove/Stove Insert	0%	1%	2%	0%	0%	0%
Furnace	0%	0%	0%	0%	0%	0%
Hot Water Radiator/Baseboard	0%	0%	0%	0%	0%	0%
Other Wood/Coal	0%	0%	0%	0%	0%	0%
No Heating Equipment	**2%**	**4%**	**4%**	**4%**	**7%**	**4%**
Sample Size (n)	1,987	388	166	171	53	165

Source: 2013 CLASS.

Table 62: Heating Equipment Type – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Electric	**5%**	**1%**	**19%**	**9%**	**12%**
Portable Heaters	1%	1%	1%	1%	2%
Heat Pump	1%	0%	5%	1%	3%
Wall/Floor Heaters	0%	0%	1%	1%	0%
Hot Air Furnace	1%	0%	2%	1%	1%
Resistance/Baseboard	0%	0%	7%	3%	3%
Other Electric	1%	0%	4%	2%	2%
Natural Gas	**82%**	**86%**	**76%**	**82%**	**78%**
Hot Air Furnace	64%	47%	32%	40%	49%
Space Heaters/Wall Units	15%	26%	40%	38%	23%
Hot Water Radiator/Baseboard	0%	0%	0%	0%	0%
Other Gas	4%	13%	4%	4%	6%
Oil	**0%**	**0%**	**0%**	**0%**	**0%**
Fireplace	0%	0%	0%	0%	0%
Steam	0%	0%	0%	0%	0%
Stove/Stove Insert	0%	0%	0%	0%	0%
Space Heaters	0%	0%	0%	0%	0%
Other Oil	0%	0%	0%	0%	0%
Propane	**3%**	**4%**	**0%**	**0%**	**3%**
Hot Air Furnace	3%	0%	0%	0%	2%
Space Heaters	0%	0%	0%	0%	0%
Hot Water Radiator/Baseboard	0%	0%	0%	0%	0%
Fireplace	0%	0%	0%	0%	0%
Steam	0%	0%	0%	0%	0%
Other Propane	0%	4%	0%	0%	1%
Wood or Coal	**6%**	**4%**	**1%**	**2%**	**4%**
Fireplace	5%	2%	1%	2%	2%
Stove/Stove Insert	1%	2%	0%	0%	2%
Furnace	0%	0%	0%	0%	0%
Hot Water Radiator/Baseboard	0%	0%	0%	0%	0%
Other Wood/Coal	0%	0%	0%	0%	0%
No Heating Equipment	**3%**	**5%**	**5%**	**7%**	**3%**
Sample Size (n)	174	72	111	90	259

Source: 2013 CLASS.

Table 63: Cooling Equipment Type and Age – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Type of Cooling Equipment/Systems						
Central Air Conditioners	47%	32%	29%	38%	24%	41%
Heat Pumps	2%	2%	3%	3%	0%	1%
Room Air Conditioners	15%	25%	16%	36%	17%	32%
Evaporative Coolers	2%	6%	5%	7%	0%	6%
No Cooling Equipment	34%	35%	48%	17%	59%	20%
Age of Cooling Equipment						
<10 years	40%	53%	47%	62%	46%	57%
10-19 years	34%	27%	39%	23%	36%	27%
20-29 years	25%	20%	14%	16%	18%	15%
30 or more years	1%	0%	0%	0%	0%	0%
Average Age	12.7	10.0	10.1	9.5	12.1	9.8
Standard Error	1.1	2.2	3.2	1.5	1.1	1.1
Sample Size (n, Age)	388	53	17	27	10	27
Sample Size (n, Type)	1,987	388	166	171	53	165

Source: 2013 CLASS.

Table 64: Cooling Equipment Type and Age – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Type of Cooling Equipment/Systems					
Central Air Conditioners	45%	26%	23%	24%	35%
Heat Pumps	2%	0%	4%	0%	4%
Room Air Conditioners	22%	36%	24%	35%	21%
Evaporative Coolers	8%	10%	1%	6%	6%
No Cooling Equipment	24%	29%	48%	35%	35%
Age of Cooling Equipment					
<10 years	56%	52%	56%	80%	51%
10-19 years	29%	29%	31%	20%	28%
20-29 years	15%	19%	13%	0%	21%
30 or more years	0%	0%	0%	0%	0%
Average Age	10.1	9.7	10.0	6.8	10.9
Standard Error	0.4	0.9	1.6	1.3	2.1
Sample Size (n, Age)	33	13	6	10	42
Sample Size (n, Type)	138	58	66	67	191

Source: 2013 CLASS.

Table 65: Water Heating Equipment Type and Age – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Water Heating Fuel						
Electricity	6%	8%	10%	7%	3%	2%
Natural Gas	84%	81%	74%	90%	74%	96%
Propane	4%	3%	5%	1%	2%	0%
Solar	1%	1%	1%	1%	0%	1%
Unknown	5%	8%	11%	2%	21%	2%
Age of Water Heating Equipment						
1-5 years	35%	33%	27%	37%	42%	37%
6-10 years	48%	45%	55%	37%	48%	37%
11-15 years	7%	9%	10%	9%	4%	8%
16-20 years	5%	8%	4%	12%	6%	12%
More than 20 years	4%	5%	4%	6%	0%	6%
Average Age	7.8	8.2	8.2	8.5	6.9	8.5
Standard Error	0.2	0.5	0.7	0.8	1.0	0.8
Sample Size (n, Age)	731	135	52	63	20	62
Sample Size (n, Type)	1,987	388	166	171	53	165

Source: 2013 CLASS.

Table 66: Water Heating Equipment Type and Age – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Water Heating Fuel					
Electricity	7%	3%	10%	8%	8%
Natural Gas	86%	95%	69%	83%	80%
Propane	4%	1%	0%	1%	4%
Solar	1%	0%	0%	0%	1%
Unknown	1%	0%	20%	9%	7%
Age of Water Heating Equipment					
1-5 years	28%	45%	35%	31%	34%
6-10 years	52%	43%	38%	50%	45%
11-15 years	8%	0%	13%	9%	9%
16-20 years	5%	11%	11%	6%	7%
More than 20 years	7%	2%	3%	4%	5%
Average Age	8.6	6.9	8.2	7.7	8.2
Standard Error	0.7	0.9	0.9	0.9	0.5
Sample Size (n, Age)	69	25	38	33	96
Sample Size (n, Type)	180	76	118	99	266

Source: 2013 CLASS.

Table 67: Existing Wall Insulation R-Value – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
No insulation (R-0)	26%	35%	36%	33%	49%	32%
R-1 --> R-10	15%	20%	23%	20%	9%	20%
R-11 --> R-18	54%	44%	37%	45%	41%	47%
R-19 --> R-30	5%	0%	5%	1%	1%	1%
Sample Size (n)	1,835	358	147	166	47	161

Source: 2013 CLASS.

Table 68: Existing Wall Insulation R-Value – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
No insulation (R-0)	35%	46%	32%	41%	36%
R-1 --> R-10	13%	17%	27%	23%	18%
R-11 --> R-18	47%	37%	39%	36%	44%
R-19 --> R-30	5%	1%	1%	0%	2%
Sample Size (n)	173	70	104	86	251

Source: 2013 CLASS.

Table 69: Foundation Type – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Slab	55%	52%	42%	59%	70%	60%
Crawl	31%	34%	39%	32%	15%	33%
Basement	7%	7%	10%	3%	7%	3%
Mobile home skirting	<1%	<1%	1%	0%	0%	0%
Not applicable (not on ground floor)	7%	9%	9%	6%	8%	4%
Sample Size (n)	1,984	387	166	170	53	164

Source: 2013 CLASS.

Table 70: Foundation Type – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Slab	46%	45%	62%	58%	50%
Crawl	43%	51%	15%	30%	35%
Basement	10%	4%	5%	6%	6%
Mobile home skirting	0%	0%	0%	0%	<1%
Not applicable (not on ground floor)	0%	0%	18%	6%	8%
Sample Size (n)	180	76	118	99	265

Source: 2013 CLASS.

Table 71: Refrigerator Characteristics – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Number of Refrigerators						
One	70%	77%	82%	73%	74%	73%
Two or three	29%	22%	18%	26%	26%	24%
Style						
Single door	12%	10%	6%	12%	9%	13%
Top/bottom doors	55%	63%	66%	61%	64%	60%
Side-by-side doors	33%	27%	28%	26%	27%	28%
Size						
Small (<17 cu ft)	14%	13%	13%	15%	9%	14%
Medium (17-20 cu ft)	28%	37%	34%	39%	34%	39%
Large (>20 cu ft)	57%	50%	54%	46%	57%	47%
Type of Defrost						
Frost-free	94%	91%	94%	88%	94%	88%
Partial frost-free	3%	4%	4%	5%	0%	4%
Manual	4%	5%	3%	7%	7%	8%
Age						
<6 years	24%	28%	27%	28%	43%	28%
6-10 years	37%	42%	42%	41%	37%	40%
11-15 years	24%	18%	20%	17%	8%	21%
16+ years	16%	13%	10%	15%	12%	12%
Average Age	9.8	8.8	8.8	9.0	7.3	8.5
Standard Error	0.2	0.4	0.5	0.5	1.1	0.5
Sample Size (n, Age)	1,249	268	111	134	25	124
Sample Size (n, Type)	1,987	388	166	171	53	165

Source: 2013 CLASS.

Table 72: Refrigerator Characteristics – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Number of Refrigerators					
One	64%	72%	92%	78%	79%
Two or three	35%	27%	8%	21%	21%
Style					
Single door	10%	10%	7%	9%	9%
Top/bottom doors	52%	63%	80%	71%	63%
Side-by-side doors	37%	27%	13%	21%	27%
Size					
Small (<17 cu ft)	12%	12%	14%	12%	13%
Medium (17-20 cu ft)	22%	40%	55%	48%	32%
Large (>20 cu ft)	65%	48%	31%	40%	54%
Type of Defrost					
Frost-free	90%	92%	94%	90%	93%
Partial frost-free	5%	2%	3%	5%	2%
Manual	5%	7%	3%	5%	4%
Age					
<6 years	28%	20%	31%	34%	24%
6-10 years	45%	43%	44%	41%	44%
11-15 years	16%	18%	17%	10%	20%
16+ years	11%	19%	8%	15%	12%
Average Age	9.3	9.9	7.9	8.3	9.1
Standard Error	0.5	0.8	0.6	0.7	0.4
Sample Size (n, Age)	142	57	63	69	174
Sample Size (n, Type)	178	75	118	99	266

Source: 2013 CLASS.

Table 73: Home Appliance Types – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Dishwasher	74%	50%	45%	54%	56%	52%
No Dishwasher	26%	50%	55%	46%	44%	48%
Clothes Washer	81%	68%	68%	70%	63%	74%
No Clothes Washer	19%	32%	32%	30%	37%	26%
Clothes Dryer	79%	66%	65%	68%	60%	72%
Electric	28%	24%	42%	8%	17%	7%
Gas	49%	40%	21%	59%	43%	65%
Propane	2%	2%	2%	1%	1%	0%
No Clothes Dryer	21%	35%	35%	32%	40%	28%
Sample Size (n)	1,987	388	166	171	53	165

Source: 2013 CLASS.

Table 74: Home Appliance Types – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Dishwasher	61%	44%	41%	26%	58%
No Dishwasher	39%	56%	59%	74%	42%
Clothes Washer	94%	97%	30%	60%	71%
No Clothes Washer	6%	3%	70%	40%	29%
Clothes Dryer	91%	91%	29%	53%	73%
Electric	31%	32%	15%	15%	27%
Gas	58%	56%	15%	38%	41%
Propane	2%	3%	0%	0%	3%
No Clothes Dryer	9%	9%	71%	47%	29%
Sample Size (n)	180	76	118	99	266

Source: 2013 CLASS.

Table 75: Lighting Types – By Population Segment and IOU

	Percent of California Population	Percent of California LI Population	Percent of California LI Population			
	Total	Total	PG&E	SCE	SDG&E	SoCalGas
Lighting Type						
Incandescent Lamps	47%	41%	40%	41%	41%	42%
CFLs	34%	41%	42%	39%	40%	39%
Fluorescent Fixtures	7%	8%	7%	9%	11%	9%
Halogen Lamps	7%	4%	3%	4%	3%	4%
Other	4%	7%	7%	7%	5%	6%
Lighting Controls Installed	18%	14%	15%	14%	12%	14%
No Lighting Controls	82%	86%	85%	86%	88%	86%
Sample Size (n)[11]	64,297	8,982	3,846	3,988	1,213	3,959

Source: 2013 CLASS.

Table 76: Lighting Types – By Home Type and Language for California LI Population

	Percent of California LI Population				
	Single-Family Own	Single-Family Rent	Multi-Family	Primary Language Spanish	English Only
Lighting Type					
Incandescent Lamps	44%	37%	38%	31%	45%
CFLs	36%	43%	47%	48%	38%
Fluorescent Fixtures	8%	8%	8%	9%	7%
Halogen Lamps	5%	4%	2%	3%	4%
Other	7%	9%	6%	9%	5%
Lighting Controls Installed	15%	13%	14%	9%	16%
No Lighting Controls	85%	88%	86%	91%	84%
Sample Size (n)	5,332	1,715	1,648	1,697	6,654

Source: 2013 CLASS.

[11] The n's in this table reflect the number of lighting fixtures in the CLASS sample rather than the number of households.

7.3.2 RASS Data

The following series of tables presents home and equipment data that are weather-sensitive by climate zone from the 2010 RASS (KEMA). The RASS data were introduced in Section 2.4. The segments shown in the tables, along with the sample sizes, are:

- Climate Zone Group:
  - Central Valley - CEC building climate zone 11-13 (n = 1,463);
  - Desert – CEC building climate zone 14 and 15 (n = 724);
  - Mountain - CEC building climate zone 16 (n = 394);
  - North Coast - CEC building climate zones 1-5 (n = 1,121);
  - South Coast - CEC building climate zones 6-8 (n = 2,166); and
  - South Inland - CEC building climate zone 9 and 10 (n = 2,102).
- ESA Measure Eligibility (based on 2009-2011):
  - Room Air Conditioner Replacement and Evaporative Cooler Installation - CEC building climate zones 10-16 (n = 3,476); and
  - Central Air Conditioner Replacement CEC building climate zones 13-15 (n = 1,504).

Table 77: Heating Fuel Type by Regional Climate Zone for California LI Population

	Total	Climate Zone - Region					
		Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Heating Fuel							
Natural Gas	71%	73%	71%	50%	73%	68%	73%
Electric	6%	7%	3%	17%	8%	7%	3%
Propane	3%	6%	5%	12%	3%	0%	1%
Wood/coal	2%	4%	3%	9%	2%	0%	0%
Other	5%	4%	13%	7%	5%	5%	5%
No heating equipment/ systems	9%	2%	2%	3%	5%	16%	13%
No Response	4%	5%	3%	3%	4%	4%	5%

Source: 2010 RASS.

Table 78: Heating Set Point Range by Regional Climate Zone for California LI Population

		Climate Zone - Region					
	Total	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Morning							
55 to 60 °F	4%	3%	4%	21%	5%	3%	3%
61 to 65 °F	12%	15%	14%	12%	18%	7%	8%
66 to 70 °F	19%	26%	21%	15%	23%	16%	14%
71 to 75 °F	12%	18%	18%	16%	6%	9%	14%
Below 55 °F	2%	1%	1%	1%	2%	2%	1%
No response	11%	8%	13%	9%	11%	14%	11%
Not applicable	20%	8%	10%	15%	16%	29%	25%
Off	18%	17%	16%	9%	18%	18%	21%
Over 75 °F	3%	4%	3%	2%	0%	2%	3%
Day							
55 to 60 °F	3%	2%	6%	6%	5%	1%	3%
61 to 65 °F	9%	11%	7%	14%	17%	7%	6%
66 to 70 °F	14%	21%	15%	11%	15%	10%	12%
71 to 75 °F	10%	19%	15%	13%	5%	6%	11%
Below 55 °F	1%	2%	2%	2%	2%	1%	1%
No response	11%	8%	13%	9%	11%	14%	11%
Not applicable	20%	8%	10%	15%	16%	29%	25%
Off	29%	26%	29%	31%	30%	30%	30%
Over 75 °F	2%	2%	3%	1%	0%	2%	2%
Evening							
55 to 60 °F	3%	3%	3%	4%	5%	3%	2%
61 to 65 °F	9%	9%	4%	13%	16%	5%	6%
66 to 70 °F	21%	29%	26%	17%	23%	18%	16%
71 to 75 °F	14%	23%	19%	14%	7%	8%	16%
Below 55 °F	1%	0%	2%	0%	1%	1%	1%
No response	11%	8%	13%	9%	11%	14%	11%
Not applicable	20%	8%	10%	15%	16%	29%	25%
Off	19%	17%	18%	27%	21%	19%	20%
Over 75 °F	3%	3%	4%	1%	0%	4%	3%
Night							
55 to 60 °F	5%	5%	5%	10%	6%	3%	5%
61 to 65 °F	12%	17%	9%	11%	17%	8%	7%
66 to 70 °F	14%	14%	23%	10%	16%	11%	14%
71 to 75 °F	10%	18%	11%	10%	4%	8%	10%
Below 55 °F	3%	4%	3%	6%	3%	3%	2%

		Climate Zone - Region					
	Total	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
No response	11%	8%	13%	9%	11%	14%	11%
Not applicable	20%	8%	10%	15%	16%	29%	25%
Off	24%	22%	23%	28%	27%	22%	24%
Over 75 °F	2%	4%	3%	1%	0%	2%	3%

Source: 2010 RASS.

Table 79: Heating Set Point Range by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Morning		
55 to 60 °F	5%	3%
61 to 65 °F	14%	13%
66 to 70 °F	23%	23%
71 to 75 °F	19%	18%
Below 55 °F	1%	2%
No response	9%	9%
Not applicable	10%	11%
Off	17%	17%
Over 75 °F	3%	3%
Day		
55 to 60 °F	3%	3%
61 to 65 °F	10%	9%
66 to 70 °F	19%	16%
71 to 75 °F	18%	20%
Below 55 °F	2%	1%
No response	9%	9%
Not applicable	10%	11%
Off	28%	29%
Over 75 °F	2%	2%
Evening		
55 to 60 °F	3%	3%
61 to 65 °F	8%	5%
66 to 70 °F	25%	23%
71 to 75 °F	22%	23%
Below 55 °F	1%	1%
No response	9%	9%
Not applicable	10%	11%
Off	19%	21%
Over 75 °F	3%	3%
Night		
55 to 60 °F	6%	5%
61 to 65 °F	14%	13%
66 to 70 °F	15%	18%
71 to 75 °F	16%	18%
Below 55 °F	4%	2%

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
No response	9%	9%
Not applicable	10%	11%
Off	24%	19%
Over 75 °F	3%	6%

Source: 2010 RASS.

Table 80: Cooling Thermostat by Regional Climate Zone for California LI Population

	Total	Climate Zone - Region					
		Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Cooling Thermostat							
Standard (Not Programmable)	17%	24%	20%	15%	6%	15%	22%
Programmable	14%	27%	25%	19%	5%	7%	16%
Programmable Communicating	9%	12%	24%	20%	7%	4%	8%
None	8%	11%	15%	13%	5%	6%	9%
Not Applicable	47%	22%	12%	31%	73%	66%	38%
No Response	4%	4%	4%	2%	5%	2%	7%

Source: 2010 RASS.

Table 81: Cooling Thermostat by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Cooling Thermostat		
Standard (Not Programmable)	25%	27%
Programmable	26%	25%
Programmable Communicating	14%	17%
None	11%	13%
Not Applicable	20%	13%
No Response	5%	5%

Source: 2010 RASS.

Table 82: Cooling Set Point Range by Regional Climate Zone for California LI Population

	Total	Climate Zone - Region					
		Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Morning							
70 to 73 °F	4%	5%	14%	3%	2%	2%	4%
74 to 76 °F	6%	11%	11%	9%	2%	2%	6%
77 to 80 °F	7%	12%	16%	19%	0%	3%	8%
Above 80 °F	1%	3%	2%	1%	0%	1%	1%
Below 70 °F	3%	4%	2%	3%	4%	2%	2%
No response	4%	4%	8%	2%	5%	3%	5%
Not applicable	57%	34%	27%	51%	79%	74%	49%
Off	18%	27%	20%	11%	7%	14%	25%
Day							
70 to 73 °F	6%	7%	9%	5%	4%	4%	9%
74 to 76 °F	7%	14%	12%	8%	3%	3%	7%
77 to 80 °F	9%	18%	18%	6%	1%	4%	11%
Above 80 °F	2%	3%	4%	1%	0%	1%	2%
Below 70 °F	4%	6%	3%	3%	2%	4%	3%
No response	4%	4%	8%	2%	5%	3%	5%
Not applicable	57%	34%	27%	51%	79%	74%	49%
Off	11%	14%	18%	24%	6%	8%	14%
Evening							
70 to 73 °F	7%	9%	17%	7%	4%	3%	9%
74 to 76 °F	8%	18%	12%	8%	3%	3%	9%
77 to 80 °F	9%	19%	21%	9%	1%	3%	11%
Above 80 °F	1%	3%	3%	1%	0%	1%	1%
Below 70 °F	4%	6%	3%	2%	3%	3%	3%
No response	4%	4%	8%	2%	5%	3%	5%
Not applicable	57%	34%	27%	51%	79%	74%	49%
Off	10%	8%	9%	19%	6%	11%	12%
Night							
70 to 73 °F	4%	5%	13%	4%	2%	3%	5%
74 to 76 °F	6%	14%	8%	4%	2%	2%	6%
77 to 80 °F	7%	12%	19%	5%	0%	3%	8%
Above 80 °F	2%	3%	2%	1%	0%	1%	1%
Below 70 °F	3%	5%	3%	2%	2%	2%	2%
No response	4%	4%	8%	2%	5%	3%	5%
Not applicable	57%	34%	27%	51%	79%	74%	49%
Off	18%	22%	20%	31%	9%	12%	24%

Source: 2010 RASS.

Table 83: Cooling Set Point Range by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Morning		
70 to 73 °F	6%	8%
74 to 76 °F	11%	13%
77 to 80 °F	14%	15%
Above 80 °F	2%	3%
Below 70 °F	3%	4%
No response	5%	6%
Not applicable	32%	26%
Off	27%	26%
Day		
70 to 73 °F	8%	6%
74 to 76 °F	13%	14%
77 to 80 °F	18%	21%
Above 80 °F	3%	5%
Below 70 °F	5%	7%
No response	5%	6%
Not applicable	32%	26%
Off	16%	16%
Evening		
70 to 73 °F	10%	10%
74 to 76 °F	16%	18%
77 to 80 °F	19%	21%
Above 80 °F	3%	3%
Below 70 °F	5%	6%
No response	5%	6%
Not applicable	32%	26%
Off	11%	10%
Night		
70 to 73 °F	7%	7%
74 to 76 °F	12%	16%
77 to 80 °F	14%	16%
Above 80 °F	3%	4%
Below 70 °F	4%	6%
No response	5%	6%
Not applicable	32%	26%
Off	25%	20%

Source: 2010 RASS.

Table 84: Primary Type of Heating Equipment by Regional Climate Zone for California LI Population

	Total	Climate Zone - Region					
		Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Electric							
Portable Heaters	5%	4%	5%	5%	3%	4%	7%
Heat Pump	2%	3%	4%	3%	0%	3%	2%
Through-the-wall Electric Heat Pump	1%	1%	1%	1%	2%	1%	2%
Central Forced Air Electric Furnace	5%	8%	4%	9%	3%	5%	5%
Resistance/Baseboard	5%	3%	2%	7%	6%	7%	3%
Other Electric	1%	0%	0%	2%	2%	1%	0%
Natural Gas							
Central Forced Air Gas Furnace	37%	46%	56%	36%	32%	29%	38%
Space Heaters/Wall Units	24%	17%	14%	10%	34%	27%	21%
Other Gas	1%	1%	1%	0%	0%	1%	1%
Fireplace	0%	0%	0%	0%	1%	0%	0%
Steam	1%	1%	1%	0%	1%	2%	1%
Propane							
Central Forced Air Propane Furnace	2%	5%	2%	7%	2%	0%	0%
Other Propane	0%	0%	0%	0%	0%	0%	0%
Steam	0%	0%	0%	0%	0%	0%	0%
Floor or Wall Propane Heater	1%	1%	2%	3%	1%	0%	0%
Wood or Coal							
Fireplace	1%	2%	2%	4%	0%	0%	0%
Stove/Stove Insert	1%	2%	1%	5%	1%	0%	0%
Solar Heat							
Solar Heat Electric Backup	0%	0%	0%	0%	0%	0%	0%
Solar Heat Natural Gas Backup	0%	0%	0%	0%	0%	0%	0%
Solar Heat Propane Backup	0%	0%	0%	1%	0%	0%	0%
Solar Heat No Backup	0%	0%	0%	0%	0%	0%	0%
Other	0%	0%	0%	1%	0%	0%	1%
No primary heating equipment/systems	13%	7%	5%	6%	9%	20%	18%

Source: 2010 RASS.

Table 85: Primary Type of Heating Equipment by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Electric		
Portable Heaters	4%	5%
Heat Pump	3%	2%
Through-the-wall Electric Heat Pump	1%	1%
Central Forced Air Electric Furnace	8%	7%
Resistance/Baseboard	3%	2%
Other Electric	0%	0%
Natural Gas		
Central Forced Air Gas Furnace	48%	54%
Space Heaters/Wall Units	14%	16%
Other Gas	1%	1%
Fireplace	0%	0%
Steam	1%	1%
Propane		
Central Forced Air Propane Furnace	4%	2%
Other Propane	0%	0%
Steam	0%	0%
Floor or Wall Propane Heater	1%	1%
Wood or Coal		
Fireplace	2%	1%
Stove/Stove Insert	1%	1%
Solar Heat		
Solar Heat Electric Backup	0%	0%
Solar Heat Natural Gas Backup	0%	0%
Solar Heat Propane Backup	0%	0%
Solar Heat No Backup	0%	0%
Other	0%	0%
No primary heating equipment/systems	8%	7%

Source: 2010 RASS.

Table 86: Cooling Equipment/System Type by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Cooling System		
Central Air Conditioners Only	49%	52%
Room Air Conditioners Only	14%	9%
Central Evaporative Coolers Only	6%	8%
Multiple Types of AC	22%	25%
No AC	9%	6%

Source: 2010 RASS.

Table 87: Existing Exterior Wall Insulation by Regional Climate Zone for California LI Population

		Climate Zone - Region					
	Total	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Existing Insulation							
Has no Wall Insulation	29%	18%	18%	19%	31%	37%	29%
Has some Wall Insulation	18%	20%	14%	14%	17%	18%	18%
Has Wall Insulation everywhere	39%	52%	53%	40%	39%	27%	36%
No Response	14%	10%	14%	26%	12%	17%	17%

Source: 2010 RASS.

Table 88: Existing Exterior Wall Insulation by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Existing Insulation		
Has no Wall Insulation	19%	21%
Has some Wall Insulation	17%	18%
Has Wall Insulation everywhere	51%	51%
No Response	12%	10%

Source: 2010 RASS.

Table 89: Existing Attic Insulation by Regional Climate Zone for California LI Population

	Total	Climate Zone - Region					
		Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Inches of Attic Insulation							
No insulation	48%	40%	30%	31%	47%	58%	51%
0-3 Inches	16%	17%	18%	21%	16%	12%	17%
4-6 Inches	18%	23%	29%	16%	16%	12%	19%
7-10 Inches	5%	6%	6%	6%	7%	4%	3%
More than 10 Inches	2%	1%	4%	4%	2%	2%	2%
No Response	12%	13%	13%	22%	12%	12%	8%

Source: 2010 RASS.

Table 90: Existing Attic Insulation by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Inches of Attic Insulation		
No insulation	38%	39%
0-3 Inches	18%	17%
4-6 Inches	24%	23%
7-10 Inches	5%	3%
More than 10 Inches	2%	2%
No Response	13%	15%

Source: 2010 RASS.

Table 91: RASS Window Type by Regional Climate Zone for California LI Population

	Total	Climate Zone - Region					
		Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Type of Window							
All or most single pane	29%	53%	39%	45%	43%	55%	52%
Mixture Single and Double Pane	18%	7%	12%	10%	12%	9%	11%
All or Most Double Pane	39%	35%	44%	40%	40%	25%	28%
No Response	14%	4%	5%	5%	5%	11%	10%

Source: 2010 RASS.

Table 92: Window Type by ESA Measure Eligibility for California LI Population

	Climate Zone – ESA Measure Eligibility	
	RAC Replace and Evap. Cooler Install	CAC Replacement
Type of Window		
All or most single pane	51%	49%
Mixture Single and Double Pane	8%	11%
All or Most Double Pane	36%	36%
No Response	5%	4%

Source: 2010 RASS.

8 Telephone Survey Detailed Results

8.1 Comparison to Census

Table 22 (from Section 7.1.2 above) compared the customer telephone survey to PUMS, which we assume is the most reliable source. Below in Table 93 we show just the PUMS and telephone survey columns from the data source comparison table. As shown, the telephone survey overrepresents the following segments:

- Homeowners
- Households with seniors
- White respondents
- Households where English is the primary language

We developed adjustment weights to correct for the difference in home ownership, but we did not attempt to weight the sample of non-English speakers and non-white respondents. Given the study resource constraints, we were unable to conduct a survey with all non-English speakers (we conducted a Spanish-language version of the survey). We do not want to represent our non-white/non-English speaking samples as reflective of the total population of non-white and non-English speakers. Instead, we provide results in this appendix broken out by these segments.

Table 94 shows the home ownership and home type differences between Census and the customer telephone survey data broken out by IOU.

Table 93: Comparison of Demographic Characteristics Across Secondary Sources and the Customer Telephone Survey for California LI Population

	Data Source	
Demographic Characteristic	**2011 PUMS LI Sample**	**2013 LINA Telephone Survey**
% own	33%	51%
% with seniors*	26%	53%
Primary language is English	46%	76%
Respondent is white	36%	46%
% Single-family home	51%	56%
% Multi-family home	43%	40%
Average # people in the home	3.0	3.0
Average age of home	47	41
*Definition of senior	Over 65 years	Over 60 years

Sources: 2011 PUMS; 2013 CARE Participant Telephone Survey.

Table 94: Comparison of Demographic Characteristics Across Secondary Sources and the Customer Telephone Survey for California LI Population – Own/Rent/Other and Home Type by IOU

		PG&E	SCE	SDG&E	SoCalGas
2011 PUMS	Multi-Family Own	1%	2%	2%	2%
	Multi-Family Rent	36%	42%	40%	42%
	Multi-Family Other	0%	0%	0%	0%
	SF/Mobile Own	34%	31%	35%	30%
	SF/Mobile Rent	25%	23%	20%	23%
	SF/Mobile Other	3%	2%	2%	2%
2013 CARE Participant Survey	Multi-Family Own	4%	4%	9%	5%
	Multi-Family Rent	28%	22%	45%	24%
	Multi-Family Other	0%	0%	0%	0%
	SF/Mobile Own	52%	58%	34%	55%
	SF/Mobile Rent	15%	15%	11%	15%
	SF/Mobile Other	2%	1%	0%	0%

Sources: 2011 PUMS; 2013 CARE Participant Telephone Survey.

8.2 Telephone Survey Results[12]

Tables below show the weight used for each segment that phone survey results are presented by in this section.

Table 95: Weight Used by ESA Participation and Utility for California LI Population

	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Weight	0.87	1.19	1.1	1.03	0.42	1.19	1.02

Source: 2013 CARE Participant Telephone Survey.

Table 96: Weight Used by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Weight	0.65	1.68	1.19	0.78	0.98	1.11	0.93	1.01	0.9

Source: 2013 CARE Participant Telephone Survey.

Table 97: Weight Used by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Weight	1.04	0.97	0.88	1.14	0.87	1.03	1.05	0.94

Source: 2013 CARE Participant Telephone Survey.

[12] Multi-family homes are defined as any housing structure with two or more units. This differs from the 2007 KEMA study were multi-family homes are defined as housing structures with five or more units. This also differs from the concurrent Cadmus multi-family LI study, which also defines multi-family homes as housing structures with five or more units.

8.2.1 Program Accessibility-ESA

Table 98: ESA Awareness (S17) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
ESA Awareness								
Unaware of ESA	32%	29%	36%	31%	33%	31%	33%	32%
Aware of ESA	68%	71%	64%	69%	67%	69%	67%	68%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 99: ESA Awareness (S17) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
ESA Awareness									
Unaware of ESA	33%	26%	36%	36%	27%	42%	43%	32%	23%
Aware of ESA	67%	74%	64%	64%	73%	58%	57%	68%	77%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 100: ESA Awareness (S17) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
ESA Awareness						
Unaware of ESA	32%	27%	19%	30%	30%	37%
Aware of ESA	68%	73%	81%	70%	70%	63%
Total (n)	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

Table 101: Source of ESA Awareness (E1) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How found out about ESA								
Friend/family/colleague	27%	23%	31%	26%	27%	24%	28%	27%
Utility bill insert	21%	19%	23%	21%	21%	25%	20%	21%
Utility mailing	18%	18%	18%	15%	22%	16%	22%	22%
Phone call to me/household	9%	8%	10%	16%	3%	11%	3%	3%
Other- utility	8%	9%	8%	7%	12%	11%	9%	12%
Someone went to house	13%	17%	9%	13%	14%	5%	14%	15%
Television	5%	4%	6%	3%	4%	8%	7%	4%
Newspaper/news media/radio	3%	2%	4%	5%	3%	2%	2%	3%
While signing up for other program	4%	4%	4%	4%	6%	5%	4%	6%
Utility website	3%	1%	5%	1%	4%	5%	4%	4%
Community based organization	2%	2%	2%	3%	3%	2%	2%	3%
Door advertisement	1%	1%	1%	2%	1%	1%	1%	1%
Other	4%	6%	2%	4%	4%	4%	4%	4%
Don't know	12%	13%	11%	13%	11%	13%	11%	11%
Total (n)	619	366	253	240	224	129	248	222

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 102: Source of ESA Awareness (E1) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How found out about ESA									
Friend/family/colleague	25%	32%	25%	28%	25%	26%	29%	26%	41%
Utility bill insert	26%	19%	18%	30%	23%	19%	17%	21%	27%
Utility mailing	14%	12%	19%	29%	22%	12%	16%	19%	9%
Phone call to me/household	15%	7%	6%	12%	10%	5%	15%	9%	21%
Other- utility	9%	8%	8%	3%	7%	8%	0%	8%	4%
Someone went to house	11%	14%	14%	22%	11%	19%	8%	13%	10%
Television	4%	4%	6%	0%	4%	7%	0%	5%	14%
Newspaper/news media/radio	6%	3%	2%	3%	5%	1%	0%	3%	1%
While signing up for other program	5%	4%	4%	0%	3%	4%	4%	4%	0%
Utility website	2%	5%	2%	0%	2%	1%	32%	3%	0%
Community based organization	2%	2%	3%	3%	3%	3%	0%	2%	2%
Door advertisement	1%	1%	2%	0%	1%	1%	0%	1%	3%
Other	1%	2%	8%	0%	4%	2%	1%	4%	0%
Don't know	15%	15%	9%	10%	12%	13%	7%	12%	12%
Total (n)	303	84	204	23	346	105	28	583	36

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 103: Source of ESA Awareness (E1) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
How found out about ESA						
Friend/family/colleague	30%	32%	43%	22%	24%	27%
Utility bill insert	25%	27%	28%	15%	20%	21%
Utility mailing	15%	17%	14%	15%	24%	19%
Phone call to me/household	16%	3%	11%	14%	5%	4%
Other- utility	8%	24%	9%	4%	13%	4%
Someone went to house	10%	6%	10%	16%	15%	14%
Television	2%	5%	11%	5%	6%	7%
Newspaper/news media/radio	3%	2%	0%	6%	4%	1%
While signing up for other program	4%	2%	0%	5%	5%	4%
Utility website	2%	0%	6%	1%	4%	6%
Community based organization	2%	6%	9%	4%	1%	1%
Door advertisement	2%	5%	5%	0%	0%	1%
Other	3%	5%	0%	4%	6%	2%
Don't know	12%	10%	6%	14%	12%	12%
Total (n)	148	39	19	99	174	140

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 104: Preference of Sources to Learn More About Programs (F0a_2) by ESA Awareness by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How like to learn more about programs								
Mail	56%	57%	56%	54%	57%	49%	59%	58%
Email	9%	8%	10%	9%	10%	13%	9%	10%
None/Don't want information	5%	3%	7%	7%	4%	7%	4%	4%
Phone	8%	8%	7%	8%	9%	4%	8%	9%
Online/internet	3%	2%	3%	1%	4%	4%	4%	4%
Other	2%	3%	2%	1%	2%	1%	3%	2%
TV	2%	2%	2%	3%	2%	2%	2%	2%
Community or assistance organizations	2%	2%	1%	2%	1%	3%	1%	1%
Flyer/brochure/print media	2%	2%	1%	2%	1%	3%	1%	1%
Come to my home	1%	2%	1%	2%	2%	2%	1%	2%
Word-of mouth (Friends, neighbors, etc.)	1%	1%	1%	1%	1%	2%	1%	1%
Don't know	8%	10%	7%	9%	7%	9%	8%	7%
At a meeting	1%	1%	0%	1%	0%	1%	1%	0%
Total (n)	863	505	358	234	378	199	426	374

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 105: Preference of Sources to Learn More About Programs (F0a_2) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How like to learn more about programs									
Mail	55%	58%	53%	54%	55%	65%	29%	56%	66%
Email	10%	11%	9%	4%	10%	3%	16%	10%	3%
None/Don't want information	6%	1%	6%	10%	8%	1%	2%	5%	7%
Phone	4%	14%	7%	17%	7%	7%	11%	7%	16%
Online/internet	2%	0%	5%	2%	3%	1%	3%	3%	0%
Other	4%	0%	3%	0%	3%	2%	5%	2%	0%
TV	2%	2%	2%	0%	1%	3%	7%	2%	0%
Community or assistance organizations	2%	2%	1%	3%	2%	0%	0%	2%	0%
Flyer/brochure/print media	2%	2%	1%	0%	2%	1%	0%	2%	0%
Come to my home	2%	1%	2%	2%	1%	1%	1%	1%	0%
Word-of mouth (Friends, neighbors, etc.)	2%	0%	1%	0%	1%	0%	5%	1%	3%
Don't know	7%	9%	9%	8%	6%	14%	20%	9%	3%
At a meeting	2%	0%	0%	0%	1%	1%	0%	0%	3%
Total (n)	401	115	312	29	418	200	42	830	32

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 106: Preference of Sources to Learn More About Programs (F0a_2) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
How like to learn more about programs						
Mail	51%	68%	67%	56%	58%	55%
Email	7%	15%	8%	12%	12%	6%
None/Don't want information	9%	2%	6%	3%	4%	5%
Phone	11%	8%	14%	9%	4%	7%
Online/internet	1%	0%	0%	0%	5%	4%
Other	4%	1%	0%	1%	1%	3%
TV	3%	0%	0%	3%	2%	2%
Community or assistance organizations	1%	0%	0%	3%	1%	2%
Flyer/brochure/print media	3%	0%	0%	2%	1%	2%
Come to my home	2%	0%	0%	1%	1%	2%
Word-of mouth (Friends, neighbors, etc.)	1%	2%	0%	1%	2%	0%
Don't know	8%	4%	0%	10%	7%	10%
At a meeting	0%	0%	5%	1%	1%	1%
Total (n)	168	59	17	93	265	261

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 107: Community Center/Meeting Attendance (F14a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Visit local community center or attend community meetings								
A lot	3%	4%	2%	3%	3%	5%	3%	3%
Sometimes	24%	27%	21%	23%	28%	24%	25%	28%
Never	73%	69%	77%	74%	69%	71%	72%	69%
Total (n)	1,021	606	415	386	382	201	430	378

Source: 2013 CARE Participant Telephone Survey.

Table 108: Community Center/Meeting Attendance (F14a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Visit local community center or attend community meetings									
A lot	3%	3%	4%	1%	4%	2%	1%	3%	0%
Sometimes	26%	21%	26%	17%	23%	28%	19%	24%	35%
Never	72%	76%	71%	81%	73%	70%	80%	73%	65%
Total (n)	480	136	356	42	528	211	49	972	48

Source: 2013 CARE Participant Telephone Survey.

Table 109: Community Center/Meeting Attendance (F14a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Visit local community center or attend community meetings						
A lot	3%	2%	0%	3%	5%	2%
Sometimes	20%	33%	24%	30%	20%	26%
Never	77%	65%	76%	67%	75%	72%
Total (n)	252	59	24	154	269	263

Source: 2013 CARE Participant Telephone Survey.

Table 110: Religious Service Attendance (F14b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Attend religious service								
A lot	28%	30%	26%	29%	26%	29%	27%	26%
Sometimes	42%	41%	43%	36%	50%	33%	49%	51%
Never	30%	29%	31%	35%	23%	38%	24%	23%
Total (n)	1,019	606	413	382	382	203	430	378

Source: 2013 CARE Participant Telephone Survey.

Table 111: Religious Service Attendance (F14b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Attend religious service									
A lot	32%	24%	27%	20%	33%	27%	23%	28%	38%
Sometimes	40%	45%	44%	47%	32%	53%	51%	43%	22%
Never	28%	31%	30%	33%	35%	20%	26%	29%	39%
Total (n)	479	136	356	41	527	212	49	971	47

Source: 2013 CARE Participant Telephone Survey.

Table 112: Religious Service Attendance (F14b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Attend religious service						
A lot	27%	21%	41%	29%	26%	31%
Sometimes	44%	43%	29%	30%	48%	44%
Never	29%	36%	30%	40%	25%	25%
Total (n)	250	59	23	153	272	262

Source: 2013 CARE Participant Telephone Survey.

Table 113: Internet Availability/Bill Pay (I1c, F15) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Internet availability/bill pay								
Has internet	34%	35%	32%	33%	33%	40%	33%	32%
Does not have internet	31%	35%	27%	36%	28%	22%	29%	28%
Has internet and pays bill online always or sometimes	35%	30%	41%	31%	39%	38%	38%	39%
Total (n)	1,018	602	416	380	384	202	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 114: Internet Availability/Bill Pay (I1c, F15) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Internet availability/bill pay									
Has internet	35%	35%	33%	28%	33%	38%	26%	34%	26%
Does not have internet	29%	22%	35%	44%	31%	43%	11%	31%	33%
Has internet and pays bill online always or sometimes	35%	43%	33%	28%	36%	20%	64%	35%	41%
Total (n)	477	134	359	41	523	213	49	970	48

Source: 2013 CARE Participant Telephone Survey.

Table 115: Internet Availability/Bill Pay (I1c, F15) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Internet availability/bill pay						
Has internet	26%	39%	35%	40%	35%	35%
Does not have internet	36%	25%	43%	32%	31%	26%
Has internet and pays bill online always or sometimes	37%	36%	22%	28%	34%	39%
Total (n)	247	59	23	154	273	262

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 116: Paper/Electric Bill (I1) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Paper/electronic bill								
Paper bill	82%	87%	78%	83%	82%	79%	83%	82%
Electronic bill	15%	12%	17%	16%	15%	19%	13%	15%
Both paper and electronic	3%	1%	5%	1%	3%	3%	5%	3%
Total (n)	1,002	594	408	366	383	201	431	379

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 117: Paper/Electric Bill (I1) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Paper/electronic bill									
Paper bill	85%	76%	82%	97%	81%	94%	61%	82%	80%
Electronic bill	13%	19%	15%	3%	17%	6%	20%	14%	18%
Both paper and electronic	2%	5%	3%	0%	3%	0%	19%	3%	1%
Total (n)	472	134	350	40	516	211	48	953	48

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 118: Paper/Electric Bill (I1) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Paper/electronic bill						
Paper bill	83%	76%	100%	82%	82%	83%
Electronic bill	16%	24%	0%	18%	16%	9%
Both paper and electronic	1%	0%	0%	1%	2%	8%
Total (n)	241	59	23	146	272	261

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 119: Contact with IOU (I1a, I1aa) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Contact with IOU								
Reads emails	10%	8%	11%	9%	12%	16%	9%	12%
Reads bill inserts	67%	69%	65%	69%	68%	65%	66%	68%
Reads emails and bill inserts	1%	1%	2%	1%	2%	2%	2%	2%
Reads neither	22%	21%	22%	21%	19%	17%	23%	19%
Total (n)	1,018	607	411	384	381	201	429	377

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 120: Contact with IOU (I1a, I1aa) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Contact with IOU									
Reads emails	9%	13%	10%	1%	11%	4%	16%	9%	16%
Reads bill inserts	73%	58%	64%	84%	66%	74%	60%	67%	68%
Reads emails and bill inserts	1%	1%	2%	0%	2%	0%	0%	1%	1%
Reads neither	17%	28%	24%	15%	21%	22%	24%	22%	15%
Total (n)	479	134	356	42	527	213	48	968	49

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 121: Contact with IOU (I1a, I1aa) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Contact with IOU						
Reads emails	9%	21%	0%	11%	13%	5%
Reads bill inserts	67%	69%	72%	70%	66%	66%
Reads emails and bill inserts	1%	0%	0%	1%	1%	4%
Reads neither	24%	9%	28%	19%	21%	25%
Total (n)	250	59	24	154	271	260

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 122: Online Utility Bill Pay (I1c) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Online utility bill pay								
A lot	26%	20%	31%	24%	28%	32%	26%	28%
Sometimes	9%	9%	9%	7%	12%	7%	12%	12%
Never/No	65%	70%	59%	69%	61%	61%	62%	60%
Total (n)	1,017	603	414	387	381	197	429	377

Source: 2013 CARE Participant Telephone Survey.

Table 123: Online Utility Bill Pay (I1c) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Online utility bill pay									
A lot	27%	29%	25%	19%	27%	9%	57%	26%	25%
Sometimes	8%	14%	8%	8%	9%	11%	7%	9%	15%
Never/No	65%	58%	67%	73%	64%	80%	36%	65%	60%
Total (n)	480	135	353	42	527	212	49	967	49

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 124: Online Utility Bill Pay (I1c) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Online utility bill pay						
A lot	26%	26%	12%	24%	24%	29%
Sometimes	11%	10%	9%	5%	10%	10%
Never/No	63%	64%	79%	72%	66%	61%
Total (n)	253	58	24	154	266	262

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 125: Utility Website Visits (I1b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Visits Utility Website								
A lot	5%	5%	6%	5%	0%	0%	0%	0%
Sometimes	15%	15%	15%	15%	0%	0%	0%	0%
Never/No	80%	80%	80%	80%	0%	0%	0%	0%
Total (n)	150	95	55	150	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 126: Utility Website Visits (I1b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Visits Utility Website									
A lot	4%	5%	5%	16%	4%	19%	12%	6%	0%
Sometimes	18%	29%	5%	5%	16%	8%	21%	15%	18%
Never/No	78%	65%	90%	79%	80%	74%	68%	79%	82%
Total (n)	71	21	44	13	107	9	7	134	16

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 127: Utility Website Visits (I1b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Visits Utility Website						
A lot	7%	0%	0%	4%	0%	0%
Sometimes	16%	0%	13%	14%	0%	0%
Never/No	77%	0%	87%	82%	0%	0%
Total (n)	80	-	7	63	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 128: Utility Calls (I1d) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Calls Utility								
A lot	2%	3%	0%	2%	0%	0%	0%	0%
Sometimes	57%	57%	58%	57%	0%	0%	0%	0%
Never/No	41%	40%	42%	41%	0%	0%	0%	0%
Total (n)	149	95	54	149	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 129: Utility Calls (I1d) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Calls Utility									
A lot	3%	0%	3%	0%	2%	0%	0%	2%	0%
Sometimes	63%	66%	43%	79%	57%	45%	59%	55%	81%
Never/No	34%	34%	54%	21%	41%	55%	41%	43%	19%
Total (n)	71	21	43	13	107	8	7	132	17

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 130: Utility Calls (I1d) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Calls Utility						
A lot	1%	0%	0%	3%	0%	0%
Sometimes	63%	0%	87%	47%	0%	0%
Never/No	36%	0%	13%	50%	0%	0%
Total (n)	81	-	7	61	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 131: Years Lived at Current Address (S8a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Years lived at current address								
Less than three years at address	18%	13%	24%	18%	23%	18%	19%	23%
Three to twenty years at address	59%	58%	60%	60%	57%	61%	58%	56%
More than 20 years at address	22%	29%	16%	22%	20%	21%	23%	20%
Total (n)	1,027	609	418	389	384	202	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 132: Years Lived at Current Address (S8a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Years lived at current address									
Less than three years at address	5%	25%	26%	11%	17%	18%	23%	19%	14%
Three to twenty years at address	51%	65%	62%	67%	56%	68%	61%	59%	59%
More than 20 years at address	44%	10%	12%	22%	27%	14%	16%	22%	26%
Total (n)	483	136	359	42	531	213	49	977	49

Source: 2013 CARE Participant Telephone Survey.

Table 133: Years Lived at Current Address (S8a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Years lived at current address						
Less than three years at address	23%	32%	4%	13%	18%	16%
Three to twenty years at address	57%	57%	70%	63%	61%	57%
More than 20 years at address	20%	12%	25%	24%	22%	26%
Total (n)	253	59	24	156	273	262

Source: 2013 CARE Participant Telephone Survey.

8.2.2 Program Accessibility - CARE

Table 134: CARE Awareness (S11) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
CARE awareness								
Unaware of CARE	23%	26%	19%	18%	21%	23%	27%	21%
Aware of CARE	77%	74%	81%	82%	79%	77%	73%	79%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 135: CARE Awareness (S11) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
CARE awareness									
Unaware of CARE	21%	23%	24%	31%	16%	38%	30%	23%	9%
Aware of CARE	79%	77%	76%	69%	84%	62%	70%	77%	91%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 136: CARE Awareness (S11) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
CARE awareness						
Unaware of CARE	17%	24%	5%	20%	26%	29%
Aware of CARE	83%	76%	95%	80%	74%	71%
Total (n)	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

Table 137: Source of CARE Awareness (E22) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Source of CARE awareness								
Utility bill insert	31%	30%	32%	28%	32%	18%	36%	33%
Friend/family/colleague	23%	23%	21%	27%	20%	21%	19%	20%
Utility mailing	16%	11%	21%	11%	19%	14%	20%	18%
Phone call to me or household	7%	6%	9%	7%	5%	12%	7%	5%
Called the utility	10%	11%	9%	10%	12%	4%	11%	12%
Utility contacted me	6%	5%	7%	8%	6%	5%	5%	6%
Someone stopped by house	7%	7%	6%	6%	8%	1%	8%	8%
Television	3%	2%	5%	1%	3%	7%	5%	3%
Utility website	3%	3%	2%	2%	5%	3%	4%	5%
Utility-other	2%	2%	1%	2%	1%	9%	0%	1%
Paid bill at utility office/bill pay center	2%	2%	2%	2%	1%	7%	0%	1%
Learned about it when signed up for other program	2%	1%	3%	2%	3%	1%	2%	3%
Community based organization	2%	3%	2%	3%	2%	3%	1%	2%
Social services/case worker	2%	2%	1%	1%	2%	6%	1%	2%
Learned about it after receiving medical equipment/doctor	1%	2%	1%	0%	2%	3%	2%	2%
Landlord/property manager/manager of home	1%	2%	1%	2%	1%	1%	1%	1%
Newspaper	1%	1%	1%	0%	2%	0%	2%	2%
Previously on CARE	1%	1%	2%	1%	2%	0%	1%	2%
Through welfare/unemployment/social security/disability	1%	1%	0%	2%	0%	1%	0%	0%

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Other	3%	4%	2%	1%	5%	0%	5%	5%
Total (n)	602	365	237	232	239	115	253	237

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Multiple mentions allowed.

Table 138: Source of CARE Awareness (E22) by ESA Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Source of CARE awareness									
Utility bill insert	36%	24%	29%	34%	35%	26%	39%	31%	34%
Friend/family/colleague	19%	20%	26%	31%	23%	14%	35%	22%	38%
Utility mailing	17%	14%	18%	3%	15%	24%	8%	16%	13%
Phone call to me or household	7%	9%	7%	13%	7%	10%	9%	7%	7%
Called the utility	8%	14%	8%	26%	10%	11%	9%	10%	11%
Utility contacted me	6%	10%	5%	2%	7%	1%	3%	6%	2%
Someone stopped by house	8%	5%	6%	0%	5%	13%	0%	7%	3%
Television	3%	3%	5%	0%	2%	6%	3%	3%	8%
Utility website	2%	3%	3%	7%	3%	0%	2%	2%	9%
Utility-other	3%	1%	2%	0%	2%	1%	9%	2%	0%
Paid bill at utility office/bill pay center	4%	2%	1%	0%	0%	4%	6%	2%	0%
Learned about it when signed up for other program	2%	2%	3%	2%	1%	6%	0%	2%	0%
Community based organization	1%	5%	2%	0%	2%	1%	0%	2%	0%
Social services/case worker	1%	1%	3%	0%	2%	0%	1%	2%	0%
Learned about it after receiving medical equipment/doctor	2%	2%	0%	0%	1%	0%	0%	1%	0%
Landlord/property manager/manager of home	1%	0%	3%	0%	1%	1%	0%	1%	3%
Newspaper	1%	1%	0%	2%	1%	0%	9%	1%	1%
Previously on CARE	0%	3%	1%	2%	1%	0%	0%	1%	0%
Through welfare/unemployment/social security/disability	1%	1%	1%	0%	2%	0%	0%	1%	0%
Other	4%	3%	3%	0%	3%	2%	0%	3%	0%

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Total (n)	286	87	199	25	328	99	28	569	32

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Multiple mentions allowed.

Table 139: Source of CARE Awareness (E22) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Source of CARE awareness						
Utility bill insert	23%	33%	60%	32%	27%	40%
Friend/family/colleague	30%	43%	18%	24%	15%	16%
Utility mailing	14%	23%	11%	9%	23%	16%
Phone call to me or household	10%	5%	0%	4%	11%	5%
Called the utility	9%	6%	17%	12%	6%	12%
Utility contacted me	7%	5%	6%	8%	4%	6%
Someone stopped by house	4%	6%	5%	7%	3%	13%
Television	1%	0%	12%	1%	6%	5%
Utility website	1%	5%	6%	2%	4%	3%
Utility-other	2%	0%	5%	2%	3%	1%
Paid bill at utility office/bill pay center	3%	2%	0%	1%	3%	0%
Learned about it when signed up for other program	2%	0%	0%	2%	5%	0%
Community based organization	4%	0%	0%	3%	3%	1%
Social services/case worker	1%	0%	0%	2%	5%	0%
Learned about it after receiving medical equipment/doctor	0%	0%	0%	0%	4%	2%
Landlord/property manager/manager of home	1%	6%	6%	2%	0%	0%
Newspaper	1%	5%	0%	0%	0%	0%
Previously on CARE	1%	6%	0%	1%	1%	0%
Through welfare/unemployment/social security/disability	2%	0%	0%	2%	1%	0%
Other	1%	1%	0%	2%	5%	4%
Total (n)	144	34	18	99	160	147

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Multiple mentions allowed.

8.2.3 ESA Drivers

Table 140: Electricity/Gas Bill Change After Enrollment in CARE (E22a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Electric/gas bill compared to bills before program participation								
A lot less	25%	26%	24%	26%	25%	29%	23%	25%
Somewhat less	52%	52%	53%	49%	52%	51%	55%	52%
Somewhat more	5%	5%	5%	5%	4%	4%	5%	4%
A lot more	4%	4%	4%	4%	5%	4%	5%	5%
About the same as they were before the CARE discount	14%	14%	14%	15%	14%	12%	13%	14%
Total (n)	644	388	256	256	239	130	255	236

Source: 2013 CARE Participant Telephone Survey.

Table 141: Electricity/Gas Bill Change After Enrollment in CARE (E22a) by ESA Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Electric/gas bill compared to bills before program participation									
A lot less	22%	22%	27%	30%	26%	21%	27%	24%	36%
Somewhat less	58%	56%	47%	44%	52%	47%	51%	52%	51%
Somewhat more	4%	1%	7%	0%	5%	5%	7%	5%	1%
A lot more	6%	4%	4%	10%	3%	10%	1%	5%	0%
About the same as they were before the CARE discount	10%	17%	15%	17%	14%	18%	14%	14%	12%
Total (n)	305	90	219	25	352	104	32	607	36

Source: 2013 CARE Participant Telephone Survey.

Table 142: Electricity/Gas Bill Change After Enrollment in CARE (E22a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Electric/gas bill compared to bills before program participation						
A lot less	24%	33%	27%	25%	24%	24%
Somewhat less	50%	39%	73%	53%	51%	56%
Somewhat more	7%	3%	0%	2%	7%	4%
A lot more	4%	1%	0%	5%	4%	7%
About the same as they were before the CARE discount	16%	23%	0%	15%	13%	9%
Total (n)	159	37	18	107	168	155

Source: 2013 CARE Participant Telephone Survey.

Table 143: Energy Use After CARE Enrollment (E22b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Energy use now compared to usage before program participation								
A lot less	2%	3%	1%	2%	2%	5%	2%	2%
Somewhat less	8%	8%	7%	7%	11%	1%	9%	11%
Somewhat more	20%	20%	20%	14%	24%	25%	26%	24%
A lot more	9%	10%	8%	10%	8%	11%	8%	8%
About the same as they were before the CARE discount	61%	58%	64%	67%	56%	59%	55%	56%
Total (n)	667	404	263	258	257	134	272	254

Source: 2013 CARE Participant Telephone Survey.

Table 144: Energy Use After CARE Enrollment (E22b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Energy use now compared to usage before program participation									
A lot less	2%	1%	2%	10%	2%	2%	0%	2%	0%
Somewhat less	7%	8%	6%	0%	8%	7%	7%	8%	7%
Somewhat more	18%	23%	22%	12%	18%	24%	27%	21%	6%
A lot more	9%	6%	11%	11%	8%	6%	13%	9%	11%
About the same as they were before the CARE discount	63%	62%	58%	67%	64%	60%	53%	60%	76%
Total (n)	314	94	228	26	365	109	32	629	37

Source: 2013 CARE Participant Telephone Survey.

Table 145: Energy Use After CARE Enrollment (E22b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Energy use now compared to usage before program participation						
A lot less	2%	0%	0%	1%	4%	2%
Somewhat less	11%	13%	0%	6%	6%	7%
Somewhat more	13%	31%	11%	18%	29%	20%
A lot more	11%	12%	13%	9%	8%	6%
About the same as they were before the CARE discount	62%	44%	76%	67%	53%	65%
Total (n)	160	39	19	110	179	160

Source: 2013 CARE Participant Telephone Survey.

Table 146: Reasons for ESA Participation (E1a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for ESA Participation								
Lower energy bill(s)/save money/lower utility cost	49%	47%	51%	52%	46%	49%	46%	45%
We need(ed) something that the program offers	21%	22%	20%	16%	25%	23%	25%	25%
Get free assistance/I need the help/We are qualified for it/Because it was offered/financial reasons	9%	11%	7%	9%	11%	9%	8%	11%
Other	5%	5%	6%	7%	3%	6%	4%	3%
Save energy	6%	6%	6%	6%	6%	4%	7%	7%
No need/No interest	2%	0%	4%	1%	3%	2%	3%	3%
Low/fixed income/retired/disabled	5%	7%	2%	6%	3%	4%	3%	4%
If I owned my home/didn't rent	1%	0%	3%	0%	1%	3%	2%	2%
Help the environment	1%	0%	1%	2%	0%	0%	0%	0%
To see what could be done/if anything needs to be fixed	1%	1%	2%	1%	2%	0%	2%	2%
Total (n)	925	548	377	335	356	185	401	352

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 147: Reasons for ESA Participation (E1a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for ESA Participation									
Lower energy bill(s)/save money/lower utility cost	42%	56%	52%	42%	44%	57%	61%	49%	46%
We need(ed) something that the program offers	20%	18%	23%	25%	23%	20%	5%	21%	24%
Get free assistance/I need the help/We are qualified for it/Because it was offered/financial reasons	13%	8%	5%	8%	10%	7%	5%	9%	12%
Other	6%	5%	6%	11%	7%	2%	11%	5%	8%
Save energy	7%	8%	5%	1%	4%	9%	7%	6%	4%
No need/No interest	5%	0%	1%	2%	2%	1%	3%	2%	2%
Low/fixed income/retired/disabled	5%	3%	4%	7%	5%	3%	5%	5%	3%
If I owned my home/didn't rent	0%	0%	3%	0%	2%	0%	0%	2%	0%
Help the environment	1%	1%	0%	2%	1%	0%	2%	1%	2%
To see what could be done/if anything needs to be fixed	2%	2%	0%	3%	2%	0%	1%	1%	0%
Total (n)	431	127	324	37	471	190	44	880	44

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 148: Reasons for ESA Participation (E1a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for ESA Participation						
Lower energy bill(s)/save money/lower utility cost	49%	41%	37%	55%	47%	50%
We need(ed) something that the program offers	19%	23%	18%	16%	27%	20%
Get free assistance/I need the help/We are qualified for it/Because it was offered/financial reasons	9%	6%	17%	10%	7%	10%
Other	6%	2%	8%	8%	5%	5%
Save energy	8%	13%	8%	3%	3%	7%
No need/No interest	1%	2%	0%	0%	2%	3%
Low/fixed income/retired/disabled	6%	6%	9%	6%	3%	3%
If I owned my home/didn't rent	1%	7%	0%	0%	4%	0%
Help the environment	1%	0%	3%	3%	0%	0%
To see what could be done/if anything needs to be fixed	1%	0%	0%	0%	1%	2%
Total (n)	222	53	23	132	248	247

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 149: Importance of Landlord Support in ESA Participation (E2d) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Importance of landlord support in ESA participation								
Not important	10%	12%	8%	12%	8%	21%	7%	8%
Somewhat important	26%	23%	30%	24%	24%	20%	29%	25%
Very important	59%	60%	59%	57%	64%	52%	61%	64%
Not applicable-not encouraged/suggested by landlord	4%	5%	4%	6%	4%	6%	3%	4%
Total (n)	435	239	196	160	143	106	167	141

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 150: Importance of Landlord Support in ESA Participation (E2d) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Importance of landlord support in ESA participation									
Not important	0%	12%	9%	29%	13%	10%	8%	10%	22%
Somewhat important	0%	23%	28%	27%	30%	22%	12%	26%	36%
Very important	0%	62%	59%	27%	52%	69%	78%	60%	42%
Not applicable-not encouraged/suggested by landlord	0%	3%	5%	16%	6%	0%	1%	5%	0%
Total (n)	-	134	294	7	211	97	21	425	10

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 151: Importance of Landlord Support in ESA Participation (E2d) by Climate Zone for California LI Population

	LI Eligible Population					
	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Importance of landlord support in ESA participation						
Not important	11%	5%	49%	10%	9%	10%
Somewhat important	21%	22%	25%	30%	26%	29%
Very important	64%	68%	26%	53%	62%	58%
Not applicable-not encouraged/suggested by landlord	4%	5%	0%	8%	3%	3%
Total (n)	88	21	4	81	141	100

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 152: Importance of ESA Offerings for Participation (E2e) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Importance of the need for something that ESA offers								
Not important	6%	4%	9%	7%	6%	9%	6%	6%
Somewhat important	28%	23%	33%	30%	24%	21%	27%	24%
Very important	66%	73%	58%	64%	70%	70%	67%	70%
Total (n)	1,009	599	410	381	379	198	426	375

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 153: Importance of ESA Offerings for Participation (E2e) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Importance of the need for something that ESA offers									
Not important	9%	5%	5%	12%	10%	1%	7%	6%	18%
Somewhat important	29%	22%	30%	14%	29%	30%	19%	28%	27%
Very important	62%	73%	65%	74%	60%	69%	74%	67%	55%
Total (n)	471	134	355	42	521	210	48	961	47

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 154: Importance of ESA Offerings for Participation (E2e) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Importance of the need for something that ESA offers						
Not important	6%	5%	14%	6%	5%	8%
Somewhat important	26%	25%	43%	31%	26%	28%
Very important	68%	70%	43%	63%	68%	65%
Total (n)	250	57	23	152	268	259

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 155: Importance of Utility Sponsorship for Participation (E2f) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Importance of utility sponsorship for ESA participation								
Not important	9%	5%	12%	10%	7%	11%	7%	7%
Somewhat important	28%	23%	33%	28%	28%	22%	28%	29%
Very important	64%	72%	55%	62%	64%	67%	65%	64%
Total (n)	1,014	599	415	386	377	200	424	373

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 156: Importance of Utility Sponsorship for Participation (E2f) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Importance of utility sponsorship for ESA participation									
Not important	13%	6%	7%	13%	13%	2%	11%	8%	15%
Somewhat important	26%	33%	28%	10%	30%	27%	21%	27%	33%
Very important	61%	61%	66%	77%	57%	71%	69%	64%	53%
Total (n)	476	135	354	42	528	208	47	964	49

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 157: Importance of Utility Sponsorship for Participation (E2f) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Importance of utility sponsorship for ESA participation						
Not important	8%	5%	26%	9%	9%	8%
Somewhat important	27%	18%	26%	31%	27%	29%
Very important	65%	77%	48%	60%	64%	63%
Total (n)	251	58	24	155	268	258

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 158: Importance of Recommendations from Others for ESA Participation (E2h) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Importance of recommendations from others for ESA participation								
Not important	16%	14%	19%	18%	13%	21%	14%	13%
Somewhat important	32%	28%	36%	37%	29%	27%	29%	29%
Very important	47%	51%	42%	41%	53%	44%	52%	53%
Not applicable - no one recommended it	5%	6%	3%	4%	5%	7%	5%	5%
Total (n)	991	586	405	368	375	199	420	371

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 159: Importance of Recommendations from Others for ESA Participation (E2h) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Importance of recommendations from others for ESA participation									
Not important	21%	16%	13%	14%	22%	7%	19%	16%	22%
Somewhat important	32%	32%	33%	23%	35%	32%	20%	32%	45%
Very important	41%	49%	49%	51%	37%	58%	58%	47%	33%
Not applicable - no one recommended it	6%	3%	4%	12%	6%	2%	3%	5%	0%
Total (n)	464	127	353	40	509	208	48	945	45

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 160: Importance of Recommendations from Others for ESA Participation (E2h) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Importance of recommendations from others for ESA participation						
Not important	19%	17%	24%	14%	16%	15%
Somewhat important	36%	16%	48%	35%	31%	30%
Very important	42%	60%	28%	46%	50%	48%
Not applicable - no one recommended it	3%	8%	0%	5%	4%	7%
Total (n)	237	55	23	151	269	256

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 161: Knowledge of How to Reduce Utility Bill (EN4) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Knowledge of how to reduce utility bill								
Yes	62%	62%	62%	70%	60%	65%	55%	60%
No	38%	38%	38%	30%	40%	35%	45%	40%
Total (n)	982	587	395	368	376	188	422	372

Source: 2013 CARE Participant Telephone Survey.

Table 162: Knowledge of How to Reduce Utility Bill (EN4) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Knowledge of how to reduce utility bill									
Yes	66%	61%	59%	66%	65%	45%	69%	72%	62%
No	34%	39%	41%	34%	35%	55%	31%	28%	38%
Total (n)	457	132	346	150	510	202	46	48	934

Source: 2013 CARE Participant Telephone Survey.

Table 163: Knowledge of How to Reduce Utility Bill (EN4) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Knowledge of how to reduce utility bill						
Yes	71%	53%	81%	66%	51%	61%
No	29%	47%	19%	34%	49%	39%
Total (n)	239	54	23	150	260	256

Source: 2013 CARE Participant Telephone Survey.

Table 164: How Household Would Reduce Utility Bill (En5) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How household would reduce utility bill								
Turn off lights	39%	40%	38%	30%	47%	43%	46%	46%
Use less electricity	22%	22%	21%	21%	21%	19%	23%	21%
Unplug equipment not in use	17%	20%	14%	19%	17%	17%	15%	17%
Don't use air conditioner	17%	18%	16%	14%	22%	11%	20%	22%
Other	17%	16%	17%	13%	22%	17%	20%	22%
Not use equipment during peak hours	13%	13%	13%	10%	17%	14%	15%	17%
Adjust thermostat	12%	11%	13%	15%	10%	5%	11%	10%
Close or open windows/ blinds/curtains/doors	11%	9%	12%	8%	13%	12%	12%	13%
Don't use the heater	10%	12%	8%	14%	8%	13%	7%	8%
Buy energy efficient lighting/ CFLs	10%	12%	8%	9%	11%	11%	10%	10%
Cut back on/turn off television/computer/ electronics	9%	10%	9%	7%	11%	9%	12%	11%
Seal windows/doors	7%	8%	6%	6%	7%	5%	7%	7%
Replace siding/doors/ windows/equipment/ appliances	6%	6%	7%	7%	7%	7%	6%	7%
Turn AC/heater down	4%	4%	3%	4%	4%	4%	3%	4%
Shorter showers	3%	3%	3%	5%	2%	5%	1%	2%
Adjust water heater temperature	3%	2%	4%	4%	3%	2%	3%	3%
Use fans	3%	2%	3%	2%	3%	5%	2%	3%

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Cut back on laundry	2%	3%	2%	2%	3%	6%	2%	3%
Cook less	2%	3%	1%	3%	3%	1%	2%	3%
Contact utility	2%	3%	1%	3%	1%	2%	1%	1%
Already doing everything we can	2%	2%	2%	3%	2%	2%	2%	2%
Wear more/less clothes/blankets depending on season	2%	3%	1%	3%	1%	3%	1%	1%
Other - water-related	2%	2%	2%	2%	2%	1%	2%	2%
Wash laundry in cold water	1%	1%	2%	2%	1%	1%	1%	1%
Line dry clothes	1%	1%	1%	2%	1%	3%	1%	1%
Insulation	1%	1%	2%	1%	2%	2%	1%	2%
Leave home to avoid having to heat/cool home	1%	2%	1%	1%	1%	3%	1%	1%
Install solar panels	1%	2%	0%	1%	1%	0%	2%	1%
CARE program	1%	1%	1%	1%	2%	0%	1%	2%
Use cheaper fuel source	1%	1%	2%	2%	0%	0%	0%	0%
Total (n)	660	383	277	268	238	131	259	236

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 165: How Household Would Reduce Utility Bill (EN5) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How household would reduce utility bill									
Turn off lights	29%	38%	46%	46%	33%	52%	27%	40%	21%
Use less electricity	19%	22%	25%	16%	20%	31%	29%	22%	6%
Unplug equipment not in use	10%	16%	23%	21%	18%	13%	14%	17%	19%
Don't use air conditioner	15%	13%	20%	15%	17%	11%	12%	17%	19%
Other	17%	17%	16%	10%	17%	14%	28%	17%	12%
Not use equipment during peak hours	12%	18%	11%	9%	11%	15%	7%	13%	17%
Adjust thermostat	14%	10%	11%	14%	15%	4%	13%	12%	10%
Close or open windows/blinds/ curtains/doors	10%	14%	10%	10%	8%	8%	18%	11%	8%
Don't use the heater	9%	14%	8%	18%	12%	3%	3%	10%	16%
Buy energy efficient lighting/CFLs	7%	11%	13%	2%	9%	15%	10%	10%	13%
Cut back on/turn off television/ computer/electronics	8%	6%	12%	13%	8%	14%	0%	9%	13%
Seal windows/doors	5%	6%	8%	5%	9%	4%	6%	7%	3%
Replace siding/doors/windows/ equipment/appliances	7%	7%	5%	2%	5%	10%	3%	6%	6%
Turn AC/heater down	5%	1%	3%	1%	5%	3%	0%	4%	0%
Shorter showers	3%	4%	2%	0%	4%	0%	5%	3%	0%
Adjust water heater temperature	4%	3%	3%	0%	5%	0%	0%	3%	12%
Use fans	2%	3%	3%	1%	3%	0%	1%	2%	7%
Cut back on laundry	3%	5%	0%	9%	3%	3%	0%	3%	0%
Cook less	1%	0%	4%	10%	2%	5%	4%	2%	0%
Contact utility	2%	1%	3%	1%	2%	3%	0%	2%	0%

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Already doing everything we can	2%	4%	1%	4%	2%	0%	8%	2%	9%
Wear more/less clothes/blankets depending on season	3%	1%	1%	10%	3%	0%	0%	2%	4%
Other - water related	3%	0%	2%	0%	2%	4%	0%	2%	0%
Wash laundry in cold water	1%	2%	1%	0%	1%	1%	6%	1%	1%
Line dry clothes	3%	1%	0%	7%	2%	0%	0%	1%	2%
Insulation	2%	1%	0%	0%	1%	1%	9%	1%	0%
Leave home to avoid having to heat/ cool home	1%	2%	1%	2%	1%	3%	0%	1%	8%
Install solar panels	2%	1%	0%	0%	1%	1%	0%	1%	2%
CARE program	0%	0%	2%	0%	1%	0%	0%	1%	3%
Use cheaper fuel source	0%	0%	1%	0%	1%	0%	0%	1%	0%
Total (n)	317	87	222	32	364	105	34	625	34

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 166: How Household Would Reduce Utility Bill (EN5) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
How household would reduce utility bill						
Turn off lights	26%	49%	18%	37%	49%	46%
Use less electricity	20%	16%	5%	22%	24%	24%
Unplug equipment not in use	14%	33%	29%	21%	14%	15%
Don't use air conditioner	20%	28%	0%	5%	18%	20%
Other	14%	23%	20%	18%	17%	17%
Not use equipment during peak hours	11%	16%	15%	7%	18%	14%
Adjust thermostat	18%	16%	6%	10%	9%	9%
Close or open windows/blinds/curtains/ doors	8%	12%	5%	8%	16%	12%
Don't use the heater	9%	6%	0%	19%	10%	8%
Buy energy efficient lighting/CFLs	5%	7%	32%	11%	17%	8%
Cut back on/turn off television/computer/ electronics	7%	28%	5%	7%	19%	4%
Seal windows/doors	11%	0%	5%	5%	6%	6%
Replace siding/doors/windows/ equipment/appliances	6%	8%	0%	8%	9%	3%
Turn AC/heater down	6%	3%	0%	0%	7%	2%
Shorter showers	3%	0%	0%	6%	3%	1%
Adjust water heater temperature	3%	6%	5%	3%	3%	2%
Use fans	3%	1%	0%	1%	3%	3%
Cut back on laundry	3%	2%	7%	1%	3%	3%
Cook less	2%	8%	0%	4%	0%	3%
Contact utility	3%	1%	0%	4%	1%	2%
Already doing everything we can	1%	0%	15%	3%	0%	3%
Wear more/less clothes/blankets depending on season	3%	0%	0%	1%	2%	1%
Other - water related	2%	0%	0%	1%	2%	2%

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Wash laundry in cold water	2%	3%	0%	2%	2%	0%
Line dry clothes	1%	0%	10%	2%	1%	1%
Insulation	2%	3%	0%	1%	1%	1%
Leave home to avoid having to heat/cool home	2%	0%	2%	1%	0%	1%
Install solar panels	2%	0%	0%	1%	0%	1%
CARE program	1%	0%	5%	0%	2%	1%
Use cheaper fuel source	2%	0%	0%	2%	0%	0%
Total (n)	177	36	20	99	161	167

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 167: How Household Would Reduce Utility Bill (EN5) by ESA Participation Groups for California LI Population

	Recent ESA Participant who Recalls Participation	ESA Participant who Does Not Recalls Participation	Not a Recent ESA Participant	Total
How Household Would Reduce Utility Bill				
Turn off lights	40%	39%	38%	39%
Use less electricity	24%	21%	21%	22%
Unplug equipment not in use	17%	22%	14%	17%
Don't use the air conditioner	23%	15%	16%	17%
Other	19%	14%	17%	17%
Not use equipment during peak hours	9%	14%	13%	13%
Adjust thermostat	13%	10%	13%	12%
Close or open windows/blinds/curtains/doors	12%	8%	12%	11%
Don’t use the heater	13%	11%	9%	10%
Buy energy efficient lighting/cfls	9%	14%	8%	10%
Cut back on/turn off television/computer/electronics	11%	9%	9%	10%
Seal windows/doors	6%	8%	6%	7%
Replace siding/doors/windows/equipment/appliances	8%	5%	7%	6%
Turn ac/heater down	8%	3%	3%	4%
Shorter showers	2%	3%	3%	3%
Adjust water heater temperature	2%	2%	4%	3%
Use fans	4%	2%	3%	3%
Cut back on laundry	3%	3%	2%	2%
Cook less	3%	4%	1%	2%
Contact utility	3%	4%	1%	2%
Already doing everything we can	1%	3%	2%	2%
Wear more/less clothes/blankets depending on season	4%	2%	1%	2%
Other - water related	1%	2%	2%	2%

	Recent ESA Participant who Recalls Participation	ESA Participant who Does Not Recalls Participation	Not a Recent ESA Participant	Total
Wash laundry in cold water	2%	1%	2%	2%
Line dry clothes	2%	1%	1%	1%
Insulation	2%	0%	2%	1%
Leave home to avoid having to heat/cool home	1%	2%	1%	1%
Install solar panels	4%	1%	1%	1%
CARE program	0%	2%	1%	1%
Use cheaper fuel source	4%	0%	0%	1%
Total (n)	113	270	277	660

Source: 2013 CARE Participant Telephone Survey.

Table 168: How Often Household Tries Reduce Utility Bill (EN6) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How often households try to reduce utility bill								
Most or all of the time	77%	77%	77%	77%	80%	77%	78%	81%
Sometimes	20%	20%	21%	20%	19%	22%	20%	18%
Never	2%	3%	2%	4%	1%	1%	2%	1%
Total (n)	1,027	610	417	389	384	202	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 169: How Often Household Tries Reduce Utility Bill (EN6) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How often households try to reduce utility bill									
Most or all of the time	79%	76%	75%	93%	84%	64%	62%	77%	82%
Sometimes	20%	20%	22%	6%	15%	33%	30%	20%	18%
Never	1%	4%	3%	2%	1%	3%	8%	3%	0%
Total (n)	483	136	359	42	532	212	49	977	49

Source: 2013 CARE Participant Telephone Survey.

Table 170: How Often Household Tries Reduce Utility Bill (EN6) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
How often households try to reduce utility bill						
Most or all of the time	79%	79%	81%	75%	76%	78%
Sometimes	19%	21%	19%	20%	22%	20%
Never	2%	0%	0%	5%	2%	2%
Total (n)	253	59	24	156	272	263

Source: 2013 CARE Participant Telephone Survey.

Table 171: Reasons for Saving Energy (EN7) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for saving energy								
Saving money	96%	96%	97%	96%	0%	0%	0%	0%
Protecting the environment	34%	28%	44%	34%	0%	0%	0%	0%
To avoid wasting energy	6%	8%	4%	6%	0%	0%	0%	0%
Other	5%	6%	3%	5%	0%	0%	0%	0%
For the benefit of future generations	4%	2%	6%	4%	0%	0%	0%	0%
Helping California lead the way on saving energy	3%	4%	0%	3%	0%	0%	0%	0%
Health	2%	3%	0%	2%	0%	0%	0%	0%
Reducing our dependence on foreign oil	0%	0%	0%	0%	0%	0%	0%	0%
Refused	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	145	94	51	145	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 172: Reasons for Saving Energy (EN7) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for saving energy									
Saving money	95%	100%	96%	90%	96%	100%	94%	97%	91%
Protecting the environment	33%	31%	44%	10%	34%	43%	54%	34%	31%
To avoid wasting energy	5%	5%	8%	10%	5%	26%	0%	6%	5%
Other	6%	0%	4%	21%	6%	0%	6%	5%	5%
For the benefit of future generations	1%	10%	3%	0%	4%	0%	34%	4%	0%
Helping California lead the way on saving energy	1%	5%	3%	0%	2%	15%	0%	3%	0%
Health	1%	0%	0%	16%	2%	0%	0%	1%	5%
Reducing our dependence on foreign oil	0%	0%	0%	0%	0%	0%	0%	0%	0%
Refused	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	70	19	42	13	104	9	6	128	17

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 173: Reasons for Saving Energy (EN7) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for saving energy						
Saving money	95%	0%	75%	100%	0%	0%
Protecting the environment	29%	0%	46%	40%	0%	0%
To avoid wasting energy	8%	0%	0%	4%	0%	0%
Other	7%	0%	13%	1%	0%	0%
For the benefit of future generations	3%	0%	0%	5%	0%	0%
Helping California lead the way on saving energy	1%	0%	0%	6%	0%	0%
Health	2%	0%	0%	1%	0%	0%
Reducing our dependence on foreign oil	0%	0%	0%	0%	0%	0%
Refused	0%	0%	0%	0%	0%	0%
Total (n)	79	-	7	59	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 174: Reasons for Difficulties in Saving Energy (EN8) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for difficulties in saving energy								
No/none	58%	58%	58%	59%	55%	61%	57%	55%
We need to use the heat/air conditioner/appliances	8%	7%	10%	8%	11%	10%	8%	11%
Drafts/leaks	7%	8%	6%	9%	8%	1%	7%	8%
Some members of the household not interested or able	7%	6%	8%	6%	7%	9%	7%	7%
Other	6%	5%	7%	7%	3%	4%	6%	3%
Age and condition of the equipment/appliance/home	5%	6%	4%	5%	6%	1%	6%	6%
No money/LI	5%	5%	5%	5%	5%	5%	5%	5%
Weather/temperature/very hot/cold climate	4%	4%	4%	6%	4%	2%	4%	4%
Medical/health reasons	3%	4%	3%	2%	4%	5%	4%	4%
Lack of information/don't know how	3%	3%	2%	3%	3%	2%	3%	3%
Not able to control our usage	2%	3%	2%	3%	2%	3%	2%	2%
Insulation	1%	1%	1%	1%	1%	0%	2%	1%
Need for air conditioning	1%	1%	1%	0%	2%	0%	2%	2%
High cost of bills	0%	0%	0%	0%	0%	1%	0%	0%
Landlord	0%	0%	0%	0%	0%	0%	0%	1%
It’s not a priority for us	0%	0%	0%	0%	0%	0%	0%	0%
We don't pay the bill, someone else pays it	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	849	497	352	237	367	193	415	363

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 175: Reasons for Difficulties in Saving Energy (EN8) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for difficulties in saving energy									
No/none	59%	53%	61%	35%	60%	66%	46%	58%	64%
We need to use the heat/air conditioner/appliances	10%	5%	8%	33%	7%	4%	16%	9%	2%
Drafts/leaks	3%	8%	8%	10%	10%	2%	0%	7%	6%
Some members of the household not interested or able	8%	10%	5%	13%	6%	7%	3%	7%	3%
Other	4%	12%	5%	6%	3%	10%	16%	6%	2%
Age and condition of the equipment/appliance/home	4%	8%	4%	2%	7%	2%	2%	5%	9%
No money/LI	5%	3%	5%	8%	6%	2%	6%	5%	9%
Weather/temperature/very hot/cold climate	8%	4%	2%	0%	3%	4%	12%	4%	5%
Medical/health reasons	3%	5%	3%	13%	4%	0%	6%	3%	14%
Lack of information/don't know how	3%	2%	3%	3%	3%	4%	2%	3%	2%
Not able to control our usage	2%	2%	2%	8%	1%	2%	7%	2%	0%
Insulation	1%	3%	1%	0%	2%	0%	0%	1%	0%
Need for air conditioning	1%	1%	2%	0%	1%	2%	0%	1%	0%
High cost of bills	1%	0%	0%	0%	0%	1%	0%	0%	0%
Landlord	0%	0%	1%	0%	0%	0%	0%	0%	0%
It's not a priority for us	1%	0%	0%	0%	0%	0%	0%	0%	0%
We don't pay the bill, someone else pays it	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	399	110	307	28	413	192	43	816	32

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

Table 176: Reasons for Difficulties in Saving Energy (EN8) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for difficulties in saving energy						
No/none	54%	48%	71%	64%	57%	61%
We need to use the heat/air conditioner/appliances	12%	13%	0%	3%	7%	9%
Drafts/leaks	10%	11%	11%	8%	7%	3%
Some members of the household not interested or able	7%	8%	11%	3%	8%	8%
Other	4%	2%	0%	9%	9%	6%
Age and condition of the equipment/appliance/home	8%	10%	0%	3%	4%	4%
No money/LI	6%	2%	2%	7%	7%	2%
Weather/temperature/very hot/cold climate	8%	3%	6%	4%	1%	5%
Medical/health reasons	5%	7%	5%	1%	3%	3%
Lack of information/don't know how	4%	0%	0%	2%	3%	3%
Not able to control our usage	2%	2%	0%	5%	3%	1%
Insulation	1%	0%	0%	1%	1%	2%
Need for air conditioning	0%	3%	0%	0%	0%	3%
High cost of bills	0%	0%	0%	0%	1%	0%
Landlord	0%	0%	0%	0%	1%	0%
It’s not a priority for us	0%	0%	0%	0%	0%	0%
We don't pay the bill, someone else pays it	0%	0%	0%	0%	0%	0%
Total (n)	168	59	16	94	258	254

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple mentions allowed.

8.2.4 ESA Barriers

Table 177: Problems with Enrollment/Receiving Services (B1a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Problems with enrollment/receiving services								
Yes	25%	17%	33%	25%	29%	22%	25%	29%
No	75%	83%	67%	75%	71%	78%	75%	71%
Total (n)	847	497	350	230	372	194	419	368

Source: 2013 CARE Participant Telephone Survey.
Note: This question was added when the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 178: Problems with Enrollment/Receiving Services (B1a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Problems with enrollment/receiving services									
Yes	25%	24%	27%	24%	26%	30%	16%	24%	43%
No	75%	76%	73%	76%	74%	70%	84%	76%	57%
Total (n)	395	113	304	29	413	191	40	816	30

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added when the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 179: Problems with Enrollment/Receiving Services (B1a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Problems with enrollment/receiving services						
Yes	23%	28%	48%	27%	24%	25%
No	77%	72%	52%	73%	76%	75%
Total (n)	166	58	16	91	260	256

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added when the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 180: Difficult Issues with Enrollment/Receiving Services (B1) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficult issues with enrollment/receiving services								
Too hard to be home during the visits/taking off work	37%	29%	43%	33%	45%	33%	43%	46%
Having contractors in my home	23%	19%	25%	17%	21%	31%	26%	20%
Getting my landlord's permission	9%	12%	7%	7%	12%	11%	11%	12%
Enrolling/scheduling/signing up	7%	13%	3%	11%	3%	2%	3%	4%
Trusting contractors	5%	4%	6%	7%	3%	6%	3%	3%
Number of visits	2%	1%	3%	2%	3%	0%	3%	3%
Not worth the paperwork, having to find/provide income docs	2%	1%	2%	1%	3%	1%	2%	3%
Do not think I need it/will benefit	2%	2%	1%	0%	4%	2%	3%	4%
Installing the equipment	1%	1%	2%	3%	0%	0%	0%	0%
Dissatisfied with equipment or repairs	1%	3%	0%	2%	0%	3%	0%	0%
Trusting the utility reps	1%	3%	0%	3%	0%	0%	0%	0%
Have not heard of it/do not know enough	1%	1%	0%	1%	0%	0%	0%	0%
Dissatisfied with contractor/installation	0%	1%	0%	0%	0%	0%	0%	0%
Adjusting/getting used to the new equipment/repairs	0%	0%	0%	0%	0%	0%	0%	0%

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Proving I own my home	0%	1%	0%	1%	0%	0%	0%	0%
Providing my household's income	0%	0%	0%	0%	0%	0%	0%	0%
Other	8%	10%	8%	11%	7%	10%	6%	7%
Total (n)	269	120	149	120	99	44	103	97

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 181: Difficult Issues with Enrollment/Receiving Services (B1) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficult issues with enrollment/receiving services									
Too hard to be home during the visits/taking off work	36%	47%	36%	22%	34%	54%	44%	37%	38%
Having contractors in my home	26%	19%	18%	40%	26%	15%	15%	23%	18%
Trusting contractors	12%	0%	4%	0%	5%	2%	4%	4%	20%
Enrolling/scheduling/signing up	8%	6%	7%	12%	8%	9%	0%	6%	17%
Number of visits	3%	6%	0%	0%	1%	4%	23%	2%	0%
Not worth the paperwork, having to find/provide income docs	3%	0%	2%	0%	1%	0%	0%	2%	0%
Installing the equipment	2%	0%	2%	0%	1%	1%	0%	1%	0%
Do not think i need it/will benefit	2%	0%	2%	0%	2%	0%	0%	2%	0%
Dissatisfied with contractor/installation	1%	0%	0%	0%	0%	0%	0%	0%	0%
Dissatisfied with equipment or repairs	1%	0%	1%	5%	1%	0%	0%	1%	3%
Trusting the utility reps	1%	0%	3%	0%	2%	0%	9%	2%	0%
Proving I own my home	1%	0%	0%	0%	0%	0%	0%	0%	0%
Adjusting/getting used to the new equipment/repairs	0%	0%	0%	0%	0%	0%	0%	0%	0%
Getting my landlord's permission	0%	12%	14%	0%	8%	15%	5%	10%	0%
Providing my household's income	0%	0%	0%	0%	0%	0%	0%	0%	0%
Have not heard of it/do not know enough	0%	0%	1%	0%	0%	0%	0%	1%	0%
Other	5%	10%	9%	20%	9%	1%	0%	9%	3%

Total (n)	122	33	101	12	156	49	12	252	17

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 182: Difficult Issues with Enrollment/Receiving Services (B1) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficult issues with enrollment/receiving services						
Too hard to be home during the visits/taking off work	43%	33%	48%	25%	41%	37%
Having contractors in my home	13%	24%	33%	19%	22%	36%
Enrolling/scheduling/signing up	8%	10%	0%	16%	5%	1%
Getting my landlord's permission	6%	14%	0%	8%	18%	6%
Trusting contractors	4%	9%	0%	12%	2%	4%
Number of visits	4%	0%	0%	1%	3%	3%
Installing the equipment	2%	0%	0%	3%	0%	0%
Trusting the utility reps	2%	0%	0%	4%	0%	0%
Not worth the paperwork, having to find/provide income docs	2%	0%	0%	1%	5%	0%
Have not heard of it/do not know enough	2%	0%	0%	0%	0%	0%
Proving I own my home	1%	0%	0%	0%	0%	0%
Dissatisfied with contractor/installation	0%	0%	0%	1%	0%	0%
Dissatisfied with equipment or repairs	0%	0%	6%	3%	1%	0%
Adjusting/getting used to the new equipment/repairs	0%	0%	0%	0%	0%	0%
Providing my household's income	0%	0%	0%	0%	0%	0%
Do not think I need it/will benefit	0%	7%	0%	0%	1%	5%
Other	13%	4%	13%	7%	3%	8%
Total (n)	68	14	10	51	65	61

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 183: Difficulty in Obtaining Landlord Permission (B2C) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in getting landlord's permission								
Easy	53%	63%	42%	55%	51%	55%	51%	51%
Somewhat hard	25%	22%	27%	26%	25%	18%	25%	24%
Very hard	11%	7%	16%	9%	14%	15%	13%	14%
Don't know	11%	8%	15%	11%	11%	12%	11%	11%
Total (n)	457	253	204	168	148	114	173	146

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 184: Difficulty in Obtaining Landlord Permission (B2C) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in getting landlord's permission									
Easy	100%	63%	45%	85%	56%	45%	49%	53%	60%
Somewhat hard	0%	22%	27%	0%	22%	31%	26%	25%	17%
Very hard	0%	8%	14%	15%	13%	12%	7%	11%	11%
Don't know	0%	7%	14%	0%	10%	13%	18%	11%	11%
Total (n)	1	136	306	7	225	103	23	447	10

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 185: Difficulty in Obtaining Landlord Permission (B2C) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in getting landlord's permission						
Easy	58%	70%	74%	56%	52%	43%
Somewhat hard	24%	10%	0%	25%	24%	29%
Very hard	8%	15%	26%	7%	13%	15%
Don't know	11%	6%	0%	12%	11%	13%
Total (n)	94	22	4	84	146	107

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 186: Difficulty in Filling Out Application with Contractor (B2D) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in filling out application with contractor								
Easy	65%	68%	62%	65%	63%	64%	65%	63%
Somewhat hard	22%	21%	23%	18%	24%	24%	25%	25%
Very hard	8%	7%	10%	11%	8%	9%	6%	8%
Don't know	5%	4%	5%	6%	4%	4%	3%	4%
Total (n)	1,021	607	414	386	383	200	431	379

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 187: Difficulty in Filling Out Application with Contractor (B2D) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in filling out application with contractor									
Easy	69%	72%	57%	81%	66%	57%	57%	65%	73%
Somewhat hard	21%	18%	26%	8%	17%	34%	32%	22%	13%
Very hard	7%	6%	11%	4%	11%	5%	11%	8%	14%
Don't know	3%	4%	6%	7%	6%	5%	1%	5%	0%
Total (n)	480	134	358	42	528	213	47	971	49

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 188: Difficulty in Filling Out Application with Contractor (B2D) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in filling out application with contractor						
Easy	64%	73%	79%	66%	65%	63%
Somewhat hard	17%	17%	8%	20%	25%	27%
Very hard	13%	10%	9%	8%	5%	7%
Don't know	6%	0%	4%	6%	5%	3%
Total (n)	250	59	24	156	271	261

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 189: Difficulty in Being Home for Contractor Visits (B2E) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in being home for contractor visits								
Easy	65%	73%	55%	62%	66%	67%	66%	66%
Somewhat hard	25%	20%	31%	26%	23%	24%	24%	22%
Very hard	10%	7%	14%	11%	12%	9%	10%	12%
Total (n)	1,007	602	405	380	378	197	426	374

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 190: Difficulty in Being Home for Contractor Visits (B2E) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in being home for contractor visits									
Easy	64%	64%	63%	75%	66%	62%	66%	65%	56%
Somewhat hard	25%	26%	27%	22%	22%	31%	20%	25%	33%
Very hard	12%	10%	10%	3%	12%	7%	15%	10%	11%
Total (n)	474	133	351	42	526	206	46	957	49

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 191: Difficulty in Being Home for Contractor Visits (B2E) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in being home for contractor visits						
Easy	67%	70%	56%	59%	69%	62%
Somewhat hard	21%	21%	27%	33%	24%	26%
Very hard	12%	9%	17%	8%	8%	12%
Total (n)	248	58	24	152	267	258

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 192: Participant Difficulty in Getting Used to Equipment/Repairs (B2F) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in getting used to equipment/repairs								
Easy	89%	89%	0%	89%	0%	0%	0%	0%
Somewhat hard	0%	0%	0%	0%	0%	0%	0%	0%
Very hard	4%	4%	0%	4%	0%	0%	0%	0%
Don't know	8%	8%	0%	8%	0%	0%	0%	0%
Total (n)	36	36	-	36	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 193: Participant Difficulty in Getting Used to Equipment/Repairs (B2F) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in getting used to equipment/repairs									
Easy	87%	75%	100%	100%	86%	100%	100%	91%	80%
Somewhat hard	0%	0%	0%	0%	0%	0%	0%	0%	0%
Very hard	9%	0%	0%	0%	3%	0%	0%	2%	10%
Don't know	4%	25%	0%	0%	11%	0%	0%	7%	10%
Total (n)	23	4	6	3	25	1	2	26	10

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 194: Participant Difficulty in Getting Used to Equipment/Repairs (B2F) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in getting used to equipment/repairs						
Easy	87%	0%	50%	95%	0%	0%
Somewhat hard	0%	0%	0%	0%	0%	0%
Very hard	0%	0%	50%	5%	0%	0%
Don't know	13%	0%	0%	0%	0%	0%
Total (n)	21	-	2	13	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 195: Recent/Non-Participant Difficulty in Getting Used to Equipment/Repairs (B2G) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in getting used to equipment/repairs								
Easy	78%	82%	74%	78%	0%	0%	0%	0%
Somewhat hard	16%	15%	18%	16%	0%	0%	0%	0%
Very hard	6%	3%	9%	6%	0%	0%	0%	0%
Total (n)	110	57	53	110	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 196: Recent/Non-Participant Difficulty in Getting Used to Equipment/Repairs (B2G) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in getting used to equipment/repairs									
Easy	83%	83%	74%	93%	81%	61%	100%	77%	100%
Somewhat hard	11%	12%	19%	7%	14%	31%	0%	17%	0%
Very hard	6%	6%	6%	0%	5%	7%	0%	6%	0%
Total (n)	46	17	36	10	81	7	4	103	7

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 197: Participant in Getting Used to Equipment/Repairs (B2G) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in getting used to equipment/repairs						
Easy	82%	0%	100%	72%	0%	0%
Somewhat hard	10%	0%	0%	25%	0%	0%
Very hard	8%	0%	0%	2%	0%	0%
Total (n)	59	-	5	46	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 198: Difficulty in Providing Income Documentation (B2A) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in providing income documentation								
Easy	75%	76%	73%	77%	72%	76%	72%	72%
Somewhat hard	15%	15%	15%	15%	15%	12%	16%	15%
Very hard	10%	9%	12%	8%	13%	12%	12%	13%
Total (n)	997	586	411	379	373	195	419	369

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 199: Difficulty in Providing Income Documentation (B2A) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in providing income documentation									
Easy	76%	80%	71%	89%	75%	76%	70%	75%	75%
Somewhat hard	13%	13%	17%	6%	12%	15%	21%	15%	12%
Very hard	11%	7%	12%	5%	13%	9%	10%	10%	13%
Total (n)	468	135	347	40	512	209	48	947	49

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 200: Difficulty in Providing Income Documentation (B2A) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in providing income documentation						
Easy	76%	81%	79%	79%	71%	73%
Somewhat hard	17%	7%	0%	15%	14%	17%
Very hard	8%	13%	21%	6%	15%	10%
Total (n)	247	55	23	152	265	255

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 201: Difficulty in Providing Ownership Documentation (B2B) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in providing ownership documentation								
Easy	80%	80%	80%	84%	78%	81%	76%	78%
Somewhat hard	13%	14%	12%	9%	13%	15%	16%	13%
Very hard	7%	6%	8%	7%	10%	4%	7%	10%
Total (n)	540	334	206	208	225	84	246	223

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 202: Difficulty in Providing Ownership Documentation (B2B) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in providing ownership documentation									
Easy	80%	0%	78%	84%	85%	63%	71%	80%	89%
Somewhat hard	13%	0%	16%	9%	7%	28%	9%	13%	6%
Very hard	7%	0%	6%	7%	7%	9%	20%	7%	5%
Total (n)	457	-	49	34	292	105	24	502	37

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 203: Difficulty in Providing Ownership Documentation (B2B) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in providing ownership documentation						
Easy	84%	69%	97%	81%	77%	78%
Somewhat hard	10%	18%	3%	7%	17%	16%
Very hard	6%	13%	0%	12%	6%	6%
Total (n)	149	36	19	68	119	149

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 204: Difficulty in Trusting Utility (B2H) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in trusting utility								
Easy	74%	79%	68%	77%	70%	78%	70%	70%
Somewhat hard	21%	18%	24%	19%	23%	18%	23%	23%
Very hard	6%	4%	8%	4%	7%	4%	8%	7%
Total (n)	998	593	405	379	371	198	417	367

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 205: Difficulty in Trusting Utility (B2H) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in trusting utility									
Easy	70%	79%	72%	81%	76%	72%	66%	74%	68%
Somewhat hard	23%	16%	22%	14%	17%	24%	25%	21%	25%
Very hard	7%	5%	5%	5%	6%	4%	9%	6%	7%
Total (n)	470	133	348	40	522	202	45	948	49

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 206: Difficulty in Trusting Utility (B2H) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in trusting utility						
Easy	78%	77%	69%	76%	69%	71%
Somewhat hard	19%	15%	27%	20%	24%	21%
Very hard	3%	8%	4%	4%	7%	8%
Total (n)	246	58	23	152	265	254

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 207: Difficulty in Trusting Contractor (B2I) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in trusting contractor								
Easy	53%	63%	42%	53%	53%	57%	52%	53%
Somewhat hard	36%	30%	42%	38%	33%	33%	34%	32%
Very hard	12%	7%	16%	9%	14%	10%	14%	14%
Total (n)	991	589	402	376	371	195	416	367

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 208: Difficulty in Trusting Contractor (B2I) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in trusting contractor									
Easy	44%	59%	54%	72%	55%	57%	35%	53%	49%
Somewhat hard	41%	33%	34%	22%	32%	35%	47%	35%	41%
Very hard	15%	8%	12%	6%	13%	7%	18%	12%	11%
Total (n)	473	134	336	41	515	200	46	942	48

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 209: Difficulty in Trusting Contractor (B2I) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in trusting contractor						
Easy	54%	63%	45%	53%	54%	49%
Somewhat hard	36%	20%	46%	40%	33%	37%
Very hard	9%	18%	9%	8%	13%	14%
Total (n)	247	58	24	149	261	252

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 210: Difficulty in Scheduling Appointments (B2J) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Difficulty in scheduling appointments								
Easy	76%	80%	70%	76%	0%	0%	0%	0%
Somewhat hard	18%	17%	20%	18%	0%	0%	0%	0%
Very hard	6%	3%	10%	6%	0%	0%	0%	0%
Total (n)	145	93	52	145	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 211: Difficulty in Scheduling Appointments (B2J) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Difficulty in scheduling appointments									
Easy	77%	71%	82%	90%	76%	80%	100%	75%	88%
Somewhat hard	16%	15%	18%	10%	18%	20%	0%	19%	6%
Very hard	8%	14%	0%	0%	6%	0%	0%	6%	6%
Total (n)	70	21	40	13	104	9	6	128	17

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 212: Difficulty in Scheduling Appointments (B2J) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Difficulty in scheduling appointments						
Easy	76%	0%	67%	78%	0%	0%
Somewhat hard	16%	0%	16%	20%	0%	0%
Very hard	8%	0%	16%	2%	0%	0%
Total (n)	79	-	7	59	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 213: Recent Participant Reasons for New Refrigerators Being Not at All Helpful (EN3_10) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for new refrigerators being not at all helpful [1]								
Work was not done properly/fix was not permanent	100%	100%	0%	0%	100%	0%	100%	100%
Total (n)	1	1	-	-	1	-	1	1

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question asked of recent participants who recall participating and said that the new refrigerator was not at all helpful.

Table 214: Recent Participant Reasons for New Refrigerators Being Not at All Helpful (EN3_10) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for new refrigerators being not at all helpful [1]									
Work was not done properly/fix was not permanent	100%	0%	0%	0%	0%	0%	0%	100%	0%
Total (n)	1	-	-	-	-	-	-	1	-

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said the new refrigerator was not at all helpful.

Table 215: Recent Participant Reasons for New Refrigerators Being Not at All Helpful (EN3_10) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for new refrigerators being not at all helpful [1]						
Work was not done properly/fix was not permanent	0%	100%	0%	0%	0%	0%
Total (n)	-	1	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said that repairs to broken or leaky windows, doors, walls, or floors were not at all helpful.

Table 216: Recent Participant Reasons for Window/Door/Wall/Floor Repair Being Not at All Helpful (EN3_11) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for window/door/ wall/floor repair being not at all helpful [1]								
Other Reason	53%	53%	0%	0%	0%	100%	0%	0%
Don't Know	47%	47%	0%	100%	0%	0%	0%	0%
Total (n)	2	2	-	1	-	1	-	-

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said that the repairs to broken or leaky windows, doors, walls, or floors were not at all helpful.

Table 217: Recent Participant Reasons for Window/Door/Wall/Floor Repair Being Not at All Helpful (EN3_11) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for window/door/wall/floor repair being not at all helpful [1]									
Other Reason	0%	100%	0%	0%	53%	0%	0%	100%	0%
Don't Know	100%	0%	0%	0%	47%	0%	0%	0%	100%
Total (n)	1	1	-	-	2	-	-	1	1

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said the repairs to broken or leaky windows, doors, walls, or floors were not at all helpful.

Table 218: Recent Participant Reasons for Window/Door/Wall/Floor Repair Being Not at All Helpful (EN3_11) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for window/door/wall/floor repair being not at all helpful [1]						
Other Reason	0%	0%	0%	0%	100%	0%
Don't Know	100%	0%	0%	0%	0%	0%
Total (n)	1	-	-	-	1	-

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that the repairs to broken or leaky windows, doors, walls, or floors were not at all helpful.

Table 219: Recent Participant Reasons for Efficient Light Bulbs/Fixtures Being Not at All Helpful (EN3_12) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for efficient light bulbs/fixtures being not at all helpful [1]								
Does not work like my other equipment	71%	71%	0%	76%	50%	77%	50%	50%
Don't know	16%	16%	0%	24%	0%	0%	0%	0%
Didn't save energy/didn't make any difference	3%	3%	0%	0%	0%	23%	0%	0%
Work was not done properly/fix was not permanent	10%	10%	0%	0%	50%	0%	50%	50%
No work was done/nothing was replaced	16%	16%	0%	24%	0%	0%	0%	0%
Total (n)	6	6	-	2	2	2	2	2

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that the efficient light bulbs and fixtures were not at all helpful.

Table 220: Recent Participant Reasons for Efficient Light Bulbs/Fixtures Being Not at All Helpful (EN3_12) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for efficient light bulbs/ fixtures being not at all helpful [1]									
Does not work like my other equipment	0%	0%	77%	100%	33%	0%	0%	85%	0%
Don't know	63%	0%	0%	0%	57%	0%	0%	0%	100%
Didn't save energy/didn't make any difference	0%	0%	23%	0%	10%	0%	0%	3%	0%
Work was not done properly/fix was not permanent	37%	0%	0%	0%	0%	0%	0%	12%	0%
No work was done/nothing was replaced	63%	0%	0%	0%	57%	0%	0%	0%	100%
Total (n)	2	-	2	2	3	-	-	5	1

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that the efficient light bulbs and fixtures were not at all helpful.

Table 221: Recent Participant Reasons for Efficient Light Bulbs/Fixtures Being Not at All Helpful (EN3_12) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for efficient light bulbs/fixtures being not at all helpful [1]						
Does not work like my other equipment	100%	0%	0%	0%	100%	0%
Don't know	0%	0%	100%	0%	0%	0%
Didn't save energy/didn't make any difference	0%	0%	0%	0%	0%	100%
Work was not done properly/fix was not permanent	0%	100%	0%	0%	0%	0%
No work was done/nothing was replaced	0%	0%	100%	0%	0%	0%
Total (n)	1	1	1	-	2	1

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that the efficient light bulbs and fixtures were not at all helpful.

Table 222: Recent Participant Reasons for Sealing Leaks Being Not at All Helpful (EN3_2) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for sealing leaks being not at all helpful [1]								
Installation contractor did not teach how to use it	45%	45%	0%	76%	0%	0%	0%	0%
Other reason sealing leaks to reduce drafts was not at all helpful	8%	8%	0%	0%	0%	21%	0%	0%
Work was not done properly/fix was not permanent	32%	32%	0%	0%	0%	79%	0%	0%
No work was done/nothing was replaced	14%	14%	0%	24%	0%	0%	0%	0%
Total (n)	6	6	-	2	-	4	-	-

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that sealing leaks was not at all helpful.

Table 223: Recent Participant Reasons for Sealing Leaks Being Not at All Helpful (EN3_2) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for sealing leaks being not at all helpful [1]									
Installation contractor did not teach how to use it	0%	74%	0%	0%	45%	0%	0%	45%	0%
Other reason sealing leaks to reduce drafts was not at all helpful	0%	0%	77%	0%	8%	0%	0%	8%	0%
Work was not done properly/fix was not permanent	47%	26%	23%	0%	32%	0%	0%	32%	0%
No work was done/nothing was replaced	53%	0%	0%	0%	14%	0%	0%	14%	0%
Total (n)	2	2	2	-	6	-	-	6	-

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said that sealing leaks was not at all helpful.

Table 224: Recent Participant Reasons for Sealing Leaks Being Not at All Helpful (EN3_2) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for sealing leaks being not at all helpful [1]						
Installation contractor did not teach how to use it	100%	0%	0%	0%	0%	0%
Other reason sealing leaks to reduce drafts was not at all helpful	0%	0%	0%	0%	23%	0%
Work was not done properly/fix was not permanent	0%	0%	0%	0%	77%	100%
No work was done/nothing was replaced	0%	0%	0%	100%	0%	0%
Total (n)	1	-	-	1	3	1

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said that sealing leaks was not at all helpful.

Table 225: Recent Participant Reasons for Energy-Saving Tips Being Not at All Helpful (EN3_8) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for energy-saving tips being not at all helpful [1]								
Other reason	22%	22%	0%	33%	0%	83%	0%	0%
Don't Know	12%	12%	0%	33%	0%	0%	0%	0%
Didn't save energy/didn't make any difference	2%	2%	0%	0%	0%	17%	0%	0%
Work was not done properly/fix was not permanent	45%	45%	0%	0%	87%	0%	87%	87%
No work was done/nothing was replaced	30%	30%	0%	67%	13%	0%	13%	13%
Total (n)	8	8	-	3	3	2	3	3

Source: 2013 CARE Participant Telephone Survey.
[1] Note: Question was asked of recent participants who recall participating and said that the energy-saving tips were not at all helpful.

Table 226: Recent Participant Reasons for Energy-Saving Tips Being Not at All Helpful (EN3_8) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for energy savings tips being not at all helpful [1]									
Other reason	37%	0%	0%	0%	30%	0%	0%	25%	0%
Don't Know	20%	0%	0%	0%	30%	0%	0%	0%	100%
Didn't save energy/didn't make any difference	0%	0%	5%	0%	5%	0%	0%	2%	0%
Work was not done properly/fix was not permanent	12%	0%	95%	0%	18%	100%	0%	51%	0%
No work was done/nothing was replaced	51%	0%	0%	0%	47%	0%	100%	34%	0%
Total (n)	6	-	2	-	5	1	1	7	1

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that the energy-saving tips were not at all helpful.

Table 227: Recent Participant Reasons for Energy-Saving Tips Being Not at All Helpful (EN3_8) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for energy savings tips being not at all helpful [1]						
Other reason	0%	0%	0%	100%	19%	0%
Don't Know	50%	0%	0%	0%	0%	0%
Didn't save energy/didn't make any difference	0%	0%	0%	0%	0%	23%
Work was not done properly/fix was not permanent	0%	0%	0%	0%	81%	0%
No work was done/nothing was replaced	50%	0%	0%	100%	0%	77%
Total (n)	2	-	-	1	3	2

Source: 2013 CARE Participant Telephone Survey.

[1] Note: Question was asked of recent participants who recall participating and said that the energy-saving tips were not at all helpful.

8.2.5 WTP in ESA

Table 228: Non-Participant Willingness (O2) to Sign Up for ESA by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Willingness to sign up for ESA								
Not at all willing	29%	0%	29%	28%	33%	34%	29%	33%
Somewhat willing	35%	0%	35%	34%	34%	23%	37%	33%
Very willing	36%	0%	36%	38%	34%	43%	34%	34%
Total (n)	407	-	407	156	154	78	171	152

Source: 2013 CARE Participant Telephone Survey.

Table 229: Non-Participant Willingness (O2) to Sign Up for ESA by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Willingness to sign up for ESA									
Not at all willing	35%	19%	29%	24%	35%	18%	29%	29%	23%
Somewhat willing	32%	40%	37%	24%	29%	48%	41%	36%	27%
Very willing	33%	41%	34%	52%	36%	34%	30%	35%	49%
Total (n)	180	59	156	12	229	67	26	382	25

Source: 2013 CARE Participant Telephone Survey.

Table 230: Non-Participant Willingness (O2) to Sign Up for ESA by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Willingness to sign up for ESA						
Not at all willing	29%	21%	15%	28%	32%	30%
Somewhat willing	31%	22%	42%	37%	32%	43%
Very willing	41%	57%	43%	34%	36%	27%
Total (n)	100	26	12	58	112	99

Source: 2013 CARE Participant Telephone Survey.

Table 231: Reasons for No Willingness to Sign Up for ESA (O2b_opn) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for no willingness to sign up for ESA								
Bad prior experience	6%	4%	7%	7%	6%	4%	5%	6%
Low energy bills	3%	2%	4%	0%	5%	13%	4%	5%
No need (appliances work fine)	11%	9%	12%	11%	9%	7%	12%	9%
No need (efficient home already)	21%	11%	27%	12%	28%	17%	27%	28%
No need (sufficient income)	2%	1%	3%	2%	3%	0%	2%	3%
No need (unknown)	7%	6%	7%	5%	5%	15%	7%	5%
Other/unknown	9%	15%	7%	13%	7%	10%	7%	7%
Planned relocation	8%	6%	9%	10%	10%	0%	8%	10%
Prefer DIY	7%	9%	5%	3%	4%	0%	9%	4%
Previous participant?	9%	20%	4%	15%	7%	8%	6%	7%
Previously contacted - rejected	4%	4%	4%	5%	4%	0%	4%	4%
Program time requirements (burden)	2%	3%	2%	0%	2%	0%	3%	2%
Skepticism/Outsiders unwelcome	9%	7%	10%	10%	7%	8%	8%	7%
Split incentive (Landlord)	23%	24%	23%	30%	23%	30%	19%	23%
Total (n)	189	86	132	54	87	39	96	87

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added when the survey was already in the field, and has a slightly lower sample size as a result.

Table 232: Reasons for No Willingness to Sign Up for ESA (O2b_opn) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for no willingness to sign up for ESA									
Bad prior experience	5%	11%	5%	0%	4%	9%	0%	6%	0%
Low energy bills	4%	0%	4%	0%	5%	1%	5%	3%	13%
No need (appliances work fine)	13%	6%	10%	39%	13%	7%	12%	12%	0%
No need (efficient home already)	27%	12%	20%	34%	32%	6%	0%	22%	16%
No need (sufficient income)	3%	0%	2%	0%	3%	0%	0%	1%	18%
No need (unknown)	13%	0%	4%	18%	5%	7%	24%	7%	0%
Other/unknown	8%	3%	13%	0%	7%	23%	12%	10%	0%
Planned relocation	2%	18%	10%	0%	4%	10%	22%	8%	0%
Prefer DIY	14%	0%	3%	0%	5%	0%	16%	7%	0%
Previous participant?	9%	28%	3%	10%	8%	19%	0%	10%	0%
Previously contacted - rejected	4%	11%	2%	0%	1%	0%	0%	4%	0%
Program time requirements (burden)	3%	0%	2%	0%	0%	0%	0%	2%	0%
Skepticism/Outsiders unwelcome	20%	6%	1%	0%	8%	12%	5%	7%	64%
Split incentive (Landlord)	0%	28%	42%	0%	28%	20%	5%	22%	46%
Total (n)	91	18	73	7	109	31	12	182	7

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added when the survey was already in the field, and has a slightly lower sample size as a result.

Table 233: Reasons for No Willingness to Sign Up for ESA (O2b_opn) by Climate Zone for California LI Population

	LI Eligible Population					
	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for no willingness to sign up for ESA						
Bad prior experience	10%	0%	0%	4%	8%	4%
Low energy bills	0%	0%	24%	0%	5%	4%
No need (appliances work fine)	4%	6%	0%	18%	10%	14%
No need (efficient home already)	18%	26%	0%	4%	26%	29%
No need (sufficient income)	4%	5%	0%	0%	2%	2%
No need (unknown)	6%	0%	0%	3%	7%	10%
Other/unknown	13%	0%	0%	12%	9%	8%
Planned relocation	21%	0%	0%	5%	6%	6%
Prefer DIY	0%	0%	0%	6%	7%	11%
Previous participant?	12%	4%	0%	24%	7%	4%
Previously contacted - rejected	5%	0%	0%	4%	3%	5%
Program time requirements (burden)	0%	0%	0%	0%	3%	3%
Skepticism/Outsiders unwelcome	10%	22%	76%	2%	9%	5%
Split incentive (Landlord)	13%	44%	51%	40%	25%	15%
Total (n)	33	10	3	24	63	56

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added when the survey was already in the field, and has a slightly lower sample size as a result.

8.2.6 Energy Insecurity

Table 234: Food/Medicine Cutbacks to Pay Utility Bill (I1e) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Cuts back on food and medicine to pay utility bill								
A lot	10%	12%	8%	10%	12%	13%	10%	12%
Sometimes	43%	44%	42%	40%	46%	36%	46%	45%
Never/No	47%	44%	50%	50%	42%	51%	44%	43%
Total (n)	1,020	605	415	387	381	200	429	377

Source: 2013 CARE Participant Telephone Survey.

Table 235: Food/Medicine Cutbacks to Pay Utility Bill (I1e) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Cuts back on food and medicine to pay utility bill									
A lot	10%	8%	11%	20%	11%	9%	16%	10%	11%
Sometimes	37%	53%	42%	44%	37%	47%	40%	43%	39%
Never/No	53%	38%	48%	35%	51%	44%	43%	47%	51%
Total (n)	480	134	357	42	528	210	49	970	49

Source: 2013 CARE Participant Telephone Survey.

Table 236: Food/Medicine Cutbacks to Pay Utility Bill (I1e) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Cuts back on food and medicine to pay utility bill						
A lot	12%	10%	10%	8%	11%	10%
Sometimes	44%	57%	39%	36%	47%	39%
Never/No	44%	33%	51%	56%	42%	51%
Total (n)	253	57	24	154	270	262

Source: 2013 CARE Participant Telephone Survey.

Table 237: Borrows Money to Pay Utility Bill (I1f) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Borrows money to pay utility bill								
A lot	3%	4%	2%	3%	2%	6%	2%	3%
Sometimes	30%	31%	30%	28%	34%	23%	33%	33%
Never/No	67%	66%	68%	69%	64%	71%	65%	65%
Total (n)	1,025	608	417	387	384	203	431	380

Source: 2013 CARE Participant Telephone Survey.

Table 238: Borrows Money to Pay Utility Bill (I1f) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Borrows money to pay utility bill									
A lot	4%	2%	2%	10%	3%	2%	3%	3%	0%
Sometimes	24%	35%	34%	37%	23%	40%	32%	31%	17%
Never/No	72%	63%	64%	53%	74%	59%	65%	66%	83%
Total (n)	482	136	358	42	531	213	48	975	49

Source: 2013 CARE Participant Telephone Survey.

Table 239: Borrows Money to Pay Utility Bill (I1f) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Borrows money to pay utility bill						
A lot	2%	1%	2%	4%	3%	3%
Sometimes	29%	34%	17%	28%	38%	26%
Never/No	68%	66%	82%	68%	59%	72%
Total (n)	252	59	24	155	273	262

Source: 2013 CARE Participant Telephone Survey.

Table 240: Disconnection Messages (I1g) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Gets disconnection messages								
A lot	4%	5%	4%	3%	4%	5%	5%	4%
Sometimes	26%	27%	25%	24%	28%	24%	27%	28%
Never/No	70%	68%	71%	72%	68%	71%	68%	69%
Total (n)	1,023	607	416	385	384	202	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 241: Disconnection Messages (I1g) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Gets disconnection messages									
A lot	5%	3%	4%	12%	5%	3%	5%	4%	5%
Sometimes	21%	33%	26%	29%	25%	32%	16%	26%	26%
Never/No	74%	64%	70%	59%	70%	66%	79%	70%	69%
Total (n)	482	136	357	42	528	213	48	973	49

Source: 2013 CARE Participant Telephone Survey.

Table 242: Disconnection Messages (I1g) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Gets disconnection messages						
A lot	4%	1%	10%	2%	8%	4%
Sometimes	21%	24%	31%	30%	32%	23%
Never/No	75%	76%	59%	68%	60%	73%
Total (n)	251	59	24	154	272	263

Source: 2013 CARE Participant Telephone Survey.

Table 243: Service Shut-Offs (I1h) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Gets service shut-offs								
A lot	0%	0%	0%	0%	0%	0%	0%	0%
Sometimes	10%	9%	10%	9%	11%	6%	11%	11%
Never/No	90%	91%	90%	91%	88%	94%	89%	88%
Total (n)	1,023	608	415	385	384	202	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 244: Service Shut-Offs (I1h) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Gets service shut-offs									
A lot	1%	0%	0%	0%	0%	1%	1%	0%	0%
Sometimes	8%	13%	10%	13%	8%	9%	3%	10%	10%
Never/No	92%	87%	90%	87%	92%	91%	96%	90%	90%
Total (n)	481	135	358	42	529	213	48	974	48

Source: 2013 CARE Participant Telephone Survey.

Table 245: Service Shut-Offs (I1h) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Gets service shut-offs						
A lot	0%	0%	2%	0%	0%	1%
Sometimes	8%	14%	20%	9%	11%	9%
Never/No	92%	86%	78%	91%	89%	91%
Total (n)	252	59	24	153	272	263

Source: 2013 CARE Participant Telephone Survey.

Table 246: Less Heating/Cooling Use to Lower Bill (I1i) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Uses less heating/cooling to lower bill								
A lot	28%	30%	26%	32%	28%	31%	24%	28%
Sometimes	45%	46%	43%	42%	46%	38%	48%	47%
Never/No	27%	24%	32%	26%	25%	31%	28%	25%
Total (n)	1,016	603	413	383	381	200	429	377

Source: 2013 CARE Participant Telephone Survey.

Table 247: Less Heating/Cooling Use to Lower Bill (I1i) by Home Type, Language, Rural and Urban for California LI Population

	LI Eligible Population								
	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Uses less heating/cooling to lower bill									
A lot	27%	31%	27%	33%	27%	15%	42%	28%	37%
Sometimes	42%	43%	48%	38%	43%	53%	43%	45%	26%
Never/No	32%	26%	26%	29%	29%	31%	15%	27%	37%
Total (n)	478	134	356	42	526	212	48	966	49

Source: 2013 CARE Participant Telephone Survey.

Table 248: Less Heating/Cooling Use to Lower Bill (I1i) by Climate Zone for California LI Population

	LI Eligible Population					
	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Uses less heating/cooling to lower bill						
A lot	31%	23%	21%	35%	26%	24%
Sometimes	47%	46%	41%	33%	43%	51%
Never/No	21%	30%	38%	32%	31%	26%
Total (n)	251	59	24	152	268	262

Source: 2013 CARE Participant Telephone Survey.

Table 249: Use of Stove/Oven to Heat Home (I1j) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Uses stove/oven to heat home								
A lot	4%	4%	4%	3%	4%	4%	5%	5%
Sometimes	11%	12%	10%	11%	8%	17%	11%	8%
Never/No	85%	84%	86%	87%	87%	79%	84%	87%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 250: Use of Stove/Oven to Heat Home (I1j) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Uses stove/oven to heat home									
A lot	2%	4%	6%	6%	4%	2%	10%	4%	0%
Sometimes	11%	13%	11%	19%	9%	10%	19%	11%	14%
Never/No	88%	83%	84%	75%	87%	88%	71%	85%	86%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 251: Use of Stove/Oven to Heat Home (I1j) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Uses stove/oven to heat home						
A lot	2%	4%	0%	4%	8%	4%
Sometimes	9%	1%	20%	12%	11%	14%
Never/No	89%	95%	80%	85%	81%	82%
Total (n)	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

Table 252: Reasons for Use of Stove/Oven to Heat Home (I1_b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Reasons for stove/oven to heat home								
Furnace does not work	41%	38%	50%	41%	0%	0%	0%	0%
Don't have another heating source	4%	5%	0%	4%	0%	0%	0%	0%
Home is too cold	13%	5%	50%	13%	0%	0%	0%	0%
Think it is more efficient than heating the whole house	4%	5%	0%	4%	0%	0%	0%	0%
Other	4%	5%	0%	4%	0%	0%	0%	0%
Power outage	4%	5%	0%	4%	0%	0%	0%	0%
Insufficient heating	4%	5%	0%	4%	0%	0%	0%	0%
Instead of heater when also cooking	4%	5%	0%	4%	0%	0%	0%	0%
Saves money vs. heater	25%	30%	0%	25%	0%	0%	0%	0%
Total (n)	13	11	2	13	0	0	0	0

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample as a result.

Table 253: Reasons for Use of Stove/Oven to Heat Home (I1_b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Reasons for stove/oven to heat home									
Furnace does not work	17%	100%	31%	43%	40%	0%	0%	41%	0%
Don't have another heating source	17%	0%	0%	0%	0%	0%	0%	4%	0%
Home is too cold	0%	0%	31%	14%	20%	0%	0%	13%	0%
Think it is more efficient than heating the whole house	17%	0%	0%	0%	6%	0%	0%	4%	0%
Other	17%	0%	0%	0%	0%	100%	0%	4%	0%
Power outage	17%	0%	0%	0%	6%	0%	0%	4%	0%
Insufficient heating	17%	0%	0%	0%	6%	0%	0%	4%	0%
Instead of heater when also cooking	17%	0%	0%	0%	6%	0%	0%	4%	0%
Saves money vs. heater	0%	0%	38%	43%	20%	0%	0%	25%	0%
Total (n)	6	1	3	3	9	1	0	13	0

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample as a result.

Table 254: Reasons for Use of Stove/Oven to Heat Home (I1_b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Reasons for stove/oven to heat home						
Furnace does not work	35%	0%	0%	51%	0%	0%
Don't have another heating source	0%	0%	0%	12%	0%	0%
Home is too cold	21%	0%	0%	0%	0%	0%
Think it is more efficient than heating the whole house	0%	0%	0%	12%	0%	0%
Other	0%	0%	0%	12%	0%	0%
Power outage	0%	0%	0%	12%	0%	0%
Insufficient heating	0%	0%	0%	12%	0%	0%
Instead of heater when also cooking	7%	0%	0%	0%	0%	0%
Saves money vs. heater	38%	0%	0%	0%	0%	0%
Total (n)	7	0	0	6	0	0

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample as a result.

Table 255: Energy Insecurity Summary (I1e, I1f, I1g, I1h, I1i, I1j) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Energy insecurity summary								
High insecurity	6%	7%	4%	5%	6%	7%	6%	5%
Medium insecurity	37%	41%	33%	41%	39%	39%	34%	39%
Low insecurity	57%	52%	63%	54%	55%	55%	60%	55%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 256: Energy Insecurity Summary (I1e, I1f, I1g, I1h, I1i, I1j) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Energy insecurity summary									
High insecurity	5%	7%	6%	6%	6%	3%	10%	6%	3%
Medium insecurity	35%	39%	37%	37%	35%	29%	48%	37%	42%
Low insecurity	60%	55%	57%	57%	59%	68%	42%	57%	55%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 257: Energy Insecurity (I1e, I1f, I1g, I1h, I1i, I1j) Summary by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Energy insecurity summary						
High insecurity	5%	3%	3%	4%	9%	6%
Medium insecurity	39%	34%	36%	42%	36%	32%
Low insecurity	55%	63%	61%	53%	55%	62%
Total (n)	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

8.2.7 NEBs

Table 258: Recent Participant Decrease in Electric/Gas Bill (PB8a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Decrease in electric/gas bill								
A lot	23%	23%	0%	22%	27%	23%	23%	27%
Somewhat	58%	58%	0%	54%	64%	41%	70%	64%
No change/No	18%	18%	0%	22%	9%	36%	7%	9%
Bills have gone up	1%	1%	0%	2%	0%	0%	0%	0%
Total (n)	157	157	-	62	54	37	58	54

Source: 2013 CARE Participant Telephone Survey.

Table 259: Recent Participant Decrease in Electric/Gas Bill (PB8a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Decrease in electric/gas bill									
A lot	20%	9%	28%	0%	23%	14%	8%	23%	19%
Somewhat	60%	70%	56%	45%	51%	81%	77%	60%	34%
No change/No	18%	21%	16%	44%	24%	4%	14%	17%	28%
Bills have gone up	1%	0%	0%	11%	2%	0%	0%	0%	19%
Total (n)	90	20	37	7	87	19	8	146	11

Source: 2013 CARE Participant Telephone Survey.

Table 260: Recent Participant Decrease in Electric/Gas Bill (PB8a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Decrease in electric/gas bill						
A lot	24%	63%	0%	25%	17%	12%
Somewhat	51%	31%	61%	56%	59%	80%
No change/No	23%	6%	39%	16%	24%	7%
Bills have gone up	2%	0%	0%	3%	0%	0%
Total (n)	43	11	3	22	45	33

Source: 2013 CARE Participant Telephone Survey.

Table 261: Non-Recent Participant/Recent Participant Change in Comfort from Temperature (PB8b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Increase in comfort in terms of temperature								
A lot	37%	37%	0%	26%	45%	37%	48%	45%
Somewhat	28%	28%	0%	33%	25%	24%	24%	25%
No change/No	35%	35%	0%	41%	30%	39%	28%	30%
Total (n)	158	158	-	63	54	37	58	54

Source: 2013 CARE Participant Telephone Survey.

Table 262: Non-Recent Participant/Recent Participant Change in Comfort from Temperature (PB8b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Increase in comfort in terms of temperature									
A lot	32%	36%	36%	25%	29%	59%	26%	38%	10%
Somewhat	37%	41%	15%	25%	30%	23%	49%	28%	27%
No change/No	32%	23%	48%	50%	40%	18%	25%	34%	63%
Total (n)	91	20	38	6	86	19	9	148	10

Source: 2013 CARE Participant Telephone Survey.

Table 263: Non-Recent Participant/Recent Participant Change in Comfort from Temperature (PB8b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Increase in comfort in terms of temperature						
A lot	30%	59%	39%	28%	46%	34%
Somewhat	37%	14%	23%	24%	19%	36%
No change/No	34%	27%	39%	48%	35%	29%
Total (n)	44	11	3	22	44	34

Source: 2013 CARE Participant Telephone Survey.

Table 264: Non-Recent Participant/Recent Participant Change in Illnesses (PB8c) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Decrease in illness								
A lot	20%	20%	0%	9%	31%	15%	35%	31%
Somewhat	24%	24%	0%	27%	22%	18%	22%	22%
No change/No	56%	56%	0%	64%	47%	68%	43%	47%
Total (n)	156	156	-	64	53	36	56	53

Source: 2013 CARE Participant Telephone Survey.

Table 265: Non-Recent Participant/Recent Participant Change in Illnesses (PB8c) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Decrease in illness									
A lot	11%	29%	29%	23%	16%	36%	0%	21%	9%
Somewhat	26%	30%	18%	0%	26%	32%	19%	25%	9%
No change/No	63%	41%	53%	77%	58%	32%	81%	55%	81%
Total (n)	89	20	37	7	85	18	9	145	11

Source: 2013 CARE Participant Telephone Survey.

Table 266: Non-Recent Participant/Recent Participant Change in Illnesses (PB8c) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Decrease in illness						
A lot	5%	47%	39%	13%	33%	22%
Somewhat	40%	8%	0%	13%	23%	17%
No change/No	55%	45%	61%	74%	44%	61%
Total (n)	45	11	3	22	43	32

Source: 2013 CARE Participant Telephone Survey.

Table 267: Non-Recent Participant/Recent Participant Change in Feelings of Household Safety (PB8e) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Increase in feelings of safety								
A lot	42%	42%	0%	36%	47%	32%	52%	47%
Somewhat	22%	22%	0%	21%	23%	27%	23%	23%
No change/No	36%	36%	0%	43%	30%	41%	25%	30%
Total (n)	157	157	-	63	54	36	58	54

Source: 2013 CARE Participant Telephone Survey.

Table 268: Non-Recent Participant/Recent Participant Change in Feelings of Household Safety (PB8e) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Increase in feelings of safety									
A lot	43%	43%	37%	23%	32%	69%	26%	43%	28%
Somewhat	25%	18%	27%	22%	18%	31%	49%	22%	34%
No change/No	32%	39%	36%	55%	50%	0%	25%	36%	38%
Total (n)	90	20	37	7	86	19	9	146	11

Source: 2013 CARE Participant Telephone Survey.

Table 269: Non-Recent Participant/Recent Participant Change in Feelings of Household Safety (PB8e) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Increase in feelings of safety						
A lot	33%	59%	0%	43%	47%	44%
Somewhat	28%	31%	23%	13%	21%	22%
No change/No	39%	10%	77%	45%	32%	34%
Total (n)	44	11	3	22	43	34

Source: 2013 CARE Participant Telephone Survey.

Table 270: Non-Recent Participant/Recent Participant Change in Water Usage (PB8f) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Decrease in water usage								
A lot	22%	22%	0%	0%	0%	14%	49%	0%
Somewhat	32%	32%	0%	75%	0%	28%	15%	0%
No change/No	40%	40%	0%	25%	0%	47%	36%	0%
Don't know	6%	6%	0%	0%	0%	11%	0%	0%
Total (n)	39	39	-	5	-	30	4	-

Source: 2013 CARE Participant Telephone Survey.

Table 271: Non-Recent Participant/Recent Participant Change in Water Usage (PB8f) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Decrease in water usage									
A lot	16%	51%	4%	0%	14%	40%	0%	23%	0%
Somewhat	34%	24%	40%	0%	28%	27%	50%	33%	0%
No change/No	45%	16%	52%	100%	44%	33%	50%	38%	100%
Don't know	5%	8%	4%	0%	15%	0%	0%	6%	0%
Total (n)	16	7	15	1	21	6	2	38	1

Source: 2013 CARE Participant Telephone Survey.

Table 272: Non-Recent Participant/Recent Participant Change in Water Usage (PB8f) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Decrease in water usage						
A lot	0%	0%	0%	0%	36%	8%
Somewhat	33%	0%	0%	100%	22%	27%
No change/No	67%	100%	0%	0%	34%	59%
Don't know	0%	0%	0%	0%	8%	5%
Total (n)	3	1	-	2	21	12

Source: 2013 CARE Participant Telephone Survey.

Table 273: Non-Recent Participant/Recent Participant Change in Ability to Save Energy (PB8g) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Change in ability to save energy by doing things around home								
A lot	30%	30%	0%	25%	35%	32%	35%	35%
Somewhat	48%	48%	0%	45%	54%	33%	56%	54%
No change/No	22%	22%	0%	30%	12%	35%	10%	12%
Total (n)	157	157	-	62	54	37	58	54

Source: 2013 CARE Participant Telephone Survey.

Table 274: Non-Recent Participant/Recent Participant Change in Ability to Save Energy (PB8g) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Change in ability to save energy by doing things around home									
A lot	26%	12%	43%	0%	25%	47%	7%	30%	28%
Somewhat	47%	63%	40%	56%	49%	42%	56%	48%	43%
No change/No	27%	25%	17%	44%	26%	11%	37%	22%	28%
Total (n)	89	20	38	7	86	19	9	146	11

Source: 2013 CARE Participant Telephone Survey.

Table 275: Non-Recent Participant/Recent Participant Change in Ability to Save Energy (PB8g) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Change in ability to save energy by doing things around home						
A lot	27%	81%	39%	23%	25%	30%
Somewhat	48%	15%	23%	45%	51%	59%
No change/No	26%	4%	39%	33%	24%	11%
Total (n)	43	10	3	22	45	34

Source: 2013 CARE Participant Telephone Survey.

Table 276: Non-Recent Participant/Recent Participant Level of Temperature Comfort (PB9a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Comfort level of home temperature								
Very comfortable	38%	34%	41%	41%	33%	39%	36%	33%
Somewhat comfortable	50%	52%	49%	48%	55%	49%	51%	55%
Not at all comfortable	12%	14%	10%	11%	12%	12%	13%	12%
Total (n)	859	448	411	322	326	163	370	322

Source: 2013 CARE Participant Telephone Survey.

Table 277: Non-Recent Participant/Recent Participant Level of Temperature Comfort (PB9a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Comfort level of home temperature									
Very comfortable	41%	29%	40%	33%	46%	22%	43%	38%	31%
Somewhat comfortable	51%	52%	49%	53%	44%	62%	44%	50%	61%
Not at all comfortable	8%	19%	12%	14%	10%	16%	14%	12%	7%
Total (n)	389	114	317	35	442	192	39	820	38

Source: 2013 CARE Participant Telephone Survey.

Table 278: Non-Recent Participant/Recent Participant Level of Temperature Comfort (PB9a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Comfort level of home temperature						
Very comfortable	39%	31%	34%	41%	37%	37%
Somewhat comfortable	52%	56%	57%	45%	50%	50%
Not at all comfortable	9%	14%	9%	14%	13%	13%
Total (n)	206	47	21	133	226	226

Source: 2013 CARE Participant Telephone Survey.

Table 279: Non-Recent Participant/Recent Participant Level of Draftiness Comfort (PB9aa) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Comfort level of home in terms of draftiness								
Very comfortable	40%	35%	43%	41%	38%	40%	39%	39%
Somewhat comfortable	49%	52%	46%	47%	50%	44%	50%	49%
Not at all comfortable	12%	14%	10%	12%	12%	16%	11%	12%
Total (n)	723	374	349	198	319	159	362	315

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 280: Non-Recent Participant/Recent Participant Level of Draftiness Comfort (PB9aa) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Comfort level of home in terms of draftiness									
Very comfortable	46%	29%	39%	48%	48%	29%	31%	39%	50%
Somewhat comfortable	44%	52%	52%	30%	41%	59%	53%	49%	44%
Not at all comfortable	10%	19%	9%	23%	11%	12%	16%	12%	6%
Total (n)	332	94	271	24	348	177	33	691	31

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 281: Non-Recent Participant/Recent Participant Level of Draftiness Comfort (PB9aa) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Comfort level of home in terms of draftiness						
Very comfortable	41%	47%	40%	41%	32%	43%
Somewhat comfortable	46%	47%	47%	47%	53%	47%
Not at all comfortable	13%	6%	13%	11%	14%	10%
Total (n)	138	45	16	80	221	223

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 282: Non-Recent Participant/Recent Participant Level of Safety (PB9b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Feelings of safety in home								
Very safe	75%	71%	79%	75%	0%	0%	0%	0%
Somewhat safe	24%	27%	21%	24%	0%	0%	0%	0%
Not at all safe	1%	2%	0%	1%	0%	0%	0%	0%
Total (n)	115	60	55	115	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample as a result.

Table 283: Non-Recent Participant/Recent Participant Level of Safety (PB9b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Feelings of safety in home									
Very safe	82%	83%	70%	71%	77%	67%	64%	74%	89%
Somewhat safe	18%	17%	27%	29%	23%	33%	36%	25%	11%
Not at all safe	0%	0%	3%	0%	0%	0%	0%	1%	0%
Total (n)	49	17	38	10	83	8	5	108	7

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample as a result.

Table 284: Non-Recent Participant/Recent Participant Level of Safety (PB9b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Feelings of safety in home						
Very safe	75%	0%	78%	74%	0%	0%
Somewhat safe	22%	0%	22%	26%	0%	0%
Not at all safe	2%	0%	0%	0%	0%	0%
Total (n)	60	-	5	50	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample as a result.

Table 285: Non-Recent Participant/Recent Participant Level of Safety from Window Condition (PB9c) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Feelings of safety from window condition								
Very safe	53%	48%	58%	56%	49%	49%	53%	50%
Somewhat safe	40%	42%	38%	38%	43%	40%	41%	42%
Not at all safe	7%	10%	4%	6%	8%	10%	7%	8%
Total (n)	751	388	363	210	328	165	372	324

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 286: Non-Recent Participant/Recent Participant Level of Safety from Window Condition (PB9c) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Feelings of safety from window condition									
Very safe	58%	48%	53%	56%	59%	45%	58%	53%	66%
Somewhat safe	37%	46%	39%	28%	36%	47%	28%	40%	34%
Not at all safe	5%	6%	8%	16%	5%	9%	14%	7%	0%
Total (n)	341	99	283	25	360	185	35	719	31

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 287: Non-Recent Participant/Recent Participant Level of Safety from Window Condition (PB9c) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Feelings of safety from window condition						
Very safe	47%	50%	82%	63%	53%	53%
Somewhat safe	46%	50%	16%	30%	41%	39%
Not at all safe	7%	1%	2%	6%	7%	8%
Total (n)	148	48	16	84	227	228

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 288: Non-Recent Participant/Recent Participant Level of Safety Using Heating/Cooling Equipment (PB9d) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Feelings of safety when using Heating/Cooling equipment								
Very safe	48%	45%	50%	52%	45%	54%	45%	46%
Somewhat safe	44%	45%	43%	43%	46%	33%	46%	46%
Not at all safe	8%	10%	7%	4%	8%	13%	9%	9%
Total (n)	746	389	357	207	327	164	371	323

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 289: Non-Recent Participant/Recent Participant Level of Safety Using Heating/Cooling Equipment (PB9d) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Feelings of safety when using heating/cooling equipment									
Very safe	57%	35%	48%	38%	53%	41%	36%	47%	65%
Somewhat safe	36%	56%	43%	57%	40%	46%	58%	45%	29%
Not at all safe	7%	9%	9%	5%	6%	13%	7%	8%	6%
Total (n)	340	97	281	25	360	182	34	715	30

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 290: Non-Recent Participant/Recent Participant Level of Safety Using Heating/Cooling Equipment (PB9d) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Feelings of safety when using heating/cooling equipment						
Very safe	49%	46%	66%	50%	44%	48%
Somewhat safe	47%	45%	31%	44%	43%	44%
Not at all safe	4%	9%	2%	6%	13%	8%
Total (n)	146	46	16	83	228	227

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample as a result.

Table 291: Level of Comfort and Safety* (PB9a, PB9aa, PB9b, PB9c, PB9d) by Elderly in Home for California LI Population

Health, Comfort or Safety Indicator		No Elderly Persons in Home	Elderly Persons in Home	Total (n)
Comfort level of home temperature	ESA Participant	89%	83%	448
	ESA Non-Participant	95%	86%	411
Comfort level in terms of draftiness	ESA Participant	90%	82%	374
	ESA Non-Participant	93%	87%	349
How safe respondent feels in home	ESA Participant	100%	94%	60
	ESA Non-Participant	100%	100%	55
In terms of window condition	ESA Participant	91%	88%	388
	ESA Non-Participant	98%	95%	363
In terms of heating and cooling equipment	ESA Participant	90%	90%	389
	ESA Non-Participant	96%	91%	357
Total (n)		385	470	-

Source: 2013 CARE Participant Telephone Survey.
*Amongst ESA non-participants and participants that don't recall participation and responded "a lot" or "somewhat."

Table 292: Level of Comfort and Safety* (PB9a, PB9aa, PB9b, PB9c, PB9d) by Disabled Person(s) in Home for California LI Population

Health, Comfort or Safety Indicator		No Disabled Person in Home	Disabled Person(s) in Home	Total (n)
Comfort level of home temperature	ESA Participant	86%	87%	448
	ESA Non-Participant	89%	90%	411
Comfort level in terms of draftiness	ESA Participant	86%	87%	374
	ESA Non-Participant	88%	92%	349
How safe respondent feels in home	ESA Participant	97%	100%	60
	ESA Non-Participant	100%	100%	55
In terms of window condition	ESA Participant	89%	90%	388
	ESA Non-Participant	95%	97%	363
In terms of heating and cooling equipment	ESA Participant	89%	94%	389
	ESA Non-Participant	91%	95%	357
Total (n)		325	514	-

Source: 2013 CARE Participant Telephone Survey.
*Amongst ESA non-participants and participants that don't recall participation and responded "a lot" or "somewhat."

Table 293: Level of Comfort and Safety by Child(ren) in Home* (PB9a, PB9aa, PB9b, PB9c, PB9d)* for California LI Population

Health, Comfort or Safety Indicator		No Children in Home	Child(ren) in Home	Total (n)
Comfort level of home temperature	ESA Participant	80%	90%	448
	ESA Non-Participant	87%	92%	411
Comfort level in terms of draftiness	ESA Participant	81%	90%	374
	ESA Non-Participant	89%	91%	349
How safe respondent feels in home	ESA Participant	100%	96%	60
	ESA Non-Participant	100%	100%	55
In terms of window condition	ESA Participant	88%	91%	388
	ESA Non-Participant	97%	95%	363
In terms of heating and cooling equipment	ESA Participant	88%	92%	389
	ESA Non-Participant	91%	95%	357
Total (n)		508	348	-

Source: 2013 CARE Participant Telephone Survey.
*Amongst ESA non-participants and participants that don't recall participation and responded "a lot" or "somewhat."

Table 294: Usefulness of Things ESA Provides to Home Comfort/Safety ESA (EN1) by Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Most useful in the ESA program to help you improve household condition or safety								
Don't know	21%	20%	22%	24%	22%	19%	20%	23%
Weather-stripping/reducing leaks or drafts	17%	15%	19%	19%	15%	17%	16%	14%
Doors/windows	11%	12%	10%	10%	12%	17%	11%	12%
Refrigerator	9%	10%	9%	9%	10%	7%	10%	10%
Air conditioning unit (central or window)	8%	8%	8%	8%	7%	4%	9%	7%
Nothing/Don't need anything done	6%	5%	8%	7%	6%	7%	5%	7%
Lower bill/assistance with bill	5%	5%	5%	4%	5%	2%	6%	5%
CFLs	4%	6%	3%	4%	4%	6%	5%	4%
Furnace	4%	4%	4%	5%	3%	1%	4%	3%
Other	2%	2%	2%	0%	2%	3%	1%	2%
Stove/oven	2%	3%	1%	1%	2%	2%	2%	2%
Energy information or service to save energy/be more comfortable	1%	2%	1%	2%	1%	3%	1%	1%
Repair of windows, doors	1%	2%	1%	1%	2%	1%	2%	2%
Up-to-date/energy efficient appliances	1%	1%	2%	1%	1%	3%	1%	1%
Evaporative cooler	1%	2%	0%	0%	3%	0%	2%	3%
Non-energy related response	1%	1%	1%	1%	0%	1%	1%	0%
Assessment	1%	0%	1%	1%	1%	1%	1%	1%

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Efficient lighting or compact fluorescent lamps and fixtures	1%	1%	0%	1%	0%	1%	0%	0%
Attic insulation	1%	0%	1%	1%	1%	1%	1%	1%
Solar panels	1%	0%	1%	1%	1%	1%	1%	1%
Water saving equipment (showerhead, aerators)	0%	1%	0%	0%	0%	0%	1%	0%
Water heater	0%	0%	0%	1%	0%	0%	0%	0%
Wiring	0%	0%	0%	1%	0%	1%	0%	0%
Repair/service of furnace	0%	0%	0%	0%	0%	1%	0%	0%
Efficient clothes washer	0%	0%	0%	0%	0%	1%	0%	0%
Other re-lamping	0%	0%	0%	0%	0%	0%	0%	0%
Microwave	0%	0%	0%	0%	0%	1%	0%	0%
Pool pump	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	1,028	610	418	376	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 295: Usefulness of Things ESA Provides to Home Comfort/Safety ESA (EN1) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Most useful in the ESA program to help you improve household condition or safety									
Don't know	21%	22%	21%	15%	18%	26%	26%	21%	25%
Weather-stripping/reducing leaks or drafts	18%	20%	16%	12%	21%	13%	12%	17%	14%
Doors/windows	10%	14%	11%	16%	10%	7%	20%	11%	10%
Refrigerator	6%	10%	10%	17%	8%	13%	1%	9%	9%
Air conditioning unit (central or window)	7%	8%	8%	6%	7%	10%	11%	8%	3%
Nothing/Don't need anything done	7%	4%	6%	6%	7%	3%	8%	6%	12%
Lower bill/assistance with bill	4%	3%	6%	3%	4%	6%	0%	5%	1%
CFLs	4%	2%	7%	2%	4%	7%	2%	5%	1%
Furnace	4%	3%	4%	2%	5%	4%	0%	4%	4%
Other	3%	3%	2%	0%	2%	3%	3%	2%	2%
Stove/oven	1%	3%	2%	4%	3%	0%	1%	2%	0%
Energy information or service to save energy/be more comfortable	1%	1%	2%	6%	1%	0%	4%	1%	0%
Repair of windows, doors	2%	3%	0%	2%	1%	1%	0%	1%	0%
Up-to-date/energy efficient appliances	2%	0%	2%	0%	1%	1%	0%	1%	3%
Evaporative cooler	2%	1%	0%	6%	2%	1%	4%	1%	4%
Non-energy related response	2%	0%	1%	0%	1%	1%	1%	1%	0%
Assessment	1%	1%	1%	0%	1%	1%	2%	1%	0%
Efficient lighting or compact	1%	0%	1%	0%	1%	1%	1%	1%	3%

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
fluorescent lamps and fixtures									
Attic insulation	1%	1%	0%	0%	1%	0%	0%	0%	4%
Solar panels	2%	0%	0%	0%	0%	0%	3%	1%	1%
Water saving equipment (showerhead, aerators)	1%	0%	0%	4%	0%	1%	0%	0%	0%
Water heater	1%	0%	0%	0%	0%	1%	0%	0%	2%
Wiring	0%	0%	0%	1%	0%	0%	0%	0%	2%
Repair/service of furnace	1%	0%	0%	0%	0%	0%	0%	0%	0%
Efficient clothes washer	1%	0%	0%	0%	0%	0%	0%	0%	0%
Other re-lamping	0%	0%	0%	0%	0%	0%	0%	0%	0%
Microwave	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pool pump	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 296: Usefulness of Things ESA Provides to Home Comfort/Safety ESA (EN1) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Most useful in the ESA program to help you improve household condition or safety						
Don't know	18%	14%	18%	27%	21%	20%
Weather-stripping/reducing leaks or drafts	17%	9%	19%	20%	19%	16%
Doors/windows	12%	12%	19%	8%	11%	12%
Refrigerator	9%	9%	4%	10%	10%	9%
Air conditioning unit (central or window)	12%	15%	6%	3%	2%	12%
Nothing/Don't need anything done	7%	7%	9%	7%	5%	5%
Lower bill/assistance with bill	3%	7%	5%	4%	7%	5%
CFLs	3%	7%	3%	4%	6%	5%
Furnace	2%	2%	9%	7%	5%	2%
Other	4%	4%	4%	1%	1%	2%
Stove/oven	1%	1%	0%	0%	5%	1%
Energy information or service to save energy/be more comfortable	3%	0%	0%	0%	2%	1%
Repair of windows, doors	1%	3%	0%	0%	1%	2%
Up-to-date/energy efficient appliances	0%	1%	4%	1%	2%	2%
Evaporative cooler	1%	5%	0%	0%	0%	2%
Non-energy related response	1%	0%	0%	0%	2%	0%
Assessment	1%	0%	0%	1%	1%	0%
Efficient lighting or compact fluorescent lamps and fixtures	1%	0%	0%	2%	1%	0%
Attic insulation	1%	1%	0%	0%	1%	1%
Solar panels	1%	1%	0%	0%	0%	1%
Water saving equipment (showerhead, aerators)	0%	1%	0%	0%	0%	1%
Water heater	0%	2%	0%	1%	0%	0%
Wiring	0%	0%	0%	1%	0%	0%
Repair/service of furnace	0%	0%	0%	0%	0%	0%

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Efficient clothes washer	0%	0%	0%	0%	0%	1%
Other re-lamping	0%	0%	0%	0%	0%	0%
Microwave	0%	0%	0%	0%	0%	0%
Pool pump	0%	0%	0%	0%	0%	0%
Total (n)	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

8.2.8 Energy Efficiency Measures

Table 297: Pool Pump Condition (EN11i) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well pool pump working in home								
Working well	78%	79%	76%	86%	72%	86%	71%	72%
In need of repair	16%	15%	17%	9%	20%	0%	23%	20%
Not working at all	6%	6%	6%	5%	8%	14%	6%	8%
Total (n)	103	58	45	38	45	15	50	45

Source: 2013 CARE Participant Telephone Survey.

Table 298: Pool Pump Condition (EN11i) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well pool pump working in home									
Working well	77%	58%	88%	100%	88%	77%	100%	76%	100%
In need of repair	19%	33%	4%	0%	10%	11%	0%	17%	0%
Not working at all	4%	9%	8%	0%	2%	12%	0%	7%	0%
Total (n)	60	11	27	4	54	20	3	96	7

Source: 2013 CARE Participant Telephone Survey.

Table 299: Pool Pump Condition (EN11i) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well pool pump working in home								
Working well	86%	63%	100%	84%	78%	72%	79%	71%
In need of repair	14%	14%	0%	4%	19%	24%	14%	15%
Not working at all	0%	24%	0%	12%	4%	4%	7%	14%
Total (n)	28	10	3	13	16	33	55	19

Source: 2013 CARE Participant Telephone Survey.

Table 300: Refrigerator Condition (EN11j) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well refrigerator working in home								
Working well	73%	66%	80%	75%	69%	73%	71%	69%
In need of repair	23%	27%	19%	21%	25%	26%	24%	25%
Not working at all	0%	1%	0%	0%	1%	1%	1%	1%
Received through program	4%	7%	1%	4%	5%	0%	4%	5%
Total (n)	1,020	607	413	381	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 301: Refrigerator Condition (EN11j) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well refrigerator working in home									
Working well	77%	68%	73%	65%	74%	74%	76%	73%	78%
In need of repair	19%	30%	21%	35%	21%	24%	15%	23%	19%
Not working at all	1%	0%	0%	0%	0%	1%	0%	1%	0%
Received through program	3%	2%	5%	0%	4%	1%	9%	4%	3%
Total (n)	482	135	354	42	526	213	48	970	49

Source: 2013 CARE Participant Telephone Survey.

Table 302: Refrigerator Condition (EN11j) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well refrigerator working in home								
Working well	71%	76%	71%	79%	67%	76%	72%	68%
In need of repair	26%	22%	29%	15%	27%	21%	25%	29%
Not working at all	0%	0%	0%	0%	1%	1%	0%	0%
Received through program	3%	1%	0%	6%	5%	2%	3%	3%
Total (n)	250	59	24	151	273	263	12	5

Source: 2013 CARE Participant Telephone Survey.

Table 303: Clothes Dryer Condition (EN11L) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well clothes dryer working in home								
Working well	81%	79%	84%	86%	80%	79%	80%	80%
In need of repair	14%	16%	13%	13%	16%	16%	15%	16%
Not working at all	4%	5%	3%	1%	4%	5%	5%	4%
Total (n)	681	402	279	188	326	130	360	323

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 304: Clothes Dryer Condition (EN11L) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well clothes dryer working in home									
Working well	84%	75%	84%	75%	86%	78%	89%	81%	85%
In need of repair	14%	17%	13%	21%	12%	12%	11%	14%	13%
Not working at all	2%	9%	3%	3%	2%	11%	0%	4%	2%
Total (n)	395	104	150	26	339	156	27	649	31

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 305: Clothes Dryer Condition (EN11L) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well clothes dryer working in home								
Working well	82%	83%	90%	87%	76%	83%	83%	77%
In need of repair	15%	16%	10%	11%	16%	14%	15%	20%
Not working at all	3%	1%	0%	2%	8%	3%	2%	3%
Total (n)	151	50	17	60	192	211	332	104

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 306: Dishwasher Condition (EN11m) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well dishwasher working in home								
Working well	70%	66%	73%	74%	69%	70%	67%	69%
In need of repair	16%	16%	17%	14%	16%	14%	19%	16%
Not working at all	14%	18%	10%	12%	15%	15%	15%	15%
Total (n)	445	235	210	135	196	96	212	194

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 307: Dishwasher Condition (EN11m) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well dishwasher working in home									
Working well	71%	55%	77%	69%	74%	51%	57%	70%	73%
In need of repair	12%	29%	13%	20%	17%	15%	16%	16%	20%
Not working at all	17%	17%	10%	10%	8%	33%	27%	14%	7%
Total (n)	237	52	133	18	253	69	24	427	18

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 308: Dishwasher Condition (EN11m) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well dishwasher working in home								
Working well	75%	79%	76%	72%	66%	64%	72%	74%
In need of repair	16%	11%	24%	10%	18%	20%	17%	14%
Not working at all	9%	11%	0%	19%	16%	16%	10%	12%
Total (n)	102	43	10	48	114	128	240	79

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 309: Microwave Condition (EN11k_2) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well microwave working in home								
Working well	82%	74%	91%	83%	82%	76%	83%	83%
In need of repair	14%	22%	6%	15%	13%	15%	13%	13%
Not working at all	3%	4%	3%	2%	5%	6%	4%	5%
Received through program	1%	1%	0%	1%	0%	3%	0%	0%
Total (n)	825	480	345	228	358	190	403	354

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 310: Microwave Condition (EN11k_2) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well microwave working in home									
Working well	85%	75%	84%	95%	84%	79%	80%	82%	95%
In need of repair	11%	20%	13%	3%	13%	15%	18%	14%	5%
Not working at all	3%	4%	3%	2%	2%	6%	2%	3%	0%
Received through program	0%	1%	0%	0%	1%	0%	0%	1%	0%
Total (n)	390	110	292	27	403	188	41	792	32

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 311: Microwave Condition (EN11k_2) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well microwave working in home								
Working well	80%	92%	95%	82%	82%	82%	83%	80%
In need of repair	16%	6%	5%	18%	11%	15%	13%	15%
Not working at all	4%	2%	0%	0%	6%	2%	3%	5%
Received through program	1%	0%	0%	0%	1%	0%	1%	0%
Total (n)	168	56	17	86	252	246	381	116

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 312: Oven/Stove Condition (EN11a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well oven/stove working in home								
Working well	75%	69%	81%	77%	72%	78%	72%	73%
In need of repair	22%	27%	16%	20%	23%	21%	23%	23%
Not working at all	3%	4%	3%	3%	4%	1%	4%	5%
Total (n)	1,007	596	411	380	377	199	424	373

Source: 2013 CARE Participant Telephone Survey.

Table 313: Oven/Stove Condition (EN11a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well oven/stove working in home									
Working well	81%	73%	73%	76%	76%	74%	78%	74%	86%
In need of repair	18%	25%	23%	20%	22%	20%	19%	22%	13%
Not working at all	2%	2%	5%	3%	2%	6%	3%	3%	1%
Total (n)	478	133	348	42	524	208	46	958	48

Source: 2013 CARE Participant Telephone Survey.

Table 314: Oven/Stove Condition (EN11a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well oven/ stove working in home								
Working well	80%	87%	88%	70%	65%	77%	82%	77%
In need of repair	18%	13%	12%	25%	29%	20%	16%	22%
Not working at all	2%	0%	0%	5%	5%	3%	2%	2%
Total (n)	250	57	24	150	266	260	477	127

Source: 2013 CARE Participant Telephone Survey.

Table 315: Door Condition (EN11e) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well doors working in home								
Working well	69%	72%	66%	71%	68%	71%	68%	69%
In need of repair	29%	26%	33%	27%	30%	28%	31%	29%
Not working at all	1%	2%	1%	1%	2%	0%	2%	2%
Total (n)	1,025	609	416	388	384	201	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 316: Door Condition (EN11e) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well doors working in home									
Working well	71%	65%	69%	61%	72%	67%	66%	69%	75%
In need of repair	27%	32%	30%	37%	27%	29%	34%	30%	25%
Not working at all	1%	3%	1%	2%	1%	3%	0%	2%	0%
Total (n)	480	136	360	42	531	213	48	975	49

Source: 2013 CARE Participant Telephone Survey.

Table 317: Door Condition (EN11e) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How well doors working in home								
Working well	69%	65%	80%	72%	69%	67%	69%	65%
In need of repair	30%	34%	20%	26%	30%	30%	30%	35%
Not working at all	1%	1%	0%	1%	1%	3%	1%	0%
Total (n)	252	59	24	156	272	262	482	132

Source: 2013 CARE Participant Telephone Survey.

Table 318: Window Condition (EN11f) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
How well windows working in home								
Working well	63%	60%	66%	65%	65%	66%	61%	66%
In need of repair	35%	37%	33%	32%	33%	33%	37%	32%
Not working at all	2%	3%	2%	3%	2%	1%	2%	2%
Total (n)	1,022	608	414	387	381	203	428	377

Source: 2013 CARE Participant Telephone Survey.

Table 319: Window Condition (EN11f) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
How well windows working in home									
Working well	67%	55%	64%	49%	66%	63%	59%	62%	66%
In need of repair	31%	42%	34%	45%	32%	34%	41%	35%	28%
Not working at all	3%	3%	2%	6%	2%	3%	0%	2%	6%
Total (n)	480	134	358	42	532	211	49	973	48

Source: 2013 CARE Participant Telephone Survey.

Table 320: Window Condition (EN11f) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
How windows working in home								
Working well	64%	67%	49%	67%	61%	60%	63%	63%
In need of repair	32%	33%	42%	31%	37%	38%	34%	36%
Not working at all	4%	0%	9%	1%	3%	2%	3%	1%
Total (n)	250	57	24	156	273	262	478	128

Source: 2013 CARE Participant Telephone Survey.

Table 321: Furnace/Heater More than 10 Years Old (EN11bb) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Furnace/heater more than 10 years old								
Don't know	18%	10%	25%	22%	16%	13%	16%	16%
Yes	57%	66%	48%	50%	59%	60%	60%	58%
No	25%	24%	26%	27%	25%	26%	24%	25%
Received through program	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	807	473	334	219	363	179	406	360

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 322: Furnace/Heater More than 10 Years Old (EN11bb) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Furnace/heater more than 10 years old									
Don't know	3%	28%	25%	2%	13%	22%	22%	18%	15%
Yes	63%	55%	53%	64%	59%	58%	58%	57%	55%
No	33%	17%	23%	34%	28%	20%	20%	25%	30%
Received through program	1%	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	387	108	279	27	394	188	38	781	25

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 323: Furnace/Heater More than 10 Years Old (EN11bb) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Furnace/heater more than 10 years old								
Don't know	26%	15%	0%	17%	12%	18%	20%	18%
Yes	47%	53%	36%	58%	68%	56%	51%	53%
No	27%	32%	64%	25%	20%	26%	29%	29%
Received through program	0%	0%	0%	0%	1%	0%	0%	0%
Total (n)	164	56	12	86	247	242	371	114

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 324: Central AC More than 10 Years Old (EN11cc) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Central AC more than 10 years old								
Don't know	17%	11%	23%	20%	16%	17%	16%	16%
Yes	49%	54%	45%	46%	45%	56%	50%	45%
No	32%	31%	32%	35%	35%	28%	30%	35%
Received through program	2%	4%	0%	0%	4%	0%	3%	4%
Total (n)	475	268	207	141	235	76	258	235

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 325: Central AC More than 10 Years Old (EN11cc) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Central AC more than 10 years old									
Don't know	1%	35%	24%	2%	13%	21%	23%	18%	8%
Yes	57%	46%	41%	76%	52%	48%	51%	49%	51%
No	41%	18%	32%	22%	33%	32%	27%	31%	40%
Received through program	1%	1%	3%	0%	2%	0%	0%	2%	0%
Total (n)	248	53	149	22	232	120	25	458	16

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 326: Central AC More than 10 Years Old (EN11cc) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Central AC more than 10 years old								
Don't know	24%	14%	0%	5%	16%	15%	19%	21%
Yes	46%	41%	41%	50%	50%	54%	48%	44%
No	30%	25%	59%	45%	33%	31%	30%	25%
Received through program	0%	21%	0%	0%	0%	0%	3%	10%
Total (n)	145	44	9	23	97	157	295	96

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 327: Window/Room AC More than 10 Years Old (EN11dd) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Window/room AC more than 10 years old								
Don't know	15%	15%	14%	27%	8%	21%	8%	8%
Yes	39%	43%	35%	45%	37%	41%	37%	37%
No	46%	42%	51%	27%	56%	38%	55%	55%
Received through program	0%	0%	0%	1%	0%	0%	0%	0%
Total (n)	324	205	119	74	156	70	179	155

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 328: Window/Room AC More than 10 Years Old (EN11dd) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Window/room AC more than 10 years old									
Don't know	3%	21%	17%	23%	12%	22%	11%	15%	12%
Yes	46%	36%	33%	38%	47%	34%	66%	39%	47%
No	50%	42%	49%	38%	41%	44%	23%	46%	41%
Received through program	1%	0%	0%	0%	0%	0%	0%	0%	0%
Total (n)	147	49	116	9	126	104	17	311	12

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 329: Window/Room AC More than 10 Years Old (EN11dd) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Window/room AC more than 10 years old								
Don't know	31%	11%	28%	11%	15%	5%	23%	23%
Yes	39%	29%	28%	60%	39%	37%	38%	29%
No	29%	59%	43%	30%	46%	58%	39%	48%
Received through program	1%	0%	0%	0%	0%	0%	0%	0%
Total (n)	65	19	8	22	96	114	152	43

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 330: Water Heater More than 10 Years Old (EN11gg) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Water heater more than 10 years old								
Don't know	18%	18%	17%	22%	18%	23%	15%	18%
Yes	35%	41%	30%	34%	36%	35%	36%	36%
No	47%	40%	53%	44%	47%	42%	49%	46%
Total (n)	813	471	342	222	369	172	415	365

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 331: Water Heater More than 10 Years Old (EN11gg) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Water heater more than 10 years old									
Don't know	8%	20%	26%	3%	14%	23%	19%	18%	14%
Yes	35%	41%	31%	51%	37%	36%	39%	36%	34%
No	57%	39%	44%	46%	49%	41%	42%	47%	52%
Total (n)	407	112	259	29	386	194	40	781	31

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 332: Water Heater More than 10 Years Old (EN11gg) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Water heater more than 10 years old								
Don't know	25%	19%	9%	20%	18%	12%	21%	20%
Yes	36%	34%	39%	31%	37%	36%	35%	40%
No	39%	47%	53%	49%	45%	52%	45%	41%
Total (n)	167	57	17	82	242	248	378	117

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 333: Clothes Washer More than 10 Years Old (EN11hh) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Clothes washer more than 10 years old								
Don't know	8%	6%	10%	8%	6%	10%	8%	6%
Yes	44%	49%	39%	43%	47%	35%	45%	46%
No	48%	45%	51%	49%	47%	54%	47%	48%
Total (n)	706	420	286	198	339	132	373	336

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 334: Clothes Washer More than 10 Years Old (EN11hh) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Clothes washer more than 10 years old									
Don't know	3%	8%	16%	2%	7%	9%	5%	8%	10%
Yes	40%	48%	37%	70%	47%	41%	30%	43%	59%
No	57%	44%	46%	28%	46%	50%	65%	49%	30%
Total (n)	404	105	164	27	345	166	31	673	32

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 335: Clothes Washer More than 10 Years Old (EN11hh) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Clothes washer more than 10 years old								
Don't know	7%	12%	4%	7%	11%	7%	8%	8%
Yes	43%	44%	62%	44%	41%	45%	43%	51%
No	50%	44%	34%	48%	48%	48%	49%	42%
Total (n)	153	53	17	68	195	220	341	109

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 336: Pool Pump More than 10 Years Old (EN11ii) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Pool pump more than 10 years old								
Don't know	21%	18%	24%	24%	18%	48%	17%	18%
Yes	46%	45%	46%	48%	47%	36%	45%	47%
No	33%	37%	30%	27%	35%	17%	38%	35%
Total (n)	104	53	51	29	52	18	57	52

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 337: Pool pump More than 10 Years Old (EN11ii) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Pool pump more than 10 years old									
Don't know	4%	4%	42%	44%	19%	38%	0%	22%	0%
Yes	54%	59%	39%	0%	48%	37%	93%	46%	46%
No	42%	37%	19%	56%	33%	25%	7%	32%	54%
Total (n)	55	9	36	3	57	20	3	98	6

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 338: Pool Pump More than 10 Years Old (EN11ii) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Pool pump more than 10 years old								
Don't know	0%	0%	0%	41%	56%	14%	5%	0%
Yes	60%	45%	0%	41%	26%	53%	55%	46%
No	40%	55%	100%	18%	18%	34%	40%	54%
Total (n)	19	12	3	13	22	35	50	20

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 339: Refrigerator More than 10 Years Old (EN11jj) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Refrigerator more than 10 years old								
Don't know	9%	8%	11%	15%	5%	17%	5%	5%
Yes	41%	42%	39%	35%	45%	37%	44%	45%
No	45%	42%	49%	44%	44%	45%	46%	44%
Received through program	4%	8%	1%	6%	5%	0%	4%	5%
Total (n)	884	520	364	245	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 340: Refrigerator More than 10 Years Old (EN11jj) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Refrigerator more than 10 years old									
Don't know	2%	8%	16%	11%	8%	9%	13%	10%	1%
Yes	48%	40%	34%	52%	42%	39%	26%	40%	53%
No	47%	49%	44%	37%	45%	51%	51%	45%	42%
Received through program	3%	2%	6%	0%	5%	1%	10%	4%	4%
Total (n)	417	115	317	29	429	204	42	849	34

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 341: Refrigerator More than 10 Years Old (EN11jj) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Refrigerator more than 10 years old								
Don't know	14%	18%	0%	17%	5%	6%	12%	13%
Yes	43%	52%	41%	30%	40%	42%	43%	53%
No	39%	28%	59%	44%	49%	50%	42%	31%
Received through program	5%	1%	0%	9%	5%	2%	3%	3%
Total (n)	175	59	17	97	273	263	399	120

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 342: Clothes Dryer More than 10 Years Old (EN11LL) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Clothes dryer more than 10 years old								
Don't know	9%	8%	10%	8%	6%	10%	9%	6%
Yes	49%	58%	40%	50%	52%	46%	49%	51%
No	42%	35%	49%	42%	42%	44%	42%	42%
Total (n)	683	403	280	188	327	131	361	324

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 343: Clothes Dryer More than 10 Years Old (EN11LL) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Clothes dryer more than 10 years old									
Don't know	3%	9%	19%	2%	8%	8%	9%	9%	4%
Yes	47%	55%	38%	63%	50%	48%	36%	48%	72%
No	49%	37%	42%	35%	42%	45%	56%	43%	23%
Total (n)	395	105	151	26	340	157	27	651	31

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 344: Clothes Dryer More than 10 Years Old (EN11LL) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Clothes dryer more than 10 years old								
Don't know	8%	9%	0%	8%	11%	10%	7%	8%
Yes	48%	49%	64%	58%	47%	47%	49%	54%
No	45%	42%	36%	35%	42%	43%	43%	38%
Total (n)	151	51	17	60	192	212	334	105

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 345: Dishwasher More than 10 Years Old (EN11mm) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Dishwasher more than 10 years old								
Don't know	11%	8%	14%	17%	8%	13%	7%	8%
Yes	48%	55%	43%	44%	47%	43%	52%	47%
No	41%	38%	43%	39%	45%	43%	41%	44%
Total (n)	462	243	219	143	200	101	216	198

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 346: Dishwasher More than 10 Years Old (EN11mm) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Dishwasher more than 10 years old									
Don't know	4%	20%	15%	5%	7%	20%	16%	11%	11%
Yes	51%	50%	39%	68%	44%	56%	60%	48%	39%
No	45%	29%	47%	27%	49%	24%	24%	40%	50%
Total (n)	243	54	142	18	260	75	26	444	18

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 347: Dishwasher More than 10 Years Old (EN11mm) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Dishwasher more than 10 years old								
Don't know	21%	4%	0%	8%	9%	8%	14%	9%
Yes	46%	53%	33%	41%	48%	53%	49%	52%
No	32%	43%	67%	50%	43%	40%	37%	39%
Total (n)	109	45	10	49	116	133	253	82

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 348: AC Age (EN13) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Age of AC								
Don't know	23%	25%	19%	23%	0%	0%	0%	0%
Less than one-year old	5%	5%	6%	5%	0%	0%	0%	0%
1 to 5 years old	15%	16%	14%	15%	0%	0%	0%	0%
6 to 10 years old	27%	21%	35%	27%	0%	0%	0%	0%
11 to 15 years old	15%	16%	14%	15%	0%	0%	0%	0%
16 or more years old	15%	17%	13%	15%	0%	0%	0%	0%
Total (n)	102	64	38	102	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 349: AC Age (EN13) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Age of AC									
Don't know	14%	26%	29%	23%	26%	0%	0%	23%	20%
Less than one-year old	2%	6%	10%	0%	5%	0%	0%	6%	0%
1 to 5 years old	17%	13%	18%	8%	16%	28%	0%	16%	10%
6 to 10 years old	27%	29%	20%	39%	22%	34%	66%	25%	59%
11 to 15 years old	17%	13%	18%	0%	18%	26%	0%	16%	0%
16 or more years old	23%	13%	5%	31%	14%	12%	34%	15%	10%
Total (n)	50	16	27	9	75	5	6	94	8

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 350: AC Age (EN13) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Age of AC								
Don't know	20%	0%	28%	31%	0%	0%	20%	12%
Less than one-year old	2%	0%	36%	14%	0%	0%	3%	12%
1 to 5 years old	17%	0%	0%	11%	0%	0%	17%	0%
6 to 10 years old	30%	0%	0%	18%	0%	0%	29%	29%
11 to 15 years old	17%	0%	0%	9%	0%	0%	17%	36%
16 or more years old	14%	0%	36%	18%	0%	0%	14%	12%
Total (n)	76	-	3	23	-	-	79	12

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 351: Main Refrigerator Age (EN12) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Age of main refrigerator								
Don't know	8%	6%	12%	8%	0%	0%	0%	0%
Less than one-year old	9%	9%	8%	9%	0%	0%	0%	0%
1 to 5 years old	36%	38%	33%	36%	0%	0%	0%	0%
6 to 10 years old	33%	35%	29%	33%	0%	0%	0%	0%
11 to 15 years old	11%	10%	12%	11%	0%	0%	0%	0%
16 or more years old	3%	2%	5%	3%	0%	0%	0%	0%
Total (n)	150	95	55	150	-	-	-	-

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 352: Main Refrigerator Age (EN12) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Age of main refrigerator									
Don't know	3%	5%	17%	0%	8%	12%	0%	9%	0%
Less than one-year old	8%	4%	11%	21%	9%	6%	0%	9%	5%
1 to 5 years old	33%	44%	40%	15%	36%	27%	74%	35%	45%
6 to 10 years old	38%	32%	20%	53%	32%	49%	21%	33%	31%
11 to 15 years old	13%	14%	8%	5%	12%	6%	0%	11%	14%
16 or more years old	5%	0%	3%	5%	4%	0%	6%	3%	5%
Total (n)	71	21	44	13	107	9	7	133	17

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 353: Main Refrigerator Age (EN12) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Age of main refrigerator								
Don't know	9%	0%	0%	8%	0%	0%	8%	14%
Less than one-year old	10%	0%	0%	7%	0%	0%	10%	0%
1 to 5 years old	41%	0%	29%	31%	0%	0%	40%	50%
6 to 10 years old	29%	0%	13%	39%	0%	0%	28%	22%
11 to 15 years old	7%	0%	25%	14%	0%	0%	8%	0%
16 or more years old	4%	0%	33%	0%	0%	0%	5%	14%
Total (n)	81	-	7	62	-	-	88	12

Source: 2013 CARE Participant Telephone Survey.
Note: this question was removed after the survey was already in the field, and has a slightly lower sample size as a result.

Table 354: Level of Helpfulness in Sealing Leaks to Reduce Draft (EN2b) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness - sealing leaks to reduce draft								
Very helpful	55%	63%	48%	52%	58%	54%	57%	58%
Somewhat helpful	16%	15%	16%	14%	13%	16%	17%	12%
Not at all helpful/No	20%	14%	25%	25%	17%	25%	16%	17%
Not applicable - did not receive/do not need	9%	8%	10%	9%	13%	5%	10%	13%
Total (n)	897	484	413	337	326	183	373	322

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.

Table 355: Level of Helpfulness in Sealing Leaks to Reduce Draft (EN2b) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness - sealing leaks to reduce draft									
Very helpful	47%	63%	57%	62%	46%	72%	51%	56%	27%
Somewhat helpful	19%	16%	14%	11%	11%	20%	18%	16%	20%
Not at all helpful/No	25%	17%	18%	15%	30%	4%	27%	19%	38%
Not applicable - did not receive/do not need	9%	4%	11%	12%	13%	3%	4%	9%	15%
Total (n)	408	122	326	36	462	197	45	858	38

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 356: Level of Helpfulness in Sealing Leaks to Reduce Draft (EN2b) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness - sealing leaks to reduce draft								
Very helpful	55%	50%	30%	51%	60%	56%	53%	51%
Somewhat helpful	12%	11%	30%	15%	14%	21%	15%	13%
Not at all helpful/No	24%	31%	16%	26%	17%	14%	22%	28%
Not applicable - did not receive/do not need	9%	8%	24%	8%	9%	8%	10%	8%
Total (n)	217	47	21	137	241	234	414	109

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 357: Level of Helpfulness in AC Replacement (EN2c) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in AC replacement								
Very helpful	47%	51%	44%	41%	52%	43%	52%	51%
Somewhat helpful	12%	13%	11%	11%	13%	10%	13%	13%
Not at all helpful/No	19%	13%	25%	22%	18%	22%	17%	18%
Not applicable - did not receive/do not need	21%	24%	19%	26%	18%	26%	17%	18%
Total (n)	864	452	412	319	334	164	377	330

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to "not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 358: Level of Helpfulness in AC Replacement (EN2c) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in AC replacement									
Very helpful	42%	60%	43%	63%	39%	57%	62%	48%	39%
Somewhat helpful	12%	11%	13%	13%	10%	17%	11%	12%	11%
Not at all helpful/No	28%	10%	19%	14%	27%	10%	8%	19%	29%
Not applicable - did not receive/do not need	18%	20%	25%	10%	24%	16%	19%	21%	21%
Total (n)	391	115	319	35	440	193	40	825	38

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to "not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 359: Level of Helpfulness in AC Replacement (EN2c) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replace-ment
Level of helpfulness in AC replacement								
Very helpful	53%	56%	48%	29%	43%	55%	54%	60%
Somewhat helpful	16%	19%	9%	4%	13%	11%	15%	17%
Not at all helpful/No	20%	16%	11%	23%	18%	19%	19%	16%
Not applicable - did not receive/do not need	10%	8%	32%	44%	27%	15%	12%	7%
Total (n)	203	56	21	132	224	228	405	116

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 360: Level of Helpfulness in Receiving Showerhead/Faucet Restrictor (EN2d) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in water saving showerheads/faucet restrictors								
Very helpful	49%	59%	40%	47%	49%	57%	48%	49%
Somewhat helpful	18%	15%	20%	15%	18%	21%	19%	18%
Not at all helpful/No	23%	18%	26%	28%	19%	13%	20%	19%
Not applicable - did not receive/do not need	11%	8%	14%	11%	13%	9%	12%	14%
Total (n)	890	477	413	323	328	187	376	324

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 361: Level of Helpfulness in Receiving Showerhead/Faucet Restrictor (EN2d) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in water saving showerheads/faucet restrictors									
Very helpful	42%	56%	50%	48%	34%	74%	50%	50%	25%
Somewhat helpful	19%	12%	20%	9%	18%	17%	16%	18%	22%
Not at all helpful/No	25%	24%	19%	32%	33%	6%	25%	21%	47%
Not applicable - did not receive/do not need	13%	8%	11%	11%	16%	3%	9%	11%	7%
Total (n)	400	121	329	36	456	197	40	850	39

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 362: Level of Helpfulness in Receiving Showerhead/Faucet Restrictor (EN2d) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness in water saving showerheads/faucet restrictors								
Very helpful	47%	36%	19%	48%	54%	51%	43%	42%
Somewhat helpful	14%	18%	10%	18%	24%	16%	15%	19%
Not at all helpful/No	28%	27%	53%	23%	16%	20%	27%	28%
Not applicable - did not receive/do not need	11%	19%	18%	12%	7%	13%	15%	12%
Total (n)	207	48	21	132	245	237	408	109

Source: 2013 CARE Participant Telephone Survey.

Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to "not applicable/don't need" if they were a recent participant who recalled participating.

Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 363: Level of Helpfulness in Receiving Microwave (EN2e) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in getting a microwave								
Very helpful	38%	46%	32%	33%	43%	41%	41%	43%
Somewhat helpful	12%	13%	11%	15%	9%	11%	10%	9%
Not at all helpful/No	19%	13%	24%	21%	18%	18%	18%	18%
Not applicable - did not receive/do not need	31%	28%	33%	31%	30%	30%	31%	31%
Total (n)	870	452	418	324	330	168	374	326

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 364: Level of Helpfulness in Receiving Microwave (EN2e) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in getting a microwave									
Very helpful	29%	41%	43%	35%	26%	64%	40%	39%	13%
Somewhat helpful	13%	10%	11%	22%	10%	14%	18%	12%	14%
Not at all helpful/No	26%	19%	16%	8%	22%	16%	24%	20%	16%
Not applicable - did not receive/do not need	32%	30%	29%	34%	42%	6%	19%	30%	56%
Total (n)	392	117	322	35	446	194	40	831	38

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 365: Level of Helpfulness in Receiving Microwave (EN2e) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness in getting a microwave								
Very helpful	35%	24%	13%	37%	46%	39%	33%	36%
Somewhat helpful	13%	10%	16%	15%	13%	8%	12%	8%
Not at all helpful/No	21%	28%	13%	19%	13%	23%	19%	20%
Not applicable - did not receive/do not need	32%	37%	58%	29%	28%	29%	36%	36%
Total (n)	208	48	21	133	229	231	404	110

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 366: Level of Helpfulness in Clothes Washer Replacement (EN2f) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in clothes washer replacement								
Very helpful	46%	50%	42%	43%	48%	44%	48%	47%
Somewhat helpful	12%	11%	13%	13%	13%	9%	11%	13%
Not at all helpful/No	23%	20%	25%	26%	21%	22%	20%	21%
Not applicable - did not receive/do not need	20%	19%	20%	18%	19%	24%	21%	19%
Total (n)	861	446	415	321	330	162	374	326

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 367: Level of Helpfulness in Clothes Washer Replacement (EN2f) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in clothes washer replacement									
Very helpful	46%	57%	39%	63%	38%	62%	30%	46%	36%
Somewhat helpful	18%	10%	9%	12%	10%	14%	15%	12%	18%
Not at all helpful/No	26%	25%	19%	16%	30%	12%	37%	22%	38%
Not applicable - did not receive/do not need	10%	8%	33%	10%	22%	12%	19%	20%	7%
Total (n)	388	115	319	35	440	194	39	823	37

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 368: Level of Helpfulness in Clothes Washer Replacement (EN2f) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness in clothes washer replacement								
Very helpful	45%	45%	33%	41%	49%	47%	44%	46%
Somewhat helpful	12%	8%	27%	12%	15%	9%	12%	13%
Not at all helpful/No	28%	23%	26%	24%	17%	22%	25%	22%
Not applicable - did not receive/do not need	16%	23%	14%	24%	19%	22%	19%	19%
Total (n)	206	48	21	132	227	227	398	110

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 369: Level of Helpfulness in Water Heater Replacement (EN2g) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in water heater replacement								
Very helpful	47%	51%	44%	43%	48%	41%	51%	49%
Somewhat helpful	15%	15%	15%	16%	15%	15%	14%	15%
Not at all helpful/No	24%	21%	26%	27%	23%	25%	21%	23%
Not applicable - did not receive/do not need	14%	13%	15%	14%	13%	19%	14%	13%
Total (n)	841	435	406	312	324	157	368	320

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 370: Level of Helpfulness in Water Heater Replacement (EN2g) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in water heater replacement									
Very helpful	42%	60%	44%	49%	36%	67%	46%	47%	36%
Somewhat helpful	18%	11%	16%	14%	14%	16%	16%	15%	20%
Not at all helpful/No	27%	16%	24%	34%	32%	13%	25%	23%	40%
Not applicable - did not receive/do not need	14%	14%	16%	3%	18%	5%	13%	15%	4%
Total (n)	387	112	304	34	428	190	39	802	38

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 371: Level of Helpfulness in Water Heater Replacement (EN2g) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness in water heater replacement								
Very helpful	52%	38%	37%	37%	49%	50%	48%	56%
Somewhat helpful	12%	17%	15%	21%	15%	13%	13%	11%
Not at all helpful/No	20%	36%	36%	30%	20%	23%	24%	20%
Not applicable - did not receive/do not need	16%	10%	12%	13%	15%	14%	15%	13%
Total (n)	201	48	21	127	220	224	392	109

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 372: Level of Helpfulness of Safety/Comfort Information (EN2h) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness of information about things to do in home for safety/comfort								
Very helpful	65%	71%	59%	60%	66%	58%	70%	66%
Somewhat helpful	26%	23%	29%	28%	26%	31%	24%	27%
Not at all helpful/No	9%	6%	11%	12%	7%	11%	5%	7%
Not applicable - did not receive/do not need	0%	0%	1%	0%	1%	0%	1%	1%
Total (n)	1,019	603	416	383	384	200	432	380

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to "not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 373: Level of Helpfulness of Safety/Comfort Information (EN2h) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness of information about things to do in home for safety/comfort									
Very helpful	57%	73%	67%	53%	54%	88%	69%	66%	45%
Somewhat helpful	30%	22%	24%	31%	33%	10%	23%	26%	26%
Not at all helpful/No	12%	5%	8%	16%	13%	2%	8%	8%	28%
Not applicable - did not receive/do not need	0%	0%	1%	0%	1%	0%	0%	0%	0%
Total (n)	478	134	358	42	525	212	49	970	48

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 374: Level of Helpfulness of Safety/Comfort Information (EN2h) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness of information about things to do in home for safety/ comfort								
Very helpful	62%	68%	32%	63%	68%	69%	61%	69%
Somewhat helpful	27%	29%	26%	28%	25%	24%	28%	25%
Not at all helpful/No	11%	3%	42%	9%	6%	7%	10%	6%
Not applicable - did not receive/do not need	0%	0%	0%	1%	1%	0%	0%	0%
Total (n)	251	59	23	153	270	263	481	132

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 375: Level of Helpfulness in Refrigerator Replacement (EN2) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in refrigerator replacement								
Very helpful	57%	66%	50%	51%	60%	67%	60%	59%
Somewhat helpful	17%	18%	16%	20%	14%	16%	15%	14%
Not at all helpful/No	17%	12%	22%	22%	16%	12%	14%	16%
Not applicable - did not receive/do not need	9%	4%	12%	7%	10%	6%	11%	10%
Total (n)	629	311	318	251	259	86	289	256

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 376: Level of Helpfulness in Refrigerator Replacement (EN2) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in refrigerator replacement									
Very helpful	45%	69%	60%	59%	46%	73%	52%	57%	44%
Somewhat helpful	21%	10%	15%	16%	18%	19%	16%	17%	10%
Not at all helpful/No	24%	14%	15%	20%	25%	8%	22%	17%	40%
Not applicable - did not receive/do not need	10%	7%	10%	4%	11%	1%	10%	9%	6%
Total (n)	298	82	221	25	297	176	28	605	23

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 377: Level of Helpfulness in Refrigerator Replacement (EN2) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness in refrigerator replacement								
Very helpful	49%	51%	50%	59%	60%	61%	51%	55%
Somewhat helpful	20%	18%	15%	21%	18%	12%	17%	23%
Not at all helpful/No	23%	14%	30%	17%	13%	15%	21%	12%
Not applicable - did not receive/do not need	8%	17%	5%	4%	8%	12%	11%	10%
Total (n)	160	32	15	107	148	167	289	84

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 378: Level of Helpfulness in Window/Door/Wall/Floor Replacement (EN2k) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness in window/door/wall/floor replacement								
Very helpful	58%	65%	53%	53%	62%	62%	62%	61%
Somewhat helpful	15%	16%	15%	17%	12%	12%	15%	12%
Not at all helpful/No	20%	14%	24%	24%	18%	20%	16%	18%
Not applicable - did not receive/do not need	7%	6%	7%	7%	9%	5%	7%	9%
Total (n)	882	468	414	325	329	177	376	325

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to "not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 379: Level of Helpfulness in Window/Door/Wall/Floor Replacement (EN2k) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness in window/door/wall/floor replacement									
Very helpful	49%	64%	64%	62%	49%	74%	63%	59%	34%
Somewhat helpful	19%	15%	12%	15%	16%	11%	12%	15%	19%
Not at all helpful/No	23%	17%	18%	14%	26%	13%	21%	19%	32%
Not applicable - did not receive/do not need	9%	5%	6%	9%	10%	2%	5%	6%	15%
Total (n)	398	122	323	35	448	197	41	842	39

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 380: Level of Helpfulness in Window/Door/Wall/Floor Replacement (EN2k) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Level of helpfulness in window/door/wall/floor replacement								
Very helpful	59%	57%	32%	49%	64%	61%	56%	58%
Somewhat helpful	15%	8%	30%	17%	14%	16%	15%	16%
Not at all helpful/No	21%	29%	15%	28%	17%	15%	20%	22%
Not applicable - did not receive/do not need	5%	6%	24%	7%	5%	9%	8%	4%
Total (n)	209	48	21	133	240	231	405	110

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 381: Level of Helpfulness of Efficient Light Bulbs/Fixtures (EN2L) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness of light bulbs/fixtures								
Very helpful	60%	65%	55%	54%	62%	60%	64%	62%
Somewhat helpful	19%	20%	18%	20%	17%	20%	18%	17%
Not at all helpful/No	14%	11%	17%	20%	13%	12%	10%	13%
Not applicable - did not receive/do not need	7%	4%	10%	7%	9%	7%	8%	9%
Total (n)	933	517	416	340	347	198	391	343

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 382: Level of Helpfulness of Efficient Light Bulbs/Fixtures (EN2L) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness of light bulbs/ fixtures									
Very helpful	49%	66%	66%	52%	48%	81%	64%	61%	35%
Somewhat helpful	23%	15%	18%	14%	23%	14%	16%	19%	17%
Not at all helpful/No	20%	13%	8%	26%	18%	4%	18%	13%	30%
Not applicable - did not receive/do not need	8%	6%	7%	8%	10%	2%	3%	7%	18%
Total (n)	423	124	340	41	480	200	43	886	46

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to "not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 383: Level of Helpfulness of Efficient Light Bulbs/Fixtures (EN2L) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replace-ment
Level of helpfulness of light bulbs/fixtures								
Very helpful	57%	51%	19%	58%	63%	66%	54%	59%
Somewhat helpful	20%	18%	14%	20%	23%	15%	19%	23%
Not at all helpful/No	18%	20%	35%	17%	8%	10%	18%	12%
Not applicable - did not receive/do not need	5%	12%	31%	5%	6%	9%	10%	5%
Total (n)	217	55	24	140	255	242	433	123

Source: 2013 CARE Participant Telephone Survey.

Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.

Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 384: Level of Helpfulness of Evaporative/Swamp Cooler Replacement (EN2n) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness of evaporative/swamp cooler replacement								
Very helpful	41%	48%	37%	38%	46%	34%	43%	45%
Somewhat helpful	11%	9%	11%	5%	10%	13%	12%	10%
Not at all helpful/No	22%	17%	25%	29%	19%	24%	19%	19%
Not applicable - did not receive/do not need	26%	26%	27%	28%	26%	29%	26%	26%
Total (n)	617	314	303	130	313	133	350	309

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 385: Helpfulness of Evaporative/Swamp Cooler Replacement (EN2n) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness of evaporative/ swamp cooler replacement									
Very helpful	33%	63%	39%	27%	30%	61%	46%	41%	45%
Somewhat helpful	7%	10%	14%	2%	4%	21%	17%	11%	6%
Not at all helpful/No	32%	14%	18%	39%	30%	11%	19%	21%	39%
Not applicable - did not receive/do not need	28%	14%	30%	31%	36%	7%	17%	27%	10%
Total (n)	292	75	226	21	274	174	26	596	20

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 386: Helpfulness of Evaporative/Swamp Cooler Replacement (EN2n) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replace-ment
Level of helpfulness of evaporative/swamp cooler replacement								
Very helpful	43%	48%	43%	43%	40%	40%	43%	48%
Somewhat helpful	6%	6%	12%	5%	14%	12%	7%	6%
Not at all helpful/No	28%	20%	33%	21%	17%	23%	24%	17%
Not applicable - did not receive/do not need	22%	26%	12%	30%	30%	25%	26%	29%
Total (n)	102	48	10	54	196	207	271	94

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 387: Level of Helpfulness in Furnace Replacement (EN2m) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Level of helpfulness - furnace replacement								
Very helpful	47%	55%	41%	45%	51%	46%	49%	50%
Somewhat helpful	16%	14%	18%	15%	17%	21%	17%	17%
Not at all helpful/No	21%	17%	23%	22%	21%	21%	19%	21%
Not applicable - did not receive/do not need	16%	14%	17%	18%	12%	12%	15%	12%
Total (n)	844	439	405	315	321	160	365	317

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 388: Level of Helpfulness in Furnace Replacement (EN2m) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Level of helpfulness – furnace replacement									
Very helpful	42%	53%	48%	50%	34%	70%	53%	48%	29%
Somewhat helpful	16%	17%	17%	13%	18%	13%	16%	17%	3%
Not at all helpful/No	24%	14%	20%	22%	29%	10%	17%	20%	43%
Not applicable - did not receive/do not need	18%	16%	15%	15%	19%	6%	14%	16%	24%
Total (n)	380	113	312	35	428	190	40	807	36

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 389: Helpfulness of Furnace Replacement (EN2m) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replace-ment
Level of helpfulness of furnace replacement								
Very helpful	46%	42%	25%	49%	52%	47%	46%	50%
Somewhat helpful	18%	24%	5%	14%	18%	14%	17%	22%
Not at all helpful/No	18%	28%	23%	26%	16%	21%	20%	19%
Not applicable - did not receive/do not need	18%	7%	48%	11%	13%	18%	17%	8%
Total (n)	201	47	21	130	220	225	393	107

Source: 2013 CARE Participant Telephone Survey.
Note: we miscoded some of the PG&E measures such that a small fraction of participants were asked whether some measures that they had already received would be helpful. We moved those cases to “not applicable/don't need" if they were a recent participant who recalled participating.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.
Note: Question was phrased differently when asked of participants and non-participants due to their varying level of experience with the program.

Table 390: Proportion of CFLs (EN14) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Proportion of CFLs								
All	26%	28%	25%	27%	27%	23%	26%	27%
More than half	21%	20%	22%	22%	20%	23%	20%	20%
About half	19%	18%	19%	19%	18%	18%	19%	18%
Less than half	19%	19%	19%	19%	20%	19%	19%	20%
None	12%	11%	12%	10%	11%	11%	13%	11%
Don't know how many are CFLs	3%	2%	3%	2%	4%	4%	3%	4%
Don't know what a CFL is	1%	2%	0%	1%	1%	2%	1%	1%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 391: Proportion of CFLs (EN14) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Proportion of CFLs									
All	21%	28%	29%	22%	26%	28%	8%	26%	32%
More than half	29%	20%	16%	13%	23%	14%	39%	21%	31%
About half	20%	18%	17%	24%	16%	21%	9%	19%	15%
Less than half	19%	18%	20%	32%	21%	15%	22%	19%	19%
None	9%	14%	13%	8%	10%	18%	17%	12%	2%
Don't know how many are CFLs	1%	2%	5%	0%	3%	2%	5%	3%	0%
Don't know what a CFL is	2%	0%	1%	2%	1%	2%	0%	1%	1%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 392: Proportion of CFLs (EN14) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Proportion of CFLs								
All	24%	30%	47%	28%	19%	31%	27%	27%
More than half	23%	17%	21%	21%	22%	19%	23%	17%
About half	19%	21%	15%	18%	19%	18%	19%	22%
Less than half	21%	29%	17%	20%	19%	15%	20%	27%
None	10%	4%	0%	11%	15%	13%	8%	5%
Don't know how many are CFLs	2%	0%	0%	2%	4%	4%	3%	1%
Don't know what a CFL is	1%	0%	0%	0%	2%	0%	1%	0%
Total (n)	253	59	24	156	273	263	484	132

Source: 2013 CARE Participant Telephone Survey.

Table 393: Proportion of Homes that Need Other Equipment Replaced (EN12a) by ESA Participation and Utility for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Proportion of homes that need other equipment replaced								
Yes	10%	12%	8%	10%	11%	14%	9%	10%
No	90%	88%	92%	90%	89%	86%	91%	90%
Total (n)	871	509	362	235	383	202	430	379

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 394: Proportion of Homes that Need Other Equipment Replaced (EN12a) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Proportion of homes that need other equipment replaced									
Yes	8%	14%	9%	24%	11%	7%	13%	10%	18%
No	92%	86%	91%	76%	89%	93%	87%	90%	82%
Total (n)	407	114	315	29	423	200	42	839	31

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 395: Proportion of Homes that Need Other Equipment Replaced (EN12a) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Proportion of homes that need other equipment replaced								
Yes	10%	11%	12%	10%	11%	8%	10%	9%
No	90%	89%	88%	90%	89%	92%	90%	91%
Total (n)	170	59	17	92	271	262	394	119

Source: 2013 CARE Participant Telephone Survey.
Note: this question was added after the survey was already in the field, and has a slightly lower sample size as a result.

Table 396: Equipment that Needs Replacement (EN12b_opn) by ESA Participation and Utility (among those that said they needed equipment replaced) for California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Equipment that needs replacement								
Water appliances (toilet, tub)	16%	16%	15%	8%	17%	6%	23%	18%
Electrical	14%	17%	9%	8%	16%	11%	14%	11%
Plumbing	13%	9%	20%	14%	18%	0%	17%	19%
Ceiling fan(s)	8%	8%	8%	5%	10%	8%	6%	5%
Flooring	6%	9%	1%	0%	10%	8%	9%	11%
Lighting	6%	7%	4%	14%	1%	9%	1%	1%
Infiltration	5%	8%	0%	14%	0%	3%	0%	0%
Ceiling	4%	3%	6%	0%	8%	0%	7%	8%
Freezer	4%	5%	3%	0%	6%	9%	1%	1%
Roof	4%	5%	2%	8%	2%	6%	2%	2%
Showerhead	4%	7%	0%	8%	2%	6%	2%	2%
Stove fan/hood	4%	3%	5%	7%	4%	1%	4%	4%
Fireplace issues	3%	1%	7%	0%	5%	3%	5%	6%
Garbage disposal	3%	3%	3%	6%	2%	1%	2%	2%
Gate/Fence	3%	1%	5%	2%	4%	0%	4%	5%
Kitchen appliance	3%	1%	5%	0%	5%	3%	5%	5%
Screens	3%	4%	3%	0%	6%	3%	6%	6%
Swamp cooler	3%	4%	0%	2%	4%	0%	4%	4%
Weather-strip	3%	1%	6%	0%	4%	3%	4%	5%
Carpet	2%	3%	0%	6%	0%	0%	0%	0%
Faucet(s)	2%	2%	3%	0%	2%	9%	2%	2%
Garage door	2%	1%	2%	3%	2%	0%	2%	2%
Hot tub	2%	3%	0%	0%	4%	0%	4%	4%

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Insulation	2%	3%	0%	2%	2%	0%	2%	2%
Kitchen cabinets	2%	3%	0%	0%	3%	0%	3%	3%
Sprinkler system	2%	1%	3%	0%	3%	0%	3%	3%
Thermostat	2%	0%	5%	7%	0%	0%	0%	0%
Lighting (exterior)	1%	1%	0%	0%	0%	5%	0%	0%
N/A	1%	0%	2%	0%	1%	0%	1%	1%
Water cooler	1%	1%	0%	0%	1%	3%	1%	1%
Yard/Driveway	1%	1%	0%	2%	0%	0%	0%	0%
Bathroom	0%	0%	1%	0%	0%	4%	0%	0%
Cabinets	0%	1%	0%	0%	1%	0%	1%	1%
Electronics	0%	1%	0%	0%	0%	3%	0%	0%
Pool heater	0%	1%	0%	0%	1%	0%	1%	1%
Ventilation	0%	0%	1%	0%	0%	4%	0%	0%
Walls	0%	1%	0%	0%	1%	0%	1%	1%
Windows	0%	1%	0%	0%	1%	0%	1%	1%
Total (n)	97	69	28	22	46	26	48	45

Source: 2013 CARE Participant Telephone Survey.

Table 397: Equipment that Needs Replacement (EN12b_opn) by Home Type, Language, Rural and Urban for California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Equipment that needs replacement									
Water appliances (toilet, tub)	21%	18%	13%	0%	13%	27%	0%	17%	0%
Roof	11%	3%	1%	0%	6%	7%	0%	3%	26%
Ceiling fan(s)	7%	4%	13%	0%	8%	11%	12%	9%	0%
Electrical	7%	0%	32%	0%	19%	4%	39%	15%	0%
Garage door	7%	0%	0%	0%	3%	2%	0%	2%	0%
Insulation	6%	0%	0%	0%	1%	2%	0%	1%	11%
Plumbing	6%	5%	22%	35%	11%	32%	7%	14%	0%
Screens	6%	5%	1%	0%	4%	0%	0%	3%	17%
Sprinkler system	6%	0%	0%	0%	2%	0%	0%	2%	0%
Garbage disposal	4%	0%	5%	0%	0%	0%	0%	3%	0%
Lighting	4%	3%	10%	0%	2%	2%	0%	6%	0%
Swamp cooler	4%	5%	0%	0%	3%	2%	0%	3%	0%
Faucet(s)	3%	4%	0%	0%	0%	8%	0%	2%	0%
Fireplace issues	3%	7%	0%	0%	5%	0%	0%	1%	34%
Gate/Fence	3%	0%	6%	0%	6%	0%	0%	3%	0%
Showerhead	3%	10%	0%	0%	5%	2%	7%	4%	0%
Yard/Driveway	3%	0%	0%	0%	1%	0%	0%	1%	0%
Cabinets	2%	0%	0%	0%	0%	2%	0%	0%	0%
Freezer	2%	4%	7%	0%	7%	0%	0%	4%	0%
Hot tub	2%	5%	0%	0%	0%	0%	7%	2%	0%
Kitchen appliance	2%	0%	7%	0%	4%	2%	0%	3%	0%
Lighting (exterior)	2%	0%	0%	0%	1%	0%	0%	1%	0%
Pool heater	2%	0%	0%	0%	1%	0%	0%	0%	0%

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Stove fan/hood	2%	12%	0%	0%	0%	13%	0%	4%	0%
Walls	2%	0%	0%	0%	0%	0%	0%	0%	0%
Water cooler	2%	0%	1%	0%	1%	2%	0%	1%	0%
Bathroom	0%	0%	1%	0%	1%	0%	0%	1%	0%
Carpet	0%	0%	5%	0%	4%	0%	0%	2%	0%
Ceiling	0%	12%	0%	0%	0%	12%	0%	4%	0%
Electronics	0%	0%	1%	0%	1%	0%	0%	0%	0%
Flooring	0%	10%	4%	27%	4%	11%	8%	5%	24%
Infiltration	0%	8%	6%	0%	4%	0%	0%	5%	0%
Kitchen cabinets	0%	5%	0%	0%	0%	0%	0%	2%	0%
N/A	0%	0%	2%	0%	0%	0%	10%	1%	0%
Thermostat	0%	7%	0%	0%	4%	0%	0%	2%	0%
Ventilation	0%	0%	1%	0%	0%	0%	0%	1%	0%
Weather-strip	0%	0%	1%	38%	1%	0%	0%	3%	0%
Windows	0%	0%	1%	0%	1%	0%	0%	1%	0%
Total (n)	39	19	36	3	44	19	7	92	5

Source: 2013 CARE Participant Telephone Survey.

Table 398: Equipment that Needs Replacement (EN12b_opn) by Climate Zone for California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Equipment that needs replacement								
Infiltration	19%	0%	0%	0%	1%	0%	9%	0%
Plumbing	13%	0%	0%	12%	23%	8%	6%	0%
Water appliances (toilet, tub,	13%	6%	0%	0%	28%	16%	11%	7%
Electrical	11%	6%	0%	17%	27%	2%	6%	21%
Carpet	9%	0%	0%	0%	0%	0%	4%	0%
Stove fan/hood	9%	0%	0%	0%	0%	8%	6%	0%
Ceiling fan(s)	7%	0%	0%	0%	15%	8%	8%	0%
Hot tub	7%	0%	0%	0%	0%	2%	3%	12%
Roof	4%	6%	0%	11%	3%	2%	3%	3%
Lighting	3%	0%	0%	26%	3%	3%	3%	0%
Swamp cooler	3%	6%	0%	0%	0%	6%	6%	9%
Kitchen appliance	2%	0%	0%	0%	1%	9%	6%	3%
Bathroom	0%	0%	0%	0%	2%	0%	0%	0%
Cabinets	0%	0%	0%	0%	0%	2%	0%	0%
Ceiling	0%	0%	0%	0%	0%	15%	0%	0%
Electronics	0%	0%	0%	0%	1%	0%	0%	0%
Faucet(s)	0%	0%	0%	0%	4%	3%	1%	0%
Fireplace issues	0%	6%	100%	0%	1%	0%	6%	3%
Flooring	0%	20%	0%	0%	3%	15%	5%	12%
Freezer	0%	0%	0%	0%	8%	7%	4%	0%
Garage door	0%	6%	0%	7%	0%	2%	1%	3%
Garbage disposal	0%	14%	0%	14%	0%	1%	3%	8%

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland	RAC Replace and Evaporative Cooler Install	CAC Replacement
Gate/Fence	0%	0%	0%	6%	7%	0%	0%	0%
Insulation	0%	0%	0%	6%	0%	3%	1%	0%
Kitchen cabinets	0%	0%	0%	0%	0%	6%	0%	0%
Lighting (exterior)	0%	0%	0%	0%	2%	0%	0%	0%
N/A	0%	0%	0%	0%	0%	3%	0%	0%
Pool heater	0%	0%	0%	0%	0%	2%	1%	0%
Screens	0%	20%	0%	0%	5%	2%	4%	11%
Showerhead	0%	0%	0%	18%	0%	7%	3%	0%
Sprinkler system	0%	0%	0%	0%	0%	6%	1%	0%
Thermostat	0%	0%	0%	15%	0%	0%	0%	0%
Ventilation	0%	0%	0%	0%	2%	0%	0%	0%
Walls	0%	0%	0%	0%	0%	2%	1%	0%
Water cooler	0%	0%	0%	0%	1%	2%	1%	0%
Weather-strip	0%	29%	0%	0%	0%	2%	6%	17%
Windows	0%	0%	0%	0%	2%	0%	0%	0%
Yard/Driveway	0%	0%	0%	6%	0%	0%	0%	0%
Total (n)	16	8	1	10	27	35	47	13

Source: 2013 CARE Participant Telephone Survey.

8.2.9 Demographics

Table 399: Year Home Built (S7) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
2011 or more recently	1%	0%	1%	0%	1%	0%	1%	1%
2001 to 2010	7%	5%	9%	9%	7%	6%	6%	7%
1990 to 2000	10%	8%	12%	12%	9%	9%	8%	9%
1970 to 1989	33%	34%	31%	30%	35%	39%	34%	35%
1950 to 1969	29%	30%	28%	30%	28%	33%	27%	27%
1949 or earlier	20%	22%	18%	18%	20%	13%	24%	20%
Total (n)	859	508	351	334	319	165	357	316

Source: 2013 CARE Participant Telephone Survey.

Table 400: Year Home Built (S7) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
2011 or more recently	0%	0%	2%	0%	0%	2%	0%	1%	0%
2001 to 2010	6%	5%	10%	5%	7%	6%	18%	7%	13%
1990 to 2000	11%	6%	11%	10%	8%	15%	8%	10%	12%
1970 to 1989	26%	25%	43%	68%	33%	32%	37%	33%	38%
1950 to 1969	35%	35%	20%	17%	31%	23%	30%	30%	19%
1949 or earlier	22%	29%	15%	0%	20%	21%	6%	20%	18%
Total (n)	454	100	260	38	479	144	40	812	46

Source: 2013 CARE Participant Telephone Survey.

Table 401: Year Home Built (S7) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
2011 or more recently	1%	0%	0%	0%	1%	1%
2001 to 2010	11%	26%	18%	5%	2%	4%
1990 to 2000	16%	17%	19%	8%	4%	7%
1970 to 1989	33%	38%	34%	27%	31%	37%
1950 to 1969	26%	11%	15%	32%	32%	33%
1949 or earlier	14%	7%	13%	28%	30%	18%
Total (n)	220	55	23	126	222	213

Source: 2013 CARE Participant Telephone Survey.

Table 402: Years Lived at Address (S8, S8a) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
23 months or less	9%	7%	12%	9%	11%	7%	10%	11%
2 to 4 years	24%	17%	31%	25%	24%	25%	23%	24%
5 to 9 years	17%	17%	17%	19%	14%	17%	14%	13%
10 to 19 years	24%	27%	22%	21%	28%	27%	27%	28%
20 to 29 years	12%	15%	8%	13%	11%	8%	12%	11%
30 years or more	14%	17%	10%	13%	12%	16%	14%	12%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 403: Years Lived at Address (S8, S8a) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
23 months or less	3%	10%	15%	4%	8%	11%	17%	9%	8%
2 to 4 years	8%	36%	31%	9%	21%	23%	29%	24%	25%
5 to 9 years	12%	19%	19%	27%	17%	15%	21%	17%	18%
10 to 19 years	27%	25%	21%	36%	24%	32%	15%	25%	21%
20 to 29 years	20%	6%	10%	16%	12%	14%	12%	12%	15%
30 years or more	30%	4%	6%	8%	18%	5%	6%	14%	13%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 404: Years Lived at Address (S8, S8a) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
23 months or less	11%	15%	0%	8%	9%	8%
2 to 4 years	30%	43%	8%	19%	21%	21%
5 to 9 years	18%	11%	21%	20%	17%	15%
10 to 19 years	19%	19%	41%	22%	28%	28%
20 to 29 years	11%	7%	24%	17%	10%	12%
30 years or more	12%	4%	6%	15%	15%	17%
Total (n) n	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

Table 405: Of Multi-family Homes, Number of Units in Building (S6a) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
2 to 4 units	19%	21%	17%	19%	18%	16%	19%	17%
5 to 10 units	30%	30%	31%	34%	23%	24%	29%	23%
11 to 20 units	14%	13%	16%	10%	20%	16%	17%	20%
More than 20 units	36%	37%	36%	37%	40%	44%	35%	41%
Total (n)	274	145	129	81	82	90	102	81

Source: 2013 CARE Participant Telephone Survey.

Table 406: Of Multi-family Homes, Number of Units in Building (S6a) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
2 to 4 units	0%	0%	19%	0%	17%	22%	35%	19%	0%
5 to 10 units	0%	0%	30%	0%	31%	31%	24%	30%	100%
11 to 20 units	0%	0%	14%	0%	14%	20%	4%	15%	0%
More than 20 units	0%	0%	36%	0%	38%	27%	37%	36%	0%
Total (n)	-	-	274	-	135	64	14	273	1

Source: 2013 CARE Participant Telephone Survey.

Table 407: Of Multi-family Homes, Number of Units in Building (S6a) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
2 to 4 units	16%	9%	0%	25%	27%	7%
5 to 10 units	33%	27%	0%	33%	29%	29%
11 to 20 units	3%	0%	0%	18%	12%	26%
More than 20 units	47%	64%	0%	24%	32%	38%
Total (n)	39	11	-	47	108	69

Source: 2013 CARE Participant Telephone Survey.

Table 408: Number of People in Home at least Nine Months of the Year (D1) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
1 persons	26%	28%	25%	34%	19%	28%	21%	20%
2 persons	20%	18%	21%	19%	21%	21%	20%	21%
3 persons	15%	16%	15%	13%	19%	11%	17%	19%
4 persons	13%	11%	15%	14%	14%	12%	13%	14%
5 or more persons	26%	26%	25%	21%	27%	28%	29%	26%
Total (n)	1,026	609	417	389	383	202	431	379

Source: 2013 CARE Participant Telephone Survey.

Table 409: Number of People in Home at least Nine Months of the Year (D1) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
1 persons	25%	10%	33%	35%	40%	8%	12%	27%	20%
2 persons	24%	12%	19%	24%	26%	11%	20%	19%	27%
3 persons	17%	16%	14%	14%	14%	11%	10%	15%	25%
4 persons	10%	20%	12%	11%	8%	22%	21%	13%	8%
5 or more persons	24%	41%	21%	15%	12%	47%	38%	26%	20%
Total (n)	482	136	360	41	531	213	49	976	49

Source: 2013 CARE Participant Telephone Survey.

Table 410: Number of People in Home at least Nine Months of the Year (D1) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
1 persons	29%	30%	17%	39%	24%	17%
2 persons	19%	26%	14%	17%	20%	20%
3 persons	16%	15%	30%	9%	14%	18%
4 persons	14%	13%	8%	14%	14%	11%
5 or more persons	22%	15%	31%	21%	28%	33%
Total (n)	253	59	24	156	273	261

Source: 2013 CARE Participant Telephone Survey.

Table 411: Number of People in Home in Age Groups (D2, D2A-D2K) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Children under 6 present in home	20%	20%	20%	19%	21%	20%	20%	21%
Children 6 to 17 present in home	35%	34%	36%	34%	35%	35%	35%	34%
Adults present in home	74%	72%	75%	67%	78%	71%	79%	78%
Seniors present in home	49%	54%	45%	51%	45%	52%	48%	46%
Total (n)	1,024	607	417	387	383	202	431	379

Source: 2013 CARE Participant Telephone Survey.

Table 412: Number of People in Home in Age Groups (D2, D2A-D2K) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Children under 6 present in home	14%	26%	22%	16%	10%	35%	16%	20%	9%
Children 6 to 17 present in home	27%	53%	34%	24%	22%	59%	21%	35%	40%
Adults present in home	68%	86%	75%	59%	60%	91%	90%	74%	67%
Seniors present in home	67%	38%	39%	64%	59%	36%	59%	49%	61%
Total (n)	482	136	358	41	530	213	49	974	49

Source: 2013 CARE Participant Telephone Survey.

Table 413: Number of People in Home in Age Groups (D2, D2A-D2K) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Children under 6 present in home	20%	20%	0%	21%	23%	18%
Children 6 to 17 present in home	33%	40%	53%	33%	36%	34%
Adults present in home	69%	65%	68%	65%	76%	83%
Seniors present in home	49%	48%	69%	50%	46%	51%
Total (n)	251	59	24	156	273	261

Source: 2013 CARE Participant Telephone Survey.

Table 414: Average Age of Respondent (D3) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Average age	56	58	55	58	54	54	55	58
Respondent is under 30	7%	5%	10%	7%	7%	4%	8%	7%
Respondent is between 30 and 60	52%	51%	52%	48%	59%	53%	54%	59%
Respondent is 60 years or older	41%	44%	38%	45%	34%	43%	38%	34%
Total (n)	1,004	598	406	380	373	200	420	369

Source: 2013 CARE Participant Telephone Survey.

Table 415: Average Age of Respondent (D3) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Average age	62	51	53	66	61	49	52	56	62
Respondent is under 30	2%	7%	12%	0%	3%	12%	18%	8%	0%
Respondent is between 30 and 60	43%	65%	54%	32%	42%	66%	42%	52%	49%
Respondent is 60 years or older	55%	28%	33%	68%	54%	22%	40%	41%	51%
Total (n)	471	133	351	42	522	210	48	956	47

Source: 2013 CARE Participant Telephone Survey.

Table 416: Average Age of Respondent (D3) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Average age	56	57	65	58	56	54
Respondent is under 30	9%	7%	0%	5%	6%	10%
Respondent is between 30 and 60	48%	50%	33%	52%	58%	51%
Respondent is 60 years or older	43%	44%	67%	43%	37%	38%
Total (n)	248	57	24	151	268	256

Source: 2013 CARE Participant Telephone Survey.

Table 417: Marital Status of Respondent (D4) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Married	36%	30%	43%	32%	42%	38%	39%	41%
Divorced	19%	20%	18%	19%	19%	23%	19%	19%
Separated	5%	5%	6%	4%	5%	4%	6%	4%
Widowed	18%	21%	14%	21%	14%	14%	15%	14%
Never married	12%	14%	11%	12%	12%	11%	12%	13%
Living with a partner	10%	10%	9%	11%	8%	10%	9%	8%
Total (n)	1,007	600	407	382	378	196	425	374

Source: 2013 CARE Participant Telephone Survey.

Table 418: Marital Status of Respondent (D4) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Married	46%	46%	26%	32%	27%	47%	63%	36%	46%
Divorced	16%	16%	22%	25%	26%	7%	7%	19%	15%
Separated	2%	6%	7%	2%	4%	8%	12%	5%	4%
Widowed	23%	11%	13%	39%	23%	9%	8%	17%	23%
Never married	8%	8%	19%	1%	14%	10%	8%	13%	3%
Living with a partner	5%	14%	12%	1%	6%	20%	2%	10%	9%
Total (n)	476	136	347	41	520	211	49	957	49

Source: 2013 CARE Participant Telephone Survey.

Table 419: Marital Status of Respondent (D4) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Married	39%	36%	64%	23%	34%	42%
Divorced	18%	30%	6%	22%	20%	16%
Separated	4%	2%	0%	3%	5%	8%
Widowed	20%	18%	31%	21%	13%	16%
Never married	9%	0%	0%	18%	17%	11%
Living with a partner	10%	15%	0%	13%	10%	7%
Total (n)	250	58	24	152	267	256

Source: 2013 CARE Participant Telephone Survey.

Table 420: Language Spoken in Home (D5, D5_1-D5_20) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
English	95%	96%	95%	96%	94%	95%	94%	94%
Spanish	40%	43%	37%	26%	49%	37%	51%	49%
Mandarin	0%	0%	1%	0%	1%	0%	1%	1%
Cantonese	0%	0%	1%	1%	0%	0%	0%	0%
Tagalog/Filipino	1%	1%	1%	1%	1%	2%	1%	1%
Korean	0%	0%	1%	0%	0%	0%	0%	0%
Vietnamese	1%	0%	1%	0%	1%	1%	1%	1%
Other	4%	5%	3%	5%	1%	5%	2%	1%
German	1%	0%	1%	1%	0%	1%	0%	0%
Chinese	1%	1%	2%	2%	1%	0%	1%	1%
Danish	0%	0%	0%	1%	0%	0%	0%	0%
Russian	0%	0%	0%	0%	0%	0%	0%	0%
Arabic	1%	1%	1%	1%	1%	1%	1%	1%
French	1%	1%	2%	1%	1%	1%	2%	1%
Japanese	1%	0%	1%	0%	0%	3%	1%	0%
Italian	0%	0%	1%	1%	0%	1%	0%	0%
Portuguese	0%	0%	0%	1%	0%	0%	0%	0%
Farsi	0%	0%	1%	1%	0%	0%	0%	0%
Total (n)	1,024	607	417	386	383	203	431	379

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple responses allowed.

Table 421: Language Spoken in Home (D5, D5_1-D5_20) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
English	95%	96%	95%	98%	100%	86%	71%	95%	100%
Spanish	36%	44%	44%	23%	0%	100%	6%	41%	7%
Mandarin	0%	0%	1%	0%	0%	0%	4%	1%	0%
Cantonese	1%	0%	1%	0%	0%	0%	5%	0%	0%
Tagalog/Filipino	1%	1%	1%	0%	0%	0%	11%	1%	0%
Korean	0%	0%	0%	0%	0%	0%	6%	0%	0%
Vietnamese	1%	1%	0%	0%	0%	0%	1%	1%	0%
Other	3%	6%	3%	0%	0%	0%	43%	4%	0%
German	0%	1%	1%	0%	0%	0%	3%	1%	0%
Chinese	2%	3%	0%	0%	0%	0%	19%	1%	0%
Danish	0%	1%	0%	0%	0%	0%	0%	0%	1%
Russian	0%	0%	0%	0%	0%	0%	5%	0%	0%
Arabic	1%	3%	1%	6%	0%	0%	15%	1%	0%
French	2%	2%	1%	0%	0%	0%	9%	1%	0%
Japanese	1%	0%	0%	0%	0%	0%	1%	1%	1%
Italian	1%	0%	0%	0%	0%	0%	0%	0%	0%
Portuguese	0%	1%	0%	0%	0%	0%	0%	0%	0%
Farsi	0%	1%	0%	0%	0%	0%	6%	0%	0%
Total (n)	479	136	360	42	532	213	49	974	49

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple responses allowed.

Table 422: Language Spoken in Home (D5, D5_1-D5_20) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
English	98%	98%	100%	95%	96%	92%
Spanish	27%	41%	3%	31%	46%	54%
Mandarin	0%	0%	0%	1%	0%	1%
Cantonese	0%	0%	0%	2%	0%	0%
Tagalog/Filipino	1%	0%	0%	2%	1%	1%
Korean	0%	0%	0%	0%	1%	0%
Vietnamese	0%	0%	0%	1%	1%	1%
Other	5%	4%	0%	5%	0%	5%
German	0%	2%	0%	1%	0%	0%
Chinese	2%	0%	0%	2%	0%	2%
Danish	0%	0%	0%	1%	0%	0%
Russian	0%	0%	0%	0%	0%	0%
Arabic	2%	1%	4%	0%	0%	2%
French	0%	2%	0%	1%	0%	3%
Japanese	0%	1%	0%	0%	1%	1%
Italian	1%	0%	0%	1%	0%	0%
Portuguese	1%	0%	0%	1%	0%	0%
Farsi	1%	0%	0%	0%	0%	1%
Total (n)	251	59	24	155	273	262

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple responses allowed.

Table 423: Primary Language Spoken in Home (D6) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
English	72%	72%	72%	79%	69%	80%	66%	69%
Spanish	23%	25%	22%	16%	28%	14%	31%	28%
Asian	2%	1%	3%	2%	2%	1%	2%	2%
Other	3%	2%	4%	3%	1%	5%	2%	1%
Total (n)	1,021	607	414	384	383	202	431	379

Source: 2013 CARE Participant Telephone Survey.

Table 424: Primary Language Spoken in Home (D6) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
English	76%	66%	70%	97%	100%	0%	0%	71%	98%
Spanish	20%	26%	27%	3%	0%	100%	0%	24%	2%
Asian	2%	2%	1%	0%	0%	0%	36%	2%	0%
Other	2%	6%	2%	0%	0%	0%	64%	3%	0%
Total (n)	479	136	357	42	532	213	49	971	49

Source: 2013 CARE Participant Telephone Survey.

Table 425: Primary Language Spoken in Home (D6) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
English	80%	84%	100%	74%	70%	61%
Spanish	14%	16%	0%	21%	28%	33%
Asian	2%	0%	0%	2%	1%	2%
Other	4%	0%	0%	2%	1%	5%
Total (n)	251	59	24	153	273	261

Source: 2013 CARE Participant Telephone Survey.

Table 426: Race of Respondent (D8) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
White (non-hispanic)	39%	35%	44%	50%	32%	49%	29%	32%
African-American	11%	12%	11%	9%	11%	10%	13%	10%
Asian	3%	3%	4%	4%	3%	3%	2%	3%
Hispanic	36%	38%	33%	25%	44%	28%	46%	44%
Other	2%	1%	3%	2%	2%	2%	2%	2%
Two or more	8%	11%	6%	10%	8%	8%	7%	8%
Total (n)	996	594	402	376	375	194	422	371

Source: 2013 CARE Participant Telephone Survey.

Table 427: Race of Respondent (D8) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
White (non-hispanic)	45%	36%	33%	71%	62%	4%	29%	37%	85%
African-American	9%	7%	16%	2%	20%	0%	1%	12%	0%
Asian	4%	5%	3%	0%	0%	0%	41%	3%	0%
Hispanic	33%	39%	39%	19%	6%	91%	5%	37%	2%
Other	1%	4%	2%	2%	2%	0%	20%	2%	2%
Two or more	9%	9%	8%	6%	9%	5%	3%	8%	11%
Total (n)	468	132	347	42	517	209	46	946	49

Source: 2013 CARE Participant Telephone Survey.

Table 428: Race of Respondent (D8) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
White (non-hispanic)	54%	56%	94%	40%	24%	31%
African-American	5%	9%	0%	13%	27%	4%
Asian	2%	0%	0%	8%	2%	3%
Hispanic	25%	30%	2%	31%	42%	49%
Other	2%	2%	0%	1%	1%	4%
Two or more	12%	4%	4%	8%	5%	10%
Total (n)	244	57	24	152	264	255

Source: 2013 CARE Participant Telephone Survey.

Table 429: Education Level of Respondent (D9) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Never attended school or only attended kindergarten	1%	1%	1%	1%	0%	2%	1%	0%
Grades 1 through 8 (Elementary)	12%	14%	9%	10%	12%	6%	14%	13%
Grades 9 through 11 (Some high school)	10%	12%	8%	11%	8%	9%	10%	8%
Grade 12 or GED (High school graduate)	26%	27%	25%	25%	27%	28%	26%	26%
College 1 year to 3 years (Some college, technical school, Associates)	32%	30%	35%	32%	35%	28%	34%	35%
College 4 years or more (College graduate)	19%	16%	22%	21%	18%	26%	15%	17%
Total (n)	1,014	604	410	385	378	199	426	374

Source: 2013 CARE Participant Telephone Survey.

Table 430: Education Level of Respondent (D9) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Never attended school or only attended kindergarten	2%	1%	0%	0%	0%	4%	0%	1%	4%
Grades 1 through 8 (Elementary)	8%	19%	11%	7%	2%	41%	1%	12%	0%
Grades 9 through 11 (Some high school)	8%	13%	10%	12%	6%	19%	11%	10%	6%
Grade 12 or GED (High school graduate)	24%	24%	30%	25%	27%	22%	15%	26%	19%
College 1 year to 3 years (Some college, technical school, Associates)	35%	28%	31%	39%	43%	7%	30%	31%	59%
College 4 years or more (College graduate)	23%	15%	18%	17%	22%	8%	42%	19%	12%
Total (n)	476	135	354	42	528	212	46	964	49

Source: 2013 CARE Participant Telephone Survey.

Table 431: Education Level of Respondent (D9) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Never attended school or only attended kindergarten	0%	0%	9%	1%	1%	2%
Grades 1 through 8 (Elementary)	13%	5%	0%	8%	12%	16%
Grades 9 through 11 (Some high school)	12%	6%	3%	9%	5%	14%
Grade 12 or GED (High school graduate)	26%	22%	10%	29%	32%	21%
College 1 year to 3 years (Some college, technical school, Associates)	31%	47%	67%	28%	29%	33%
College 4 years or more (College graduate)	18%	20%	11%	26%	20%	14%
Total (n)	250	57	24	155	268	260

Source: 2013 CARE Participant Telephone Survey.

Table 432: Employment of People in Home 18 Years or Older (D10) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Working full-time	26%	31%	22%	24%	29%	23%	28%	29%
Working part-time	16%	17%	16%	13%	18%	17%	18%	18%
Not working and looking for work	18%	17%	20%	17%	19%	17%	19%	18%
Not working and not looking for work	39%	35%	43%	45%	34%	43%	35%	35%
Total (n)	2240	890	1350	748	925	443	1038	914

Source: 2013 CARE Participant Telephone Survey.
Note: The total (n) reflects the total number of adults over the age of 18 in 988 surveyed households. Data from 40 households was omitted due to missing information.

Table 433: Employment of People in Home 18 Years or Older (D10) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Working full-time	25%	32%	26%	27%	16%	20%	35%	21%	16%
Working part-time	14%	17%	19%	15%	4%	15%	19%	14%	14%
Not working and looking for work	15%	18%	21%	16%	28%	15%	18%	27%	13%
Not working and not looking for work	46%	33%	34%	41%	53%	50%	28%	38%	57%
Total (n)	1136	337	682	1482	76	968	579	144	97

Source: 2013 CARE Participant Telephone Survey.
Note: The total (n) reflects the total number of adults over the age of 18 in 988 surveyed households. Data from 40 households was omitted due to missing information.

Table 434: Employment of People in Home 18 Years or Older (D10) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Working full-time	23%	26%	20%	29%	26%	28%
Working part-time	13%	18%	11%	14%	17%	20%
Not working and looking for work	19%	10%	14%	16%	19%	20%
Not working and not looking for work	45%	47%	55%	41%	38%	32%
Total (n)	510	117	53	298	609	653

Source: 2013 CARE Participant Telephone Survey.
Note: The total (n) reflects the total number of adults over the age of 18 in 988 surveyed households. Data from 40 households was omitted due to missing information.

Table 435: Household Income Now, Compared to Three Years ago (D13) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
A lot more	3%	1%	5%	3%	3%	4%	3%	3%
Somewhat more	14%	14%	13%	16%	11%	13%	12%	11%
Somewhat less	17%	18%	15%	17%	18%	18%	17%	18%
A lot less	21%	20%	22%	18%	26%	21%	23%	26%
About the same / no change	46%	46%	45%	47%	42%	44%	45%	42%
Total (n)	989	591	398	375	370	193	417	366

Source: 2013 CARE Participant Telephone Survey.

Table 436: Household Income Now, Compared to Three Years ago (D13) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
A lot more	3%	4%	3%	0%	2%	4%	5%	3%	1%
Somewhat more	12%	14%	15%	22%	12%	15%	9%	14%	12%
Somewhat less	20%	15%	15%	13%	15%	19%	23%	17%	18%
A lot less	20%	20%	23%	36%	25%	14%	16%	21%	25%
About the same / no change	46%	48%	44%	29%	44%	49%	47%	46%	44%
Total (n)	469	131	341	41	521	199	45	939	49

Source: 2013 CARE Participant Telephone Survey.

Table 437: Household Income Now, Compared to Three Years ago (D13) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
A lot more	2%	3%	0%	3%	1%	5%
Somewhat more	16%	5%	16%	16%	12%	13%
Somewhat less	16%	26%	30%	17%	13%	18%
A lot less	19%	19%	22%	14%	25%	24%
About the same / no change	47%	46%	32%	50%	48%	40%
Total (n)	243	56	24	151	263	252

Source: 2013 CARE Participant Telephone Survey.

Table 438: What Caused Household Income to Change (D13a) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCal Gas	SCE & SoCalGas
Moved out	3%	2%	3%	2%	3%	5%	2%	3%
Job change	9%	6%	12%	9%	9%	9%	9%	9%
Job loss/not working	23%	25%	21%	22%	26%	29%	23%	26%
Cut in hours	13%	13%	14%	9%	16%	12%	16%	15%
Increase in hours	2%	1%	4%	3%	3%	2%	2%	3%
Pay decrease	5%	5%	4%	3%	8%	5%	6%	8%
Pay raise/increase	9%	7%	10%	9%	7%	9%	8%	7%
Additional household members working	4%	4%	4%	5%	3%	3%	4%	3%
Assistance from other programs stopped	4%	5%	3%	5%	3%	2%	4%	3%
Something else	13%	16%	10%	16%	13%	14%	12%	13%
Retired	6%	6%	7%	4%	7%	5%	8%	7%
Death in the family	5%	5%	5%	4%	3%	5%	5%	3%
Increase in social security/welfare/unemployment/pension	7%	11%	3%	8%	7%	9%	6%	7%
Hurt/injured	2%	1%	2%	3%	0%	1%	0%	0%
Economy/inflation/cost of living/recession	6%	4%	8%	8%	3%	2%	6%	4%
Medical reasons/health/got sick/disabled	8%	6%	10%	7%	8%	8%	9%	8%
Rent/bills/expenses increased	3%	3%	3%	3%	3%	5%	3%	3%
Decrease in social security/welfare/unemployment/pension	4%	4%	3%	5%	3%	2%	3%	3%
Separated/divorced	2%	1%	2%	3%	1%	2%	1%	1%
Change in child support payments	1%	1%	0%	1%	0%	0%	0%	0%
Total (n)	542	321	221	203	208	109	227	205

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple Mentions allowed.

Table 439: What Caused Household Income to Change (D13a) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Moved out	2%	5%	2%	6%	4%	1%	2%	3%	0%
Job change	8%	14%	8%	2%	6%	11%	9%	9%	3%
Job loss/not working	22%	28%	22%	25%	22%	21%	22%	23%	22%
Cut in hours	11%	15%	15%	4%	7%	25%	16%	14%	3%
Increase in hours	3%	2%	3%	3%	2%	3%	11%	2%	6%
Pay decrease	5%	4%	6%	0%	5%	3%	2%	5%	8%
Pay raise/increase	6%	10%	10%	5%	7%	11%	8%	9%	5%
Additional household members working	5%	8%	2%	0%	2%	9%	7%	4%	3%
Assistance from other programs stopped	1%	7%	3%	16%	6%	2%	7%	4%	16%
Something else	10%	17%	11%	25%	16%	7%	14%	13%	28%
Retired	9%	4%	5%	14%	8%	5%	3%	6%	0%
Death in the family	8%	5%	3%	6%	5%	3%	6%	5%	0%
Increase in social security/welfare/unemployment/pension	5%	3%	9%	14%	10%	2%	8%	7%	15%
Hurt/injured	2%	3%	1%	0%	2%	0%	0%	1%	10%
Economy/inflation/cost of living/recession	9%	5%	5%	3%	10%	1%	4%	5%	18%
Medical reasons/health/got sick/disabled	13%	7%	6%	0%	10%	6%	6%	8%	14%
Rent/bills/expenses increased	4%	1%	4%	0%	3%	5%	8%	3%	3%
Decrease in social security/welfare/unemployment/pension	3%	3%	4%	8%	4%	0%	4%	4%	0%
Separated/divorced	2%	5%	0%	0%	3%	0%	0%	2%	7%
Change in child support payments	0%	0%	1%	3%	0%	0%	0%	1%	0%
Total (n)	252	72	192	24	286	97	30	516	26

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple Mentions allowed.

Table 440: What Caused Household Income to Change (D13a) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Moved out	1%	9%	0%	2%	3%	2%
Job change	8%	9%	6%	10%	8%	11%
Job loss/not working	24%	25%	14%	21%	26%	22%
Cut in hours	11%	8%	6%	5%	14%	20%
Increase in hours	3%	6%	0%	6%	0%	2%
Pay decrease	3%	10%	13%	4%	4%	5%
Pay raise/increase	5%	0%	0%	16%	10%	9%
Additional household members working	5%	1%	0%	5%	2%	5%
Assistance from other programs stopped	5%	0%	27%	2%	2%	5%
Something else	17%	16%	50%	7%	11%	12%
Retired	6%	9%	0%	3%	10%	6%
Death in the family	6%	2%	0%	3%	2%	8%
Increase in social security/welfare/unemployment/pension	11%	1%	21%	3%	6%	6%
Hurt/injured	4%	3%	0%	3%	0%	0%
Economy/inflation/cost of living/recession	10%	1%	13%	4%	7%	4%
Medical reasons/health/got sick/disabled	7%	19%	6%	7%	7%	9%
Rent/bills/expenses increased	4%	7%	3%	1%	3%	3%
Decrease in social security/welfare/unemployment/pension	4%	6%	0%	6%	2%	3%
Separated/divorced	6%	0%	0%	0%	0%	1%
Change in child support payments	0%	0%	0%	2%	0%	0%
Total (n)	130	29	15	80	139	149

Source: 2013 CARE Participant Telephone Survey.
Note: Multiple Mentions allowed.

Table 441: Adults in Household Unable to Work due to Physical, Mental, or Emotional Disability (D11) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	37%	40%	34%	38%	35%	38%	36%	36%
No	63%	60%	66%	62%	65%	62%	64%	64%
Total (n)	1,008	599	409	377	381	199	428	377

Source: 2013 CARE Participant Telephone Survey.

Table 442: Adults in Household Unable to Work due to Physical, Mental, or Emotional Disability (D11) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	35%	33%	37%	62%	43%	28%	37%	36%	50%
No	65%	67%	63%	38%	57%	72%	63%	64%	50%
Total (n)	473	135	351	42	526	211	46	958	49

Source: 2013 CARE Participant Telephone Survey.

Table 443: Adults in Household Unable to Work due to Physical, Mental, or Emotional Disability (D11) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	45%	33%	58%	29%	36%	35%
No	55%	67%	42%	71%	64%	65%
Total (n)	246	58	24	151	269	260

Source: 2013 CARE Participant Telephone Survey.

Table 444: Person in Household with a Hearing Impairment or Wearing a Hearing Aid (D15a) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	13%	14%	12%	14%	12%	19%	12%	12%
No	87%	86%	88%	86%	88%	81%	88%	88%
Total (n)	1,010	600	410	381	380	198	427	376

Source: 2013 CARE Participant Telephone Survey.

Table 445: Person in Household with a Hearing Impairment or Wearing a Hearing Aid (D15a) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	16%	12%	9%	12%	15%	9%	24%	12%	27%
No	84%	88%	91%	88%	85%	91%	76%	88%	73%
Total (n)	475	134	352	42	529	210	47	960	49

Source: 2013 CARE Participant Telephone Survey.

Table 446: Person in Household with a Hearing Impairment or Wearing a Hearing Aid (D15a) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	17%	6%	36%	9%	13%	11%
No	83%	94%	64%	91%	87%	89%
Total (n)	248	58	24	153	268	259

Source: 2013 CARE Participant Telephone Survey.

Table 447: Adults in Household with a Vision Impairment that Cannot be Corrected with Eyeglasses or Contact Lenses (D15b) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	12%	13%	10%	9%	11%	12%	13%	11%
No	88%	87%	90%	91%	89%	88%	87%	89%
Total (n)	1,004	598	406	377	378	198	425	374

Source: 2013 CARE Participant Telephone Survey.

Table 448: Adults in Household with a Vision Impairment that Cannot be Corrected with Eyeglasses or Contact Lenses (D15b) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	9%	13%	11%	16%	13%	11%	14%	12%	12%
No	91%	87%	89%	84%	87%	89%	86%	88%	88%
Total (n)	471	135	349	42	523	210	47	956	47

Source: 2013 CARE Participant Telephone Survey.

Table 449: Adults in Household with a Vision Impairment that Cannot be Corrected with Eyeglasses or Contact Lenses (D15b) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	10%	10%	10%	12%	16%	9%
No	90%	90%	90%	88%	84%	91%
Total (n)	245	56	24	152	268	259

Source: 2013 CARE Participant Telephone Survey.

Table 450: Person in Household requires the use of a Cane, Walker, Wheelchair, or other Assistance to move Around Safely (D15c) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	28%	33%	23%	31%	26%	32%	26%	27%
No	72%	67%	77%	69%	74%	68%	74%	73%
Total (n)	1,009	601	408	381	380	197	427	376

Source: 2013 CARE Participant Telephone Survey.

Table 451: Person in Household requires the use of a Cane, Walker, Wheelchair, or other Assistance to move Around Safely (D15c) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	34%	18%	27%	53%	35%	17%	20%	28%	42%
No	66%	82%	73%	47%	65%	83%	80%	72%	58%
Total (n)	473	135	352	42	527	211	47	959	49

Source: 2013 CARE Participant Telephone Survey.

Table 452: Person in Household requires the use of a Cane, Walker, Wheelchair, or other Assistance to move Around Safely (D15c) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	35%	21%	42%	24%	28%	26%
No	65%	79%	58%	76%	72%	74%
Total (n)	248	58	24	153	266	260

Source: 2013 CARE Participant Telephone Survey.

Table 453: Person in Household has Emotional, Nervous or Psychiatric Problems (D15d) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	17%	19%	14%	16%	18%	17%	18%	18%
No	83%	81%	86%	84%	82%	83%	82%	82%
Total (n)	997	593	404	373	377	197	423	373

Source: 2013 CARE Participant Telephone Survey.

Table 454: Person in Household has Emotional, Nervous or Psychiatric Problems (D15d) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	13%	16%	20%	28%	21%	12%	5%	17%	12%
No	87%	84%	80%	72%	79%	88%	95%	83%	88%
Total (n)	468	133	347	42	523	208	46	949	47

Source: 2013 CARE Participant Telephone Survey.

Table 455: Person in Household has Emotional, Nervous or Psychiatric Problems (D15d) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	21%	17%	15%	11%	17%	17%
No	79%	83%	85%	89%	83%	83%
Total (n)	244	58	24	149	265	257

Source: 2013 CARE Participant Telephone Survey.

Table 456: Person in Household has Other Chronic Medical Conditions (D15e) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	44%	49%	39%	47%	40%	55%	41%	41%
No	56%	51%	61%	53%	60%	45%	59%	59%
Total (n)	999	596	403	375	379	195	425	375

Source: 2013 CARE Participant Telephone Survey.

Table 457: Person in Household has Other Chronic Medical Conditions (D15e) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	47%	40%	42%	65%	54%	26%	45%	44%	57%
No	53%	60%	58%	35%	46%	74%	55%	56%	43%
Total (n)	467	135	348	42	520	210	46	950	48

Source: 2013 CARE Participant Telephone Survey.

Table 458: Person in Household has Other Chronic Medical Conditions (D15e) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	50%	48%	61%	41%	44%	39%
No	50%	52%	39%	59%	56%	61%
Total (n)	243	57	24	152	264	259

Source: 2013 CARE Participant Telephone Survey.

Table 459: Care for Illness or Condition Needs Medical Equipment on Ongoing or Daily Basis that Requires Use of Electricity (D17) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Yes	36%	37%	35%	34%	38%	35%	39%	38%
No	64%	63%	65%	66%	62%	65%	61%	62%
Total (n)	542	341	201	218	177	121	203	177

Source: 2013 CARE Participant Telephone Survey.

Table 460: Care for Illness or Condition Needs Medical Equipment on Ongoing or Daily Basis that Requires Use of Electricity (D17) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Yes	31%	45%	35%	44%	36%	29%	44%	36%	37%
No	69%	55%	65%	56%	64%	71%	56%	64%	63%
Total (n)	262	60	187	28	330	74	19	510	32

Source: 2013 CARE Participant Telephone Survey.

Table 461: Care for Illness or Condition Needs Medical Equipment on Ongoing or Daily Basis that Requires Use of Electricity (D17) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Yes	38%	28%	30%	29%	42%	37%
No	62%	72%	70%	71%	58%	63%
Total (n)	140	30	17	80	142	133

Source: 2013 CARE Participant Telephone Survey.

Table 462: Ownership of Home (S5) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Own	34%	34%	35%	35%	32%	38%	33%	33%
Rent	63%	62%	65%	61%	65%	62%	65%	65%
Other	0%	0%	1%	0%	1%	0%	1%	1%
Someone else owns/don't pay rent/live here for free	2%	4%	0%	4%	2%	0%	1%	2%
Total	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 463: Ownership of Home (S5) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Own	100%	0%	4%	58%	37%	29%	32%	33%	61%
Rent	0%	100%	95%	42%	59%	70%	68%	64%	39%
Other	0%	0%	1%	0%	0%	2%	0%	1%	0%
Someone else owns/don't pay rent/live here for free	0%	0%	0%	0%	4%	0%	0%	2%	0%
Total	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 464: Ownership of Home (S5) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Own	39%	34%	65%	25%	30%	36%
Rent	55%	65%	35%	71%	70%	61%
Other	0%	1%	0%	0%	0%	1%
Someone else owns/don't pay rent/live here for free	5%	0%	0%	4%	0%	1%
Total	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

Table 465: Home Type (S6) by ESA Participation and Utility For California LI Population

	Total	Participant	Non-Participant	PG&E	SCE	SDG&E	SoCalGas	SCE & SoCalGas
Single-Family	55%	56%	55%	58%	52%	52%	53%	53%
Multi-Family 2-4 Units	12%	13%	12%	11%	12%	10%	13%	12%
Multi-Family 5-10 Units	10%	9%	11%	9%	8%	9%	11%	8%
Multi-Family 11-20 Units	5%	4%	6%	3%	7%	6%	6%	7%
Multi-Family Over 20 Units	12%	11%	12%	10%	15%	16%	13%	15%
Multi-Family Unknown Units	3%	4%	3%	5%	3%	2%	2%	2%
Mobile Home	3%	4%	2%	4%	3%	5%	2%	3%
Total (n)	1,028	610	418	389	384	203	432	380

Source: 2013 CARE Participant Telephone Survey.

Table 466: Home Type (S6) by Home Type, Language, Rural and Urban For California LI Population

	Single-Family Own	Single-Family Rent	Multi-Family	Mobile	English Only	Primary Language Spanish	Primary Language Other	Urban	Rural
Single-Family	100%	100%	0%	0%	56%	52%	65%	54%	88%
Multi-Family 2-4 Units	0%	0%	30%	0%	11%	14%	17%	13%	0%
Multi-Family 5-10 Units	0%	0%	24%	0%	10%	12%	5%	10%	3%
Multi-Family 11-20 Units	0%	0%	11%	0%	4%	8%	1%	5%	0%
Multi-Family Over 20 Units	0%	0%	28%	0%	12%	11%	8%	12%	0%
Multi-Family Unknown Units	0%	0%	7%	0%	3%	2%	4%	3%	0%
Mobile Home	0%	0%	0%	100%	4%	0%	0%	3%	9%
Total (n)	483	136	360	42	532	213	49	978	49

Source: 2013 CARE Participant Telephone Survey.

Table 467: Home Type (S6) by Climate Zone For California LI Population

	Central Valley	Desert	Mountain	North Coast	South Coast	South Inland
Single-Family	67%	56%	75%	48%	43%	58%
Multi-Family 2-4 Units	8%	3%	0%	18%	22%	7%
Multi-Family 5-10 Units	7%	10%	0%	12%	13%	9%
Multi-Family 11-20 Units	1%	0%	0%	6%	6%	8%
Multi-Family Over 20 Units	10%	23%	0%	8%	14%	12%
Multi-Family Unknown Units	3%	2%	0%	7%	2%	3%
Mobile Home	5%	6%	25%	1%	0%	3%
Total (n)	253	59	24	156	273	263

Source: 2013 CARE Participant Telephone Survey.

9 Detailed Modeling Results

9.1 CARE Modeling

Table 468 contains the results of the CARE *Participation* model and Table 469 contains the results of the CARE *Penetration* model. Because we estimated the models based on a logit-transformation of the proportion of households enrolled in CARE, the coefficient estimates (column b) have little intuitive meaning. They represent our estimates of the (marginal) change in the log-odds that a household would be enrolled in CARE based on a one-unit increase in the value of the respective independent variable, while holding the value of all other independent variables constant. While there is little or no intuitive meaning to the coefficient estimates, the sign of the coefficient (positive or negative) indicate if a one-unit increase in the independent variable would lead to an increase or decrease in the proportion of households enrolled in CARE. The standard errors (column c) are a measure of the precision of the coefficient estimates—the smaller the standard error, the greater the precision of the estimated coefficient. The t-statistic (column d) is a statistical measure of whether the true parameter is different from zero and is computed by dividing the coefficient by the standard error.[13] The larger the absolute value of the t-statistic, the greater the statistical evidence that the true parameter differs from zero. The t-statistic for each coefficient is statistically significant at the 0.05 level or greater, indicating a strong relationship between the respective explanatory variable and the dependent variable.[14]

[13] The null hypothesis is that the true parameter is equal to zero (i.e., the independent variable does not affect the dependent variable) versus the alternative that the true parameter is different from zero (i.e., the independent variable has either a positive or negative effect on the dependent variable).

[14] In fact, most t-statistics are significant at the .001 level (or better), indicating a very strong relationship between the dependent and independent variable.

Table 468: CARE Participation Model Results

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**t-Statistic***	**Change in Odds Ratio**	**Change in Proportion on CARE**
(Constant)	-2.822	0.022	-126.0		
% HH < 100% FPL	0.009	0.000	22.3	0.90%	0.75%
Average Number Persons Per HH	0.423	0.011	38.6	52.65%	0.73%
% HHs with Person >= 65	0.013	0.000	39.2	1.31%	0.84%
% Spanish Speaking HHs	0.009	0.000	32.5	0.90%	1.49%
% Home Ownership	-0.008	0.000	-29.0	-0.80%	-1.34%
% Non English/Spanish HHs	0.003	0.000	11.3	0.30%	0.27%
% Single Parent HHs	0.050	0.001	46.2	5.13%	1.91%
% HHs on Public Assistance	0.009	0.001	11.4	0.90%	0.25%
% HHs with Income > $200K	-0.046	0.000	-111.5	-4.50%	-2.53%
% African-American HHs	0.007	0.000	20.7	0.70%	0.20%

Model Summary Statistics: Adj. R2 = 0.83; n = 22,712; F-statistic = 9,991
* All coefficients statistically significant at 0.001 level.

Column *e* of Table 468 shows the marginal change in the odds ratio associated with a one-unit change in the respective independent variable. This is not the same as the marginal change in the proportion of households enrolled in CARE. Rather, it's the effect on the *odds* that a household will be on a CARE rate. Recall that the odds are calculated as the ratio of the proportion of households on CARE to the proportion not on CARE. The values in Column e are estimates of the percent change in this ratio due to a one-unit change in the independent variable. Positive values in column e indicate that the odds that a household will be on a CARE rate increase when the respective independent variable increases by one unit. For example, the coefficient on the independent variable "*% HH < 100% FPL*" in Table 468 indicates that the odds that a household will be on a CARE rate increases by 0.90 percent if the percent of households living below the federal poverty level in that Census block group increases by one percentage point.

Likewise, negative values indicate that the odds that a household will be on a CARE rate decreases when the respective independent variable increases by one unit. For example, the independent variable "*% Home Ownership*" in Table 468 indicates that the odds that a household will be on a CARE rate decreases by 0.70 percent if the home ownership rate in that Census block group increases by one percentage point.

Column f in Table 468 shows the estimated percent change in the proportion of households on CARE due to a one-unit change in the value of the independent variable.[15] Because the model was estimated based on the log-odds transformation of the proportion of households on CARE, developing estimates of the marginal change on the CARE proportion requires the following non-linear transformation:

$$\Delta CARE = \left(e^{\beta_k \bar{x}} \Big/ 1 + e^{\beta_k \bar{x}} \right) - \left(e^{\beta_k \bar{x}+1} \Big/ 1 + e^{\beta_k \bar{x}+1} \right)$$

$$Where:$$

$$\Delta CARE = Marginal\ change\ in\ CARE\ rate$$

$$e^{\beta_k \bar{x}} = Estimated\ odds\ evaluated\ at\ mean\ value\ of\ independent\ variable$$

$$e^{\beta_k \bar{x}+1} = Estimated\ odds\ evaluated\ at\ mean\ value\ of\ independent\ variable\ plus\ one\ unit$$

The estimates of marginal change must be evaluated at a "point of approximation." The standard point of approximation and the one used for this analysis is the mean value of the independent variable. The point of approximation matters because, as the formula above shows, the transformation is non-linear and so the estimated marginal impacts will differ based on the point at which the function is evaluated. Table 469 provides an interpretation of the estimated marginal impact on the proportion of CARE households (in a block group) associated with each of independent variables in the model. We will discuss these estimates of marginal change in detail in the *Finding from the CARE Models* section below.

Columns e and f of Table 469 show the same information as the corresponding columns in Table 468, but with respect to the penetration for CARE eligible households to be on a CARE rate. We will discuss the estimates of marginal impacts shown in column *f* in detail in the *Finding from the CARE Models* section below.

[15] These values also represent estimates of the marginal change in the probability that a randomly drawn household will be on a CARE rate.
Note: the estimates of the marginal change in the proportion on CARE were calculated at the mean value of the respective independent variable.

Table 469: CARE Penetration Model Results

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**t-Statistic***	**Change in Odds Ratio**	**Change in Proportion on CARE**
(Constant)	0.243	0.086	2.822**		
% HH < 100% FPL	-0.100	0.001	-75.24	-9.52%	-1.51%
Average Number Persons Per HH	0.843	0.036	23.179	132.33%	4.32%
% HHs with Person >= 65	0.013	0.001	11.935	1.31%	0.32%
% Spanish Speaking HHs	0.012	0.001	13.101	1.21%	0.29%
% Home Ownership	0.002	0.001	1.94***	0.20%	0.05%
% Non English/Spanish HHs	0.006	0.001	6.944	0.60%	0.15%
% Single Parent HHs	0.120	0.004	33.728	12.75%	2.08%
% HHs on Public Assistance	0.022	0.003	8.043	2.22%	0.55%
% HHs with Income > $200K	-0.040	0.001	-29.231	-3.92%	-0.98%
% African-American HHs	0.019	0.001	16.665	1.92%	0.47%
Avg Annual BTUs CARE HHs	-0.009	0.001	-12.53	-0.90%	-0.21%
Population Density	0.00001	0.000	3.561	0.00%	0.03%

Model Summary Statistics: Adj. R2 = 0.41; n = 22,715; F-statistic = 1,304
* Unless indicated, statistically significant at .001 level or better.
** Statistically significant at 0.01 level.
**Statistically significant at 0.05 level.

9.1.1 Other Variables Considered for the CARE Models

In addition to the variables shown in Table 468 and Table 469 that were included as explanatory variable in the final CARE Participation and Penetration models, we considered numerous other potential explanatory variables, but did not include them because of one or more of the following reasons:

1) The variable was not statistically significant based on the t-statistic.
2) The variable was highly collinear with one or more variables already in the model.
3) Inclusion of the variable reduced the overall significance of the model as measured by the F-statistic.

Variables considered, but ultimately not included in the model are shown in Table 470.

Table 470: Variables Considered, but not Included in the Participation or Penetration Models

Type	Variable	Description	Reason Not Included
Income	Median Income	Median household income for block group	Not statistically significant*
	Percent FPL	Proportion of households below some percent of FPL	Highly collinear with the variable "***% HH < 100% FPL***"
	Income Level	Percent of households below various income thresholds	Highly collinear with the variable "***% HH < 100% FPL***"
Demographic	Pacific Islander	Percent of households that are Pacific Island	Not statistically significant*
	Population density	Persons per square mile	Marginally statistically significant; Reduced F-statistic (*Participation* model only)
	Medicaid	Proportion of households on Medicaid	Collinear with "***% HH < 100% FPL***"
Geographic	Climate zone	Dummy variable indicator for each climate zone (1 if block group in climate zone; else 0)	Highly collinear with one or more other variables; no theoretical reason to believe climate zone should influence CARE participation or penetration
	IOU territory	Dummy variable indicator for each IOU territory (1 if block group in climate zone; else 0)	Highly collinear with one or more other variables; no theoretical reason to believe climate zone should influence CARE participation or penetration
	Housing units	Count of housing units in block group	Not statistically significant*
Utility	CARE kWh	Average annual kWh for households in CARE program	Converted to BTUs and added with average gas usage in BTUs
	CARE Therms	Average annual Therm for households in CARE program	Converted to BTUs and added with average kWh usage in BTUs

*These variables were not statistically significant in the context of the overall model. However, each of these variables may be statistically significantly related to the dependent variable, but that relationship is not incremental beyond those variables already in the model.

It is important to note that for many of the variables considered, but not included in either the Participation or Penetration model, their exclusion does not imply that the variables are not related to the dependent variable. Rather, many of the excluded variables contain high levels of the same information contained in the explanatory variables included in the regression model.

9.2 ESA Modeling

9.2.1.1 Model Results

In this section, we present detailed results of the Stage 1 and Stage 2 ESA models. Because the logistic regression model is non-linear, the coefficient values do *not* represent the marginal change in the dependent variable associated with a small change in the covariate (as they do in OLS regression), but rather the direction and relative magnitude of the contribution of that explanatory variable. Of greater use is information on how each explanatory variable affects the probability that a CARE enrollee will also participate in the ESA program. That is, a measure of the marginal impact that each explanatory variable has on the likelihood of ESA participation. To obtain estimates of the marginal impact for each explanatory variable, we used the same non-linear transformation we used for the CARE models (Equation 1).

Equation 1: Formula for Computing Marginal Impacts to Probability of Participating in ESA

$$\Delta Prob(ESA) = \left(e^{\beta_k \bar{x}} \Big/ 1 + e^{\beta_k \bar{x}}\right) - \left(e^{\beta_k \bar{x}+1} \Big/ 1 + e^{\beta_k \bar{x}+1}\right)$$

Where:

$\Delta Prob(ESA)$ = Marginal change in probability of participating in ESA

$e^{\beta_k \bar{x}}$ = Estimated odds evaluated at median value of explanatory variable

$e^{\beta_k \bar{x}+1}$ = Estimated odds evaluated at 60th percentile value of explanatory variable

For explanatory variables that are continuous, we computed the estimates of marginal impact based on a change from the median value the 60th percentile value.[16] For explanatory variables that are discrete and countable (e.g. number of failed payments to the utility), we used the median value and the median plus one unit. Finally, for binary explanatory variables (e.g. customer has medical equipment in home), we computed the marginal impact based on the difference between "yes" (1) and "no" (0).

The results of the ESA models are presented in the following five tables as follows:

- Table 471 contains the Stage 1 result for SCE

[16] Alternatively, we could have used the change in value between any two other "points of approximation," such as the mean and one standard deviation above the mean. Because percentiles are robust to extreme values (unlike parametric statistics such as the mean and standard deviation), we believe they provide a more realistic and reliable point of approximation for developing estimates of marginal change.

Note: The point of approximation does matter. As Equation 1 shows, the transformation is non-linear and so the estimated marginal impacts will differ (at least slightly) based on the point at which the function is evaluated.

- Table 472 contains the Stage 1 results for SoCalGas
- Table 473 contains the Stage 1 results for SDG&E
- Table 474 contains the Stage 1 results for PG&E
- Table 475 contains the Stage 2 results from the phone survey

The modeling results are segmented into three groups based on the type of explanatory variable: continuous, discrete and countable, and binary. The points of approximation for computing the odds ratios and marginal impacts differ for each of type of variable as explained above.

The coefficient estimates **(column b)** in each table have little intuitive meaning. They represent our estimates of the (marginal) change in the log-odds that a household would be enrolled in CARE based on a one-unit increase in the value of the respective independent variable, while holding the value of all other independent variables constant. The sign of each coefficient (positive or negative) indicate if an increase in the value of the independent variable would lead to an increase or decrease in the probability that a CARE enrollee lives in a home treated through the ESA program, either by choosing to participate in the program or by living in a home already treated. For independent variables that are binary, a positive coefficient indicates that the presence of that factor (e.g. "room AC eligible") has a positive impact on the probability of ESA participation.

The standard errors **(column c)** are a measure of the precision of the coefficient estimates—the smaller the standard error, relative to the coefficient, the greater the precision of the estimated coefficient.

The Wald-statistic **(column d)** is a statistical measure of whether the true parameter is different from zero and, therefore, has an impact on the probability that a CARE enrollee will participate in ESA. The Wald-statistic is computed as the ratio of the square of the coefficient to the square of the standard error.[17] The larger the absolute value of the Wald-statistic, the greater the statistical evidence that the true parameter differs from zero. Below each table is a note indicating the statistical significance of the respective coefficients. Most are significant at the 0.01 level or better.

Column e shows the marginal change in the odds ratio for each explanatory variable. This is not the same as the marginal change in the probability that a CARE enrollee will participate in ESA, rather, it's the effect on the *odds* that a CARE enrollee will participate in CARE (i.e. the ratio of the probability of ESA participation to the probability of not participating in ESA).

[17] The null hypothesis is that the true parameter is equal to zero (i.e., the explanatory variable does not affect the dependent variable) versus the alternative that the true parameter is different from zero (i.e., the explanatory variable has either a positive or negative effect on the dependent variable).

The values in **Column e** are estimates of the percent change in this ratio due to a one-unit change in the explanatory variable. Positive values in column e indicate that the odds that a CARE enrollee will participate in ESA increases when the respective explanatory variable increases. For example, the value in column e for the variable "*Household Size*" in Table 471 indicates that the odds that a CARE enrollee will participate in ESA is seven percent greater for households with one more than the median household size, while holding all else constant.

Likewise, negative values in column e indicate that the odds that a CARE enrollee will participate in ESA decreases when the respective independent variable increases. For example, the explanatory variable "*Coastal Location*" indicates that the odds that a enrollee will participate in ESA decreases by 20.1 percent for enrollees in a coastal location (i.e., "*Coastal Location*" = 1).

Column f shows the estimated percent change in the probability that a CARE enrollee will participate in ESA due to a change in the value of the explanatory variable from one point of approximation to another.[18]

[18] For continuous variables, the points of approximation are the median and the median plus one; for discrete and countable variables the points of approximation are the median and the median plus one; for binary variables the points of approximation are zero and one.

Note: the estimates of the marginal change in the proportion on CARE were calculated at the mean value of the respective independent variable.

Table 471: Stage 1 ESA Participation Model Results—SCE

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**Wald-Statistic***	**Change in Odds Ratio**	**Change in Prob. of ESA Participation**
Constant	-3.549	0.137	673.95	NA	NA
Continuous Variables (Impacts evaluated at Median & 60th %tile)					
Account Age	0.037	0.002	546.96	-2.6%	2.3%
Median Income	-0.005	0.001	28.59	3.8%	-0.6%
Population Density	0.006	0.005	1.39	-0.5%	0.1%
Percent Spanish	1.754	0.090	382.85	0.6%	2.3%
Percent Non-English/Spanish	0.366	0.135	7.33	1.8%	0.3%
Percent 65 and Over	0.614	0.184	11.15	0.4%	0.3%
Months on CARE Rate	0.029	0.002	143.70	0.6%	0.5%
Average Home Age	0.003	0.001	4.42	2.9%	0.6%
Percent Black	1.12	0.128	76.41	0.3%	0.6%
Discrete and Countable Variables (Impacts evaluated at Median & Median + 1)					
Household Size	0.068	0.009	51.51	7.0%	1.7%
Failed Utility Payment Count	0.013	0.005	8.36	1.3%	0.3%
Overdue Utility Payment Count	0.022	0.005	17.58	2.2%	0.6%
Binary Variables (Impacts evaluated at 0 and 1)					
Categorically Qualified	0.154	0.033	21.89	16.6%	3.8%
Central & Room AC Eligible	0.656	0.071	84.99	92.7%	15.8%
Room AC Eligible	0.777	0.052	226.18	117.5%	18.5%
Medical Equipment in Home	0.560	0.099	32.27	75.1%	13.7%
Coastal Location	-0.225	0.044	26.07	-20.1%	-5.6%
Single-Family Home	0.784	0.035	497.00	119.0%	18.7%
CARE App Recertified	0.574	0.033	309.45	77.5%	14.0%

* All coefficients, except on Pop Density, are statistically significant at 0.05 level or better.

Table 472: Stage 1 ESA Participation Model Results—SoCalGas

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**Wald-Statistic***	**Change in Odds Ratio**	**Change in Prob. of ESA Participation**
Constant	-2.785	0.127	480.296	NA	NA
Continuous Variables (Impacts evaluated at Median & 60th %tile)					
Median Income	-0.011	0.001	151.52	-1.1%	-1.39%
Avg. Daily Therms	-0.005	0.021	0.05	-0.5%	-0.02%
Account Age	0.007	0.001	32.49	0.7%	0.45%
Percent Spanish	0.986	0.091	118.69	1.0%	2.10%
Percent Non-English/Spanish	-1.307	0.116	127.42	-1.3%	-1.01%
Percent 65 and Over	0.782	0.182	18.53	0.8%	0.35%
Months on CARE Rate	0.050	0.004	152.29	5.1%	0.87%
Avg. Household Size	0.368	0.025	210.73	44.5%	1.49%
Percent Single Parent Families	0.459	0.365	1.58	0.5%	0.22%
Percent Black	1.533	0.112	187.37	1.5%	0.62%
Binary Variables (Impacts evaluated at 0 and 1)					
Medical Equipment in Home	0.736	0.115	40.982	108.8%	17.61%
Coastal	-0.590	0.031	361.213	-44.6%	-14.34%
Has IOU Electricity	0.346	0.032	118.736	41.3%	8.56%

* All coefficients, except on *Avg Daily Therms* and *Percent Single Parent Families*, are statistically significant at 0.05 level or better.

Table 473: Stage 1 ESA Participation Model Results—SDG&E

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**Wald-Statistic***	**Change in Odds Ratio**	**Change in Prob. of ESA Participation**
Constant	-1.198	0.105	129.61	NA	NA
Continuous Variables (Impacts evaluated at Median & 60th %tile)					
Avg Daily kWh	-0.029	0.002	247.24	-2.86%	-1.32%
Service Account Age	-0.005	0.002	11.29	-0.50%	-0.21%
Median Income	-0.013	0.001	210.22	-1.29%	-2.01%
Population Density	0.018	0.003	30.21	1.82%	0.37%
Spanish Speaking	0.299	0.097	9.53	0.30%	0.42%
Non-English/Spanish Speaking	-1.351	0.118	130.67	-1.34%	-0.66%
Percent Over 65	0.305	0.160	3.66	0.31%	0.17%
Percent Single Parent Families	5.659	0.387	213.61	5.82%	2.70%
Average Building Age	0.011	0.002	43.95	1.11%	0.30%
Percent on Medicaid	3.478	0.209	275.78	3.54%	3.78%
Discrete and Countable Variables (Impacts evaluated at Median & Median + 1)					
Count of Calls to Customer	0.014	0.002	84.40	1.41%	0.35%
Count of Failed Payments	-0.075	0.030	6.23	-7.23%	-1.87%
Count of Utility Disconnects	-0.096	0.034	8.01	-9.15%	-2.40%
Count of Overdue Payments	0.003	0.002	3.76	0.30%	0.07%
Binary Variables (Impacts evaluated at 0 and 1)					
Coastal	-0.108	0.034	9.89	-10.24%	-2.70%

* All coefficients are statistically significant at 0.10 level or better.

Table 474: Stage 1 ESA Participation Model Results—PG&E

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**Wald-Statistic***	**Change in Odds Ratio**	**Change in Prob of ESA Participation**
Constant	-2.715	0.107	640.025	NA	NA
Continuous Variables (Impacts evaluated at Median & 60th %tile)					
Average Daily kWh	-0.006	0.001	25.103	-0.6%	-0.5%
Service Account Age	0.013	0.001	109.389	1.3%	0.8%
Median Income	-0.003	0.001	13.522	-0.3%	-0.6%
Population Density	-0.015	0.005	7.821	-1.5%	-0.2%
Spanish Speaking	0.957	0.089	115.359	0.1%	1.5%
Non-English/Spanish Speaking	0.502	0.101	24.535	0.1%	0.6%
Percent 65 & Older	1.554	0.162	92.026	0.2%	0.8%
Percent Single-Parent Families	1.584	0.363	19.024	0.4%	0.6%
Average Building Age	0.007	0.001	66.193	0.7%	0.7%
Percent on Medicaid	2.041	0.172	141.115	0.2%	1.8%
Discrete and Countable Variables (Impacts evaluated at Median & Median + 1)					
Count of Utility Disconnects	-0.156	0.060	6.833	-14.4%	-3.9%
Number of Failed Payments	-0.114	0.054	4.432	-10.8%	-2.9%
Binary Variables (Impacts evaluated at 0 and 1)					
IOU Provides kWh & Gas	0.734	0.044	283.782	108.3%	17.6%
IOU Provides Only kWh	0.214	0.055	15.344	23.9%	5.3%
Medical Equipment in Home	0.246	0.057	18.462	27.9%	6.1%

* All coefficients are statistically significant at 0.05 level or better.

Table 475: Stage 2 ESA Participation Model Results—Phone Survey

a	*b*	*c*	*d*	*e*	*f*
Variable	**Coefficient**	**Standard Error**	**Wald-Statistic***	**Change in Odds Ratio**	**Change in Prob of ESA Participation**
Constant	-2.715	0.107	640.025	NA	NA
Continuous Variables (Impacts evaluated at Median & 60th %tile)					
Avg. Daily kWh	-0.026	0.015	3.085	-2.6%	-3.8%
Population Density	-0.028	0.019	2.070	-2.8%	-3.1%
Home Tenure	0.044	0.006	52.431	4.5%	12.0%
Household Income	-0.014	0.005	7.274	-1.4%	-5.6%
Discrete and Countable Variables (Impacts evaluated at Median & Median + 1)					
Household Size	0.160	0.046	11.948	17.4%	3.7%
Binary Variables (Impacts evaluated at 0 and 1)					
Male	-0.329	0.156	4.482	-28.0%	-8.2%
Married	-0.481	0.171	7.864	-38.2%	-11.8%
English Proficient	-0.377	0.191	3.885	-31.4%	-9.3%
Home Built 1970-1989	0.339	0.164	4.308	40.4%	8.4%
Other Race**	0.406	0.215	3.579	50.1%	10.0%
Primary Lang not English/Spanish	-0.635	0.378	2.825	-47.0%	-15.4%
Chronic Medical Condition	0.333	0.149	4.979	39.5%	8.3%
Aware of CARE Rate	-0.305	0.175	3.043	-26.3%	-7.6%
Forego Heating/Cooling***	0.522	0.158	10.895	68.5%	12.8%
ESA Offered Something Needed	0.414	0.153	7.293	51.3%	10.2%
Not a Barrier: Landlord	0.463	0.158	8.552	58.9%	11.4%
Not a Barrier: Being Home	0.455	0.160	8.075	57.6%	11.2%
Not a Barrier: Documentation	-0.273	0.169	2.607	-23.9%	-6.8%
Not a Barrier: Contractor	0.614	0.152	16.259	84.8%	14.9%

* All coefficients are statistically significant at 0.05 level or better.

9.2.1.2 Other Variables Considered for the ESA Models

In addition to the variables shown in the tables above, Table 476 describes the types of variables we considered as explanatory variables in the ESA participation models. The explanatory variables included in the regression models are a subset of these variables and were included in the models based on their ability to predict the dependent variable (i.e., that a residential premise was treated through the ESA program).

Table 476: Potential Explanatory Variables for Stage 1 ESA Participation Models

Variable	Source	Level	Description
Location and climate	Census/Athens	Census Block Group	Population per square mile; rural/urban distinctions and climate zone
Household demographic & income, Workforce	Census/Athens	Census Block Group	Such as persons per home, race/ethnicity, seniors, children and disabled member information, primary languages; median household income; employment statistics
Participation in non-energy LI assistance programs	Athens, Census	Census Block Group	Public assistance income, SSI income, food stamp recipients, etc.
Housing stock and related economic data	CIS, Census, Athens, housing authority	Customer and Census Block Group	Distributions of home type, home size, home vintage, own versus rent,
Energy Usage and IOU territory	CIS/billing	Customer	Monthly kWh and therm consumption, Serviced by kWh/Gas IOU
IOU tariff/rate and payment information	CIS/billing	Customer	FERA, Medical Baseline. Arrearages and service interruptions
ESA Participation	ESA data	Customer	If and when home was retrofit through ESA
CARE enrollment characteristics	CARE data	Customer	Household is currently enrolled in CARE; timing of current enrollment; enrollment type (categorical versus income)

Many pairs of variables within the data set are highly correlated—i.e., have a strong positive or negative linear relationship. Because of this, they have the same or very similar relationship with the dependent variable, which can lead to problems in the estimation of the econometric model.[19] Including two (or more) highly correlated explanatory variables in the regression model would not only be unnecessary, but would likely result in large variances on the coefficient estimates of the collinear variables because the variables provide essentially the same information for predicting the dependent variable (likelihood that a residence participated in the ESA program). It is, therefore, important to note that for many of the variables considered, but not included in the ESA models, their exclusion does not imply that the variables are not related to the dependent variable. Rather, many of the excluded variables contain high levels of the same information contained in the explanatory variables included in the regression model.

[19] The estimation problem, multicollinearity (or simply collinearity), is a condition occurring when two or more independent variables in the same regression model contain high levels of the same information and, consequently, are strongly correlated with one another. When significant collinearity is present, the coefficients of the independent variables in the regression model can be unstable, and even the signs of these coefficients may change when different variables are included, making it difficult to interpret the regression coefficients. In addition, standard errors may be inflated, resulting in insignificant t-statistics and incorrect conclusions regarding the statistical significance of the coefficients.

9.3 Conjoint Analysis

Table 477 below shows the results for ESA program Option 1 participation model. In this model, the coefficients should be interpreted as contributing to the overall probability of the customer participating in the ESA program. As with the previous model, the sign and magnitude of the coefficient estimates on all variables are as expected. The coefficient on Income Verification is not statistically significant—meaning it is not statistically different from zero—so no inference about this variables effect on the likelihood on participation can be made from this model.

Table 477: Conjoint Results – ESA Program Option 1 – Participation Model

Attribute	Estimate	Standard Error	Significance
Monthly Energy Savings	0.03494997	0.00522182	< 1%
Number of Home Visits	-0.28122272	0.08454755	< 1%
Income Verification	-0.32067475	0.21471195	14%
Comfort	0.97350353	0.20730736	< 1%
Total Time in Home	-0.24797019	0.06503928	< 1%

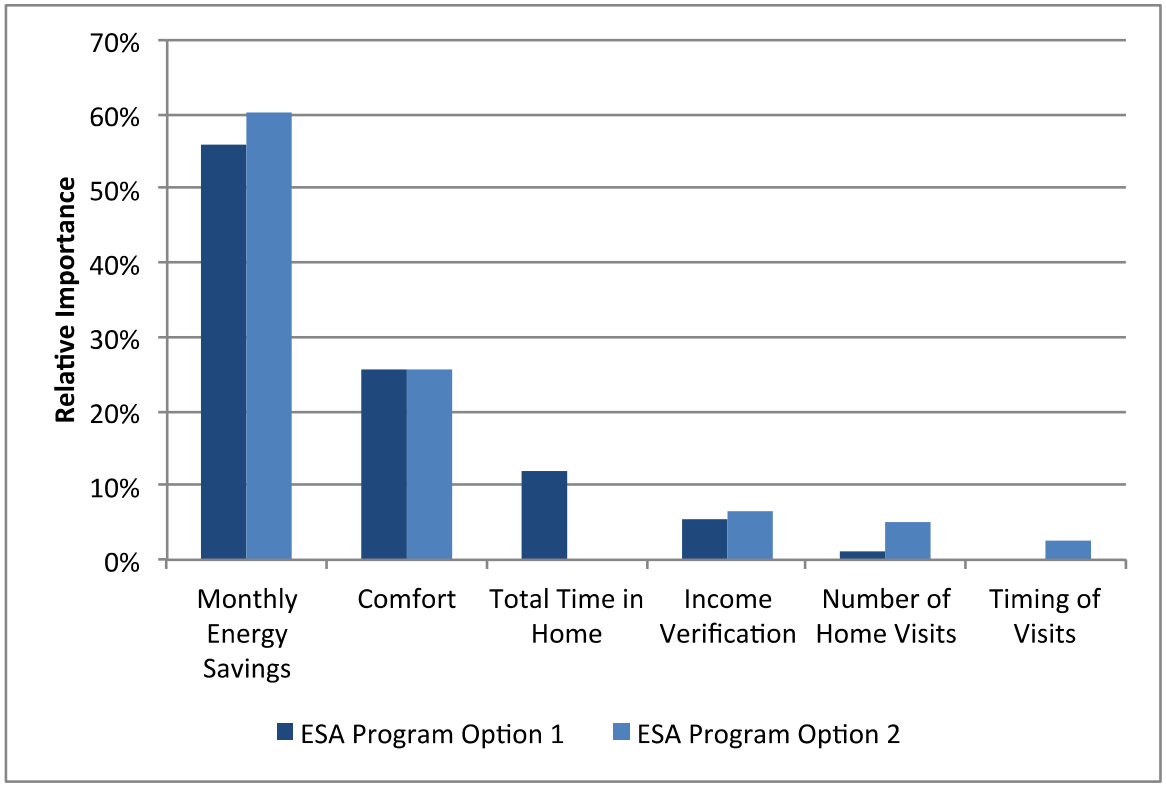
Table 478 below shows the results for the ESA program Option 2 participation model. In this model, the coefficients should be interpreted as contributing to the overall probability of the customer participating in the ESA program. More so than the rank model, the sign and magnitude of the coefficient estimates on all variables are as expected. The coefficient on Income Verification and Timing of Home Visits are not statistically significant—meaning they are not statistically different from zero—so no inference about these variables effect on the likelihood on participation can be made from this model.

Table 478: Conjoint Results – ESA Program Option 2 – Participation Model

Attribute	Estimate	Standard Error	Significance
Monthly Energy Savings	0.02984359	0.00509824	< 1%
Number of Home Visits	-0.47088404	0.08558553	< 1%
Income Verification	-0.11586613	0.2054695	57%
Comfort	0.82316006	0.20553007	< 1%
Timing of Home Visits	-0.27037356	0.21180599	20%

Figure 1 below shows a chart of the relative importance statistics that were reported above. It is apparent that monthly energy savings and comfort are the most important factor to customers.

Figure 1: Relative Importance of Attributes



9.3.1 ESA Program Option Participation Probabilities

Once the above models for ESA Program Option 1 and Option 2 participation decisions were estimated, the probability of participation was calculated by combining the coefficient estimates with attribute levels for different scenarios. These probabilities were calculated such that participation was minimized and maximized representing an ESA program that is least and most likely to evoke participation. Additionally, the analysis included a scenario that matched the current ESA program features as closely as possible. The three scenarios had the following characteristics for ESA Program Option 1:

- "Worst" Participation Scenario
  - Monthly Energy Savings: $0
  - Number of Home Visits: 3
  - Income Verification: Documentation Required
  - Comfort: No Change
  - Total Time in Home: 4 hours

- "Best" Participation Scenario
    - Monthly Energy Savings: $50
    - Number of Home Visits: 1
    - Income Verification: None
    - Comfort: Improvement
    - Total Time in Home: 1 hour
- Current Program Design Participation Scenario
    - Monthly Energy Savings: $10
    - Number of Home Visits: 1
    - Income Verification: Documentation Required
    - Comfort: Improvement
    - Total Time in Home: 1 hour

Likewise for ESA Program Option 2:

- "Worst" Participation Scenario
    - Monthly Energy Savings: $0
    - Number of Home Visits: 3
    - Income Verification: Documentation Required
    - Comfort: No Change
    - Timing of Home Visits: Evenings/Weekends Only
- "Best" Participation Scenario
    - Monthly Energy Savings: $50
    - Number of Home Visits: 1
    - Income Verification: None
    - Comfort: Improvement
    - Timing of Home Visits: Days Only
- Current Program Design Participation Scenario
    - Monthly Energy Savings: $10
    - Number of Home Visits: 1
    - Income Verification: Documentation Required
    - Comfort: Improvement
    - Total Time in Home: 1 hour

Table 479 below shows the participation scenarios for ESA Program Option 1 and the participation probability for each scenario. The first row reflects that the likelihood of participation is approximately 10 percent, meaning that 10 percent of those surveyed would be willing to participate in a program with attributes corresponding to those included in the same row. The purchase probability for the "best" participation scenario is 90 percent, and the purchase probability for the reasonable program design is 62 percent.

Table 479: ESA Program Option 1 Participation Probabilities

Participation Scenario	Attribute Values	Purchase Probability
"Worst"	Energy Savings: $0 Number of Visits: 3 Verification: Documentation Req. Comfort: No Change Time in Home: 4 hours	0.104
"Best"	Energy Savings: $50 Number of Visits: 1 Verification: None Comfort: Improvement Time in Home: 1 hour	0.900
Current Program Design	Energy Savings: $10 Number of Visits: 1 Verification: Documentation Req. Comfort: Improvement Time in Home: 1 hour	0.616

Using the probabilities above for the three program scenarios and assuming a linear trend, we were able to calculate the monthly bill savings amount that is equivalent to:

1) Increasing the number of home visits by one.
2) Requiring income verification documentation.
3) Participants experiencing no change in comfort versus a significant change in comfort.
4) Increasing the duration of home visits by one hour.

As exhibited in Figure 2, participants must realize an additional $8 in monthly bill savings if the program requires one additional home visit and the same level of program participation is to be maintained. Similarly, a program with no change in comfort versus one in which a significant improvement in comfort is experienced is equivalent to an additional $28 in monthly bill savings. In other words, if there were no improvement in comfort, customers would need an additional $28 a month in bill savings in order to maintain the same levels of participation. Given the higher amount in bill savings equivalence, it is apparent that improvements in comfort are more important to customers than other factors (except savings) when determining program participation.

Figure 2: Equivalent Monthly Bill Savings Amounts – ESA Program Option 1

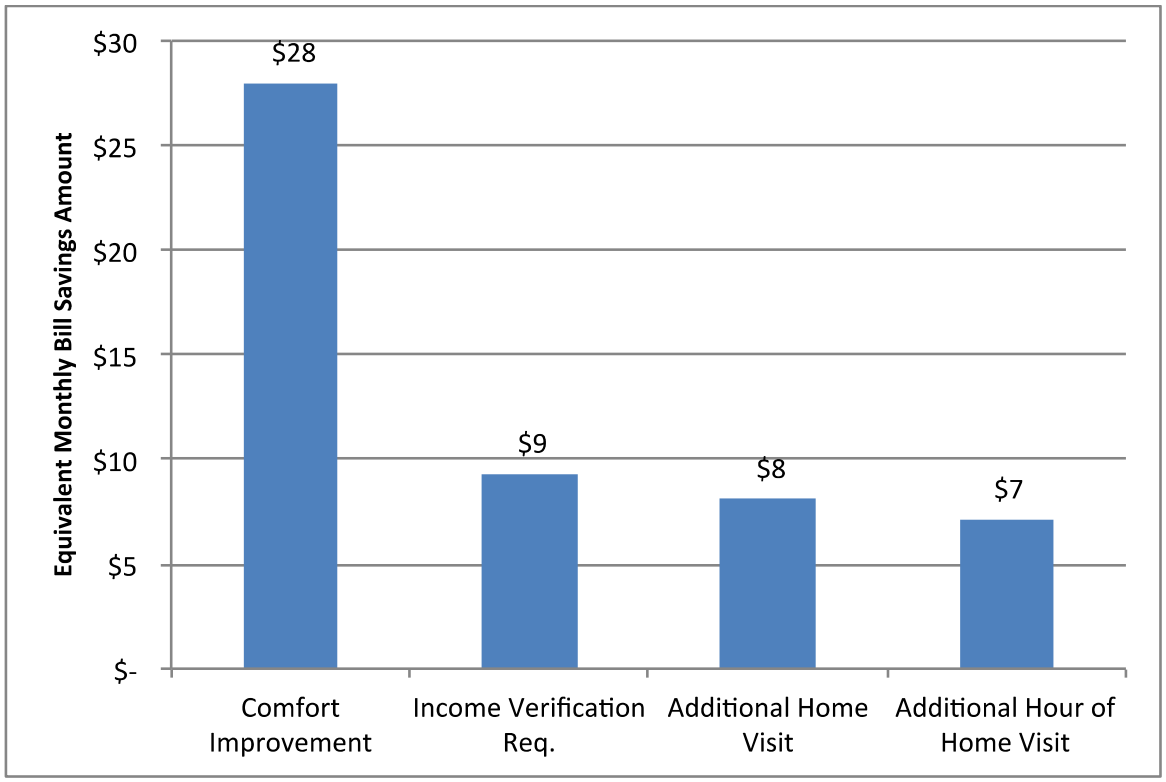


Table 480 below shows the participation scenarios for ESA Program Option 2 and the participation probability for each scenario. The first row reflects that the likelihood of participation is approximately 14 percent, meaning that 14 percent of those surveyed would be willing to participate in a program with attributes corresponding to those included in the same row. The purchase probability for the "best" participation scenario is 86 percent, and the purchase probability for the current program design is 63 percent. It is important to note that the probability values themselves are only hypothetical, because they are based on hypothetical program scenarios, but the relative magnitude of probabilities between different scenarios do reflect real customer preferences.

Table 480: ESA Program Option 2 Participation Probabilities

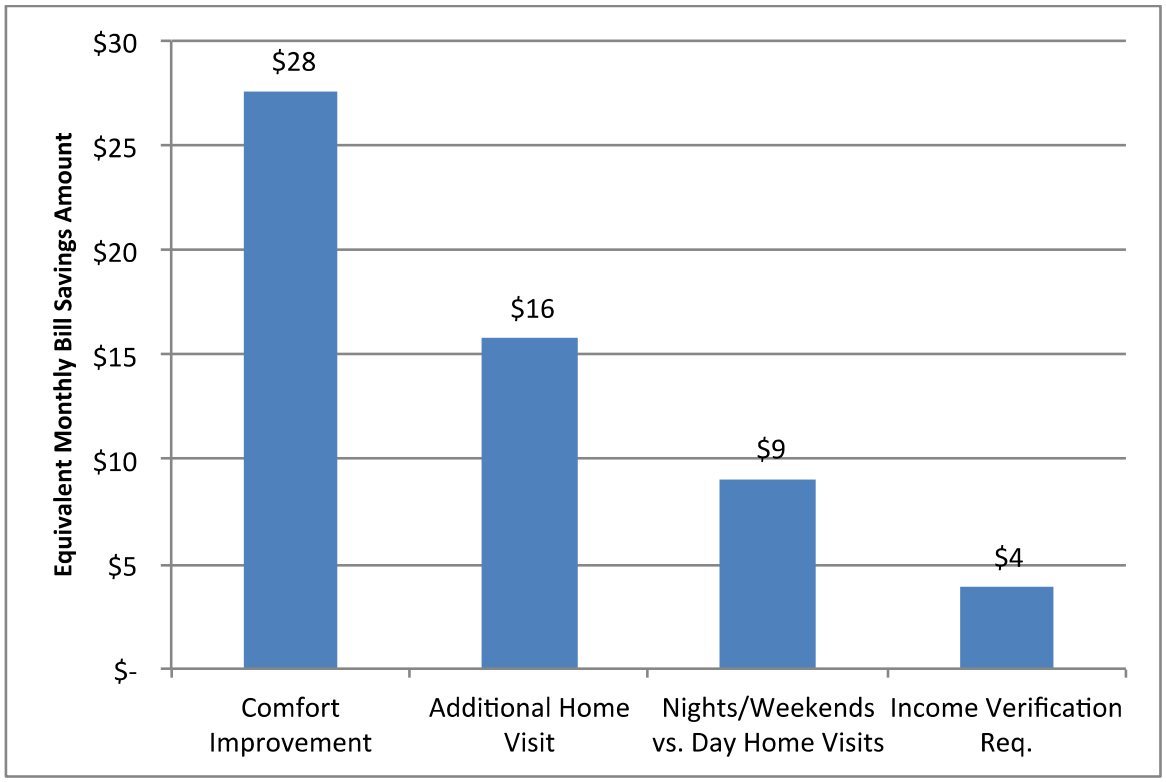
Participation Scenario	Attribute Values	Purchase Probability
"Worst"	Energy Savings: $0 Number of Visits: 3 Verification: Documentation Req. Comfort: No Change Timing: Nights/Weekends Only	0.142
"Best"	Energy Savings: $50 Number of Visits: 1 Verification: None Comfort: Improvement Timing: Days Only	0.863
Current Program Design	Energy Savings: $10 Number of Visits: 1 Verification: Documentation Req. Comfort: Improvement Timing: Days Only	0.631

As above, we were able to calculate the monthly bill savings amount that is equivalent to:

1) Increasing the number of home visits by one.
2) Requiring income verification documentation.
3) Participants experiencing no change in comfort versus a significant change in comfort.
4) Having home visits on nights/weekends versus days only.

As shown in Figure 3, participants must realize an additional $32 in monthly bill savings (or $16 per visit) if the program requires three home visits instead of one and the same level of program participation is to be maintained. Moreover, a program with no change in comfort versus one in which a significant improvement in comfort is experienced is equivalent to $28 in monthly bill savings. As in the ESA Program Option 1 scenarios, changes in comfort are much more valuable to customers than any other factor when determining program participation.

Figure 3: Equivalent Monthly Bill Savings Amounts – ESA Program Option 1



10 In-Home Interview Detail

While our aim in conducting in-home visits was to provide actionable insights about households that are eligible for ESA but not currently participating, we would be remiss if we didn't first paint a picture of the range of households we visited and the diversity of situations in which they find themselves. We do not seek to replicate past characterization studies that cover this topic more fully, but are simply striving to provide context for the reader that we think is helpful in thinking about how the program interacts with its target population.

Perhaps one of the most important items to consider when thinking about eligible non-participants is that this population is not *one* group that ESA will seek to reach in upcoming years, but a collection of a great variety of individuals, households, housing situations, needs, circumstances, and approaches to dealing with life. The households we visited all have their own individual stories that defy stereotypes and simple classification. Before discussing the more applied aspects of our in-home research, we seek to describe this diversity by briefly presenting their characteristics and describing the stories of a few of them in more detail for illustrative purposes.

10.1.1 Household Types

We encountered a variety of household types comprising combinations of adults and children. Table 481 summarizes these household types.

Table 481: Types of Households

Household Type	Number
Adults with child(ren)	30
Single parent with child(ren)	8
Senior(s)-only	15
Adult(s) without children	16
Multiple generations –adults only	11
Multiple adult generations—with child(ren)	8

The ages of our primary interviewees ranged from about 25 to 90. Young adults, middle-aged adults, and seniors were all well-represented among eligible non-participants, as shown in Table 482.

Table 482: Age of Primary Interviewee

Age Category	Number
Young adult (<40)	17
Middle-aged adult (40-64)	45
Senior (65+)	26

10.1.2 Major Energy-Using Equipment

As part of our visit, we conducted a walk-through to assess energy-using equipment and identify the degree to which measure opportunities appear to exist among eligible non-participants. These data allow us to characterize the major energy-using systems in the home.

As shown in Table 483, the large majority of homes are heated with natural gas, either a stand-alone, central forced-air furnace (57%) and wall furnace (17%) or a package unit that combines a gas, forced air furnace and a central AC unit (11%). We encountered only three high-efficiency, condensing furnaces among the sampled homes. Nearly a third of the households reported using some form of supplementary heating, mostly electric space heaters and fireplaces.

Half of the interview sample has central air conditioning, and about a quarter has one or more room or sleeve AC units. Evaporative coolers were uncommon in the study sample. About a quarter of the sample had no air conditioning or evaporative coolers: these were nearly all in coastal areas (Climate Zones, 3, 6, 7 and 8) where a mix of homes with and without air conditioning equipment was encountered.

The large majority of homes in the sample have a conventional, gas-fired water heater. These are fairly evenly divided among units located inside, outside and in garages.

Delivered hot-water temperature at the kitchen sink ranged from 107F to 156F, with an average of 127F. About one in five homes (21%) had a measured hot-water temperature that exceeded 135F (Figure 4). The Department of Energy recommends temperature settings of 120F to save on heating energy.

Measured flow for the primary showerhead in the home ranged from less than 1 gpm to more than 5 gpm, with an average of 1.98 gpm. About one in ten homes (12%) had a showerhead with a flow rate that exceeded 2.5 gpm, which is the current federal standard for new showerheads (Figure 5).

Most of the homes in the sample had a primary refrigerator that was manufactured after 2000 (Figure 6). Only about 6 percent of homes had a refrigerator that dated to earlier than 1992.

Table 483: Selected Heating, Cooling and Water Heating Characteristics (based on 88 in-home visits)

Primary heating system	*Type*	Forced-air furnace	57%
		Wall furnace	17%
		Package furnace/AC unit	11%
		Electric	8%
		Fireplace/Stove	3%
		Multifamily central heat	1%
		Unable to determine	2%
	Fuel	Natural gas	83%
		Electricity	8%
		Propane	3%
		Wood	2%
		Unable to determine	3%
	High efficiency? (for furnaces, wall furnaces and package units)	Yes	4%
		No	82%
		Unable to determine	14%
	Functional?	Yes	90%
		No	7%
		Unable to determine	3%
Supplemental heat	*Used?*	Yes	30%
		No	69%
		Unable to determine	1%
	Type (if used) (multiple sources may be present)	Electric space heater(s)	65%
		Fireplace	46%
		Oven/range	12%
Cooling system	*Type* (multiple types may be present)	Central AC	49%
		Room/sleeve AC	23%
		Central evaporative cooler	3%
		Room evaporative cooler	3%
		None	25%
		Unable to determine	1%
Water heater	*Type*	Tank	83%
		Tankless	3%
		Multifamily central	9%
		Unable to determine	5%
	Fuel (for non-central systems)	Natural Gas	85%
		Electricity	5%
		Propane	6%
		Unable to determine	4%
	Location (for non-central systems)	Indoors	35%
		Outdoors (or in exterior closet)	34%
		Garage	28%
		Unable to determine	4%

Figure 4: Measured Hot Water Temperature at Kitchen Sink

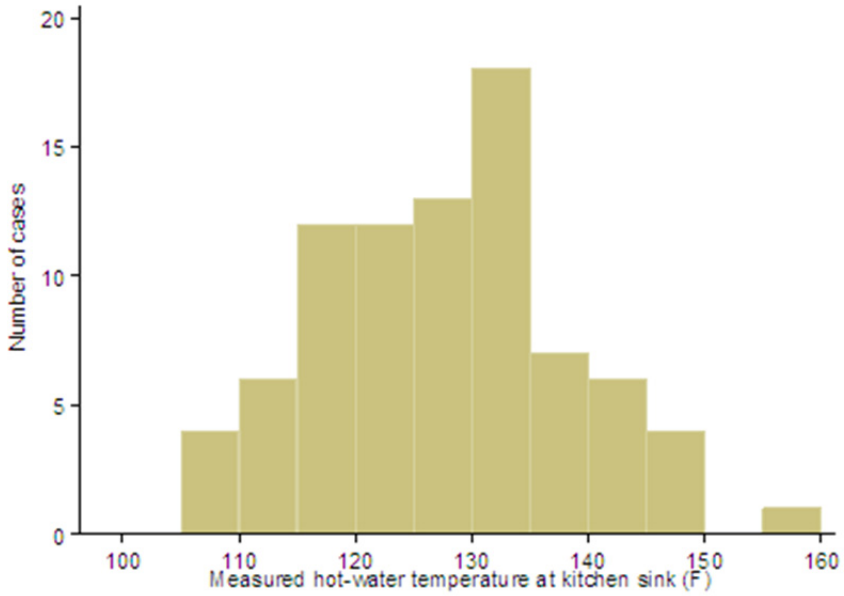


Figure 5: Measured Showerhead Flow

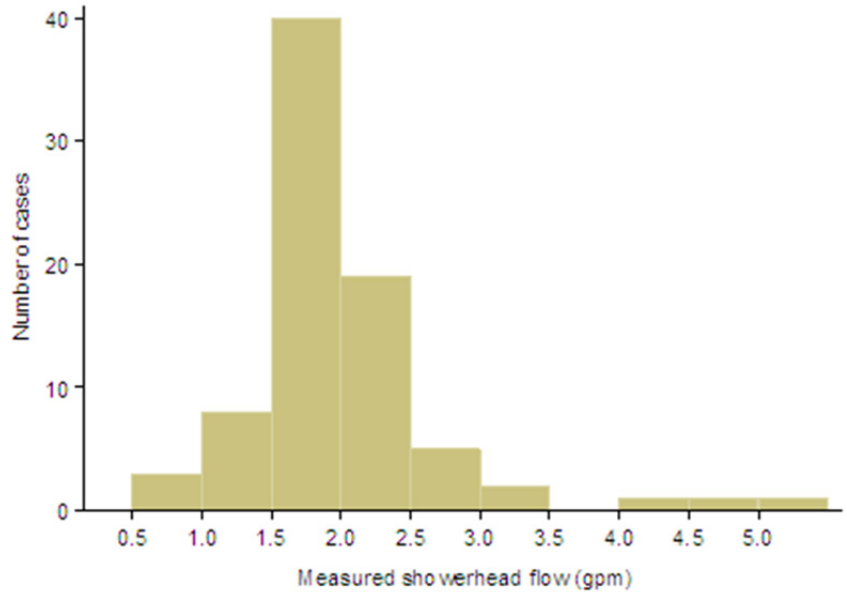
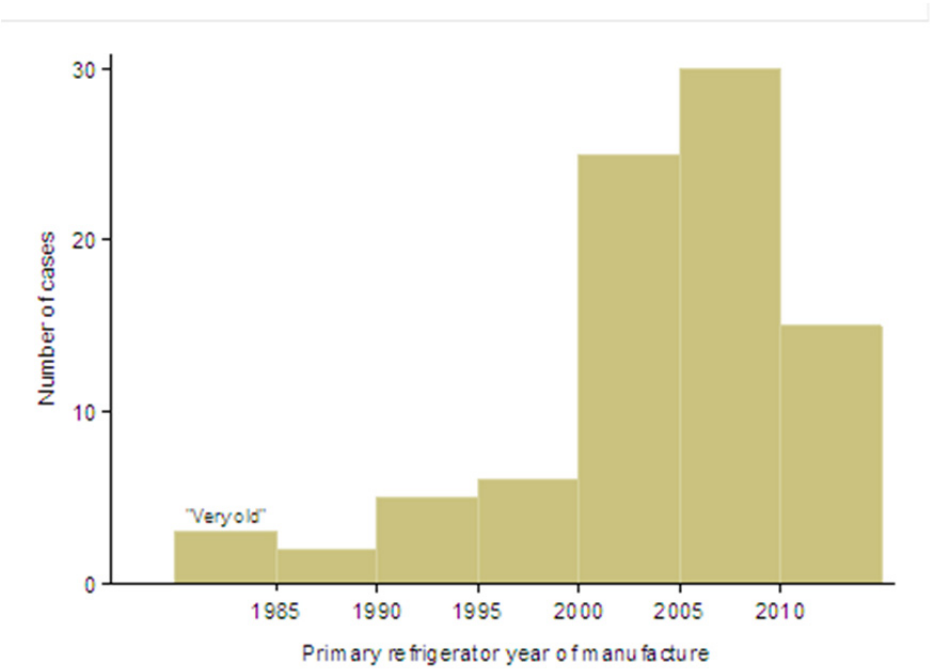


Figure 6: Primary Refrigerator Age



10.1.3 Selected Illustrative Profiles

We have included below the stories we heard from a few of the households we visited. These profiles are qualitative descriptions of the range of circumstances we encountered. We have changed people's names and described their locations only very generally to protect the privacy of the households we are describing.

Illustrative Example: "Janet" – a frugal energy miser
Janet is an 80-year-old retired widow who lives in an apartment in a coastal (temperate) climate zone. She lives on a fixed income that qualifies her for CARE and ESA, but seems to be getting by just fine. She declined the $100 Visa gift card we were offering for the in-home visits because she does not use credit cards and did not think she needed the funds. She is a low energy user, choosing to spend her time reading and engaging in social activities at her church. She has very few energy-using devices. Her average monthly energy bills are about $30 for electricity and natural gas combined. While there are technical opportunities in her home—replacing incandescent light bulbs and repairing a window that does not close tightly—the savings would probably be minimal. She would decline participation because she knows her usage is low and doesn't think she needs the help.

Illustrative Example: "Jim" – a self-sufficiency-minded high user
Jim and his wife are raising four minor children in a large home they had built in the foothills of the Sierra Nevada before Jim suffered a neck injury. He believes in living a self-sufficient lifestyle and in neighbors helping neighbors and has mixed feelings about social programs. He is on the CARE rate, but only because his IOU contacted him to offer it. He would generally not seek out assistance on his own. The home is highly efficient in most respects, and Jim is very well-informed about energy efficiency, having done much to make his home efficient. He has converted to LED lights, verified wall insulation with an infrared camera, and ensured that doors and windows were tight-fitting. The only remaining efficiency needs according to Jim are completing a switch to double-paned windows, which he can't afford, and fixing insulation underneath the house that he says is falling apart. Nevertheless, Jim is a high energy user whose electric bills average around $200 per month, at least in part due to a well pump that he operates to irrigate food he grows and hydrate vegetation on his sizable property to mitigate against perennial fire danger. Comfort is a substantial issue at times. Jim heats with wood that he manages to collect and buy. A few years ago, he was only able to acquire half the wood he would have needed and said the house dropped to freezing temperatures on occasions. Conversely, during the summer, the evaporative coolers stop cooling effectively once the temperature surpasses 100 degrees Fahrenheit. He says the family leaves the house at those times and spends time at the local creek or in air-conditioned spaces.

Illustrative Example: "Fred" – grateful participant who can't use all the measures
Fred and his wife have lived in the same 800 square foot house in a pleasant and very temperate ocean-side neighborhood for multiple decades. They are around retirement age, and Fred has stopped working after suffering an accident that left him with a disability. They have custody of three grandchildren, and an adult son lives with them too while he is finishing his education. The large family size makes them a moderate energy user with combined monthly bills of around $80, and the large number of dependents qualifies them for LI programs. They appear to have participated in ESA recently after their IOU called them to offer the CARE rate and efficiency improvements. They are grateful for the measures they received, but are benefitting from only some of them. They received a new showerhead and refrigerator, which they are using although its size is a bit small for a household of six people. They also received a new "more efficient" microwave to supplement the one they still have, making their kitchen space tighter. And they

received two standing lamps with CFLs, but they have only been able to find room for one in their tight quarters. They do still have one leaky door that leaves them with drafts in the "cold season," but they are careful not to complain since they think they live in "paradise" and don't really experience any comfort issues.

Illustrative Example: "Sharon" – highly stressed "shut-in"

Sharon is a 70-year-old widow who moved to a small in-land town after her husband died to be closer to her daughter, but was surprised to find herself having very little contact with her daughter. She lives in a rented unit in a triplex and has modest energy bills that she struggles to pay on her fixed income. Other than her television set, which she runs for companionship, she tries to use energy very sparingly to save money, compromising on comfort.

Energy is only part of her struggles, however. We observed that her refrigerator was nearly completely empty, for example, probably as a result of lack of funds and lack of mobility. (She does not drive and has some medical issues that make it difficult to board the bus or walk to the grocery store.)

Even small levels of assistance would go a long way toward improving Sharon's quality of life. A IOU contractor had already visited her about ESA three months before our in-home visit, and she was waiting for the contractor to return to install measures. Obvious opportunities included a substantial gap around one exterior door, an old refrigerator, and CFLs. (It should be noted, however, that Sharon does not think she can afford CFLs on her own, so she would be likely to return to incandescent light bulbs once CFLs burn out.)

Illustrative Example: "Ed" – immigrant family

Ed is an employed man in his mid-twenties who lives with his wife, two other unrelated adults and three young children (two of which are his children) in a small two bedroom rented apartment that is in a state of disrepair. They have two small room A/C units and a wall heater that they do not use because it's old and they don't trust it. They described comfort issues in the winter during the coldest times of year. The building management does not respond well to request for updates and upkeep of the apartment.

While there are three working adults in the household, money is continually tight. A few times throughout the year they have to defer payment on their energy bills, although they have never had their energy cut off. They do not know of ways to reduce their energy usage but would be open to anything that could help them save

money and improve their comfort in their home, including participating in ESA as long as they can schedule a time for a program visit when someone can be home. They have a secondary refrigerator, but it is full and does not seem to be needlessly running. There are many air sealing opportunities, including broken windows and door gaps large enough to allow a lizard in the house.

11 LI Program Review Detail

11.1 Results Table

Name	Relationship to federal WAP	Statewide ratepayer-funded EE budget (2010 LIHEAP Clearinghouse)	Income eligibility limit ($ shown is for 4-person hhld)	Target high usage hhld's	Criteria for high usage screening	Enrollment Process	Income docs/proof of other LI qualification required?	Renters: landlord approval required
PECO LIURP Program	Separate from WAP	$29,881,000	200% of FPL ($47,100)	Yes	If on CAP rate: >500 kWH, Non CAP rate electric heating: 1400 kWH. Gas: >50CCF	Referred through the Customer Assistance Program (utility rate discount program)	Yes, at time of audit	Yes
MA Weather-ization Assistance Program	Is WAP	$29,860,000	60% of state median income ($60,137)	Yes	If the client receives a LIHEAP high energy benefit (highest 30% of LIHEAP population)	Call/visit weatherization agency	Need to be on the LIHEAP program	Yes
NYSERDA Empower	Both separate and complementary from WAP, because offer some EE measures that WAP does not.	$27,708,000	60% of the state median income ($49,333)	No	N/A	Application process, referrals through private contractors, LI agencies or WAP	Verification by a utility, human service organization or other approved entity. Only requested if not already verified.	No

Name	Relationship to federal WAP	Statewide ratepayer-funded EE budget (2010 LIHEAP Clearinghouse)	Income eligibility limit ($ shown is for 4-person hhld)	Target high usage hhld's	Criteria for high usage screening	Enrollment Process	Income docs/proof of other LI qualification required?	Renters: landlord approval required
New Jersey Comfort Partners	Separate from WAP	$35,300,000	225% of FPL ($52,988)	Yes	< 600 therms, baseload measures only 600-1000: one EE measure >1000: more than 1 EE measure	Referred through the Universal Service Fund (percent of income program)	Yes, income verification may be requested	Yes
Wisconsin WAP	Is WAP	$5,500,000	60% of state median income ($46,697)	Yes	Outreach prioritized to hhld's with highest energy burden	Referred by LIHEAP program or call/visit weatherization agency		
Ohio Energy Partnership Program (EPP)	Complementary to WAP, as they offer electric measures which WAP does not.	$11,900,000	150% of FPL ($35,325)	Yes	5000 kWh annually or above.	Referred through the Percent of Income Program (PIPP)	Verification required for PIPP	
CA Energy Savings Assistance Program	Separate from WAP	$231,732,000	200% of FPL ($47,100)	No	N/A	Online and telephone enrollment. Wide range of outreach.	Yes	

(Table is continued)

Name	Eligible Measures (programmatic level)	Delivery models	Req's to implement measures?	Year prgm began	# homes treated in 2012 (# since inception)	Level of participation of MF or renters	Total # eligible households
PECO LIURP Program	Comprehensive (both Wx and electric)	For-profit vendor implements the audits and measures	Cost effective calculation aren't performed during audit	1992	9,100 (98,000)		
MA Weather-ization Assistance Program	Focus on heating measures, if natural gas or oil-heated	Community action coalitions (CAC) implement the audits and measures	Savings to Investment Ratio >=1.0	1978	1,841 (130,000)	Few; state utilities fund separate LI-MF program administered by WAP network.	~180,000
NYSERDA Empower	Comprehensive (both Wx and electric)	Program is implemented by state-wide subcontractors and overseen by Honeywell.		2004	13,000 (79,000)	14% MF HH's. Renter percent unknown; likely higher amount than MF	
New Jersey Comfort Partners	Comprehensive (both Wx and electric)	Consortium of utilities that each work with a set of contractors	Follow BPI Wx protocol, do not use SIR ratio. Health and safety upgrades a priority	2001	7,897 (82,693)	Low MF. Only MF up to 12 units are eligible.	

Name	Eligible Measures (programmatic level)	Delivery models	Req's to implement measures?	Year prgm began	# homes treated in 2012 (# since inception)	Level of participation of MF or renters	Total # eligible households
Wisconsin WAP	Comprehensive (both Wx and electric)	CAC's implement the audits & measures	SIR Ratio >=1.0, plus health and safety upgrades	1976	7,472 in 2013 (~102,000 since mid-1990's)	30% MF units, 39% of units were renters	
Ohio Energy Partnership Program (EPP)	Electric baseload	CAC's implement the audits & measures	SIR Ratio >=1.0	2001	14,155 (140,000)	Very few MF or renters	108,288 (as of July 2013)
CA Energy Savings Assistance Program	Comprehensive (both Wx and electric)	Contractor implementation, but varies by utility.					

12 Study Methods Detail

12.1 Telephone Survey Detailed Methods

This subsection provides additional detail on the telephone survey sampling (the frame of which was also used for the ESA modeling), weights and call disposition.

12.1.1 Sample Frame

The IOUs provided us with CARE and ESA data that we used to construct the sample frame for the telephone survey and the ESA modeling dataset:

- CARE: we received the full CARE population from PG&E, SCE and SDG&E and a 20 percent sample of CARE customers (customers enrolled on CARE anytime during the period 2010-2012) from SoCalGas;
- ESA: we received the population of premises that have had ESA treatment since 2002.

We combined the ESA and CARE data to determine which households from the CARE data had been treated by ESA. We combined the data and attempted to match premises within IOU and then across IOUs where there is overlap. We conducted the matching and developed the sample frame based on several stages of sampling.

First, we pulled a sample of 10 percent of census blocks that have IOU service territory in the state. Next, we pulled a sample of 20 percent of CARE customers for PG&E and SCE (excluding SoCalGas, which had only provided a 20 percent sample, and SDG&E, whose population is about 20 percent of the other IOUs.)

We then conducted matching of CARE and ESA customer data within census blocks. We used the premise identification number to match CARE and ESA data for a single IOU. We used address matching to match across IOUs, screening out from the ESA Non-Participant sample frame any households that were a likely match.

Finally, we pulled a sample of 20 percent of ESA recent and prior participants for PG&E, SCE and SoCalGas (we kept all of SDG&E's due to their smaller relative number of customers).

Table 484 below shows the CARE and ESA population by IOU and Table 485 the telephone survey and the ESA modeling dataset.

Table 484: ESA and CARE Population by IOU

	CARE Participants	ESA Recent Participants	ESA Prior Participants	ESA Non-Participants
PG&E	30,654	7,439	7,439	15,776
SCE	28,751	4,284	4,284	20,183
SoCalGas only	7,690	1788	1788	4113
SDG&E	30,860	6,448	6,448	17,963
Total	97,954	19,595	19,959	58,035

Source: IOU LI program tracking and billing data.

Table 485: Telephone Survey Sample Frame and ESA Modeling Dataset

	CARE Participants	ESA Recent Participants	ESA Prior Participants	ESA Non-Participants
PG&E	30,654	7,439	7,439	15,776
SCE	28,751	4,284	4,284	20,183
SoCalGas only	7,690	1788	1788	4113
SDG&E	30,860	6,448	6,448	17,963
Total	97,954	19,595	19,959	58,035

Source: IOU LI program tracking and billing data.

For the CARE modeling, we used the population (all) of census block groups based on the Athens Research data. For the second stage ESA modeling, we used the telephone survey completes, shown in Section 2.5.

12.1.2 Call Disposition

Table 486 shows the disposition of calls for the phone survey. 70 percent of non-participants agreed to be recruited for the in-home visits.

Table 486: Telephone Survey Disposition of Calls

Quota	Level	Recent Participant (2010-Present)				Prior Participant (2002-2010)				Nonparticipant or Early Participant (> 2002)			
	IOU	PG&E	SCE	SDG&E	SoCalGas Only	PG&E	SCE	SDG&E	SoCalGas Only	PG&E	SCE	SDG&E	SoCalGas Only
SCG Flag	SCG Customers	0	111	0	14	0	115	0	14	0	157	0	17
Meter Type	Master Metered	0	0	0	0	0	0	0	0	0	0	0	0
	Submetered	0	0	0	0	0	0	0	0	0	0	0	0
	Unknown Meter	111	111	61	14	114	117	59	14	156	159	79	17
Home Type	Single Family	79	83	28	9	66	89	17	6	96	94	38	8
	Multifamily	35	35	35	5	43	31	50	10	64	84	52	14
	Mobile home	4	6	4	0	10	4	1	0	3	4	4	0
	Other	3	1	1	1	2	1	2	0	6	3	0	0
Ownership	Own	69	74	31	9	64	77	15	6	77	80	42	9
	Rent	37	36	30	4	46	34	44	8	76	78	36	8
	Other	5	1	0	1	4	6	0	0	3	1	1	0
Urban	Rural	11	1	0	0	10	2	0	0	17	6	2	0
	Urban	100	110	61	14	103	115	59	14	139	153	77	17
Geography	Inland	94	74	26	9	73	88	12	11	113	106	25	11
	Coastal	17	37	35	5	41	29	47	3	43	53	54	6
Climate Zone	Climate Zone 1	5	0	0	0	5	0	0	0	6	0	0	0
	Climate Zone 2	11	0	0	0	5	0	0	0	5	0	0	0
	Climate Zone 3	12	0	0	0	36	0	0	0	37	0	0	0
	Climate Zone 4	10	0	0	0	10	0	0	0	10	0	0	0
	Climate Zone 5	0	0	0	0	0	0	0	0	0	0	0	0
	Climate Zone 6	0	6	0	0	0	3	0	0	0	9	0	0
	Climate Zone 7	0	0	35	0	0	0	47	0	0	0	54	0
	Climate Zone 8	0	31	0	5	0	26	0	3	0	44	0	6
	Climate Zone 9	0	20	0	8	0	28	0	8	0	40	0	8
	Climate Zone 10	0	27	24	1	0	29	12	2	0	26	23	3

Quota	Level	Recent Participant (2010-Present)				Prior Participant (2002-2010)				Nonparticipant or Early Participant (> 2002)			
	IOU	PG&E	SCE	SDG&E	SoCalGas Only	PG&E	SCE	SDG&E	SoCalGas Only	PG&E	SCE	SDG&E	SoCalGas Only
	Climate Zone 11	13	0	0	0	15	0	0	0	18	0	0	0
	Climate Zone 12	49	0	0	0	27	0	0	0	55	0	0	0
	Climate Zone 13	9	11	0	0	10	13	0	0	18	10	0	0
	Climate Zone 14	0	7	2	0	0	12	0	0	0	17	2	0
	Climate Zone 15	0	7	0	0	0	4	0	1	0	8	0	0
	Climate Zone 16	2	2	0	0	6	2	0	0	7	5	0	0

*Multifamily is defined as: Duplex/Triplex/Quadplex, Apartment, Resort cottage or cabin, Townhouse or condominium, Co-op/Retirement Community
Source: Tetra Tech

(Table is continued)

Quota	Level	Overall			
	IOU	PG&E	SCE	SDG&E	SoCalGas Only
SCG Flag	SCG Customers	0	383	0	45
Meter Type	Master Metered	0	0	0	0
	Submetered	0	0	0	0
	Unknown Meter	381	387	199	45
Home Type	Single Family	241	266	83	23
	Multifamily	142	150	137	29
	Mobile home	17	14	9	0
	Other	11	5	3	1
Ownership	Own	210	231	88	24
	Rent	159	148	110	20
	Other	12	8	1	1
Urban	Rural	38	9	2	0
	Urban	342	378	197	45
Geography	Inland	280	268	63	31
	Coastal	101	119	136	14
Climate Zone	Climate Zone 1	16	0	0	0
	Climate Zone 2	21	0	0	0
	Climate Zone 3	85	0	0	0
	Climate Zone 4	30	0	0	0
	Climate Zone 5	0	0	0	0
	Climate Zone 6	0	18	0	0
	Climate Zone 7	0	0	136	0
	Climate Zone 8	0	101	0	14
	Climate Zone 9	0	88	0	24
	Climate Zone 10	0	82	59	6
	Climate Zone 11	46	0	0	0

Quota	Level	Overall			
	IOU	PG&E	SCE	SDG&E	SoCalGas Only
	Climate Zone 12	131	0	0	0
	Climate Zone 13	37	34	0	0
	Climate Zone 14	0	36	4	0
	Climate Zone 15	0	19	0	1
	Climate Zone 16	15	9	0	0

*Multifamily is defined as: Duplex/Triplex/Quadplex, Apartment, Resort cottage or cabin, Townhouse or condominium, Co-op/Retirement Community
Source: Tetra Tech

Table 487 isolates the disposition categories that may be classified as "unreachable". The final row shows the percent of the total sample that was unreachable for the survey (52% of the total).

Table 487: Disposition Categories That May Be Classified as Unreachable

Level	Recent Participant (2010-2012)				Prior Participant (2002-2009)				Nonparticipant				Total
IOU	PG&E	SCE	SDG&E	SoCalGas	PG&E	SCE	SDG&E	SoCalGas	PGE	SCE	SDG&E	SoCalGas	
Total sample provided	**1113**	**1538**	**611**	**163**	**1024**	**1555**	**609**	**209**	**1556**	**2030**	**895**	**210**	11513
Not at number	204	632	128	48	203	573	126	59	375	856	186	46	3436
Fax/data line	4	19	4	0	11	20	3	2	12	33	11	2	121
Business number	5	21	2	5	3	24	3	5	5	51	5	2	131
Ineligible - Incorrect Address or Utility Information	11	23	5	4	7	14	6	1	16	66	9	3	165
Hard Refusal	8	10	8	0	12	13	2	0	19	33	10	5	120
Soft Refusal	129	95	51	17	132	119	56	16	197	118	117	13	1060
Incompletes (partial interviews)	5	4	1	0	4	0	2	0	6	2	5	0	29
Unavailable for duration	6	12	3	3	8	15	5	0	10	12	8	2	84
Incapable/incoherent	10	10	3	0	12	17	6	2	18	20	13	1	112
Language barrier - Other	22	27	18	3	42	30	33	5	50	44	19	13	306
Called out	1	1	1	0	0	0	1	0	0	445	0	0	449
Total not reachable	405	854	224	80	434	825	243	90	708	1680	383	87	6013
Percent not reachable	36%	56%	37%	49%	42%	53%	40%	43%	46%	83%	43%	41%	52%

Source: Tetra Tech

12.1.3 Weights

We constructed sample weights for the telephone survey based on the CARE enrollee population, the self-reported rates of ESA awareness we collected during the phone survey and using PUMs housing information on ownership/rental rates and home type,[20] Table 488 shows the rates of ESA awareness reported by ESA participation category and IOU. The population data was reallocated based on the percents shown in the table below.

Table 488: ESA Awareness Rates of Population by ESA Participation Category and IOU

IOU	Aware of ESA	Recent ESA Participants	Prior ESA Participants	Non-participants
PG&E	Yes	79%	62%	71%
	No	21%	38%	29%
SCE	Yes	79%	72%	55%
	No	21%	28%	45%
SoCalGas only	Yes	50%	62%	45%
	No	50%	38%	55%
SDG&E	Yes	81%	71%	66%
	No	19%	29%	34%

Source: Tetra Tech

[20] Multi-family homes are defined as any housing structure with two or more units. This differs from the 2007 KEMA study were multi-family homes are defined as housing structures with five or more units. This also differs from the concurrent Cadmus multi-family LI study, which also defines multi-family homes as housing structures with five or more units.

Table 489 presents the population data that was used for the sample weights after it was allocated (using PUMs data as described in section 8.1) to account for home type and ownership.

Table 489: Telephone Survey Population

IOU	ESA Participation	Home Type	Own	Rent	Other
PG&E	ESA Non-Participant	Multi-Family	9,279	240,621	2,835
		Single-Family/Mobile	224,656	165,452	17,674
	ESA Participant	Multi-Family	11,672	302,689	3,566
		Single-Family/Mobile	282,606	208,130	22,233
SCE	ESA Non-Participant	Multi-Family	15,601	323,452	2,922
		Single-Family/Mobile	236,070	175,306	14,466
	ESA Participant	Multi-Family	12,887	267,179	2,413
		Single-Family/Mobile	194,999	144,807	11,949
SoCalGas Only	ESA Non-Participant	Multi-Family	5,216	109,388	989
		Single-Family/Mobile	78,697	59,539	4,865
	ESA Participant	Multi-Family	4,129	86,589	783
		Single-Family/Mobile	62,295	47,130	3,851
SDG&E	ESA Non-Participant	Multi-Family	2,559	46,230	305
		Single-Family/Mobile	40,861	23,667	2,139
	ESA Participant	Multi-Family	4,285	77,413	510
		Single-Family/Mobile	68,424	39,631	3,582

Source: IOU CARE program tracking and billing data for population numbers; 2011 PUMS for % home type and own versus rent.

Table 490 presents the survey participant numbers that were used for creating weights.

Table 490: Telephone Survey Respondents

IOU	ESA Participation	Home Type	Own	Rent	Other
PG&E	ESA Non-Participant	Multi-Family	4	52	-
		Single-Family/Mobile	78	27	-
	ESA Participant	Multi-Family	11	54	-
		Single-Family/Mobile	128	30	5
SCE	ESA Non-Participant	Multi-Family	8	49	1
		Single-Family/Mobile	72	26	-
	ESA Participant	Multi-Family	9	37	-
		Single-Family/Mobile	149	31	2
SoCalGas Only	ESA Non-Participant	Multi-Family	2	7	-
		Single-Family/Mobile	7	4	-
	ESA Participant	Multi-Family	3	13	-
		Single-Family/Mobile	13	3	-
SDG&E	ESA Non-Participant	Multi-Family	8	31	-
		Single-Family/Mobile	35	7	-
	ESA Participant	Multi-Family	11	60	-
		Single-Family/Mobile	35	16	-

Source: Telephone survey data.

Table 491 presents the sample weights that we applied by strata by combining the data from the previous two tables.

Table 491: Telephone Survey Sample Weights

IOU	ESA Participation	Home Type	Own	Rent	Other
PG&E	ESA Non-Participant	Multi-Family	2,320	4,627	N/A
		Single-Family/Mobile	2,880	6,128	N/A
	ESA Participant	Multi-Family	1,061	5,605	N/A
		Single-Family/Mobile	2,208	6,938	11,885
SCE	ESA Non-Participant	Multi-Family	1,950	6,601	11,885
		Single-Family/Mobile	3,279	6,743	N/A
	ESA Participant	Multi-Family	1,432	7,221	N/A
		Single-Family/Mobile	1,309	4,671	11,885
SoCalGas Only	ESA Non-Participant	Multi-Family	2,608	15,627	N/A
		Single-Family/Mobile	11,242	14,885	N/A
	ESA Participant	Multi-Family	1,376	6,661	N/A
		Single-Family/Mobile	4,792	15,710	N/A
SDG&E	ESA Non-Participant	Multi-Family	320	1,491	N/A
		Single-Family/Mobile	1,167	3,381	N/A
	ESA Participant	Multi-Family	390	1,290	N/A
		Single-Family/Mobile	1,955	2,477	N/A

12.2 CARE Modeling Detailed Methods

Using regression analysis, we statistically analyzed the factors that affect the rate of CARE participation and penetration by block group. Regression analysis allows us to estimate the individual impacts that demographic, economic, and program characteristics have on the likelihood (probability) that a residential customer will participate in the CARE program. The dependent variable for both the Participation and Penetration models is the "log-odds ratio of CARE participation" (or more simply as the "log-odds").[21] It is instructive to both describe what the log-odds transformation is and why it was used for this study. We performed the same transformation for the same reason for both the CARE Participation and Penetration models, but we explain the how and why with respect to the CARE Participation model only.

To begin, the parameter of interest to us in the Participation model is the proportion of households in each block group enrolled in CARE, based on data provided by Athens Research.

[21] This method of regression is also referred to as logit-transformed linear regression.

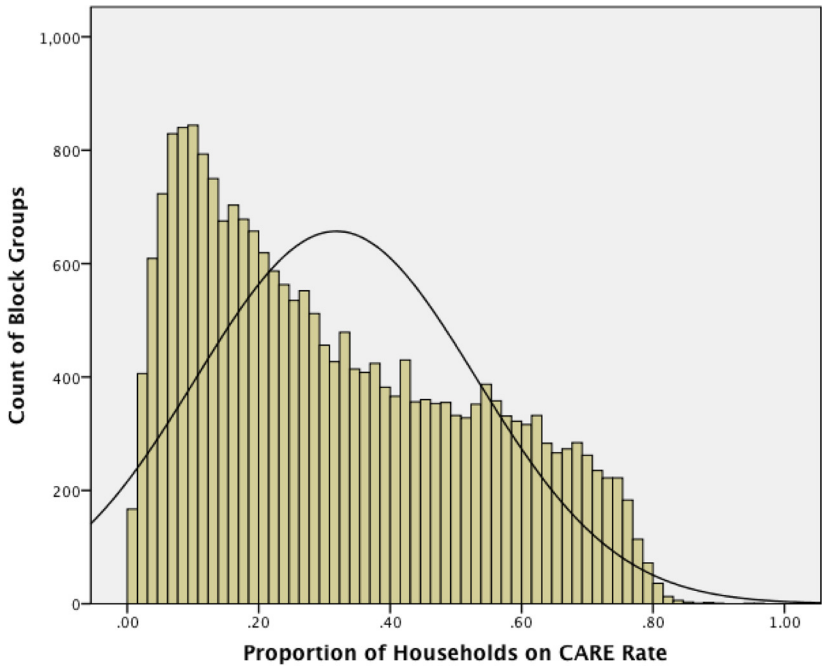
CARE Participation = Count of CARE Participants / Count of Residential Customers

Figure 7 shows the distribution of the proportion of households on the CARE rate in 2012 for the more than 20,000 block groups in California. As the figure shows, the proportion must range between zero (no household enrolled on the CARE rate) and 1.0 (all households enrolled on the CARE rate). In practice, the CARE proportion is unlikely to be at either extreme value, however, there are many block groups with a low (less than 10 percent) proportion of households on CARE.

The fact that the variable of interest is bounded by 0 and 1 can cause problems for estimating the linear regression model. Specifically, *predicted* values of the dependent variable (proportion enrolled in CARE) are nonsensical when they are less than 0 (i.e., less than 0 percent of households are enrolled in CARE) and greater than 1 (i.e., more than 100 percent of households are enrolled in CARE).[22] In fact, because there are many block groups with low rates of CARE participation (less than 20 percent), there will be many predicted values of CARE participation that will be less than 0 (percent). Even if the estimated values lying outside of the 0-to-1 range are assigned the values 0 and 1, it's not useful to consider prediction outcomes where no household within a block group is enrolled in CARE or all households within a block group are enrolled in CARE.

[22] In addition, the variance of the proportions gets smaller at zero and one resulting in estimation problems due to heteroskedasticity.

Figure 7: Proportion of Households on CARE Rate by Block Group



Source: Analysis by Evergreen Economics of Data from Athens Research.

A standard solution to the problem of a dependent variable that is a proportion (and therefore bounded by 0 and 1) is to transform the variable to the real line.[23] To do this, we first compute the odds ratio (the "odds") of the proportion on CARE, which is simply the ratio of the proportion over 1 – the proportion:

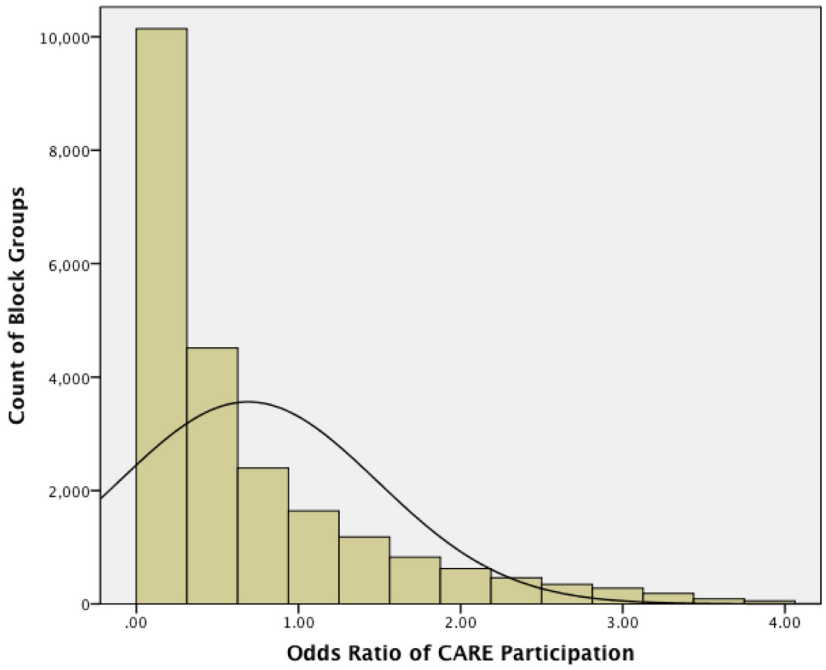
$$Odds\ of\ CARE\ Participation = \frac{p}{(1-p)} = \frac{Proportion\ of\ Households\ on\ CARE}{Proportion\ of\ Households\ Not\ on\ CARE}$$

In this instance, the odds represents the probability that a household is on a CARE rate to the probability that a household is not on a CARE rate. If the proportion of households in a block group on a CARE rate is 75 percent, then the odds that a randomly drawn household from that block group is on a CARE rate is 0.75 / (1 - 0.75) = 3, which is interpreted as "the odds are 3 to 1 that a household is on a CARE rate." Alternatively, if the proportion of households in a block group on a CARE rate is 25 percent, then the odds that a randomly drawn house from that block group is on a CARE rate is 0.25 / (1 - 0.25) = 0.33, which is interpreted as "the odds are 1 to 3 that a household is on a CARE rate."

[23] The real line is simply the horizontal line that extends from zero in both directions to infinity.

Figure 8 shows the distribution of odds of CARE participation computed using the data on CARE participation by block group shown in Figure 7. Unlike the proportional data, the odds are not restricted to be less than or equal to 1.0, but the odds are still restricted to be greater than zero (cannot have negative odds).

Figure 8: Distribution of Odds of CARE Participation by Block Group



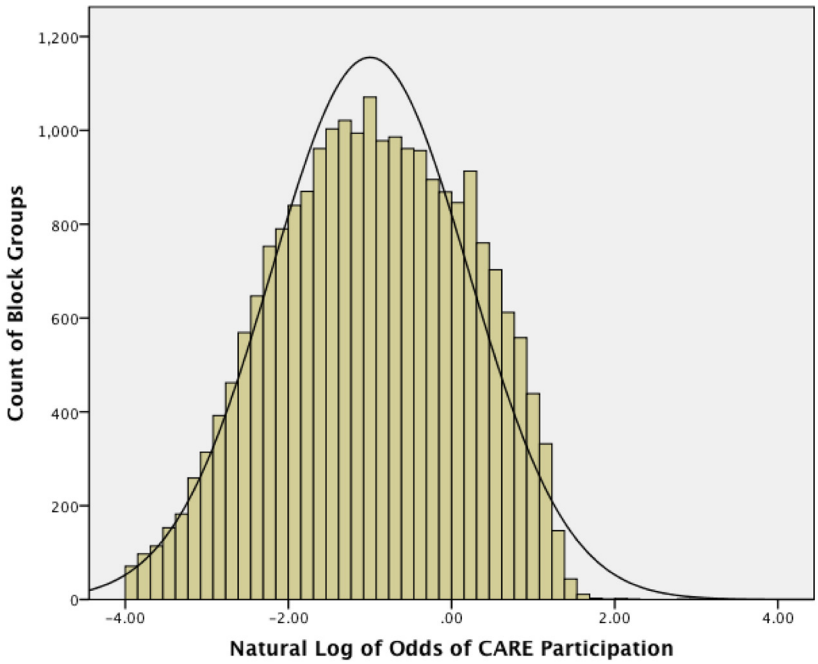
Source: Analysis by Evergreen Economics of Data from Athens Research.

The next step of the transformation is to take the log of the odds ratio (i.e., the "log-odds") of the dependent variable.

$$Ln(odds\ ratio) = Ln[CARE\ Proportion / (1 - CARE\ Proportion)]$$

The log- odds-ratio transformation results in a dependent variable that is continuous and no longer bounded by zero and one, though in practice, most values tend to lie within a relatively tight range. Figure 9 shows the distribution of CARE proportions altered by the log-odds transformation. Comparing Figure 7 to Figure 9, we see that the log-odds transformation not only eliminates the constraint that data lie within the 0-to-1 interval, but also redistributes the data from a distribution that is truncated at 0 and right skewed, to one that is largely normally distributed.

Figure 9: Distribution of Log Odds of CARE Participation



Source: Analysis by Evergreen Economics of Data from Athens Research.

While the transformation eliminates the intuitive meaning of the CARE proportion, a simple transformation of the estimated coefficients provides estimates of the impact on the odds of a household being enrolled on a CARE rate, associated with a one unit change in the value of the independent variable, holding all else constant. A slightly more complex transformation provides estimates of the impact on the proportion of households enrolled on a CARE rate associated with a one-unit change in the independent variable. For most readers, this measure of marginal impact has greater intuitive meaning. Nevertheless, all of these estimates of marginal impacts provide information on which economic, demographic, and other characteristics are associated with—or even influence—CARE participation, and how strong the relationship is.

The general form of the regression model is as follows:

Ln(odds) = f(demographic, economic, housing, utility)

Where:

Ln(odds) is the log of the odds ratio of CARE participation *(P(enrolled) / (1-P(enrolled))*;
F(.) denotes "a function of";
demographic are block group level demographic variables
housing are block group level housing characteristics

utility are indicator variables of electric and/or gas utility

In addition to the information provided by the individual coefficients, we use the estimated model to predict the proportion of residential households participating in the CARE program at the block group level using the following formula:

$$\text{CARE participation rate} = 1 / (1 + e^{-x})$$

Where:

e is the exponential function
x is the estimated regression equation

12.2.1 Interpreting Coefficients from a Logit Model

The coefficients from log-odds model possess little intuitive meaning. Nevertheless, the sign (negative or positive) and the magnitude (relative to zero) are important indicators of the relationship between the independent variable and either the probability that a household will be on a CARE rate or the proportion of households in a block group on a CARE rate.

When the independent variable is a continuous variable, a positive coefficient value indicates that a unit increase in the independent variable will lead to an increase in the odds that a household will be on CARE. Conversely, a negative coefficient value indicates that a unit increase in the value of the (continuous) independent variable will lead to a decrease in odds that a household will be on a CARE rate. To calculate the estimated change in the odds that a household will be on a CARE rate, the coefficient must be exponentiated (raised to the base *e*, also referred to as the "antilog"*)*, which transforms the coefficient from log-odds to an odds ratio.

$$\Delta Odds = e^{\beta_k} - 1$$

$$Where:$$

$$\Delta Odds = Change\ in\ the\ odds\ ratio$$

$$\beta_k = Estimated\ coefficient\ on\ continuous\ variable$$

$$e = is\ the\ number\ 2.7182...$$

12.2.2 Transforming from Proportion to Log-odds

The variable of interest, proportion of households on the CARE rate, is analogous to a probability. For example, if the proportion of households within a block group that are on a CARE rate is 60 percent, then there is a 60 percent probability that a randomly drawn household from that block group is on a CARE rate. Keeping with this same example, the proportion of households not on a CARE rate is equal to 1 minus the proportion that are on a CARE rate (1 – 0.60 = 0.40 or 40 percent). This of course is also the probability that a randomly chosen house in the block group is not on a CARE rate. The ratio of these two proportions (or probabilities) is called the "odds" or the "odds ratio."

$$Odds = \frac{p}{(1-p)}$$

$$Where:$$

$$p = Proportion\ on\ a\ CARE\ rate$$

For our example, the odds ratio that a household in that block group is on a CARE rate is equal to 0.6/0.4 = 1.5. Odds are generally expressed as an integer, therefore, we would say the odds are 3 to 2 that a randomly drawn household in that block group is on a CARE rate.[24]

The transformation from a proportion to an odds ratio is a monotonic transformation, which simply means that the odds increase as the proportion increases (and vice versa). While the proportion is bounded by 0 and 1, transforming the proportion into the odds eliminates the upper bound, but not the lower bound. Since both the numerator and denominator of the odds ratio are positive, the odds are always positive and is, therefore, bounded from below at zero. To remove the lower bound, the odds ratio is transformed by the natural logarithm to derive the log-odds or "logit" transformation.

The log-odds transformation results in a variable that is not bounded at either end and, like the transformation from proportion to odds, the transformation from odds to log-odds is monotonic. This is important point, because, while we need to transform the proportion due to its restricted range, we want to ensure that relationship between proportion values is preserved. Table 492 shows the relationship between a select number of proportions and their odds and log-odds transformations.

[24] If the proportion of CARE households is 50 percent, then the odds are 0.5/(1-0.5) = 1.0. Thus the odds that a randomly drawn household is on the CARE rate is 1 to 1 or 50 percent.

Table 492:Relationship Between Proportions, Odds, and Log-odds

Proportion	Odd	Log-odds (Logit)
0.05	0.05	-2.94
0.10	0.11	-2.20
0.20	0.25	-1.39
0.30	0.43	-0.85
0.40	0.67	-0.41
0.50	1.00	0.00
0.60	1.50	0.41
0.70	2.33	0.85
0.80	4.00	1.39
0.90	9.00	2.20
0.95	19.00	2.94

Proportion Range 0 to 1
Odds Range: 0 to infinity
Log-odds Range: negative infinity to infinity

12.3 ESA Modeling Detailed Methods

12.3.1 ESA Methods

12.3.1.1 Statistical Models of ESA Participation

We developed and estimated regression models to examine the factors that explain participation in the ESA program. Eligibility for the ESA program is based on the same income criteria as the CARE program, and to participate in the ESA program the customer must be enrolled in the CARE program. However, whereas a customer can move into and out of the CARE program, once a premise is treated—based on the income criteria of the customer—it is treated. In general, once a premise has been treated through the ESA program, it is ineligible to be treated again. Therefore, a LI customer that otherwise would be eligible to participate in ESA is not eligible to do so if the premise was treated previously when occupied by a prior CARE enrollee. Table 493 shows the counts of premises treated through the ESA program while occupied by the current resident and prior resident, as well as the count of premises occupied by CARE enrollees that have not been treated through the ESA program.

Table 493: Counts of ESA-Treated Premises Occupied by CARE Enrollees

IOU	Premises Occupied by CARE Enrollee Treated Through ESA Program		CARE-Occupied Premises Not Treated Through ESA	% CARE Premises Treated
	Current Resident	Prior Resident		
PG&E	5,442*	5,407	19,123	36%
SCE	3,633*	2,900	20,321	24%
SoCaLGas	4,572	4,585	25,199	27%
SDG&E	4,985*	8,484	19,053	40%

* The count of premises treated while occupied by current CARE enrollees and treated while occupied by past CARE enrollee are as follows: PG&E=46, SCE=79, SoCalGas=0, CDG&E=262.
Source: Analysis by Evergreen Economics of data provided by the California IOUs.

Separate models were developed for each of the four California investor-owned utilities (IOUs). We estimated the regression models based on household-level data provided by the IOUs, but also include data on the characteristics of the block group in which each residence is located.[25] The dependent variable, explained in greater detail below, is a binary variable that equals 1 if the premise received measures through the ESA program at any time between 2002 and 2012 and equals 0 if it did not.

For the SCE, SDG&E, and PG&E models, only residential customers that were on a CARE rate at any time after October 31, 2012 were included in the analysis. For the SoCalGas model, only those residential customers on a CARE rate during April 2013 were included in the analysis.[26]

12.3.1.2 Model description

Using regression analysis, we statistically analyzed the factors that affect the probability that a CARE enrollee lives in a residence treated through the ESA program either by applying for the ESA program or by living in a premise previously treated through the ESA program.[27]

The dependent variable in each of the IOU-level models is a binary indicator that is equal to 1 if the premise was treated through the ESA program and 0 if it was not. We estimated the Stage 1 and Stage 2 ESA models using a logistic regression. The logistic regression model is a non-linear, S-shaped distribution function that constrains the estimated probabilities to a

[25] The block group-level data came from two sources: The U.S. Census Bureau; Athens Research (provided by the IOUs). A block group is a geographical designation used by the U.S. Census Bureau that consists of a cluster of census blocks having the same first digit of their four-digit identifying numbers within a census tract. Block groups generally contain between 600 and 3,000 people, with an optimum size of 1,500 people. Block groups never cross the boundaries of states, counties, or statistically equivalent entities, except for a block groups delineated by American Indian tribal authorities, and then only when tabulated within the American Indian hierarchy. Block groups never cross the boundaries of census tracts. Source: http://www.census.gov/geo/www/geo_defn.html [May 29, 2012]
[26] The alternative criteria for SoCalGas is due to the way data were pulled by the IOU.
[27] While exceptions may exist, an otherwise eligible customer is not eligible for ESA if they live in a premise previously treated through the ESA program.

distribution between zero and one. The logistic regression model is by far the most popular method for estimating regression models when the dependent variable is binary. This is because the logit function is mathematically straightforward to estimate (using statistical software) and the estimated probabilities are easy to calculate and fall within the zero-to-one interval (i.e., zero percent up to 100 percent chance of occurring). Mathematically, the logistic regression model is expressed as:

Equation 2: Generalized Logistic Regression Model

$$PROB(y=1) = \frac{e^{\beta'\lambda}}{1+e^{\beta'\lambda}}$$

Where:

$PROB(y=1) =$ *is the probability that a an event occurs (e.g. a household is low-income)*

$e =$ *is the exponential function, equal to 2.718*

$\beta =$ *is a vector of coefficients to be estimated in the model*

$\lambda =$ *is a vector of values for the covariates in the model*

Empirically, the Stage 1 logistic regression models, which we estimated separately for each of the four IOUs, were specified as follows:

Equation 3: Stage 1 Logistic Regression Model

$$ESA_i = \alpha_0 + \beta_j Customer_{ij} + \lambda_k BlockGroup_{ik} + \upsilon$$

$Where$:

$ESA_i = Indicator\ variable\ of\ ESA\ participation\ (1=ESA\ Particiant;\ 0=not)$

$Customer_j = Array\ of\ variables\ from\ IOUs\ characterizing\ the\ customer$

$BlockGroup_k = Array\ of\ variables\ from\ Census\ and\ Athens\ Research\ characterizing\ the\ block\ grou$

$ESA = Indicator\ variable\ of\ ESA\ participation\ (1=ESA\ Particiant;\ 0=not)$

$\alpha, \beta, \lambda = Coefficients\ to\ be\ estimated\ in\ the\ model$

$\upsilon = Random\ error\ term,\ assumed\ log\text{-}normal$

We estimated the Stage 2 logistic regression model using data from the household survey and other sources of data. Because the focus of the Stage 2 model was to examine the relationship between ESA participation and information provided by the survey respondents, the Stage 2 model was based only on the 1,020 CARE enrollees that completed the telephone survey. The Stage 2 model is specified as follows:

Equation 4: Stage 2 Logistic Regression Model

$$ESA_i = \beta_0 + \beta_1 kWh_i + \beta_j Survey_{ij} + \beta_k BlockGroup_{ik} + \upsilon_i$$

$Where$:

$ESA_i = Indicator\ variable\ of\ ESA\ participation\ (1=ESA\ Particiant;\ 0=not)$

$kWh_i = Array\ of\ variables\ from\ IOUs\ characterizing\ the\ customer$

$Survey_{ij} = Array\ of\ variables\ from\ phone\ survey\ characterizing\ each\ customer$

$BlockGroup_k = Array\ of\ variables\ from\ Census\ and\ Athens\ Research\ characterizing\ the\ block\ group$

$ESA = Indicator\ variable\ of\ ESA\ participation\ (1=ESA\ Particiant;\ 0=not)$

$\beta_0, \beta_1, \beta_j, \beta_k, = Coefficients\ to\ be\ estimated\ in\ the\ model$

$\upsilon = Random\ error\ term,\ assumed\ log\text{-}normal$

12.3.1.3 Interpreting Coefficients from a Logit Model

The coefficients estimated in a logistic regression model possess little intuitive meaning. Nevertheless, the sign (negative or positive) and the magnitude (relative to zero) are important indicators of the relationship between, respectively, the explanatory variable and the probability that a CARE enrollee will also participate in the ESA program.

A positive coefficient value indicates that a unit increase in the explanatory variable will lead to an increase in the odds that a household will be on CARE. Conversely, a negative coefficient value indicates that a unit increase in the value of the explanatory variable will lead to a

decrease in odds that a household will be on a CARE rate. To calculate the estimated change in the *odds* that a household will be on a CARE rate, the coefficient must be exponentiated (raised to the base *e*, also referred to as the "antilog"), which transforms the coefficient from log-odds to an odds ratio.

$$\Delta Odds = e^{\beta_k} - 1$$

$$Where:$$

$$\Delta Odds = Change\ in\ the\ odds\ ratio$$

$$\beta_k = Estimated\ coefficient\ on\ continuous\ variable$$

$$e = is\ the\ number\ 2.7182...$$

12.4 Conjoint Analysis Detailed Methods

Conjoint analysis is a stated preference survey technique that involves having respondents review and rank options that reflect different choice options. In this application, the conjoint data collection was done using a website that asked respondents to rank a series of choices relating different possible ESA program participation experience**s**. For the ESA scenarios, each program choice is defined by several attributes (discussed below) and respondents were asked to rank the options from most to least preferred based on these attributes. Respondents were also asked to identify which program choices they would actually be willing to participate in after they complete the ranking exercise.

Conjoint analysis has the advantage of presenting several program characteristics simultaneously, which forces the respondent to make tradeoffs between attributes. By presenting attributes simultaneously, respondents must decide which features are most important, deciding whether or not to participate in an energy efficiency program. Past experience as well as existing literature indicates that the most successful conjoint designs limit each exercise to ranking 16 choices at a time, with four to six attributes defining each choice. Including more than 16 options or additional attributes tends to overwhelm respondents and results in less reliable data.

For this conjoint exercise, respondents were provided with a general description of the ESA program:

> The Energy Savings Assistance (ESA) Program is a program offered by [utility] to help LI households save money on their energy bills. This is accomplished by scheduling a home inspection to establish eligibility and identify what types of efficiency equipment should be installed, followed by additional home visits to install the equipment. Depending on the needs of the household, customers can receive a variety of things such as information on safety and ways to save energy, energy efficient light bulbs, refrigerators, attic insulation, caulking, maintenance services for some appliances, and in some areas heating and air

conditioning systems. The ESA Program pays 100 percent of the cost of the energy efficiency equipment – there is no charge to the homeowner.

With this program description as context, respondents are asked to rank eight possible options for the ESA program.[28] Each program option is defined as a combination of energy savings, number of home visits, income verification requirements, etc. The various attribute levels for each of these characteristics are shown in Table 494. These attribute levels are randomly assigned to create 18 possible programs that the respondent then ranked during the on-line conjoint session. Descriptions of these program attributes given to respondents during the survey are as follows:

- **Monthly Energy Savings:** Amount that households can expect to save on their monthly energy bill if they participate in the ESA program.
- **Income verification:** Whether or not customers must provide income verification such as a tax return to prove program eligibility.
- **Number of home visits:** Number of times that someone from the ESA program (both initial visit and measure installation) will visit the home, with each visit requiring some sort of scheduling and coordination on the part of the homeowner.
- **Timing of home visits:** Installation work done during the day (requiring that someone be at the home), evenings, or a combination of evenings and weekends.
- **Duration of home visits:** Total amount of time that program staff will spend at the home (both initial visit and installations).
- **Comfort:** Change in comfort level due to participation, defined as home being less drafty during cold weather and cooler during warm weather.

The values used to describe each choice option are randomly assigned, which forces the respondent to choose which attributes to focus on to rank the choices. To accomplish this, the conjoint application uses an orthogonal design, which means that there is zero correlation between each of the choice attributes. This is critical to the analysis, as correlation across attributes results in a loss of precision and makes it difficult to estimate the importance that respondents place on each attribute. For example, consider the situation where monthly energy savings and comfort are two of the characteristics being evaluated, and on each choice the monthly energy savings are high and the comfort level is also high. Since monthly energy savings and comfort are perfectly correlated, there is no way to determine from the data if a respondent is ranking the choices based on savings or comfort. For this reason, having an orthogonally designed study is essential.

[28] Respondents are first given a practice conjoint exercise to complete using a non-energy example in order to get them familiar with the online conjoint ranking process.

Once all the choices are ranked, the respondent is then asked to indicate which of the eight program options (if any) they would be willing to participate in, given their current living conditions. The participation choices and the ranking information are then automatically captured on the website for analysis.

Respondents will be asked to rank two different ESA program options, defined with slightly different characteristics. The various attribute and levels for both program options are shown in Table 494.

Table 494: ESA Program Choice Characteristics

ESA Program Option 1	Possible Values
Monthly Energy Savings	$0, $25, $60
Number of Home Visits	1,3
Income Verification	None, Documentation required
Comfort	No Change, Improvement
Total Time in Home	1 hour, 4 hours
ESA Program Option 2	**Possible Values**
Monthly Energy Savings	$0, $25, $60
Number of Home Visits	1,3
Income Verification	None, Documentation required
Comfort	No Change, Improvement
Timing of Home Visits	Days Only, Evenings/Weekends Only

12.4.1 Sample Design and Recruitment

Respondents for the conjoint analysis were recruited from a phone survey of LI households currently on the CARE rate and eligible to participate in the ESA program. If the phone survey respondents were willing to take the conjoint survey, their email addresses were collected and a separate email directing them to the conjoint website was sent out. Of the 166 customers that started the survey, 33 completed the conjoint survey. Additionally, a further 20 customers completed at least the first half of the survey, and 17 of these 20 completed the entire survey as part of our onsite verification efforts. Respondents completed the conjoint survey in September 2013.

12.4.2 Conjoint Discrete Choice Models

Once the conjoint surveys are completed, the conjoint data will be used in a discrete choice model. Using the ranking data, a conditional logit model will be developed to estimate how the attribute levels influence the rankings for program choices using the following equation (shown for ESA Option 1):

$$Rank_i = \beta' Saving_i + \beta' Duration_i + \beta' Income_i + \beta' Time_i + \beta' Comfort_i + \varepsilon_i$$

Where :

$Rank_i$ = *Rank value between 1 and 18, based on respondents' relative assessment of each choice*

$Saving_i$ = *Monthly bill savings for option i*

$Duration_i$ = *Total amount of time spent in the home for option i*

$Income_i$ = *Income verification required for option i*

$Time_i$ = *Timing of home visits for option i*

$Comfort_i$ = *Change in comfort level resulting from option i*

ε_i = *Random error term assumed logistically distributed*

β = *Coefficient to be estimated*

A second model (a binomial logit) will also be estimated to determine the influence of the attribute levels on the willingness to participate in the ESA program:

$$Participate_i = \beta' Saving_i + \beta' Duration_i + \beta' Income_i + \beta' Time_i + \beta' Comfort_i + \varepsilon_i$$

Where :

$Participate_i$ = *Indicator (0,1) on willingness to participate in program option i*

$Saving_i$ = *Monthly bill savings for option i*

$Duration_i$ = *Total amount of time spent in the home for option i*

$Income_i$ = *Income verification required for option i*

$Time_i$ = *Timing of home visits for option i*

$Comfort_i$ = *Change in comfort level resulting from option i*

ε_i = *Random error term assumed logistically distributed*

β = *Coefficient to be estimated*

12.4.3 Relative Importance

While coefficients estimates from the logit models provide some information on the influence of the variable on total utility, it is misleading to look only at the coefficient to gauge the influence of that variable. For example, if the comfort coefficient is ten times the magnitude of the savings coefficient, this is due in part to differences in the magnitude of the variable values, where the indicator variable comfort (0,1) is only a fraction of the value of the monthly energy savings ($ per month). Only looking at the magnitude of the coefficients would give the misleading impression that comfort is considered much more important than savings. To address this issue, "relative importance statistics" are calculated that combine both the coefficient and attribute value to get an overall measure of the influence on total utility. The relative importance statistic can be interpreted as each attribute's contribution to total "utility", or the perceived benefit associated with that choice. This statistic measures the

importance of one design feature, relative to that of all other design features in determining the total utility for each program option.

The total utility of each option can be calculated by inserting attribute values into the estimated regression equation:

$$Total\ Utility_i\ (U_i) = \beta' Saving_i + \beta' Duration_i + \beta' Income_i + \beta' Time_i + \beta' Comfort_i$$

Using the coefficient estimates and the values for the variables used in the conjoint analysis, the importance statistic is defined as:

$$Relative\ Importance_j = \frac{\Delta u_j}{\Delta U} = \frac{Maximum\ utility\ change\ due\ to\ attribute\ j}{Maximum\ utility\ change\ due\ to\ all\ attributes}$$

The importance statistic measures the percentage of the total maximum change in utility across all choices that is attributable to a single feature. Stated another way, the importance statistic measures each feature's contribution to the total utility based on the attributes included in the conjoint analysis.

12.4.4 Participation Probabilities

To assist in the interpretation of the binomial logit models, the probability of participating in the program is calculated by combining the coefficient estimates with program attributes within the logit probability function:

$$Prob(Participate) = \frac{exp(\beta' X)}{1 + exp(\beta' X)},$$

where β'X reflects the sum of the coefficient estimates used in the conjoint analysis. By using different values for savings, comfort, home visits, and income verification to simulate different programs, this equation can be used to determine the overall effect on utility of alternative program designs. The probabilities can also be used to determine the value a respondent places on savings and timing of installation visits, for example.

We will calculate the probability of participation in ESA by using values for the variables that match the current program design as much as possible. Given that this estimate is determined using only five factors included in the conjoint, when in reality there are many other factors that are influencing this decision, the result should not be interpreted as a direct estimate of potential market share. Nevertheless, we will explore options for using the probability calculations to determine a threshold level of willingness to participate. One possibility would be to calculate the probability using the highest (i.e., most attractive) values for all variables and using the resulting value (i.e., 1-probability) as an estimate of the portion of customers that are unlikely to participate in the ESA program under any circumstances.

13 Research Instruments

Phone

In-home

Contractor

Attachment U



research into action inc

ESA Program
Multifamily Segment Study
Volume 1: Report

December 4, 2013

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Table of Contents

Executive Summary i
Introduction ii
Research Objective ii
Research Methodology iii
Key Research Findings iv
Recommendations viii
Organization of this Report x
Section 1. Background, Research Objectives, Methodology, Data Sources and Study Limitations 1
Study Background 1
ESA Program Background 2
Multifamily Segment Study Research Objectives 2
Research Methodology and Data Sources 3
Study Limitations 12
Section 2. Key Research Questions, Findings, and Themes 14
1. What are the characteristics of the low-income multifamily segment? 14
2. Where are the low-income multifamily buildings located? 16
3. In what ways is this segment being served through the existing ESA Program? 16
4. Who is the multifamily customer: tenant or building owner? 18
5. What is available (services and benefits) to the multifamily tenants and building owners now, via IOU or other programs? 20
6. What do multifamily customers need from the IOU? 22
7. What are the barriers to serving multifamily customers? 23
8. How are other multifamily programs offered? What are their organizing principles? 25
Section 3. California Multifamily Housing Data Relevant for Low-Income Customer Programs 28
Distribution of Low-Income Multifamily Housing in California 28
Characteristics of Low-Income Multifamily Housing in California 31
ESA Program and MFEER Penetration into the Low-Income Multifamily Sector 58
Measures Installed in Multifamily Housing Through the ESA Program and MFEER 61
Measures Installed Through the MFEER Program 65
The Number of Buildings Housing Low-Income Multifamily Households 66
Housing Unit Mobility Among Low-Income Multifamily Households 69

Section 4. Surveys and Interviews 70
Surveys with Owners and Operators of Low-Income Multifamily Buildings 70
Interviews with Stakeholders and Advocacy Groups 93
Section 5. Comparison Programs Across the Country 107
Program Catalog Findings 107
In-Depth Comparison Program Findings 110
Section 6. The Current California Landscape for Low-Income Multifamily Programs 146
Overarching Goals 146
Programs Serving Multifamily Buildings 149
Section 7. Financing and Funding Options 177
Limitations of the Financing Catalog 177
Multifamily Property Owner Financing Catalog: Description and Use 177
Additional Resources 182
Section 8. Conclusions and Recommendations 183
Methodology 184
Key Considerations 185
Findings and Conclusions 186
Recommendations: Reaching More Income-Qualified Households 198
Recommendations: Maximizing Cost-Effective Energy Savings 202

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Executive Summary

Initially offered in the early 1980s, the Energy Savings Assistance (ESA) Program is a mature, ratepayer-funded initiative that provides subsidized energy-efficiency services to low-income households that cannot otherwise afford energy-efficiency upgrades. The objectives of the ESA Program are these:

- To provide low-income customers with ways of reducing their energy bills, and
- to improve the quality of life of these customers through home weatherization and energy-efficiency measures.[1]

The California Investor-Owned Utilities (IOUs) administer the ESA Program, making it available to homeowners and renters living in single-family dwellings, multifamily dwellings, and mobile homes.

In Decision 12-08-044, the California Public Utility Commission (Commission) mandated that the IOUs do the following:

- Implement immediately eight specified strategies to improve ESA's penetration into the multifamily segment of the low-income population;[2]
- Conduct a Multifamily Segment Study of the 2012-2014 program cycle; and
- Administer the ESA Program "to yield maximum energy savings at reasonable costs."[3]

The IOUs then engaged Cadmus to conduct the Multifamily Segment Study, and the results of that effort are presented in this report. In this study, Cadmus addresses the two goals for the ESA Program and the three directives of Decision 12-08-044. Thus, the study was designed with this overarching objective in mind: Develop a detailed picture of the low-income multifamily market (including segment profiles). Through our research, the Cadmus team gathered important data that can be used to:

- ***Develop comprehensive multifamily segment strategies for the ESA Program.*** These strategies will aid California in preparing and promoting effective long-term plans to meet the needs of low-income IOU customers living in multifamily housing.
- ***Inform recommendations that enhance program design and delivery***, so as to help California meet its 2020 energy targets.

An important challenge associated with this study is that while the ESA Program focuses on providing services to households (families and individuals), Decision 12-08-044 has an implied focus on upgrading

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1 California Public Utilities Commission. *California Energy Efficiency Strategic Plan.* January 2011 Update, pp. 23-24.

2 D.12-08-044, p. 157. The eight strategies are listed in Appendix A of this report. Note that examination of these eight strategies or determining whether the steps were successful in reaching the multifamily segment were outside the scope of the Multifamily Segment Study.

3 D.12-08-044, p. 3.

multifamily buildings, which may or may not provide direct benefits to income-qualified multifamily tenants.

The background for—and an overview of—this study are presented in the following sections.

Introduction

On August 23, 2012, the California Public Utility Commission (Commission) approved Decision 12-08-044 for the 2012-2014 program cycle, allocating approximately $5 billion to continue two energy-related low-income programs: the ESA Program and the California Alternate Rates for Energy (CARE) Program for the IOUs. As detailed in the California Strategic Plan for Energy Efficiency—and later codified in PU Code Section 382(e)—the Commission's vision for low-income communities is that "by not later than December 31, 2020, ensure that all eligible low-income electricity and gas customers are given the opportunity to participate in low-income energy efficiency programs, including customers occupying apartments or similar multiunit residential structures." (Note that for this research, multifamily buildings are defined as "dwellings with five or more housing units."[4] Also, low-Income customers are defined as "households with gross income equal to or less than 200% of the Federal Poverty Guidelines."[5])

The Commission proposed a dual approach for ESA and mandated that the IOUs immediately implement eight strategies to improve ESA's penetration into the multifamily segment of the low-income population.[6] The second and complementary approach (D.12-08-044, Section 3.10.6.4) mandated that the IOUs conduct a Multifamily Segment Study. Additionally, Decision 12-08-044 mandated that the IOUs administer the ESA Program "to yield maximum energy savings at reasonable costs."[7]

Research Objective

For this Multifamily Segment Study, Cadmus was to develop a detailed picture of the low-income multifamily market (including segment profiles). As previously noted, the results of this research will serve as the basis for: (1) comprehensive multifamily segment strategies to promote the ESA Program; and recommendations to enhance the program, so as to meet California's 2020 targets.

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4 Statewide Low-income Energy Efficiency Program Policy and Procedures Manual. California Public Utilities Commission. August 2010.

5 California Public Utilities Code Section 739.1(b)(1) The commission shall establish a program of assistance to low-income electric and gas customers with annual household incomes that are no greater than 200 percent of the federal poverty guideline levels, the cost of which shall not be borne solely by any single class of customer. The program shall be referred to as the California Alternate Rates for Energy or CARE program. The commission shall ensure that the level of discount for low-income electric and gas customers correctly reflects the level of need.

6 Note that examination of these eight strategies or determining whether the steps were successful in reaching the multifamily segment were outside the scope of the Multifamily Segment Study.

7 D.12-08-044, p. 3.

Research Methodology

The Cadmus team used a multi-method approach to conduct the low-income Multifamily Segment Study. The key methods for gathering and analyzing data were these: primary and secondary research, quantitative (data analyses and geocoding), and qualitative techniques (literature searches, surveys, interviews, and input from public workshops). We drew upon this research to: (1) identify opportunities to reach deeper into the low-income multifamily market; (2) address and improve the energy efficiency and quality of life in as many low-income households as possible; and (3) maximize cost-effective energy savings in this sector.

After conducting key informant interviews for background and context for the Multifamily Segment Study, Cadmus' evaluation team conducted these research tasks.

- ***Develop low-income multifamily housing characteristics*** using data from the American Community Survey, American Housing Survey, and GIS technology. (Section 3 of this report)
  - Estimate the number of low-income multifamily households in California and apportion those households by IOU service territory, by county, and by census tract.
  - Profile the characteristics of the low-income multifamily segment based on additional metrics.
  - Determine average costs of measure installations using IOU data on past ESA Program multifamily projects.
- ***Survey building owners and managers of low-income multifamily buildings*** (including market rate properties and rent-assisted properties). Cadmus collected data about ownership, buildings and equipment, and decision-making related to energy-efficiency upgrades in apartment units and the common areas in multifamily buildings. (Section 4)
- ***Interview low-income stakeholder and advocacy organizations working with affordable and market-rate multifamily housing*** to collect information about considerations associated with financing multifamily building improvements and energy-efficiency upgrades. (Section 4)
- ***Identify comparison programs nationwide that target multifamily buildings or residents.*** After cataloging programs representing a range of design and delivery approaches, we conducted additional research on five selected programs. The purpose of the national program comparisons was to identify approaches to reaching the low income multifamily sector. In formulating recommendations, the research team considered these approaches in the context of the existing California program landscape and the characteristics of the low income multifamily market in California. The selected programs are implemented by: CNT Energy, Energy Outreach Colorado (EOC), Massachusetts Gas and Electric IOUs, NYSERDA, Public Service Electric and Gas Company (PSE&G). (Section 5)
- ***Examine California's low-income multifamily energy-efficiency program landscape***, which includes: the ESA Program; the federally funded weatherization program administered by the

California Department of Community Services and Development (CSD Program);[8] the Multifamily Energy Efficiency Rebate (MFEER) program; and whole-building efficiency programs, such as including the IOUs' Energy Upgrade California Multifamily Path (EUC MF Path) and the multifamily programs offered by the Bay Area Regional Energy Network (Bay REN) and the Southern California Regional Energy Network (SoCal REN). (Section 6)

- ***Research and catalog financing and funding options*** available to owners of low-income multifamily properties for energy-efficiency upgrades. (Section 7)
- ***Propose strategies to enhance the program's ability to serve income eligible households, encourage participation, and maximize cost-effective energy savings.*** (Section 8)

Key Research Findings

The ESA Program's current delivery strategy is designed around its mission to deliver program services that benefit individual households and, as such, this strategy is well suited to - maximizing the number of low-income multifamily customers benefitting from the program. However, as the program matures, it will become increasingly difficult to reach 100% of eligible low-income customers, largely because eligible, willing, and untreated households will be harder to find.

Due largely to the physical characteristics of multifamily housing, coupled with restrictions in existing ESA Program policies and procedures, the economic benefits provided to low-income tenants through the program are relatively limited. Further, some of the strategies recommended in Decision 12-08-044,[9] indicate an implied preference for program services that appeal to building owners, as a way to reach the individual tenants in each unit and maximize energy savings.

Low-Income Multifamily Housing Characteristics

Within California, there are approximately 3.719 million low-income households (those earning no more than 200% of the Federal Poverty Guidelines), representing about 30% of all households. Of these, approximately 1.175 million live in multifamily housing, which includes all buildings with five or more units. Statewide, low-income multifamily households represent approximately 9% of total residential households, 32% of low-income households, and 42% of multifamily households. (This total includes some double-counting, as some households are served by two of the utilities.) The percentage of low-income multifamily households varies widely across IOUs, ranging from 39% to 27%.

Using data from the 2011 American Community Survey and GIS technology, we estimated the number of low-income multifamily households in California and apportioned those households by IOU service

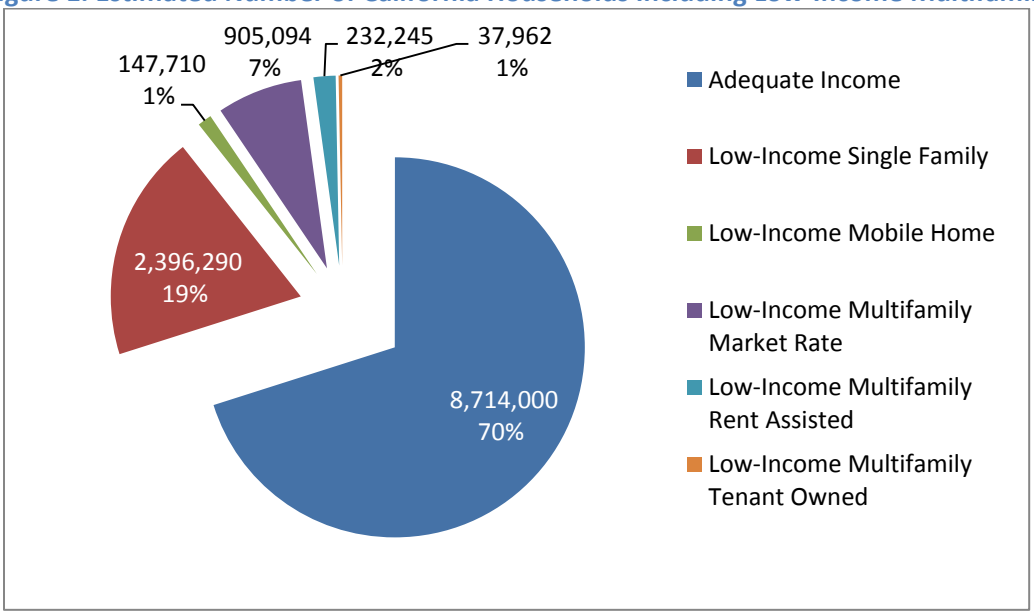
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[8] CSD administers weatherization programs with funding primarily from the U.S. DOE's Weatherization Assistance Program (WAP) and the U.S. Department of Health and Human Services' Low-income Home Energy Assistance Program (LIHEAP), although the program also received American Recovery and Reinvestment Act stimulus funds.

[9] See Section 6, under Decision-12-08-044. See also Appendix A of this report. Specifically, strategies 3, 4, and 5 recommend greater marketing, coordination, and delivery consistent with a building, rather than tenant, approach..

territory, by county, and by census tract. Figure 1 shows the estimated number of households in California by income category and housing type.

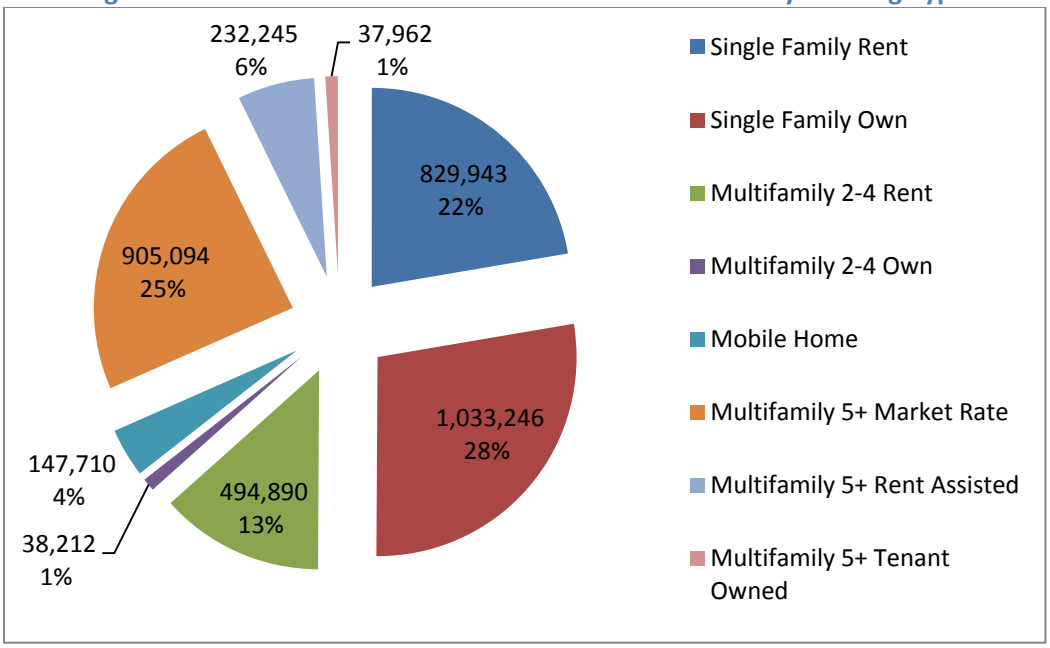
Figure 1. Estimated Number of California Households Including Low-Income Multifamily



Source: 2011 American Community Survey and 2011 American Housing Survey

Figure 2 apportions low-income households in California across categories of building type and ownership status. About 32% of low-income households live in housing categorized as "multifamily" (buildings having five or more units) by the ESA program.

Figure 2. Estimated Number of Low-Income Households by Housing Type



Source: 2011 American Community Survey and 2011 American Housing Survey

Table 1 shows the rate of program participation among low-income multifamily households during the program years 2007 to 2012 and the average annual participation. We note that the actual goals of the program take into consideration characteristics that we have not been able to assess for this research. Among these are the number of households that do not meet a minimal criterion for receiving measures and the number of households that are either resistant to participation or are not able to participate for various reasons. Thus, from the program standpoint, the denominator for full participation is a subset of total households. However, what we present is the number of households meeting only the criteria of program income eligibility (up to 200% of Federal Poverty Level guidelines) and building type (multifamily 5+ units).

Table 1. Rate of ESA Program Participation among Low-Income Multifamily Households PY 2010 to PY 2012

Utility	Estimated Low-Income Multifamily Households	Participating LIEE Households PY 2007 to PY 2009	Participating ESA Households PY 2010 to PY 2012	Average Annual Participation PY 2007 to PY 2012
PG&E	377,015	22,678	58,877	13,593
SCE	335,484	5,061	65,775	11,806
SCG	591,929	15,779	64,510	13,382
SDG&E	116,904	15,711	32,670	8,064

Because census data are organized around individuals and households, our data do not provide clear evidence of the number of buildings within which low-income multifamily households reside. Our results include information about the number of units in the buildings within which respondents reside; however, we do not have specific data regarding the percentage of units in each building that are inhabited by low-income households. This would be critical to an accurate estimate of the number of buildings housing low-income multifamily households. By making an assumption about this "mixing ratio" of low and adequate income households, we have provided an estimate of buildings.

Table 2 shows the estimated number of low-income multifamily buildings by utility. We have also disaggregated the total to show our estimates of rent-assisted households and market rate households.

Table 2. Estimated Number of Low-income Multifamily Buildings by Utility and Sector

Utility	Buildings Housing LIMF Households	Rent-Assisted	Market Rate
PG&E	33,889	7,996	25,893
SCE	30,128	6,866	23,262
SDG&E	10,546	2,794	7,752
SCG	52,812	9,196	43,616

The low-income multifamily sector is quite literally a moving target. The ESA Program treats *housing units* in order to provide benefits to *households,* but households are highly mobile, whereas the

treatments remain behind. By 2020, based on AHS data for the California low-income multifamily sector, we would expect 82% of low-income multifamily households to have moved to a different housing unit at least one time.

The most notable characteristic of the low-income multifamily segment is its variety, both in the social circumstances of the households and, more germane to the current research, in the physical structures and the energy-consuming equipment with which they live. For instance, the variety in the sizes and vintages of multifamily buildings within which low-income households reside influences the approach that is optimal for addressing their need. Size and vintage are not equally distributed across the territories but rather vary by metropolitan area.

Over the next few years, it will be important to consider the vintage of existing equipment and housing in plans to maximize energy savings. The 68% of low-income multifamily households living in units built before 1980 represent approximately 766,000 households within the IOUs' service territories.[10] This is the segment most likely to benefit from building shell improvements (such as ceiling and wall insulation, roofing, or windows), although buildings of later vintage may also benefit and some of these pre-1980 units may have already received shell upgrades. We estimate about 79,942 low-income multifamily households living in the IOUs' high-need climate zones 11 through 16 within buildings in likely need of shell improvement.

About 347,000 households among the IOUs' low-income multifamily customers have heating equipment that is 20 years old or older. Data suggests that about 21,000 buildings (serving an estimated 207,000 households) have furnace equipment at the end of its effective useful life. We estimate there are 39,500 central AC systems that are 20 years old or older. We estimate that roughly 94,000 low-income multifamily households have refrigerators that are 15 years old or older.

The California Landscape and Comparison Programs

The programs selected for in-depth comparison operate in areas with climates very different from much of California. However, low-income tenants and multifamily building owners across the country likely face similar considerations in their decisions regarding energy efficiency. As a result, the comparison programs' established and well-documented approaches to reaching the low-income multifamily sector may provide insight into program delivery approaches that could be effective in California.

The in-depth comparison of other multifamily programs offered in other states all included activities in five key areas expected to help achieve efficiency retrofits in low-income multifamily buildings. The comparison programs were notable for the presence and role of nonprofit and public benefit organizations in both administering and delivering services to multifamily buildings. As a whole, the

[10] Our estimate of the number of low-income multifamily households within the combined utility territories is 1.127 million. Sixty-eight percent of 1.127 million is 766,000. The value reported above, 1.175 million households is a statewide number.

comparison programs prioritized a comprehensive treatment of the buildings they targeted, with some covering substantial (if not all) of the retrofit costs.

Our research shows that existing ESA Program policies that prohibit addressing an entire building may be missing opportunities to treat more tenant units and increase energy savings within a given building. The ESA Program may be able to increase energy savings results and likely serve more low-income households by relaxing the eligibility requirements associated with addressing low-income multifamily buildings as a whole.

Neither the current ESA Program nor the other multifamily sector programs offered by the IOUs are designed specifically to maximize energy savings in low-income multifamily buildings. Put more simply, there is a gap in the current multifamily program landscape in California (i.e., ESA, MFEER, EUC MF, and MIDI) whereby multifamily buildings that primarily or exclusively serve low-income residents do not have access to incentives for common area and central system upgrades that are specifically set at levels to address financial barriers common to this sector.

Better coordination and technical support is needed for multifamily building owners and tenants who are eligible for multiple programs to ensure their participation derives maximum energy savings and other benefits. While the building owner can be difficult to engage, once engaged, communications with the building owner presents an opportunity for the IOUs to work with them to capture more significant energy savings by installing upgrades to larger, building-wide systems.

Recommendations

The California IOUs have already accomplished a great deal to help low-income residents reduce their utility costs and improve the comfort and safety of their households through the ESA Program. Each utility is committed to continuous improvement of the ESA Program: they are working to align their ESA Programs with the Strategic Plan and codified PU Code goals and making steady progress to streamline operations and improve outreach to target low-income multifamily residents. The individual IOUs should continue these efforts. Furthermore, the research team recognizes that the IOUs operate in fidelity to an existing programmatic framework that entails rules, policies, and procedures set by the Commission that may limit their ability to implement significant program design adjustments.

It is important to note that under existing program funding cycles and funding allocation, there are limited programmatic resources for energy efficiency. Increasing services in one segment may not be desirable if it affects service delivery to another important segment of the population. The final decisions about the implications and trade-offs within or between other programs are not in the purview of this research, instead, those are determinations to be made by policymakers. Thus, any recommendations must be considered within the regulatory context and program delivery constraints inherent in the existing California market.

To address the range of study objectives, Cadmus presents two sets of recommendations. The first set of recommendations is geared toward doing more within the existing ESA Program framework to reach the

increasingly hard-to-reach populations and attract more income qualified households to the program (that is, up to 200% of Federal Poverty Level guidelines). Because the program will always need a means to treat an individual household and apartment unit, we recommend keeping the existing program delivery structure. These recommendations build on the existing infrastructure. In general, the research team believes implementing the recommendations in this section would be feasible under existing ESA Program rules and do not require significant regulatory involvement.

1. ***Consider adopting customized recruitment and delivery strategies*** (by IOU) to target identified opportunities based on climate zone, measure and buildings characteristics, and geographic areas.
2. ***Treat all units (whether vacant or occupied) and the building shell in those buildings where 80% of the tenants are income-qualified.***
3. ***Consider options for expanding current process exceptions to subsidized buildings.***

The second set of recommendations, in keeping with the implied goals of Decision 12-08-044, is geared toward maximizing cost-effective energy savings through the ESA program. Achieving this objective entails a comprehensive approach to treating low-income multifamily buildings. Therefore, these recommendations provide suggestions for more significant programmatic changes that potentially entail adjustments at a higher level than can be accomplished by the individual IOUs.

4. ***Ensure consistency with the current policy objectives*** by reviewing the rationale behind the 80-20 threshold for treating all units and the building shell.
5. ***Consider offering cost-effective common-area measures and incentives that cover the incremental cost*** of central heating and cooling system replacements.
6. ***Consider researching building recapitalization cycles*** to inform marketing strategies that target building owners.
7. ***Consider options for integrating the ESA Program with MFEER and/or EUC MF*** to create a comprehensive project path for ESA building owners.

Organization of this Report

- Section 1 discusses the Multifamily Segment Study's research objectives, provides background about the Commission Decision that directs the study, and provides background about the ESA Program. The section summarizes the multi-methods research approach used to conduct this study and provides details about the methods. Data sources and data limitations are also discussed.
- Section 2 discusses findings and conclusions stemming from this research, addressing eight primary research questions that underlie the study. The key findings and conclusions presented in this section flow from the individual research tasks discussed in Sections 3 through 7.
- Section 3 presents California multifamily housing data relevant to low-income multifamily housing programs.
- Section 4 summarizes findings from (1) surveys with owners and managers of low-income multifamily buildings, including representatives from rent-assisted (also referred to as affordable housing) and market rate housing, and (2) interviews with low-income advocacy groups and stakeholders who represent, own, or manage market-rate and affordable housing.
- Section 5 compares low-income multifamily programs across the United States, describing features that may be useful for California IOUs to consider.
- Section 6 describes the current California landscape for low-income and multifamily programs. This section discusses the ESA program, MFEER, CSD, EUC.
- Section 7 discusses research on a limited number of financing and funding options that consider energy efficiency and may be available to owners of multifamily building with high numbers of ESA qualified tenants.
- Section 8 consolidates findings from this research in order to draw broad conclusions regarding the ESA Program's alignment with the study objectives. We further provide recommendations for the IOUs to consider that are intended to help the IOUs reach and serve the low-income population living in multifamily housing and maximize cost-effective energy savings.

Appendices A through K (in a separate Volume of this report) provide additional detail about the research methods, findings, and supporting materials.

- Appendix A lists the objectives of the study as outlined in Decision 12-08-044. It summarizes specific passages in the Decision and the page number, commonly referenced in this report. The appendix lists the eight Multifamily Segment Strategies the Commission directed the IOUs to implement.
- Appendix B lists the stakeholders providing public comments on Decision 12-08-044.
- Appendix C details the methodology used in Section 3 to estimate the distribution of low-income multifamily housing.
- Appendix D details the methodology used in Section 3 to determine the characteristics of low-income multifamily housing.
- Appendix E details the methodology used in Section 3 to estimate the penetration of ESA Program and MFEER penetration into the low-income multifamily sector.

- Appendix F expands on Section 4 and provides details about the methodology and sampling plan for the survey conducted with building owners and managers. It also discusses challenges the Cadmus team encountered conducting this survey.
- Appendix G details the research methodology and sample frame for the interviews with low income stakeholder and advocacy groups working with market rate and/or rent-assisted multifamily buildings. The interview findings are discussed in Section 4 of this report.
- Appendix H summarizes the eligible measures for California programs targeting the multifamily sector. The programs are discussed in Section 5 of this report.
- Appendix I provides additional detail for the 16 financial and funding options reviewed in Section 7 of this report.
- Appendix J summarizes measures installed in multifamily households through the ESA Program by each of the four IOUs, referenced in Section 3 of this report.
- Appendix K is the bibliography.

Section 1. Background, Research Objectives, Methodology, Data Sources and Study Limitations

Study Background

On August 23, 2012, the CPUC approved Decision 12-08-044 for the 2012-2014 program cycle, allocating approximately $5 billion to continue two energy-related low-income programs: the Energy Savings Assistance (ESA) Program and the California Alternate Rates for Energy (CARE) Programs for the California Investor-Owned Utilities (IOUs).

As detailed in the California Strategic Plan for Energy Efficiency and later codified in PU Code Section 382(e), the Commission's vision for low-income communities is that "by not later than December 31, 2020, ensure that all eligible low-income electricity and gas customers are given the opportunity to participate in low-income energy efficiency programs, including customers occupying apartments or similar multiunit residential structures." In addition to producing energy savings, the dual objectives of the ESA Program are to provide low-income customers with ways to reduce their energy bills and improve their quality of life.[11] In accordance with those complementary objectives, Decision 12-08-044 directs the IOUs to administer the ESA Program "to yield maximum energy savings at reasonable costs"[12] and to "provide an improved quality of life for the low-income populations" through home weatherization and efficiency measures.[13]

Testimony by the IOUs, several ratepayer and low-income advocates, and the Commission's response discussed visions for "smarter and streamlined program implementation, by increasing consistency and coherence in delivery of demand side programs, and by promoting and encouraging creativity, innovation, and efficiency through tailored, adaptable and flexible program delivery" (D.12-08-044, p. 7). To that end, the Commission proposed a dual approach for the ESA Program and mandated that the IOUs immediately implement, as the first prong in the approach, eight multifamily segment strategies to improve the ESA Program's penetration into the multifamily segment of the low-income population. The second and complementary approach (D.12-08-044, Section 3.10.6.4.) mandated that the IOUs conduct a Multifamily Segment Study.

As the ESA Program matures, the intent of the Commission and the IOUs is to encourage more efficient program delivery, integrating efforts with other demand-side program offerings, and developing strategies for the next eight years, toward meeting the 2020 program goals. During the 2009-2011 program cycle, the ESA Program treated more than one million homes. The IOUs anticipate treating nearly another one million homes in the 2012-2014 program cycle, with a budget that exceeds $1

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[11] California Public Utilities Commission. *California Energy Efficiency Strategic Plan.* January 2011 Update, pages 23-24.

[12] D.12-08-044, pg. 3.

[13] *Ibid*, pg. 19.

billion. Among the changes to the 2012-2014 program cycle, the Commission expects the IOUs to continue efforts to integrate the ESA Program with other programs, to promote efficiencies by leveraging opportunities to coordinate delivery with other programs, and to take parallel approaches to increase participation of the multifamily segment of the low-income population. As the Commission noted in its Decision, "the program must be directed, administered, and delivered in a manner so as to yield significant energy savings."[14]

ESA Program Background

The respective IOUs administer the ESA Program in each service territory and it is available to homeowners and renters living in single-family dwellings, multifamily dwellings, and mobile homes. The ESA Program uses a direct-install approach to provide home weatherization (installing cost-effective measures at reasonable costs), energy-efficient appliances, and energy education services at no cost to income-qualified IOU customers. In its current design, the ESA Program serves income qualified residents in individual multifamily units; the program does not address multifamily building common areas or central systems. The building shell is addressed if at least 80% of the tenants in building are income-qualified for the ESA Program.

Multifamily Segment Study Research Objectives

The Decision D.12-08-044 directed the IOUs to conduct the Multifamily Segment Study to build a comprehensive understanding of this segment and develop long-term strategies to reach 100% of eligible and willing households by 2020 and meet program goals. This study's goals were driven by three key overarching questions.

The Cadmus team's assessment was guided by the IOU's and the Commission's goals for this study. Key research objectives provided the underlying context for the research and recommendations:

- How can the current ESA Program be modified to better meet the needs of low-income multifamily residents?
- How can integrated outreach, education, and marketing be most effective in reaching low-income multifamily housing owners and operators?
- Could the current service delivery approach be modified to address multifamily, energy-efficiency programming concerns?

With this backdrop and research objectives in mind, the Decision and the Study Team outlined eight key research questions that the research tasks were designed to address. The eight questions are:

1. What are the characteristics of the low-income multifamily segment?
2. Where are the low-income multifamily buildings located?
3. In what ways is this segment being served through the existing ESA Program?
4. Who is the multifamily customer: the tenant or the building owner?

[14] D. 12-08-044, page 3.

5. What is available (services and benefits) to the multifamily customer now, via IOU or other programs?
6. What do multifamily customers need from the IOUs?
7. What are the barriers to serving multifamily customers?
8. How are other multifamily programs offered? What are their organizing principles?

Research Methodology and Data Sources

The Cadmus team developed a research plan responding to the IOUs' request for a study, describing activities that were in very close alignment to those discussed in Decision 12-08-044. The Cadmus team proposed a research plan within the time and funding constraints described by the Commission, discussed the proposed plan with the Study Team, and secured the team's approval before research commenced. Cadmus and the Study Team posted the draft research plan on energydataweb.com, received public comments, and discussed the plan in the first public workshop in February 2013. Comments and directions from the Study Team and the public were reflected in the approved research plan.

The Cadmus team used a multi-methods approach to conduct the low-income Multifamily Segment Study and to characterize this complex market segment. Using more than one method provides a more complete set of findings, reduces uncertainty, and increases confidence that the multifamily segment is robustly characterized. The team used primary and secondary research as well as quantitative (data analyses and geocoding) and qualitative methods (literature searches, surveys, and interviews) to gather and analyze data.

Our approach to developing and understanding the characteristics of low-income multifamily households was directed toward objective indicators of what this sector might need to increase energy efficiency. We took as fundamental the overriding objective of the ESA Program: to provide energy efficiency measures to households that might not otherwise be able to install them. We focused on a depiction of the overall landscape: its dimensions and its particular characteristics. On the whole, we are confident in the quality of the data collection efforts and in the results of this analysis. We hope and expect the information this study provides will be combined with other research to inform decision-making for this tremendously complex sector.

Table 3 summarizes the primary research activities and methods utilized in this study.

Table 3. Multifamily Segment Study Research Methods

Research Activity Identified in D.12-08-044	Multifamily Segment Study Research Method
Gather data on the state's multifamily housing stock and ownership profiles, including a statewide demographic and programmatic assessment of California's low-income multifamily housing stock (by each IOU territory and by county).	**Key informant interviews** conducted with managers of the four IOUs provided background and context. **IOU customer data** identified customers for survey sample. **IOU program data** identified measures installed in the ESA Program. **Secondary research** included U.S. Census Bureau 2011 American Community Survey data, and American Housing Survey, identified low-income multifamily buildings within census tracts, building and apartment unit characteristics, numbers of units and estimated numbers of buildings. Regression models examined program penetration rates and differences based on demographic characteristics. Findings are presented by IOU service territory, by county, and by census tract. **Surveys** were conducted with a stratified random sample of 124 multifamily owners or operators in each IOU service territory identified ownership structures, building and unit characteristics, decision making and factors affecting energy efficiency upgrades. The sample was stratified by market sector (market rate and rent-assisted) and by property size (determined by numbers of units operated in CA). **GIS mapping** (geocoding) using IOU customer data, and socioeconomic census data identified areas where multifamily buildings have been served. Also used to identify census tracts with low-income households to develop the survey sample frame.

Catalogue multifamily energy-efficiency programs (particularly those for low-income customers), including Commission programs and those administered by other government agencies, utilities, and organizations within the state of California as well as the most successful and/or effective recent and ongoing multifamily energy-efficiency programs benefitting low-income customers administered in other jurisdictions across the country.	**Key informant interviews** with ESA Program managers provided background on program delivery channels, multifamily participants, and details about the databases; interviews with IOU multifamily, direct install, and EUC programs informed ESA program enhancement research. **Research** identified comparative multifamily programs in other states. Secondary and primary research provided data to help characterize the multifamily market. Examined 44 programs nationwide. Five key programs were examined in depth to collect data that can be used to enhance the ESA Program design. The research cataloged key program elements and identified delivery channels, examples where programs use a single point of contact, and various financing vehicles. **Research** identified and cataloged key low-income programs benefiting low-income customers in California. Assessed program elements, including delivery methods, single point of contact.
Evaluate and further examine proposals from parties to the ESA Program proceeding (A.11-05-017 et al.) in the context of previous ESA Program decisions, the current Commission directions (including the Spring 2011 Energy Division staff guidelines for a Multifamily Pilot), and the EE Strategic Plan.	**Reviewed materials** including testimony and proposals provided by stakeholders in response to ESA program proceedings, Commission directives, Decision, and Strategic Plan. Examination provided context and background to guide this research project.
Review other existing multifamily programs, projects and pilots benefitting low-income residents performed under other state programs **Review other recently completed** multifamily projects and pilots benefitting low-income residents performed under other state programs.	**Reviewed** other multifamily programs in California and developed a summary of the California landscape within which the ESA Program operates. Reviewed and compared ESA Program with MFEER, CSD, and EUC MF. Assessed program elements, including delivery methods, single point of contact. **Reviewed** California Energy Efficiency Strategic Plan, Decision 12-08-044, and the Multifamily Home Energy Retrofit Coordinating Committee (MF HERCC) report on multifamily program design **Interviewed 14 stakeholders** who are owners of market rate and/or rent-assisted properties.

Review and investigate options for new delivery methods for the ESA Program. Review coordination concerns related to any new delivery methods for the ESA Program with non-IOU financing and energy efficiency options.	**Interviewed key** ESA Program delivery contractor and other stakeholders who are owners of market rate and/or rent-assisted properties. **Utilized key findings** from other studies such as the Multifamily Energy Efficiency Rebate (MFEER) evaluation. **Research** of key low-income programs in the California landscape and relevant multifamily programs examined program delivery methods and financing options.
Identify available low-income and energy-efficiency financing options, and develop a funding and implementation schema utilizing the variety of energy-efficiency programs available for each multifamily housing owners/operators profile.	**Researched and cataloged** financing and funding options available to low-income multifamily building owners. Cataloged 16 options in this quickly changing market.
Review and investigate cost and budget implications of one or more approaches to low-income multifamily program implementation, including consideration of possible new cost-sharing arrangements and/or financing mechanisms that might be applied.	**Determined** average costs of measure installations using data from four IOUs summarizing ESA Program data for multifamily projects. Determined costs per unit replacement or incremental cost per unit. Proposed range of strategies for further consideration to enhance program's ability to serve low-income households, encourage participation, and maximize energy savings.
Hold public meetings to obtain, document, review, and consider all stakeholders' input.	**Three public workshops** were held. The first discussed the research plan with stakeholders who provided comment and input for the study, the second workshop provided interim research findings, and the third workshop summarized the study's conclusions and recommendations. The research plan and draft report were uploaded to energydataweb.com for public comment. The research team responded to comments, and comments were considered and addressed in final research plan and final report.
Propose (and possibly conduct) field studies, as needed.	**No field studies** were proposed or conducted.

The primary research tasks, their research methodologies and data sources are discussed in the following sections. Findings from each research task are described in separate sections of this report.

Background for the Multifamily Segment Study

Key Informant Interviews

Early in the research study, the Cadmus and Research Into Action team interviewed staff persons from each of the IOUs. The interviews provided background and context for the Multifamily Segment Study. Interviews were conducted at each IOU, with some member(s) of the Cadmus team at the IOU in person, and some on the phone. Staff persons typically included the IOU Study Team member, the ESA Program managers and others familiar with the program, the MFEER program managers, and person(s) working with EUC or developing the IOU's process to offer a single point of contact.

Testimony and Comments on Decision 12-08-044

The comments, proposed changes, and recommendations on Decision 12-08-044 from parties to the proceedings provided important context for the findings of this study. By understanding the issues and concerns raised by stakeholders, a more robust exploration of the multifamily segment was conducted. This information contributed to the development of key considerations for the study's findings and conclusions. Appendix A provides a summary of comments.

- Appendix A lists the objectives of the study as outlined in Decision 12-08-044. It summarizes specific passages in the Decision and the page number, commonly referenced in this report. The appendix lists the eight Multifamily Segment Strategies the Commission directed the IOUs to implement.
- Appendix B lists the stakeholders providing public comments on Decision 12-08-044.

Section 3. California Multifamily Housing Data Relevant for Low-Income Customer Programs

Methodology

Using data from the U.S. Census Bureau 2011 American Community Survey and GIS technology, we estimated the number of low-income multifamily households in California and apportioned those households by IOU service territory, by county, and by census tract. Geocoding was used to allocate census tracts to counties, climate zones, and utility territories to estimate the number of low-income multifamily households. Together with this information, the U.S. Census Bureau 2011 American Housing Survey provided information for developing a profile of the low-income multifamily segment on additional metrics such as building vintage, equipment, and amount of rent paid. We also conducted a regression analysis of program participation data and census data, to identify patterns in participation by census tract. The findings are discussed in Section 3, and details are provided in several appendices.

- Appendix C details the methodology used to estimate the distribution of low-income multifamily housing.
- Appendix D details the methodology used to determine the characteristics of low-income multifamily housing.
- Appendix E details the methodology used to estimate the penetration of ESA Program and MFEER penetration into the low-income multifamily sector.

- Appendix J summarizes measures installed in multifamily households through the ESA Program by each of the four IOUs.

Data Sources

The IOUs provided customer data for geocoding. Publicly available data were used for analysis, including the following. The Bibliography lists additional data sources.

- U.S. Census Bureau American Community Survey 2011
- American Housing Survey (AHS) Public Use File 2011; AHS is sponsored by the Department of Housing and Urban Development (HUD) and conducted by the U.S. Census Bureau
- The 2011 AHS data were used for eight MSAs identified in California: Anaheim, Los Angeles, Oakland, Riverside, Sacramento, San Diego, San Francisco, and San Jose
- 2009 California Residential Appliance Saturation Study, Palmgren et al. 2010, prepared for the California Energy Commission: Kema, Inc. CEC-200-2010-004
- Research data and discussions with John Peterson. "Athens Research Eligibility Estimates Documentation: Memo to the Joint Utilities Working Group." Athens Research, April 5, 2013
- U.S. Energy Information Administration. 2009. *Residential Energy Consumption Survey*

Section 4. Surveys with Owners and Managers of Low-Income Multifamily Buildings

Methodology

A survey with a stratified random sample of 124 building owners and managers of low-income multifamily buildings included owners and operators of market-rate buildings (73 respondents) and rent-assisted buildings (51 respondents). The *sector* strata differentiated between market-rate housing and assisted-housing. Respondents were further stratified by the number of units owned or operated in California (0-25 units, 26-249 units, and 250 units or more owned or managed). Survey weights were applied to answers according to the stratum the respondents represented. The final sample included respondents from all four IOU service territories, although this was not a stratum within the sample design. The sample design called for 300 surveys, including equal numbers in each stratum and post-weighting the responses. However, collecting survey data was challenging, evidenced by 124 completed surveys. The survey findings are discussed in Section 4 of this report.

Appendix F discusses the survey methodology and sampling plan in more detail. It also discusses challenges conducting the survey.

Data Sources

Cadmus relied on several resources to obtain the data for the affordable housing and the market rate sectors.

Affordable Housing Data Sources

Cadmus utilized public sources to develop the sample frame for property owners and managers. These sources included participants in the US Department of Housing and Urban Development's (HUD) Section 8 rental subsidy program. Property owners and managers in the Low-income Housing Tax Credit (LIHTC)

program administered by the California Tax Credit Allocation Committee (CTCAC) were included in the sample frame. These lists came from two sources; HUD and CTCAC. Also included was a list from the US Department of Agriculture for participants in the California Rural Development program. California Housing Partnership Corporation provided records with updated contact information of key decision makers. The initial population in this sector's population included 7,598 records. After filtering and removing duplicates the initial sample frame included 2,365 records. Following the survey pre-test, the list was further filtered and included 367 unique management contacts.

Market Rate Sources

IOUs provided customer data to compile a sample of property owners and managers for the market rate sector sample. To identify building managers or owners, Cadmus used contact information from master or common-area meter accounts in buildings with at least one CARE recipient. To identify this intersection, Cadmus required both individual tenant records with an identifier of CARE status, common area and master-meter account records. The customer data provided varied by IOU. The initial population included over 88,000 records. After filtering and removing duplicates the initial sample frame included 11,714 records. After the pre-test and additional filtering, the sample included 5,377 market rate records.

Convenience Sample

In addition to the sample compiled from the IOU customer data for the market rate housing sector, a convenience sample was compiled. This included additional records of multifamily property owners provided by SCE and records obtained through an internet search of housing associations. From the initial sample frame of 722 records, three surveys were completed.

Section 4. Interviews With Stakeholders and Advocacy Groups

Methodology

The research team conducted interviews with 14 low-income stakeholders and advocacy groups working with affordable- and/or market-rate multifamily housing, and with multifamily building owners and managers. These qualitative interviews collected information about the respondents' constituency and their respective financing considerations for multifamily building improvements. The interviews were not designed to represent a statistically significant sample of the California multifamily market. They represented a diversity of views and highlight the similarities and differences between the various stakeholder and advocacy groups. The respondents' views cannot be classified as belonging solely to affordable- or market-rate housing groups. The findings are discussed in Section 4.

Appendix G details the interview research methodology and sample frame. The appendix lists the agencies interviewed and their primary constituency.

Data Sources

Stakeholders were chosen through a process of reviewing:

- Formal documents designated as "comments" posted to the Commission Decision (D.) 12-08-044 on the Commission website[15]
- Roster of attendees from the Multifamily Segment Study public workshop on March 5, 2013
- Suggestions provided by attendees of the Multifamily Segment Study public workshops on March 5 and September 25, 2013
- Multifamily Executives Magazine's 2013 Top 50 Owners List
- Multifamily housing associations lists
- A.1111-05-017 Service List[16]

Section 5. Comparison Programs Across the Country

Methodology

The review sought to identify strategies that other programs have found to successfully reach the low-income multifamily market and included two primary tasks. The research team's first task was to catalog relevant multifamily programs operating throughout the United States. The team then selected a cohort for further investigation and more in-depth analysis.

Research Into Action identified 44 comparison programs nationwide that target multifamily buildings or residents. Fifteen of the 37 programs reviewed focused exclusively on the low-income multifamily market or had unique program offerings for low-income buildings or their tenants. To understand each comparison program, the research team conducted a more detailed literature review and in-depth interviews with specific program managers. These literature searches for other multifamily and low-income energy-efficiency programs offered in California and North America resulted in a catalog and profiles of programs which offered insight into program design and delivery approaches that may be transferable to California.

None of the programs identified in the catalog excluded multifamily buildings serving low-income tenants. However, many programs did not include specific strategies or services to overcome the unique challenges of serving low-income multifamily buildings. The research team conducted an in-depth review of five programs, expecting that they would yield the greatest insight into program approaches relevant to the ESA Program. The five programs chosen for in-depth comparison were selected because they served areas with large multifamily populations relative to the United States as a whole and because they represented a range of program approaches. The five were: CNT Energy; Energy Outreach Colorado (EOC); Massachusetts Gas and Electric IOUs; NYSERDA; and Public Service Electric and Gas Company (PSE&G).

The programs selected for in-depth comparison operate in areas with climates very different from much of California. It is important to consider these differences in climate in comparisons of the energy

[15] CPUC, Filed October 26, 2012, contact list for posting information regarding scheduled hearings.

[16] Ibid

savings accomplishments of the various programs and the cost effectiveness of the measures they offer. However, low-income tenants and multifamily building owners across the country likely face similar considerations in their decisions regarding energy efficiency. As a result, the comparison programs' established and well-documented approaches to reaching the low-income multifamily sector may provide insight into program delivery approaches that could be effective in California.

Findings are discussed in Section 5.

Appendix H provides a master list of measures eligible for these California programs.

Data Sources

The research team reviewed publically available information sources (including for example, American Council for an Energy-Efficient Economy (ACEEE) reports, program filings, monthly and annual program reports, evaluation reports, and information on program websites) to identify 44 programs outside of California that focus on low-income households, multifamily households, or both. Phone interviews were conducted for the five programs with in-depth reviews.

See Appendix K for the bibliography and additional data sources.

Section 6. The Current California Landscape for Low-Income Multifamily Programs

Methodology

The research team compiled a summary of the low-income multifamily energy-efficiency program landscape in California. The findings are discussed in Section 6.

1. Overarching goals for multifamily efficiency programs, drawing on the California Energy Efficiency Strategic Plan, Commission decisions, and the Multifamily Subcommittee of the Home Energy Retrofit Coordinating Committee (MF HERCC) report.
2. Efficiency programs targeting multifamily building owners and their tenants and interactions between the various programs.

Data Sources

This summary draws on in-depth interviews with IOU program staff, as well as a review of documents. The research team reviewed three documents that express overarching goals guiding the design of programs serving the low-income multifamily sector in California: the California Energy Efficiency Strategic Plan, Decision 12-08-044, and the Multifamily Home Energy Retrofit Coordinating Committee (MF HERCC) report on multifamily program design.

Section 7. Financing and Funding Options

Methodology

Cadmus researched financing and funding options available to multifamily property owners making energy-efficiency capital improvements, especially for properties with a high proportion of ESA Program-eligible tenants. This research was not intended to be limited to debt options, but to look at a

range of potential funding sources to support energy-efficient upgrades, including grants and tax incentives. To that end, "financing" in this section does not refer specifically to loans, but to any program the helps owners pay for an energy saving project.

The catalog presents a sample of representative programs and resources; it should not be regarded as an exhaustive list. Furthermore the catalog does not include programs offering nonfinancial support to energy-efficiency and renewable energy projects (such as permit expediting, although a reduced permit wait time may be financially advantageous in some situations). In addition, data may exist that was not available to our team, such as representative projects and number of projects completed. When interpreting data such as number of projects completed, it is good to note that the programs may not have much activity simply because they are new or because they lack marketing or administrative dollars, and not necessarily because of a failure of program design. The findings are discussed in Section 7 and additional resources are offered.

Appendix I provides additional detail for the 16 financial and funding options reviewed.

Data Sources

The Cadmus team conducted internet searches, phone interviews, and drew upon internal knowledge evaluating a number of utility on-bill financing and on-bill repayment programs.

Section 8. Conclusions and Recommendations

Methodology

Public workshops and regular weekly meetings with the Study Team provided input about areas of greatest interest and concern. From this input and research, we compiled data about options to fund energy-efficiency projects, barriers to upgrading buildings, and aligned findings reflecting barriers, drivers, and potentially replicable program models according to functional areas, such as eligibility rules, participant intake and enrollment, technical and administrative support, marketing and outreach, and delivery and implementation. Our task was to draw upon information gathered through primary and secondary research to identify opportunities to reach deeper into the low-income multifamily market, both addressing the needs of as many low-income households as possible and increasing cost-effective energy savings in this sector at a reasonable cost.

Study Limitations

The Multifamily Segment Study combined primary and secondary research to characterize this complex market segment.

The Study focused on low-income tenants (renters) in multifamily buildings with five or more units but not on single family home renters. There may be similarities between classes of renters, such as barriers to tenant participation and to capturing energy savings, which may apply to renters whether they rent apartments in multifamily buildings with more than five units, fewer than five units, or rent single family homes. Where these more general renter-related barriers exist we call them out; however, our primary focus is on the five-plus low-income multifamily market segment.

This research did not include in-depth process evaluations nor did we have the time or resources to conduct a full scale investigation of every program in California. The complexity of the landscape touching multifamily buildings housing low-income tenants is evident both in the challenges documenting the programs we reviewed and the myriad of program rules and exceptions that apply to a given program and building and unit. The IOUs are implementing these programs with fidelity to current program rules.

It is important to point out that, per the approved research plan, no tenant surveys or interviews were conducted for this project, and no on-site technical assessments or property inspections were conducted. Rather, to understand the tenant, the study focused on the household level data to characterize the tenants of low-income multifamily buildings, the energy-consuming equipment with which they live, the apartment units, and the physical structures. Extensive secondary research with census and AHS data, details these characteristics and other metrics. In addition, primary research with building owners and managers described energy related characteristics of the buildings and apartment units, and the factors important to their decisions to upgrade or replace equipment in the apartment units and common areas, and to improve energy efficiency of buildings and properties as a whole. Research identified financial options that could assist building owners to upgrade the energy efficiency of these buildings.

Interviews with interested stakeholders focused on a limited set of questions and their responses provided valuable input. We note that the limited input may not provide an accurate picture of their overall understanding of the program and program rules as implemented by the IOUs. The findings from these interviews may not necessarily reflect the specific needs, opinions, or objectives of the California IOUs and regulators or the rules under which energy efficiency program sponsors and administrators must operate.

The examination of comparison programs studied how other states deliver programs targeting the multifamily sector and provided insights that may assist the IOUs to reach the multifamily target market. The reviews of California's multifamily programs serving the low-income sector were not, and were not intended to be, an in-depth process evaluation of each program. Likewise, the assessments of comparison multifamily programs offered in other states were not in-depth process evaluations. Most program managers were not able to provide cost data describing the cost to treat each unit or cost to deliver the programs.

Section 2. Key Research Questions, Findings, and Themes

This section summarizes findings for key research objectives and discusses the themes emerging from research findings.

1. What are the characteristics of the low-income multifamily segment?

There are approximately 3.719 million low-income households within the state of California, representing about 30% of all households. Low-income multifamily households are those earning no more than 200% of the federal poverty guidelines. Of these, approximately 1.175 million live in multifamily housing which includes all buildings with five or more housing units. The low-income multifamily sector represents about 9% of total households and 32% of low-income households within the state.

In other respects, the most notable characteristic of this segment is its variety, both in the social circumstances of the households and, more germane to the current research, in the physical structures and the energy-consuming equipment with which they live. For instance, the variety among low-income multifamily households in the sizes and vintages of buildings where they reside shapes the approach that is optimal for addressing their need. Size and vintage is not equally distributed across the territories but rather varies by metropolitan area. San Francisco and San Jose have the highest percentage of buildings with 40 or more units (about 25%); San Diego and Anaheim have the lowest percentage (12% and 14%, respectively). San Francisco has the oldest buildings, with 90% built before 1980, while San Jose has significantly newer buildings overall, with only 56% built before 1980.

Low-income multifamily households do not appear to be greatly different regarding their energy-using equipment than multifamily households with adequate income. For instance, with respect to air conditioning (AC), 62% of low-income households have one or more room AC units or central AC. For multifamily households that are above 200% of the federal poverty guidelines, 63% have AC equipment. The most important factor determining whether multifamily households have AC equipment is not income but location: 98% of low-income multifamily households in Riverside have either room AC or central AC, whereas in San Francisco only 9% of low-income multifamily households have AC. The presence of central AC among low-income multifamily households is strongly related to the vintage of the building, with older buildings less likely to have central AC. Buildings smaller than 40 apartment units are less likely to have central AC than buildings that are larger (30% compared to 53%, respectively).

In the equipment used to heat the apartment, low-income multifamily households are more similar to other households' types in the same area than they are to other low-income multifamily households in other areas. In Riverside, 65% of households heat with a central furnace and air ducts; in San Jose, only 35% have central furnaces with another 35% having wall heaters and 18% using baseboard heaters or electric coils. Heating fuel does not vary much for multifamily households of all income levels on a statewide basis, but varies from one area to another. The percentage of low-income multifamily households using gas for space heating varies from 39% in San Diego to 63% in Anaheim.

Low-income multifamily households are only slightly less likely to report they have ENERGY STAR® qualified equipment than multifamily households with adequate income. For instance, 27% of low-income multifamily households say their refrigerator is ENERGY STAR qualified, compared to 33% of multifamily households with adequate income. The average age of the primary refrigerator does not differ between the two income groups either. While low-income multifamily households are less likely to have clothes washers, clothes dryers, or dishwashers in their units than are multifamily households with adequate income, the proportion of households reporting ENERGY STAR rated equipment is similar in the two sectors.

The split incentive barrier is well understood in the multifamily sector: where tenants pay for electricity and gas use, property owners derive less benefit from improvements in energy-efficiency. In the low-income sector, however, this barrier is somewhat attenuated. A greater proportion of households report that utility bills are paid by the property owner: 11% for electricity and 22% for gas. This compares to 6% and 18%, respectively, for multifamily households above 200% of the federal poverty guidelines. In San Francisco, moreover, 23% of low-income multifamily households report that electric utilities are included in their rent payment and 25% say gas is included. Among households for which energy utilities are separate from their rent payment, electric and gas utility costs consume about 4.5% of household income, on average. This utility burden, however, varies across the differing degrees of poverty. For households whose income brings them no higher than 50% of the federal poverty guidelines (about 40% of low-income households), utility costs consume nearly 29% of income, on average. At the other end of the spectrum, among households between 150% and 200% of poverty (about 20% of low-income households), utilities consumer about 3% of income.

Although our data do not allow us to develop great precision, making an assumption about the average rate at which low-income and adequate income multifamily households live together within buildings brings us to the estimate (shown in Table 4) of the number of buildings housing low-income multifamily households. Again, this is quite a rough estimate; but in concept it includes all buildings housing any low-income households. For example, this table shows that in PG&E's territory, there are an estimated 20,315 multifamily buildings housing low-income households that have five to nine apartment units. To arrive at this value we have had to make an assumption about the average rate at which low-income households mix with households with adequate income. For more detail on this assumption, see Section 3.

Table 4. Estimated Number of Buildings Housing Low-Income Multifamily Households

Building Size	PG&E	SCE	SDG&E	SCG
5 to 9 Units	20,315	18,113	6,331	31,714
10 to 19 Units	8,319	7,424	2,597	13,021
20 to 49 Units	3,298	2,915	1,018	5,107
50 or More Units	1,956	1,676	599	2,970
Total	**33,889**	**30,128**	**10,546**	**52,812**

2. Where are the low-income multifamily buildings located?

Cadmus estimated the number of low-income multifamily households in each California census tract, county, and utility territory. Low-income multifamily households are spread widely across the utility territories and in rather equal proportions: they constitute roughly 7% of households in PG&E's territory and 11% of households in SCG's territory, with proportions in SCE's and SDG&E's territories falling between those values.

Alpine and Mono counties have the highest proportion of low-income multifamily households, at about 22% and 16% of total households, respectively; but these are generally rural areas with few households of any kind. Otherwise, the highest proportions of low-income multifamily households are in urban counties—Los Angeles 14%, San Francisco 13%, San Diego 11%, Alameda 10%—or in agricultural areas such as Yolo County (13%) and Imperial County (10%).

3. In what ways is this segment being served through the existing ESA Program?

The existing ESA Program serves all low-income IOU customers, including single-family residences, multifamily residences, and mobile homes. The ESA Program provides income-qualified residents of multifamily buildings (along with single-family residences and mobile homes) with direct installation of retrofit measures to manage their energy use and save money on their monthly energy bills at no charge to the participating household. Unlike other IOU multifamily programs, the ESA Program focuses on serving households rather than building owners. Consistent with this approach, all of the services the program offers target the dwelling units of qualified households; the ESA Program does not treat central systems or common areas in multifamily buildings.

In 2012, the largest portion of the ESA Program's spending across all housing types went to installation of infiltration and space conditioning measures, including air sealing, duct sealing, and attic insulation. Lighting measures, primarily CFLs and interior CFL fixtures, provide the largest portion of the program's electric energy savings, and water heating measures such as low-flow faucet aerators and showerheads, pipe insulation, and water heater blankets provide the largest portion of the program's gas savings.

The ESA Program does not ostensibly distinguish services offered to multifamily and single-family residences. However, some differences exist in program delivery to owner-occupied units as opposed to renter-occupied units (which includes most multifamily properties). To provide some services to renters, the ESA Program requires building owners to sign a Property Owner Waiver form, authorizing efficiency improvements.[17] The program also requires building owners to provide a co-payment for the

[17] The Statewide ESA Policy and Procedures Manual states that, with written authorization from the IOU program manager, ESA contractors can install "services and measures that do not directly affect the condition and/or structure" of renter-occupied units without receiving a signed Property Owner Waiver form.

replacement of older, inefficient refrigerators in tenant units if the building owner owns the refrigerator and the tenant does not pay the electric bill, although ESA Program staff noted that both of these conditions rarely occur. The ESA Program provides refrigerator replacement at no cost to qualified owner-occupied households and renters who own their refrigerator or directly pay their electric bills.

The need to obtain a signed Property Owner Waiver form can be a barrier to participation, since some building owners are difficult to reach or unresponsive. To overcome this issue in the multifamily sector, the IOUs and ESA Program contractors have increased their outreach to the owners of buildings in low-income areas. Once ESA Program contractors gain the cooperation of a multifamily building owner, they seek access to the entire property so they can work through the building to enroll all eligible participants in multifamily rental units. As in single-family buildings, the ESA Program verifies the eligibility of multifamily households on a unit-by-unit basis prior to delivering services, although the program can also treat unoccupied units in a multifamily building once it has verified that at least 80% of the households are income-qualified.

The ESA Program does not offer any measures exclusively for multifamily buildings, nor does it explicitly exclude any measures from multifamily buildings, but fewer ESA Program measures are typically feasible to install in multifamily units than in single-family buildings. For example, multifamily units may have fewer exterior walls for air sealing, and multifamily units in multistory buildings may not have an attic that could be insulated. As a result, it may be more difficult for program contractors to meet the ESA Program requirement of installing at least three measures or achieving annual energy savings of at least 125 kWh or 25 therms through installation of one or two measures in multifamily units.

During the six-year period between 2007 and 2012, about 21% of low-income multifamily households in the utility territories participated in the ESA Program (formerly referred to as LIEE but referred to by IOU specific names to customer).[18] The distribution of measures installed varied by IOU.

1. ***Appliances:*** Of SCE MF participants, 18% received appliances (specifically, refrigerators). PG&E distributed microwave ovens to 1% of multifamily participants and refrigerators to 13% of multifamily participants.[19] At SDG&E, for example, 3% of participants received microwaves and 6% received refrigerators.
2. ***Envelope and Air Sealing:*** At PG&E and SDG&E, more than 70% of multifamily participants received measures in the categories of envelope and air sealing and domestic hot water. Among SCG ESA multifamily 5+ participants, more than 90% received envelope and air sealing measures.

[18] The ESA Program was formerly known as the Low-income Energy Efficiency (LIEE) Program.

[19] For PG&E, microwave ovens were offered through a limited pilot in in 2009-2010, and were not offered in 2011. Microwaves are back in the program starting 2013 as a regular PG&E ESA program measure.

3. ***Domestic Hot Water:*** Three-quarters or more of participating multifamily households received domestic hot water measures except among SCE's participants where, the prevalence of gas water heat makes the measure a less important source of electric savings.
4. ***Heating and Cooling:*** For all utilities, only a minority of multifamily households received HVAC measures, with about 11% of SDG&E households receiving heating measures and 14% of PG&E households receiving cooling measures.
5. ***Lighting:*** Most participating multifamily households in PG&E's and SDG&E's program received lighting measures. SCG did not distribute lighting measures because it is a gas only utility.

Table 5. Percentage of Participating Multifamily Households Receiving ESA Program Measures[1, 2]

Utility	Participants	Appliance	Envelope & Air Sealing	Domestic Hot Water	Heating	Cooling	Lighting
PG&E	58,877	14%	82%	84%	1%	14%	89%
SCE	65,775	18%	2%	0%	1%	1%	36%
SCG	64,510	0.1%	92%	98%	3%	0%	0%
SDG&E	32,670	14%	75%	73%	11%	2%	96%

1. Data is for PY2010 through PY2012
2. Percentages are of total MF households receiving measures during 2010 through 2012

4. Who is the multifamily customer: tenant or building owner?

The energy-efficiency services and incentives available to multifamily customers in California are divided between programs that view the tenant as the multifamily customer and programs that view the building owner as the multifamily customer.

Energy-efficiency programs offering common-area and central-system measures primarily target building owners, who have decision-making authority over these systems, while programs focused on in-unit measures are more likely to view the tenant as their customer. MFEER and the whole-building multifamily efficiency programs (including Energy Upgrade California multifamily (EUC MF) path and the REN programs) offer common-area and central-system measures, as well as in-unit measures. These programs target building owners.

The federally funded weatherization program that the California Department of Community Services and Development administers (CSD program)[20] takes both approaches. The program has reached out to, and worked with, owners of low-income multifamily properties to complete whole-building

[20] The CSD program receives funding through the U.S. Department of Energy's Weatherization Assistance Program as well as the U.S. Department of Health and Human Services' Low-income Home Energy Assistance Program.

weatherization projects,[21] but also allows multifamily households to qualify individually and provides in-unit measures to individually-qualified households.

The ESA Program and the CSD program primarily offer in-unit measures to individually-qualified households. They view the income-qualified tenant, rather than the building owner, as their customer. In part, these programs target income-qualified tenants because they seek to achieve goals beyond generating energy savings. Through the ESA Program, the IOUs seek to ensure that all ratepayers can benefit from ratepayer-funded efficiency program offerings by providing measures at no cost to customers who could not otherwise afford them.

A key reality faced by programs targeted to tenants is the amount of housing unit mobility among this sector. AHS data indicate that 54% of households had lived in their previous unit for three years or less. Thus, tenants receiving benefits are quite literally a moving target, with nothing to assure they will move into a unit that has been treated or that the household moving into the vacated unit would qualify for the program.

The ESA Programs' approach (serving low-income residents in mixed housing types) contrasts with that of the comparison low-income multifamily programs in other parts of the country that the research team examined. Like the ESA Program, these programs ultimately seek to benefit low-income households; however, the primary target of these programs is the owner of a multifamily building with low-income tenants. The comparison programs' focus on building owners is consistent with these programs' more comprehensive focus: in addition to measures in tenant units, these programs support upgrades to measures in common areas and central systems.

Obtaining benefits for the residents of the buildings served through these programs remains a priority, however. Comparison programs in Colorado and Massachusetts have formal requirements designed to ensure that the retrofits they support benefit tenants[22]. Both programs require building owners to agree not to raise rents for a defined period following the retrofit, and the program in Colorado further requires building owners to specify how they plan to use the cost savings from their efficiency improvements to benefit tenants.

Both the ESA Program and the CSD Program have increased their outreach to multifamily building owners in their efforts to target the low-income multifamily sector. The CSD program used budget increases resulting from ARRA funding to work directly with building owners to undertake whole-

[21] As described below, to qualify for whole-building weatherization measures, CSD requires that 66% of the residents in a multifamily building be income qualified or that the building be listed on the list of qualified buildings maintained by the U.S. Department of Housing and Urban Development and the U.S. Department of Energy.

[22] Energy Outreach Colorado's Low-Income Multifamily Weatherization Program brings together funding from federal weatherization programs, utilities, and other sources. The LEAN Multifamily Program in Massachusetts is funded by utility ratepayers.

building retrofits in multifamily buildings with low-income tenants, but this level of support is unlikely to continue under the program's current, reduced budget.

The strategies for reaching out to the low-income multifamily sector that Decision 12-08-044 directs the IOUs to undertake approaches to serve multifamily housing with low-income tenants and will also require the ESA Program to work directly with multifamily building owners and managers. For example, efforts such as a whole-neighborhood approach and same-day enrollment, assessment, and installation require coordination with building owners and managers. The IOUs' proposed multifamily single point of contact will also direct building owners to the ESA Program, when applicable.

5. What is available (services and benefits) to the multifamily tenants and building owners now, via IOU or other programs?

Table 6 summarizes characteristics of the four statewide programs that most directly target the low-income multifamily sector. As described below, the programs listed include both programs targeting low-income tenants of multifamily buildings and programs targeting the owners and managers of multifamily buildings.

Table 6. Multifamily Program Characteristics

Program Characteristics	Programs Targeting Tenants		Programs Targeting Building Owners		
			MFEER	Whole Building	
	ESA Program	CSD Program		Bay REN	EUC MF Path and SoCal REN
Building Areas Treated	Dwelling units	Dwelling units Common areas[1] Central systems[1]	Dwelling units Common areas Central systems	Dwelling units Common areas Central systems	Dwelling unit Common areas Central systems
Typical retrofit scope	Lighting measures, hot water saving measures, weatherization, refrigerator replacement	Lighting measures, hot water saving measures, weatherization, refrigerator replacement	Single-measure upgrades: primarily lighting for PG&E, SCE, and SDG&E, water saving measures for SCG	Multiple measure upgrades	Comprehensive upgrades
Measure Identification	Walk-through assessment	Walk-through assessments and energy audits using diagnostic equipment	No standard protocol, contractor may conduct an assessment to determine scope of work	Building owner completes software-based assessment; technical assistance completes energy model and on-site verification	Investment grade audit
Incentive type	Direct installation[2]	Direct installation[2]	Prescriptive rebates[3] – may cover full cost to participant	Performance-based fixed per-unit incentive[4]	Performance-based tiered per-unit incentive[5]

1. While CSD individually-qualifies and treats tenant units, the program has also completed whole-building upgrades in buildings that meet its income qualification requirements.
2. In a direct installation program, the contractors who install measures work under contract to the program administrator. Direct installation programs typically provide measures at little or no cost to the participant.
3. Prescriptive rebates provide a set rebate amount for installation of specific measures.
4. Per-unit incentive amounts are based on the number of units in a participating building. The total incentive the building owner receives is the product of the per-unit incentive and the number of units in the building. For the Bay REN program, performance is assessed similarly to EUC MF programs, with a single minimum performance threshold of 10% whole building energy savings.
5. Performance-based incentives are based on project-specific energy savings estimates. These estimates depend on the pre-retrofit characteristics of the building or equipment, and may take into account factors including the actual duty cycle of the equipment and interactions between multiple measures.

The programs targeting building owners each focus on retrofits of different scopes and provide services consistent with that scope. For example, MFEER's single-measure retrofits are delivered primarily by contractors who use the program's incentives to sell retrofits to multifamily building owners. In contrast, IOU staff and contractors take a more active role in the EUC MF Path programs, as the single point of contact is expected to guide participants through a more complex retrofit process.

Taken together, the programs targeting multifamily buildings in California provide services to meet a wide range of customer needs. However, fully meeting the needs of an individual building owner, particularly in buildings serving low-income tenants, may require drawing on services from multiple programs. [23] Process evaluations of the ESA Program and MFEER, and IOU staff interviews suggest the coordination between programs has posed challenges in the past, particularly in coordinating between programs targeting tenants and those targeting building owners. The single point of contact proposed for the 2013-2014 program cycle and the more formal coordination process laid out in the EUC MF Path Program Implementation Plans (PIPs) seek to improve coordination between the programs serving the multifamily sector.

Responding to Commission direction in D. 12-11-015, in 2013, all of the IOUs planned to implement a single point of contact for multifamily building owners. This single point of contact will primarily work with building owners to determine which energy efficiency program offerings are most appropriate given the characteristics of the building and the types of upgrades the owner is interested in undertaking. The single point of contact will also assist building owners in navigating energy efficiency program participation processes and coordinating processes across programs. While the IOUs proposed the single point of contact as part of their EUC MF Path plans, and EUC MF Path participants will likely work most closely with the single point of contact, other programs serving the multifamily sector are expected to connect building owners with other programs, or with the single point of contact as appropriate.

The IOUs' EUC MF Path plans also describe a structured approach for the programs' coordination with the ESA Program. As part of their agreement to participate in the EUC MF Path, building owners will be required to authorize the ESA Program to serve their income-qualified tenants, and ESA Program contractors will qualify and treat all willing and eligible tenants. The participating building's energy use baseline will be calculated with the ESA Program's improvements in place to give credit to EUC MF for measures installed with ESA Program funding.

6. What do multifamily customers need from the IOU?

While we did not speak directly to low-income multifamily tenants, in our survey and comparative research we identified nothing to challenge or augment the fundamental premise of the ESA Program

[23] For example, a multifamily building owner may authorize ESA to serve units occupied by income-qualified tenants prior to installing additional measures and treating non-income-qualified units through MFEER or EUC MF Path.

that the chief need the IOUs can reasonably be expected to address is assistance in upgrading equipment and systems that consume energy. We found no mismatch between these needs and the ESA Program offerings. In our view, the primary challenge is in meeting these needs in the most efficient and effect manner possible.

To this end, the ESA Multifamily Financial Options Catalog, created for this research and discussed in Section 7, highlights the need for a single point of contact for multifamily building owners to facilitate their applications to any of the various financing opportunities that currently exist in the state of California. All 16 of the existing options we identified in this study are limited by different factors, such as geography, eligible measures, eligible applicants, and available funding. This can make it difficult for multifamily building owners and managers unfamiliar with the various options to identify the programs for which they might qualify, let alone make it difficult to navigate the application process. In addition, the tenant qualification process using different income guidelines can be disruptive to tenants, and place an administrative burden on property managers.

7. What are the barriers to serving multifamily customers?

The ESA Program must overcome a range of barriers in its efforts to serve low-income households, including customers' skepticism of the program's offer of free services, customers' inability to take time off of work to meet with program contractors, customers' difficulty providing the required documents, and cultural and language barriers. This study did not identify significant additional barriers that are unique to low-income residents of multifamily buildings. However, because nearly all low-income multifamily residents are renters, the need to obtain the property owners' permission to install some measures can pose a challenge to the ESA Program in reaching low-income tenants of multifamily buildings. Building owners may be hard to reach or unresponsive to ESA Program contractors, and may refuse participation for any number of reasons.[24]

Programs serving multifamily property owners and managers have encountered a range of barriers that prevent energy efficiency improvements. One barrier may stem from building owners' difficulty navigating the range of funding options available to provide the capital for energy efficiency retrofits. The Cadmus team's research on funding options available for multifamily building owners and tenants found that a number of options exist and that this market is rapidly changing.

In their 2013-2014 Program Implementation Plans (PIPs) for MFEER and the whole-building multifamily programs, the IOUs and Regional Energy Networks (RENs) cite a range of barriers to serving the multifamily property owners and managers who are these programs' participants. The low-income multifamily programs examined in other parts of the country also address the three barriers most commonly cited in the IOU and REN multifamily PIPs.

[24] These challenges apply to single-family renters as well as multifamily renters. As noted, they are relevant to the low-income multifamily sector specifically because 97% of low-income multifamily households are renters.

Table 7. Barriers to Serving Multifamily Building Owners and Managers

Barrier	California Program Approaches	Comparison Program Approaches[1]
Split Incentives: In many buildings, tenants pay the bills for energy used in dwelling units, and would thus benefit from energy savings. However, building owners maintain, replace, and upgrade energy-using equipment.	• Incentives cover full cost of some MFEER measures to building owner.[2] • Coordination with the ESA Program provides measures in qualified units at little or no cost to building owner.[3] • Marketing focus on non-energy benefits of upgrades to building owner.	• Fully subsidizing retrofits. • Outreach to public and non-profit-owned housing, where building owners are driven by missions that include providing benefits to tenants. • Marketing focus on non-energy benefits of upgrades to building owner.
Lack of awareness of energy efficiency: Building owners and managers may not be aware of opportunities to improve the efficiency of their buildings and may lack the information necessary to evaluate various retrofit options.	• Single point of contact will direct building owners to the most appropriate program and assist with participation process. • EUC MF Path participants undergo a comprehensive energy audit to identify savings opportunities.	• Comprehensive energy audits identify savings opportunities; comparison programs encourage building owner participation in this process. • One program provides more structured energy education to building owners/managers.
Lack of access to capital: Multifamily buildings often have tight operating margins and complicated financing structures, making it difficult for owners to provide capital for retrofits.	• Incentives provided to offset retrofit costs, in some cases covering most or all costs.	• Incentives provided to offset retrofit costs, typically covering 50%-100% of retrofit costs. • Programs offer financing or partner with a lender; program contacts advise building owners on financing options.

1. The five comparison programs examined are: CNT Energy's Energy Savers Multifamily Program, operating in the Chicago, IL area; NYSERDA's Multifamily Performance Program, operating in New York; Energy Outreach Colorado's Low-income Multifamily Weatherization Program, operating in Colorado; the LEAN Multifamily program operating in Massachusetts and administered by that state's gas and electric IOUs; and PSE&G's Residential Multifamily Housing Program, operating in New Jersey. Table 8, below, provides additional information about each program.
2. MFEER offers per-measure, prescriptive incentives. However, for some lighting retrofits and hot water saving measures these incentives cover the full retrofit cost, allowing participants to receive measures at no cost.
3. ESA provides measures at no cost to the low-income participant. However, in renter-occupied units, building owners may be required to provide a co-pay for replacement of refrigerators that are the property of the building owner, rather than the tenant, if the building owner pays the electric bill.

In interviews conducted for this study, building owners, managers, and advocacy groups expressed the desire to provide tenants with benefits offered by energy efficiency programs. However, respondents said concerns such as timing of upgrades, cost-effective measures, and limiting administrative time must remain a priority when considering participation in energy-efficiency programs. Additionally, analysis of the AHS data shows the average low-income multifamily household spends 4.5% of their income on energy costs, an average of $40 for electricity and $20 for gas. This relatively low energy burden may result in low motivation for the tenant to participate in the ESA Program, especially if barriers such as confusing paperwork or unwilling building owners are presented.

Managing multifamily buildings requires, at a minimum, long-term planning, financial commitment, technical expertise, organizational acumen, and significant administrative time. Add the perceived complexity of the various energy-efficiency programs, multiple measure types, and regulatory requirements to the mix, and multifamily building owner and manager participation in these programs can be inhibited.

Not surprisingly, the most prevalent theme to emerge from interviews with building owners, managers, and other stakeholders was the desire for IOUs to provide help in navigating the energy-efficiency programs, the offerings, the requirements, and funding sources. Respondents said they would also like technical expertise and administrative support from the programs.

8. How are other multifamily programs offered? What are their organizing principles?

The in-depth comparison of other multifamily programs offered in other states all included activities in five key areas expected to help achieve efficiency retrofits in low-income multifamily buildings: [25]

1. Supporting building owners through the retrofit process
2. Assessing energy-savings opportunities and developing a retrofit scope of work
3. Assisting with financing
4. Installing energy-efficiency measures
5. Ensuring the quality of installations and verifying energy savings.

Beyond these five key activity areas, the comparison programs were notable for the presence and role of nonprofit and public benefit organizations in both administering and delivering services to multifamily buildings. These organizations sought to identify buildings and work closely with owners to develop

[25] The programs selected for in-depth comparison operate in areas with climates very different from much of California. It is important to consider these differences in climate in comparisons of the energy savings accomplishments of the various programs and the cost effectiveness of the measures they offer. However, low-income tenants and multifamily building owners across the country likely face similar considerations in their decisions regarding energy efficiency. As a result, the comparison programs' established and well-documented approaches to reaching the low-income multifamily sector may provide insight into program delivery approaches that could be effective in California.

scopes of work that captured all cost effective opportunities. Several were able to facilitate or offer financing opportunities directly that further encouraged building representatives to take action.

As a whole, in the comparison programs, the priority was for a comprehensive treatment of the targeted buildings, with some programs covering substantial (if not all) of the retrofit costs. The wide range of costs per unit treated (and per multifamily unit) in a program's respective territories, illustrating the range of cost tolerance associated with reaching this challenging population. Most notable is the Multifamily Performance Program (MPP) of the New York State Energy Research and Development Authority (NYSERDA), which offers incentives to multifamily building owners based on the level of energy use reduction their retrofits achieve. Building owners can install any measure that building energy models show to be cost-effective. While the program is open to all multifamily buildings, those with qualified populations are able to access substantially higher incentives than market rate buildings progressing through the same program.

Broadly, the comparison programs approach the market with a facilitative, solution-oriented package. These programs provide access to detailed assessment information, feedback, and (in some cases) construction support. The audit is treated as an opportunity to identify all cost-effective upgrades and educate building owners.

Perhaps most importantly, the materials for several programs articulated a long-term commitment to this market by: (1) describing expectations such as building the skills of contractors and technical partners, (2) documenting the non-energy benefits associated with energy-efficiency upgrades, and (3) locking in financial benefits for the residents of treated buildings. Table 8 provides a brief summary of the approaches taken by each comparison program.

Table 8: Summary of Comparison Program Approaches

Administrator	Program Name	Service Area	Broad Approach	Description
CNT Energy	Energy Savers Multifamily Program	Chicago metro area	Partnership + case management	CNT Energy staff work closely with participating buildings to guide them through the retrofit process and manage their participation in applicable efficiency programs offered by utilities.
NYSERDA	Multifamily Performance Program	New York State	Facilitation + performance	Participants in NYSERDA's MPP work with a consulting engineer ("partner") who guides them through the retrofit process, including identifying financing offerings and overseeing contractor selection and measure installation. The program pays incentives based on the energy savings a building achieves, with higher incentives offered to buildings housing low-income tenants.

Administrator	Program Name	Service Area	Broad Approach	Description
Energy Outreach Colorado	Low-income Multifamily Weatherization Program	Colorado	Clearinghouse + general contractor	EOC brings multiple funding sources together to form a single program targeting the low-income multifamily sector. EOC works as a general contractor for program participants during the retrofit process, defining a scope of work and contracting with installers.
Massachusetts gas and electric IOUs	Low-income Energy Affordability Network (LEAN) Multifamily Program	Massachusetts	Gatekeeper + full service	LEAN provides participating building owners with WegoWise benchmarking software in order to identify those with the greatest potential for retrofits. LEAN covers the full cost of retrofits for buildings participating in the program.
Public Service Electric & Gas Company (PSE&G)	Residential Multifamily Housing Program	Central New Jersey	All comers + financing	PSE&G's program does not have explicit income requirements, although the program recruits the majority of its participants through its partnership with the New Jersey Housing and Mortgage Finance Authority, which serves low-income housing providers. The program offers on-bill financing to cover the cost of retrofits not paid for by incentives.

Section 3. California Multifamily Housing Data Relevant for Low-Income Customer Programs

Distribution of Low-Income Multifamily Housing in California

Summary of Key Findings

Using data from the American Community Survey and GIS technology, we estimated the number of low-income multifamily households in California and apportioned those households by IOU service territory, by county, and by census tract. Cadmus calculated the percentage of households that: (1) meet the ESA Program low-income criterion of earning less than or equal to 200% of the federal poverty guideline (defined by the U.S. Census Bureau), and (2) resided in buildings with five or more units. The result is our estimate of the size of the targeted low-income multifamily sector.

For details about the methodology, see Appendix C.

Appendix D details the methodology used to determine the characteristics of low-income multifamily housing.

Appendix E details the methodology used to estimate the penetration of ESA Program and MFEER penetration into the low-income multifamily sector.

Appendix J summarizes measures installed in multifamily households through the ESA Program by each of the four IOUs, referenced in Section 3 of this report.

Table 9 shows Cadmus' estimated population statistics for each of the IOUs. Where relevant, we present separate figures for electricity and gas territories. To estimate the number of gas customers we adjusted the number of households by the proportion that receive gas service. We made these adjustments using data from the 2011 American Housing Survey (AHS) Public Use File, described more fully below and in Appendix C. Where more than one utility serves the same household, that household is represented in both rows of the table.

Table 9. Estimated Population Statistics for California IOUs

Utility Fuel	Population	Housing Units	Households	Low-Income Households	Multifamily Households	Low-Income Multifamily Households
PG&E Electric	12,202,249	4,676,014	4,263,939	1,175,083	790,156	313,050
PG&E Gas	11,266,960	4,370,507	3,992,141	1,090,934	744,293	303,475
PG&E Combined	14,405,709	5,520,242	5,042,422	1,418,408	921,301	377,015
SCE Electric	13,047,504	4,498,850	4,115,093	1,239,688	789,022	335,484
SDG&E	3,345,594	1,275,178	1,169,705	302,148	308,055	116,904

Utility Fuel	Population	Housing Units	Households	Low-Income Households	Multifamily Households	Low-Income Multifamily Households
Electric						
SDG&E Gas	2,385,014	904,483	829,106	223,603	226,262	87,800
SDG&E Combined	3,345,594	1,275,178	1,169,705	301,947	308,055	116,904
SCG Gas	17,185,501	6,009,618	5,523,378	1,773,469	1,344,630	591,929

Source: U.S. Census Bureau American Community Survey 2011 and Athens Research

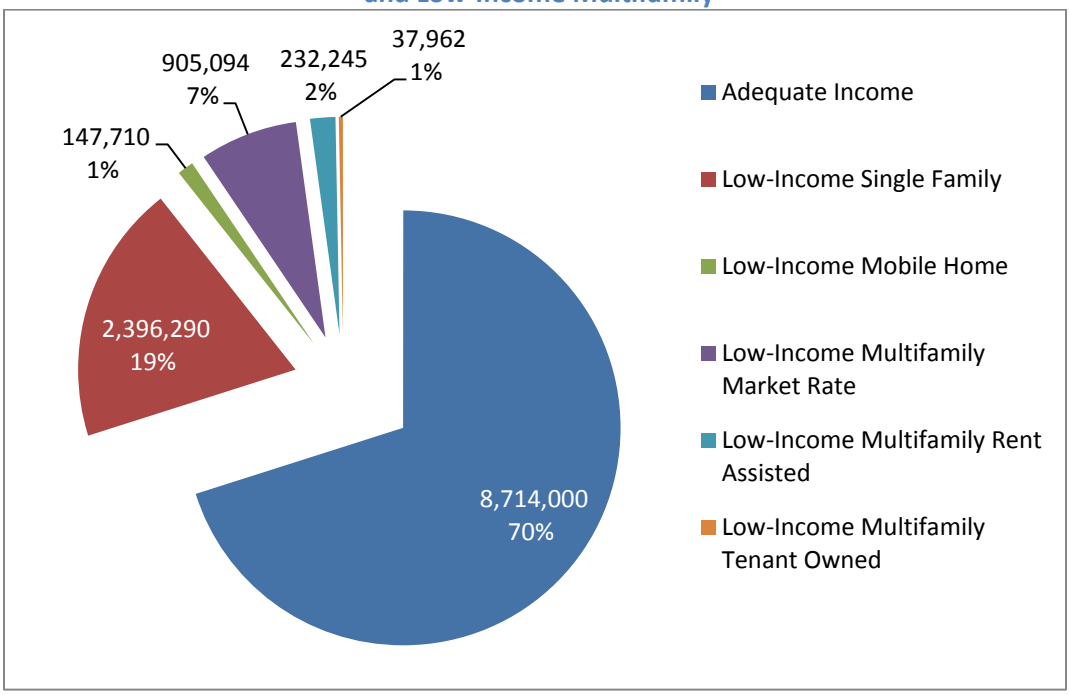
It is important to note that the estimates of low-income multifamily households in Table 9 represent occupied residential units and exclude group quarters such as dormitories and prisons. Moreover, the count of households is lower than the number of active service connections to the IOU, as some households have more than one connection. As a point of comparison with our estimates, PG&E estimates 5.768 million total residential customers, which is 4% higher than our estimate of housing units and 14% higher than our estimate of households. Our estimate of low-income households was arrived at using a different methodology than the other statistics. For those, we applied an estimate of the percentage of low-income households by county, produced by Athens Research, to the ACS estimate of total households. PG&E estimates 1.758 million low income customers, which is 24% higher than our estimate. For a discussion of our methods, see Appendix C.

Statewide, low-income multifamily households in buildings with five or more units represent approximately 9% of total residential households, 32% of low-income households, and 42% of multifamily households, for a total of 1.175 million households.[26] Note, however, that the percent of multifamily households within the low-income sector varies across IOUs, ranging from 39% to 27%. Based on 2011 American Housing Survey data, discussed below, approximately 20% of low-income multifamily households live in housing units that are government subsidized. This represents about 230,000 households.

Figure 3 shows the estimated number of households in California by income category and housing type.

[26] Table 9 includes some double counting of households, because some households are served by two of the utilities.

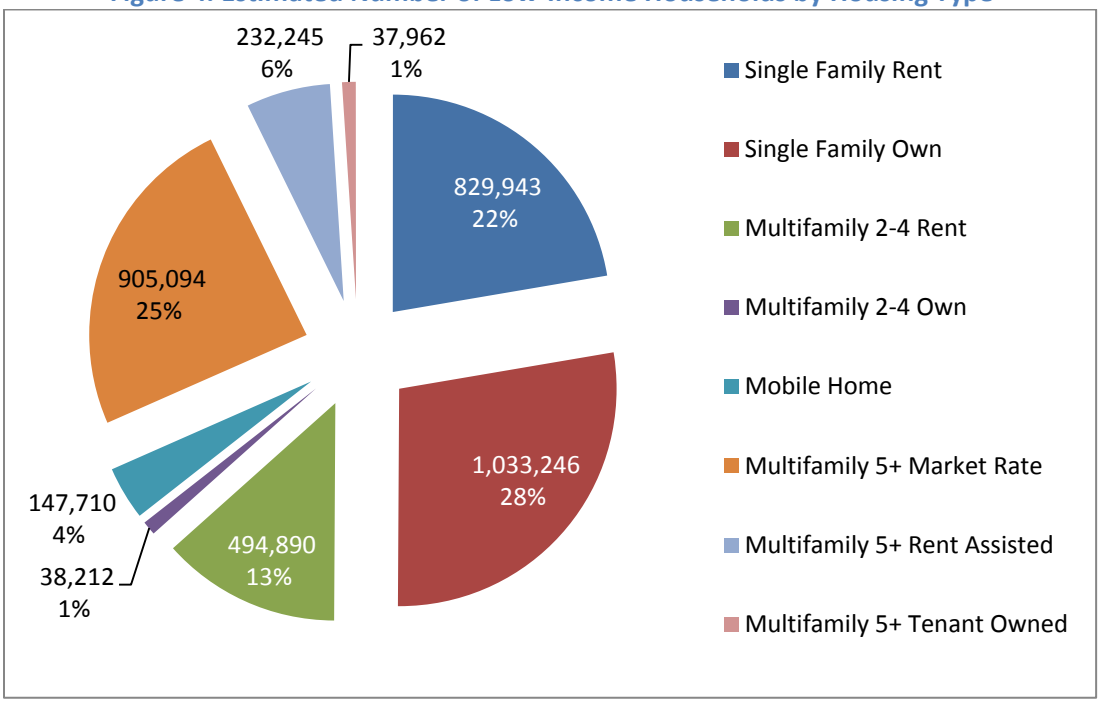
Figure 3. Estimated Number of California Households Including Low-income and Low-Income Multifamily



Source: 2011 American Community Survey and 2011 American Housing Survey

In Figure 4, the low-income households in California are apportioned in eight categories of building type and ownership status. About 32% of low-income households live in housing that is categorized as multifamily housing by the ESA program, including buildings with five units or more.

Figure 4. Estimated Number of Low-Income Households by Housing Type



Source: 2011 American Community Survey and 2011 American Housing Survey

Population statistics for California counties are presented in Appendix C. Also in that appendix is a comparison of frequencies obtained in the current study with findings from the 2009 Residential Appliance Saturation Survey (RASS) and with an estimate produced by Athens Research intended to estimate the number of customers eligible for the CARE rate.

Characteristics of Low-Income Multifamily Housing in California

Summary of Key Findings

Cadmus' characterization of low-income multifamily housing in California is derived primarily from the 2011 American Housing Survey (AHS) Public Use File. The AHS is sponsored by the Department of Housing and Urban Development (HUD) and conducted by the U.S. Census Bureau. These data provide much greater detail about housing characteristics than are found in the ACS and, thus, provide a key source of information about the circumstances of our target class of households, the low-Income Multifamily Sector or LIMF.

The data Cadmus used are organized into Metropolitan Statistical Areas (MSAs). The 2011 AHS survey identifies eight MSAs in California: Anaheim, Los Angeles, Oakland, Riverside, Sacramento, San Diego, San Francisco, and San Jose (see Housing for a map of these MSAs.) Table 10 shows the MSAs used for this analysis and the corresponding counties. Maps of the MSAs superimposed onto the utility electric and gas territories are included in Appendix D.

Table 10. California MSAs in the 2011 AHS Data and Corresponding Counties

MSA Name	Counties
Anaheim	Orange
Los Angeles	Los Angeles
Oakland	Alameda, Contra Costa
Sacramento	El Dorado, Placer, Sacramento, Yolo
Riverside	Riverside, San Bernardino
San Diego	San Diego
San Francisco	Marin, San Francisco, San Mateo
San Jose	San Benito, Santa Clara

Because the data do not include all customers of the IOUs, we do not contend that the data reflect either the absolute numbers of all multifamily or the subset of low-income multifamily households. For instance, neither Fresno nor Stockton, both large Central Valley communities with high percentages of low-income qualifying customers, are represented by an MSA. Nevertheless, we consider the relative percentages of low-income multifamily units to be important indicators of the sector as a whole and especially of relatively urban areas.

The MSAs included in the 2011 AHS survey encompasses a large proportion of utility customers. Table 11 shows the estimated number and percentage of utility households and low-income households included within the eight AHS MSAs.[27]

Table 11. Estimated IOU Population Included within AHS MSAs

Utility/Fuel	MSA Households	Total Households	MSA Low-Income Households	Total Low-Income Households
PG&E Electric	4,263,939	53%	1,175,083	42%
PG&E Gas	4,756,266	61%	1,299,746	51%
PG&E Combined	5,185,236	56%	1,458,581	46%
SCE Electric	4,115,093	87%	1,239,688	87%
SDG&E Electric	1,169,705	100%	302,148	100%
SDG&E Gas	1,064,048	100%	286,965	100%
SDG&E Combined	1,169,705	100%	301,947	100%
SCG Gas	6,167,353	86%	1,980,239	86%

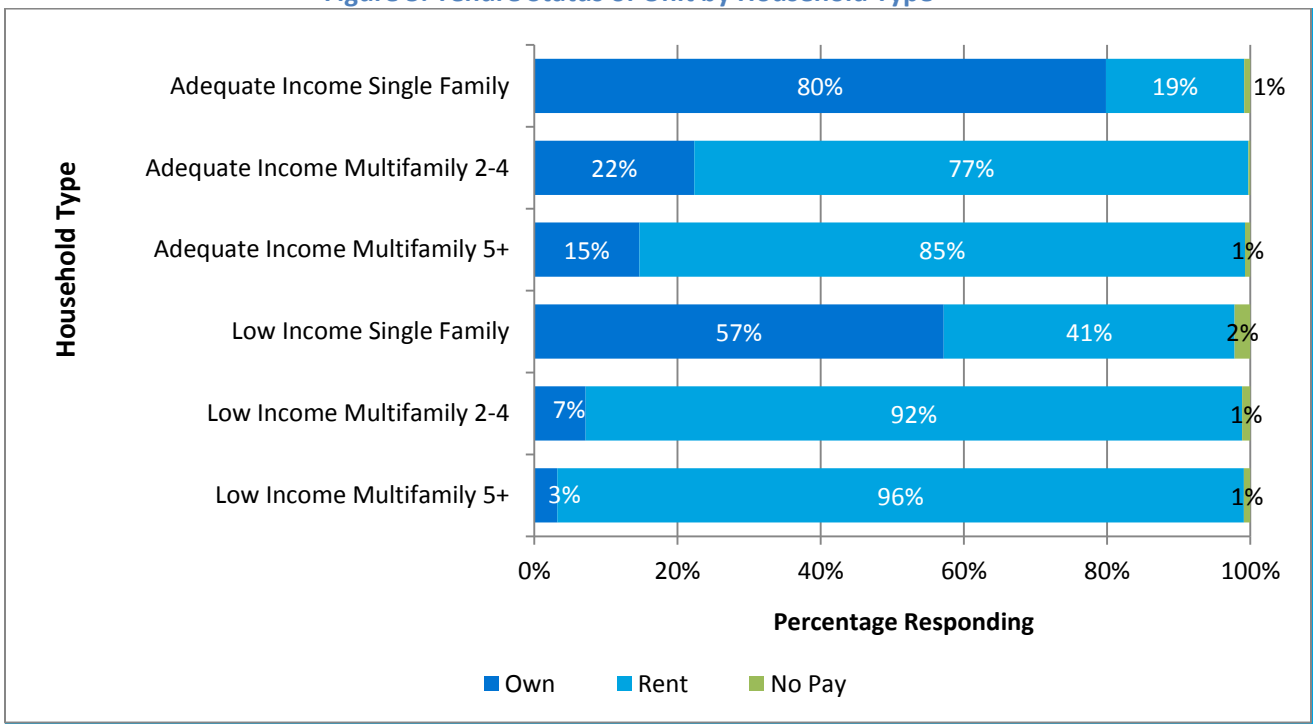
Source: U.S. Census Bureau American Housing Survey 2011 and Athens Research

[27] The household percentages were estimated using county-level data provided by John Peterson at Athens Research. MSAs are contiguous with county boundaries. Athens provided the number of utility customers in each county and we calculated the proportion of total customers in counties within the MSA boundaries.

Tenure

"Tenure" is the term used by the Census Bureau to characterize whether members of a household own or rent the unit they inhabit. Figure 5 shows the tenure status for each of the six household types. The percentage of householders who own the property they inhabit is higher for single-family units than for multifamily units, regardless of income status. Still, for each building structure, low-income households are less likely to own their residence than households with adequate income.

Figure 5. Tenure Status of Unit by Household Type



Source: U.S. Census Bureau American Housing Survey 2011

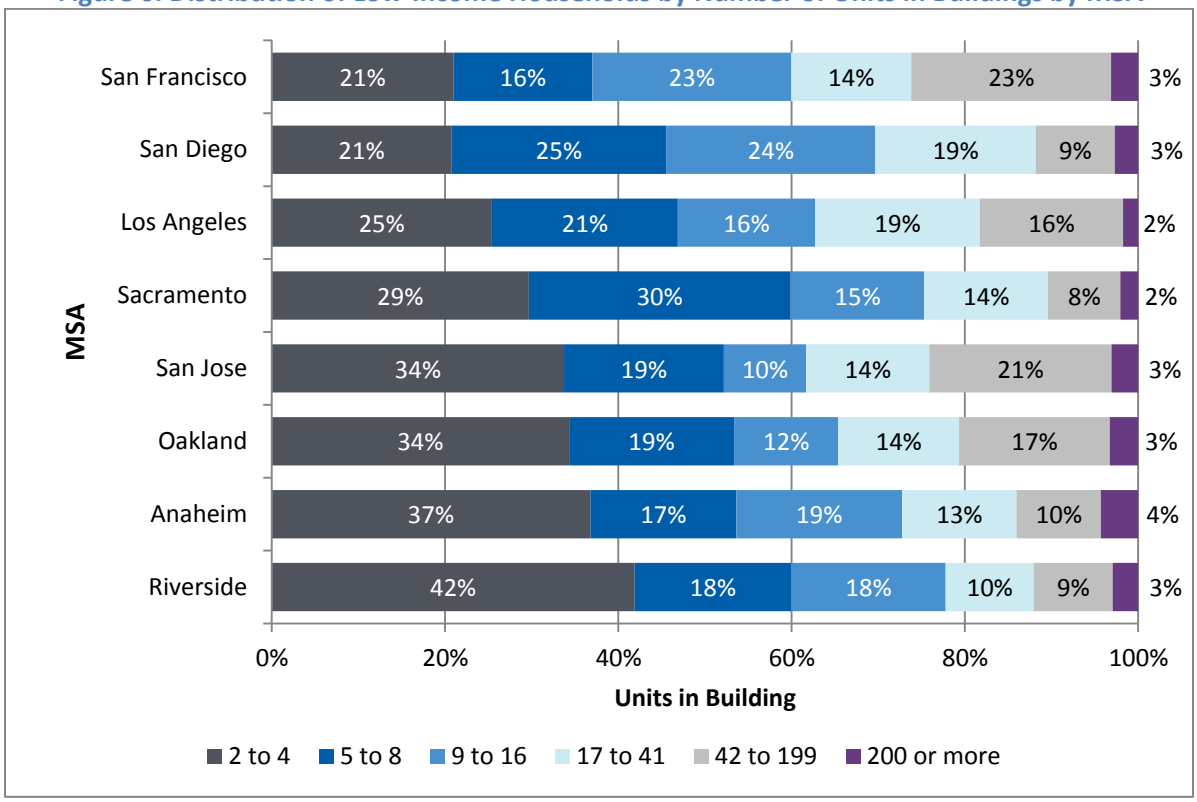
Building Characteristics

The number of units in the building in which low-income multifamily households live is shown in Figure 6.[28] For comparison purposes, we have included households living in buildings with between two and four units, although these are not defined as multifamily properties by the ESA Program. The MFEER program does define these two-to-four unit building as multifamily properties although EUC MF does not. San Francisco has the highest percentage of low-income households living in large buildings of 42

[28] The categories shown represent the quartiles of building size for buildings with five units or more, across the eight MSAs, with the upper quartile is split so that the category "200 or more" units represents the top 5% of all buildings. Thus, approximately 25% of all low-income multifamily households live in buildings of 5 to 8 units, 25% live in buildings of 9 to 16 units, 25% live in buildings of 17 to 41 units, and 25% live in buildings with 42 units or more.

units or more (26%). Conversely, Sacramento has the largest percentage of households living in buildings with only 5 to 8 units (30%).

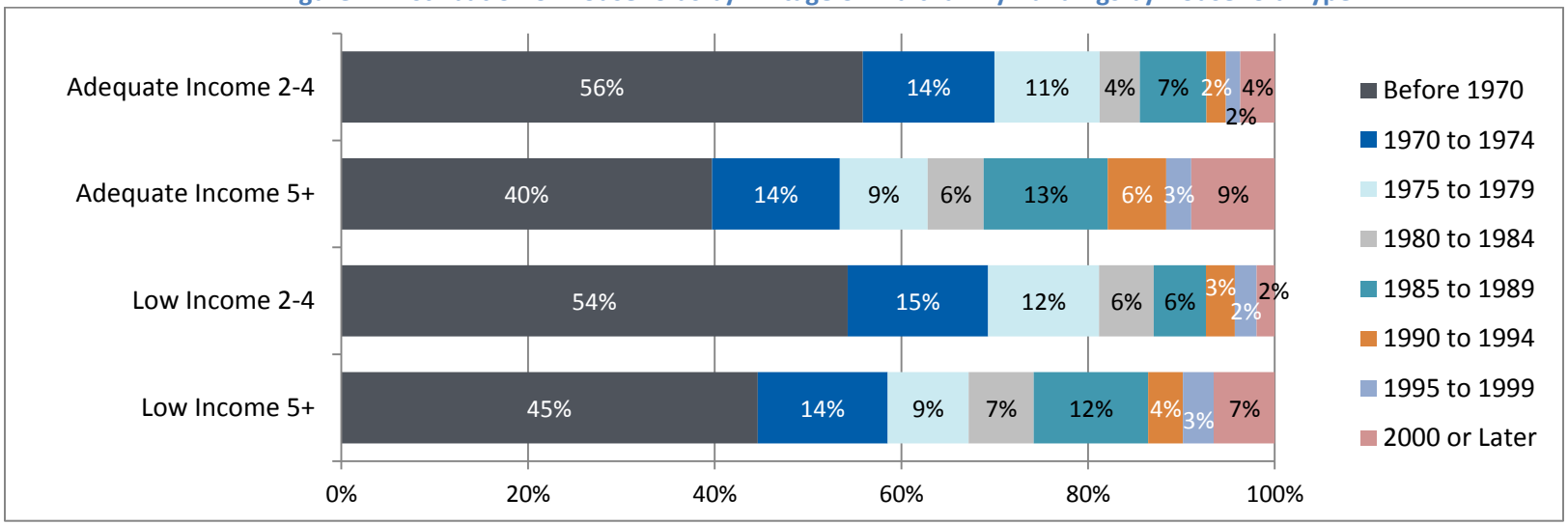
Figure 6. Distribution of Low-Income Households by Number of Units in Buildings by MSA



Source: U.S. Census Bureau American Housing Survey 2011

Figure 7 shows the distribution of multifamily households by vintage of the building they inhabit, by household type. Buildings with two to four units are somewhat older, on average, than buildings with five or more units, regardless of the income of the household living in them. Nearly 70% of low-income multifamily households in five or more unit buildings live in buildings built before 1980. For the smaller two-to-four unit buildings, the percentage is even higher, at more than 80%.

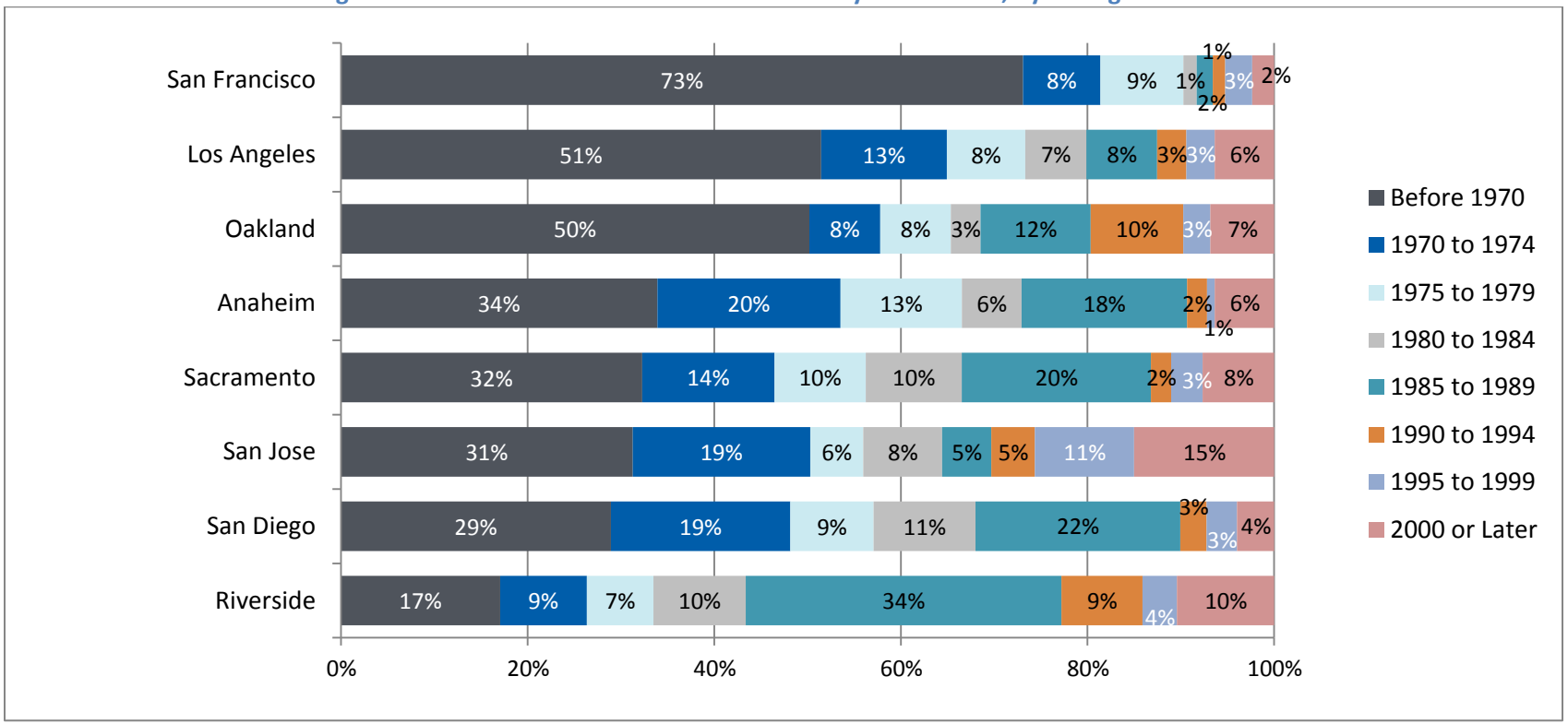
Figure 7. Distribution of Households by Vintage of Multifamily Buildings by Household Type



Source: U.S. Census Bureau American Housing Survey 2011

Figure 8 shows the distribution of low-income multifamily households in buildings with five or more units, by the vintage of the building they inhabit and by MSA. Low-income multifamily households in San Francisco inhabit in the oldest buildings, on average, with 90% living in buildings built before 1980. In southern California, outside of Los Angeles County, there is a bulge in the distribution for housing built between 1985 and 1989.

Figure 8. Distribution of Low-Income Multifamily Households, by Vintage and MSA



Source: U.S. Census Bureau American Housing Survey 2011

The 68% of low-income multifamily households living in units built before 1980 represent approximately 766,000 households. This is the segment most likely to benefit from shell improvements, though buildings of later vintage may also benefit and some of these pre-1980 units may have already received shell upgrades.

Benefits are larger in climate zones with greater cooling and heating loads. The California IOUs have approximately 160,000 low-income multifamily customers in California climate zones 11 through 16, all of which have relatively large heating and especially cooling needs. Buildings in these areas also tend to be of more recent vintage. As shown in Figure 8 the percentages low-income households living in pre-1980 multifamily buildings in Riverside (33%) and Sacramento (56%) serve as the basis of a blended estimate that there are about 160,000 x 0.495 = 79,200 low-income multifamily households living in high-need climate zones within buildings in likely need of shell improvement. Based on utility measure costs of between $104 and $202 per unit for envelope and air sealing measures, it would cost $12.1 million to serve this number of households.

Unit Characteristics

Table 12 shows the number of occupants, bedrooms, and rooms for both low-income and adequate-income households living in multifamily buildings having five or more units. The data in this table are sorted according to number of occupants in the low-income units. Although low-income units do not consistently have fewer bedrooms or rooms, low-income households across all MSAs tend to have more occupants than do households with adequate income.

Table 12. Occupancy Characteristics of Multifamily Households (5+ Units) by MSA and Income Status

MSA	Number of Occupants		Number of Bedrooms		Number of Rooms	
	Low-Income	Adequate Income	Low-Income	Adequate Income	Low-income	Adequate Income
Anaheim	2.8	2.1	1.6	1.6	3.9	3.8
Riverside	2.7	2.0	1.6	1.6	3.9	3.8
San Diego	2.6	2.0	1.6	1.6	3.8	3.8
Sacramento	2.1	1.8	1.5	1.7	3.7	4.0
Oakland	2.2	1.8	1.5	1.5	3.7	3.7
Los Angeles	2.5	1.9	1.5	1.6	3.6	3.9
San Jose	2.3	2.2	1.4	1.7	3.6	3.9
San Francisco	2.3	1.8	1.2	1.3	3.1	3.5

Source: U.S. Census Bureau American Housing Survey 2011

In buildings having five or more units, the low-income units are generally smaller (in terms of overall square footage) than the adequate-income units. The only exception to this generalization occurs in the MSA of Oakland. Table 13 shows the total square footage of low- and adequate-income multifamily units.

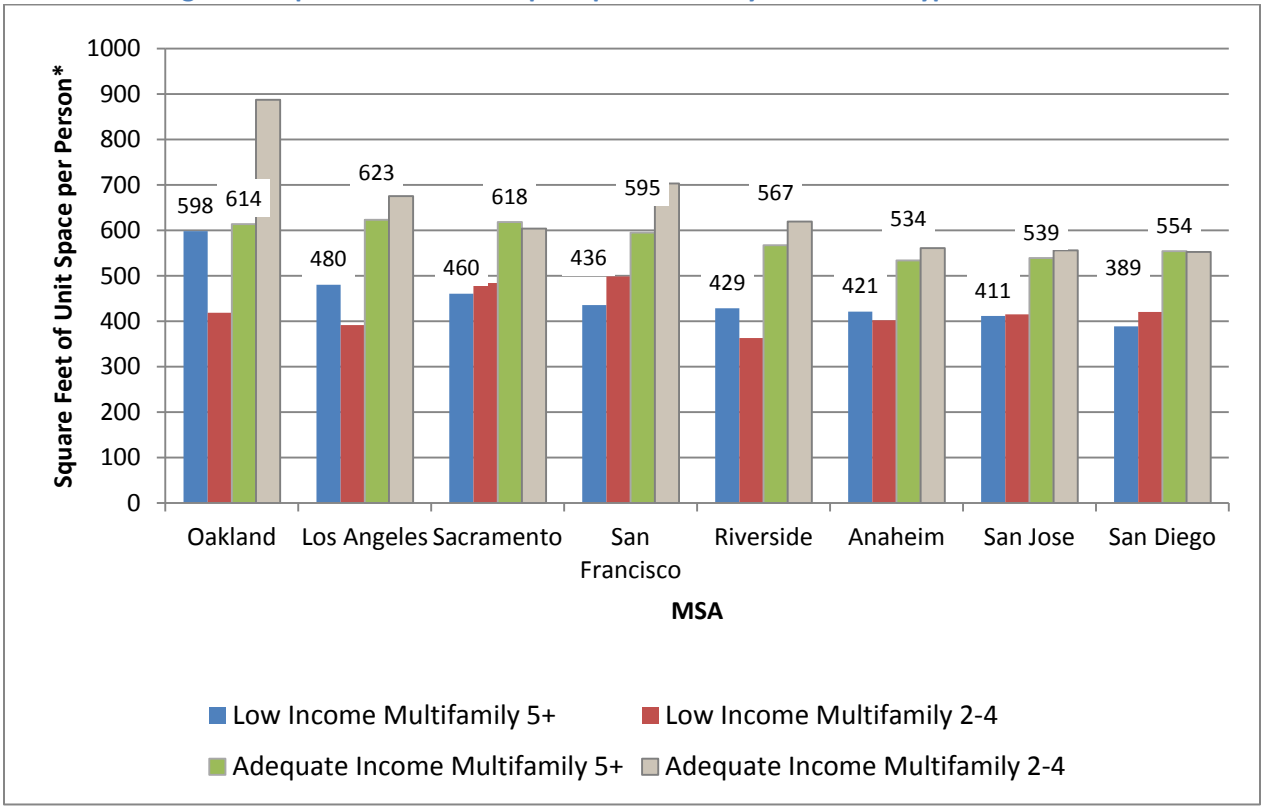
Table 13. Square Feet of Unit Space in Multifamily Buildings by Income, Number of Units and MSA

MSA	Total Square Feet			
	Low-Income (2-4 units)	Adequate Income (2-4 units)	Low-Income (5+ units)	Adequate Income (5+ units)
Oakland	932	1,493	993	873
Riverside	814	927	842	900
Anaheim	924	1,001	829	901
Los Angeles	807	1,093	788	978
San Diego	823	995	783	896
San Jose	833	1,032	712	916
Sacramento	899	905	710	898
San Francisco	959	1,280	704	885

Source: U.S. Census Bureau American Housing Survey 2011

For four types of multifamily households, Figure 9 shows the average square feet of unit space per person. Considering that low-income multifamily households have more occupants than do adequate-income households, the size of units per person clearly shows the effect of income status on living space. Across the eight California MSAs, the square feet of unit space per person in low-income households in buildings having five or more units is less than that of adequate-income households in the same building types. To highlight the contrast, our graphic contains the values of low-income and adequate-income households living in apartments having five or more units.

Figure 9. Square Feet of Unit Space per Person by Household Type and MSA*



Source: U.S. Census Bureau American Housing Survey 2011

* The values shown are the numbers of low-income (dark blue leftmost bar) and adequate-income (the green bar third from left) households living in apartments having five or more units.

Rent and Rent Subsidy

Table 14 shows the average rent paid per bedroom for both low- and adequate-income multifamily households in buildings having five or more units. (This is sorted by rent for low-income units.)

To simplify comparison across unit sizes, we divided the total rent amount by the number of bedrooms, as that is a large component of total cost. The 2011 rents for these low-income households range from a low of $552 (Riverside) to a high of $812 (San Jose) per bedroom. Again, Oakland is an interesting anomaly, as it has among the lowest rent-per-bedroom for low-income households, but it has the third highest rent-per-bedroom for adequate-income households.

Table 14. Average Monthly Rent and Rent Paid per Bedroom (Multifamily 5+ Unit Buildings)[1]

MSA	Monthly Rent		Rent per Bedroom	
	Low-Income	Adequate Income	Low-Income	Adequate Income
Anaheim	$1,197	$1,331	$788	$957
San Jose	$1,097	$1,631	$812	$1,091
San Diego	$957	$1,212	$635	$826
Los Angeles	$907	$1,390	$646	$964
San Francisco	$898	$1,580	$694	$1,266
Oakland	$841	$1,226	$594	$982
Riverside	$813	$987	$552	$671

Source: U.S. Census Bureau American Housing Survey 2011

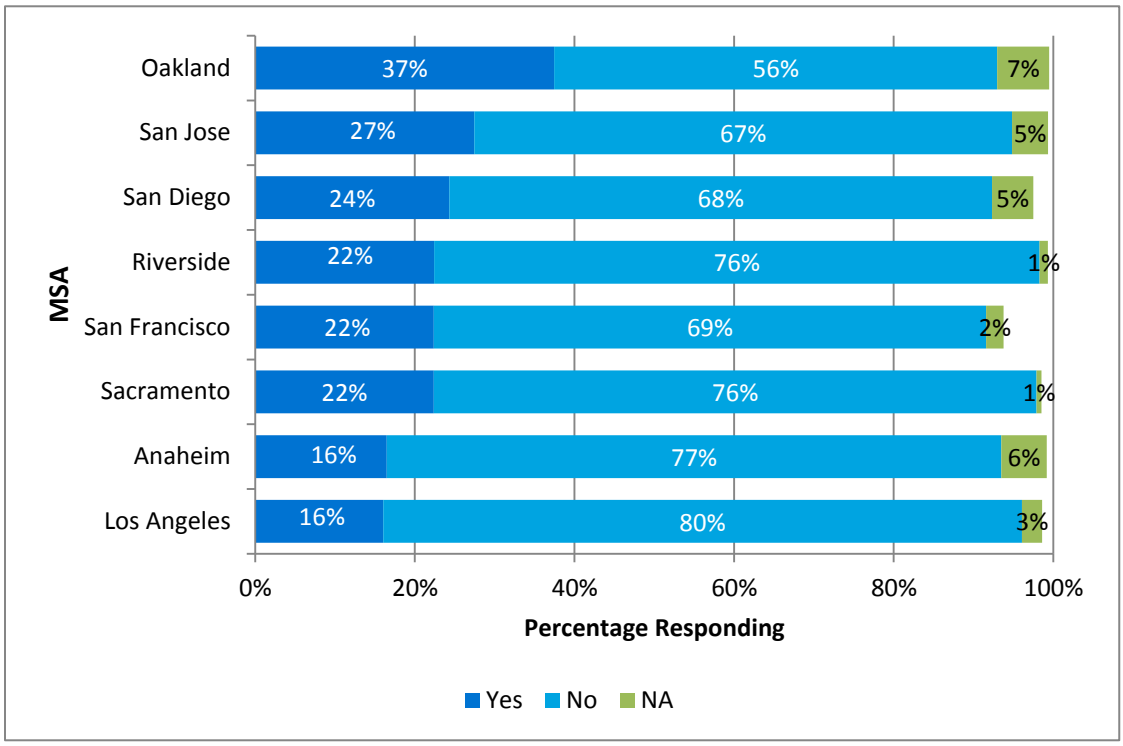
1. The AHS item is: "How much is the rent?"

Some low-income households receive direct assistance in the form of government subsidies for paying their rent. AHS documentation indicates that data on rent subsidies are not based on government or local records but on self-reported responses. The respondent is asked, "Does the Federal, State, or local government pay some of the cost of the unit?" with several follow-up items to verify the response. AHS documentation notes that the data are *"subject to the ability of a respondent to properly classify the unit as public or private and, if private, as subsidized or nonsubsidized housing…Subsidized housing…includes state and local programs as well as federal and need not be low-income housing."*[29]

For buildings having five or more units, the percentage of low-income multifamily units for which the rent is government-subsidized is shown in Figure 10. Oakland has the highest proportion (37%), and Los Angeles and Anaheim each have less than half that. We note that Anaheim has among the highest rents for this class of households. The response "NA" represents respondents who occupy a housing unit without paying rent, either because they own the unit or because they are staying in a unit they do not own without paying rent. This does not include households living in public housing.

[29] U.S. Department of Housing & Urban Development, Office of Policy Development & Research. March 2013. "Codebook for the American Housing Survey, Public Use File: 1997-2011." p. 534

Figure 10. Percentage of Units with Government Subsidized Rents for Low-Income Multifamily (5+ Units)



Source: U.S. Census Bureau American Housing Survey 2011

Equipment in Existing Units

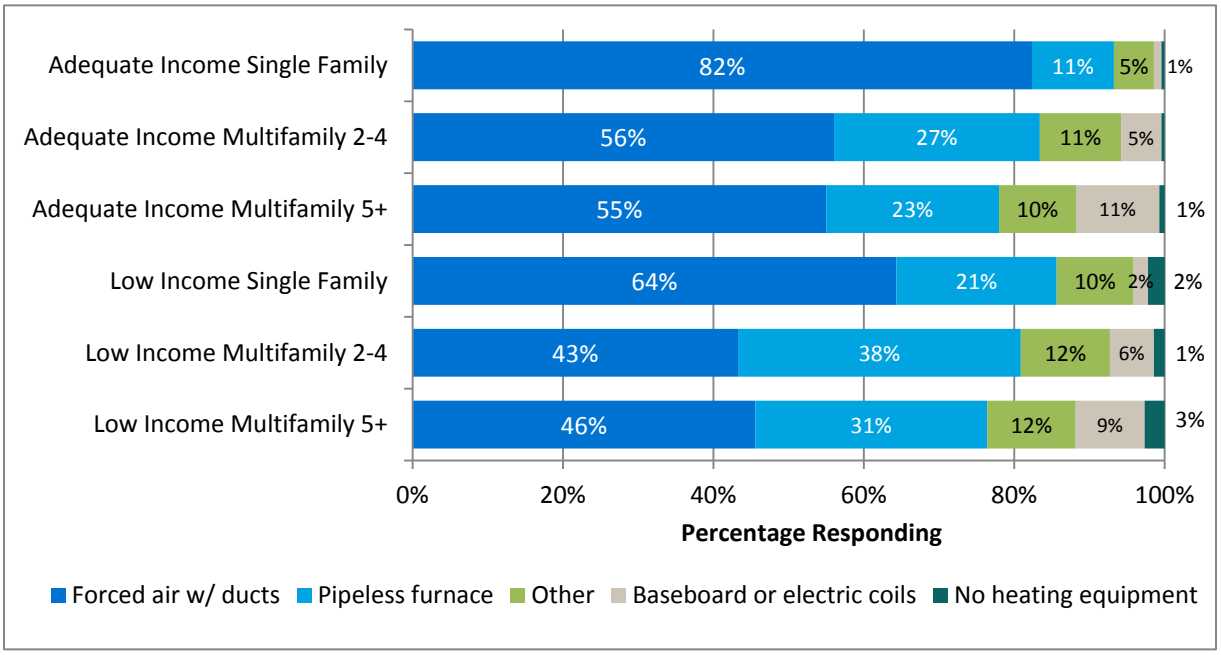
The AHS provides information about energy-using equipment installed in housing units. In this section we report data related to heating and cooling as well as major appliances. The AHS does not collect data on the vintage of equipment, which is an important piece of information in determining the need for efficiency upgrades. To get an estimate of equipment vintage, we used the 2009 Residential Energy Consumption Survey (RECS) conducted for the U.S. Energy Information Administration.[30] This survey is based on a smaller sample than the AHS, and thus cannot provide the resolution needed to identify low-income multifamily households within the State of California. Rather, the estimates we derive are for the Western Census Region, which includes California, Oregon, and Washington. Nevertheless, they provide a reasonable estimate of equipment vintage for California to the extent that California households are not substantially different than those in other states with respect to equipment vintage.

[30] U.S. Energy Information Administration. 2009. *Residential Energy Consumption Survey.* http://www.eia.gov/consumption/residential/

Heating Equipment

Figure 11 shows the most common heating equipment used by building type. In buildings having five or more units, low-income multifamily households use fewer forced-air systems (46%) than do adequate-income households (55%). Pipeless furnaces seem to account for this difference, comprising 31% of low-income multifamily households but just 23% of adequate-income households in these buildings.[31]

Figure 11. Heating Equipment Use by Household Type



Source: U.S. Census Bureau American Housing Survey 2011

Figure 12 shows the most common heating equipment used in multifamily buildings having five or more units. Organized by MSA, this information reveals that:

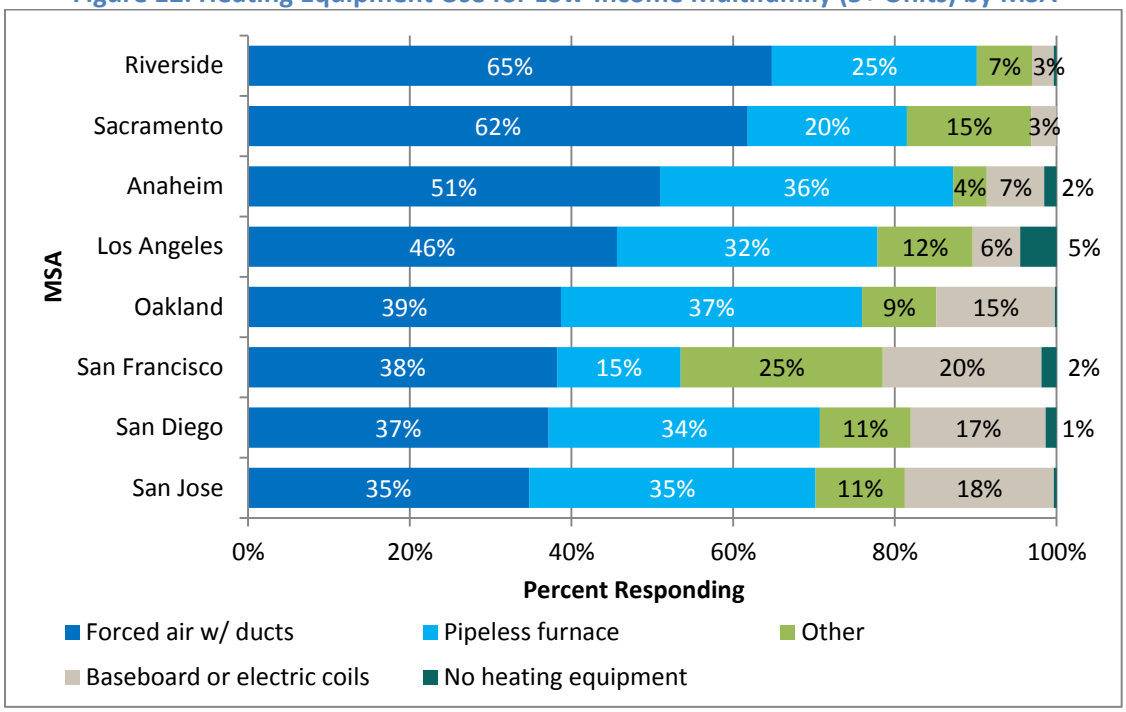
- Low-income households in Riverside and Sacramento use the highest proportion of forced-air heating.
- Baseboard or electric coils comprise more than 15% of the heating equipment used in San Francisco (20%), San Jose (18%), San Diego (17%), and Oakland (15%).

San Francisco uses a sizeable amount of "other" heating equipment (25%), which includes radiators or other steam system (20%) and vented kerosene, gas, or oil (4%). The category of "Other" heating types for Figure 12 encompasses radiators and other hot water or steam systems, electric heat pumps, vented

[31] "A 'floor, wall, or other ***pipeless*** furnace or built-in hot air heater without ducts' delivers warm air to the room right above the furnace or to the room(s) on one or both sides of the wall in which the furnace is installed." See: U.S. Department of Housing & Urban Development, Office of Policy Development & Research. March 2013. "Codebook for the American Housing Survey, Public Use File: 1997-2011," p. 148.

room heaters burning kerosene, gas, or oil, and portable electric heaters used as main heating sources. Approximately 12% of low-income multifamily households use portable electric heaters as supplemental heat. This is a lower rate of use than for households in other categories, which use portable electric heaters as supplemental heat in about 17% of households.

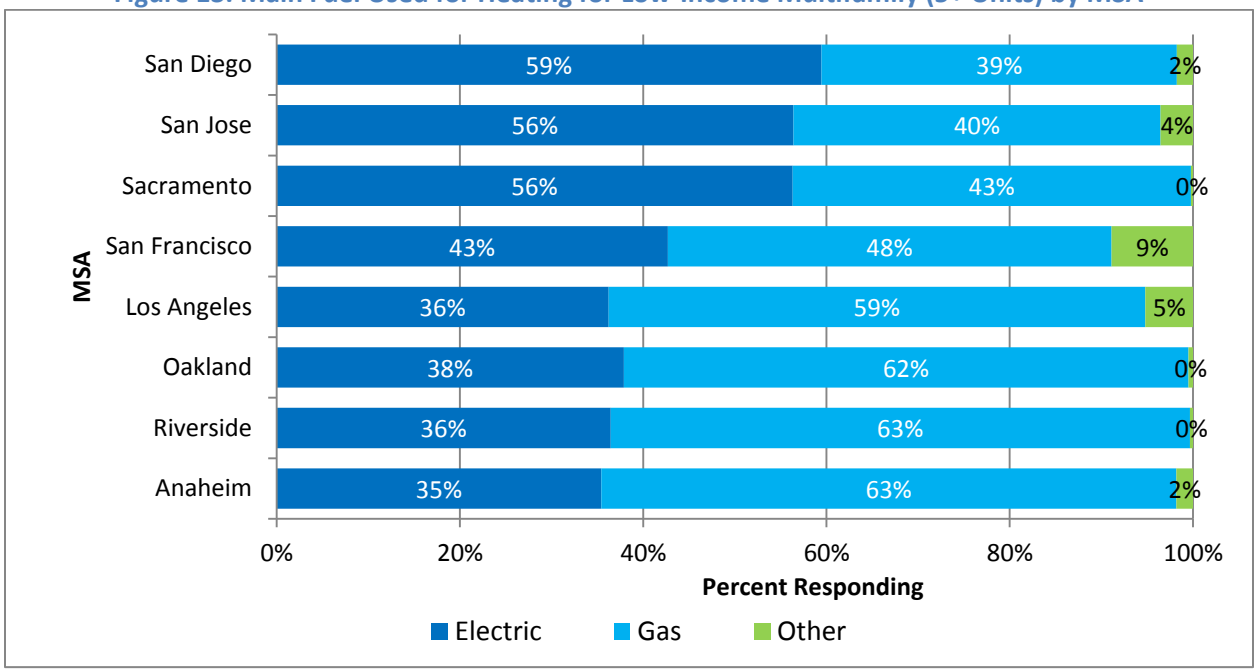
Figure 12. Heating Equipment Use for Low-Income Multifamily (5+ Units) by MSA



Source: U.S. Census Bureau American Housing Survey 2011

Electricity is a more common heating fuel in the multifamily sector—regardless of household income—than in other sectors. About 42% of low-income multifamily households use electricity as their main heating fuel, compared to 22% in 2 to 4 unit low-income multifamily and 22% in single-family low-income multifamily. The relative share of electric heat varies considerably for the low-income portion of the multifamily sector across MSAs, however. This is shown in Figure 13. The response "other" includes households that do not have heating equipment and, in San Francisco, 5% of low-income multifamily households that are heated with fuel oil.

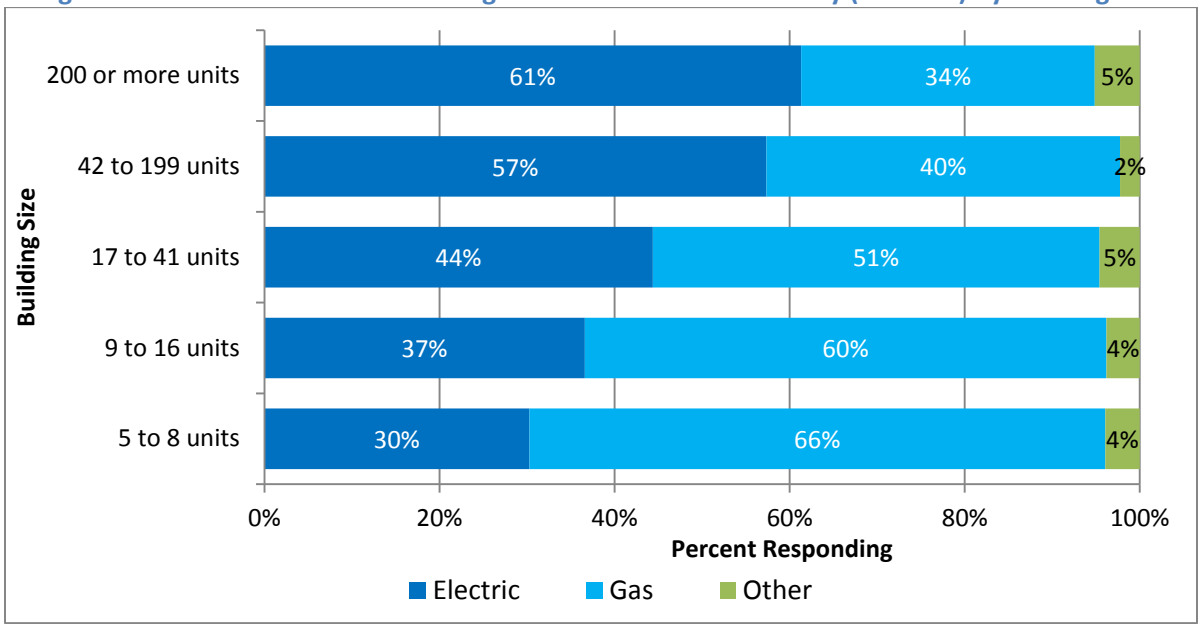
Figure 13. Main Fuel Used for Heating for Low-Income Multifamily (5+ Units) by MSA



Source: U.S. Census Bureau American Housing Survey 2011

The proportion of low-income multifamily households that use electricity as the main heating fuel also varies greatly by the size of the building and the vintage of the building in which the household resides. Figure 14 shows the main heating fuel of low-income multifamily households by building size. As the size of the building increases, the share of households heated by electricity increases substantially.

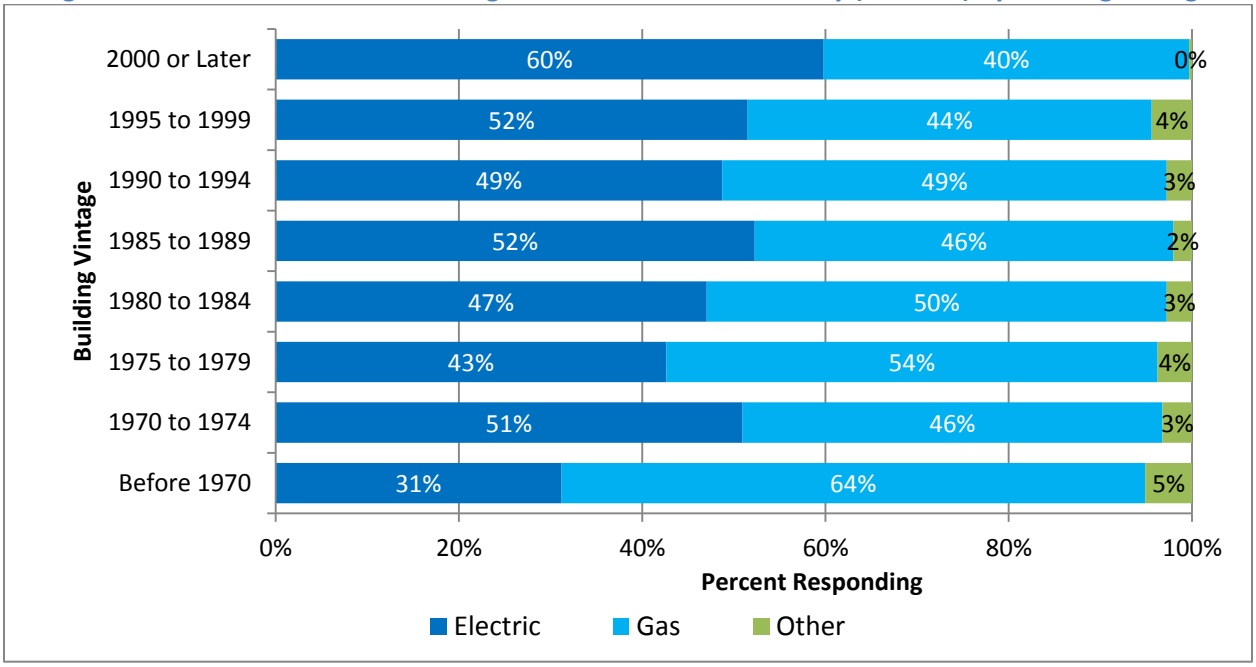
Figure 14. Main Fuel Used for Heating for Low-Income Multifamily (5+ Units) by Building Size



Source: U.S. Census Bureau American Housing Survey 2011

Figure 15 shows the main heating fuel of low-income multifamily households by building vintage. There is a tendency for newer buildings to use electricity in higher proportion than older buildings, though there is an anomalous bump in electric heating among buildings built between 1970 and 1974.

Figure 15. Main Fuel Used for Heating for Low-Income Multifamily (5+ Units) by Building Vintage



Source: U.S. Census Bureau American Housing Survey 2011

For an estimate of equipment vintage, we used results of the 2009 RECS. Those data indicate that, for the Western Census Region, among low-income multifamily households, 40% of households have heating equipment that is 20 years old or older. Those proportions are not equivalent by heating fuel type, however. Forty-nine percent of low-income multifamily households with gas heat have equipment that is 20 years old or older; only 32% of low-income multifamily households with electric heat have equipment as old as 20 years or more.

Looking at building vintages, another pattern emerges. In buildings built in 1960 or before, 37% of low-income multifamily households have heating equipment that is 20 years old or older. Many of these buildings have had equipment replaced in the lifetime of the building. In buildings built after 1960 and before 1991, 55% of households live in buildings with heating equipment older than 20 years.

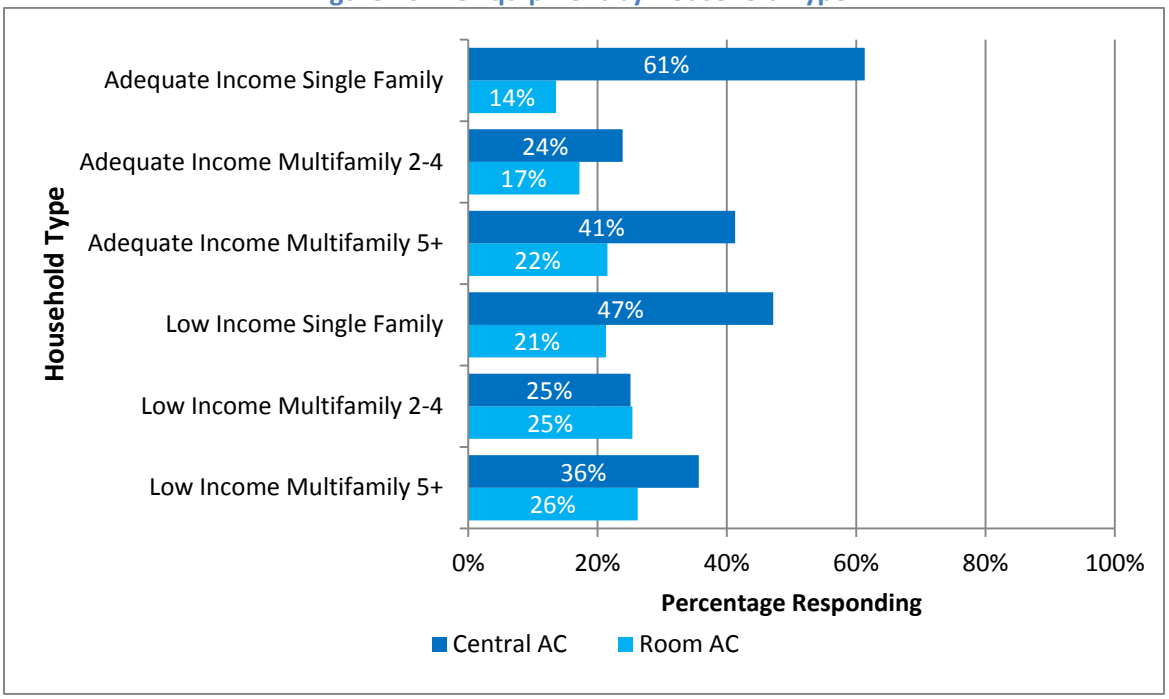
Figuring that 77% of low-income multifamily households have either forced-air furnaces or pipeless wall furnaces, and that 40% of households have heating equipment that is 20 years old or older, about 347,000 households among the IOU's low-income multifamily customers are estimated to have heating equipment that is 20 years old or older. Of these, approximately 207,000 are forced air furnace systems and 140,000 are pipeless wall furnaces. It is difficult to accurately assess the number of *systems* represented among households with forced air systems because these furnaces can serve numerous households. We estimated an average of 10 households per building housing low-income multifamily

households. This implies that the 207,000 households with forced air furnace equipment at the end of its effective useful life reside within about 21,000 buildings. Based on DEER modeling and cost estimates, we calculate the average replacement cost for a multifamily forced-air furnace as $7,828.[32] We estimate the incremental equipment cost as $1,736. Thus, full replacement cost for 21,000 units would be $164.4 million, and the incremental equipment cost would be $36.5 million.

Cooling Equipment

Figure 16 shows the percentage of respondents, organized by household type, who have central air conditioning or room air conditioning. (Note that these data are only from customers living within the eight MSAs in the 2011 AHS survey and not the hot Central Valley communities of Fresno or Stockton, which are in PG&E's service territory.)

Figure 16. AC Equipment by Household Type*



Source: U.S. Census Bureau American Housing Survey 2011

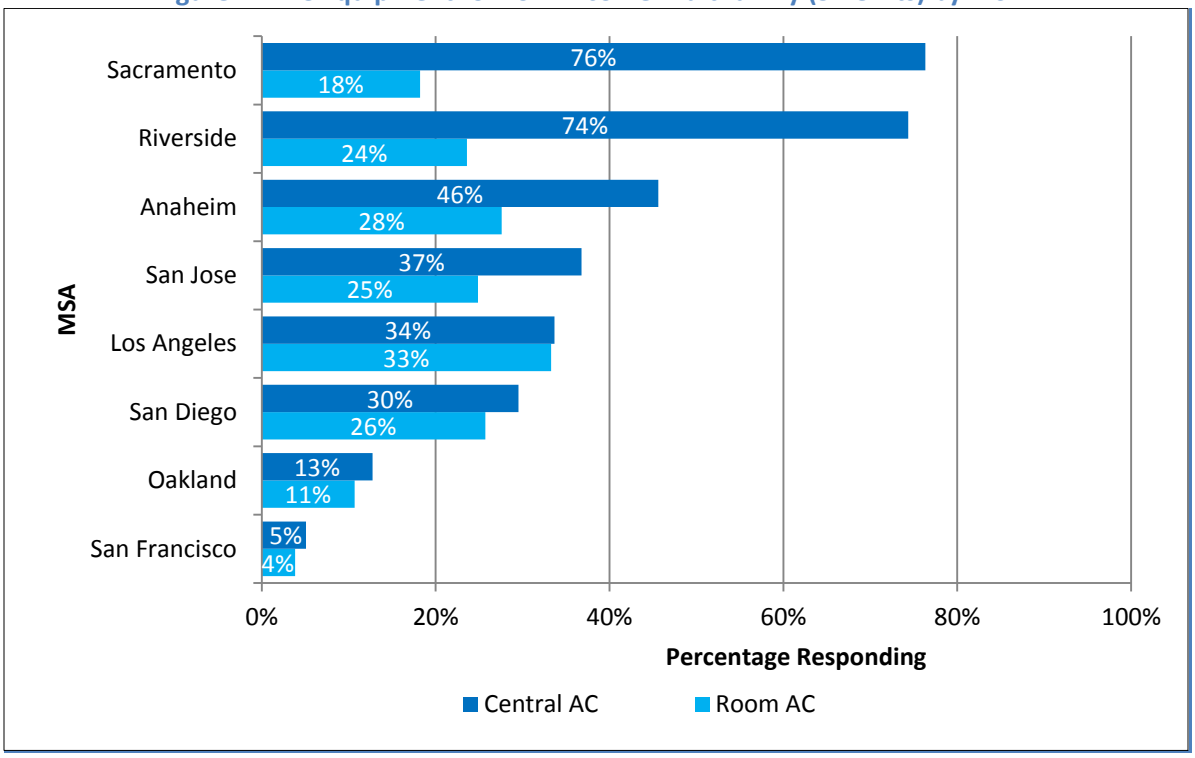
* Figure shows the percentage of total households that have either room or central AC.

[32] Using average heating capacity (378 kBtu) for multifamily buildings (based on the Itron report, "2005 DEER Residential Prototype Characteristics Workbook"), we estimated the average full and incremental costs for replacing existing equipment with an AFUE 90% furnace. Incremental costs are relative to a baseline 80% AFUE furnace. Cost data come from the 2008 DEER database, which is the most recent DEER data on equipment costs. We blended DEER values by climate zone, weighted by the number of low-income multifamily utility customers living within each climate zone, using data for apartments build before 1978.

While the differences across types are not dramatic, single-family units are more likely to have central AC regardless of income. Among households living in multifamily buildings with five or more units, low-income households are only slightly less likely than adequate-income households to have AC, but the equipment mix is different (more room AC and less central AC).

Not surprisingly, a strong factor in determining whether low-income multifamily households have AC is the climate in which they reside. Among low-income households living in multifamily building with five or more units, the incidence of AC equipment varies widely by MSA. Figure 17 shows the percentage of low-income multifamily households in buildings with five or more units that have either room AC or CAC.

Figure 17. AC Equipment for Low-Income Multifamily (5+ Units) by MSA*



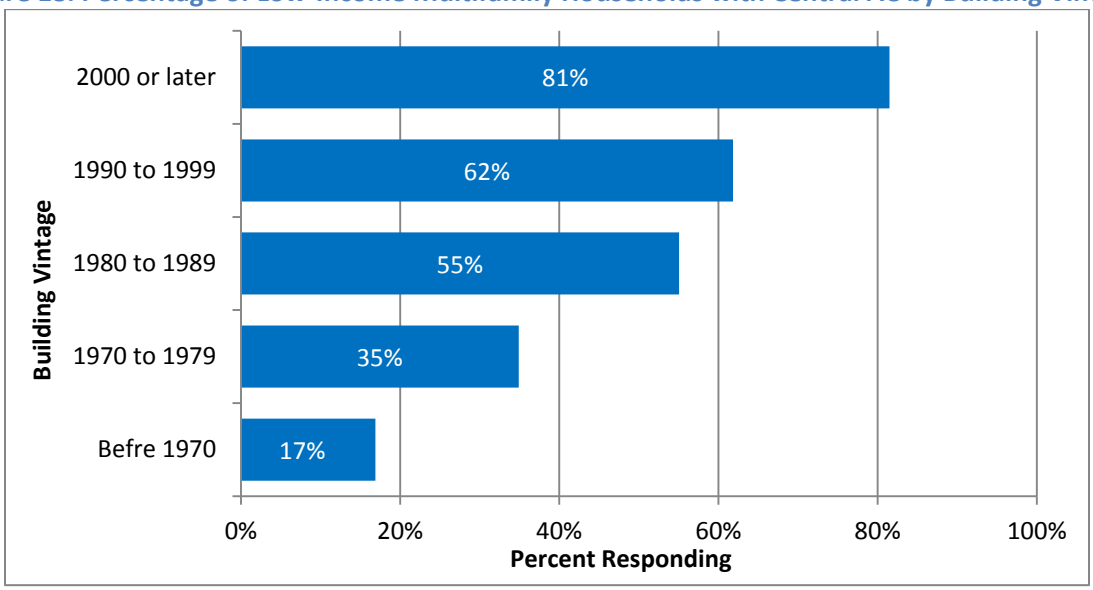
Source: U.S. Census Bureau American Housing Survey 2011

* Figure shows the percentage of total households that have either room or central AC.

Central AC use exceeds room AC use by more than 10% in the following MSAs: Sacramento, Riverside, Anaheim, and San Jose. Los Angeles and San Diego each exhibit smaller differences between room AC and central AC use. Oakland and San Francisco have relatively little AC use, due to the cooler Bay Area climate.

Having a central AC system is strongly correlated with the age of the building, as shown in Figure 18. Among low-income multifamily households, 81% percent of buildings that were built since 2000 have central AC. In buildings built between 1990 and 2000, 62% have central AC. Only 17% of buildings built before 1970, however, have central AC.

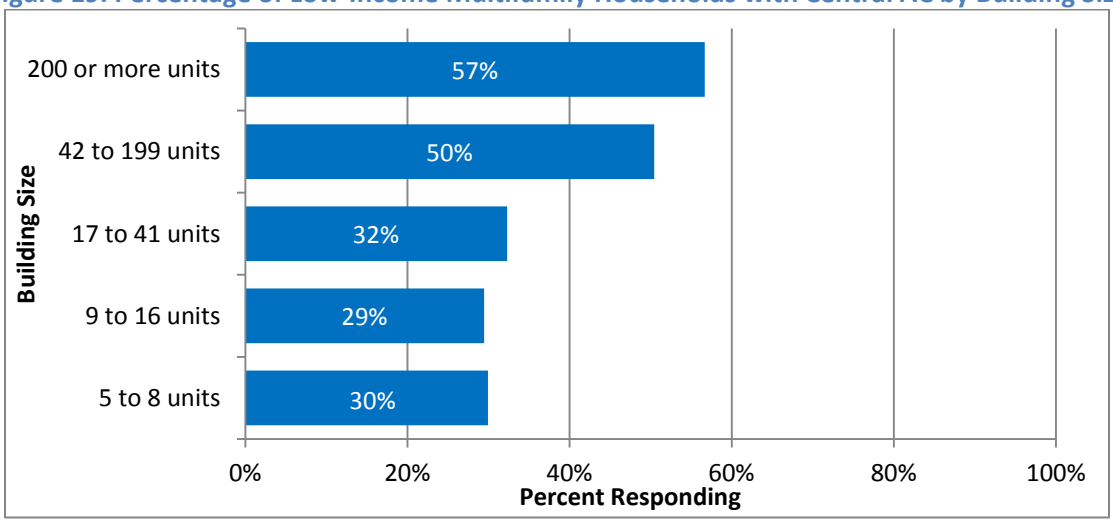
Figure 18. Percentage of Low-Income Multifamily Households with Central AC by Building Vintage



Source: U.S. Census Bureau American Housing Survey 2011

Larger buildings are also more likely to have central AC. Figure 19 shows that central AC is most common in the largest two quintiles of building size (that is, buildings having more than 42 units).

Figure 19. Percentage of Low-Income Multifamily Households with Central AC by Building Size

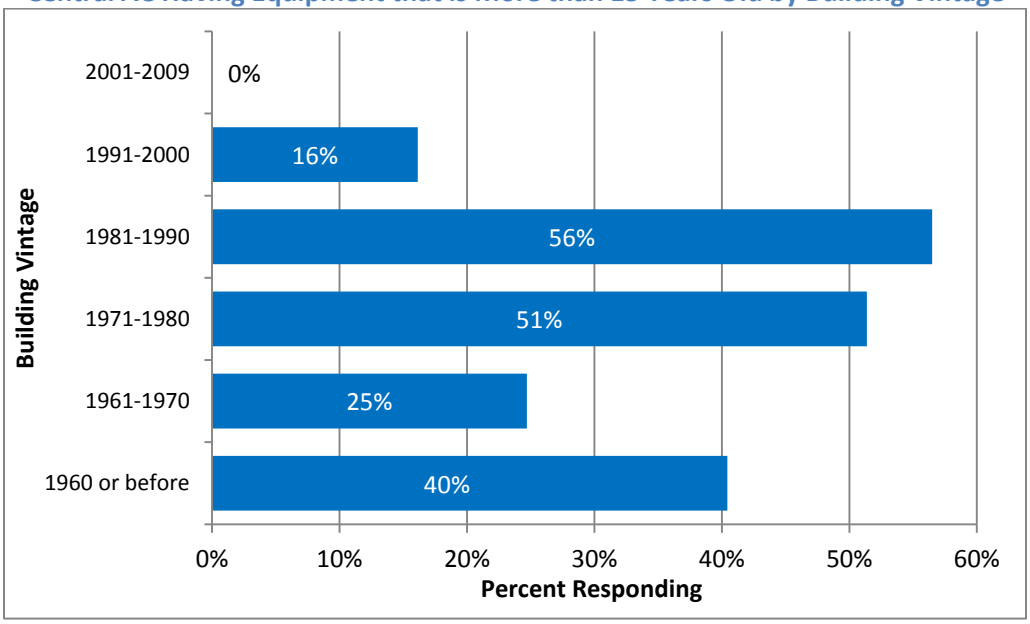


Source: U.S. Census Bureau American Housing Survey 2011

For an estimate of equipment vintage, we again used results of the 2009 RECS. Those data indicate that, for the Western Census Region, among low-income multifamily households in buildings with five or more units and *that have central AC equipment*, 34% of households have AC units that are 15 years old or older, with 28% having equipment that is 20 years or older. We note that this is nearly the same percentage found among multifamily households with adequate income (35% > 15 years old; 24% > 20 years old).

Considering building vintage, we can see the effects of equipment life on the proportion of older central AC units. As Figure 20 shows, significant numbers of buildings built in 1960 or before have equipment that is aging, having gone through two and possibly three replacement cycles. Buildings built between 1961 and 1970 are at a lower point in the replacement cycle. The highest percentage of older equipment is in buildings build between 1971 and 1990.

Figure 20. Percentage of Low-Income Multifamily Households with Central AC Having Equipment that is More than 15 Years Old by Building Vintage



Source: Energy Information Administration 2009 RECS Survey

Combining the estimate that 36% of low-income multifamily households have central AC, with the estimate that 28% of households have central AC equipment that is 20 years old or older, implies that about 118,500 *households* are cooled by central AC equipment that is 20 years old or older.

If the analysis is narrowed to only climate zones where energy savings are greatest from AC upgrades, our estimate of the number of central AC units at the end of their useful lives is reduced. For instance, PG&E only provides AC tune-ups and replacement in climate zones 11, 12, and 13. There are about 120,000 low-income multifamily households in these climate zones that are PG&E customers. If, as in the Sacramento MSA (see Figure 17), about 75% of households have central AC, and if 28% of those households have equipment that is 20 years old or older, then approximately 25,200 households in

these climate zones are cooled by central AC equipment that is 20 years old or older. SCE has provided AC tune-ups and replacement primarily in climate zones 14 and 15, in which they have approximately 28,000 low-income multifamily customers. Applying the proportion of central AC equipment from Figure 17 for the Riverside MSA, 74%, and the region-wide of equipment that is 20 years old or older, we estimate 5,800 multifamily households are cooled by central AC equipment that is 20 years old or older. SCG and SDG&E did not replace central AC equipment.

In PY 2012, only SCE replaced central AC systems or compressors in multifamily households through the ESA program, replacing either the condenser or the package at 61, for an average unit cost of about $4,000.[33] Thus, very roughly, the full cost to replace all PG&E low-income multifamily units 20 years old or older would be $101 million, with a cost of $23 million to replace all SCE units. The incremental cost to replace these units, on the other hand, assuming an average unit size of three tons, we estimate to be $714.[34] Thus, if the program covered only the incremental material cost, the cost to upgrade all units would be $18.0 million for PG&E and $4.1 million for SCE.

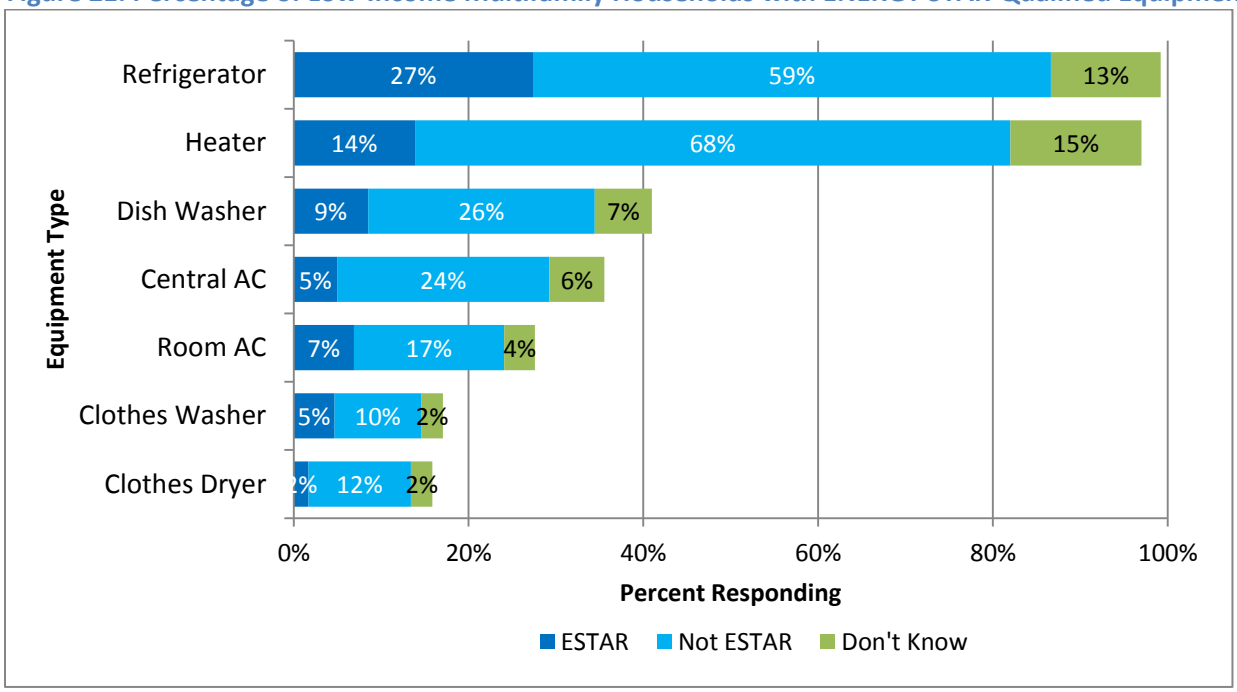
Appliances

The AHS captures the percentage of ENERGY STAR rated appliances compared to regular efficiency appliances. Figure 21 shows both the saturation of major measures and the proportion of each that low-income multifamily households report are ENERGY STAR qualified. In this figure, the total length of each bar represents the saturation of the equipment in low-income multifamily households. Each bar is divided into the proportion of households that has Energy Star qualified equipment, the proportion that does not have this equipment, and the proportion that does not know. Twenty-eight percent (27%) of low-income multifamily households *that have a refrigerator* report they have an ENERGY STAR qualified unit. Ninety-nine percent of households have a refrigerator. The percentage of ENERGY STAR equipment is similar for clothes washers (among households that have a clothes washer, 27% are ENERGY STAR), room AC (among households that have room AC, 25% are ENERGY STAR), and dishwashers (21% are ENERGY STAR in the households that have dishwashers).

[33] Based on a communication with the ESA program manager at SCE. Cost includes equipment and installation as well as duct testing and sealing.

[34] 2008 DEER database, the incremental cost of installing a SEER 14 unit instead of a SEER 13 unit: Measure Material Cost Case ID D08-RE-HV-ResAC-S15, Base Case -Code/Standard Cost Case ID ResAC-13p0seer. Incremental material cost = $238 per ton.

Figure 21. Percentage of Low-Income Multifamily Households with ENERGY STAR-Qualified Equipment



Source: U.S. Census Bureau American Housing Survey 2011

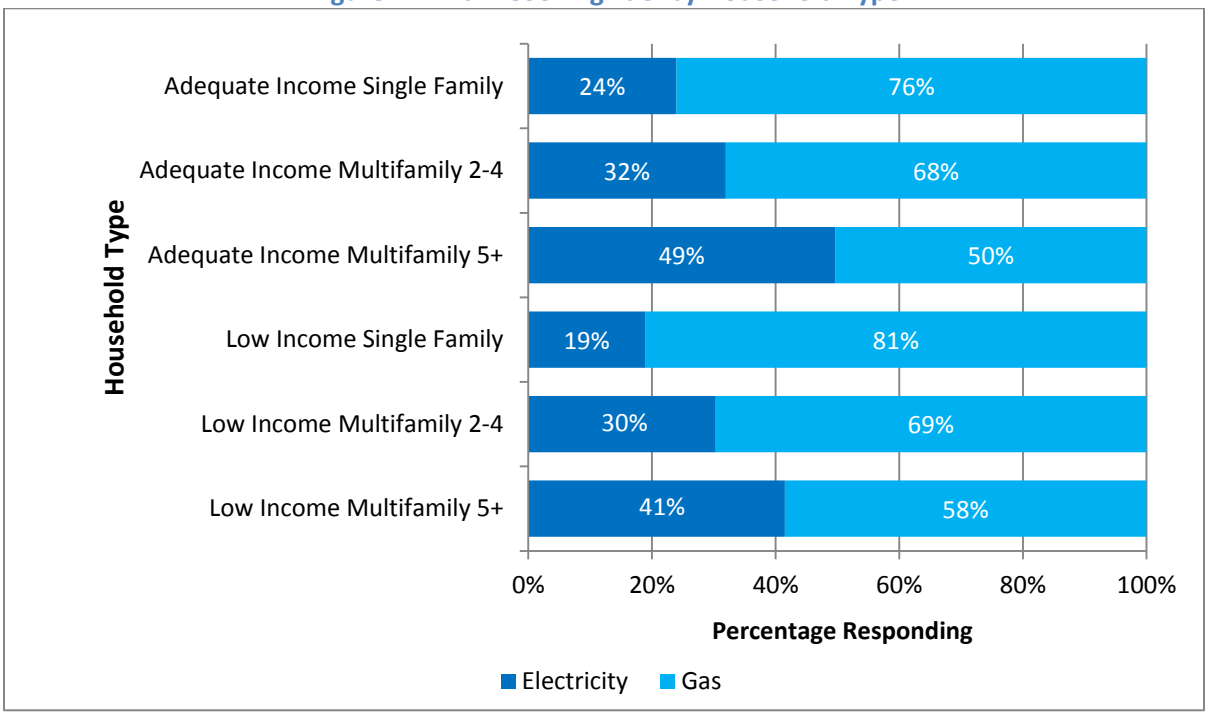
The 2009 RECS data indicate that for the Western Census Region, among low-income multifamily households, about 27% of refrigerators 10 years old or older, with 8% that are 15 years old or older. This compares to 24% of refrigerators 10 years old or older among multifamily households with adequate income, with 8% that are 15 years old or older. Applying these percentages to the number of low-income multifamily households, we estimate that roughly 94,000 low-income multifamily households have refrigerators 15 years old or older.

Based on ESA program measure costs for PY 2012 it costs between $574 and $856 to replace a refrigerator through the program. Using the average price of $717, it would cost $67 million to replace all refrigerators that are 15 years old or older. The survey conducted by Cadmus, results of which are reported in Section 4, found that about 23% of low-income multifamily households own their own refrigerator. If this proportion is applied to the number of old units, the resulting 21,620 units would cost about $15.5 million to replace. In PY 2012, PG&E replaced 2,046 refrigerators in multifamily households through the ESA program; SCE replaced 3,097 and SCG&E replaced 340.

Fuel Use

In California's eight MSAs, multifamily households are more likely than single-family households to use electricity as the main cooking fuel. However, low-income multifamily households with five or more units are more likely to use gas for the main cooking fuel (58%) than are adequate-income multifamily households with five or more units (50%). Figure 22 provides a comparison of the main cooking fuel used by the different household types.

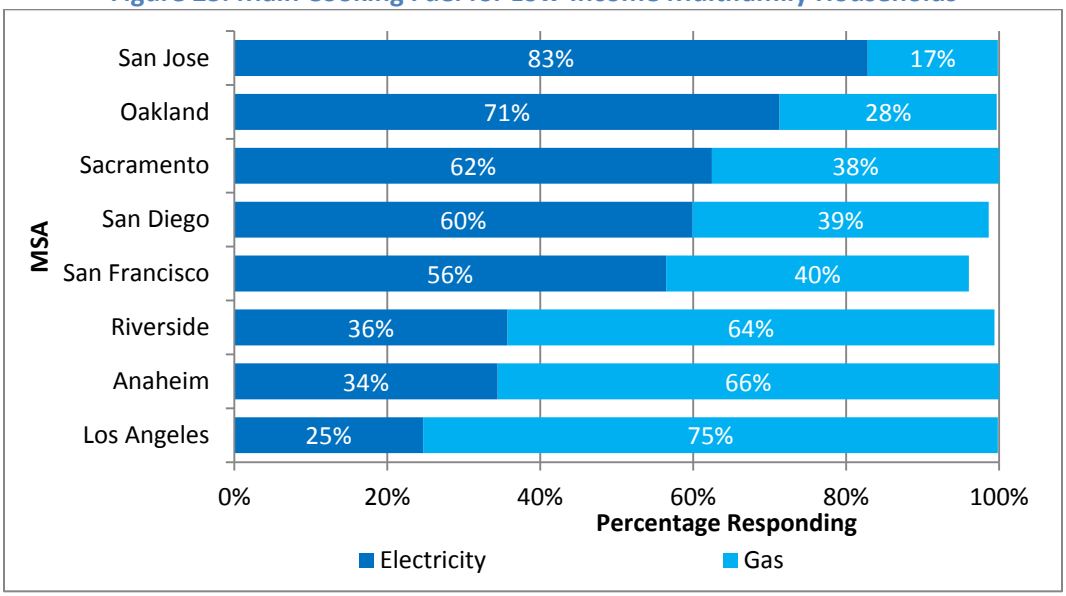
Figure 22. Main Cooking Fuel by Household Type



Source: U.S. Census Bureau American Housing Survey 2011

Figure 23 shows the main cooking fuel for low-income multifamily households, organized by MSA.

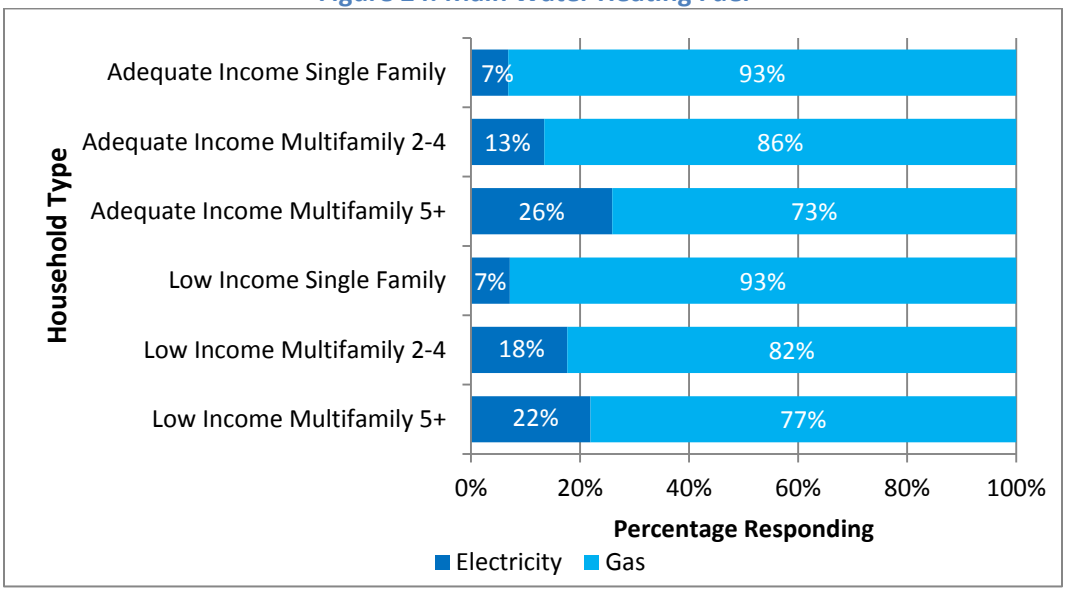
Figure 23. Main Cooking Fuel for Low-Income Multifamily Households



Source: U.S. Census Bureau American Housing Survey 2011

Figure 24 provides a comparison of the main water heating fuel, organized by household type.

Figure 24. Main Water Heating Fuel

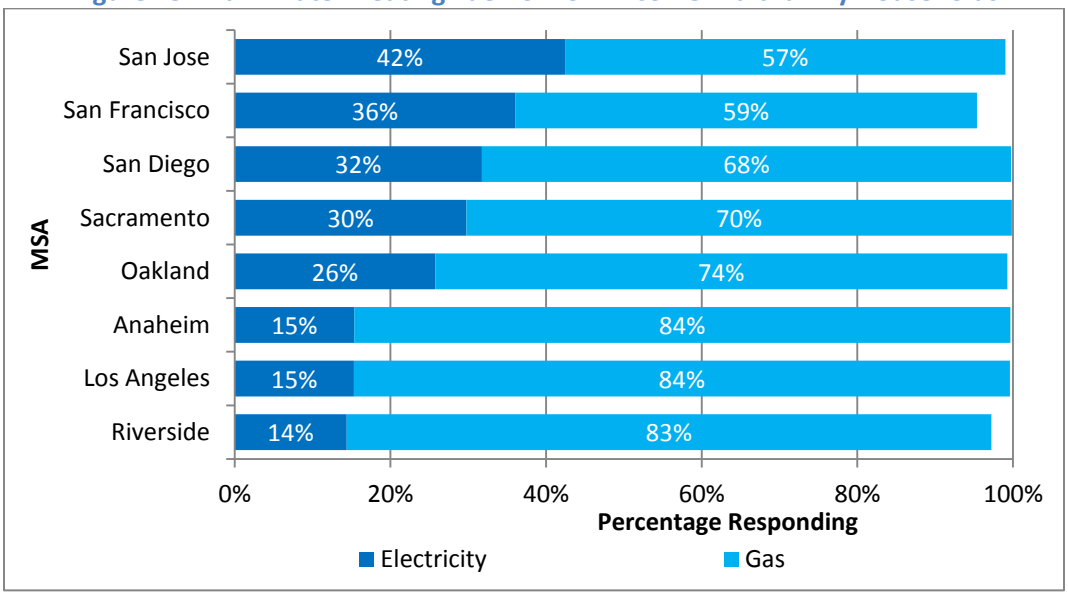


Source: U.S. Census Bureau American Housing Survey 2011

The survey does not indicate whether the water heating system among multifamily residences is a centralized or an in-unit system. All households within multifamily buildings are more likely to heat water with electricity than are single-family households. The AHS data do not provide data on whether water heating systems are for single or multiple units. The 2009 RECS data for the western census region

indicate that 50% of low-income multifamily households share water heating equipment with other "apartments, condos, households, businesses, or farm buildings." The main water heating fuels for low-income multifamily households, organized by MSA, are shown in Figure 25. Again, between the various areas, there is a large difference in the proportion of households that heat with electricity (the highest is San Jose and the lowest is Riverside).

Figure 25. Main Water Heating Fuel for Low-Income Multifamily Households

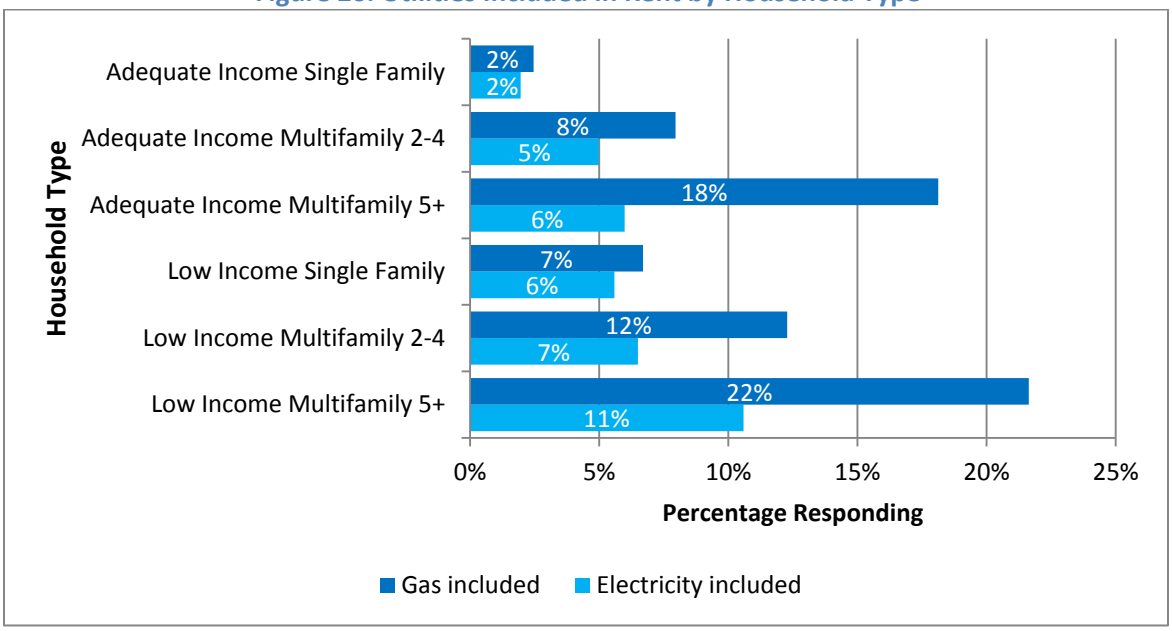


Source: U.S. Census Bureau American Housing Survey 2011

Utilities

Figure 26 shows the percentage of units, organized by household type, for which the utility costs are included in the rent. Although still a small percentage of the total, the low-income multifamily household is the most likely to have utility costs included.

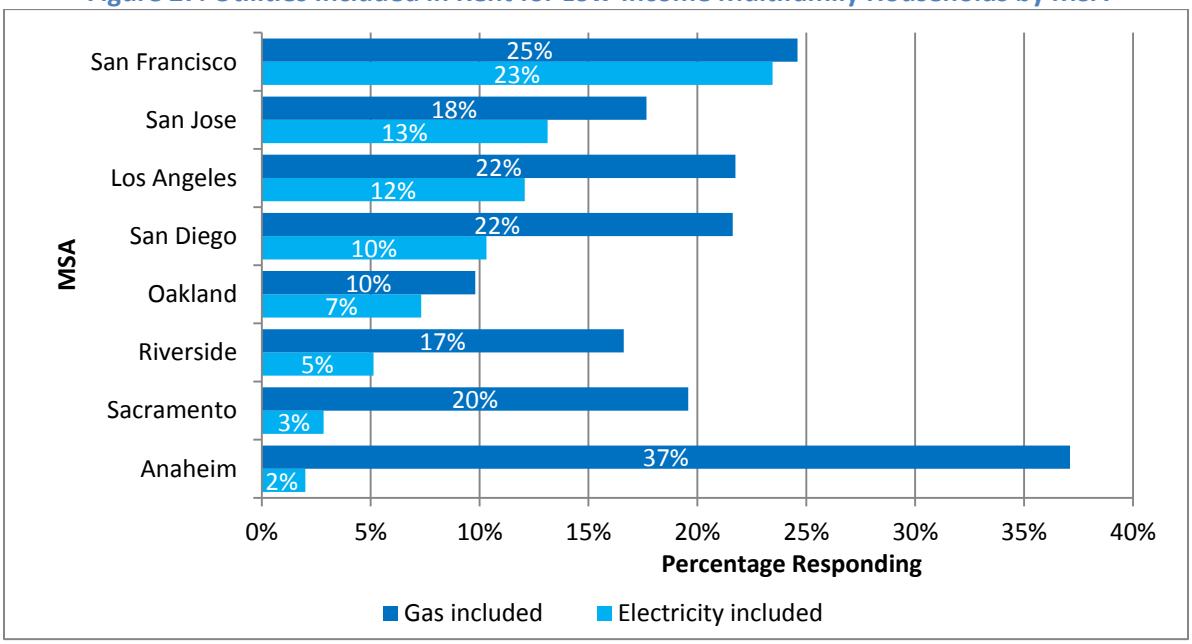
Figure 26. Utilities Included in Rent by Household Type



Source: U.S. Census Bureau American Housing Survey 2011

Figure 27 shows the percentage of units for which utility costs are included in the rent. Again, there are very significant differences from the highest to the lowest percentage MSA. For instance, roughly a quarter of low-income multifamily households in San Francisco have either gas or electricity or both included in their rent.

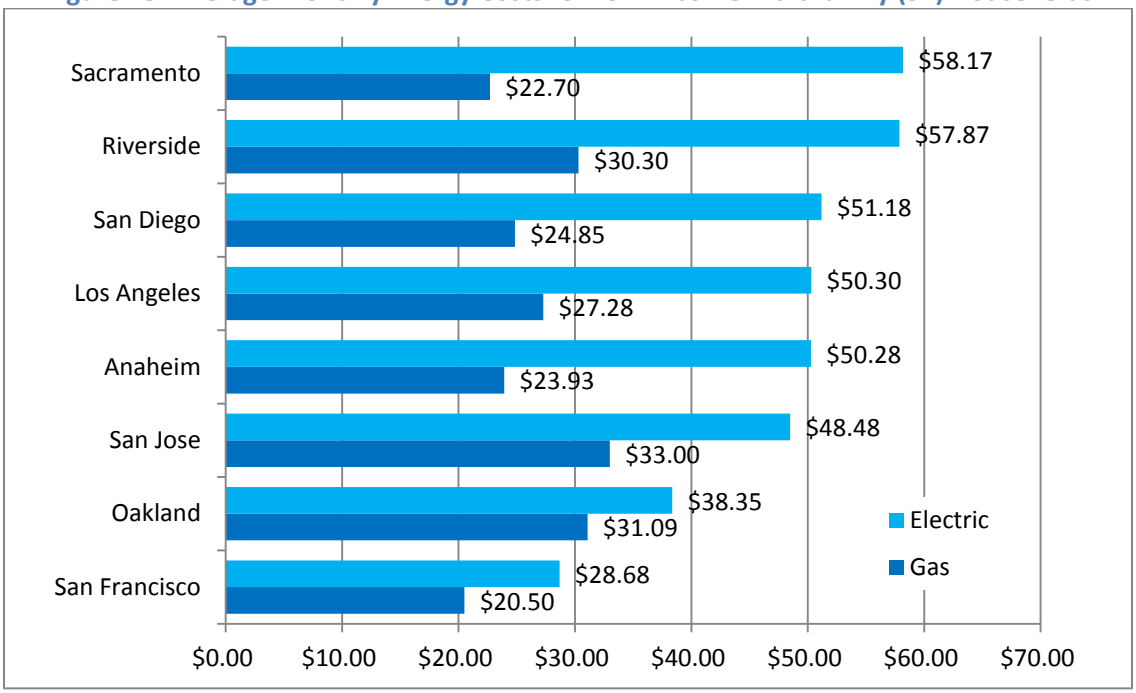
Figure 27. Utilities Included in Rent for Low-Income Multifamily Households by MSA



Source: U.S. Census Bureau American Housing Survey 2011

Figure 28 shows the 2011 average monthly energy cost of utilities for low- and adequate-income multifamily households, where the cost of utilities are not included in the rent. Utility costs are respondent reported values.[35] Note that these reported energy costs would reflect the CARE rate for respondents who receive that rate. The data do not indicate whether or not a respondent is on the CARE rate.

Figure 28. Average Monthly Energy Costs for Low-Income Multifamily (5+) Households



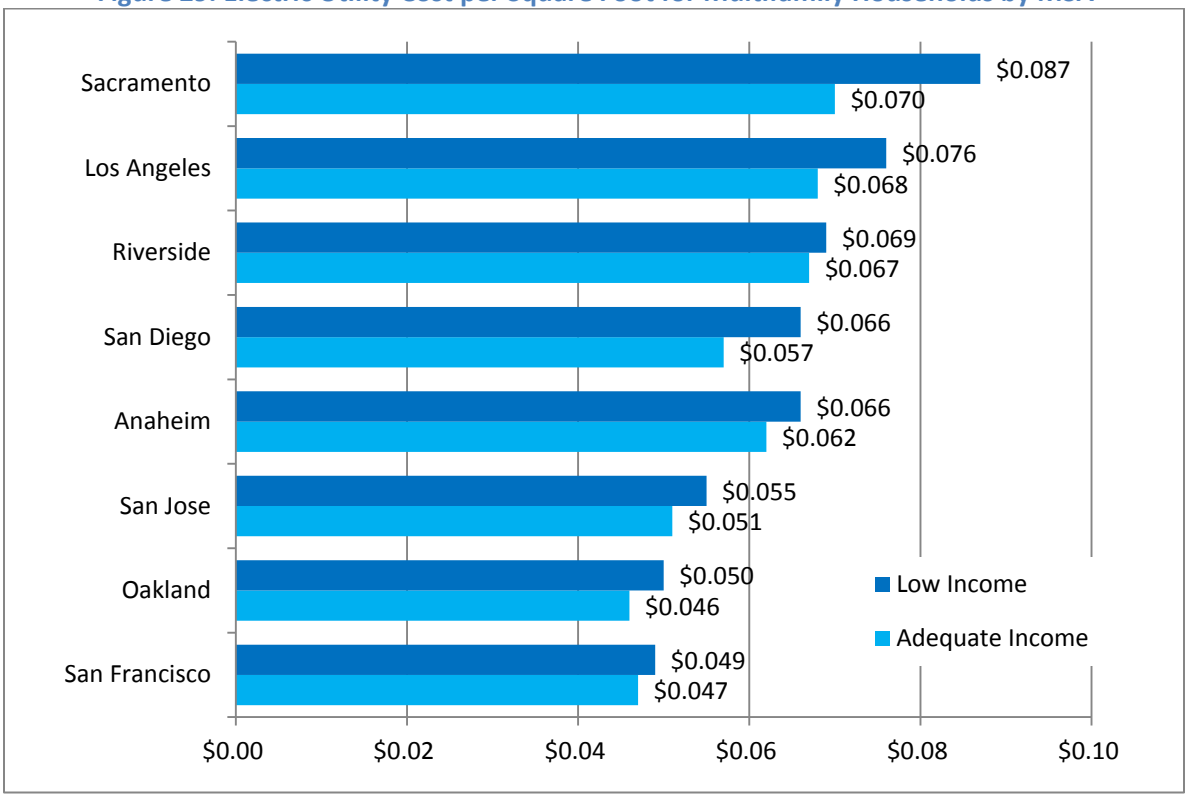
Source: U.S. Census Bureau American Housing Survey 2011

Although low-income households pay a lower total cost than adequate income households across nearly all MSAs, their cost per square foot of living space is higher. For instance, in Los Angeles, low-income multifamily households pay $50.30 per month for electricity, on average compared to $58.46 for adequate income multifamily households. But low-income multifamily households pay more for electricity per square foot: $0.076 compared to $0.068.

[35] The AHS Codebook indicates, "Respondents are asked to state their average monthly costs based on the last 12 months. If the respondent does not know the exact cost, the interviewer accepts an estimate, probing as necessary to obtain the estimate." U.S. Department of Housing & Urban Development, Office of Policy Development & Research. March 2013. "Codebook for the American Housing Survey, Public Use File: 1997-2011" P. 634.

Figure 29 shows a comparison of electricity costs per square foot of living space, by income level and MSA.

Figure 29. Electric Utility Cost per Square Foot for Multifamily Households by MSA



Source: U.S. Census Bureau American Housing Survey 2011

Based on estimates from the AHS survey, electric and gas utility costs consume about 4.5% of income, on average, among low-income multifamily households.[36] This burden is not equally distributed across the low-income multifamily sector, however: those earning no more than 50% of the Federal Poverty Guidelines spend 29% of income on average while those in the upper quarter, between 150% and 200% of poverty, spend only about 3% on average. As a point of comparison, among multifamily households with adequate income, electric and gas utility costs consume about 1% of household income.

[36] These are median values. Included in this average are households that pay directly for either gas or electricity or both and that have positive household income.

ESA Program and MFEER Penetration into the Low-Income Multifamily Sector

Summary of Key Findings

The combination of census data and ESA Program participation data allows us to provide a high-level assessment of the penetration of the program relative to the number of low-income multifamily households in a particular area. In this context, "penetration" refers to the rate of impact on the target sector (that is, the number of ESA Program participants per unit of geography).

Table 15 shows the number of program participants among low-income multifamily households during the program years 2007 to 2012, grouped into two periods and the average annual participation rate over the entire period. Going back six years of program participation by low-income multifamily households, spanning both LIEE and ESA Programs, we see that PG&E had 81,555 participants. Thus, approximately 21% of the total number of low-income multifamily households participated during this six-year period. SCE had 70,836 participants in the LIEE and ESA Programs for a population we have estimated to be 335,484 in 2011, thus also reaching about 21% of all low-income multifamily households. SDG&E, with 48,381 participants, provided services to approximately 41% of total low-income multifamily households within their service territory. SCG had 80,289 participants over six years, providing services to approximately 12% of the total number of low-income multifamily households. Note that for each utility, the second half of the period saw a dramatic increase in participation.

Table 15. Rate of LIEE and ESA Program Participation Among Low-Income Multifamily Households PY 2007 to PY 2012

Utility	Estimated Low-Income Multifamily Households	Number of Participating Households PY 2007 to PY 2009 (LIEE)	Number of Participating Households PY 2010 to PY 2012 (ESA)	Average Annual Participation PY 2007 to PY 2012
PG&E	377,015	22,678	58,877	13,593
SCE	335,484	5,061	65,775	11,806
SCG	591,929	15,779	64,510	13,382
SDG&E	116,904	15,711	32,670	8,064

The goals of the ESA Program are set relative to the entire low-income population. There is no separate goal for the multifamily sector. These goals take into consideration characteristics beyond the number of qualifying low-income multifamily households. The number of eligible and willing households adjusts the totals in Table 15 excluding households that:

- Do not meet a minimal criterion for receiving measures
- Are either resistant to participation or are not able to participate because, for instance, they cannot be present during an audit
- Have been treated through LIHEAP

Additionally, the population of eligible households is assumed to grow by 1% per year.

Thus, from the program standpoint, the denominator for full participation is a subset of total households; whereas, what we present are the number of households that meet only the two basic criteria of income and building type. As noted, the utility adjustments to the population apply to the total population of low-income households, not to any subsector such as multifamily. The utilities have applied a 5% discount on the population to account for unwilling and unable households. For their 2012-2014 ESA Program Application, PG&E and SCE have projected LIHEAP participation at 90% of the rate between 2002 and 2007. SCG&E projects 100% of that rate. SCG has not projected a number for LIHEAP.

The utilities' total rate of ESA participation across both single and multifamily sectors is designed to either achieve or surpass the goal of serving all willing and eligible households. If we look at only the multifamily sector, and apply the same assumptions applied for the total program to the rate of participation in that sector, it appears the planning may not hold for that sector. The assumptions used to estimate multifamily ESA performance are:

- Rate of participation 2002-2006 was equal to the average rate between 2007 and 2009
- Rate of participation 2013-2020 will be equal to the average rate between 2010 and 2012
- The proportion of eligible and willing households in the multifamily sector is the same as in the single-family sector
- Rate of population growth in the multifamily sector is the same as in the single-family sector
- Proportion of multifamily households participating in LIHEAP equals the proportion in the population of low-income households as a whole (32%)

Under these assumptions, SCE and SDG&E would serve all low-income multifamily households by 2020 but PG&E would only serve 87%. We did not have data with which to subtract an estimate of LIHEAP participants from SCG's eligible and willing households but if we assume that 20% of low-income multifamily households are treated by LIHEAP by 2020—about the same proportion as PG&E--we can estimate that ESA would have treated 70% of low-income multifamily households by 2020.

It would seem critical to underscore the uncertainty surrounding these estimates. The utilities will be able to adjust the program going forward to address any emerging shortfall. We would especially highlight the uncertainty associated with the assumption of a constant rate of participation as the number of remaining, untreated households declines. If, for instance, the annual rate of service is assumed to fall by 5% per year starting in 2015, because for instance it becomes more difficult to identify and treat homes, SCE will not serve all eligible and willing multifamily households.

Regression Model of ESA Program Multifamily Penetration

To better understand the penetration of the ESA Program into the low-income multifamily sector, Cadmus conducted a regression analysis of census tract data. The team wanted to understand any factors affecting the rate of program penetration. If program delivery is uniform across the state, we would expect a simple—and, ideally—linear relationship between the number of eligible multifamily households and the number of participating multifamily households. Significant parameter values on additional predictor variables related to socio-demographics would indicate that these factors either increase or decrease the rate of program penetration.

We predicted ESA Program participation in each census tract based on:

- The number of low-income multifamily households
- Median income
- Number of multifamily households
- Total black or African American population
- Total Hispanic population
- Total "other" population
- Total LEP population

A complete discussion of this modeling effort is presented in Appendix E. Here, we summarize our findings.

As expected, the ESA Program has a higher rate of program penetration where there are more low-income multifamily households. The increase in ESA Program participation does not keep up with increases in low-income multifamily households, however, and high concentrations of low-income multifamily households tend to be served at a lower rate of penetration than lower concentrations. In other words, ESA Program participation goes up with a rise in the number of LIMF households, but the percentage of low-income multifamily households served tends to go down.

With respect to income, ESA Program participation goes down as the median income of a census tract goes up. In fact, a doubling of income yields about a quartering of ESA Program participants, all else being equal comparing one census tract to another. Again, this relationship is in the expected direction and shows the keen sensitivity of ESA Program penetration to income. Because the effect of income exists even controlling for the number of low-income multifamily households, it suggests that where these households exist among more-affluent households, they are less likely to participate in the program. In other words, if two census tracts had the same number of low-income multifamily households but in one tract the median income was higher, we would expect the rate of participation to be lower.

Our model found no strong evidence that racial or ethnic identity is associated with increased ESA Program participation, though for some utilities a weak relationship exists. We did identify a relationship suggesting that areas with higher numbers of limited English proficiency households have higher participation rates in the ESA Program.

Thus, our regression model does not identify any strong factors related to the uniformity of participation in the ESA program other than what is expected, the number of low-income multifamily households, with the one exception of the relative economic affluence of the area where the households are located. Where low-income multifamily households are situated among more affluent households, their rate of participation is lower.

Measures Installed in Multifamily Housing Through the ESA Program and MFEER

Summary of Key Findings

In this section, Cadmus reports on the number of measures installed in low-income multifamily households through the ESA Program, by utility and climate zone. One goal of our research was to identify missed opportunities for measure installation. Note that conducting a complete evaluation of missed opportunities would require a review of inspection data from participating households—and possibly site visits. Our approach is more aggregate and data-driven: we have counted the number of households receiving different categories of measures. We cannot say whether individual households received too much or too little of each measure; but, we can say that the list of measures includes a substantial menu across five measure categories. The list of candidate measures was extensive and included 106 distinct measures for PG&E and 116 distinct measures for SCG. SCE and SDG&E presented data in more aggregate form, rolled into measure categories. A list of ESA measures is presented in Appendix H.

Methodology

To analyze the mix of measure across utilities and climate zones, Cadmus created a consolidated list of distinct measure names from each utility's participation data. We then mapped the names to these five categories that encompass all energy-saving measures:

- Appliances
- Envelope and air sealing
- Domestic hot water
- HVAC
- Lighting

All participants received an assessment and energy education.

We joined the measure category names to the measure-level participation data and then we linked them to the previously geocoded[37] participant records, thus, associating the participants with their climate zones.[38]

[37] Geocoding converts a street addresses to latitude and longitude coordinate points. Two separate geocoders were used. The first pass used the ESRI StreetMap North America road data. A second pass used the ArcGIS

ESA Program Measures for Multifamily Housing

For the years from 2009 through 2011, Table 16 shows the number of ESA Program participants living in multifamily housing and the percentage of participants receiving measures within five measure categories.

- ***Appliances:*** Of SCE MF participants, 18% received appliances (specifically, refrigerators). PG&E distributed microwave ovens to 1% of multifamily participants and refrigerators to 13% of multifamily participants.[39] At SDG&E, for example, 3% of participants received microwaves and 6% received refrigerators.
- ***Envelope and Air Sealing:*** At PG&E and SDG&E, more than 70% of multifamily participants received measures in the categories of envelope and air sealing and domestic hot water. Among SCG ESA multifamily 5+ participants, more than 90% received envelope and air sealing measures.
- ***Domestic Hot Water:*** Three-quarters or more of participating multifamily households received domestic hot water measures except among SCE's participants where, the prevalence of gas water heat makes the measure a less important source of electric savings.
- ***Heating and Cooling:*** These measures are reported in greater detail in Table 17. For all utilities, only a minority of multifamily households received HVAC measures, with about 11% of SDG&E households receiving heating measures and 14% of PG&E households receiving cooling measures.
- ***Lighting:*** Most participating multifamily households in PG&E's and SDG&E's programs received lighting measures. SCG did not distribute lighting measures because it is a gas only utility.

Table 16. Percentage of Participating Multifamily Households Receiving ESA Program Measures[1, 2]

Utility	Participants	Appliance	Envelope & Air Sealing	Domestic Hot Water	Heating	Cooling	Lighting
PG&E	58,877	14%	82%	84%	1%	14%	89%
SCE	65,775	18%	2%	0%	1%	1%	36%
SCG	64,510	0.1%	92%	98%	3%	0%	0%
SDG&E	32,670	14%	75%	73%	11%	2%	96%

1. Data is for PY2010 through PY2012.
2. Percentages are of total MF households receiving measures during 2010 through 2012.

Online geocoder for addresses that were geocoded to a ZCTA centroid or could not be geocoded during the first pass.

[38] In the case of PG&E, because the measure-level data were provided separately, these were joined to the original participants, by address. Of the 59,259 original participant records, 125 could not be linked to the measure-level data.

[39] For PG&E, microwave ovens were offered through a limited pilot in in 2009-2010, and were not offered in 2011. Microwaves are back in the program starting 2013 as a regular PG&E ESA program measure.

At PG&E and SDG&E, significant numbers of multifamily participants received HVAC measures. As shown in Table 17, the majority of HVAC measures installed through PG&E's ESA Program were cooling measures. At SDG&E, about 11% of participants received heating equipment repair or replacement.

Table 17. Percentage of ESA Multifamily Program Participants Receiving HVAC Measures

Utility	HVAC Detail	Percentage Receiving Measures
PG&E	Central AC repair/replacement	9.65%
PG&E	Furnace repair/replacement	0.04%
PG&E	Room AC	2.46%
SCE	Central AC repair/replacement	0.74%
SCE	Evaporative cooler	0.02%
SCE	Heat pump	0.10%
SCE	Room AC	0.19%
SCE	Thermostat	0.43%
SCG	FAU Stand Pilot / Change Out	0.21%
SCG	Furnace Clean & Tune	0.80%
SCG	Furnace Repair / Replace	0.12%
SDG&E	FAU Stand Pilot / Change Out	0.25%
SDG&E	Furnace Clean & Tune	8.58%
SDG&E	Furnace Repair / Replace	10.55%
SDG&E	Central A/C Tune-up	0.003%
SDG&E	Room A/C Replacement	2.03%

1. Data is for PY2010 through PY2012.
2. Percentages are of total MF households receiving measures during 2010 through 2012.

In a review of HVAC measures by weather zone, we noted the following ways in which the utilities concentrated their resources for HVAC improvement. Although only a small percentage of SCE participants received HVAC equipment overall, sizeable percentages received cooling measures in climate zones 14 (8% of households) and 15 (36% of households). These are desert areas, most of which experience well over 2,000 cooling degree days, some areas experiencing as much as 6,500 cooling degree days. Similarly, PG&E's efforts were focused on cooling measures in climate zones 11, 12, 13, and 16, which are the only PG&E CZs for which AC is authorized, where between 10% and 29% of households received central AC tune-ups. SDG&E's HVAC measures were primarily related to furnace repair and tune-up and were spread relatively evenly across the two primary climate zones within its utility territory. Among SCG multifamily participants, HVAC measures were received by only a small minority of households in any weather zone.

ESA Program Measure Costs

Table 18 shows the number of multifamily households for each utility participating in the ESA program during program year 2012, as well as the total costs for energy saving measures and the cost per participating household.[40] These data were provided by the utilities as special, multifamily 5+ extractions of cost.

Table 18. ESA Program PY 2012 Participating Multifamily 5+ Households and Measure Costs

Utility	Multifamily Households	Measure Cost	Cost per Household
PG&E	19,723	$8,283,942	$420
SCE	13,839	$2,158,019	$156
SCG	17,897	$3,925,482	$219
SDG&E	10,009	$2,878,598	$288

Table 19 shows the cost per unit that utilities spent to install measures through the ESA program. These costs were arrived at by dividing the total measure cost by the number of treated units. Thus, significant variation from project to project may be concealed within the average. One line in particular to draw attention to is the average cost for furnaces which includes replacement of both central systems and wall furnaces, as well as the repair of furnaces. Costs for replacing a central furnace system vary greatly by installation. The cost for central AC and heat pump replacement derives from a bottom-up calculation of costs provided by SCE and includes the cost of duct sealing and testing as part of the installation.

Table 19. Summary of ESA Program Unit Measure Costs by Utility

Measure	PG&E	SCE	SCG	SDG&E
Heating Systems				
Furnaces	$1,621			$1,037
Forced Air Unit Standing Pilot Change Out			$284	$329
Furnace Clean and Tune				
Cooling Measures				
A/C Replacement - Room	$1,017	$720	$993	
A/C Replacement - Central		$4,000		
A/C Tune-up - Central	$216			
Heat Pump		$4,000		
Infiltration & Space Conditioning				
Envelope and Air Sealing Measures	$202	$104	$133	$177
Duct Sealing		$194		$359
Attic Insulation	$749		$786	$770

[40] These include the installed cost of measures but not costs for outreach and assessment or in-home education. They also do not include administration costs.

Measure	PG&E	SCE	SCG	SDG&E
Water Heating Measures				
Water Heater Conservation Measures	$48	$83	$70	$46
Water Heater Replacement - Gas	$1,243		$892	$1,035
Thermostatic Shower Valve	$20		$7	
Lighting Measures				
CFLs	$5	$6	$7	
Interior Hard wired CFL fixtures	$72		$79	
Exterior Hard wired CFL fixtures	$71			
Torchiere		$50	$101	
LED Night Lights			$3	
Appliances				
Refrigerators -Primary	$717	$790	$574	
Microwave	$80		$90	
Thermostatic Shower Valve	$20		$62	
LED Night Lights			$3	
Occupancy Sensor	$52			
High Efficiency Clothes Washer			$629	$750

Measures Installed Through the MFEER Program

Based on matching street addresses, about 6% of MFEER street addresses match ESA Program addresses. MFEER may benefit low-income households that are not ESA Program participants; however, from the data we have reviewed, it is difficult to discern the portion of benefit accruing to tenants. Also, given the differences in the program design and target markets (e.g., for MFEER the building is targeted and the contractors are given incentives for specific measure installations whereas for the ESA Program, the low-income customer is targeted, and the unit is treated for "all" feasible measures). In addition, the programs are driven by different overall goals; for example, the MFEER program pursues kWh goals, whereas the ESA Program pursues a "homes treated" goal. Not, surprisingly, such programmatic goals will drive marketing and outreach strategies for the two programs.

Across all MFEER participating properties, the measures installed tended to be homogeneous for a given utility.

- ***PG&E:*** PG&E had the most diverse distribution of measure installations: 69% were for lighting, 16% were appliances, and 10% were hot water.
- ***SCE:*** In SCE's territory, 98% of measures installed through MFEER were lighting, and approximately 45% of these were interior CFL fixtures. The remaining measures were either exterior CFL fixtures or T-8 fixtures, and we would expect savings benefits from these measures to go to property owners. At the same time, in some cases, the tenants may benefit from non-savings benefits such as safety if common areas are well-lit.

- ***SCG:*** At SCG, 95% of MFEER measures were shell measures, which would benefit tenants insofar as they pay for the cost of heating and cooling their units. Similarly, tenants may benefit from comfort related benefits resulting from the MFEER program.
- ***SDG&E:*** At SDG&E, 72% of measures were lighting and 25% were water heating. Again, the property owners and tenants may receive slightly different benefits from the MFEER program with the property owners more likely to benefit from the kWh savings associated with MFEER.

The Number of Buildings Housing Low-Income Multifamily Households

Our data do not provide clear evidence of the number of buildings within which low-income multifamily households reside. Census data is organized around individuals and households, not buildings. Results provide information about the number of units in the buildings within which respondents reside but no information about the percentage of units in each building that are inhabited by low-income households. We can provide a rough estimate of the number of buildings that house low-income households if we assume an average proportion of households within each building that qualify as low-income.

From the three-year ACS data, we know that the distribution of households by building size is:

- 27% of households in buildings of 5 to 9 units
- 24% of households in buildings of 15 to 19 units
- 22% of households in buildings of 20 to 49 units
- 27% of households in buildings of 50 or more units

If we assume the midpoint of each size category is the average building size, we can divide the number of households living in each category by the midpoint to estimate the number of buildings.[41] For instance, of the 377,015 low-income multifamily households living in PG&E's territory, about 27% live in buildings with an average of 7 units (i.e. midpoint of the "5 to 9 units" category). If all low-income families lived only with other low-income families, the following equation would provide an estimate of the total number of buildings.

$$\frac{(\text{Low} - \text{Income Multifamily Population} \times \text{Percent in Size Category})}{\text{Midpoint of Size Category}}$$

In the above example, we would estimate (377,015* 0.27) / 7 = 14,542 buildings.

Since we cannot assume that low-income multifamily households live in buildings exclusively with other low-income households, that is, since low-income multifamily households live in buildings mixed among adequate income households, the number of buildings housing *any* low-income multifamily households

[41] For the uppermost category, we have estimated a midpoint of 74 units. This is based on a regression analysis conducted for the MFEER program evaluation.

must be larger than the equation above would imply. If we knew the average mixing ratio of low-income and adequate income households in multifamily buildings we could inflate to population accordingly. The adjusted equation for each size category is:

$$\frac{(\text{LIMF Population} \div \text{Average Percent LI in Building} \times \text{Percent in Size Category})}{\text{Midpoint of Size Category}}$$

We do not have a good source of data on this ratio, however.

Table 20 shows an estimate of the number of buildings that house low-income multifamily households assuming a mixing ratio of 2:1 for market rate buildings and a ratio of 3:1 for rent-assisted buildings. This means, for instance, that on average in market rate buildings where low-income multifamily households reside, two-thirds of all households in the building are low-income. In buildings where tenants receive assistance, three-fourths of all households receive assistance. This estimate suggests there are approximately 33,889 buildings housing low-income multifamily households in PG&E's territory, 30,128 in SCE's territory, 10,546 in SDG&E's territory, and 52,812 in SCG's territory. The lower the mixing ratio, the more spread out are low-income multifamily households across the multifamily buildings and thus the larger the number of buildings housing them. Thus, if the mixing ratio for market rate buildings is 1:1 rather than 1:2, there are 36,793 buildings in PG&E's territory or 9% more.

In this table we also estimate the number of market rate and rent-assisted buildings. To arrive at this value we applied the proportion of those two groups in MSAs served by each utility, broken out by building size, to the number of buildings in each size category for each utility. For instance, in the Riverside and Anaheim MSAs, 26% of households in buildings with five to nine units receive government rent assistance. Thus, we apportioned 26% of buildings in this size category for this utility into the rent assistance sector.

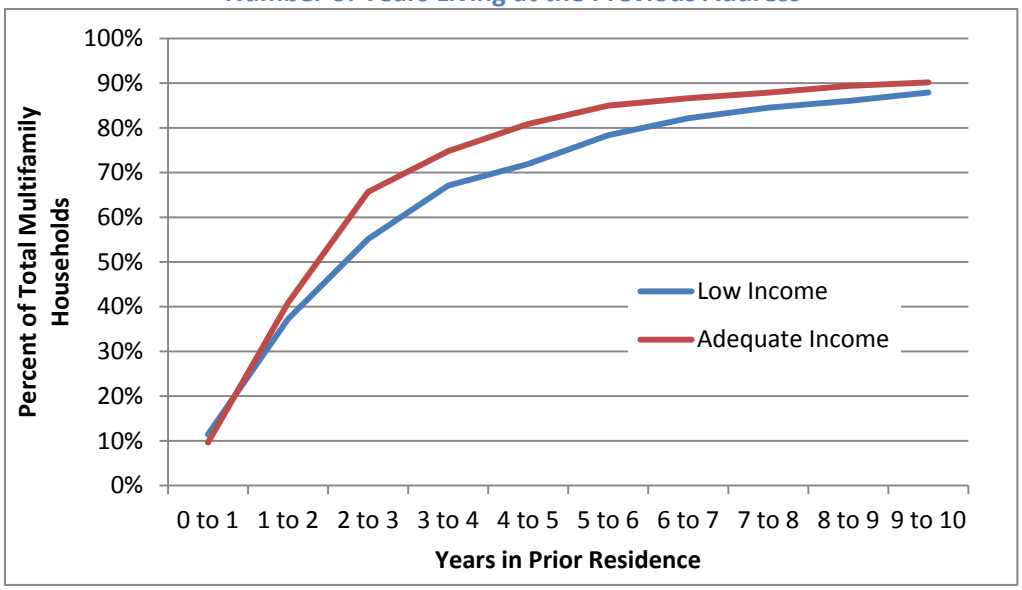
Table 20. Estimate of the Number of Low-Income Multifamily Buildings by Utility

Utility	Building Size	Percentage of Multifamily Households	Low-Income Multifamily Households	Low-Income Multifamily Households and Neighbors	Buildings Housing Low-Income Multifamily Households	Low-Income Multifamily Rent-assisted Buildings	Low-Income Multifamily Market Rate Buildings
PG&E	5 to 9 Units	27%	103,566	142,204	20,315	4,845	15,470
	10 to 19 Units	24%	88,787	120,632	8,319	1,265	7,055
	20 to 49 Units	22%	82,529	113,789	3,298	899	2,399
	50 or More Units	27%	102,134	144,766	1,956	987	969
	Total	**100%**	**377,015**		**33,889**	**7,996**	**25,893**
SCE	5 to 9 Units	27%	92,157	126,793	18,113	4,619	13,494
	10 to 19 Units	24%	79,006	107,644	7,424	1,298	6,125
	20 to 49 Units	22%	73,437	100,582	2,915	635	2,280
	50 or More Units	27%	90,883	124,017	1,676	314	1,362
	Total	**100%**	**335,484**		**30,128**	**6,866**	**23,262**
SDG&E	5 to 9 Units	27%	32,114	44,320	6,331	1,776	4,555
	10 to 19 Units	24%	27,531	37,662	2,597	540	2,057
	20 to 49 Units	22%	25,590	35,115	1,018	238	780
	50 or More Units	27%	31,669	44,342	599	240	359
	Total	**100%**	**116,904**		**10,546**	**2,794**	**7,752**
SCG	5 to 9 Units	27%	162,603	221,997	31,714	6,076	25,637
	10 to 19 Units	24%	139,399	188,797	13,021	1,643	11,377
	20 to 49 Units	22%	129,573	176,191	5,107	810	4,297
	50 or More Units	27%	160,354	219,797	2,970	666	2,304
	Total	**100%**	**591,929**		**52,812**	**9,196**	**43,616**

Housing Unit Mobility Among Low-Income Multifamily Households

The AHS provides information about the rate at which households move from one housing unit to another. The survey collects information about the year the respondent moved into the current housing unit, and importantly, about the year the respondent had moved into the previous housing unit. The difference in years, plus one, is the maximum time a survey respondent could have spent living in the previous housing unit.[42] Figure 30 shows the cumulative distribution of households by the number of years living at the previous address. To help control for faulty memories, we limited our analysis to households that had moved into the current residence within the past five years. Both low-income and adequate income sectors are represented. We note that low-income households remained in their previous unit slightly longer, on average. Nevertheless, within seven years, 82% of low-income multifamily households had moved from their prior residence into the current one.

Figure 30. Cumulative Distribution of Multifamily (5+) Households by the Number of Years Living at the Previous Address



Source: American Housing Survey

[42] For instance, if a respondent moved into the current unit in 2011 and into the previous unit in 2009, the difference in years is two; but, it is possible the respondent moved into the unit in January 2009 and moved out in December 2011. So, 3 years is the maximum time the respondent could have lived in the unit. For our purposes, this estimate will be precise enough. This analysis represents a simplification of housing unit mobility because households do not all remain intact as they move from one unit to another.

Section 4. Surveys and Interviews

Surveys with Owners and Operators of Low-Income Multifamily Buildings

Summary of Key Findings

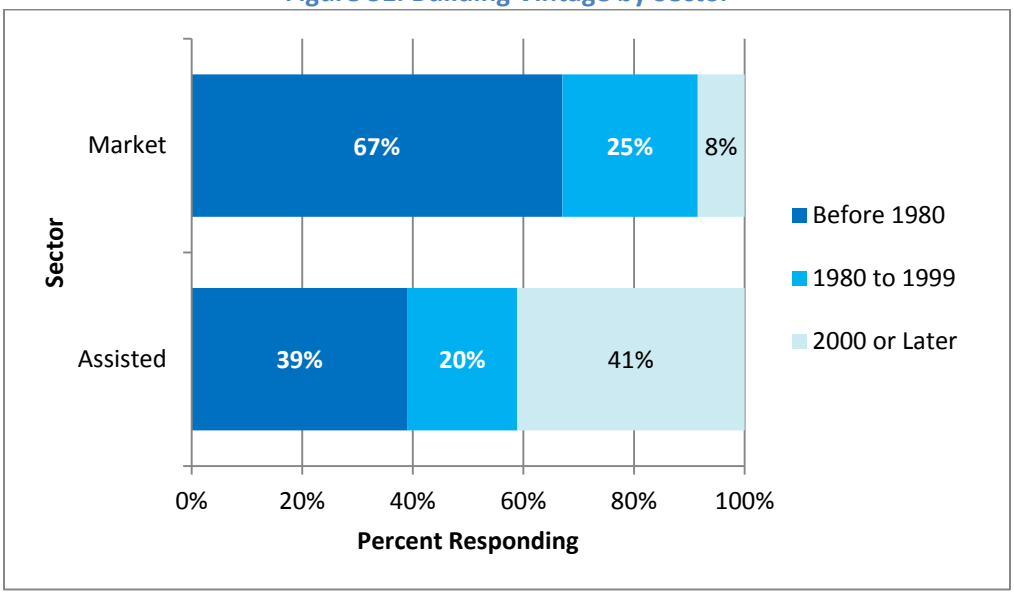
Using data collected from the telephone survey with owners and operators of multifamily buildings with low-income tenants, we collected information about the building characteristics including equipment in apartment units and common areas, awareness of IOU energy efficiency programs, and decision-making related to purchase and installation of energy efficient equipment. By extension, these data provided information about the tenants' needs. The surveyor asked respondents about their perception of energy efficiency upgrades needed at their property, but the survey was not intended to take the place of a comprehensive building audit.

Appendix F provides details about this survey's research methodology and sampling plan. The appendix provides a description of the data sources for the stratified sample and the convenience sample, and presents the sample attrition tables. The appendix also discusses the challenges conducting this survey.

Building Characteristics

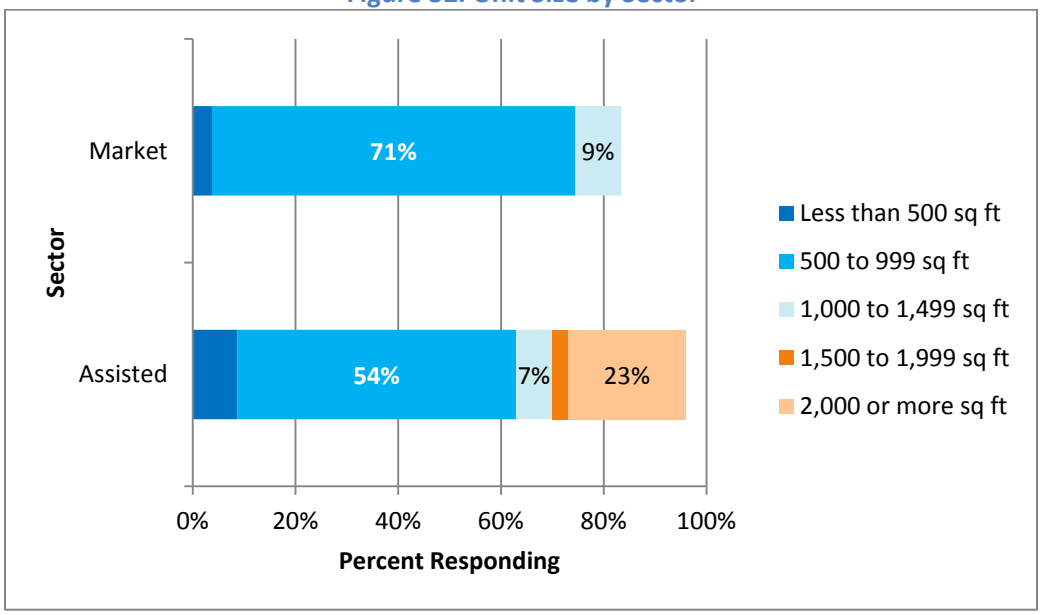
Although the AHS data (discussed in Section 3 of this report) provide a generally richer set of data for characterizing low-income multifamily buildings, especially because of the relatively large sample of assisted properties, there are some important points of information to glean from survey data. As shown in Figure 31, survey data suggest that buildings in the assisted sector are of more recent vintage, on average than market rate buildings. Fully two-thirds of the market rate respondents said their building was built before 1980, whereas only 39% of buildings in the assisted sector sample were built before 1980.

Figure 31. Building Vintage by Sector



The survey findings also indicate that the average size of apartment units in the assisted sector is larger than in the market rate sector. As indicated in Figure 32, fully 23% of respondents from the assisted sector said the average size of their units is 2,000 square feet or more; however, no one from the market rate sector reported average unit size as large as 2,000 square feet.

Figure 32. Unit Size by Sector



As seen in Table 21, this is related to the number of bedrooms in the apartments discussed in the survey. The survey findings show that size of apartment correlates with number of bedrooms. Half of studio apartments are less than 500 square feet, 17% of studio apartments are between 500 and 1,000

square feet, and one-third said they did not know the size of studio apartments. All one-bedroom apartments are less than 1,000 square feet. All two-bedroom apartments are 500 square feet or more with 76% between 500 and 1,000 square feet. Three bedroom apartments range in size from 500 square feet to more than 2,000 square feet (43%).

Table 21. Number of Bedrooms and Size of Apartments*

	Less Than 500	500 to Less Than 1,000	1,000 to Less Than 1,500	1,500 to Less Than 2,000	2,000 or More	Don't Know	Refused
Mostly Studios (n=6)	50%	17%	0%	0%	0%	33%	0%
Mostly 1 Bedroom (n=13)	23%	77%	0%	0%	0%	0%	0%
Mostly 2 Bedrooms (n=95)	0%	76%	11%	0%	0%	13%	1%
Mostly 3 Bedrooms (n=7)	0%	29%	29%	0%	43%	0%	0%

* Size is in square feet.

Rent and Utilities

Nearly all, 94% of respondents, reported that apartment units are individually metered for utilities. Only 12% of respondents said all utilities are included in the rent; 18% said none; and 70% said some. Water, sewer, and garbage are the most common utilities included in rent. Respondents reported electricity is included in the rent, 28%, and including gas in the rent was reported by 26% of respondents.

Respondents estimated the typical monthly rent for units at their property. Rents ranged from less than $250 to over $1,500. Average rent depends on apartment size but the most common monthly rents are $500 to $750 (45%).

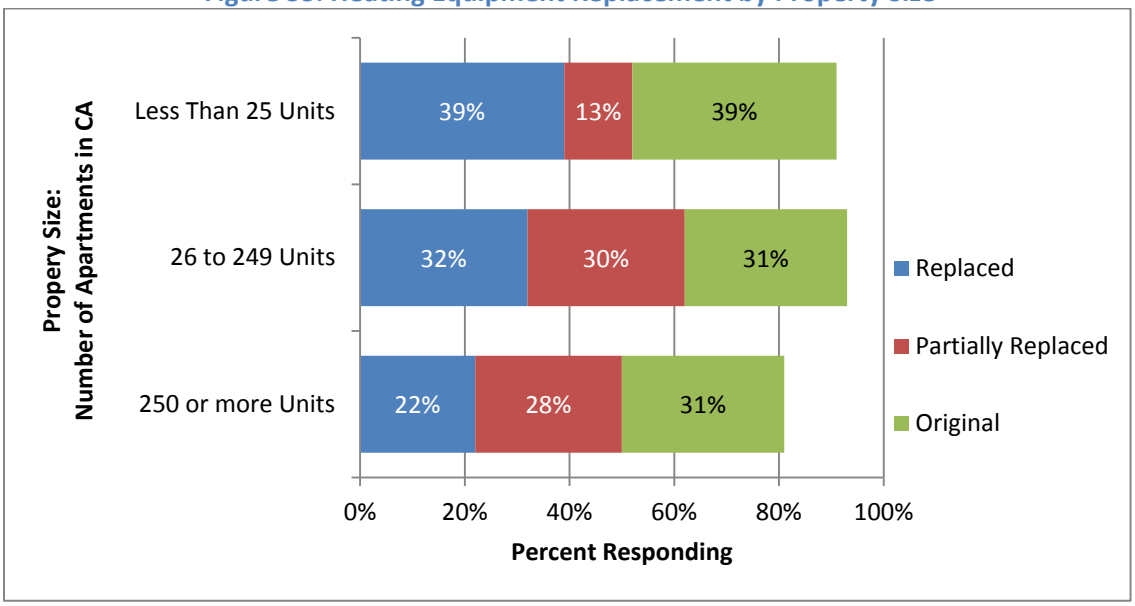
Table 22. Rent by Size of Apartment

Rent	Less than 500 sq ft	500 to 999 sq ft	1,000 to 1,499 sq ft	1,500 to 1,999 sq ft	2,000 sq ft or more	Don't Know
$250 or less	10%	-	-	-	-	-
$251 to under $500	1%	2%	-	-	99%	12%
$500 to $750	88%	48%	53%	-	-	27%
$751 to under $1,000	1%	15%	11%	-	1%	20%
$1,000 to under $1,200	-	8%	16%	-	-	9%
$1,200 to under $1,500	-	9%	16%	100%	-	-
$1,500 or more	-	4%	4%	-	-	-
30% of income	-	3%	-	-	-	-
Depends on income	-	3%	-	-	-	-
Don't know	1%	4%	-	-	-	33%
Refused	-	4%	-	-	-	-

Equipment Replacement

While the AHS data (see Section 3) provide precise information about the type of heating and cooling equipment installed in multifamily buildings housing low-income tenants, they do not indicate whether the equipment has been replaced. A surveyor asked respondents whether the heating equipment in their building (discussed in the survey) was replaced or was original to the building. Figure 33 shows responses for the building discussed in the survey, sorted by the respondents' property size. Property size is defined by the number of apartment units owned or managed by respondents in California. A large percentage of respondents were unable to answer the question. The responses do not vary greatly by property size, except that owners of small properties are less likely to partially replace equipment.

Figure 33. Heating Equipment Replacement by Property Size



The survey also asked about cooling equipment. Results are quite consistent with findings of the much larger AHS dataset, with 36% of respondents saying their building has central AC, 23% saying their building's units have room AC, and 34% saying the units have no AC. Replacement of original AC equipment is closely related to building vintage. Almost half, 47% of respondents managing buildings built in 2000 or later, saying central AC equipment is original and only 8% of respondents managing buildings built before 1980 saying the AC equipment is original.

Common Areas

The survey provides information about common areas in low-income multifamily buildings that is unavailable from the AHS dataset. The majority of buildings discussed in the survey have common areas, regardless of size; however, larger buildings are more likely to have a common area. Among respondents managing buildings with 25 or fewer units on the property discussed in the survey, 77% said the building had a common area. Among respondents managing larger buildings the percentages were larger: 93% for buildings with 26 to 249 units and 100% for buildings with 250 units or more on the property. Respondents managing buildings built after 2000, however, were more likely to say their

building did not have a common area than respondents managing buildings of an older vintage (39% compared to 11%).

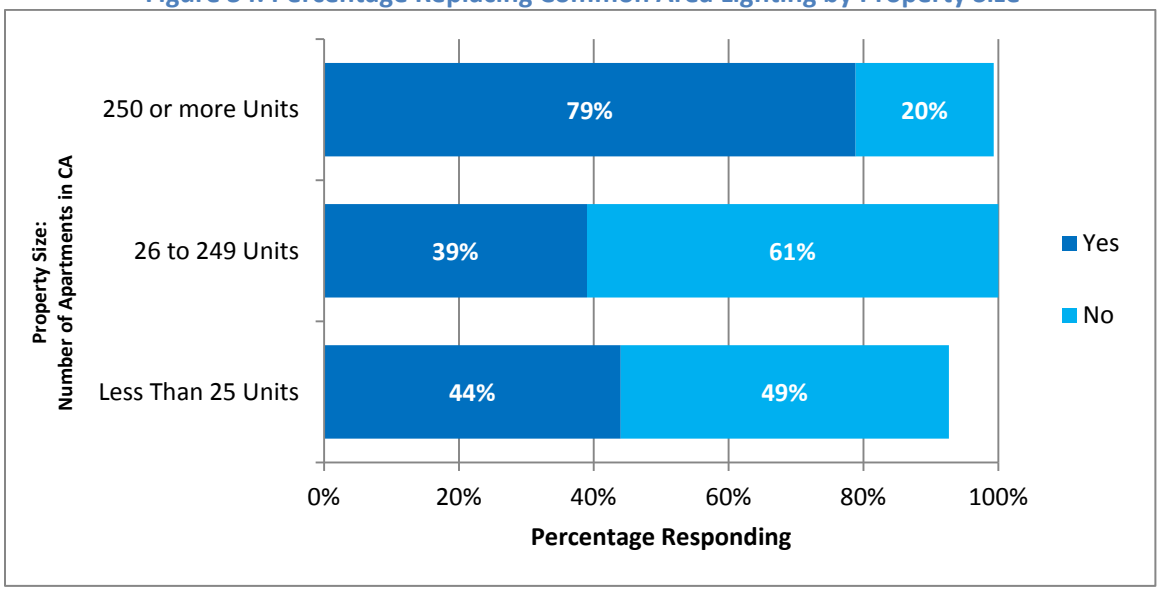
Among respondents with common areas in the building discussed in the survey, 48% said the common areas are not heated; 54% said the common areas are not cooled.

Gas is the dominant fuel used to heat common areas. Respondents reported system types included furnaces, boilers, rooftop units and baseboard or wall heaters. Electricity is the dominant fuel used to cool common areas. Central AC units are most often used to cool common areas; some swamp coolers and window AC units are used.

Lighting and Equipment Upgrades

Another area where the AHS dataset offers relatively little insight is in providing specific information about property upgrades. The survey asked a series of questions about equipment replacement *"in the past couple of years"* for common area lighting and lighting in units, heating and AC equipment, clothes washers in common areas, and appliances in units. Respondents managing larger buildings were more likely to say they had replaced equipment. For instance, Figure 34 shows the number of respondents who said they had replaced common area lighting, by property size.

Figure 34. Percentage Replacing Common Area Lighting by Property Size

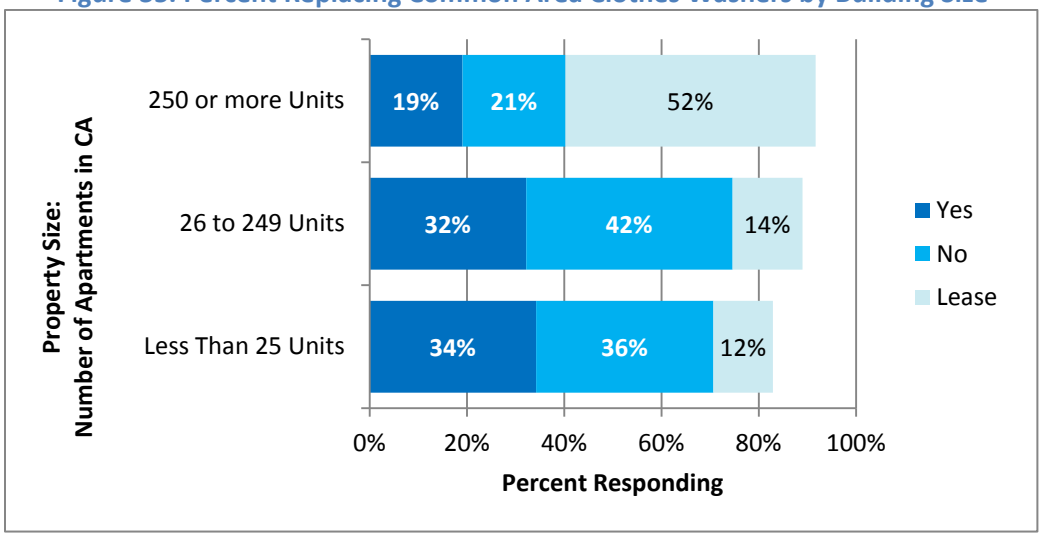


Exactly 50% of respondents said they replaced equipment for the purposes of upgrading it, without the equipment being broken. There is no indication, however, that managers of large properties were more likely to install *high efficiency* equipment. To the contrary, 50% of small property managers (having 25 or fewer units) said they had installed high efficiency lighting in common areas, as compared to about 35% of larger building managers.

Within tenant units, the percentage of respondents saying they had replaced lighting equipment in the past couple of years was nearly identical to the percentage saying they had replaced outdoor and common area lighting. Specifically, 80% of those managing 250 units or more in California, 42% of those managing between 25 and 249 apartment units, and 45% of those managing fewer than 25 apartment units had replaced lighting in the apartments. Fifty-five percent of respondents said they had replaced equipment to upgrade it; 54% said they had replaced lighting with high-efficiency equipment. Once again, however, data show that managers of the larger numbers of apartment units—above 25 units--were less likely to have replaced lighting equipment with high-efficiency units than were managers of 25 units and smaller: 47%, as compared with 65%.

For clothes washers located in common areas, the managers of the largest numbers of units report they are most likely to lease equipment, rather than purchase it. That practice is less common for managers of smaller numbers of units, as shown in Figure 35.

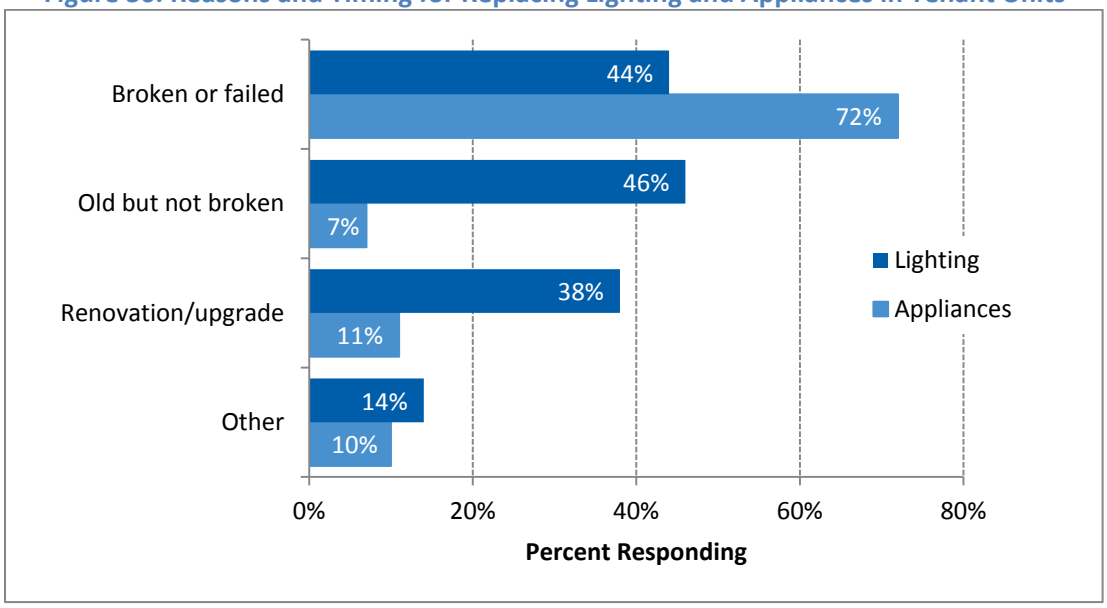
Figure 35. Percent Replacing Common Area Clothes Washers by Building Size



About one-third of respondents said they had installed high efficiency equipment, with no significant difference by size.

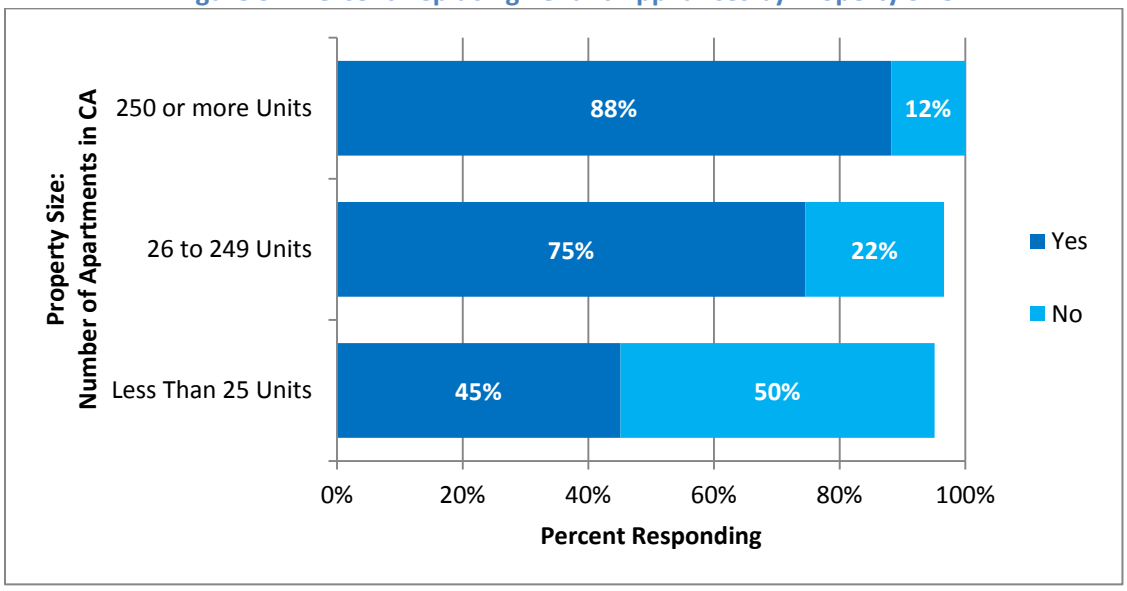
Lighting upgrades in tenant apartments occur for different reasons than appliance upgrades. Lighting is upgraded 44% of the time because it is broken or failed, and 46% of the time when it is old but not broken. Lighting is replaced 38% of the time as part of a renovation or upgrade. About 54% said lighting was replaced with high efficiency equipment. Appliances are most often replaced (72%) when it breaks or fails (Figure 36).

Figure 36. Reasons and Timing for Replacing Lighting and Appliances in Tenant Units



In the tenant apartments at the property discussed in the survey, the percentage of respondents who said the appliances were replaced within the past couple of years is shown in Figure 37. Seventy-two percent of respondents said appliances were replaced because they were broken or had failed. Only 11% said the appliance replacements were part of an upgrade. Overall, 35% said that equipment was replaced with high-efficiency equipment. This was higher (48%) in large properties (250 or more units on the property discussed in the survey) than in small properties. Also, 19% of respondents did not know the efficiency of the installed equipment.

Figure 37. Percent Replacing Tenant Appliances by Property Size

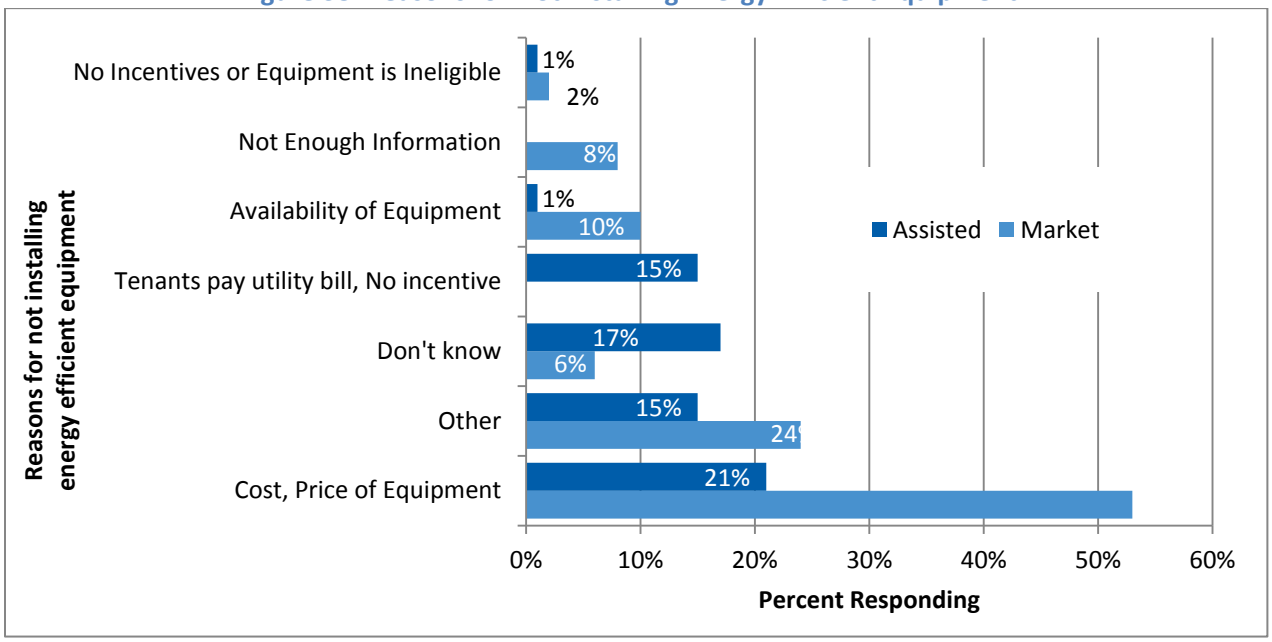


When asked who pays for the lighting and equipment upgrades made to the tenant apartment units, the majority, 81%, said the property owners pay for the equipment upgrades in tenant units, 11% said both the tenant and owners pay or it depends on the situation, and 7% said the tenant pays for upgrades.

We asked respondents if tenants owned any of the equipment within their units. We did not ask what percentage of tenants own each type of equipment, so we do not attempt to develop overall percentages from this data. Nevertheless, the responses are indicative that some low-income households do own major appliances; 29% of respondents said tenants own refrigerators, 14% of respondents said tenants own clothes washers, and 10% of respondents said tenants own room air conditioners.

Respondents reported they did not install energy-efficient equipment largely because of the price: 53% of managers and owners of market rate, and 21% of rent-assisted buildings. Those in the "other" category stated that energy efficiency equipment is not as durable, they follow state policies, it is *"just basic stuff,"* and there is no benefit from installing energy efficient equipment in the apartments. The next largest response for the rent-assisted group, 17% said they did not know and 15% said the tenants pay the bills and there was no incentive for the owners to install efficient equipment.

Figure 38. Reasons for Not Installing Energy-Efficient Equipment



Benefits from Common Area Upgrades

Survey respondents who have common areas on the property were asked to identify the ways they thought reducing energy use in common areas benefits owners and tenants. Respondents said the top benefit for owners was to save money and reduce costs (Table 23). Over one-quarter said there were no benefits to owners. The two sectors differed with only 4% of rent-assisted respondents saying there were no benefits and 32% of market rate respondents saying this.

Forty-three percent of respondents said that there were no benefits to tenants for making energy efficiency upgrades in common areas (Table 24). Market rate respondents said this more frequently (44%) than respondents in the rent-assisted sector (34%). The top benefits for tenants were saving money for tenants (29%), tenant comfort level (10%), and being good for the environment (6%). Other benefits accounted for 5% of the responses. These responses included better lighting, decreased utility costs, tenants learn about energy efficiency, more efficient home, offer more programs to tenants, and keeping rent down.

Table 23. Benefits of Energy Efficiency Upgrades in Common Areas to Property Owners*

Benefits	Weighted Base	Rent Assistance	Market Rate
Save money for owners/reduce costs	55%	88%	50%
No benefit to owners	28%	4%	32%
Increase property value	6%	8%	6%
Other	5%	8%	5%
Good for the environment	4%	5%	4%
Improve cash flow	3%	11%	2%
More money for capital expenses	3%	11%	2%
Nicer building/more comfortable	2%	4%	2%
Don't know	9%	4%	10%

* n=104. Percentages do not add up to 100 because respondents could give multiple responses.

Table 24. Benefits of Energy Efficiency Upgrades in Common Areas to Tenants*

Benefits	Weighted Base	Rent Assistance	Market Rate
No benefits to tenants	43%	34%	44%
Save money for tenants	29%	39%	28%
Nice building/more comfortable	10%	8%	10%
Good for the environment	6%	1%	6%
Lower rent	5%	8%	4%
Other	5%	12%	3%
Not raise rent	3%	4%	3%
Don't know	8%	4%	9%

* n=104. Percentages do not add up to 100 because respondents could give multiple responses.

Table 25 compares two response options about the benefits from upgrading common areas: benefits to property owners or tenants and saving money for owners or tenants (Table 25). Almost half of the responses indicating there was no benefit to owners for making common area upgrades indicated that there was also no benefit to tenants in making these upgrades. A majority of the responses indicated that upgrades in common areas save money for tenants and owners (83%).

Table 25. Comparison of Benefits to Owners and Tenants

	No benefit to tenants	Save money for tenants
No benefit to property owners (n=57)	48%	13%
Save money for property owners/reduce costs for owners/reduce operating costs (n=29)	45%	83%

Decision Making

Surveyors asked respondents who makes the decisions about improvements or purchasing new heating and cooling equipment for their multifamily properties. This question was answered by 96 respondents (a weighted base), including 32 representing rent-assisted and 64 representing market rate apartments. The majority of all respondents, 87%, stated the owner or manager made these decisions. Of those representing rent-assisted properties, 63% stated the owner or manager made decisions, followed by 27% reporting directors made property decisions. Of those representing market rate housing, 88% stated the owner or manager made decisions, followed by 9% reporting directors made decisions.

Table 26. Decision Makers

Decision Maker	Weighted Base*	Rent Assistance*	Market Rate*
Owner or manager	87%	63%	88%
Director	10%	27%	9%
Facilities manager	4%	10%	3%

* Percentages were rounded.

When asked about the ownership structure of the property, 54% of respondents said an individual owned the property (Table 27). This was most common for properties discussed in the survey that had between 5 and 24 units (58%) and for properties with between 25 and 249 units. A corporation (66%) was the most common ownership structure for larger buildings (250+ units on the property).

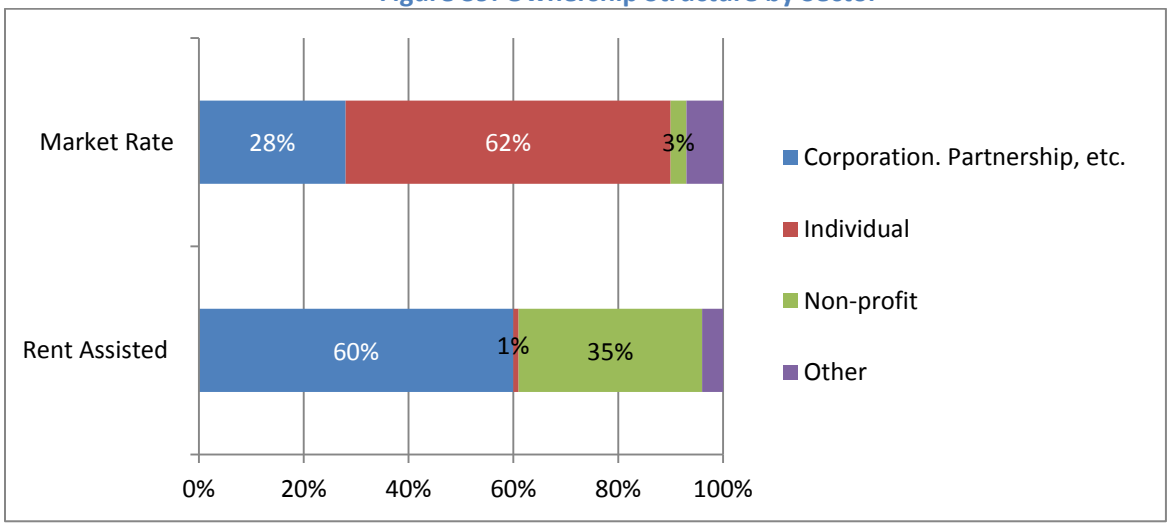
Table 27. Ownership Structure by Size (Number of Units in Buildings Discussed in Survey)*

	Weighted Base	5-24 Units	25-249 Units	250+ Units
Individual	54%	58%	44%	32%
Corporation, partnership, LLC, limited partnership	31%	26%	40%	66%
Non-profit institution	7%	8%	5%	-
Private institution	1%	2%	< 1%	-
Public institution	1%	2%	-	1%
Other	5%	4%	7%	-
Don't know	< 1%	-	1%	-
Refused	2%	2%	1%	-

* Weighted percentages were rounded.

The ownership structure for market rate and rent-assisted sectors are quite different. Individuals own the majority of market rate properties (62%), followed by corporations, which own 28% of properties. Corporations own the majority of rent-assisted properties (60%), followed by non-profits, which own 35% of properties. We assume that ownership of the specific multifamily property discussed in the survey is indicative of all units owned or managed by these respondents in California.

Figure 39. Ownership Structure by Sector



When asked if this decision making process changed when making major decisions for new buildings versus older buildings, 13% did not know. However, of those who had both new buildings and older buildings and who could answer, the majority, 83%, stated the process did not change. Another 10%

stated it depends, and major decisions were directed to the board. Several commented that they try to make older buildings more energy efficient, put in more efficient equipment, look at upgrading the building versus getting rid of the building, or tend to make major improvements in older buildings.

Surveyors asked respondents if they made decisions one building at a time or for the whole portfolio at the same time. The majority of all respondents (75%) reported decisions were made one building at a time. This differed between the rent-assisted respondents (33%) and market rate respondents (77%). More rent-assisted properties, 46%, reported making decisions for the whole portfolio. Only 21% of rent-assisted properties said they make decisions for the whole portfolio. Differences in responses between the two groups were statistically significant.

Table 28. Are Decisions Made One Building at a Time or for the Portfolio?

Are decisions made one building at a time or for the whole portfolio?	Weighted Base	Rent Assistance	Market Rate
Each building	75%	33%	77%
The whole portfolio	14%	46%	12%
It depends	7%	21%	6%
Don't know	5%	0	5%

As a whole, property owners and managers tend to spend money on major improvements (like installing a heating or cooling system) when it breaks (70%) rather than planning for it (17%). However, separating the two respondent groups, 44% of rent-assisted housing managers and 73% of market rate housing managers spend money when equipment breaks (statistically significant, p=.08). Rent-assisted housing owners and managers (23%), and market rate housing owners and managers (16%), plan ahead to spend money on major improvements.

When asked how far in advance they plan for something like a new heating or cooling system, 40% plan less than one year before the project begins, 26% said they plan between one and two years in advance, 1% plan between two and three years in advance, and 5% plan more than three years in advance. Another 14% of respondents did not know how far in advance expenditures were planned.

Table 29. Planning for Upgrades

How far in advance do you plan for something like a new heating or cooling system?	Weighted Base	Rent Assistance	Market Rate
Less than 1 year before the project begins	40%	25%	43%
1 year to less than 2 years	26%	38%	24%
2 years to less than 3 years	1%	10%	
3 years or more	5%	5%	5%
Varies	7%	11%	7%
Don't know	14%	10%	15%
Refused	6%	-	7%

The surveyor asked respondents how they paid for equipment replacements and upgrades. The questions were:

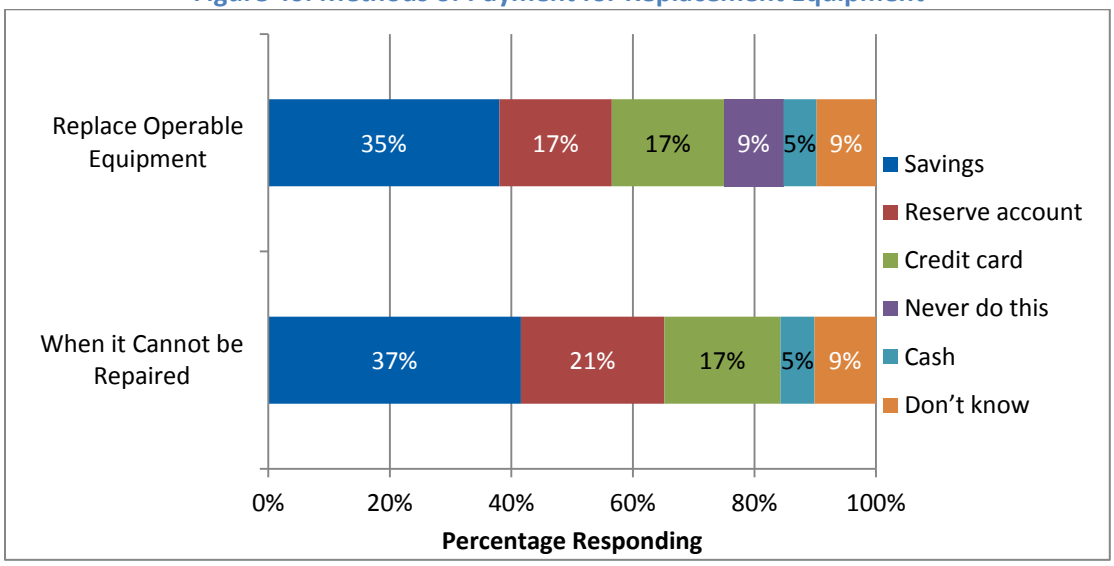
> *"When equipment like heating systems or water heaters are broken and can't be repaired, does your company take out a loan, charge the expenses, or use savings for the replacements?"*
>
> *"How about if you are replacing or upgrading old equipment that may still work? Does your company take out a loan, charge the expenses, or use savings for the replacements?"*

Responses were open ended (that is, the surveyor did not read the response options). These two scenarios result in similar approaches to payment.

As a whole, owners and managers reported they would pay for replacing or upgrading old but ***operable*** equipment with savings (35%), credit card (17%), and reserve account (17%). Another 9% reported they never replace old but operable equipment.

Respondents reported how they paid for equipment replacements like heating systems or water heaters when the system is inoperable. Respondents pay for placements of ***inoperable*** equipment with savings (37%), reserve account (21%), and credit card (17%).

Figure 40. Methods of Payment for Replacement Equipment



When equipment is inoperable, the two sectors approached paying for equipment replacements differently. Rent-assisted housing uses a reserve account (20%), credit card (23%), and savings (12%). Market rate housing uses savings (40%), credit card (16%), and reserve accounts (21%).

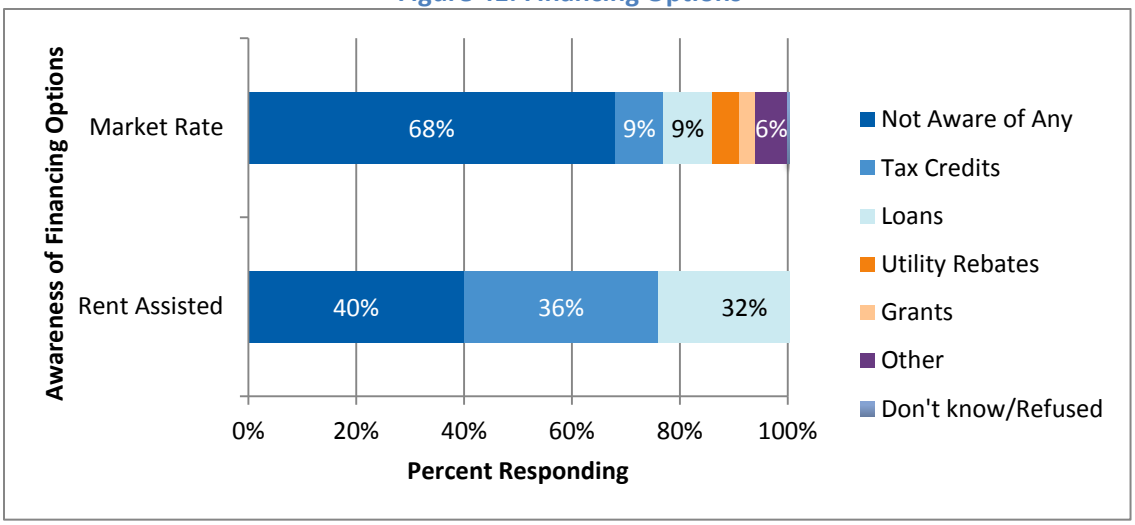
The two sectors also approach paying for upgrades of operable equipment differently. Rent-assisted housing uses a reserve account (46%), followed by credit card (23%), and savings (9%). Market rate

housing uses savings (38%), reserve accounts (13%), and credit card (17%). Differences between the two sectors were statistically significant for reserve accounts (p=.01) and savings (p=.09).

Surveyors asked respondents if they were aware of any financing options that may assist with the expenses to upgrade or replace equipment. The majority, 65%, said they were not aware of any. Others said they were aware of tax credits (12%), loans (12%), utility rebates (6%). The two groups had different levels of awareness: 40% of rent-assisted housing owners and managers were not aware of financing options, and 68% of market rate housing owners and managers were not aware of any options (Figure 41).

Tax credits were mentioned by 36% of owners and managers of rent-assisted housing, while this was mentioned by only 9% of market rate housing owners and managers (statistically significant difference, p=.02). Loans were mentioned by 32% of rent-assisted housing, and by only 9% of market rate housing owners and managers (statistically significant difference, p=.05). Utility on-bill financing was mentioned by 2% of all respondents. Other financing options mentioned by one person were Property Assessed Clean Energy program (PACE) and Power Purchase Agreement's (PPAs).

Figure 41. Financing Options



The most important factor in the decisions made when selecting equipment to upgrade or replace was cost (76% for the group as a whole; 93% of rent-assisted housing and 75% of market rate housing). The second most important factor for the group as a whole was energy efficiency (32%), followed by availability of equipment (20%), and then the size of the upgrade or improvement (14%).

For the two groups separately, 53% of the owners and managers of rent-assisted housing stated energy efficiency was a factor, 42% said the size of the upgrade or improvement was a factor, 24% said availability of equipment was a factor. Energy efficiency was a factor reported by 31% of market rate owners and managers, availability of equipment was mentioned by 19%, and size of the job was a factor

for 13%. The only statistically significant difference between the sectors was the size of the upgrade or improvement (p=.01).

Table 30. Factors Influencing Decisions to Select Equipment

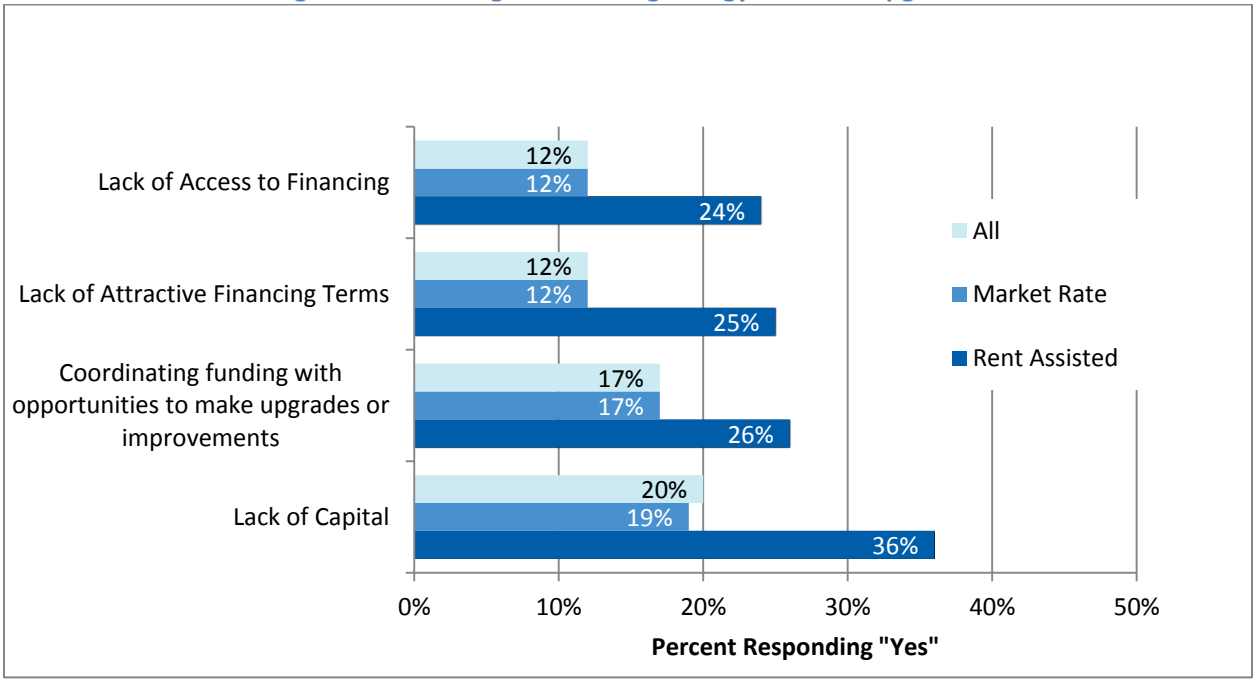
When you replace or update old or broken equipment, what factors influence your decision to select the equipment you install?[1]	Weighted Base	Rent Assistance	Market Rate
Cost	76%	93%	75%
Energy efficiency	32%	53%	31%
Availability of equipment	20%	24%	19%
Size of upgrades/improvements	14%	42%[2]	13%
Various: quality, tax credits, customer or contractor, reliability, matching old equipment, payback, prior experience, etc.	23%	6%	24%

1. Respondents could provide more than one response.
2. Statistically significant, p=.01

Surveyors asked respondents if specific factors made it difficult to make energy efficiency upgrades. The factors included lack of capital, lack of access to financing, lack of attractive financing terms, and coordinating funding with opportunities to make upgrades or improvements. About half the respondents reported that the factors did not make it difficult to make energy efficiency upgrades. The factor causing the most difficulty was the lack of capital (20% of all respondents; 36% of managers and owners of rent-assisted properties). Almost one-third of respondents also stated they did not know or refused to answer.

One quarter of the managers and owners of rent-assisted properties stated each of the other factors made it difficult to make energy efficiency upgrades. Among the managers and owners of market rate properties, 12% to 17% of respondents stated each factor made it difficult to make energy efficiency upgrades (Figure 42).

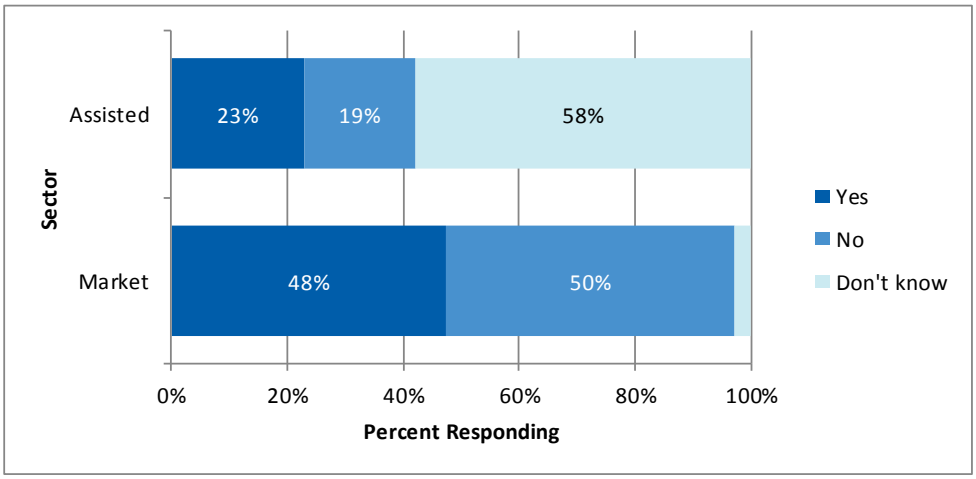
Figure 42. Challenges to Making Energy-Efficient Upgrades



The property owner (81%) pays the majority of costs for improvements to the building and apartment units. Otherwise, depending on the specific measure, the tenant may pay replacement costs.

About half the survey respondents reported their company had taken advantage of utility rebates. Programs and rebates mentioned included the ESA program, MASH, weatherization, lighting, showerheads, ceiling fans, energy audits, refrigerators, weatherstripping, and water efficiency measures. Breaking out the responses by sector, about half (48%) of respondents managing market rate properties responded they have taken advantage of rebates, and 23% of rent-assisted properties said they had. Another 58% of rent-assisted properties said they did not know if their company utilized utility rebates.

Figure 43. Respondents Participation in Utility Rebate Programs



Decision Making Key Findings

Overall, the majority (87%) of property managers and owners are the decision makers when it comes to building upgrades or replacing operable or inoperable equipment. When it comes to decisions about how to pay for upgrades to operable equipment or replacing inoperable equipment, the source of funds is similar, with 35% paying from savings, 17%-21% paying from reserves, and 15%-17% paying with credit cards. Only 5% of property managers and owners report using cash. The primary factor influencing decisions to make upgrades or repairs is cost (76%), with energy efficiency lagging, but ranking second (32%). When it comes to factors that make it difficult to make energy efficiency upgrades, lack of access to capital is the primary factor for both groups individually and for respondents as a whole (20%). The majority, 65%, said they were not aware of any financing options that may assist with the expenses to upgrade or replace equipment.

But the approaches taken by owners and managers of rent-assisted housing and market rate housing are different when making decisions one building at a time versus at a portfolio level, and in planning timelines. Market rate housing managers tend to make decisions one building at a time (77%) while rent-assisted housing managers tend to approach these decisions at the portfolio level (46%). Market rate housing managers tend to make decisions within one year of the expenditure for equipment upgrade or replacement (43%) while rent-assisted housing tend make these decisions one to two years before the project (38%).

The two groups also tend to use different funding sources to pay for equipment upgrades. When rent-assisted managers pay for upgrades when equipment cannot be repaired they use credit cards (23%), and then reserve accounts (20%), and savings 12%. When Market rate housing managers replace equipment that cannot be repaired they use savings first (40%), reserve accounts (21%), and then credit cards (16%).

Market rate managers use savings first for making upgrades for operable equipment (38%), and then credit cards (17%), and then reserve accounts (13%). Rent-assisted housing managers used reserve accounts first (46%) and then credit card (23%).

Both groups said that the top two factors influencing decision making about replacing equipment was cost and energy efficiency but energy efficiency was mentioned much less by market rate housing managers (31%) than by rent-assisted housing managers (53%). Rent-assisted housing managers mentioned size of upgrades as a top factor (42%) but this was mentioned less by market rate housing managers (13%).

Market rate housing managers were less aware of financing options than rent-assisted housing managers. Sixty-eight percent of market rate housing managers were not aware of financing options while 40% of rent-assisted housing managers were not aware.

Table 31 provides details about decision-making themes for both groups of housing managers.

Table 31. Decision-Making Profile Comparing Two Sectors*

Decision-Making Themes	Rent Assistance Housing	Market-Rate Housing
Decision Maker	63% of decision makers are owners or managers and 27% are directors.	88% of decision makers are owners or managers and 9% are directors.
Decisions made one building at a time or for the portfolio	46% reported that decisions are made for the whole portfolio while 33% said decisions are made one building at a time.	12% reported that decisions are made for the whole portfolio while 77% reported that decisions are made one building at a time.
Planning for Upgrades	44% spend money when equipment breaks and 23% plan ahead.	73% spend money when equipment breaks and 16% plan ahead.
Planning Timeline	25% plan less than one year before the project begins while 49% said they plan between one and two years in advance.	43% plan less than one year before the project begins while 24% said they plan between one and two years in advance.
Payment for upgrades when equipment cannot be repaired	23% pay for upgrades with a credit card, 20% pay using a reserve account, and only 12% use savings.	16% pay for upgrades with a credit card, 21% use a reserve account, and 40% use savings to pay for upgrades.
Payment for upgrading operable equipment	46% use a reserve account to pay for operable equipment upgrades, 23% use a credit card.	38% use savings to pay for upgrades, 17% use credit cards, and 13% use reserve accounts.
Awareness of financing options	40% were not aware of financing options. 36% were aware of tax credits.	68% were not aware of financing options. Only 9% were aware of tax credits.
Factors influencing decisions to replace or upgrade equipment[1]	Top factors were cost (93% of responses), energy efficiency (53%) and size of upgrades (42%).	Top factors were cost (75% of responses), energy efficiency (31%), and size of upgrades (13%).
Lack of capital	36% said this factor made it difficult to make upgrades.	Only 19% said this factor made it difficult to make upgrades.

* Respondents could provide more than one response.

We used the total number of apartment units the respondent owned or managed in California to classify respondents. Small refers to companies with between 5 and 24 apartments in California, medium refers to those with 25 to 249 units in California, and large companies are those with 250 or more units in California. This classification structure was based on the answer to two survey questions: number of units on the specific property discussed in the survey and the number of additional apartment units in California. If respondents did not know the exact number of additional apartment units, they were asked to identify the size range. If they did not know this, Cadmus conducted an Internet search to determine the size. If there was no information, we classified the survey based on the number of units on the property.

Table 32. Decision-Making Profile Comparing Three Property Sizes

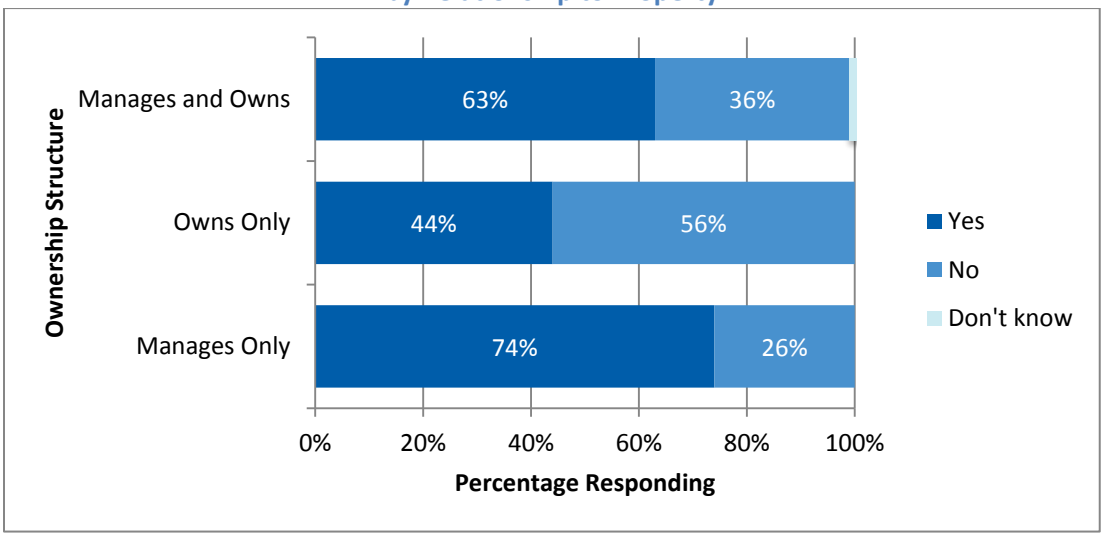
Decision-Making Themes	Large Properties	Medium Properties	Small Properties
Decisions made one building at a time or for the portfolio	24% reported that decisions are made for the whole portfolio, while 44% said decisions are made one building at a time.	12% reported that decisions are made for the whole portfolio, while 83% reported that decisions are made one building at a time.	14% reported that decisions are made for the whole portfolio, while 72% reported that decisions are made one building at a time.
Planning for Upgrades	51% spend money when equipment breaks and 21% plan ahead. 28% do both.	71% spend money when equipment breaks and 22% plan ahead. 5% do both.	73% spend money when equipment breaks and 10% plan ahead. 10% do both.
Planning Timeline	55% plan less than one year before the project begins while 23% said they plan between one and two years in advance.	31% plan less than one year before the project begins while 25% said they plan between one and two years in advance.	44% plan less than one year before the project begins while 33% said they plan between one and two years in advance.
Payment for upgrades when equipment cannot be repaired	25% pay for upgrades with a credit card, 29% pay using a reserve account, and only 11% use savings.	7% pay for upgrades with a credit card, 24% use a reserve account, and 42% use savings to pay for upgrades.	26% pay for upgrades with a credit card, 15% use a reserve account, and 38% use savings to pay for upgrades.
Payment for upgrading operable equipment	25% pay for upgrades with a credit card, 21% pay using a reserve account, and only 11% use savings.	10% pay for upgrades with a credit card, 12% use a reserve account, and 35% use savings to pay for upgrades.	24% pay for upgrades with a credit card, 21% use a reserve account, and 40% use savings to pay for upgrades.
Awareness of financing options	58% were not aware of financing options. 12% mentioned loans and 5% tax credits.	69% were not aware of financing options. 12% were aware of tax credits and 8% loans.	61% were not aware of financing options. 14% were aware of tax credits and 16% loans.
Factors influencing decisions to replace or upgrade equipment*	Top factors were cost (69% of responses), energy efficiency (14%) and size of upgrades (10%). Mentions: codes, quality, using same equipment.	Top factors were cost (82% of responses) and energy efficiency (27%). Mentions: quality, warranties, equipment size.	Top factors were cost (70% of responses), energy efficiency (43%) and size of upgrades (23%). Mentions: using comparable equipment.
Lack of capital	14% said this factor made it difficult to make upgrades.	Only 17% said this factor made it difficult to make upgrades.	Only 24% said this factor made it difficult to make upgrades.

* Respondents could provide more than one response.

Program Awareness and Participation

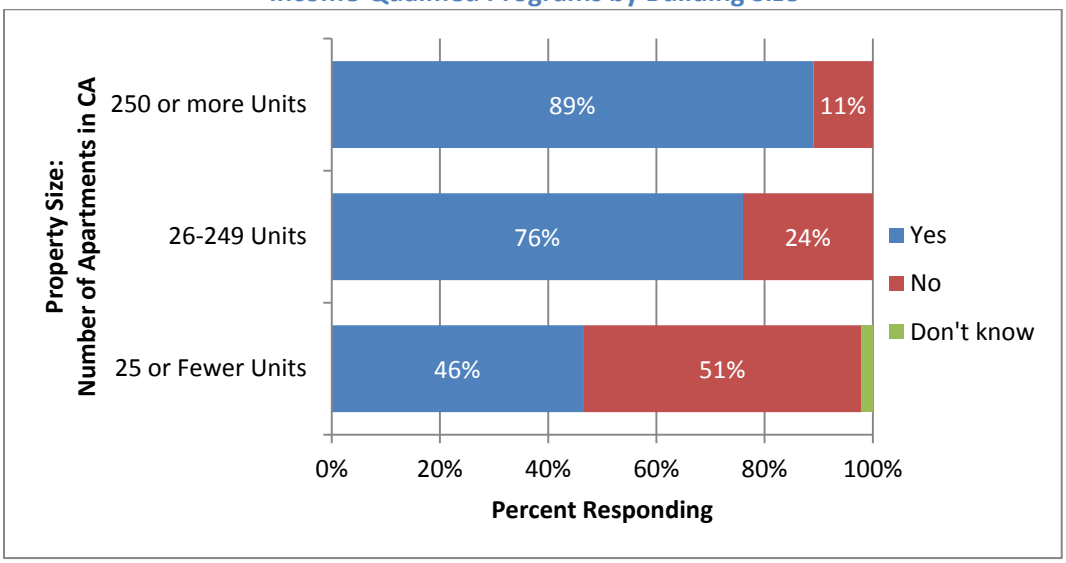
About 65% of survey respondents said they had heard of programs offered by utilities that provide income qualified households with free equipment and services related to energy efficiency. The percentage was higher among respondents who manage the property than among respondents who own the property but do not manage it. As shown in Figure 44, only 44% of respondents who owned by did not manage the property were aware of income-qualified programs.

Figure 44. Respondents Who Have Heard of Income-Qualified Programs by Relationship to Property



Respondents in the market rate sector were more likely to have heard of utility-sponsored income-qualified programs, with two-thirds having head of them; only 40% of respondents from the rent-assisted sector had heard of such programs. Managers of larger buildings are more likely to have heard of utility-sponsored income-qualified programs, as shown in Figure 45.

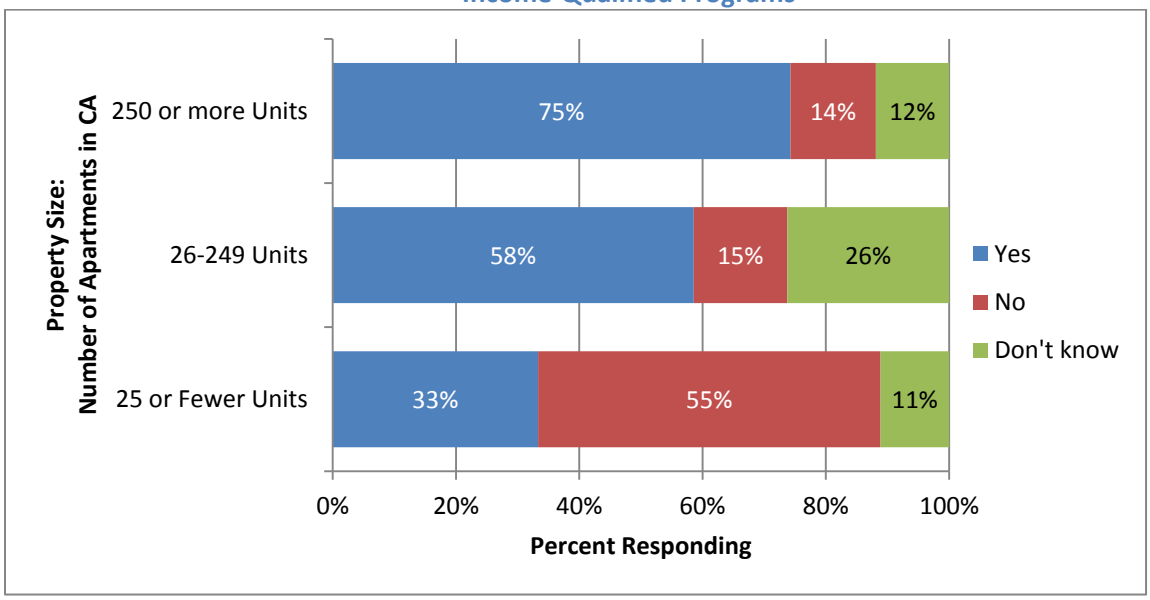
Figure 45. Respondents Who Have Heard of Income-Qualified Programs by Building Size



Overall, about 50% of respondents who were aware utility-sponsored income-qualified energy efficiency programs said that some of their tenants had taken advantage of them. Eighteen percent of respondents said they did not know whether tenants had participated; however, 54% of respondents who only own the building but do not manage it, said they do not know whether tenants have participated.

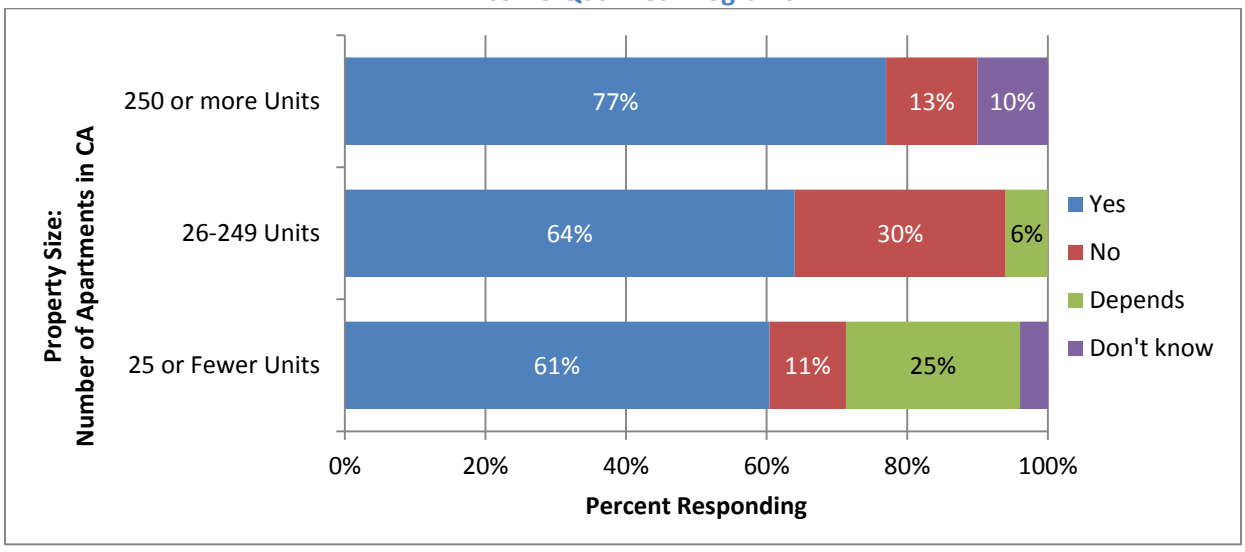
Among respondents who own or manage market rate buildings, 58% of respondents said some of their tenants had participated in income-qualified programs. Among respondents who manage rent-assisted properties, only 7% said their tenants had participated (statistically significant difference, p=.01). Owners and Managers of larger buildings were more likely to report their tenants have participated in income-qualified programs.

Figure 46. Aware Respondents Who Said Tenants Had Participated in Income-Qualified Programs



Surveyors asked respondents if they would be supportive of tenant participation in utility-sponsored income-qualified programs, even if they would have to fill out paperwork and allow contractors not hired by their company to have access to the property. The majority, 64%, said they were supportive. Another 20% of respondents said they would not be supportive of participation under those circumstances; and 13% of respondents said their support would depend upon specific circumstances related to paperwork or building access. These percentages did not differ significantly between the market rate and rent-assisted sectors; however, as shown in Figure 47, owners and managers of larger numbers of units were more likely to say they would be supportive of the program.

Figure 47. Respondents Who Said They Would Support Tenant Participation in Income-Qualified Programs



Interviews with Stakeholders and Advocacy Groups

Cadmus interviewed the owners and managers of market-rate housing and assisted housing.

Summary of Key Findings

Cadmus conducted interviews with low-income stakeholder and advocacy groups working with affordable and market-rate multifamily housing, and multifamily building owners and managers. We conducted 16 separate interviews with 18 people from 14 different stakeholder organizations. Of these, eight organizations had attended the Multifamily Segment Study public workshop in March 2013 and six had posted comments to Decision 12-08-044. We collected information about the respondents' constituency, financing considerations for multifamily building improvements, and discussed concerns about participation in the ESA Program.

Appendix G details the research methodology and sample frame for these interviews with low income stakeholder and advocacy groups working with market rate and/or rent-assisted multifamily buildings.

Because the Cadmus team conducted guided interviews with these stakeholders rather than surveys, we do not report frequencies for responses for each topic. Instead, we identified themes that could affect the ESA Program. This section synthesizes stakeholder experiences and perceptions, and responses may not reflect the ESA Program as implemented from the IOU's perspective.

The key interview topics we addressed were these:

1. Financing and investment structures
2. ESA Program enrollment
3. Implementing energy-efficiency retrofits in multifamily buildings
4. Suggestions for others who could be interviewed or surveyed (specifically, we sought contact lists of multifamily building owners and managers)
5. Organizations or other resources that could provide information about owners of low-income condominiums and apartments
6. Suggestions for additional research

Financing and Investment Structures

Respondents provided background about and insights into the financing and investment structures as they discussed their considerations related to energy-efficiency upgrades in multifamily buildings. Five respondents spoke of how the timing of upgrades with respect to building maintenance and larger-scale property rehabilitation can affect the decisions of building owners and managers.

One respondent explained how the key to identifying opportunities to make energy-efficiency upgrades is to have an understanding of two primary financial events.

- ***Asset management events for ongoing operations and maintenance activities.*** Equipment replacement is typically an asset management activity, as it does not occur on a large scale within one building at the same time. Equipment upgrades are usually made a few units at a time, such as when a specific piece of equipment fails or when a unit turns over.
- ***Recapitalization events, involving a restructuring of the property debt.*** During these events, the entire property may be rehabilitated. Thus, in addition to non-energy-efficiency capital improvements, building owners could make whole-building energy-efficiency upgrades at this time. (For example, all room air conditioners or refrigerators or central HVAC equipment could be upgraded.)

Since the recapitalization events tend to occur on a 15- to 20-year cycle, one respondent said it provides an opportunity to layer in funding resources for energy-efficiency upgrades. Two respondents offered examples of collaborating successfully with IOUs to synchronize their recapitalization events with the utilities' energy-efficiency programs. This collaboration improved their resource averaging (reduced per-unit cost of resources used throughout their project) and resulted in cost-effective energy savings. These respondents would like to see the ESA Program foster this level of collaboration.

Respondents representing affordable housing mentioned the importance of long-term planning for financing building upgrades. One stakeholder plans projects as far ahead as 40 years to allow for adequate cash reserves.

Financing Considerations

All respondents reported that multifamily property owners and managers use a layered approach to financing large retrofits and energy-efficiency improvements. The financing methods typically depend on these factors: (a) whether a property rents units at the market rate or at an affordable-housing rate, and (b) where the building is within its investment and life cycle.

Specifically, respondents reported that the financing methods routinely used are these:

- For subsidized multifamily housing, the building owners and managers tend to use HUD funds, grants, rebates, tax credits (for new buildings or solar upgrades), and cash reserve accounts.
- For market-rate multifamily housing, the building owners and managers depend primarily on cash accounts and use a combination of bank loans, real estate investment trusts, and joint-venture partnerships.
- For small multifamily market-rate housing, the property owners may also use traditional bank loans (rather than loans from a savings and loan bank, a credit union, or a mutual savings bank).

Four respondents said that financing for affordable multifamily housing is particularly complicated and it can be difficult to figure out the many layers of funding and associated requirements. As shown in Table 33, the stakeholders described some of the financing differences between affordable-housing and market-rate housing for multifamily buildings.

Table 33. Affordable and Market-Rate Financing Considerations as Described by Respondents

Finance Themes	Affordable Housing	Market-Rate Housing
Funding Combination	Uses HUD funds, grants, rebates (and tax credits for new construction or solar upgrades). May use cash reserves and/or short-term financing.	Uses a combination of bank loans, real estate investment trusts, and joint venture partners. (Note that small multifamily building owners tend to use traditional bank loans.)
Cash flow	Affordable-housing rents often do not provide sufficient cash flow to finance improvements.	Market-rate rents may provide sufficient capital for financing building improvements.
Restrictions	More restrictions regarding improvements that can be made with specific funding sources. Also, there tend to be regulatory requirements as to which improvements can be made and how they are made.	More flexibility making decisions about which improvements to make; also, the decisions are subject to investor/funder approval.
Project reserve funds	May fund improvements with project reserves. However, these reserves may be subject to approval by lenders and investors.	May fund improvements with project reserves. Improvements may be subject to approval by lenders and investors.
Leasing options	Leasing equipment is very complex because there are multiple layers of regulation and funding. Also the leasing process may be too time-consuming to utilize for adding energy-efficient equipment.	Leasing is an option for adding energy-efficient equipment.
Available financing resources	Programs and grants are available for affordable-housing improvements.	Few resources and programs are available for market-rate housing improvements.

Many properties have multiple investors, each requiring a separate approval process. As noted in Table 33, most property owners and managers must obtain approval from investors before making upgrades that will increase debt to the property. In addition, the investor approval process tends to be affected by the type of improvement under consideration. Specifically:

- Replacing equipment at the end of its useful life is covered by the operations and maintenance budget.
- Upgrading equipment to a more energy-efficient model across the entire property (regardless of whether the equipment to be replaced has reached the end of its useful life) can require funding beyond the resources provided by the cash flow or project reserves in multifamily housing. In these instances, other means of financing may be needed to complete the project.

Respondents explained that to avoid creating subordinated debt on a property, other financing approaches—such as on-bill loans and leasing—are sometimes used.

Use of Tax Credits

Two respondents said that tax credits work well for new construction, but such credits can be very difficult to obtain when a building is in operation. One respondent said that the investors who fund the property's construction often plan to exit the partnership after 10 or 15 years and use their capital for other investments.

Concerns and Barriers about Financing and Investment in Energy Efficiency

The key messages from respondents regarding barriers to financing energy-efficiency improvements were the following:

Coordination with the IOUs

More coordination with the IOUs is needed for the scaling and timing of major multifamily building upgrades that receive funding through the ESA Program or another IOU-sponsored program.

During recapitalization, there tends to be a limited window of time appropriate for adding energy-efficiency improvements.

Project Costs and Payback

Although respondents did not define cost-effectiveness, they said that the savings must be cost-effective so the investment in energy efficiency is worthwhile. Five respondents stated that a long payback period on energy savings is a barrier for building owners. Two respondents stated energy savings were not as immediate or as high as expected. One respondent said the amounts available for financing (through utility programs) need to be substantial enough for owners to spend the time and resources to make energy-efficiency improvements.

- When property owners and managers must pursue multiple programs to get a small amount of work done, the effort (in terms of staff resources and coordination) may be cost-prohibitive. Thus, some managers choose not to participate.
- When the cost-per-building of a major rehabilitation project is substantial, then it is worth the time and expense for owners to get permission from the multiple investors supporting that property.
- Long-term payback on energy savings (more than five years) makes it difficult to justify the investment in energy-efficiency upgrades.

One respondent said rents paid in multifamily affordable-housing do not provide an adequate source of funding for energy-efficiency upgrades.

One respondent said there is a need for more flexible financing options available to multifamily building owners during recapitalization periods if they are to take on energy-efficiency upgrade projects.

One respondent pointed out that energy-efficiency and aesthetics are the top two considerations when replacing equipment, partly because that is what tenants want, even though it may not directly benefit the building owner in terms of cost or energy savings.

Financing Awareness and Options

Several respondents told us multifamily building owners are not aware of all the financing options available to them.

One respondent pointed out that some programs do not work well with mixed-use properties. That is, financing is problematic when a building contains both market rate and affordable units.

According to one respondent, there are limited options for market-rate multifamily building owners to finance energy-efficiency improvements. Two respondents said that energy-efficiency is not required for financing upgrades in market-rate properties. That is, there is a lack of drivers for energy-efficiency built into the requirements to obtain funding for market-rate building retrofit projects.

According to one respondent, unsecured financing (not tied to equity in the building) may be a possible approach, but few unsecured financing options available to multifamily owners. Also, since this approach is rarely used, there is a lack of adequate data on the risks associated with unsecured financing.

Regulatory Issues

Respondents stated that some barriers to investing in affordable multifamily housing are a result of current regulatory agreements for each funding source that make it difficult for multifamily owners to take on additional debt (create subordinated debt). The key barriers of this type brought up by respondents are these:

- It is difficult for multifamily affordable-housing buildings to add supplemental loans because of complex nature of the requirements for the existing funding package for each property.
- To obtain funds for building improvements on multifamily affordable housing, the improvements must increase the building's energy efficiency as a result of the entire project.

One respondent said that meeting the tax credit and state regulatory requirements combined with the complex process to fund upgrades is the largest obstacle.

Strategies to Address Financing and Investment in Energy Efficiency

Not surprisingly, most respondents recognized that the multifamily property owners tend to prefer financing solutions that do not require a large outlay of funds and do not create subordinated debt.

Five respondents discussed options such as tax liens and on-bill financing (OBF) mechanisms as promising solutions to funding multifamily energy-efficiency retrofits. With these options, the debt remains with the property, or transferred with ownership of the building. Owners may choose to pass the debt to tenants. In addition, respondents stated OBF levels the costs of an improvement over a long time and embeds the costs in building operations, but without creating subordinated debt.

These respondents said they were eager to see the results of large retrofit projects funded through OBF, although they did not specify a particular project funded with OBF.

The financial strategies recommended most frequently by respondents for making energy-efficiency upgrades are listed in Table 34.

Table 34. Financial Strategies Recommended by Respondents

Financial Strategy	Description
On-Bill Financing	The owners pay for the improvements over time through utility bills, and they do not need to increase debt secured by the property. The OBF stays with the property, becoming part of the operations cost. • For master-metered accounts, the costs may be passed on to tenants or transferred to new owners. • For individually metered accounts, the cost can be included on the tenant's utility bill as an "on-bill refinance cost for energy-efficiency," which can also be passed on from tenant to tenant.
Power Purchase Agreements (PPA) and solar leases	PPAs provide the financing for solar projects by creating a contractual relationship between the owner of the property that generates electricity with the installed solar equipment and the power company that purchases that power. A solar lease is an agreement between the solar consumer and the developer who owns the solar equipment. In this arrangement, the consumer pays the developer for the electricity generated by the equipment, and the consumer's electricity costs are typically lower than conventional utility rates. Stakeholders cited the California Solar Initiative (CSI) and federal investment tax credits as possible models of successful financing options used by these programs.
Packaging energy-efficiency loans for purchase by secondary markets	A recently launched example of this strategy in California is the Warehouse of Energy Efficiency Loans (WHEEL), an entity that purchases energy-efficiency loans from loan originators (state and local), pools them, and sells them into secondary markets. WHEEL creates the scaling needed for repackaging energy-efficiency loans, which frees state and local resources for more energy-efficiency loans.
Tax Liens	The cost of energy-efficiency upgrades becomes part of the tax bill and remains with the property, even if the ownership changes. Property Assessed Clean Energy (PACE) programs are an example of this strategy, as they enable local jurisdictions to finance energy-efficiency upgrades through a property assessment (for qualifying properties). PACE programs are considered lower-risk financing strategies because the repayment of the loan is prioritized ahead of the mortgage on the property.

ESA Program Enrollment[43]

Respondents described their experiences with and knowledge of program-enrollment issues that create barriers to ESA Program participation. The key strategies respondents recommended for improving enrollment were these:

- Allowing HUD's income-qualified tenants (categorical eligibility) to be pre-qualified for the ESA Program to expedite the enrollment; and
- Simplifying the program processes (eligibility, application, and participation) to make it easier for tenants and building owners to understand and navigate (including having a single point of contact to address participant questions).

Concerns about ESA Program Enrollment

Nearly all interviewees mentioned barriers to enrolling in the ESA Program—barriers for tenants and for building owners seeking improvements to their buildings for the benefit of their tenants. The most significant perceived barriers were the lack of integration of multifamily energy-efficiency programs (sponsored by the IOUs and others) and the absence of contact people to help owners and managers leverage these programs to make whole-building retrofits. Two respondents reported that multifamily building owners, primarily in market rate buildings, do not necessarily know whether a tenant is low-income. One respondent explained that a third party contractor verifies tenant income-eligibility; therefore, the owner does not need to know which tenants are low-income.

Seven respondents reported that program participation is time-consuming for building owners and managers because of the effort involved in navigating the requirements of the various programs available (in terms of fuel source and measure, the oversight, administration, and management).

The key process concerns identified by respondents were these:

- No single point of contact to help property owners and managers determine the appropriate program for each phase of their whole-building rehabilitation projects.
- Inadequate integration between the ESA Program, Energy Upgrade California, and other programs to help property owners and managers address whole properties and achieve maximum energy savings. For example, performance incentives are needed to make the whole-building energy-efficiency retrofit project cost-effective for the owner. However, as one respondent stated, when the programs are not integrated, the first program utilized addresses the "low-hanging fruit," which then makes the whole-building upgrade project difficult to complete. It was perceived that the remaining upgrades alone would not meet the energy savings goals or qualify for the performance incentives.

[43] Cadmus and Research into Action recognize the importance of stakeholder comments, which revealed that the perceptions of the interviewees do not always reflect the intent of the IOUs' program designers. We also note that the respondents may not be aware of or understand the reasons for differences in the IOUs' programs or why the programs operate as they do.

- The current ESA Program enrollment process results in the missed opportunity (for income-restricted housing) of making energy-efficiency upgrades while a unit is unoccupied. The main benefits of working on unoccupied units are: reduced administrative burdens; a lower cost for the logistics and the scheduling of upgrades; and, faster completion of the work.
- Low-income households that qualify for affordable housing probably participate in other low-income programs. If they do, they have been rigorously screened already and provided with the documentation to qualify.[44] However, streamlining the ESA Program enrollment process with a categorical eligibility option would be difficult because of the different income qualification guidelines.
- To repeat the tenant qualification process using different income guidelines is perceived as time-consuming and disruptive (to tenants). Due to fair housing laws, multifamily building owners—primarily in market rate buildings—do not always know whether a tenant meets the low-income qualifications.

Strategies to Address ESA Program Enrollment

Interview respondents recommended these high-level strategies to improve ESA Program participation by their multifamily building tenants and to address what they perceived as barriers.

- Respondents noted that if the income requirements of HUD's affordable housing guidelines and the ESA Program were compatible, then the enrollment process would be less time- and resource-intensive, as the ESA Program could have a categorical eligibility process in place. Thus, for example, HUD's income-qualified tenants would be pre-qualified for the ESA Program.
- To income-qualify a whole building, the property owners and managers currently verify that 80% of the units must house people who meet the income guidelines. Units could be upgraded when they are unoccupied, which would save both time and resources for the program, property owners, and managers. Income-qualified tenants could then move into units that are already upgraded, eliminating the challenges associated with upgrading occupied units.
- Strategically integrating the ESA Program with other programs (such as Energy Upgrade California[45]) would allow multifamily building owners and managers to address the needs for upgrades to the property as a whole, rather making small upgrades at potentially different times. Overlapping programs with different functions can work well together through better collaboration and coordination between multifamily building owners and utilities.
- By having a single point of contact for multifamily buildings that was knowledgeable about other energy-efficiency programs available in the area and possess expertise in funding resources, the ESA Program could significantly reduce or eliminate barriers to participation for this low-income customer segment.

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[44] Author's note: These low-income programs have varying eligibility requirements that do not necessarily align with the ESA Program requirements (see Section 6).

[45] Energy Upgrade California was designed to coordinate with the ESA Program; multifamily building owners are required to authorize the ESA Program to serve their income-qualified tenants.

Implementing Energy-Efficiency Retrofits in Multifamily Buildings

Currently, to address all aspects of a whole-building retrofit by funder and fuel source, the property owners and managers must become involved in multiple programs. Because these interview respondents did not perceive that the ESA Program addressed multifamily buildings as a whole, they mentioned the missed opportunities for energy savings. They also mentioned a desire for more coordination across multiple programs. Three respondents said that the lack of a whole-building approach makes it difficult to address multifamily building energy-efficiency from either the *"owner and manager-controlled, common area energy usage perspective"* or from the *"tenant-controlled energy usage perspective."*

Three respondents mentioned that it is difficult to discern how tenants benefit from energy-efficiency improvements to multifamily buildings rather than landlords and owners.

The respondents said that incentives are split between the tenants who could make their own energy-efficient upgrades under the ESA Program, and, the property owners and managers who make energy-efficient upgrades to common areas, typically funded through programs sponsored by utilities and others.

Respondents also said that property managers usually keep replacement units on hand in case there is a problem with the equipment. Thus, the program should allow for some backup units to replace equipment that fails or is damaged. Respondents perceive that Energy Upgrade California as a potentially successful example of implementing a whole-building approach.[46]

Concerns and Barriers to Implementing Energy-Efficiency Retrofits

Five respondents indicated that one barrier to implementing energy-efficiency retrofits in an entire multifamily property or portfolio is the lack of a whole-building approach. One respondent suggested that a custom approach to building audits would accommodate the various structures and types of large multifamily buildings. For example, the audit and recommended upgrades for 100 duplex units could be very different from the audit and recommended upgrades for 100 high-rise units.

Respondents said that incentives are split between property owners and managers on the one hand, and apartment dwellers on the other. That is, property owners and managers make energy-efficiency upgrades in the common areas (using funding provided by utility and other programs), and tenants receive upgrades to individual apartments (through the ESA Program).

Several respondents also noted the ESA Program measures do not include central domestic hot water systems and heating/cooling systems, which is a missed opportunity for energy savings. However, one stakeholder's perspective was that the central heating and hot water upgrades were the "low-hanging

[46] Author's note: no independent evaluation of the Energy Upgrade California program had been conducted as of September 2013.

fruit" already addressed by other programs, so multifamily building owners needed support for making upgrades beyond the common areas.

Three respondents expressed concerns about working with approved ESA Program contractors. Building owners have their own vendor qualification and quality control processes. When there is a problem with the work—or if the equipment is not installed correctly—multifamily building owners want a quick response and an assurance that the contractor will be accountable. They prefer to work with contractors with whom they have a long-standing business relationship. One respondent stated that they assumed all ESA Program contractors are vetted by the utility, and thus had no concern about their qualifications.

Strategies to Address Implementation of Energy Efficiency Retrofits

Two primary strategies emerged in discussions with this limited pool of respondents that they thought would help both affordable and market-rate multifamily building owners and managers implement energy-efficient retrofits for the benefit of their low-income qualified tenants. These were: (1) changing the ESA Program design to foster a whole-building approach, and (2) increasing coordination between IOUs and property owners and managers.

Using a Whole-Building Approach

Respondents said that having a whole-building approach would allow multifamily building property owners and managers to combine opportunities to make energy-efficiency upgrades during major retrofits. Specific strategies suggested by respondents were these:

- Enable utility program staff and multifamily building owners or managers to collaborate so that the retrofit program opportunities could be aligned with the timing of capital plans and financing efforts. For example, during planned recapitalization, all refrigerators in a building could be replaced with energy-efficient models.
- Add upgrades of central heating and hot water systems as eligible measures within the ESA Program. Two respondents said these are cost-effective opportunities for saving energy in multifamily buildings.
- Provide multifamily building owners with support to coordinate with IOUs when there are programs that have overlapping functions so that the common areas and the individual units can be treated (but not necessarily through the same program.)

Having Better Coordination among Stakeholder Groups

Respondents said that to work effectively with property owners and managers for major retrofits, utility ESA Program staff members need to understand how energy-efficiency upgrades impact daily operations and maintenance across affordable - and market-rate multifamily building portfolios.

Five respondents suggested optimized timing and coordination between multifamily building capital plans, financing opportunities, and the ESA Program would improve the program's relevance to owners and reduce costs. These respondents said that if IOUs designed their programs with the flexibility to synchronize with multifamily investment schedules, it would enable property owners and managers to scale their improvement efforts across an entire portfolio (whether affordable- or market-rate). For

example, one jurisdiction's Housing Authority collaborated with its local utility to replace 900 HVAC systems within a single affordable-housing portfolio.

Respondents mentioned the following factors affect coordinating retrofits:

- If energy efficiency is addressed across an entire housing portfolio, then asset management (unit turnover/maintenance and operations management) could be planned and appropriately scaled.
- To restructure debt and make capital improvements, many multifamily building owners refinance properties at year 15.
- HUD requires five-year capital plans, at which time major building investments are identified.

Suggestions of Others to Interview or Survey

During these interviews, the Cadmus team sought to obtain contact lists of multifamily building owners and managers. Most of the data sources named by stakeholders were already in the lists that Cadmus had compiled. Thus, we used this stakeholder information to confirm that our datasets were comprehensive.

Information Sources about Low-Income Owners of Condominiums and Apartments

None of the respondents recommended a specific source for information on low-income owners of condominiums and apartments. However, a few mentioned that there are advocacy groups that may know more about this population.

Respondents Suggestions for Additional Research

The Cadmus team asked stakeholders about research topics of interest. Most suggestions were already addressed by this study. The topics stakeholders suggested that are not addressed by this study are summarized here.

- **Data on master metered multifamily buildings.** The type of metering presents issues in terms of program implementation, data collection, and analysis of energy-savings. Currently, there is no existing data source for whole-building energy use (common meters and tenant meters together) in multifamily buildings. To help implement a whole-building approach with energy-efficiency upgrades, respondents recommended that we identify a data source or a method for determining which buildings are master-metered and which are individually metered. One respondent noted that the classification of master-metered multifamily buildings may limit eligibility for utility programs. For instance, in some states these buildings do not qualify for residential utility programs because they are considered commercial accounts. Another stakeholder wanted to know if tenants could be asked to report the benefits to their households of energy-efficiency upgrades, particularly in a master-metered building.
- **Affordable multifamily housing and utility regulatory policies impact multifamily housing financing.** Regulatory policies can have unintended effects on the financing of multifamily building improvements. One stakeholder said more research is needed about regulatory policies and how they potentially create barriers to securing multifamily housing financing. Additionally,

this stakeholder wanted to know: (1) how many states have a low-income adder (that is, what is the prevalence of this type of policy), and (2) what the non-energy benefits of energy-efficiency improvements are for tenants.

- **Energy-efficiency upgrades as part of large rehabilitation projects.** Because energy-efficiency upgrades are usually only one element of a larger building rehabilitation project, some respondents wanted to know how other multifamily building owners and managers made large-scale energy-efficiency improvements within larger capital improvements. One respondent would like to know the overall size of projects that incorporate energy-efficiency upgrades.
- **Process for including utilities in rent.** One respondent suggested these questions for further research: How do property owners fold utilities into the rent? What process do property owners and managers use to decide which utilities to include in the rent? Would the decision-making process and the implementation process for including utilities in the rent change, and if so why?

Findings and Conclusions

The findings and conclusions below focus on the most prevalent themes to emerge from our interviews with stakeholders.

1. ***Opportunities exist to increase ESA Program participation by engaging multifamily building owners and operators directly as a means to reaching more individual tenants.***

Interview respondents commonly stated that the ESA Program could increase participation by helping the multifamily building owners participate in the program for the benefit of their tenants. When owners act as a conduit to serving their tenants, then removing barriers to participation by building owners enhances program effectiveness by increasing overall program participation. Thus, through the program and through the building owner's participation, tenants are provided with lower energy bills and improved health, comfort, and safety.

Interview respondents expressed the desire to provide tenants with benefits offered by energy efficiency programs. However, respondents said concerns such as timing of upgrades, cost-effective measures, and limiting administrative time must remain a priority when considering participation in energy-efficiency programs. This suggests building owners' competing priorities can affect their willingness to provide permission for unit upgrades, thus hindering program participation by tenants.

2. ***Utilities can more effectively and efficiently serve multifamily customers—building owners and tenants—through a single point of contact to guide enrollment and participation in all available utility energy efficiency programs.***

The solution to increasing participation in the ESA Program mentioned most often by respondents, which seem to touch most all of the concerns raised by respondents, is the creation of a single point of contact for multifamily building owners, managers, and tenants. Ideally, this customer liaison would be knowledgeable about all programs—utility energy-efficiency programs, and, non-utility programs serving low-income populations—available to multifamily building owners and tenants. The contact

could help building owners determine the right programs for their property, how to leverage the programs, and the optimal timing and sequence for participating in the programs. This person (the single point of contact) could also guide building owners through the program's application process, which would cut down on costly administrative time spent sorting out the various program requirements.

Respondents reported financing for property upgrades affect participation in the ESA Program. Related to funding is the timing of major energy efficiency improvements with property recapitalization, which generally occurs in 15- to 20-year cycles for subsidized housing. Interview respondents did not provide a single specific solution, but suggested that a more flexible program could allow for layering of energy-efficiency retrofits along with other planned building rehabilitation projects. Again, this could be mitigated with assistance from a single point of contact with expertise in finance options.

3. ***Large-scale building upgrades and treatment of the whole building, including common area measures, may be the best way to achieve highest energy savings at lowest cost. However, this applies to large multifamily complexes and subsidized housing rather than smaller properties.***

Concern for obtaining cost-effective savings pervaded many of the interviews, either directly or indirectly. Interview respondents mentioned that in order to invest in energy-efficiency upgrades, costs to the property owners must be weighed against benefits—to both the owner and the tenants—in order to justify their implementation. This concern is related to receiving funding approval from investors, timing of upgrades with building financing cycles, the level and length of time for savings paybacks on measures, and administrative time invested in program applications and requirements.

Many respondents felt that if the ESA Program would allow treatment of the whole building, they could achieve maximum savings for their buildings at the lowest cost, whether through a single program or overlapping several programs (such as the ESA Program for units and the MFEER or EUC program for common areas). That is, by integrating or overlapping the ESA Program with other programs, multifamily building owners could upgrade the property as a whole rather than making small upgrades (or repairs and replacements) at different times.

Author's Note

It appears that the stakeholders' perceptions of the ESA Program do not always reflect the program's design and objectives. Respondents' comments indicate they may not be aware of or understand the reasons for differences in the IOU's programs or why the programs operate as they do.

However, consideration should be given to the limited scope and duration of the interviews. Because many of the questions concerned financing and investment structures, any perceived emphasis on funding may be disproportionate to the actual extent of the stakeholder concerns.

We acknowledge that this synthesis of stakeholder experiences and perceptions may not provide an accurate picture of their overall understanding of the program and program rules as implemented by

the IOUs. (Section 6 provides overview of the ESA Program and other multifamily programs in California.)

Section 5. Comparison Programs Across the Country

This chapter presents findings from Research Into Action's review of multifamily programs operating outside of California. The review sought to identify strategies that other programs have found to successfully reach the low-income multifamily market and included two primary tasks. The research team's first task was to catalog relevant multifamily programs operating throughout the United States. The team then selected a cohort for further investigation and more in-depth analysis.

This comparison research sought to identify program strategies in use around the country to reach the low-income multifamily market. A program's inclusion in this comparison does not imply a recommendation that the ESA program adopt that program's design. The research team recognizes that important differences exist in both the program goals and the markets served between the comparison programs and the ESA Program. These differences have the potential to influence measure costs and savings potential as well as the extent to which an approach would appeal to the multifamily market. In developing recommendations for the ESA Program, the research team has sought to consider the program design approaches described in this section in the context of the California program landscape, the goals of the ESA Program, and the characteristics of California's low-income multifamily sector.

Appendix H summarizes the eligible measures for California programs targeting the multifamily sector. The programs are discussed in Section 5 of this report.

Program Catalog Findings

The research team reviewed publically available information sources (including American Council for an Energy-Efficient Economy (ACEEE) reports, program filings, monthly and annual program reports, evaluation reports, and information on program websites) to identify 44 programs outside of California that focus on low-income households, multifamily households, or both. Upon further review, the team excluded seven of these programs after determining they were: duplicative, only tangentially relevant to multifamily properties, or focused only on new construction.[47] This left the research team with 37 programs pertinent to the research objectives.[48]

[47] As this study seeks to identify opportunities for the ESA Program to better serve the multifamily sector, and the ESA Program serves low-income ratepayers in their existing households, the research team's review excluded programs that focused on new construction.

[48] Multifamily buildings or residents are eligible to participate in many programs that do not specifically target the multifamily sector; appliance recycling programs are a common example. As this review sought to identify effective approaches to the multifamily sector specifically, the research team's review only included programs directly targeting multifamily buildings or residents.

As this study is focused on identifying program approaches to reach the low-income multifamily sector, the research team specifically sought to understand how each multifamily program approached low-income populations. That is, was the program designed to:

- Focus exclusively on the low-income sector?
- Serve a broader population, but have offerings specific to the low-income sector?
- Differentiate between the low-income sector and other sectors served?

Program Administration and Funding

While utilities administer the majority of programs identified (25 of 37), public benefit organizations and nonprofit groups more often administer the programs focusing on the low-income sector, as shown in Table 35. Utilities, however, administered all the low-income multifamily programs launched in 2013, potentially indicating a growing national interest among utility program administrators in reaching this segment. Among the multifamily programs that do not differentiate between low-income and standard buildings (standard offer programs most similar to MFEER), more than three-quarters are administered by utilities.

Table 35. Program Administrator Type

Administrator Type	Low-Income-Focused Programs		Non-Low-Income-Focused Programs	Total
	Established	New		
Utility	3	5	17	**25**
Non-utility Public Benefit Organization	4	0	2	**6**
Government	1	0	3	**4**
Nonprofit	2	0	0	**2**
Total	**10**	**5**	**22**	**37**

Consistent with the prevalence of utility program administrators, 84% (32 of 37) of the programs were identified as exclusively funded with ratepayer funds, and almost all receive at least some funding from ratepayers, as shown in Table 36. Only one program, administered by the Connecticut Department of Economic and Community Development, appears to operate exclusively on taxpayer funds.

Table 36. Funding Sources

Funding Source	Low-Income-Focused Programs		Non Low Income-Focused Programs	Total
	Established	New		
Ratepayer funds exclusively	6	5	21	**32**
Taxpayer and ratepayer funds	4	0	0	**4**
Taxpayer funds	0	0	1	**1**
Total	**10**	**5**	**22**	**37**

ELIGIBILITY CRITERIA

The identified multifamily programs most often define multifamily buildings as containing five or more units, as shown in Table 37.

Table 37. Definition of Multifamily Buildings

Minimum Number of Units	Count of Programs	Proportion of Programs
2	1	3%
3	6	16%
4	4	11%
5	17	46%
Not listed	9	24%
Total	**37**	**100%**

The 15 programs identified that specifically target the low-income sector vary in their income qualification criteria, as shown in Table 38. Programs most often base their income qualification criteria on a percentage of tenants in a building earning less than a set proportion of the area median income or the federal poverty level. Other income qualification criteria include state-level requirements (such as the Minnesota Low-Income Rental Classification).

Table 38. Income Qualification Criteria

Income Qualification Criteria	Number of Programs
Percentage of area median income	5
Percentage of federal poverty level	2
Public and subsidized housing only	2
Other	2
Income qualification not required	3
Not listed	1

Incentives

The majority of the cataloged multifamily programs identified offer prescriptive incentives[49], although direct installation of measures, such as faucet aerators, showerheads, water heater pipe wrap, and CFLs is also a common approach. Table 39 lists the number of programs offering incentives of each type (for example, prescriptive incentives, direct installation, custom incentives etc.). Nearly one-half of the programs identified (15 of 37) offer more than one type of incentives. Most often, these programs offer a combination of direct installation and measures with prescriptive incentives (8 of 15). For example, some programs offer direct installation of measures inside dwelling units, in conjunction with prescriptive rebates for common area lighting. Five programs also offer direct installation, prescriptive

[49] Prescriptive incentives are those that offer a set dollar amount per measure. A customer purchases the measure and receives a pre-set dollar amount from the utility designed to offset the incremental cost of the measure.

incentives, and custom incentives to subsidize different types of measures. Four programs do not directly provide incentives, with most of these focused on facilitating access to other incentive programs.

Table 39. Types of Incentives Offered[1, 2]

Incentive Type	Low-Income Focused Programs (n=15)		Non-Low-Income Focused Programs (n=22)		Total (n=37)	
	Number	Percent	Number	Percent	Number	Percent
Prescriptive	7	47%	13	59%	20	54%
Direct install	7	47%	10	45%	17	46%
Custom	7	47%	5	23%	12	32%
CFLs provided to building owner	0	0%	2	9%	2	5%
Program does not directly provide incentives	2	13%	2	9%	4	11%
Unclear	0	0%	2	9%	2	5%

1. Programs may offer multiple types of incentives
2. As suggested in Table 39, programs focused on low-income multifamily buildings are more likely to offer custom incentives[50] and less likely to offer prescriptive incentives than programs not focusing on the low-income market.

In-Depth Comparison Program Findings

None of the programs identified in the catalog excluded multifamily buildings serving low-income tenants. However, many programs did not include specific strategies or services to overcome the unique challenges of serving low-income multifamily buildings. The programs most relevant to this research—those with promising, comprehensive, multifamily segment strategies relevant to the ESA Program—provide offerings specific to both the low-income and multifamily sectors. Fifteen of the 37 programs reviewed focused exclusively on the low-income multifamily market or had unique program offerings for low-income buildings or their tenants, as shown in Table 40.

Table 40. Multifamily Program Approaches to Low-Income Sector

Approach to Low-Income Sector	Number of Programs
Exclusive focus	12
Specific program offerings	3
Do not differentiate	22

Of the 15 programs with activities that specifically targeted the low-income multifamily sector, five launched in 2013 and reported few (if any) results that the research team could examine to evaluate the

50 Custom incentives are determined by a calculation of energy savings that result from installed measures. The participant does not receive a set dollar amount for installing a specific measure. Instead the participant receives an incentive based on the amount of energy savings or some other calculated method.

effectiveness of their approach. Five additional programs were excluded because they had small budgets, served populations with very few multifamily households, or because the program's status was unclear. The remaining programs appeared to be the most successful and best documented of the ten programs specifically targeting the low-income multifamily sector. All five of these programs target building owners and managers, rather than individual low-income tenants, and all support efficiency measures in common areas and central building systems, in addition to tenant dwelling units.

The research team then conducted an in-depth review of these five programs, expecting that they would yield the greatest insight into program approaches relevant to the ESA Program. The five programs chosen for comparison were selected because they served areas with large multifamily populations relative to the United States as a whole and because they represented a range of program approaches. Table 41 lists the five programs selected for in-depth review.

Table 41. Comparison Programs Selected for In-Depth Review

Program Administrator	Program Name	Area Served
CNT Energy	Energy Savers Multifamily Program	Chicago metropolitan area
Energy Outreach Colorado (EOC)	Low-Income Multifamily Weatherization Program	Colorado
Massachusetts Gas and Electric IOUs	LEAN[1] Multifamily Program	Massachusetts
NYSERDA[2]	Multifamily Performance Program (MPP)	New York State
Public Service Electric and Gas Company (PSE&G)	Residential Multifamily Housing Program	North-central New Jersey

1. Low-income Energy Affordability Network.
2. New York State Energy Research and Development Authority.

To understand each comparison program, the research team conducted a more detailed literature review and in-depth interviews with specific program managers. Drawing on the literature review and interviews, the research team prepared summaries describing each program's approach, and submitted these to the interviewed program managers, who reviewed them for accuracy.

This section provides a brief summary of each in-depth comparison program's approach to the low-income multifamily market, followed by a more in-depth comparison of program design, delivery, and accomplishments across the five programs.

Comparison Program Background

CNT Energy: Energy Savers Multifamily Program

The Energy Savers Multifamily Program seeks to provide Chicago area multifamily building owners with a "one-stop shop" to support energy-efficiency upgrades. The program analyzes a building's utility bills, and conducts an energy assessment[51] to identify potential energy-efficiency improvements. Program staffs are available to support building owners during the installation process, including developing bid proposals, reviewing bids, and monitoring work. The program does not offer incentives to buildings for completing retrofits. However, program staff shepherd owners through the participation process including assisting building owners in obtaining incentives from utility programs and other sources, and recommending financing options. Program staff emphasized that, in their role as the main contact for the building owner, they do not simply refer participants to incentive and financing programs. Instead, the staff assists with all technical and administrative work associated with participating in these programs, including filling out application forms and coordinating any necessary inspections.

The program partners with the nonprofit Community Investment Corporation (CIC), an organization providing mortgage financing to multifamily building owners to support neighborhood revitalization. With the support of a loan loss reserve fund that the City of Chicago provided using funding from the U.S. Department of Energy's Better Buildings Neighborhood Program, CIC offers loans at a 3% interest rate that participating building owners can use to pay for their energy upgrade projects. CIC does not receive utility ratepayer funding.

The Energy Savers Multifamily Program was created to preserve the availability of affordable rental housing, but the program does not require buildings to meet income qualifications to receive support. According to program staff, income-qualified buildings may access a wider range of incentive and financing programs such as the Illinois Department of Commerce and Economic Opportunity's low-income housing trust fund, LIHEAP, and the HUD Green Refinance Plus program.

Energy Outreach Colorado: Low-Income Multifamily Weatherization Program

The nonprofit Energy Outreach Colorado uses funding from federal weatherization programs, utility incentives, and other sources to address the efficiency needs of multifamily buildings, serving low-income residents, including measures in tenant units, common areas, and central systems, through its Low-Income Multifamily Weatherization Program. Ten percent of each funding source is reserved for staff and administrative costs.

Buildings must meet income qualification requirements to participate. The program uses a central application and assessment process for all participating building owners, regardless of the funding sources their projects use. This assessment is done via a site visit by EOC staff, with the goal of

[51] This assessment includes a building analysis and a thorough inspection of the building to identify the most cost-effective investments for the building. The assessment takes about 2 hours and includes a review of hot water heating equipment, basements, HVAC equipment, and about 10% of all units in the building.

determining whether sufficient energy-efficiency retrofit opportunities exist to justify a Department of Energy approved full-scale audit. These full-scale audits meet the demands of utilities and provide building modeling. EOC staff work with building owners to interpret the audit findings and develop a scope of work. EOC acts as a general contractor and manages the retrofit installation process. Installation contractors contract with both EOC and the building owners.

As the program's funding sources use varying incentive structures, the incentives the EOC offers may vary, based on the extent that a particular building draws on each funding source. EOC staff reported the program's incentives typically cover approximately one-half of the cost of an efficiency retrofit. EOC's Low-Income Multifamily Weatherization Program typically treats a smaller number of buildings on an annual basis than the other comparison programs.

Massachusetts Utility Program Administrators: Low-income Energy Affordability Network (LEAN) Multifamily Program

The Massachusetts efficiency program administrators—the state's gas and electric investor-owned utilities—contract with two lead agencies, Action for Boston Community Development (ABCD) and Action, Inc., to administer the LEAN multifamily program.

The program acts as a single point of contact for multifamily building owners interested in energy upgrades, leveraging existing utility energy-efficiency offerings, focused on lighting and appliances, in addition to program-provided weatherization services and support for central system upgrades.

Program staff assists building owners in benchmarking their energy use, conducting assessments,[52] and developing a scope of work. The program also selects contractors to conduct installation work, although building owners can use their own contractors as long as those contractors agree to the program's pricing. The program subsidizes the full cost of efficiency retrofits that meet cost-effectiveness requirements.[53] Buildings must meet income-qualification requirements to participate in the LEAN Multifamily Program.

NYSERDA: Multifamily Performance Program

NYSERDA's Multifamily Performance Program (MPP) offers incentives to building owners, based on the number of units in a building, to achieve a minimum 15% reduction in energy use. Buildings achieving a 20% or greater reduction in energy use receive bonus incentives, based on measured energy savings. All multifamily buildings may participate in the MPP, but the program offers higher incentives to buildings serving low-income tenants.

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[52] In some cases the assessments will be comprehensive audits that examine the building envelope, mechanical systems and motors, ventilation, lighting, etc. Where opportunities exist to combine cost effective energy-efficiency work with building renovations, the assessments will likely be more limited in scope.

[53] Measures must have a TRC value for gas greater than 1.8 and for electric greater than 2.1. Additional details on cost-effectiveness are in Measures Installed section of report.

Participating consulting engineers, which NYSERDA refers to as "Partners," deliver the MPP. Partners recruit participants, who contract directly with the Partner to complete their project. Partners work with building owners to benchmark a building's energy performance, conduct the building audit, and identify cost-effective efficiency opportunities. Partners also work with building owners to develop a scope of work for the upgrade project and to identify financing sources the building owner can use to pay for the project. The Partner creates an Energy Reduction Plan, articulating the scope of work and the financing sources. Partners support building owners through the installation process, ensuring correct installation of measures. Finally, Partners determine that all measures are installed and functional to the intent of the Energy Reduction Plan and Partners schedule a time with the MPP Program to complete their site inspection. In addition the Partner completes a post retrofit utility bill analysis one year after project completion. If the Partner determines that the building achieved energy savings of at least 20%, the building owner receives an additional performance incentive.

Public Service Electric and Gas (PSE&G): Residential Multifamily Housing Program

Like NYSERDA's MPP, PSE&G's Residential Multifamily Housing Program draws on consulting engineers to guide participants through the retrofit process. However, while building owners contract with the MPP's Partners directly, the consulting engineers delivering the Residential Multifamily Housing Program work under contract to PSE&G. Despite this distinction, the two programs use similar participation processes. In PSE&G's program, the program's consulting engineers conduct audits,[54] identify retrofit opportunities, work with building owners to develop a scope of work and select installation contractors, and monitor the quality of the installation work. The scope of work is based on the financial constraints of the owner and what projects within the buildings will save the most energy.

The Residential Multifamily Housing Program bases its incentives on the simple payback of the efficiency measures identified. Any measure with a simple payback of 15 years or less is eligible. Incentives are set by reducing the simple payback of all measures by seven years (with a cap to keep simple payback to at least two years). The program offers on-bill repayment at zero percent interest for the balance of the retrofit costs.

PSE&G designed the Residential Multifamily Housing Program in partnership with the New Jersey Housing and Mortgage Finance Agency (NJHMFA). A state agency, NJHMFA focuses on increasing the availability of affordable housing, and offers programs for single-family homebuyers as well as owners of affordable multifamily housing. NJHMFA has played a role in identifying and recruiting buildings to participate in the Residential Multifamily Housing Program; in the program's first funding cycle (2009 and 2010) all participants were low-income properties identified by NJHMFA. Although the Residential Multifamily Housing Program was designed to meet the needs of the low-income multifamily buildings NJHMFA serves, the program later opened participation to all multifamily buildings.

[54] The depth of the audit is determined by the consulting engineers. A walk through is done initially that determines if a deeper audit is necessary.

Program Context

Regulatory Context

All five programs selected for in-depth reviews formed or were substantially redesigned within the last five years,[55] suggesting that multifamily low-income programs are evolving across the country. Three of the programs formed in response to legislation establishing energy-efficiency resource standards. The administrators of two of these programs—EOC in Colorado and ABCD and Action, Inc., in Massachusetts—advocated for inclusion of low-income programs in energy-efficiency offerings designed to meet new resource standards prior to receiving funding to implement their programs.

While the comparison programs typically benefitted from increased funding for energy efficiency resulting from establishment of energy-efficiency resource standards within their jurisdictions, the regulatory context in which they operate also posed challenges for some comparison programs.

For example, one primary challenge LEAN Multifamily Program staff reported resulted from the structure of Massachusetts' energy-efficiency funding mechanism. Massachusetts' ratepayer funding for electric-efficiency measures is tracked separately from ratepayer funding for gas-efficiency measures. Consequently, the LEAN Multifamily Program cannot transfer funds between its budgets for electric efficiency and gas efficiency. Staff stated the program received sufficient funding to provide the cost-effective electric-efficiency measures identified in all of the participating buildings, but not sufficient to install all of the gas-efficiency measures identified as cost effective. This discrepancy can mean that the program is able to address electrical efficiency opportunities, but must wait to address gas-efficiency measures until funding becomes available in the gas-efficiency budget—potentially years later.

Program Administration

The organizations selected for an in-depth review reflect the prevalence of nonprofits and public benefit administrators in established low-income multifamily programs. Utilities administered only two of the five programs: the LEAN Multifamily Program in Massachusetts, and PSE&G's Residential Multifamily Housing Program in New Jersey-- the PSE&G program is the only comparison program directly administered by a utility. Nonprofit organizations (EOC, CNT Energy, and the Massachusetts program implementers, ABCD and Action, Inc.) and a non-utility public benefit program administrator (NYSERDA) implemented the remaining programs.

The nonprofit organizations administering and implementing the comparison programs also implement a variety of efficiency programs in addition to the multifamily offerings, typically targeting low-income residential customers and nonresidential facilities owned by non-profit organizations. Table 42 summarizes these program offerings.

[55] NYSERDA's MPP existed prior to 2010. However, significant changes in the program design resulted because the program was required to have each measure installed meet the TRC. (The previous program required projects to meet the TRC at the project level.) These changes resulted in the program's suspension from June 2009 to October 2010.

Table 42. Nonprofit Organization Efficiency Program Offerings In Addition to Multifamily

Program Location	Organization	Efficiency Program Offerings in Addition to Multifamily		
		Low-Income Single-Family	Small Multifamily (2-4 Units)	Facilities Owned By Nonprofits
Massachusetts	ABCD, Action, Inc.	✓	✓	
Chicago	CNT Energy		✓	✓
Colorado	Energy Outreach Colorado	✓		✓

The nonprofit organizations implementing the comparison programs in Chicago, Colorado, and Massachusetts are not exclusively focused on delivering energy-efficiency programs. As community action agencies, the organizations implementing the LEAN Multifamily program in Massachusetts, ABCD, and Action, Inc., deliver other income-qualified programs such as Head Start. EOC administers utility bill assistance programs in addition to its efficiency work. CNT Energy administers dynamic energy pricing programs, and works with counties and municipalities to include energy efficiency as a consideration in urban planning.

Funding Sources

All of the in-depth comparison programs receive funding from utility ratepayers, although EOC, CNT Energy, and NYSERDA draw on additional funding sources to support their low-income multifamily programs.

Table 43. Funding Sources for Comparison Programs

Program Location	Implementer	Ratepayer Funds	Federal Weatherization Funds*	Other Gov't Funds**	Other Funding Sources
Chicago	CNT Energy	✓		✓	✓
Colorado	EOC	✓	✓	✓	✓
Massachusetts	LEAN	✓			
New Jersey	PSE&G	✓			
New York	NYSERDA	✓			✓

* Such as WAP and LIHAP
** Such as ARRA

Precise data on the proportion of each program's budget funded through each source were not available, although the information available about each program provides some sense of the extent to which each program draws on its various funding sources. Specifically,

- EOC staff reported that early in its implementation, their program primarily drew on federal weatherization funds, but currently ratepayer funding makes up approximately 60% of program funding, with federal weatherization funds contributing approximately 20% and other sources the remaining 20%.

- The Illinois Department of Commerce and Economic Opportunity granted CNT Energy a total of $2.9 million in ratepayer funding to deliver its low-income multifamily program over grant periods from January 2012 to June 2013.[56] The program spent a total of $5.3 million in 2012, which includes additional funding provided directly by natural gas utilities.
- Ratepayer funds provided through New York's Energy Efficiency Portfolio Standard account for 90% of the funding allocated to NYSERDA's MPP, with the remaining 10% of funding divided approximately evenly between Regional Greenhouse Gas Initiative (RGGI) and Green Jobs Green New York funding.

EOC's program and NYSERDA's program provide examples of programs bringing together multiple funding sources to support a single program delivery model. In each case, the various funding sources seek slightly different goals and place differing restrictions on use of the funds. Table 44 summarizes each program's funding source and its associated goals and restrictions. Data on the proportion of each program's budget that each funding source provides were not available.

Table 44. Energy Outreach Colorado and NYSERDA Funding Sources

Funding Source	Funder Goals	Restrictions on Use of Funds
EOC		
Utilities	Energy and demand savings.	Program must achieve a TRC value >1, including a 25% adder for non-energy benefits.
Federal weatherization funds	Maintenance and improvement of affordable housing.	Each measure must meet a savings to investment ratio >1.
City of Denver	Maintenance of affordable housing, energy savings, carbon reduction, water savings.	None identified.
Private donations	Broad support of EOC mission.	Unrestricted, but typically used only for cost effective measures.
NYSERDA		
Energy-Efficiency Portfolio Standard (EEPS): ratepayer funding	Energy savings contributing to a statewide 15% reduction in energy use by 2015.	Measures must have a TRC of 1.0 or greater. Advanced measures (e.g. photovoltaic) are not eligible.
Regional Greenhouse Gas Initiative (RGGI): proceeds from CO_2 allowance auctions	Reduce greenhouse gas emissions, energy savings.	Funds may only be used to support energy savings from heating fuels other than electricity or natural gas.

[56] Under Illinois' energy-efficiency portfolio standard, energy efficiency programs are funded through cost recovery tariffs. Utilities administer 75% of the funds, and the Illinois Department of Commerce and Economic Opportunity (DCEO) administers 25% of the funds. The DCEO distributes funds as contracts, grants, and rebates to municipalities and organizations in support of programs targeting low-income populations, government facilities, and information and training efforts to bring about market transformation.

Green Jobs Green New York (GJGNY): RGGI Funding	Energy savings, carbon reduction, job creation.	Can provide no more than one-half the funding for loans to support energy-efficiency projects.

By leveraging multiple funding sources, NYSERDA and EOC can address a greater range of participants' efficiency needs than a single funding source would allow.

For example, NYSERDA uses RGGI funds to replace space heating and domestic hot water systems, install building shell upgrades, and support other retrofits not covered under EEPS. GJGNY funds allow NYSERDA to offer low-interest loans to multifamily building owners for energy-efficiency upgrades and to support the program-required multifamily audits.

EOC first screens participants' eligibility to receive federal weatherization funds, then considers the performance-based incentives the building could receive from its utilities. EOC uses available funding from the City of Denver and private donations to support installation of cost-effective measures not eligible for federal or utility incentives.

While the programs in Massachusetts and New Jersey do not receive significant funding support beyond ratepayer dollars, both programs maintain relationships with government organizations or other groups providing administrative support. In Massachusetts, LEAN program staff described frequently working with local governments and redevelopment authorities to include efficiency measures in multifamily building retrofits these groups contribute funds to. Staff also reported working with a contact at the state housing authority to spread awareness of the program and to prioritize projects within the housing authority's network. In New Jersey, PSE&G works with the NJHMFA, which has helped publicize the program and recruit participants among its network of multifamily buildings.

Characteristics of Markets Served

Each in-depth comparison program operates in a multifamily market with unique characteristics. This section presents data drawn from the U.S. Census Bureau's American Community Survey (ACS) five-year estimates for 2007–2011 to compare the characteristics of the multifamily market across comparison program areas.[57]

[57] Figures listed for the PSE&G territory are estimates and include all of the counties PSE&G serves, although in some cases PSE&G territory does not encompass the entire county. PSE&G figures include the following counties: Bergen, Burlington, Camden, Essex, Gloucester, Hudson, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, and Union.

In terms of the absolute number of households living in multifamily buildings, the multifamily market as a whole, as well as the low-income multifamily market, in New York State is much larger than the multifamily markets the other comparison programs serve, as shown in Table 45.[58]

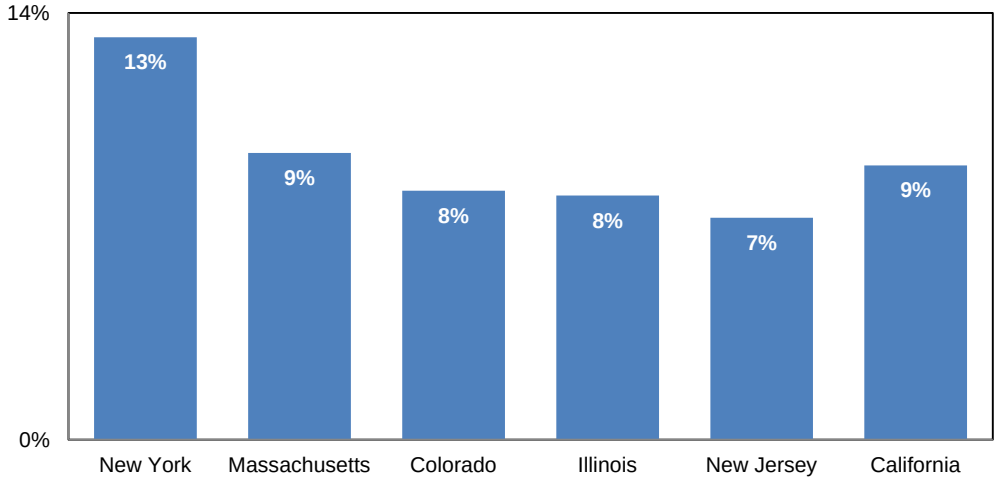
Table 45. Size of Multifamily Markets Served

State*	Households in Multifamily Buildings	Low-income Households in Multifamily Buildings	Proportion of Low-Income Multifamily Households
New York	2,631,249	989,225	38%
New Jersey	715,101	241,997	34%
Illinois	1,070,265	394,817	37%
Massachusetts	582,601	235,079	40%
Colorado	458,254	174,533	38%
California	2,798,336	1,175,301	42%

* Due to limited evaluation resources to conduct a more granular analysis, the data presented in this table are at the state level, although some comparison programs (notably CNT in Illinois and PSE&G in New Jersey) do not serve their entire state.

Low-income multifamily households also compose a larger proportion of New York State's housing stock than in the other comparison program areas. Approximately 13% of the households in New York State are low-income and live in multifamily buildings of five units or more. Massachusetts has the next highest concentration of low-income multifamily housing, with 9% of all households qualifying as low-income and living in multifamily buildings. Approximately 8% of all households in Colorado, Massachusetts, and New Jersey are low-income multifamily, as shown in Figure 48.

Figure 48. Low-income Multifamily as a Proportion of All Households



[58] For the purpose of these comparisons, multifamily buildings are defined as those containing five units or more.

The rest of this section reviews additional characteristics of the multifamily markets the comparison programs serve. However, data focused specifically on the low-income multifamily sector are not readily available, and, due to limited study resources, the research team was not able to examine these characteristics for low-income multifamily buildings specifically in each comparison program area. As a result, the findings presented below reflect all multifamily buildings in the comparison program territories, including those serving both low-income and non-low-income tenants. The low-income multifamily market may differ from the market as a whole in some of the characteristics listed below.

While CNT Energy's program operates entirely within the metropolitan Chicago area, the other comparison programs serve a more varied territory. In each case, however, the service territory's largest metropolitan areas contain the majority of multifamily housing, as shown in Table 46. This contrasts with California, which is larger than the comparison program areas and contains multiple large metropolitan areas.

Table 46. Proportion of Total Multifamily Units in the Largest Metropolitan Areas

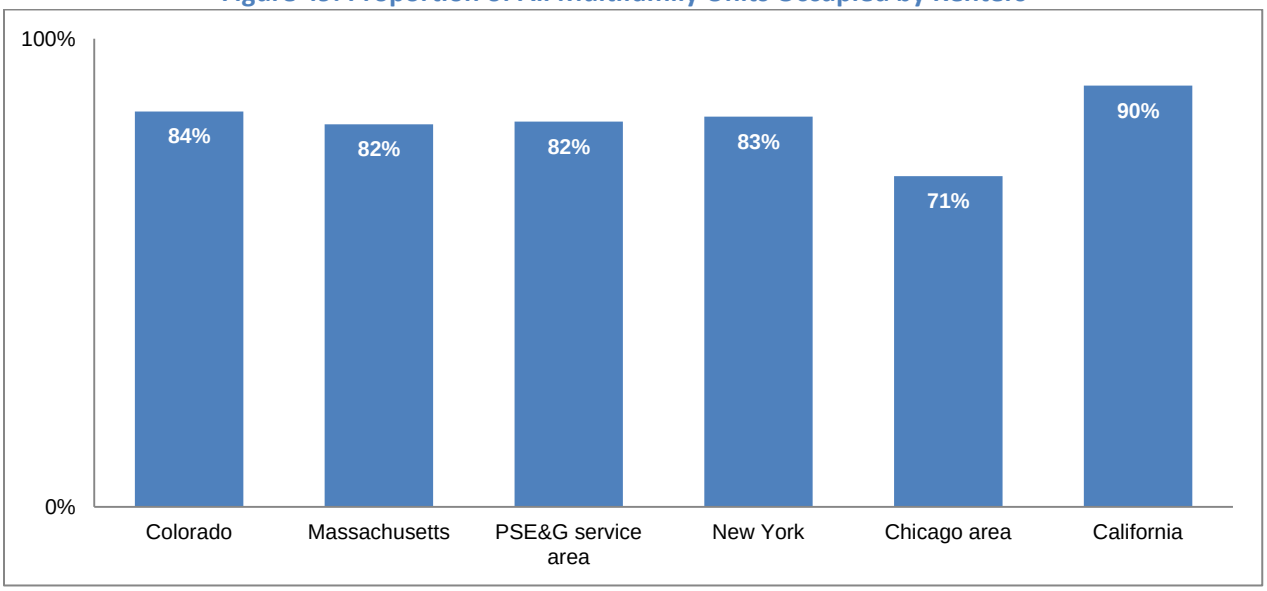
Program Area	Largest Metropolitan Area	Proportion of Multifamily Units
New York	New York City	87%
Massachusetts	Boston	73%
Colorado	Denver	67%
PSE&G service area	Newark*	61%
California	Los Angeles	47%

* Newark is part of the New York City Metropolitan Statistical Area (MSA). The figures listed reflect only the portions of the New York City MSA in New Jersey.

Although NYSERDA's program serves the entire state of New York, of the comparison programs, it contains the greatest concentration of multifamily units within its territory's largest metropolitan area. PSE&G's service area has the lowest concentration of multifamily units in its largest metropolitan area—the portion of the New York City metropolitan area in New Jersey. However, PSE&G's territory also includes portions of the Philadelphia metropolitan area, which Table 46 does not include.

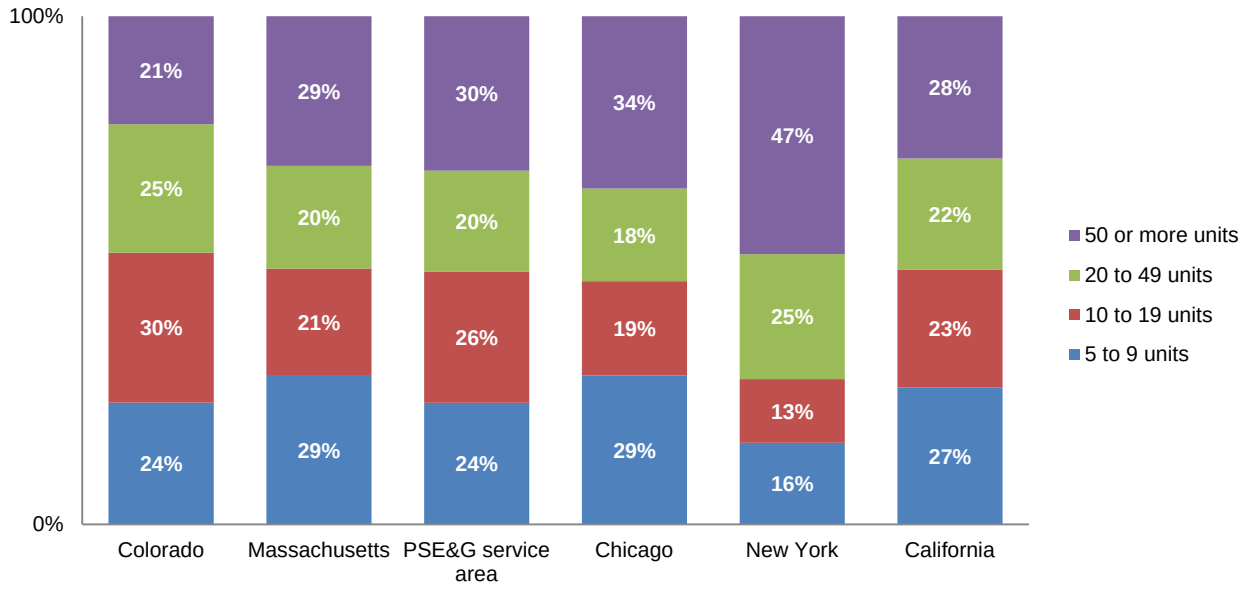
Renters occupy the majority of multifamily households in all comparison program areas, although the Chicago area has a higher proportion of owner-occupied multifamily units than the other comparison program areas, as shown in Figure 49. In all comparison program areas, a higher concentration of owner-occupied multifamily units occurs within metropolitan areas than in the service territory as a whole. Notably, however, these figures represent all multifamily households; the proportion of low-income multifamily residents who rent may not match that of the overall population. For example, in California renters occupy 90% multifamily units overall, but 96% of all low-income multifamily households are renters.

Figure 49. Proportion of All Multifamily Units Occupied by Renters



Large multifamily buildings are more prevalent in New York, Chicago, and New Jersey than in Colorado and Massachusetts, as shown in Figure 50. In New York, Chicago, and New Jersey a majority of multifamily units are located in buildings with 20 units or more, with 47% of the multifamily units in New York in buildings containing 50 units or more. As discussed in Section 3 (Figure 6), the size of multifamily buildings varies in different cities within California, with larger buildings accounting for a greater proportion of the units in the larger cities.

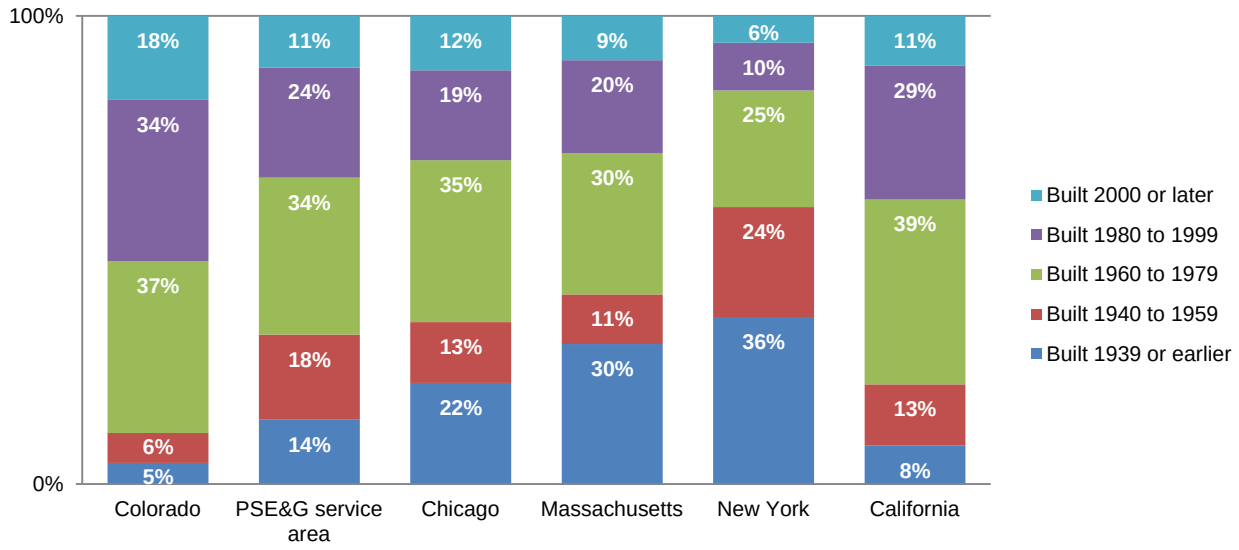
Figure 50. Proportion of Multifamily Units by Building Size



New York and Massachusetts exhibit a greater proportion of older multifamily buildings than the other comparison program areas, as shown in Figure 51. However, in all comparison program areas except

New York, a plurality of multifamily units is located in buildings built between 1960 and 1979. Again, it is important to note that these figures include all multifamily households – adequate income as well as low-income. Based on California data, low-income households may be more likely to live in older buildings. While Figure 51, below, indicates that 60% of all multifamily households in California live in buildings built prior to 1980, Figure 7 in Section 3 indicates that 68% of low-income multifamily households in California live in buildings built prior to 1980.

Figure 51. Proportion of Multifamily Units by Building Vintage



Program Theory and Goals

All five of the programs receiving in-depth reviews seek to generate energy savings as their primary goal. Program staff also noted that by reducing operating costs for multifamily buildings serving low-income tenants, their programs help property owners continue to provide affordable and comfortable housing.

To generate energy savings, the designs of multifamily programs examined sought to achieve two broad objectives:

- To overcome barriers to efficiency in the multifamily sector
- To increase the market for efficiency in multifamily buildings

This section lists barriers the comparison programs seek to address, market support objectives they seek to achieve, and briefly describes program approaches for each. The following sections provide additional detail on program activities and offerings.

Overcoming Barriers

The comparison programs examined seek to address three common barriers to efficiency in multifamily buildings:

- **Split incentives:** In many buildings, tenants pay the bills for energy used in dwelling units, and would thus benefit from energy savings. However, building owners are responsible for the costs associated with maintaining, replacing, and upgrading energy-using equipment. The effect of this barrier can prevent owners from making investments when the economic benefits accrue only to their tenants. It can also prevent tenants from making investments of time and money to secure upgrades for space they do not own.
- **A lack of awareness of efficiency among building owners and managers:** Building owners and managers may not be aware of opportunities available to improve the efficiency of their buildings or the potential energy savings available from various retrofit options.
- **A lack of access to capital for building owners:** Multifamily buildings, particularly those serving low-income tenants, often have tight operating margins and complicated financing structures, which can make it difficult for building owners to bear the upfront cost of energy upgrades.

Specifics about each program's approach to each barrier are provided thematically below.

Split Incentives

The strength of the split incentive barrier varies between comparison programs. While program services can benefit tenants as well as owners, all of the comparison programs focus on reaching building owners, meaning that the metering and subsidy status of the building affects the viability of projects. The Colorado Energy Office wanted to focus statewide multifamily efficiency efforts on master metered buildings, leaving local weatherization agencies to deliver services to units in individually metered buildings. Since building owners pay all energy costs for these buildings, EOC has largely avoided the split-incentive issue.[59] Among the other programs, reluctance on the part of building owners to invest in reducing tenant energy use is a more powerful barrier, addressed with an array of strategies:

- **Provide generous incentives.** The LEAN program in Massachusetts addresses split incentives by fully subsidizing retrofits, thus eliminating costs to the building owner.
- **Promote non-energy benefits.** CNT Energy promotes the non-energy benefits associated with energy-efficiency upgrades, such as reduced maintenance costs and lower tenant turnover. CNT Energy staff work to quantify these benefits.
- **Target public or subsidized buildings**. Contacts reported that split incentives are more easily overcome in public housing and multifamily buildings owned by nonprofit organizations. Staff from EOC and LEAN reported that all or almost all their participants are either publically subsidized buildings or nonprofits offering reduced rents to low-income people. For these types of buildings, efficiency retrofits align with non-profit organizations' missions to benefit the populations they serve. These organizations also often plan to own their properties longer than for-profit building owners.

[59] EOC is starting to work with more individually metered buildings and has completed many "low-cost measures" in these types of buildings.

- **Capture other tenant benefits.** Programs targeting the low-income multifamily sector often seek to ensure that any incentives provided to building owners to upgrade their buildings ultimately benefit the low-income tenants these programs seek to serve. To this end, EOC and the LEAN multifamily program require building owners to commit to not raising rents within a specified time period. In addition, EOC requires building owners to specify in their applications how they will use energy cost savings to benefit tenants. For example, building owners have pledged to provide increased case management in HUD-subsidized properties, to install playground equipment, and, in one case, to decrease rents.

  To monitor property owners' compliance with their agreements not to raise rents, EOC informs tenants of their landlord's agreement as part of their energy education. EOC staff also follow-up with building owners after tracking the building's energy use for 12 months following the retrofit, and during that meeting, EOC staff inquire about how the building owner is using their energy cost savings. EOC does not have authority to impose punitive measures on building owners that increase rents and or fail to use cost savings in a way that benefits tenants. However, a building owner who failed to comply with their agreements would be ineligible to participate in EOC programs in the future, which EOC staff noted could be a disadvantage for owners who have multiple buildings, as most of the program's participants do. EOC also asks that building owners return the funds the program has provided toward their retrofits if they sell a building that has received retrofits to a new owner who will not maintain the building as affordable housing.

Lack of Awareness of Efficiency among Multifamily Owners

Comparison program managers described efforts to educate multifamily building owners and managers about energy efficiency and their buildings' energy use through interactions during the retrofit process. EOC, the LEAN multifamily program in Massachusetts, and CNT Energy's program in Chicago use the energy assessment process to educate building owners and managers about their buildings' energy use and about opportunities to save energy in on-going operations and maintenance. Interviewees suggested that the education provided during the assessment process was informal as opposed to part of a curriculum. LEAN also encourages building owners and managers to participate in the post-installation inspection, ensuring they achieve a strong understanding of the efficiency improvements made through the program. During the inspection, owners and facility staff learn about the best ways to run their property efficiently. LEAN program staff reported two of the engineering firms the program works with have a great deal of experience working with facility managers, and have helped the program effectively communicate with these groups.

Building owner and manager participants in EOC's program must agree to participate in training on energy-efficiency opportunities, and EOC has contracted with other agencies to develop and administer more formal educational programs for these groups. EOC staff reported that, in at least one property, the program's education process motivated participants to make changes that generated substantial energy savings. EOC staff works with owners and property managers on a one-on-one basis to get them

to understand how important behavior is to saving energy. EOC has held meetings with various project staff members, post installation, to share best practices with facility managers and provide them an opportunity to ask questions about ways to save energy. EOC also created a formal resident training program that facility staff delivers to residents.

Lack of Access to Capital

As described in greater detail below, to overcome barriers regarding access to capital, all comparison programs, except for CNT Energy's program in Chicago, provide incentives designed to cover a large proportion of retrofit costs. Managers of the LEAN Multifamily Program in Massachusetts, which was designed to cover all of the costs associated with participants' energy savings upgrades, stated these large incentives allowed the program to avoid the considerable effort required to work with building owners to develop financing packages for their projects.

In addition to incentives, three comparison programs (PSE&G, NYSERDA's MPP, and CNT Energy) offer building owners financing to cover the cost of efficiency retrofits.

- In New Jersey, PSE&G offers opportunities for participants to repay the balance of their upgrade costs in installments as a line-item on their utility bills. Offering on-bill repayment in this way may allow building owners to access financing for retrofit projects without obtaining approval from their investors, as they typically must do before a building takes on additional debt.
- NYSERDA's MPP and CNT Energy's program in Chicago do not offer on-bill repayment, although both programs work with building owners to identify financing options, including (but not limited to) loans offered by the program or its partners.

Increasing the Market for Energy Efficiency

All five programs included activities expected to influence building owners and managers to make energy efficiency a regular consideration in their decision-making processes and develop a base of contractors and engineers capable of delivering energy-efficiency services to multifamily buildings.

Influencing Building Owners

Several comparison programs seek to incorporate energy efficiency into multifamily building owners' and managers' day-to-day business practices. Illustrating the need for such a shift in awareness of building energy use, EOC staff reported that building owners frequently continue to repair old, inefficient equipment rather than replace it and typically select the lowest-cost option without regard for efficiency when replacing equipment. Thus, the program seeks to work with building owners, managers, and tenants to build their understanding of efficiency, and ensure they know of—and have bought into—the efficiency improvements installed through the program.

The LEAN multifamily program in Massachusetts encourages building owners and managers to take part in building audits to better their understanding of their building's energy use and savings opportunities.

The program also provides participants with analyses from energy benchmarking software,[60] which allows them to monitor their buildings' energy use, in addition to helping the program prioritize applications and track savings.

To encourage program participants to remain engaged with their energy use and to continue to operate their buildings efficiently, CNT Energy sends past participants annual billing analysis reports that estimate the energy and cost savings resulting from their retrofits.

The structure of the incentives NYSERDA offers through the MPP may also encourage building owners to consider energy use in their decision making and take actions to reduce energy use. The performance incentives offered for buildings exceeding a 20% reduction in energy use draw upon an analysis of consumption data for 12 months following installation. Building owners that do not meet the performance targets anticipated in their Energy Reduction Plans receive incentives commensurate with their buildings' actual energy performance.[61] Thus, building owners who do not prioritize operations and maintenance practices may receive a lower-than-expected incentive.

Developing a Base of Contractors and Engineers

Managers of two of the comparison programs—NYSERDA's MPP and the LEAN multifamily program in Massachusetts—described efforts to build a base of contractors and engineers with specific expertise in specifying and installing efficiency measures in multifamily buildings.

NYSERDA offers training to the consulting engineers that deliver the MPP and verifies their credentials prior to approving them for participation. In training these Partners, NYSERDA provides technical information about installing efficient equipment in multifamily buildings and information about resources available to help finance comprehensive energy-saving projects. Through these efforts, NYSERDA seeks to build a group of professionals uniquely qualified to conduct multifamily energy-efficiency work. NYSERDA also hopes this group of professionals will apply their efficiency knowledge to their work outside the program, both in multifamily buildings and in other commercial facilities.

Program staff in Massachusetts reported their program has faced a shortage of contractors capable of completing weatherization work on the scale necessary to treat multifamily buildings. Staff noted that small contractors may not have the logistical and administrative capabilities to complete large, multifamily weatherization jobs. As a result, the program works to expand the market. Building on the experience of ARRA-funded contractor training programs, the LEAN multifamily program encourages experienced weatherization contractors to expand into the multifamily market.

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[60] The LEAN Multifamily Program provides participants with WegoWise, privately developed benchmarking software that is available to the general public.

[61] Owners of buildings that exceed their performance targets receive bonus incentives that reflect their predicted savings; they do not qualify for larger incentives.

Program Activities and Offerings

Eligibility Requirements

PSE&G's and CNT Energy's programs target low-income buildings, but do not require income qualification. NJHMFA only provides financing to buildings offering rents accessible to low-income households. As a result, all participants coming to PSE&G's Residential Multifamily Housing Program through its partnership with the NJHMFA serve low-income populations.

Similarly, many of CNT Energy's participants come to the program as referrals from Chicago's Community Investment Corporation (CIC)), which primarily works with buildings serving low-income populations. CIC is a not-for-profit mortgage lender that provides financing to buy and rehabilitate multifamily buildings in the Chicago area.

The three comparison programs requiring income verification each specify different income-eligibility criteria, as shown in Table 47. NYSERDA uses the most inclusive income-eligibility requirements, allowing tenants to earn a larger proportion of the state median income than the LEAN Multifamily Program in Massachusetts, and requiring a lower proportion of tenants meet the income requirements than the other two programs.

Table 47. Income Eligibility Requirements

Administrator	Program Name	Income Eligibility Requirement	Proportion of Tenants Who Must Meet Eligibility Requirement
EOC	Low-income Multifamily Weatherization Program	200% of federal poverty level or less	67%
Massachusetts IOUs	LEAN Multifamily Program	60% of area median income or less	50%
NYSERDA	MPP	80% of state median income or less	25%

Verification

The three comparison programs requiring income verification accept participation in state or federal low-income housing programs as verification that a building meets their income requirements. As many of the buildings these programs serve receive subsidies from state or federal low-income programs, income verification typically does not pose a major challenge.

For example, EOC staff review HUD applications of public and assisted multifamily properties, and LEAN program staff review the income certifications that building owners receiving state or federal subsidies are required to conduct on an annual basis.

For the EOC, LEAN, and NYSERDA programs, buildings not receiving federal subsidies qualify to participate, but the process of verifying income eligibility becomes more involved. In such cases, EOC's program collects data on every tenant. In the process of collecting this information, the program asks

tenants to sign a release providing access to their utility billing data, and acknowledging that retrofit work will take place in the building. The program also gathers information on tenants' chemical sensitivities that may be relevant in the process of installing upgrades.

The LEAN and NYSERDA programs leave responsibility for providing income verification data to the building owner. In NYSERDA's program, building owners can use the building's "rent roll" as a proxy for tenant income. Through this method, building owners calculate tenants' annual household income based on rent and occupancy, assuming housing costs make up 30% of household incomes. Building owners also can qualify by submitting signed income certification forms and supporting documentation for 25% of the units in a building.

None of the comparison programs have significant staff capability to conduct door-to-door income verification, a factor likely contributing to the prevalence of public and subsidized housing among these programs' participants. Contacts at EOC and LEAN reported that the large majority of the for-profit building owners that participate in their programs receive some type of subsidy to support affordable housing, and the buildings referred to PSE&G's program through the NJHMFA are largely subsidized. CNT Energy staff reported that many of the buildings that participate in their program are not subsidized, although the program does not require buildings owners to provide income verification documents. Data on the proportion of the affordable properties NYSERDA serves through its MPP that receive subsidies were not available.

Prioritization

Three of the five comparison programs (EOC, LEAN, and PSE&G) receive more applications from interested building owners than their budgets allow them to serve. As a result, these programs have developed criteria by which to prioritize projects.

LEAN requires applicants to use program-provided benchmarking software, called WegoWise. Applicants enter one year of energy-usage data as well as characteristics of their buildings into the benchmarking tool. The software provides a score, based on the energy intensity and energy-savings potential of the building, which the program uses to prioritize applications. Program staff stated, however, that they also may prioritize buildings with planned equipment replacement or renovations that would time nicely with an efficiency retrofit. For example, building owners may take advantage of previously planned renovations to complete efficiency upgrades they would be unlikely to complete as stand-alone projects, like boiler replacements or adding insulation. By not acting at the time of the renovation, the program may lose the opportunity to make these efficiency improvements.

EOC is the only comparison program that does not accept applications on an ongoing basis. Instead, EOC accepts applications during defined application periods, based on its funding availability. Similar to the LEAN program, EOC considers the energy-savings potential of applicants' buildings in prioritizing projects, and seeks to ensure the buildings it treats are balanced between urban and rural areas and are geographically distributed throughout the state.

PSE&G distributes its program funding on a first-come, first-served basis.

Outreach

EOC's program in Colorado, the LEAN program in Massachusetts, and PSE&G's program in New Jersey reported reaching out to organizations already working with low-income multifamily properties to promote their services. Local community action agencies promote the LEAN program in Massachusetts. In Colorado, EOC initially conducted outreach through statewide affordable housing associations, and, more recently, has started reaching out to apartment manager associations to more effectively contact market-rate building owners. In New Jersey, PSE&G leveraged NJHMFA's relationships with multifamily building owners to generate leads. PSE&G's consulting engineers also bring leads to the program.

NYSERDA's program delivery model (described in greater detail below) draws upon the services of program Partners, engineering and construction firms that guide participants through the retrofit process. These Partners take the primary responsibility for promoting the program to building owners.

CNT Energy staff reported that, in addition to its standard outreach efforts (such as attending community events and speaking at trade shows), its partner lending agency, CIC, refers many participants to the program. Contractors and past participants also provide referrals. Additionally, the Chicago Housing Authority provides possible leads to CNT Energy.

Program Delivery Roles

All of the in-depth comparison programs act in five key areas to achieve efficiency retrofits in low-income multifamily buildings:

- Supporting building owners through the retrofit process
- Assessing energy-savings opportunities and developing a retrofit scope of work
- Assisting with financing
- Installing energy-efficiency measures
- Ensuring the quality of installations and verifying energy savings

The five comparison programs draw on distinct combinations of implementation staff, installers, and engineers to fulfill each role. While each program has multiple people working on a project, one similarity across all five programs is the single point of contact interface between the program and the participant. The following sections describe the approaches of each comparison program.

Participant Support

Conducting retrofit work in multifamily buildings is a complex undertaking that requires identifying efficiency opportunities and defining a scope of work for efficiency retrofits that requires specialized, technical knowledge. Consequently, all the comparison programs use established systems to help participating building owners and managers identify retrofits and guide them through the retrofit process. The following sections describe greater detail on the comparison programs' approaches to each step in the participation process. However, all five comparison programs provide participant support at each stage, including the following:[62]

- Using historical utility billing data to analyze the energy use of applicants' buildings. Some comparison programs, such as the LEAN multifamily program, help building owners enter their data into benchmarking software,[63] which the building owners can continue to use to monitor their energy use after the retrofit.
- Conducting assessments or audits to identify energy-savings opportunities and helping building owners to interpret the results. All the comparison programs provide assessments or audits to building owners at no cost. The comparison programs also work with building owners to develop a retrofit scope of work that meets both the participants' needs and program cost-effectiveness requirements.
- Identifying the incentive and financing options building owners can use to fund their retrofits. CNT Energy does not offer incentives directly, but program staff direct participants to incentives and financing options to cover retrofit costs. NYSERDA's MPP partners also advise participants on financing options, and include the building owner's plan for project financing in the Energy Reduction Plan, which details the project's scope of work. The LEAN Multifamily Program does not identify other financing options, as it provides incentives to cover the full cost of retrofits; and PSE&G's program fully finances retrofit costs through a combination of incentives and on-bill financing.
- Assisting building owners in selecting contractors. The comparison programs vary in their approach to measure installations: in some cases the program selects installation contractors, while in others the building owner selects an installation contractor, choosing from a program-qualified list for some programs, and without restriction for others. The programs through which building owners select installation contractors provide participants with support in developing bid request documents and reviewing bids.
- Verifying the quality of installed measures. All the comparison programs conduct inspections to verify the specified measures have been installed correctly.

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[62] As noted previously, all of the comparison programs view the multifamily building owners and managers, rather than tenants, as their participants. As a result, the program services described in this section target multifamily building owners and managers.

[63] LEAN uses WegoWise, benchmarking software, which was privately developed and is available to the public, NYSERDA and EOC use tools developed specifically for their programs.

In many cases, providing this level of support involves designating an individual to work with participating building owners and managers. The comparison programs broadly fall into two groups regarding the market actor designated to support participants: some draw on external consulting engineers, while others use internal program staff members. NYSERDA's MPP and PSE&G's program use consulting engineers to support participants throughout the retrofit process. These consulting engineers are professional engineers whose firms offer energy-efficiency consulting services in non-residential buildings, in addition to their multifamily program work. In both programs, these consulting engineers provide participants with support throughout the retrofit process. However, participants in the MPP contract with consulting engineers directly, while engineers supporting Residential Multifamily Housing Program participants work under contract to PSE&G.

Program staff members provide support to participants in EOC's, LEAN's, and CNT Energy's programs. EOC acts as a general contractor, managing the retrofit process for participants and subcontracting with installers to complete retrofit work. Staff at the organizations implementing the LEAN program guide participants through a complex participation process, bringing together distinct gas- and electric-efficiency offerings. CNT Energy uses its own staff to support participants throughout the process and to help them identify incentives and financing options for their retrofits. The EOC, LEAN and CNT Energy staff members that provide support to participants have construction and efficiency experience. EOC has an engineer on staff that supports the program, and EOC's project managers have construction and efficiency experience, including BPI training. LEAN staffs are BPI certified at a minimum and receive regular efficiency training to keep abreast of new technologies. CNT Energy largely provides technical training internally, but all the staff members engaged in supporting participants are BPI certified.

Assessment of Savings Opportunities

All the comparison programs provide participants with some level of building assessment or audit at no cost. Details about the differences between and assessment and audit are described below.

While PSE&G's program originally provided all participants with an investment grade (ASHRAE Level III) audit, the program found, in some cases, a less extensive, ASHRAE Level II audit proved sufficient. Due to the lower costs of these audits, cost savings improve the cost-effectiveness of individual retrofit projects and allow the program to serve a greater number of participants.

NYSERDA's MPP also uses ASHRAE Level II audits. NYSERDA uses its ERP tool, which it developed in collaboration with Oak Ridge National Laboratory and the U.S. EPA, to benchmark participating buildings and to estimate measure cost-effectiveness. The tool draws upon a database of approximately 500 multifamily buildings across the country. EOC conducts comprehensive audits and building modeling using procedures approved by the U.S. DOE for programs using federal weatherization funds.

In Massachusetts, the LEAN program offers varying assessment levels, based on the measure types and participants' needs. Most participants receive two distinct assessments:

- The program leverages existing utility efficiency offerings to provide appliance and lighting upgrades, and implementers, under contract to the utilities, conduct assessments focused on these measures.
- In a separate assessment, LEAN program staffs assess weatherization opportunities, and determine whether conducting detailed assessments will be necessary to identify central system upgrade opportunities.

If staff determine that central HVAC system savings opportunities exist, the program works with HVAC equipment manufacturers' representatives to specify upgraded equipment. The manufacturers' representatives send engineers to the building to generate detailed replacement specifications. Staff noted that drawing on manufacturers' representatives this way allows the program to avoid hiring an engineer to conduct a detailed audit of the HVAC system, thus reducing costs and increasing the range of measures that can meet the cost-effectiveness requirements.

CNT Energy program staffs conduct an audit of participating buildings, including inspections and diagnostic testing of building envelopes, mechanical systems, and lighting. This audit includes common areas and reviews of a sample of dwelling units. Following the advice of a marketing consultant, CNT Energy simplified the content of its audit reports, removing technical details about building characteristics and building science to focus more strongly on the costs and savings potential of recommended improvements.

Measure Installation

Variations in the comparison programs' requirements around measure installation largely parallel the differences in each program's method for supporting participants through the upgrade process.

NYSERDA and PSE&G, with programs drawing on consulting engineers to support participants, leave responsibility for selecting installation contractors to the building owners. In these programs, the role of the installation contractor is limited to implementing a pre-defined scope of work. The consulting engineers provide building owners with documents specifying the work to be completed and remain available to review bids and advise the building owner in the contractor-selection process. The building owner can select any contractor with the appropriate license to complete the work.

In contrast, the LEAN program in Massachusetts and the EOC program in Colorado, which use program staff to guide participants through the retrofit process, typically select the contractors to install measures in their participants' buildings. As noted, EOC acts as a general contractor, and installation contractors enter into a contract with both EOC and the building owner. EOC typically selects installation contractors through a competitive bidding process.

The LEAN multifamily program also typically selects installation contractors to install measures for participants. The program works with a group of contractors, with whom it has negotiated a set price for

labor and materials, although it may put installation work out to bid when very large projects allow the program to obtain prices lower than the negotiated prices. The LEAN program allows participants to select a contractor, if they choose to do so, but the contractor must agree to the program's pricing arrangements. As with specifying equipment, the LEAN multifamily program works with manufacturers' representatives to install central HVAC equipment. After developing the specifications, the manufacturers' representatives put the installation work out to bid among contractors the manufacturer has qualified to install its equipment.

Similar to the LEAN and EOC's programs, internal staff members of CNT Energy's multifamily program in Chicago guide participants through the retrofit process. However, participants in CNT Energy's program take responsibility for selecting their own contractors but CNT Energy staff helps participants solicit bids from licensed contractors.[64]

QA/QC Inspection and Verification

With the exception of CNT Energy, which does not directly incentivize measures, the comparison programs conduct post-installation inspections on all projects. Typically, the individual responsible for conducting the original building assessment and providing participant support conducts these inspections. EOC and LEAN draw on program staff to conduct the inspections, and the LEAN program encourages building owners and their maintenance staff to participate in the inspection as an opportunity to build their understanding of the building's energy use and the measures installed. CNT Energy staffs help coordinate inspections required by organizations incentivizing their participants' retrofits.

NYSERDA and PSE&G draw upon consulting engineers to conduct inspections, although PSE&G staffs conduct some inspections. The relationships consulting engineers have built with participating building owners and managers provide one reason NYSERDA draws on the Partners for inspections.

PSE&G and NYSERDA conduct an inspection at the midpoint of the measure installation process as well as once work has been completed. Inspections verify the progress of installation work, and, following the inspection, each program provides a partial incentive payment to the participant.

Incentives

CNT Energy's program in Chicago and the LEAN program in Massachusetts differ from the other in-depth comparison programs through their incentive offerings.

The CNT Energy program primarily plays a support role, guiding participants through the retrofit process. It does not offer incentives for measure installation, although the program disperses limited grant funding to support projects that staffs determine are unlikely to move forward without additional

[64] CNT maintains a list of "preferred" contractors, who have experience completing retrofits in multifamily buildings.

capital.[65] The LEAN multifamily program draws on a combination of direct installation, prescriptive measures, and performance-based incentives to fund the entire cost of retrofits, although building owners may contribute funding to install measures that the program's analysis has determined do not prove cost-effective, based on their energy savings.

All three of the remaining comparison programs offer performance-based incentives, although each structures its incentive offerings differently. All comparison programs offering incentives subsidize a relatively large portion of retrofit costs, with at least three of the four typically covering at least one-half of the retrofit cost. Nonetheless, only the LEAN Multifamily Program typically covers the full cost of retrofits to the building owner.

Table 48 summarizes each comparison program's incentive structure and the proportion of retrofit costs covered.

Table 48. Comparison Program Incentive Structure

Administrator	Program Name	Incentive Structure	Proportion Of Costs Typically Covered
CNT Energy	Energy Savers Multifamily Program	Program does not directly incentivize retrofits.	N/A
EOC	Low-Income Multifamily Program	Performance-based utility incentives; weatherization funds distributed based on a flat per-unit basis.	Approximately 50%
Massachusetts IOUs	LEAN Multifamily Program	Program covers full cost of measures.	100%
PSE&G	Residential Multifamily Housing Program	Qualified measures must have a simple payback of 15 years or less. Incentive levels are set to reduce the simple payback by up to 7 years, to not less than 2 years.	More than 50%
NYSERDA	MPP	Base per-unit incentive provided for savings of 15% above baseline; bonus incentives for buildings achieving savings of 20% or greater. Incentives are greater for low-income buildings and less for buildings not heated by utility-provided natural gas.	Unknown

Two comparison programs, in New York and New Jersey, provide participants with incentive payments in multiple installments over the course of the upgrade project. PSE&G staff explained the program pays

[65] These funds are expended on a discretionary case-by-case basis. It program staff think that a project will not proceed without the additional infusion of money, they will offer extra funds. Staff stated that this occurs most often for properties that are not eligible for loans.

these incentives to ensure property owners do not face barriers resulting from insufficient capital to cover installation costs that must be paid before a project can be fully completed.

In its role as a general contractor, EOC typically covers such costs for participants, as does the LEAN program, which fully subsidizes retrofits. Staff at both organizations noted their organizations' large size allows them to absorb these costs until incentives become available—an asset important to the programs' success.

Prior to installation, programs often require building owners to address any health or safety issues found during the building audit. For example, EOC requires owners to address lead or asbestos problems prior to installation of efficiency measures, and LEAN identifies "obvious health and safety problems" during audits, and requires those issues must be addressed before efficiency measure can be installed. In Massachusetts, some funds are available to help owners pay for required health and safety improvements.

Measures Installed

All the comparison programs install measures throughout multifamily facilities. Consistent with the performance-based incentives the majority of in-depth comparison programs offer, most of the programs place few restrictions on the types of measures that participants are allowed to install. All the comparison programs, however, require retrofits to meet cost-effectiveness requirements, in most cases at the measure level, as detailed in Table 49. LEAN and PSE&G program staff reported that cost-effectiveness requirements largely prevented their programs from subsidizing window replacements.

Table 49. Cost Effectiveness Requirements

Administrator	Program Name	Cost-Effectiveness Test	Level at Which Test Is Applied
CNT Energy	Energy Savers Multifamily Program	N/A – Program does not directly provide incentives.	
Energy Outreach Colorado	Low-Income Multifamily Weatherization Program	Savings Investment Ratio (SIR)*	Measure
		TRC	Program
Massachusetts IOUs	LEAN Multifamily Program	TRC	Measure
NYSERDA	MPP	TRC	Measure
PSE&G	Residential Multifamily Housing Program	Simple Payback	Measure

* Measures receiving federal weatherization funds.

The comparison programs differed somewhat regarding the extent that they provide direct-install measures, such as faucet aerators and CFLs. PSE&G and NYSERDA have distinct programs offering those measures, while their low-income multifamily programs focus on larger, whole-building upgrades. NYSERDA's program requires participants to achieve a minimum of 15% energy savings. In contrast,

LEAN and EOC typically provide a wider range of measures, from faucet aerators, CFLs, and appliances to boiler replacements, and not all participants must pursue larger upgrades.

NYSERDA and EOC provided the evaluation team with data on the frequency with which measures are installed. In NYSERDA's MPP, common area lighting, low-flow showerheads and faucet aerators, insulation, in-unit lighting, and refrigerator replacements are the most commonly installed measures, with each included in more than half of all MPP projects. EOC's energy savings primarily come from heating system upgrades (32%), in-unit, common area, and exterior lighting (27%), water heating and low-flow fixtures (14%), window replacement (12%), and insulation and air sealing (12%).

Financing

Three of the comparison programs—NYSERDA, PSE&G, and CNT Energy—offer financing to offset the upfront costs of efficiency upgrades in low-income multifamily buildings. Table 50 summarizes the details of each program's loan offerings.

Table 50. Financing Offerings

Comparison Program	Interest Rate	Loan Term
CNT Energy Savers Multifamily Program	3%	7 years
NYSERDA MPP	~50% of market rates	Unknown
PSE&G Residential Multifamily Housing Program	0%	Affordable housing: 10 years Market rate buildings: 5 years

PSE&G's program in New Jersey offers interest-free on-bill financing to cover the portion of upgrade costs not covered by incentives. NYSERDA offers financing through its Green Jobs Green New York (GJGNY) funding, and building owners in some New York utility territories may repay their loans through their utility bills.[66] Using GJGNY funds, NYSERDA provides participating lenders with one-half of the principal amount of loans made to support energy upgrade projects, interest free. This funding typically allows lenders to reduce the interest rate on energy upgrade loans by approximately 50%.

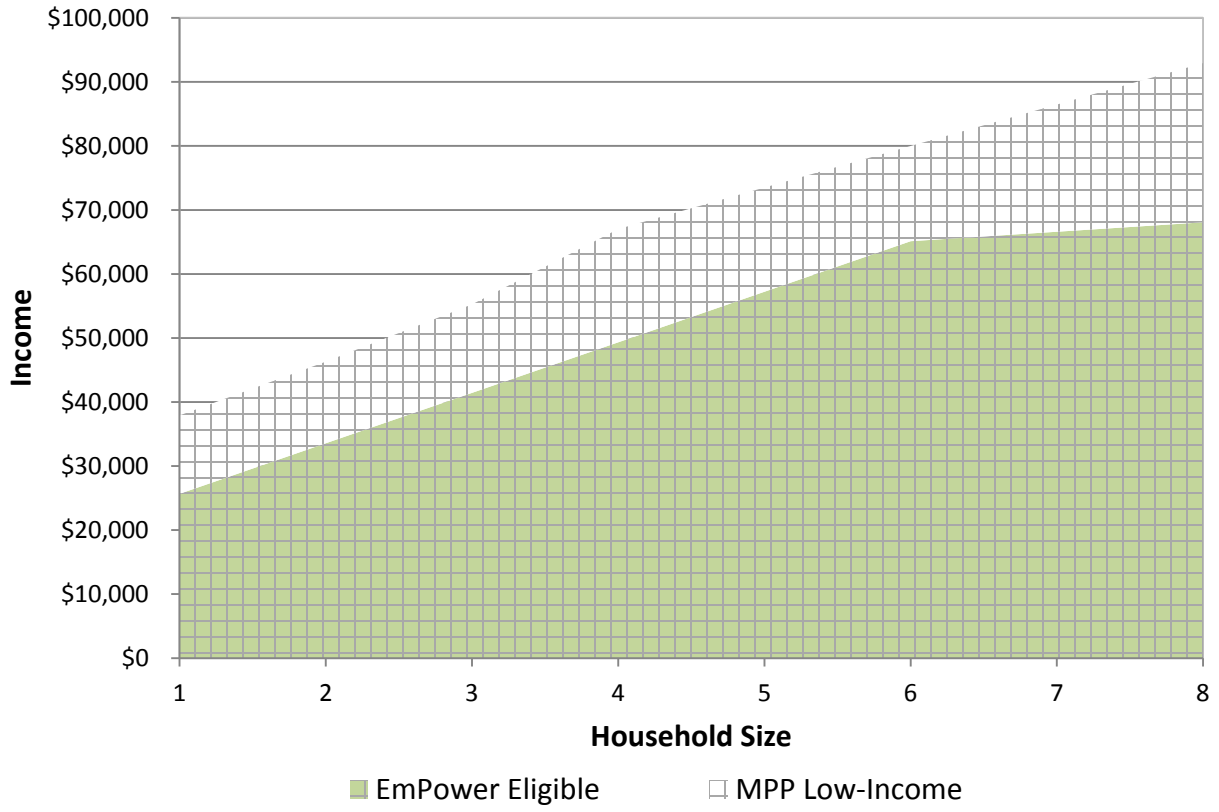
Coordination with Other Program Offerings

Each in depth comparison program coordinates with various other program offerings available to multifamily buildings within its jurisdiction. This coordination largely takes place through recruitment and referral of participants to the most appropriate program for the scope of improvements they express interest in undertaking.

[66] A statewide program, the GJGNY Program promotes energy efficiency and installation of clean technologies to reduce energy costs and greenhouse gas emissions. The program provides access to: no-cost and reduced-cost energy audits; installation services; low-cost, innovative financing through revolving loan funds; workforce development; job placement; and outreach by constituency-based organizations serving targeted communities.

If a multifamily property owner in New York cannot or will not pursue a comprehensive upgrade, MPP staff or Partners direct the participant to NYSERDA's EmPOWER program, which provides direct installation of energy-efficiency measures to income-qualified individuals living in buildings with 100 units or less. For buildings qualified for both programs, the availability of EmPOWER incentives could potentially complicate MPP recruitment and MPP eligibility.

Figure 52: MPP Low-Income and EmPOWER Eligibility



As the Figure 52 suggests, a large portion of low-income properties eligible for the comprehensive MPP low-income incentives are also eligible for the direct install measures provided by EmPOWER. MPP requires building owners to commit their own financial and time resources whereas EmPOWER is free to the owner and is minimally intrusive. The owner only has to grant permission for the EmPOWER staff to work with the buildings tenants to receive the in-unit measures. Therefore, EmPOWER could look more attractive to a building owner because s/he can receive some measures for their tenants without having to invest a lot of their time or effort. The comprehensive nature of MPP requires more time and money from the building owner. MPP offsets this effort by providing enhanced per-unit incentives for buildings that meet the income qualification threshold established by the program, but seeks to ensure that upgrades benefit tenants by requiring building owners to make all cost-effective in-unit upgrades in order to receive the larger incentives.

A building cannot participate in MPP if it participated in EmPOWER in the previous year. If a building participated in EmPOWER more than one year prior to potential participation in MPP, the savings obtained by EmPOWER measures may make it more difficult for a building to achieve the minimum of 15% savings required to participate in MPP.

In New Jersey, PSE&G staff can direct a participant to one of PSE&G's commercial programs if the building could not participate in the multifamily program. Once a participant enters NYSERDA's MPP or PSE&G's program, relatively little coordination with other programs takes place in delivering the retrofit.

The EOC, LEAN, and CNT Energy programs bring together services from a variety of efficiency programs, although all three seek to allow participants to access these resources through a single participation process. For example, as described, LEAN's program draws on existing utility offerings focused on lighting and appliances, in addition to the weatherization services LEAN staff members oversee. EOC uses a single application and assessment process to treat buildings using federal weatherization funds and utility funding.

CNT Energy coordinates the use of private monies, utility programs, and state programs to provide a one-stop shop for multifamily owners. Unlike EOC and LEAN, which directly provide incentives, CNT Energy identifies the programs most pertinent to a participant's circumstances and guides the participant through the program processes that best fit their circumstances.

Program Outcomes

This section provides information about each program's performance, and describes elements program managers cited as contributing to their program's success as well as remaining challenges the comparison programs face.

Program Performance

Limitations of Available Data

It proved difficult to obtain comparable data on which to evaluate the performance of the comparison programs and other programs serving the low-income multifamily sector using publicly available documents. A variety of factors contribute to this difficulty, including variations in reporting formats and requirements across jurisdictions, which can lead to data being reported at different detail levels.

For example, while EOC, LEAN, and NYSERDA report budgets and numbers of units served separately for gas and electric savings, PSE&G and CNT Energy report overall budgets and numbers of units served. As some facilities may receive only gas or only electric measures, while others receive both, it is not possible to aggregate figures on units treated with gas and electric measures for comparison with programs not distinguishing between gas and electric measures in their reporting.

The diversity of the comparison programs' funding sources also contributes to the difficulty of finding publicly available performance data.

Utility program administrators typically operate under relatively robust reporting requirements, although the assumptions underlying reported accomplishments may vary greatly across jurisdictions. However, many comparison programs draw on funding sources in addition to ratepayer funds, which may not require as detailed of reporting and may not make reports readily available to the public. In addition, programs operating with multiple funding sources may report to each funder only the accomplishments attributable to that source, rather than the program's overall achievements.

Program Accomplishments

Using available data, the research team compared the energy savings accomplishments of the comparison programs. As program budgets vary widely, the research team calculated three metrics designed to provide context for these comparisons:

1. Dollars spent per unit of energy savings (kWh or therm)
2. Energy savings per dwelling unit treated
3. Dollars spent per dwelling unit treated

Table 51 summarizes the comparison programs' electric energy savings accomplishments in 2012. When reviewing energy savings accomplishments, it is important to recognize that each program likely varies in its methods for deriving savings estimates and the assumptions that goes into those estimates.

In addition, energy savings accomplishments can be highly dependent on climate; for example, HVAC and shell upgrades may achieve larger heating fuel savings in colder climates. A diversity of climates exist in California, and the majority of the state's population lives in areas where space heating is less significant as an energy end-use and space cooling is more significant than in the comparison program areas. As a result, the cost and energy savings estimates listed here should be used for broad comparisons only.

Table 51. 2012 Comparison Program Electric Savings Accomplishments

Administrator	Program Name	Electric Spending	kWh Savings	Units Treated	Spending per kWh	kWh Saved per Unit	Spending per Unit
NYSERDA[1]	MPP	$8,989,473	32,542,000	10,136	$0.28	3,211	$887
Massachusetts IOUs	LEAN Multifamily Program	$16,500,000	17,600,000	14,500	$0.94	1,214	$1,138
EOC[2]	Low-Income Multifamily Program	$306,160	1,132,806	1,900[3]	$0.27	596	$161
CNT Energy	Energy Savers Multifamily Program	Not Reported	1,858,715[4]	Not Reported			
PSE&G	Residential Multifamily Housing Program		1,839,500				

1. Figures reflect projected spending and savings; actual accomplishments were not available. Figures reflect only low-income buildings.
2. Figures reported reflect only funding from Xcel Energy and associated accomplishments.
3. Estimated based on number of buildings served with Xcel funding (38), assuming 50 units per building, based on figures in EOC's annual report (62 buildings and 3,096 units treated with utility funding).
4. Complete projects only.

Among the three programs listed in Table 51 with complete data available, EOC's program in Colorado spent the least and achieved the lowest energy savings per unit treated. However, the figures in the table only reflect funds EOC received from Xcel Energy and the associated savings. As EOC brings together multiple funding sources to support the buildings it treats, some units listed in Table 51 may have received additional funding and achieved energy savings not reflected in these figures. EOC provided the research team with data on overall program spending and units treated, but did not break these data out between gas and electric measures. According to EOC staff, the program spends an average of $2,828 per unit,[67] putting the program's spending more in line with that of NYSERDA and LEAN. While NYSERDA and LEAN spend roughly comparable amounts per unit treated, NYSERDA's anticipates much higher energy savings than LEAN has achieved.

[67] This figure excludes measures installed in partnership with the Mile High Youth Corps in order to provide a more accurate sense of costs associated with the more comprehensive retrofit projects described in this section. Through its partnership with Mile High Youth Corps, EOC provided low-cost measures to a large number of multifamily units.

Table 52 summarizes the comparison programs' gas savings accomplishments in 2012. NYSERDA achieved considerably higher therm savings per unit than the comparison programs.

Table 52. 2012 Comparison Program Gas Savings Accomplishments

Administrator	Program Name	Gas Spending	Therm Savings	Units Treated	Spending per Therm	Therms Saved Per Unit	Spending per Unit
NYSERDA[1]	MPP	$13,613,911	1,531,050	5,829	$9	263	$2,336
Massachusetts IOUs	LEAN Multifamily Program	$18,600,000	1,100,000	6,700	$17	164	$2,776
EOC[2]	Low-Income Multifamily Program	$503,416	14,390	900[3]	$35	16	$559
CNT Energy	Energy Savers Multifamily Program	Not Reported	679,200	Not Reported			
PSE&G	Residential Multifamily Housing Program		351,676[4]				

1. Figures reflect projected spending and savings, actual accomplishments were not available. Figures reflect only low-income buildings.
2. Figures reported reflect only funding from Xcel Energy and associated accomplishments.
3. Estimated based on the number of buildings served with Xcel funding (38), assuming 50 units per building, based on figures in EOC's annual report (62 buildings and 3,096 units treated with utility funding).
4. Complete projects only.

To allow comparisons between programs reporting aggregate spending figures and those that break spending out between gas and electric measures, the research team converted each comparison program's gas and electric savings accomplishments to million British Thermal Units(MMBTU), and added these to create a figure for overall program energy savings, as shown in Table 53. Overall, NYSERDA and CNT Energy spent the least per MMBTU saved, which likely reflects the higher incentives offered by the other programs.

Table 53. Comparison Program Combined MMBTU Savings Accomplishments

Administrator	Program Name	Total Spending	MMBTU	Spending per MMBTU
NYSERDA[1]	MPP	$22,603,384	264,138	$86
Massachusetts IOUs	LEAN Multifamily Program	$35,100,000	170,051	$206
CNT Energy	Energy Savers Multifamily Program	$ 5,269,094	74,196	$71
PSE&G[2]	Residential Multifamily Housing Program	$14,042,457	41,510	$338
Energy Outreach Colorado[3]	Low-income Multifamily Program	$809,576	5,304	$153

1. Figures reflect projected spending and savings, actual accomplishments were not available. Figures reflect only low-income buildings.
2. Complete projects only.
3. Figures reported reflect only funding from Xcel Energy and associated accomplishments.

Due to the differences in the size of the multifamily segment in each of the areas the comparison programs serve, the research team also compared total program spending and MMBTU savings per multifamily dwelling in each program's service area (Table 54). Among the comparison programs, the LEAN multifamily program spends the most, although it also achieves the largest energy savings relative to the number of multifamily units in its service area.

Table 54. Comparison Program Spending and Savings by Multifamily Units in Service Area

Administrator	Program Name	Multifamily Units in Service Area [1]	Total Spending	MMBTU	Spending/Unit in Service Area	MMBTU/Unit in Service Area
NYSERDA[2]	MPP	2,614,244	$22,046,584	373,652	$8.43	0.14
PSE&G	Residential Multifamily Housing Program	625,713[3]	$14,042,457[4]	41,510	$22.44	0.07
CNT Energy[5]	Energy Savers Multifamily Program	873,545[5]	$5,269,094	74,196	$6.03	0.08
Massachusetts IOUs	LEAN Multifamily Program	569,075	$35,100,000	170,051	$61.68	0.30
EOC[6]	Low-Income Multifamily Program	450,678	$809,576	5,304	$1.80	0.01

1. US Census Bureau, American Community Survey, 2007-2011, 5 year estimates, Table B25024; generated using American Fact Finder.
2. Figures reflect projected spending and savings, actual accomplishments were not available. Figures reflect only low-income buildings.
3. This is an estimate of PSE&G service territory. This value consists of the New Jersey Counties of Bergen, Burlington, Camden, Essex, Gloucester, Hudson, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, and Union.
4. Complete projects in 2012
5. Consists of the Illinois Counties of Cook, DuPage, Kane, Kendall, Lake, McHenry, and Will.
6. Figures reported reflect only funding from Xcel Energy and associated accomplishments.

The programs selected for in-depth comparison operate in areas with climates very different from much of California. It is important to consider these differences in climate in comparisons of the energy savings accomplishments of the various programs and the cost effectiveness of the measures they offer. However, low-income tenants and multifamily building owners across the country likely face similar considerations in their decisions regarding energy efficiency. As a result, the comparison programs' established and well-documented approaches to reaching the low-income multifamily sector may provide insight into program delivery approaches that could be effective in California.

Successful Program Elements

In addition to the program approaches discussed, three elements arose in interviews with multiple comparison program managers as having contributed to their programs' success:

- **Organizational experience:** As noted in the "Program Administration" section, many organizations implementing the comparison programs had considerable experience working with low-income populations and delivering efficiency programs. EOC and LEAN program staff cited this experience as valuable in allowing them to launch their programs quickly and smoothly. For example, LEAN program staff could draw upon existing relationships with stakeholders to gain buy-in on their program.
- **Building owner education:** A lack of energy-efficiency knowledge among building owners presented a barrier many comparison programs sought to address, and comparison program staff cited advances in building owner knowledge as a factors contributing to their programs' success. Managers of multiple comparison programs noted that, after completing a retrofit project, building owners frequently returned to the program to retrofit other buildings in their portfolio. EOC staffs attribute this repeat participation to an increase in the building owner's awareness of energy use in their buildings.
- **Comprehensive focus:** All comparison programs encourage multifamily owners to address the full range of savings opportunities in their buildings through comprehensive audits and performance-based incentives. NYSERDA and PSE&G's programs most strongly focus on achieving deep energy savings. NYSERDA program staff noted that achieving savings exceeding initial projections, as MPP projects often do, can motivate building owners to enroll other properties in the program.

Remaining Challenges

Multiple comparison program managers also described three factors that continue to pose challenges to their programs.

- **Multifamily retrofit timelines:** PSE&G staff reported multifamily retrofit projects can take as long as 24 months, making it difficult for projects to fit within typical efficiency program reporting cycles. Long lag times can occur between an audit and the time a customer decides to participate in the program. Customers also may need significant time to procure a contractor and negotiate a contract. LEAN program staff reported that experience with these long project lead times played a role in the program's decision to fully subsidize retrofits. By paying the full cost of retrofits, LEAN seeks to eliminate the need for building owners to negotiate installation costs and piece together financing packages.
- **Multifamily building financing structures:** EOC staff noted that multifamily buildings often operate using complicated financing structures, and may have limited ability to take on additional debt. Further, differences in existing financing arrangements for individual buildings in a multifamily complex may result in some buildings having more capital available for upgrades than others, and it may not be possible to transfer capital to buildings with the greatest need for retrofits. In response, EOC seeks to develop a financing program following an ESCO model, in

which EOC would arrange financing for participants, with the expectation that the project's energy savings would cover the loan payments. PSE&G's on-bill repayment option also addresses this challenge by providing building owners with an opportunity to finance efficiency retrofits without procuring a traditional loan.

- **Cost-effectiveness:** All comparison programs required projects to meet cost-effectiveness requirements, in many cases at the measure level. Comparison program managers reported that low natural gas prices made it more difficult to meet cost-effectiveness requirements and limited the range of measures their programs can install. Comparison program managers have taken a variety of steps to reduce overall project costs, including, when feasible, providing less comprehensive audits and working with manufacturers' representatives to specify and install equipment, boosting project cost-effectiveness.

Section 6. The Current California Landscape for Low-Income Multifamily Programs

This section, which presents a summary of California's low-income multifamily energy-efficiency program landscape in California, discusses the following:

- Overarching goals for multifamily efficiency programs, drawing on the California Energy Efficiency Strategic Plan, Commission decisions, and the Multifamily Subcommittee of the Home Energy Retrofit Coordinating Committee (MF HERCC) report.
- Efficiency programs targeting multifamily building owners and their tenants and interactions between the various programs.

This summary draws on in-depth interviews with IOU program staff, as well as a review of documents including program implementation plans, Commission decisions, and evaluation reports.

Overarching Goals

The research team reviewed three documents that express overarching goals guiding the design of programs serving the low-income multifamily sector in California: the California Energy Efficiency Strategic Plan, Decision 12-08-044, and the Multifamily Home Energy Retrofit Coordinating Committee (MF HERCC) report on multifamily program design. The three documents build on each other, and all three address three broad goals for efficiency programs targeting the low-income multifamily sector:

- Addressing the full range of efficiency opportunities in participating buildings
- Streamlining program processes and program delivery
- Targeting outreach to most effectively reach multifamily buildings.

The following sections provide details about the goals laid out in each document.

Strategic Plan

Three of the goals listed in the Strategic Plan relate to the low-income multifamily sector: the core residential sector goal of implementing a whole-building approach to efficiency (Goal 2) and the two goals for the low-income sector: giving all willing and eligible customers the opportunity to participate in the ESA Program by 2020 and delivering long-term, cost effective savings. Also, the Strategic Plan notes that adopting a whole-building approach to energy efficiency will require a shift in program design from promoting individual measures to promoting packages of measures that address a more comprehensive range of efficiency needs within each building. The Strategic Plan also states that an increase in customer awareness of energy efficiency is necessary to build demand for whole-building retrofits.

The Strategic Plan's goal of serving all eligible and willing low-income customers by 2020 requires the ESA Program to increase the pace at which it reaches these households. The Strategic Plan suggests that the ESA Program should improve the efficiency of program delivery through both targeted outreach and leveraging service providers like community-based organizations.

In order to deliver long-term, cost effective savings – the second goal for the low-income sector – the Strategic Plan suggests that the ESA Program will have to increase its coordination with both non-IOU programs serving the low-income sector and core efficiency programs. The strategic plan also suggests that the ESA Program focus on the longest-lasting and most cost-effective measures.

Decision 12-08-044

In August 2012, the Commission released Decision 12-08-044, which directed the IOUs to immediately roll out eight strategies to better serve the low-income population residing in multifamily buildings. These eight strategies address three broader approaches to serving low-income multifamily buildings:

1. **Streamlining program delivery:** The Decision's Strategy 7 is to "streamline practice and service delivery," but other strategies, including the Whole Neighborhood Approach (Strategy 1) and same day enrollment, assessment, and installation (Strategy 6) also broadly seek to increase the efficiency with which the IOUs deliver the ESA Program and simplify the participation process.
2. **Addressing a wider range of efficiency needs in multifamily buildings:** In the Decision, the Commission declines to expand the ESA Program's measure offerings to include replacement of functioning central systems in multifamily buildings, citing the substantial increase in budget that would be required to support these installations. Instead, the Decision presents strategies to meet a broader range of efficiency needs through retaining some ESA Program measures proposed for retirement (Strategy 8), and coordinating ESA Program offerings with other programs serving multifamily buildings (Strategy 4). The Decision directs the IOUs to establish a single point of contact for multifamily building owners that would support this coordination (Strategy 5).
3. **Increasing direct outreach to multifamily building owners and managers:** Consistent with its focus on serving low-income households, the ESA Program's outreach primarily targets individual ratepayers, rather than building owners. However, the Decision notes that there are benefits in directly reaching out to property owners and managers as well (Strategy 3). In support of improving outreach to building owners and managers, the Decision also directs the IOUs to update the ESA Program's Property Owner Waiver form to create a simplified, uniform document for use across IOUs (Strategy 2).

These three broad approaches—which support each other—are consistent with the Strategic Plan's goals of moving building owners toward a whole-building. For example, providing direct outreach to building owners is necessary to promote the strategies for streamlining program delivery (such as the Whole Neighborhood Approach). The evaluation team notes that these strategies are likely to require ESA Program staff and contractors to coordinate with building owners to a greater extent than would be necessary to treat an individual unit.

MF HERCC Report

The U.S. EPA Region 9 convened the California Home Energy Retrofit Coordinating Committee (HERCC) to develop consensus-based energy upgrade program recommendations. In October 2010, the multifamily sub-committee of the HERCC released a report entitled *Improving California's Multifamily Buildings: Opportunities and Recommendations for Green Retrofit & Rehab Programs* (MF HERCC report). In a guidance decision for the IOU's mainstream energy-efficiency portfolios issued in May 2012 (Decision 12-05-015) the Commission directed the IOUs to consider the MF HERCC report in their designs for the Energy Upgrade California (EUC) Multifamily Path. The IOUs' plans for EUC Multifamily Path are largely consistent with the HERCC report.

Stopwaste, Alameda County's Waste Management Authority and Source Reduction and Recycling Board, chairs the multifamily sub-committee of the HERCC. The MF HERCC report lists 90 individuals representing 42 organizations as MF HERCC participants. Government, utilities, and representatives of organizations involved in efficiency program implementation make up the largest groups of MF HERCC participants. Table 55 summarizes the types of organizations represented in the MF HERCC.

Table 55. MF HERCC Participants

Organization Type		Number of Organizations Represented	Number of Members
Government	Local Government	7	19
	State Government	4	11
	Federal Government	4	7
Utilities	IOU	4	14
	Municipal	1	1
Program Implementers		10	21
Advocacy Groups		5	8
Contractor Training & Certification (BPI, HERS)		3	5
Software Providers		2	2
Other		2	2
Total		**42**	**90**

The MF HERCC report goes into greater detail on program design than the documents described above, but many of the report's recommendations address similar overarching goals. The report argues that delivering whole-building energy efficiency to multifamily buildings will require a distinct approach from those being implemented in the single family sector. The report describes a performance-based whole-building efficiency program design that seeks to address the unique needs of multifamily building owners.

Key elements of the program design the MF HERCC report proposes include designating a single point of contact to direct building owners to the efficiency program or programs that best meet their needs and guide them through the participation process. The report also recommends a program delivery structure centered on Home Energy Raters (HERS raters), who would be involved in building assessments and

developing the scope of work, ensuring that installation contractors are qualified and verifying installations once they are complete. Due to the complexity of large upgrade projects in multifamily buildings, the report argues that it is important that building owners be free to choose their own contractors to complete retrofit work.

The report notes that a role remains for less comprehensive multifamily efficiency programs to serve buildings that are not prepared to commit to a larger retrofit. It also suggests ways that multifamily buildings serving low-income tenants could draw on low-income program offerings in addition to performance-based multifamily programs and proposes opportunities to streamline delivery of those services. In order to facilitate participation in multiple programs for multifamily buildings, the report suggests developing uniform procedures and requirements across programs, for example standardizing energy audit protocols across programs and taking steps to make it easier for a single installation contractor to install measures that receive incentives through different programs.

The report also recommends that low-income programs move toward a whole-building approach that includes support for common area and central system measures and streamline their procedures for verifying income eligibility. To streamline income eligibility procedures, the report recommends that low-income programs should broaden their categorical eligibility policies to accept participation in a wider range of other income-qualified programs as proof the building qualifies. The report also recommends that low-income programs allow owners of subsidized multifamily properties who maintain records of tenants' incomes to provide income qualification information for their tenants and authorize energy upgrade work.

Programs Serving Multifamily Buildings

The research team identified a wide range of programs in its efforts to create a catalog of programs serving the low-income multifamily sector in California. However, many of these programs serve only limited areas of the state, and are thus less relevant to a broad understanding of the statewide efficiency program context. This section focuses on the four statewide programs most relevant to the low-income multifamily sector: the ESA Program, the federally funded weatherization program administered by the California Department of Community Services and Development (CSD Program),[68] the Multifamily Energy Efficiency Rebate (MFEER) program, and whole-building efficiency programs including the IOUs' Energy Upgrade California Multifamily Path (EUC MF Path) and the multifamily programs offered by the Bay Area Regional Energy Network (Bay REN) and the Southern California Regional Energy Network (SoCal REN).

[68] CSD administers weatherization programs with funding primarily from the U.S. DOE's Weatherization Assistance Program (WAP) and the U.S. Department of Health and Human Services' Low-income Home Energy Assistance Program (LIHEAP), although the program also received American Recovery and Reinvestment Act stimulus funds.

The following sections compare the following aspects of each program.

1. **Background**: This section provides some context and general information about each program. Topics include regulatory context and recent budgetary changes.
2. **Eligible Measures**: This section examines the measures each program typically provides.
3. **Primary Outreach**: The principal methods used for reaching potential participants are discussed in this section. When available, survey findings reported in past process evaluations inform this section.
4. **Participant Eligibility**: This section compares the building types and income levels that determine eligibility for each program. Eligibility for these programs is determined by either income or building type.
5. **Incentive Schedules**: A comparison of the types of incentives provided by each program is discussed in this section. The comparison examines if the programs provide direct installation of measures, prescriptive incentives, or custom/performance related incentives. In addition, the section summarizes how much of the project cost a participant is expected to cover.
6. **Assessment/Audit**: This section compares how each program determines the efficiency needs of a building. In some cases a simple walk through assessment is provided while in other cases an investment grade audit is required.
7. **What is asked of the Participant**: This section describes the requirements of each participant for each program and defines whether a participant is a building owner or resident.

Background

As indicated above, the evaluation team elected to describe the four programs most pertinent to the multifamily market. Two of these programs target low-income households, and two seek to serve multifamily buildings as a whole (Table 56). For the programs targeting low-income households, the tenants in multifamily buildings make the decision to participate and are primarily responsible for interacting with the program, although building owners may have to authorize upgrades. For the programs targeting multifamily buildings, the building owner or their representative makes the decision to participate and primarily interacts with the program.

Table 56. Definition of Participant in Programs Serving the Multifamily Sector

Program	Participants
ESA Program	Tenants
CSD (WAP/LIHEAP)	Tenants and building owners
MFEER	Building owners
Whole House	Building owners

This section provides context and general information about each program.

Table 57 shows how the four programs compare to one another across 12 characteristics.

Table 57. Summary of Four Programs Most Pertinent to Low-Income Multifamily Programs

Program Characteristics		ESA Program	WAP/LIHEAP	MFEER	Whole House
Program Administrator		IOUs	Comm. Serv. Agencies	IOUs	IOUs and Local Government
Exclusive Multifamily Program		No	No	Yes	Yes
Exclusive Low-income		Yes	Yes	No	No
Regional Coverage		IOU territory	Statewide	IOU territory	5 regions in state[1]
Funding		Ratepayer	Taxpayer	Ratepayer	Ratepayer
Incentive Structure	Direct Install[2]	Yes	Yes	No, but incentives may cover full measure cost	No
	Prescriptive[3]	No	No	Yes	No
	Custom/ Performance[4]	No	No, but energy audit software may be used to determine measure cost-effectiveness	No	Yes
Incentives		Measures installed at no cost to tenant[5]	Measures installed at no cost to tenant	Incentive offsets project cost but may cover full cost in some cases[6]	Incentive offsets project cost
Primary Measures Installed		Weatherization, lighting, appliances	Weatherization, lighting, appliances	Lighting in electric utilities; hot water saving in SCG	TBD – Program recently launched
Building Area Covered by Program		Tenant Area Only	Tenant and Common[7]	Tenant and Common	Tenant and Common
Investment Grade Audit	Audit Required	No	No[8]	No	Yes
	Who Completes Audit	N/A	N/A	N/A	HERS II Multifamily Raters
"Clipboard" Assessment[9]	Assessment Required	Yes	Yes[8]	No	No
	Who Completes Assessment	Program Staff	Program Staff	N/A	N/A

1. The 5 regions are: 9 counties in Bay Area, Sacramento County, Los Angeles County, Marin County, San Diego County
2. In a direct install program, the contractors who install measures work under contract to the program administrator. Direct install programs typically provide measures at little or no cost to the participant.

3. Prescriptive incentives provide a set rebate amount for installation of specific measures.
4. Custom/performance incentive amounts are based on project-specific energy savings estimates. These estimates depend on the pre-retrofit characteristics of the building or equipment, and may take into account factors including the actual duty cycle of the equipment and interactions between multiple measures.
5. In renter-occupied units where the refrigerators are owned by the owner, the program offers to pay for a portion of replaced refrigerators, not 100% of the cost.
6. MFEER offers per-measure, prescriptive incentives. However, for some lighting retrofits these incentives cover the full retrofit cost, allowing participants to receive measures at no cost.
7. CSD's program treats common areas in buildings that meet its income qualification requirements. If a building does not meet the requirements, CSD installs in-unit measures in units occupied by income-qualified tenants.
8. CSD's program requires an energy audit in buildings receiving whole-building weatherization upgrades. These audits are completed by a professional energy auditing consultant. The program conducts clipboard assessments for units treated under its individual unit approach.
9. A "clipboard assessment" is a checklist inventory or survey of a building. A "clipboard assessment" less comprehensive than an investment grade audit which involves taking measurements and conducting an analysis of the building.

To provide a sense of the relative size of the various programs, Table 58 lists the 2013-2014 budgets for the statewide programs serving the low-income multifamily sector. The ESA Program has the largest budget of all the programs considered.

Table 58. 2013-2014 Program Budgets

Program		PG&E	SCE	SCG	SDG&E	Total
ESA Program	Total	$330,969,000	$127,499,000	$166,300,360	$45,294,193	$670,062,553
	Multifamily Only (Est.)*	$59,574,420	$29,324,770	$41,575,090	$24,458,864	$154,933,144
MFEER		$5,189,025	$23,495,961	$2,767,910	$3,402,589	$34,855,485
Whole Building	MF EUC	$5,630,116	$2,831,867	$1,000,000	$2,501,496	$11,963,479
	So Cal REN					$9,543,801
	Bay REN					$7,293,750
CSD Programs(2013 only)						$39,423,628

* Estimates based on proportion of multifamily households relative to all households treated by the ESA Program between 2007 and 2010, as listed in D.12-08-044.

The following section provides a general description of each program.

Energy Savings Assistance (ESA) Program

The ESA Program is a direct install program that serves all low-income IOU customers, including single-family residences, multifamily residences, and mobile homes. The ESA Program does not significantly distinguish its services between multifamily and single family residences. The same eligibility, measure, and income requirements apply to both single family and multifamily residents, the same groups of contractors deliver the program to single family and multifamily residences, and the participation process is the same regardless of the participant's dwelling type.

The ESA Program serves both renters and homeowners. In order to provide some services to renters, the ESA Program requires building owners to sign a Property Owner Waiver form, authorizing efficiency improvements.[69] The ESA Program also requires building owners to provide a co-payment for replacement of older, inefficient refrigerators in tenant units when the building owner owns the refrigerator and the tenant does not pay the electric bill, although ESA Program staff noted that both of these conditions rarely occur. The ESA Program provides refrigerator replacement at no cost to low-income households that own their refrigerator or directly pay their electric bills.

The ESA Program provides income-qualified residents of multifamily buildings with direct installation of retrofit measures to manage their energy use and save money on their monthly energy bills at no charge. Measures installed include, CFL lights, air sealing, low-flow fixtures, and replacing refrigerators. In multifamily buildings, all of ESA's improvements are made within the qualified participants' dwelling units; the program does not treat central systems or common areas. Each IOU in the state administers the ESA Program for their service territory and provides the same general service across the territories. Differences, both within and across IOU exist in terms of the specific eligible measures the program installs. These differences are determined, in part by climate zone, relative need (either as per savings or for health, comfort, and safety) and fuel source.

Unlike the other IOU multifamily programs discussed below (MFEER and the whole-building programs), the ESA Program focuses on serving households, not building owners. Thus, the outreach efforts have traditionally been aimed at the building residents. This focus on residents means that services may be delivered unit by unit as opposed to installing measures for an entire building at once. However, many ESA Program contractors target multifamily buildings in low-income areas and work with building owners and managers to gain access to an entire property and enroll all eligible residents at the same time so that they can work through the entire building at once. ESA Program participants also need permission from their landlord to receive measures, which can be a barrier to participation since some landlords are difficult to reach or unresponsive to the program's efforts.

Utilities have increased their outreach to building owners in order to gain access to an entire property. However, once the building owner has given the program permission to treat a building, the program typically must verify the eligibility of households within the building individually prior to delivering services to those households. In some cases, this verification can be a time-consuming process. The IOUs have also simplified the income verification process for the ESA Program. The program has identified areas where census data suggest there is a high concentration of low-income households and relaxed income verification requirements for participants in these areas. In addition, the program can treat all units in a multifamily building if it finds that 80% of the residents are income qualified.

[69] The ESA Program Policies and Procedures Manual states that, with prior authorization form the IOU program manager, ESA contractors may provide "services and measures that do not directly affect the condition and/or structure" of renter-occupied units without obtaining a signed Property Owner Waiver.

CSD Programs

The California Department of Community Services and Development (CSD) combines funds from the U.S. Department of Energy's (DOE) Weatherization Assistance Program (WAP) and the U.S. Department of Health and Human Services' (HHS) Low-income Home Energy Assistance Program (LIHEAP) to deliver weatherization services to low-income Californians. These funds are available for residents of single family and multifamily buildings, and these funds support all measure costs that meet the program's cost effectiveness criterion.[70] In 2013, CSD received $1,523,628 from the DOE's WAP and an additional $37.9 million dollars from HHS's LIHEAP.[71] CSD distributes these funds to 40 community action agencies around the state who administer the program for each of California's 58 counties.[72] For the remainder of this report these funds are referred to as CSD funds.

ARRA money heavily supported weatherization services from 2009-2012. Over $166 million of ARRA money went to the community action agencies, allowing them to weatherize 59,066 homes between 2009 and 2012.[73] Additionally, California received about $40 million dollars in 2012 from DOE WAP and from HHS's LIHEAP, meaning CSD had a total of about $81 million dollars to spend on weatherization in 2012. The $39.4 million investment in weatherization services by DOE and HHS for 2013 represents less than half of the weatherization spending in 2012, suggesting there will be a large decline in the number of residences CSD will serve in 2013.

CSD funds are used to reduce the heating and cooling costs for low-income families by improving the energy efficiency of their homes and ensuring their health and safety. DOE WAP funds emphasize efficiency whereas the LIHEAP funds emphasize bill reduction and improving health and safety conditions. In delivering its services, the program prioritizes those households with elderly residents, individuals with disabilities, and families with children.

Like the ESA Program, the CSD Programs historically have not distinguished their services between single family and multifamily buildings; the programs provided in-unit measures to multifamily units that eligible participants occupied. However, with the influx of ARRA funding, the CSD programs began to test a more whole-building-focused approach to multifamily properties. The programs expanded their

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70 Under the federal weatherization programs, a measure must achieve a savings-to-investment ratio (SIR) of 1.0 or greater, meaning that, over the expected life of the measure, the energy cost savings will equal or exceed the measure cost. If they choose to do so, building owners can use their own funds to 'buy down' a measure's cost to the program so that it will achieve a SIR of 1.0.

71 Department of Energy Weatherization Program Notice 13-2. http://waptac.org/data/files/website_docs/government/guidance/2013/wpn-13-2.pdf (Accessed August 14, 2013)

72 For a list of all CSD program service providers see the following California Community Services and Development website. http://www.csd.ca.gov/Services/FindServicesinYourArea.aspx (Accessed 8/7/13)

73 The sum of awards listed by CSD show a total of about $166 million were awarded through ARRA. www.csd.ca.gov/NewsRoom/NewsReleases/October30,2012/StatewideWeatherizedHomesBreakout.aspx

services to provide central system and common area measures and whole-building infiltration measures to qualified multifamily buildings. The programs provided these measures at no cost to the participating households or the building owner.

In order to qualify for these expanded measures buildings had to appear on a list of subsidized and tax credit properties created by DOE and HUD, or at least 66% of the units had to be individually income qualified.[74] All of the buildings that received whole-building retrofits through the CSD program provide subsidized housing or receive tax credits as low-income housing. According to CSD staff, due to significant budget restrictions it is unlikely the CSD programs will continue to provide whole-building multifamily services going forward. This contact noted that, with limited budgets, it would be difficult for the locally-based community action agencies that deliver the program to justify committing a large amount of funding to a multifamily retrofit project since doing so could limit the services available to the rest of the agency's service area.

Multifamily Energy Efficiency Rebate Program (MFEER)

The MFEER program is a utility ratepayer-funded residential program that promotes rebates for qualified energy- efficient improvements in apartment dwelling units, common areas of apartment and condominium complexes with two or more units, and common areas of mobile home parks. The MFEER program is administered by the four IOUs in California and is promoted by trade allies that serve the multifamily marketplace. MFEER is not income qualified. Any multifamily building owner with more than two units is eligible to participate.

MFEER largely provides lighting and water saving measures at no or very small cost to participating building owners, once they (or their contractor) receive their rebates.

Whole Building Programs

All four IOUs included plans for Energy Upgrade California Multifamily Path (EUC MF) programs in their approved 2013-2014 Program Implementation Plans (PIPs). PG&E, SCE, and SCG plan to pilot their EUC MF offerings, while SDG&E will move to full implementation drawing on the experience of the pilot in San Diego County. These programs aim to encourage multifamily building owners to undertake large-scale, comprehensive retrofits. They will offer building owners performance-based incentives for efficiency improvements and support as they navigate the retrofit process. The Bay Area Regional Energy Network (Bay REN) and the Southern California Regional Energy Network (SoCal REN) have also proposed multifamily programs that seek to bring about more comprehensive upgrades than those

[74] This list includes buildings receiving federal subsidies from the Department of Housing and Urban Development, the U.S. Department of Agriculture, as well as city and county affordable housing properties and properties receiving Low-income Housing Tax Credits through the California Tax Credit Allocation Committee.

typically conducted through MFEER.[75] Since these programs all target similar types of large retrofit projects, this document groups them together under the heading of whole-building programs. All of these programs primarily seek to achieve energy savings; unlike the ESA and CSD Programs, improving the comfort, health, and safety of building tenants is not a primary objective.

The whole-building programs draw on the experience of a variety of municipalities across California, including Alameda County, Los Angeles County, and San Diego County, which used ARRA stimulus funding to implement multifamily energy-efficiency programs under the Energy Upgrade California (EUC) umbrella. With the exception of Bay REN (discussed below), the whole-building programs are focused on serving property owners interested in taking on large energy-efficiency projects. They will seek to leverage the major rehabilitation projects that multifamily properties periodically undergo, targeting properties that are planning to complete, or are in the process of completing, major renovations. In many ways, the whole-building program designs parallel the recommendations of the MF HERCC report, although differences exist in program delivery among the utilities and RENs. Table 59 summarizes key elements of the whole-building programs, and the following sections describe each element in additional detail.

[75] In Decision 12-11-015, the Commission authorized the formation of two Regional Energy Networks (RENs): Bay REN and SoCal REN. Both RENs are made up of a collection of local governments in their respective areas. In contrast to the IOUs existing Local Government Partnerships, the Commission (rather than the IOUs) reviews and approves REN proposals and REN programs operate outside of the IOUs' portfolios. Although the IOUs do not have authority over the RENs' program designs, they will manage the RENs' contracts.

Table 59. Key Characteristics of MF EUC Programs

Characteristics		SoCal REN		SCE/SCG	SDG&E	Bay REN	PG&E		
Qualified Buildings		5 or more units		3 or more units 4 stories or less	Not specified	5 or more units	5 or more units		
Audits	Scope	ASHRAE Level II		Investment grade	Investment grade	Building owner-provides software inputs; technical assistance completes energy model and on-site verification	Investment grade		
	Auditor	Participant contracts with approved rater/analyst		Contractor to program	Participant contracts with approved rater/analyst	N/A	Participant contracts with approved rater/analyst		
	Audit Subsidy	Number of Units	Subsidy	No cost to participant	None for audit alone, but incentive levels include $100 per unit for costs of energy modeling and combustion safety testing.	N/A	Number of Units	Affordable	Market Rate
		5-20 units	$5,000				5-30	$5,000	$2,500
		21-50 units	$10,000				31-100	$10,000	$5,000
		Incremental per unit >50	$20				Incremental per unit >100	$20	$10
Installation Contractors		Participant selects		Participant selects	Participant selects	Participant selects	Participant selects, but contractors must enroll in EUC and attend a pilot information session.		
Per-unit Incentive*	10%	$200		$700	$550	$750 (8-12% savings anticipated)	TBD, but anticipate average of $1,000 per unit.		
	15%	$400		$800	$625				
	20%	$700		$1,000	$800				
	25%	$950		$1,200	$1,000				
	>30%	$1,200		$1,400	$1,350				
	>35%			$1,600					
	>40%				$1,500				

* Incentive amounts are based on the number of units in a participating building. The total incentive the building owner receives is the product of the per-unit incentive amount and the number of units in the building.

As Table 59 suggests, Bay REN's whole-building offering differs from those of the IOUs and SoCal REN. Bay REN's offering targets energy upgrade projects with smaller budgets and more limited scopes than the other whole-building programs. As a result, rather than offering a graduated incentive that increases with energy savings, Bay REN will offer a flat incentive to building owners who install two or more measures the program anticipates will achieve a minimum of 8% energy savings.[76] As discussed further below, Bay REN also seeks to facilitate the upgrade process by eliminating the need for a comprehensive building audit. Because PG&E serves much of Bay REN's territory, buildings owners interested in larger upgrades may pursue PG&E's EUC MF Path offering.

SoCal REN's service territory largely overlaps with SCE and SCG service territories, but SoCal REN's multifamily offering takes a similar approach to that of SCE and SCG. In Decision 12-11-015, the Commission acknowledged this similarity, but approved the program for piloting. The decision states that the difficulty of reaching the multifamily market justifies testing all approaches that may deliver significant energy savings.

Eligible Measures

While other measures are available, Table 60 lists the measures most commonly installed through the comparison programs. Consistent with their performance-based incentives, the whole-building programs offer a wide range of measures, and since the programs are new to the market in their current form, information on the measures most commonly installed is not yet available.

Table 60. Typical Measures Installed by Program

Program	Typical Measures Installed
ESA Program	In-unit weatherization and water saving measures. Includes air sealing, refrigerators, and CFLs.
CSD programs	In-unit weatherization and water saving measures. Includes air sealing, refrigerators, and CFLs.[1,2]
MFEER	Lighting and water saving measures.
Whole building programs	Any combination of measures that results in 10-20% savings

1. Under ARRA, the CSD treated 43 large multifamily buildings and 4 garden-style apartment complexes including common area measures and whole-building weatherization.
2. While ESA and CSD broadly offer the same types of measures, CSD offers a wider range of measures than ESA in certain measure categories.

[76] Bay REN will determine which combinations of measures are likely to meet the 8% energy savings threshold for each participating building based on utility bill information and building characteristics entered into an online tool (see Assessment/Audit section below). Any measure that can be modeled in EnergyPro software is potentially eligible to receive program incentives.

Within each program there are a range of measures that can be installed under certain circumstances. A brief description of measures installed under each program is provided below.

ESA Program Measures

Because the ESA Program's focus is on assisting low-income residents with their utility bills, the ESA Program covers only in-unit measures that directly affect a resident's energy costs. Common area measures such as hallway lighting or central systems like boilers do not qualify for ESA Program funds. Table 61 summarizes the measure types that the ESA Program provides; a complete list of the specific measures in each category is included in Appendix H. Some measures are eligible for installation through the ESA Program only in certain climate zones.

Table 61. ESA Program Measure Types By Spending and Energy Savings[1]

Measure Type	Spending		kWh Savings		Therm Savings	
	Spending	Percent of Total	Savings	Percent of Total	Savings	Percent of Total
Infiltration & Space Conditioning[2]	$86,894,754	44%	6,274,889	10%	974,018	39%
Lighting Measures	$28,056,084	14%	27,483,070	42%	-	0%
Refrigerators	$19,684,296	10%	17,327,150	26%	-	0%
Cooling Measures[2]	$19,415,333	10%	8,919,454	14%	-	0%
Heating Systems[2]	$19,694,389	10%	-	0%	73,081	3%
Water Heating Measures	$15,464,712	8%	595,863	1%	1,251,824	50%
High Efficiency Clothes Washers	$5,036,434	3%	45,673	0%	203,349	8%
Pool Pumps	$1,311,649	1%	2,080,524	3%	-	0%
Microwaves	$535,797	0%	2,900,496	4%	17,206	1%
Total	**$196,093,448[3]**	**100%**	**65,627,119**	**100%**	**2,519,478**	**100%**

1. Data aggregated from PG&E, SCE, SCG, and SDG&E ESA Program PY 2012 Annual Reports. Figures include both multifamily and single family installations.
2. Some measures in category available only in select climate zones.
3. Spending on measures only – does not include spending on customer enrollment.

The majority of the ESA Program's spending goes to infiltration and space conditioning measures, a category that includes envelope and air sealing measures, duct testing and sealing, and attic insulation. However, the figures in Table 61 include both single family and multifamily units; ESA's spending distribution may differ for multifamily units, which often do not have attics available for insulation and may have fewer exterior walls. Lighting measures and refrigerators provide the majority of the ESA Program's electric energy savings, while water heating measures and infiltration and space conditioning provide the greatest portion of therm savings.

For a dwelling unit to receive services, ESA Program contractors must determine that it is feasible to install at least three program measures ***or*** to achieve annual energy savings of at least 125 kWh or

25 therms within that unit through installation of one or two measures.[77] These eligibility requirements apply to both single-family and multifamily residences, which can limit the number of multifamily residences treated because fewer ESA Program measures are typically feasible to install in multifamily units.

CSD Programs

CSD installs some measures that ESA does not offer, primarily a wider range of building envelope measures than ESA, including measures designed to reduce energy loss through windows like tinted window films, shutters and storm windows. CSD also provides repair and replacement of heating and cooling systems and water heaters in both renter-occupied and owner-occupied units.[78]

CSD programs are delivered by designated community action agencies in each county that install weatherization measures at no cost to the resident. The most common types of measures installed are: air sealing and repairing holes or cracks around windows, doors, and pipes; insulation in attics, walls, and floors; fixing or replacing broken windows; insulation blankets on hot water heaters; and ensuring existing heating and cooling equipment are operating properly.

As noted above, the ARRA funding from 2009-2012 allowed CSD to expand its scope for multifamily buildings and address things like building shells, centralized mechanical systems, and common area lighting. Now that ARRA funding has been exhausted, and DOE WAP and LIHEAP funds are smaller than previous years' funding, CSD staff report it is harder to justify spending a considerable portion of the program budget on one building. Therefore, it is less likely that the CSD program funds will be used for common area building measures in coming years.

[77] Appendix C: California Statewide ESA Program Policy and Procedures Manual. Downloaded from https://www.pge.com/regulation/LowIncomeProgramPY12-14/Pleadings/Joint-CDE/2013/LowIncomeProgramPY12-14_Plea_Joint-CDE_20130715_281462.pdf (Accessed on 8/14/13)

[78] Because building owners are required to provide tenants with working heat and hot water, ESA only provides these services in owner-occupied units.

MFEER Measures

MFEER provides prescriptive incentives for measures across all aspects of a building. Incentives are available for efficient HVAC, building shell, hot water, appliances, lighting, and pool pump upgrades. However, lighting makes up the majority of the measures for which MFEER provides incentives, and provides the largest part of the program's energy savings.[79]

There is variation among utilities in terms of the percentage of projects that receive each type of measure. According to the 2013 process evaluations of MFEER in SCE and PG&E territories, in 2011, SCE's MFEER program was almost exclusively a lighting program with 99.8% of all measures and 98.3% of program energy savings resulting from lighting upgrades.[80] PG&E's and SDG&E's MFEER programs are less lighting-centric with lighting making up about 64% and 69% respectively of program measures. Table 62 provides an overview of the percentage of measure types installed by each program. Because SCE provides electric service only and SCG provides only gas, some measures are not applicable, or less applicable, to those utilities. For example, SCG does not provide any installation of lighting and SCE provides few HVAC measures.

Table 62. MFEER Measures Installed by Utility, 2011

	PG&E[1]	SCE[1]	SDG&E[2]	SCG[3]
Lighting	64%	99.8%	69%	--
HVAC	1.2%	0.01%	--	1%
Appliances[4]	15.8%	0.16%	1%	30%
Water Heat	10.8%	--	27%	45%
Building Shell	7.1%	0.02%	3%	2%
Other[5]	1.2%	--	--	23%

1. 2010-2012 PG&E and SCE Multifamily Energy Efficiency Rebate Program (MFEER) Process Evaluation and Market Characterization Study. April 22, 2013. Available on CALMAC, Study ID PGE0301.01
2. SDG&E 2010-2011 Residential Program Process Evaluation. March 30, 2012 Available on CALMAC, Study ID SDG0257.01. Total exceeds 100% due to rounding.
3. SCG 2010-2011 Residential Program Process Evaluation. March 30, 2013. Available on CALMAC, Study ID 0214.01
4. Appliances include clothes washers and vending machines
5. Pump demand controls and pool heaters

[79] According to the process evaluation of SCE and PG&E's MFEER program for 2010-2012, the prevalence of lighting among MFEER measure installations in SCE territory is a result of steps SCE took to improve contractor performance. In 2011, SCE issued a competitive RFP to select a limited number of contractors to represent the program. All seven of the contractors selected through the RFP process were lighting contractors. Reasons for the prevalence of lighting measures in PG&E and SDG&E territories are less clear, although program incentives often cover the full cost of lighting retrofits in both territories.

[80] The Cadmus Group Inc. 2010-2012 MFEER Process Evaluation in SCE and PG&E Territories, April 15, 2013. Accessed 8/5/13 http://www.calmac.org/publications/MFEER_Process_Evaluation_FINAL_130415.pdf

Building owners rarely use MFEER incentives for upgrade projects that result in deep savings, such as HVAC or building shell upgrades. None of the IOUs reported more than 3% of their measures were HVAC related, and only PG&E reported installing building shell upgrades that represented over 5% of their program measures. PG&E reported that less than 2% of program savings resulted from shell measures and less than 1% of savings resulted from HVAC upgrades. In SCE, there were almost no HVAC or building envelope upgrades (.03% of measures installed and .03% of all program savings).

EUC Measures

Because their incentives are based on modeled energy savings that reflect existing building conditions, the Multifamily EUC programs allow for a wide range of measures. A list of potential upgrade measures, taken from EUC Multifamily Path PIPs, is in Appendix H. With some exceptions, building owners can install any permanently installed measure for which program-approved energy modeling software can provide savings estimates. Measures not included in Multifamily EUC include solar photovoltaic, solar thermal, cold water savings measures, and clothes dryers.

Outreach Efforts

Each program conducts outreach using different methods. The ESA Program and MFEER rely heavily on program contractors to contact potential participants and "sell" the program. EUC MF relies on utility account representatives and contacts the regional energy networks developed with multifamily property owners to promote the program.[81] The CSD programs rely on the community based service providers to conduct outreach to potentially eligible households.

Details on the outreach strategy of each program are provided below.

ESA Program Outreach

According to a process evaluation for the 2009-2010 LIEE program,[82] the IOUs employed a variety of outreach tactics to encourage enrollment in the program.[83] Common approaches included outbound calling and/or automated voice message campaigns, email, direct mail, canvassing, and working with municipalities to host or attend community events in areas with low-income populations. All of the utilities have tried various forms of mass media, such as TV and advertisements on public transportation and campaigns targeted at specific populations.[84] Mass media outreach is viewed as an effective way to generate awareness and credibility so that when the customer next encounters the program – whether

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81 For more information, refer to the "what is asked of the participant" section of the memo.

82 LIEE (or the Low-income Energy Efficiency Program) was the name for the ESA Program prior to 2010.

83 Research Into Action Inc. Low-Income Energy Efficiency Program Evaluation 2009-2010 Process Evaluation, June 10, 2011. Study ID PGE0298.01. Prepared for CA Public Utilities Commission. http://www.calmac.org/publications/LIEEFinal_Report_w_study_number.pdf (Accessed 8/7/13).

84 For example, SCE and SCG participated in a Univision telethon, PG&E provides language services for the Hmong population, and SDG&E's has a Hispanic radio station campaign.

through outbound calling, a mailer, or someone knocking on their door – they will be more receptive to enrolling.

In 2009-2010, some differences existed in terms of how much emphasis each IOU put into specific outreach efforts. For example, SCE, SCG, and SDG&E provided marketing materials to contractors while PG&E encouraged contractors to create their own materials in addition to materials provided. All of the IOUs also provided lists of leads to contractors.[85] Another difference between IOUs was in how much canvassing contractors were expected to conduct. PG&E contractors did more door-to-door canvassing of the program than did contractors at the other utilities.

Decision 08-11-031, issued in November 2008, directed the IOUs to undertake a Whole Neighborhood Approach (WNA) outreach strategy for the ESA Program. The WNA strategy sought to leverage economies of scale to increase the efficiency of program delivery by enrolling large numbers of participants in the same area at once and delivering retrofits to them at the same time. In a subsequent white paper, the Commission's Energy Division described the WNA process:[86]

1. The IOUs identify a neighborhood for targeted the ESA Program outreach based on the proportion of low-income individuals in the neighborhood and/or higher than average energy usage in the neighborhood.
2. The IOUs then conduct outreach to neighborhood residents, including canvassing, direct mail, email blasts, and potentially attendance at community events.
3. ESA Program enrollment and assessment contractors conduct assessments of interested households in the neighborhood, with installation contractors closely following the assessors to install basic weatherization, hot water saving, and lighting measures.
4. When needed, installation contractors return to install more complex heating and cooling measures and replace appliances or equipment.
5. The IOUs follow the ESA Program's typical quality assurance and control processes for the retrofitted units and follow-up with interested residents in the neighborhood not reached in the initial sweep.

According to the 2009-2010 LIEE process evaluation, the IOUs largely found the WNA strategy as described above impractical. It was difficult to recruit a large enough group of participants in a relatively small area to allow installers to take advantage of economies of scale. Many potential participants were not home to speak with enrollment contractors or were not prepared to provide income documentation. In addition, the diversity of single-family homes made it difficult for installers to predict what equipment they would need.

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[85] The leads include information on location, CARE participation, and customers that participated in ESA in recent years.

[86] California Public Utilities Commission Energy Division. Draft Whole Neighborhood Approach – White Paper. May 2009.

In some cases, the program was able to overcome these challenges in large multifamily properties. Large multifamily properties offered a large enough pool of potential participants that, even if many were not home or could not provide income documentation, enough participants were available and qualified that installers could still take advantage of economies of scale. In addition, the units within a development offered uniform enough efficiency opportunities that contractors could anticipate their equipment needs in advance.

Although the IOUs achieved some success implementing a WNA strategy for the ESA Program in multifamily buildings, one ESA Program staff member said these multifamily WNA efforts required a great deal of coordination and were very labor intensive as a result. Due to the amount of labor required, this staff member stated that it would not be practical to include this type of WNA outreach in ongoing ESA Program operations.

While the IOUs found the WNA strategy described in the 2009 white paper impractical, they have taken steps to improve the efficiency of ESA Program delivery by targeting small geographic areas. The IOUs target their outreach efforts for the ESA Program to focus on areas with high concentrations of low-income residents. In addition, ESA Program workload management software groups' jobs by geographic area, allowing contractors to minimize time spent traveling from one job to another.

CSD Programs

Weatherization services are delivered by 40 designated local community action agencies operating in each California County. These local agencies provide a variety of poverty relief services which may include: subsidized child care, emergency food services, and economic development opportunities. Weatherization and energy-efficiency services are often one service among many these agencies offer to residents of their counties. Through their contact with low-income households across these different services, the programs are able to refer households to weatherization services.

In some areas of the state the contractors that install weatherization measures for CSD also install measures for the ESA Program. In these cases, coordination across programs can happen more easily because the same people are involved in both programs. In other areas of the state the contractors for the two programs are different and coordination across programs happens, but is minimal. According to utility staff interviews, ESA Program staffs are most likely to refer potential participants to the local community action agency when participants use propane for space and water heating. In units with propane, the electric IOU-sponsored ESA Programs can only provide lighting, refrigerators, and cooling measures, so participants can receive air sealing and other measures through CSD's program. Because

there are very few multifamily buildings in California served by propane, coordination across programs likely does not happen often in the context of a multifamily building.[87]

Given the limited funds CSD has to complete upgrades in 2013 compared to 2012, the program may not need to conduct significant outreach efforts beyond referrals in order to recruit as many participants as it will have the capacity to serve.

MFEER Outreach

MFEER is primarily delivered by trade allies—contractors who use the program's incentives to sell energy-efficient retrofits to customers—but, in some cases, the IOUs have become more involved in marketing MFEER in recent years. According to the PG&E and SCE MFEER process evaluation covering program years 2010-2012, utility representatives were the most common source of program awareness for participants (31% of SCE participants and 27% of PG&E participants), followed by contractors (30% of SCE participants and15% PG&E participants).[88] Other sources of program awareness include word of mouth, seeing an advertisement, and the utility website.

The process evaluation also asked participants to describe what motivated participation. More respondents reported saving energy was an important motivation for participation than any other motivation (91% percent of PG&E participants and 95% of SCE participants) but this was followed closely by the over 85% of respondents that reported they wanted to demonstrate that their properties were well maintained and that 85% wanted to do the right thing for the environment. Other reasons given for participation included reducing tenant utility costs, reducing owner operating costs, and increasing the value of the property.[89]

Whole Building Program Outreach

The IOUs have not conducted large-scale outreach efforts for the EUC Multifamily Path due to the limited budgets and modest goals of these newly launched programs. As described in the "What is asked of the participant" section below, the IOU EUC MF programs will use a single point of contact to direct multifamily building owners to the programs most appropriate to their upgrade plans. While the single point of contact will work with participants in all of the multifamily programs, the role is most closely associated with EUC MF Path, and will likely work most extensively with EUC MF Path participants. At SCE and SCG, the building owners' utility account managers are expected to fulfill the role of the single

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87 According to the 2011 American Housing Survey, there are 6,500 multifamily units served by propane (bottled gas) in the metro areas of San Diego, Los Angeles, San Francisco and San Jose. Assuming 25 units per building means there are 260 buildings served by propane. Assuming 100 units per building means there are only 65 buildings served by propane.

88 The Cadmus Group Inc. 2010-2012 MFEER Process Evaluation, April 15, 2013.

89 The Cadmus Group Inc. 2010-2012 MFEER Process Evaluation in SCE and PG&E Territories, April 15, 2013. Accessed 8/5/13 http://www.calmac.org/publications/MFEER_Process_Evaluation_FINAL_130415.pdf

point of contact, and will thus be able to build on their existing relationships to inform potential participants about the program.

The REN programs will leverage the existing relationships between local governments and multifamily building owners. For example, Bay REN's Program Implementation Plan (PIP) notes that building owners planning renovation projects will come into contact with local governments as they apply for building permits and seek public financing.

Eligibility

Beyond a multifamily property being located in the program service territory, program eligibility is determined by two factors: the income of the participant (or the overall income make-up of the participant's building) and the building type. Income of the participant determines the eligibility of ESA and CSD Program participants and the building type, whether it is a multifamily building or not, determines the eligibility of MFEER and EUC participants.

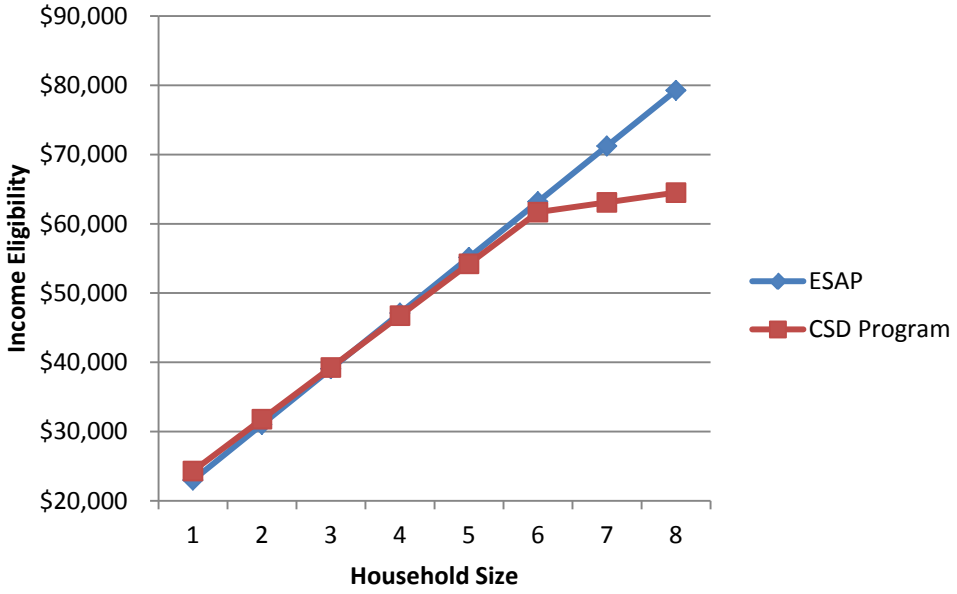
Income Eligibility

The ESA and CSD Programs determine eligibility based on the income of a household relative to the size of the household. As indicated in Figure 53, the income levels for eligibility are similar between the ESA Program and the CSD Program but not the same. The ESA Program's eligibility requirements are based on 200% of Federal Poverty Guidelines, while WAP eligibility requirements are based on 60% of state median income. Larger households, those with seven or eight household members, have higher income levels for the ESA Program than the CSD program meaning more large households may qualify for the ESA Program than for the CSD Program. It is also important to note that the IOUs' Moderate Income Direct Install (MIDI) program is available to households earning up to 250% of the Federal Poverty Guideline in SCE and SCG territory and 300% of Federal Poverty Guideline in SDG&E territory. MIDI offers many of the same services as the ESA Program and is delivered by the same contractors.

The CSD program's eligibility criteria allow the program to treat all of the units within a building if 66% of the building's units are income qualified.[90] The ESA Program must meet a higher threshold, determining that 80% of the units are occupied by income-qualified tenants, before treating all units in the building.

[90] Department of Energy. Weatherization Program Notice 09-1, Effective Date November 17, 2008. http://waptac.org/data/files/website_docs/government/guidance/2009/wpn%2009-1%20-%20final%2011.17.08.pdf (Accessed August 15, 2013)

Figure 53: Annual Income Eligibility



Income included in the ESA Program household calculation includes wages, salaries, and benefits from public assistance such as food stamps and housing subsidies.[91] ESA Program accepts enrollment in certain other income-qualified programs as sufficient verification of a tenant's income qualification. For example, a resident of a multifamily building can participate in the program by providing documentation that they are participating in programs such as food stamps.[92]

Building Eligibility

The only determination to participate in MFEER and EUC Multifamily is for the building to be a multifamily property. There are no income requirements for either MFEER or EUC; however the majority of the participants in the ARRA-funded EUC Multifamily pilots in Alameda, Los Angeles, and San Diego counties were properties offering affordable housing.

MFEER defines multifamily as any residential property with two or more units. Additionally, the common areas of condominiums and mobile home parks can qualify for the program. MF EUC programs require

[91] For a complete list of items included in income, see the Policy and Procedures Manual. Appendix C: California Statewide ESA Program Policy and Procedures Manual. Downloaded from https://www.pge.com/regulation/LowIncomeProgramPY12-14/Pleadings/Joint-CDE/2013/LowIncomeProgramPY12-14_Plea_Joint-CDE_20130715_281462.pdf (Accessed on 8/14/13)

[92] The Policy and Procedures Manual for the ESA Program lists all forms of acceptable income verification. Appendix C: California Statewide ESA Program Policy and Procedures Manual. Downloaded from https://www.pge.com/regulation/LowIncomeProgramPY12-14/Pleadings/Joint-CDE/2013/LowIncomeProgramPY12-14_Plea_Joint-CDE_20130715_281462.pdf (Accessed on 8/14/13)

participating buildings to have five or more units (the same criteria that the ESA Program uses), although SCE and SCG's program will accept buildings with as few as three units but will not accept buildings over four stories tall.

Incentive Structures

The simplicity or complexity of incentives corresponds with the nature of the programs. For example, the ESA Program and MFEER typically provide relatively simple measures, whereas the EUC programs provide their incentives based on meeting a performance goal (Table 63). In the case of the ESA Program and the CSD Program, participants receive measures for free with the programs incurring the cost of all measures and installation. MFEER's prescriptive incentives generally cover the full cost of lighting upgrades and water saving measures. MFEER incentives offset the cost of building shell, appliances, or HVAC measures, with participating building owners responsible for the portion of the retrofit cost not covered by the rebate. Recall from the eligible measures section that most MFEER projects are lighting and water savings related, thus making most MFEER projects free to the building owner.

Table 63. Incentive Summary by Program

Program	Direct Install	Prescriptive	Custom/ Performance	Installed Primarily in		Rebates Provided
				Units	Commons	
ESA Program	✓			✓		100% of project cost covered
CSD (WAP/LIHEAP)	✓[1]			✓		100% of project cost covered
MFEER	✓	✓		✓	✓	100% of project cost covered for lighting and water saving measures; Rebates offset cost of other measures[2]
EUC[2]			✓	✓	✓	Rebates offset the cost of installed measures and vary by EUC program[3]

1. Like programs offering custom incentives, CSD service providers may use energy performance modeling to determine measure cost-effectiveness, particularly when completing whole-building weatherization in large multifamily buildings. However, CSD is considered a direct install program because it selects the contractors who will install measures and fully subsidizes retrofits of all cost-effective measures.
2. Recall that lighting is the dominant measure associated with MFEER. The SDG&E MFEER process evaluation indicates that their rebates also make the water saving measures free for participants.
3. More specific information on the EUC incentives are provided below

EUC's incentives generally do not cover 100% of the upgrade cost and incentives vary across the various administrators of EUC. The next section details the incentives offered by EUC.

Incentive Structures within Whole Building Programs

The incentive levels listed in SCE and SCG's PIP are somewhat higher than those offered by SDG&E. SDG&E anticipates that $100 of its per-unit incentive will cover the cost of energy modeling and combustion safety testing, while SCE and SCG provide audits and energy modeling at no cost to the participant. As a result, SCE and SCG will likely contribute more to participants' upgrade costs than SDG&E. Of the three MF EUC programs that specified graduated incentive levels, SoCal REN's performance-based incentives are the lowest, but SoCal REN offers relatively large incentives to cover the cost of energy audits. PG&E's PIP does not specify incentive levels for specific savings proportions; instead, PG&E will refine its incentive structure based on initial upgrades and additional analysis. Nonetheless, PG&E anticipates that it will provide MF EUC participants with an average incentive of $1,000 per unit.

In order to provide a basis for comparison of overall incentive levels, Table 64 lists the MF EUC incentives under each program available to a 50-unit building achieving 20% energy savings.

Table 64. Whole Building Incentives for a 50-unit Building Achieving 20% Energy Savings

Program Administrator	Audit Incentive	Improvement Incentive	Total
SCE/SCG	Fully subsidized	$50,000	$50,000 + value of audit
PG&E	$5,000	$50,000 (estimate)	$55,000 (estimate)
SoCal REN	$10,000	$35,000	$45,000
SDG&E	Included in improvement incentive	$40,000	$40,000
Bay REN	N/A	$37,500	$37,500

As noted above, Bay REN's multifamily whole-building offering targets building owners interested in smaller upgrades than the IOUs' EUC MF Path programs or SoCal REN's program. Bay REN's incentive offerings do not offer graduated incentives for building owners that achieve higher levels of energy savings. Instead, building owners receive a set per-unit incentive for installing two or more measures that the program anticipates will provide energy savings of at least 8%.

The program designers hope that upgrade projects will average 12% savings. As a result, PG&E's MF EUC program may be more appropriate for buildings undertaking retrofits that achieve higher levels of energy savings, like the example in Table 64.

Assessment/Audit

Each program provides some type of review of the participant's building, whether the participants is the owner or resident. In the case of the ESA Program, individual units treated under the CSD Program, and MFEER, relatively basic assessments are provided.[93] For the ESA Program this review is limited to the units where tenants have qualified to receive program services. The CSD program review can potentially go beyond in-unit assessments to include common areas and centralized mechanical systems but as mentioned earlier, due to limited funds, common area measures are less likely to be installed going forward than they were when ARRA was supporting weatherization services. Contractors using the MFEER program may conduct a broader assessment, including common areas and central systems.

A contractor or staff person reviews the building (or units) and determines which measures are applicable to the property based on this walk-through assessment. For the ESA Program, this assessment determines whether the unit is likely to meet the program's requirement to install at least three measures per unit or meet deemed savings requirements of 125 kWh or 25 therms annually.

Energy modeling is not required of the ESA Program, individual units treated under the CSD Program, or the MFEER Program (Table 65) but it is required of EUC programs. The next section describes the assessment and audit process associated with EUC programs.

Table 65. Assessments and Audits by Program

Program	Assessment	Audit	Assessment/Audit Provider
ESA Program	Free walk through assessment	Not provided	Program contractor
CSD (WAP/LIHEAP)	Free walk through assessment	Not provided for individual unit upgrades; Comprehensive audit required for buildings receiving common area or central system improvements	Program staff perform walk through assessments; professional energy consultants perform comprehensive audits
MFEER	Free walk through assessment	Not provided	Program contractor
EUC	Free walk through assessment	Up to and including an Investment Grade Audit (IGA) provided	Rater/Analyst

Assessment/Audits Specific to Whole Building Programs

According to EUC MF Path and REN PIPs, SCE, SCG, SoCal REN, and PG&E program staff will conduct preliminary walk-through assessments of buildings whose owners have expressed interest in MF EUC. These assessments identify energy upgrades likely to meet the program's savings requirements. If staffs conclude that the potential for whole-building energy upgrades exists, the building will undergo a more comprehensive audit.

[93] In multifamily buildings receiving whole-building weatherization, the CSD program requires a more in-depth audit conducted by a qualified energy auditor.

All of the Whole Building Programs with the exception of Bay REN include comprehensive audits. The programs vary, however, in the way these audits are provided. In PG&E, SoCal REN, and SDG&E's programs, building owners select and contract directly with a participating HERS rater to conduct the audit. SDG&E does not subsidize audits directly; its per-unit incentive levels include $100 to cover the cost of the combustion safety testing and energy modeling included in the audit. SoCal REN and PG&E will offer incentives based on building size to cover the cost of the audit, with PG&E offering larger incentives to buildings providing affordable housing. SCE and SCG will take a different approach, contracting with an energy consulting firm whose staff members will conduct audits at no charge to participants.

In an effort to reduce costs and streamline the retrofit process for participants, Bay REN's program seeks to eliminate the need for a comprehensive, on-site audit. Instead, the program plans to modify EnergyPro energy modeling software to create a tool that will generate energy saving projections based on inputs that a building owner could collect on their own. This tool would provide a "minimum assumed savings" estimate that the program would use to determine whether a building owner's proposed upgrades are likely to meet the program's minimum savings requirement. The program's technical advisors conduct a site visit to verify the building conditions entered into the software tool and ensure that the proposed measures are appropriate.

What is asked of the Participant

As mentioned previously, ESA Program and CSD Program participants are building residents and MFEER and EUC participants are building owners. In the cases of the ESA Program and the CSD Program, owners must get involved even though they are not the participants because they must grant access to the property and approve measure installations. CSD staff noted that some building owners are also motivated to participate in the retrofit process because they recognize the benefits to their tenants. Table 66 summarizes the requirements of the owner and the residents for each program.

Table 66. Requirements of Participant Summary

Program	Requirements of Building Owner	Requirements of Building Resident
ESA Program	No requirement other than granting permission to property by signing waiver	Apply to program, verify their income; allow enrollment and installation contractors and QC inspectors access to unit; receive free upgrades
CSD (WAP/LIHEAP)	Grant permission to property and may provide income qualification and demographic data, and information about building performance. Coordinate with program on scope and installation of central system, common area, and building shell measures, if applicable.	Apply to program, verify their income; allow installation contractors access to unit; receive free upgrades

Program	Requirements of Building Owner	Requirements of Building Resident
MFEER	Apply to program; Work with contractor to install equipment; Submit receipts to utility for rebate; Pay little or none of the project cost	No requirements
EUC	Work with "single point of contact" from EUC throughout project process; contract with rater/analyst; schedule time for rate/analyst to review building; coordinate times for installations to occur; pay majority of upgrade cost	No requirements

The ESA Program and the CSD Program require little investment on the part of participating residents beyond completing an application, verifying their eligibility, and scheduling time for the program contractors to do assessments, installations, and inspections. Similarly, MFEER incentives often cover the full cost of retrofits for participating building representatives. In contrast, whole-building programs provide comprehensive upgrades that require a significantly larger investment on the part of the participating building representatives. In whole-building programs participating building representatives must agree to pay a larger share of the project cost than the other programs and be more involved in the coordination of installation and inspection activities occurring at his/her property.

Multifamily and the "Single Point of Contact"

Responding to Commission direction in D. 12-11-015, in 2013, all of the IOUs planned to implement a single point of contact for multifamily building owners. This single point of contact will primarily work with building owners to determine which efficiency program offerings are most appropriate given the characteristics of the building and the types of upgrades the owner is interested in undertaking. In addition to identifying programs, the single point of contact will assist building owners in navigating program participation processes and coordinating processes across programs. For example, the implementer of a pilot using a single point of contact approach in SDG&E territory was able to schedule QC inspections concurrently with the HERS rater's visits to minimize disruption to building owners and tenants.

In SDG&E's Multifamily EUC pilot, the single point of contact approach proved effective in leveraging ESA Program services for buildings undertaking large retrofits, but it was less common for building owners who initially came into contact with ESA Program or MFEER to then pursue EUC. One implementation staff member involved in SDG&E's Multifamily EUC pilot stated, "That collaboration is going from EUC down, not from the ESA Program up, if you think of ESA as the first rung on the ladder."

The IOUs single point of contact is designed to assist building owners in identifying programs and navigating the participation process. The single point of contact does not provide participants with technical assistance in identifying and evaluating upgrade opportunities and managing measure installation. Instead, the whole-building programs, with the exception of Bay REN, require participating

building owners to contract with HERS raters and BPI Multifamily Building Analysts to provide this type of support. The programs maintain a list of qualified raters and analysts, and building representatives select and contract with a qualified rater directly. Raters conduct audits and energy modeling, work with building owners to develop a scope of work for their energy upgrade projects, verify that upgrades are installed properly, and conduct a post-installation audit.

Bay REN and SoCal REN will also provide building owners participating in their whole-building programs with assistance throughout the upgrade process, although PIPs suggest that this assistance will be more focused on the technical aspects of completing upgrades than on identifying and navigating program processes. Bay REN may refer participants to PG&E's single point of contact if program staffs determine that the participant might be better served by a utility program.

All of the MF EUC programs allow participants to select the contractor that will install retrofit measures, although PG&E requires that participants use a contractor that is enrolled in EUC and has attended a pilot information session.

Coordination Between Programs

Together, the programs serving low-income multifamily buildings and their tenants in California address a broad spectrum of efficiency needs and provide a variety of offerings for building owners interested in upgrades ranging from relatively small-scale weatherization to major retrofits. However, none of the individual programs provides this full range of services. Instead, coordination between programs is necessary to meet the policy goal of addressing all of the efficiency needs within multifamily buildings. Coordination between utilities is also necessary, particularly in relation to customer served by more than one IOU. As single fuel utilities that share many customers, SCE and SCG in particular have taken steps to coordinate across their different customer data systems.

The following sections describe how the ESA Program coordinates with other energy-efficiency programs targeting low-income multifamily buildings and their tenants. In the past, the IOUs have faced challenges in effectively coordinating between the ESA Program and other efficiency programs serving the multifamily market, and coordination has been somewhat limited. However, plans for MF EUC programs describe a more formal coordination process, and the single point of contact is expected to work with participants in all of the programs targeting multifamily buildings to identify any additional program opportunities.

The CSD Program

While there is overlap in the measures installed between the ESA Program and the CSD Program, some participants, particularly those with non-IOU-provided heating fuels, may qualify for measures under the CSD Program that they are not eligible for under the ESA Program. However, coordination between the ESA Program and the CSD Program has been limited. The 2009-2010 LIEE Process Evaluation reported that LIEE enrollment and assessment contractors mentioned the CSD program to LIEE recipients in 23% of the visits evaluators observed.[94] IOU program staff cited two factors that prevent greater coordination between the ESA Program and the CSD Program: The CSD program typically has a much smaller budget than the ESA Program, making it difficult to devote resources to coordination efforts, and the CSD program has a more fragmented delivery structure, with local community action agencies delivering the program to participants in their counties.

The CSD Program's limited budget in comparison to the ESA Program has restricted coordination between the programs because ESA Program staffs are reluctant to refer more customers to the CSD program than the program has the capacity to serve. As a result, ESA Program staffs typically refer only the customers with the greatest need. The CSD Program's limited capacity to accept referrals from the ESA Program will likely continue.

The CSD program is delivered by 40 community action agencies throughout 58 counties across California. According to IOU staff, this fragmented delivery structure has limited the potential for information-sharing between the ESA Program and the CSD Program. ESA Program staffs see a potential to leverage the CSD program's information, including which households had participated and what measures had been installed. CSD, the IOUs, and the Commission are currently collaborating on a pilot to improve data sharing between programs. One obstacle the programs have faced in the past is customer confidentiality issues, which must be worked out before data-sharing can be implemented on a large scale.

In order to address some of the coordination obstacles between the ESA Program and CSD, in 2009 the Commission and CSD entered into a memorandum of understanding (MOU) that outlined their intent to "leverage and coordinate existing programs for low-income energy efficiency and utility assistance." [95] The coordination did not happen immediately because CSD became busy administering the large infusion of ARRA money they received and utilities became busy developing the EUC programs. Over the last year, CSD and utilities have started to launch pilot programs aimed at improving their coordination. These pilots will focus on data sharing, opportunities for geographic coordination and leveraging, solar hot water system installation, and bulk purchasing.

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[94] In 23% of the project site visits conducted by the ESA Program evaluation team, contractors mentioned the CSD program.

[95] Memorandum of Understanding between the California Public Utilities Commission and the Department of Community Services and Development (CSD), March 17, 2009.

MFEER

Some overlap exists between the measures incentivized through MFEER and the measures ESA Program installs. Since the ESA Program targets low-income households and MFEER targets building owners, coordination between the two programs is necessary to ensure that the measures each program provides do not duplicate measures already installed by the other. Process evaluations of SCG and SDG&E's 2010-2011 multifamily retrofit programs have cited problems caused by a lack of information sharing between the ESA Program and MFEER. IOU program staff described efforts to better carry out this type of coordination, and anticipated that the single point of contact would facilitate coordination between programs. IOU program staff reported closer coordination between ESA and MFEER occurring on some recent projects.

A process evaluation of SDG&E's 2010-2011 multifamily retrofit program reported that in some cases program contractors replace measures installed under a previous program with similar measures; according to the evaluation this is most common with low-cost measures like faucet aerators, showerheads, and lamps. IOU staff noted, however, that since 2010, some IOUs have stopped offering some of these low-cost measures through MFEER. In order to avoid duplication of measures, program staff from multiple IOUs noted that MFEER staff can access the ESA Program database to determine which units in a participating building the ESA Program has served. However, IOU staff noted that it may be difficult to match ESA Program participants to facilities participating in MFEER, particularly in large complexes where units may have different street addresses.

In addition to efforts to avoid duplication of measures, staff at multiple IOUs described efforts to cross-promote the ESA Program and MFEER. For example, MFEER and the ESA Program each promote the other program in their marketing collateral and SCE program staff reported that they are developing a Multifamily Property Energy Efficiency Resource Guide, which will provide building owners with information about all of the energy efficiency and renewable energy programs targeting the multifamily sector. MFEER will also include information on its application form informing building owners about the potential to receive services from the ESA Program. MFEER program staff may also encourage the owners of participating buildings to allow the ESA Program to treat their tenants. ESA Program staffs also provide interested building owners information about MFEER.

Evaluation findings have also detailed challenges with these cross-promotional efforts, however. According to recent process evaluations, SCG and SDG&E's MFEER programs referred any building with households that might qualify for the ESA Program prior to installing measures through MFEER. However, contractors reported that this resulted in delays in MFEER installations as ESA Program verified tenant eligibility and determined which measures it would install. Because of the potential for delays, and resulting contractor dissatisfaction, some IOUs have chosen not to require buildings to receive measures from the ESA Program prior to participating in other multifamily efficiency programs.

MF EUC

Among the programs serving the multifamily sector, the IOUs' plans for MF EUC include the greatest degree of formal coordination with the ESA Program, although these integration efforts occur differently across the state. As part of their agreement to participate in the MF EUC program, SDG&E will require building owners to authorize the ESA Program to serve their income-qualified tenants. ESA Program contractors will then qualify and treat all willing and eligible tenants before the building baseline is calculated. [96] SCE and SCG will not require building owners to authorize ESA to serve their tenants prior to MF EUC participation, although the single point of contact will educate building owners about all of the available efficiency programs, including ESA. SCE program staffs anticipate building owners will recognize that, in most cases, leveraging the ESA program's services will be the most beneficial approach. SCE staff reported that the energy auditors working with their MF EUC program would prefer that ESA measures be installed after the MF EUC modeled energy savings estimates had been confirmed.

While IOU staff noted that drawing on ESA prior to making larger efficiency improvements had been successful in a pilot project conducted at a subsidized housing development, they expressed some concern that it may be less feasible in multifamily developments where only a small portion of residents are low-income. In addition, a contact involved in the implementation of the MF EUC pilot in San Diego noted that following all of the policies and procedures of each program treating a building can result in building owners receiving numerous visits from program staff. This contact noted that coordinating these visits in order to minimize the disruption to the participant can require a great deal of effort. IOU staffs anticipate that coordination between ESA and MF EUC will be streamlined as the IOUs learn from early efforts to integrate program offerings and develop additional resources like the single point of contact and a greater capacity to support whole-building energy audits.

[96] In the case of a very large scale rehabilitation in which any measures ESA installed would be removed over the course of the project, ESA may address any measures remaining to install after other retrofits are complete.

Section 7. Financing and Funding Options

In coordination with the ESA Program Multifamily Study Team, Cadmus researched financing and funding options available to multifamily property owners making energy-efficiency capital improvements, especially for properties with a high proportion of ESA Program-eligible tenants. This research was not intended to be limited to debt options, but to look at a range of potential funding sources to support energy-efficient upgrades, including grants and tax incentives. To that end, "financing" in this section does not refer specifically to loans, but to any program the helps owners pay for an energy saving project.

Appendix I provides additional detail for the 16 financial and funding options reviewed in this section.

Limitations of the Financing Catalog

The multifamily funding landscape is constantly changing and new financing programs continue to emerge. This catalog presents a sample of representative programs and resources; it should not be regarded as an exhaustive list. Furthermore the catalog does not include programs offering nonfinancial support to energy-efficiency and renewable energy projects (such as permit expediting, although a reduced permit wait time may be financially advantageous in some situations). In addition, data may exist that was not available to our team, such as representative projects and number of projects completed. When interpreting data such as number of projects complete, it is good to note that the programs may not have much activity simply because they are new or because they lack marketing or administrative dollars, and not necessarily because of a failure of program design.

Multifamily Property Owner Financing Catalog: Description and Use

The purpose of the catalog is to give the ESA Program Multifamily Study Team a snapshot of the multifamily financial solutions targeted at energy or environmental related projects, areas in California where the solutions are available, and who or what projects are eligible. We anticipate this catalog will be useful in two ways.

- First, it provides the Study Team with different program design elements that have been developed for the California market, and with which property owners may already have some familiarity. Where information is available, we provide an estimate of the number of projects completed, size of the program, maximum amount of financial support per retrofit project, if the funding supports renewables or energy-efficiency, and other descriptive factors.
- Second, the catalog can help identify where financing gaps exist in the market place. For example, nationwide and statewide programs likely cover all California multifamily buildings, but services that are provided by cities or counties are unlikely to apply beyond their jurisdictions. If the local programs are popular, they could provide models for services the IOUs would like to expand to a broader scale. Or, programs can be combined with ESA Program resources to broaden the scope of buildings that qualify.

The following examples illustrate how the catalog can be used:

- Not all buildings are ready for EE measures to be installed. A program like the **CalHFA Preservation Loan Program** can be used to fix holes in a roof or update plumbing, so that funds targeted to energy efficiency could then be used for conservation measures such as insulation or a high-efficiency water heater.
- The **LIIF Bay Area Multifamily Retrofit Loan Fund (recently discontinued but may be restarting under a different effort)** provides financing for up to 50% of the cost of retrofits that reduce energy use by at least 10%, up to $500,000. While this program is helpful, larger projects may still need additional incentives from other sources. This program is limited to the bay area so buildings in Southern California are unable to take advantage of this resource.

The catalog presents active or recent multifamily building funding and financing opportunities that we anticipate could complement a wide range of ESA Program strategies that adopt a whole-building approach. Programs included in the catalog meet the following criteria:

1. **They can be used for retrofitting existing multifamily housing, whether low-income specific or market-rate housing.**
   Programs must complement ESA Program strategies by providing alternative or complementary financial assistance to property owners of complexes housing ESA-Program-eligible utility customers. To be included in the catalog, a program must provide incentives for retrofitting existing, multifamily housing, regardless of the party eligible to apply for the incentive (tenant or owner). While some programs included in the catalog support new multifamily construction or retrofits to other types of buildings, none do so exclusively.
2. **They promote awareness of building energy costs, green building, renewables, and energy efficiency.**
   All programs and financing products included in the catalog promote green building, energy-efficiency, or renewable energy technologies. Financing programs not specifically requiring attention to building energy usage do not promote awareness of energy conservation or utility cost issues. They may even create a barrier to greater efficiency and conservation by allowing "missed opportunities" to occur. In other words, such programs could allow building retrofits that do not address relevant energy-usage issues, and make it less likely an owner will further invest in energy-saving improvements.
3. **The programs are available in areas served by one or more of the California IOUs.**
   The catalog only includes programs available to property owners with tenants that could be eligible for the ESA Program.

The catalog presents 16 programs currently or recently active in the California IOU's territories. These programs are listed in Table 67.

Table 67. Programs Included in Financing Catalog (August 2013)

Name of Program/Product	Region	Type	Website
Green Finance Plus	United States	Financing	https://www.fanniemae.com/content/fact_sheet/grnrefiplus.pdf
Green Affordable Housing Preservation Loan Fund	United States	Financing	http://www.nhtinc.org/green_loan_fund.php
Rural Development Multifamily Housing Energy Efficiency Initiative	US (Section 516 funds can be used for off-farm housing for farm workers in urban areas. All other projects must be in non-urban areas, which cover most of CA.	Financing and grants	http://www.rurdev.usda.gov/program_details.html
Mark-to-Market (M2M) Green Initiative Pilot	United States	Grant/ Loan Restructuring	http://www.hud.gov/offices/hsg/omhar/paes/green/greenini.pdf
Business Energy Investment Tax Credit	United States	Tax Credit (Federal Corporate Tax)	http://energy.gov/savings/business-energy-investment-tax-credit-itc
CaliforniaFIRST (PACE)	More than 100 cities and counties throughout the state, as well as statewide	Financing	https://californiafirst.org/property_owners_overview
CalHFA Preservation Loan Program	State of California	Financing	http://www.calhfa.ca.gov/multifamily/financing/termsheets/index.htm
Multifamily Portfolio Loan Prepayment Program	State of California	Financing Prepayment	http://www.calhfa.ca.gov/multifamily/financing/termsheets/index.htm
Property Tax Incentive	State of California	Tax Exclusion (State Property Tax)	http://www.boe.ca.gov/proptaxes/gase.htm

Name of Program/Product	Region	Type	Website
Multifamily Affordable Solar Housing (MASH)	State of California	Rebate	http://www.cpuc.ca.gov/PUC/energy/Solar/mash.htm
Bay Area Multifamily Retrofit Loan Fund	San Francisco Bay Area	Financing	http://www.liifund.org/products/community-capital/capital-for-affordable-housing/bay-area-multifamily-fund/
LEED Incentive Program	Burbank, Calif.	Rebates	http://www.burbankwaterandpower.com/incentives-for-businesses/leed-incentive-program
Energy Solutions	Burbank, Calif.	Rebates	http://www.burbankwaterandpower.com/incentives-for-businesses/energy-solutions-business-rebate-programs
Energy Upgrade California Multifamily Program, Bay Area	Bay Area, Calif.	Rebates and free technical assistance	https://multifamily.energyupgradeca.org/local#bayarea
Energy Upgrade California Multifamily Program, Los Angeles County	Los Angeles County, Calif.	Rebates and free technical assistance	https://multifamily.energyupgradeca.org/local#los_angeles
Energy Upgrade California Multifamily Program, Marin (Green Multifamily Loan Program)	Marin County, Calif.	Financing	https://multifamily.energyupgradeca.org/local#marin

Rows follow in the order of geographic coverage, with nationwide programs presented first, followed by statewide programs, and then local and county programs. Within each geographic subsection, the catalog identifies program eligibility and types of measures supported. In addition to the programs identified in Table 67, the IOUs provide financing and rebates for multifamily buildings through On-Bill Financing[97] and the Multifamily Energy Efficiency Rebate program. CPUC D.13-09-044 also authorizes ratepayer funding for two additional financing programs targeted to the multifamily sector in the 2013-2014 program cycle, one administered by the IOUs and another administered by BayREN.

The financing catalog is provided in Appendix I, and Table 68 describes each column header in the catalog.

Table 68. Data Description for Catalog Headers

Column Header	Definition
Name of Program/Product	Name of the funding program, as it is marketed or best known.
Sponsor	The organization that manages the program.
Region	The region covered by the program.
Type	The type of funding product offered by the program.
Targets Low-income?	Indicates whether the program is specifically targeted to low-income or affordable housing.
Program Size	The total amount of funding available for distribution through the program.
Individual Project Amount	The total amount of funding available for any single applicant.
Percent of Project	The percentage of total project costs that the program can cover.
Eligibility	Project or applicant requirements necessary to qualify for funds through the program.
Restrictions on Measures (if applicable)	Any restrictions on measures funded through the program.
Energy-efficiency (EE) or Renewable energy (RE)	Whether the program supports energy efficiency (EE) or renewable energy (RE) resources.
Number of Projects Completed	The number of projects completed using program funds since the program's inception.
Description	A brief description of the program's purpose.
Website	A website providing more information about the program.
Representative Project	Where available, details on a representative project supported by the program.
Additional information	Any additional information (including contacts) considered useful.

[97] Owners must not reside on the property in order to qualify. In personal correspondence to Cadmus, PG&E program staff estimates the OBF program provided two loans to PG&E multifamily customers in the first half of 2013 for common area improvements.

Additional Resources

Bell, Catherine J., S. Nadel and S. Hayes. On-Bill Financing for Energy Efficiency Improvements: A Review of Current Program Challenges, Opportunities, and Best Practices. Report Number E118. American Council for an Energy-Efficient Economy. December 2011.

Energy Efficiency Financing in California – Needs and Gaps. Harcourt, Brown and Carey. July 2011.

Improving California's Multifamily Buildings: Opportunities and Recommendations for Green Retrofit & Rehab Programs (DRAFT). California Home Energy Retrofit Coordinating Committee. October 2010. Available at http://www.builditgreen.org/_files/Admin/HERCC/MF_HERCC_report_10152010.pdf

McKibbin, Anne, A. Evens, S. Nadel, and Eric Mackres. Engaging as Partners in Energy Efficiency: Multifamily Housing and Utilities. CNT Energy and American Council for an Energy-Efficient Economy. January 2012. Available at http://www.cntenergy.org/media/Engaging-as-Partners-in-Energy-Efficiency-MF-Housing-and-Utilities-Final-012512.pdf

Partnering for Success: An Action Guide for Advancing Utility Energy Efficiency Funding for Multifamily Rental Housing. National Housing Trust. March 2013. Available at http://www.cleanenergyfinancecenter.org/wp-content/uploads/partnering-for-success-action-guide.pdf

Recognizing the Benefits of Energy Efficiency in Multi-Family Underwriting. Steven Winter Associates. January 2012. Available at http://www.cleanenergyfinancecenter.org/wp-content/uploads/DBLC_Recognizing_the_Benefits_of_Energy_Efficiency_01_12.pdf

Section 8. Conclusions and Recommendations

The ESA Program is designed to provide subsidized energy-efficiency services to low-income households that cannot otherwise afford energy-efficiency upgrades. The scope of this study was limited to research relevant to eligible ESA participants (income-qualified households—the tenants) living in multifamily buildings. The purpose of the study was to obtain information regarding the ESA Program's long-term vision of providing cost-effective energy-efficiency services to 100% of eligible and willing customers by 2020. Additionally, the Cadmus team was directed to "develop alternative program design, delivery strategies, and measure offerings for consideration by the study team[98]" that are consistent with the Commission's direction that the program will be "directed, administered, and delivered in a manner so as to yield significant energy savings.[99]"

To achieve optimal energy savings, the Commission also requires that the ESA Program must be "administered cost-effectively to yield maximum energy savings at *reasonable costs*.[100]" Decision 12-08-044 directs the IOU's to develop strategies that (1) address the full range of opportunities in participating buildings, (2) streamline program processes and program delivery, and (3) target outreach to most effectively reach multifamily buildings.

This section offers recommendations for program design and delivery strategies aimed at helping the California IOUs develop and advance long-term plans.

The section is organized under these topic areas:

- ***Methodology*** for development of strategy recommendations.
- ***Key Considerations*** regarding the ESA Program objectives and future direction that provide context for the Cadmus team's analysis.
- ***Findings and Conclusions*** drawn from the Cadmus team's research with consideration for likely trade-offs and potential impacts on costs associated with implementing recommendations.
- ***Recommendations*** for addressing identified program barriers and enhancing the existing program design and delivery strategy. These recommendations presented are aligned with the two specified objectives.

98 ESA Multifamily Segment Study Research Plan, Prepared for the Study Team. February 25, 2013.

99 California Public Utilities Commission Decision 12-08-044. August 23, 2012, p. 3.

100 Ibid.

Methodology

To draw conclusions and develop recommendations, we consolidated key findings from the Cadmus team's research associated with various research questions and documented emerging themes. The research was guided by the ESA program and these objectives:

- To support the ESA Program's long-term vision of providing cost effective energy efficiency services to 100% of eligible and willing customers by 2020, and
- To yield maximum cost-effective energy savings in the low-income multifamily sector at reasonable costs.

In addition, three researchable questions identified in the Commission Decision 12-08-044, provided underlying context for our research and conclusions:

- How can the current multifamily program offering, in particular the multifamily component of the ESA program, be modified to better meet the needs of low-income multifamily residents?
- How can integrated outreach, education, and marketing be most effective in reaching low-income multifamily housing owners/operators?
- How can the current service delivery approach be modified to address multifamily, energy-efficiency programming concerns?

To draw conclusions and develop recommendations, the Cadmus team documented significant findings and emerging themes from market characterization research, reviews of comparison programs, assessment of the existing program landscape in California, and surveys with owners and operators of multifamily buildings with low-income tenants. Recommendations were also informed by interviews with IOU program managers and the Study Team, program staff involved with five comparative multifamily programs in other states, and representatives from low-income advocacy groups or stakeholders who work with market rate and affordable (rent-assisted) multifamily buildings. From the research, we categorized findings reflecting participation barriers, drivers, and potentially replicable models according to functional areas, such as eligibility rules, participant intake and enrollment, technical and administrative support, marketing and outreach, and delivery and implementation.

Our task was to draw upon this research to identify opportunities to reach deeper into the low-income multifamily market, addressing the needs of as many low-income households as possible while maximizing cost-effective energy savings in this sector. It is important, however, to note the following:

- Some research findings are drawn from secondary sources and input provided by interested stakeholders who may have specific positions on the existing programmatic context or larger programmatic objectives.
- The study's scope, budget, and schedule as well as constraints associated with accessing data for discrete sub-segments of the multifamily housing market limited our ability to fully represent the opinions or objectives of building owners of all property sizes, nor robustly represent subsidized, affordable housing and market-rate housing.

- While the study gathered survey data from property owners and operators in multifamily buildings with low-income tenants, it did not include direct outreach to low-income tenants nor visits to multifamily properties, so findings may not necessarily reflect the specific needs or opinions of the full breadth of potential participants in the ESA Program's multifamily component.
- Some findings and recommendations included in this section represent a deviation from the existing rules and program guidelines under which the California energy efficiency programs currently operate; and implementation of some recommendations would require a change in program rules at a legislative or Commission level.

Key Considerations

In combination, the program objectives under which the Cadmus team conducted its research presented a challenge for the study. In an implementation context, the ESA Program's current delivery strategy is designed around its mission to deliver program services that benefit individual households and as such is well suited to achieving the objective of maximizing the number of low-income multifamily customers benefitting from the program. However, this will become increasingly difficult as the program matures. Additionally, , achieving the second objective (maximizing cost-effective energy savings) and complying with some of the strategies recommended in Decision 12-08-044,[101] implies a preference for program services that appeal to and engage building owners as a way to reach the individual tenants in each unit and capture opportunities for more extensive building upgrades.

Put more simply, the ESA Program's goal to provide cost-effective services to as many low-income households as possible, and the Commission's objective to maximize energy savings implies different programmatic strategies and are in some ways contradictory. In an implementation context, the first requires that the program's eligibility rules, program delivery strategy, eligible measures, incentive structure, and marketing tactics be centered on benefiting individual low-income customers living in multifamily dwellings while the second is more consistent with a program designed to target building owners and managers and provide a broader and more complex set of services that reduce lost opportunities and maximize energy savings.

With potentially competing objectives as a backdrop, the following sections present research findings, conclusions and recommendations under two objective scenarios: (1) reaching more income-eligible people and (2) increasing or maximizing energy savings while administering the ESA Program cost-effectively to achieve both objectives at reasonable costs.

The development of program design and delivery strategies going forward will require the IOUs and Commission to carefully consider these recommendations and the potential costs and benefits inherent in efforts to achieve each objective.

[101] Specifically strategies 3, 4, and 5 recommend greater marketing, coordination, and delivery consistent with a building, rather than tenant, approach. See Section 6, under Decision-12-08-044.

Findings and Conclusions

The findings and conclusions are presented in two sections: reaching more income qualified households, toward providing services to 100% of eligible and willing income-qualified customers living in multifamily buildings by 2020, and, maximizing cost effective energy savings by providing services to the low-income multifamily segment.

Reaching More Income-Qualified Households

1. ***While the ESA Program has addressed a portion of the low-income multifamily households statewide, as the program matures it may become more difficult to reach less accessible populations.***

As described in Section 3 of this report, the Cadmus team used data from the 2011 American Community Survey and GIS analyses to estimate the number of low-income multifamily households in California and apportioned those households by IOU service territory, by county, and by census tract. A second data source, the 2011 American Housing Survey, provided a profile of the low-income multifamily segment on additional metrics such as building vintage, equipment, and amount of rent paid. Through this analysis, we found that low-income multifamily households in buildings with five or more units represent approximately 9% of total residential households in California, 32% of low-income households, and 42% of multifamily households, for a total of 1.175 million households.[102]

ESA Program data available to the Cadmus team suggest that that between 25% and 48% of eligible and willing multifamily households participated in the IOU's programs between 2007 and 2012. Our research suggests that participation is highest where there are known concentrations of qualifying multifamily households. Over the six-year period from 2007 to 2012, we estimate that as many as 75% of qualifying multifamily households have participated in some areas. In other areas, however, one percent or fewer qualifying multifamily households have participated.

In some instances, this disproportionate participation may be because there are few qualifying multifamily households to begin with; but this apparent regional difference in penetration points to the fact that not all households will be equally accessible. In particular, our modelling of ESA Program participation by census tract suggests that low-income multifamily households living within relatively affluent areas are less likely to receive program treatment. Additionally, because mobility among low-income households appears to be high, it can be difficult to locate 100% of eligible households. Finally, there will always be buildings with owners or managers who are uninterested in investing in their buildings (or unwilling for other reasons).[103] Our research and the difficulty encountered surveying and interviewing market rate building owners indicates that some buildings may fall into this category of the harder-to-reach and motivate-to-take-action. The implications are that, over time, the program will

[102] Section 3, Table 16 includes some double counting of households, because some households are served by two of the utilities.

[103] In testimony the IOUs provided to the Commission

need to dedicate increasing resources to reach all households, with very likely diminishing returns for equal levels of effort as the percentage of households yet to treat decreases. We do not see evidence of an allowance for this tendency in the current rate of program participation, nor evidence in planning for future years.

2. The list of measures offered by the existing ESA Program is comprehensive but does not result in large energy cost savings, on average.

The ESA Program relies on a list of approved measures that apply across all ESA participant types (single- and multifamily); it does not offer any measures exclusively for multifamily buildings, nor does it explicitly exclude any measures from multifamily buildings. However, fewer ESA Program measures are typically feasible to install in multifamily units than in single family buildings. For example, with fewer exterior walls, multifamily units present less opportunity (and a lower need) for air sealing, and multifamily units may not have access to an attic that could be insulated. [104] Furthermore, under existing ESA Program rules, a tenant unit must offer opportunities to install at least three different measures (i.e., lighting alone is not sufficient) to qualify for program services. Tenant units that do not meet this criteria cannot be treated.

Among PG&E customers the average participating multifamily household in 2012 is estimated by the program to save 217 kWh per year, equivalent to about $3.08 per month at retail energy costs of $0.17 per kWh.[105] Among SCE customers the average annual electric savings is estimated by the program to be 362 kWh, worth about $5.17 in monthly savings. Cadmus' research found no evidence that the tenant units treated by the ESA Program require more or different measures than those currently available in the list of program-approved measures. Differences between utilities generally conform to different fuels they offer and to the different climate zones prevalent in their territories. Therefore, it appears that increasing energy savings will likely require addressing shell and building system (e.g., HVAC and DHW) upgrades.

3. Specific market data can help the IOUs develop customized delivery strategies targeting specific climate zones, building vintages, and equipment.

Statewide, the population of low-income multifamily households is characterized by considerable variability in the social circumstances of the households and, more germane to the current research, in the physical structures and the energy-consuming equipment with which they live. While Cadmus' research points toward various elements that may suggest energy efficiency opportunities and/or new pilot approaches, compiling these diverse elements into multi-dimensional territory profiles that account for climate and market variability would require a complicated analysis reliant on multiple assumptions. Nevertheless, characteristics identified through our research can help inform the IOU's

[104] Utility estimates of annual savings for CFLs are 15 kWh per year per measure, for envelope and air sealing 45 kWh and 0.37 therms per household, and for DHW measures 0.88 therms per household.

[105] Retail cost is for the state of California from EIA, November 2013, "Electric Power Monthly with Data for September 2013." U.S. Department of Energy.

measure delivery approach and support targeted marketing and outreach strategies to help capture new tenant participants to the ESA program.

The following findings highlight potential opportunities.

- **Target buildings by vintage.** 68% of low-income multifamily households live in units built before 1980, representing approximately 766,000 households. This is the segment most likely to benefit from shell improvements, though buildings of later vintage may also benefit and some of these pre-1980 units may have already received shell upgrades. Older buildings are also indicative of older equipment, which could be due for an upgrade or replacement.
- **Increase shell improvements in specific climate zones.** The California IOUs have approximately 160,000 low-income multifamily households in California climate zones 11 through 16, all of which have relatively large heating and especially cooling needs. We estimate about 79,200 low-income multifamily households living within buildings in high-need climate zones 11 through 16 are likely in need of shell improvements. Based on utility measure costs of between $104 and $202 per unit for envelope and air sealing measures, it would cost about $12.1 million to serve the number of households that are likely in need of shell improvements.
- **Develop a strategy for identifying and upgrading equipment at the end of its useful life.**
    - About 347,000 households (24%) among the IOU's low-income multifamily housing units have heating equipment that is 20 years old or older. It is difficult to accurately assess the number of systems represented among households with forced air because these furnaces can serve numerous households; however, data suggests that about 21,000 buildings (serving an estimated 216,000 households) have furnace equipment at the end of its effective useful life. Assuming incentive levels were set to cover 100% of the estimated incremental cost of $1,735 per building, this implies a program cost of $36.5 million to replace the forced-air units that are past the end of their effective useful lives.
    - An estimated 36% of low-income multifamily households have central air conditioning, and 28% of these households have central AC equipment that is 20 years old or older. Our estimates yield 39,500 central AC systems that are 20 years old or older. Further, surveys revealed that the need to replace original AC equipment is closely related to building vintage, with 47% of respondents managing buildings built in 2000 or later saying central AC equipment is original and only 8% of respondents managing buildings built before 1980 saying the AC equipment is original. We estimate the full equipment incremental cost of replacement on failure (per unit) to be approximately $714 (Table 69). Thus the program's estimated cost of replacing all central AC systems at the end of their useful lives, assuming incentive levels are set to cover the full incremental cost of equipment replacement, are approximately $28.2 million.
    - In regions where energy savings are greatest from AC upgrades, approximately 25,200 buildings in climate zones 11, 12, and 13 are cooled by central AC equipment that is 20 years old or older. In climate zones 14 and 15, there are 5,800 multifamily households

that are cooled by central AC equipment that is 20 years old or older. Again using incremental cost of equipment replacement as an estimate of program spending, targeting only AC systems at the end of their useful lives in these climate zones would equate to approximately $1.4 million.

- **Don't abandon the refrigerator replacement effort.** Roughly 94,000 low-income multifamily households have refrigerators 15 years old or older. In PY 2012, the IOUs began replacing refrigerators built before 1999. PG&E replaced 2,046 refrigerators in multifamily households through the ESA Program; SCE replaced 1,889 and SDG&E replaced 340. Based on ESA Program measure costs for PY 2012, and using the average price of $717, it would cost $67 million to replace all refrigerators that are 15 years old or older.
- **Screen all buildings for common area lighting opportunities.** Multifamily building owner and operator surveys revealed that, while larger buildings (250+ units) are more likely to have a common area, they are also much more likely than smaller buildings to have replaced common area lighting (79%). Opportunities remain for common area lighting upgrades in smaller buildings and complexes. Fifty-eight percent of property owners managing buildings with 25 or fewer units indicated their properties had common areas and about half (49%) noted they had not replaced common area lighting equipment. We estimate this equates to approximately 36,000 buildings with five to 25 units where common area lighting opportunities may exist. At an average cost of $160 per building for common area upgrades, the estimated cost of implementing this upgrade is approximately $5.8 million.

To support the IOUs' evaluation of these opportunities and those discussed in the next conclusion, we provide estimated costs in Table 69. These estimations are based on data from the existing California programs serving multifamily buildings, and the incentive values serve as a proxy for related ESA Program costs for incentivizing similar measures.

Table 69. Estimated Incentive Cost of Common Area/Central System Upgrades[106]

Service/Measure	Specification	Estimated Full Cost per Building	Estimated Incremental Cost
Whole building assessment[1]	5-20 units	Varies	$5,000
	21 -100 units	Varies	$10,000
Common Area Lighting[2]	Linear fluorescent lighting and CFL fixtures and lamps	$160	NA
Central Cooling[3]	Central AC unit	$4,000	$714
Central Heating[4]	Central heating system	$7,828	$1,735

1. In EUC MF, a $5,000 incentive is offered for building assessments in properties with 5-20 units (SoCal REN) or 5-30 units (PG&E); and a $10,000 incentive for assessments in properties with 21-50 units (SoCal REN) or 31-100

[106] Estimates in this table come from data derived from existing California programs (ESA/MFEER/EUC MF) that address multifamily housing using a range of different approaches; however actual costs may range considerably based on building size, construction and equipment characteristics and project scope.

units (PG&E). See Table 59.
2. MFEER Program average cost data. Common area lighting upgrades are typically cost-effective; MFEER covers the full replacement cost.
3. Full cost: SCE's ESA program estimate representing average cost for central cooling replacements plus duct testing and sealing conducted by SCE in 2013 through August. Incremental cost: DEER 2008 Cost Data.
4. DEER 2005 Residential Prototype Characterization Study and DEER 2008 Cost Data (weighted by household type and climate zone) and DEER 2008 Cost Data (weighted by household type and climate zone).

4. Heating and cooling system upgrades offer a potential untapped savings opportunity for the ESA Program's target population.

Cadmus' research revealed that a majority of low-income multifamily buildings, which together include nearly 800,000 tenant units, were constructed before 1980 and therefore may offer energy savings opportunities associated with the building envelope. Data on equipment vintages further suggest that opportunity remains for implementing heating and cooling system upgrades in low-income multifamily properties. Forty-nine percent of low-income multifamily households with gas heat have equipment that is 20 years old or older, while 32% of low-income multifamily households with electric heat have equipment as old as 20 years or more.

On the cooling side, low-income multifamily households tend to have a higher saturation of room AC and less central AC systems than do adequate-income households[107]. Among low-income multifamily households with room AC, only 25% of the equipment in use is ENERGY STAR qualified.

The ESA Program does not typically include provisions for replacing central system upgrades in master-metered buildings as the benefits of these upgrades are more difficult to justify when energy costs are paid by the building owner or landlord. However, in buildings that are not master-metered and where tenants pay their own utility costs, the energy savings available through central heating and cooling system upgrades accrue to the individual low-income households. Based on findings from building owner and operator surveys, 94% of the low-income multifamily buildings in California are individually metered for utilities; only 28% of respondents indicated electricity is included in rent and 26% indicated that gas is included in rent. In buildings that are centrally heated and/or cooled, and where tenants pay their utility bills or gas and electricity are included in the rent, there is an opportunity to capture energy savings through central-system upgrades that are consistent with the ESA Program's mission.

As noted in Section 3, Figure 31, about 68% of market rate buildings are aging and 39% of rent-assisted are aging buildings. This is important to note because different types of interventions may be needed for the different market sectors. We lack specific information about how to engage the market rate property owners, the larger segment with aging buildings. Additional research may be needed. However, survey findings indicate that a significant portion of multifamily building owners (both rent-assisted and market rate) replace equipment only when required to do so due to equipment failure.

[107] See Section 3, under Equipment in Existing Units.

When making purchasing decisions, many building owners and operators select equipment based on initial cost rather than efficiency and their decisions may further be influenced by a lack of available capital. These factors may point to an opportunity for the ESA Program to influence building owners' purchasing decisions toward more energy efficient options at the time these decisions are made, by offering a financial incentive designed to cover only the incremental cost of higher-efficiency equipment over standard efficiency models. Data from the existing California programs indicate that an incentive designed to cover incremental cost equates to approximately $1,736 for heating system upgrades and $714 for cooling system upgrades (see Table 69). As described above, based on Cadmus' estimates of heating and cooling systems at or near the end of their useful lives, the total cost to the program of offering central system upgrades would be approximately $65.7 million (i.e., $36.5 million to replace all potentially eligible heating systems and $28.2 million to replace all potentially eligible cooling systems).

5. Obtaining Property Owner Waiver Forms is a participation barrier.

For the low-income tenant in a multifamily building, participation is a partnership between the tenant and building owner. To provide services to multifamily renters, the ESA Program requires building owners to sign a Property Owner Waiver form, authorizing efficiency improvements in the units to be treated[108]. This can be a barrier to the tenant's participation since some landlords are difficult to reach or unresponsive to the program's efforts. The building owner can be difficult to engage, but, once engaged communications with the owner presents an opportunity to work with them to access other incentives and upgrade other systems.

6. The existing ESA Program policies associated with addressing an entire building may be missing opportunities to treat more tenant units and increase energy savings within a given building.

When 80% or more of the individual dwelling units in contact with the envelope in a given building or complex can be independently income-qualified, the ESA Program is able to treat the building shell. And, if 80% of units in contact with the ceiling are income qualified, the ESA Program can add ceiling insulation. Achieving the 80% threshold also enables the program to treat any unoccupied units in a given building; however the current policy disallows treating units within the remaining 20% that are occupied but not income-qualified[109]. Any occupied units for which the tenant is unable or unwilling to participate in the income verification process cannot be treated. If a sufficient number of tenants can be qualified to reach the threshold, the policy of not treating occupied units may be missing savings opportunities that, due to tenant mobility are likely to benefit a low-income household within three years of being treated.

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[108] IOUs allow property owners to sign a single Property Owner Waiver that is applicable to multiple units in a complex to be treated.

[109] As described in the ESA Program Policies and Procedures Manual, "To qualify an entire multifamily building for other measures offered by the program (defined as 80-20 measures), at least 80% of all (occupied and unoccupied) dwelling units must be occupied by income-qualified households."

7. Housing unit mobility among low-income multifamily households will make it difficult to locate and treat 100% of eligible households.

The goal of offering the ESA Program to all (willing and eligible) households by 2020 must reflect the fact that the low-income multifamily sector is quite literally a moving target. The ESA Program treats *housing units* in order to provide benefits to *households*; but households are highly mobile, whereas the treatments remain behind. By 2020, based on AHS data for the California low-income multifamily sector, we would expect 82% of low-income multifamily households to have moved to a different housing unit at least one time. There are several implications associated with this mobility:

- Some qualifying households will benefit without ever participating in the program, by moving into a unit that has been treated and vacated.
- Some *unqualified* households will benefit from the program by moving into a unit that has been treated and vacated.
- Treating vacant units can provide benefits if there is a high probability that a qualified household will move in during the lifetime of the measures installed.
- Treating units where unqualified households live can provide benefits to qualified households if there is a high probability that a qualified household will move in during the lifetime of the measures installed.

In cases where a building qualifies for building-wide treatment (80% of occupied units have been verified as eligible), but some units have not been verified, it is very likely that within the lifetime of installed efficient equipment a low-income tenant will move into that unit. Treating every unit in a building that is largely low-income increases the probability that eligible households will eventually be reached and benefit from the upgrades installed by the program. The average cost to treat an apartment unit is relatively low: IOU ESA Program measure cost data to treat multifamily unit ranges from $200 to $500 per unit.

Maximizing Cost-Effective Energy Savings

Guidance provided by the Commission and Decision 12-08-044 as well as information gathered from varied stakeholders points to a desire for the ESA Program to increase its focus on maximizing cost effective energy savings. Adopting a goal to maximize energy savings while administering the ESA Program cost-effectively, either as an alternative or an accompaniment to the goal of reaching as many income qualified households as possible, suggests that the ESA Program may need to shift how it approaches building owners.

There is currently no provision in the ESA program for subsidizing upgrades to central systems or common areas—these are expected to be addressed through other multifamily energy efficiency programs. Because the ESA Program interacts with building owners directly each time a rental unit is treated, there may be opportunities for the ESA Program to further leverage this contact by explicitly encouraging whole building audits and upgrades to aging central systems. If this were coupled with a strategy of treating all units in qualified buildings, lost opportunities could be minimized.

Important aspects of this strategy include: (1) conducting a thorough energy assessment to analyze the potential costs and benefits of central system upgrades and identify and mitigate health and safety issues and (2) obtaining the owner or landlord's commitment that tenants benefit from the reduction in energy costs associated with central systems in their buildings. Benefits accrue to the tenants through increasing the safety and comfort of their buildings, and helping to maintain affordable rental rates by mitigating operational cost increases (e.g., not passing energy cost increases on to tenants through rent).

Because the financial benefits of central system upgrades are often assumed to benefit the building owner or property manager, it will be important for policy makers to carefully consider the requirements that might be needed to ensure that tenants benefit. While this approach merits consideration, over-emphasis on common area and building-level measures could redirect program funds from other efforts that may be better aligned with the ESA Program's vision.

8. The ESA Program may be able to increase energy savings results and likely serve more low-income households by relaxing the eligibility requirements to address low-income multifamily buildings as a whole.

The ESA Program requires that 80% of tenants be income qualified before the program can move to simpler self-certification for the remaining units and install building shell upgrades. The CSD program, which relies on Federal LIHEAP funds and DOE eligibility rules, uses the federal building approval guideline of 66% income-qualified residents[110]. Further, as shown in Chapter 5 (under "Eligibility Requirements"), none of the comparison programs researched require this level of income verification to either address all tenant units or to install whole building solutions. While the comparison programs are all focused on providing services at the multifamily building level rather than at the tenant level, all of these programs have limited budgets and all have adopted a mission of supporting low-income households.

The IOUs have taken some steps to simplify building verification for the ESA Program by adopting categorical eligibility policies for individual tenants who qualify for other assistance programs, and by identifying areas where census data suggest there is a high concentration of low-income households and allowing households to self-certify their income rather than providing documentation in these areas.[111]

All of the comparison programs the Cadmus team reviewed allow building owners to provide income qualification documentation for their buildings. While this primarily applies to owners of subsidized properties who maintain tenant income records as a condition of the subsidies they receive, NYSERDA

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[110] See Chapter 6, under "Income Eligibility."

[111] Categorical eligibility means that a tenant can participate in the ESA Program if they provide documentation to prove they are participating in another income-qualified program with equally stringent standards. Self-certification means the tenant can participate in the ESA Program if they sign a form stating that they are income qualified, but the tenant does not have to provide income documentation.

uses rent as a proxy for income through its "rent roll" certification, allowing market rate buildings to qualify without going door-to-door to verify tenant income. Through this method, owners calculate tenants' annual household income based on rent and occupancy, assuming housing costs consumes 30% of household incomes. The Cadmus team's research found that NYSERDA's estimate that rent makes up 30% of income is far lower than the actual proportion of income spent on rent for most of the low-income multifamily population (making 30% a conservative estimate). Similarly, many of CNT Energy's participants come to the program as referrals from Chicago's Community Investment Corporation, which primarily works with buildings serving low-income populations. Thus, these programs eliminate the cost of individual income verification by allowing alternative income indicators to serve as eligibility verification.

9. Neither the current ESA Program nor the other multifamily sector programs currently offered are designed specifically to maximize energy savings in low-income multifamily buildings.

As described in Section 6 of this report[112] the energy-efficiency services and incentives available to multifamily customers in California are divided between programs that deliver benefits to the tenant as the customer and programs that deliver benefits to the building owner as the customer. Each of these existing programs is designed to achieve its own set of goals and objectives and operates under its own delivery and administrative rules. Each has its own customer targets (i.e., market-rate tenants, low-income tenants or building owners and operators), eligibility rules, available measures, incentive structures, and installation approaches (e.g., unit-level, common areas, or whole building).

Because the ESA Program's focus is on assisting low-income tenants with their utility bills and improving their quality of life, it covers only in-unit measures that directly affect a resident's energy costs[113] (and, as noted previously, building envelope measures can be installed when 80% of residents whose units touch the building's shell are income-qualified). Common area measures such as hallway lighting, that may or may not directly affect tenants' energy costs or produce individual household benefits, do not qualify for ESA Program funds. The MFEER and EUC MF Programs offer services focused on common areas and whole-building upgrades, but, while EUC MF does integrate with the ESA program on tenant qualified units and low-income qualified buildings may participate in whole building upgrades, neither program provides services or offers enhanced incentive levels specifically designed to overcome the capital constraints in low-income properties.

Put another way, the current multifamily program landscape in California has several programs that treat multifamily buildings (i.e., ESA, MFEER, EUC MF, and MIDI) but none that primarily or exclusively serve low-income residents. While property owners of low-income multifamily buildings can take

[112] See Section 2, under question 5 and Section 6: The current California Landscape for Low-Income Multifamily Programs.

[113] Participants may also qualify for improvements that address health and safety, which contribute to their quality of life.

advantage of the program, the current programs do not provide incentives for common area and central system upgrades that are specifically set at levels to address financial barriers common to the low-income sector. Early results from the EUC MF program's first year of implementation indicate that there is interest among low-income multifamily building owners and operators in installing more comprehensive building upgrades.

The ESA Program's approach contrasts with that of the comparison low-income multifamily programs in other parts of the country that the research team examined. Like the ESA Program, these programs ultimately seek to benefit low-income households; however, they primarily target the owner of a multifamily building with low-income tenants, assuming they will benefit all residents of a building that is audited and upgraded. The comparison programs' focus on multifamily building owners is consistent with these programs' more comprehensive focus: in addition to measures in tenant units, they install upgrades in common areas and central systems. Some programs include a formal requirement to ensure benefits are passed along to income-qualified building residents of master-metered buildings. These programs require building owner participants to agree not to raise rents for a defined period following the retrofit and the program in Colorado further requires building owners to specify how they plan to use the cost savings from their efficiency improvements to benefit tenants; however there is no formal process in place to verify compliance or enforce the building owner's commitment.

The California Long-Term Energy Efficiency Strategic Plan and Decision 08-11-031 provide unequivocal direction to the California IOU's that the ESA program must evolve into a resource program that garners "significant energy savings" while providing an improved quality of life for California's low-income population. Decision 12-08-044 specifically recommends the IOUs implement eight strategies to help overcome ESA program barriers, including several that signal a desire for the ESA Program to work more directly with multifamily building owners and managers and provide a more comprehensive whole-building energy assessment by better leveraging other existing multifamily programs, including[114]: Strategy 3: update marketing approach to multifamily homes (building owners); Strategy 4: improve EUC/MIDI/MFEER coordination, and Strategy 5: establish a single point of contact (to coordinate the varying IOU programs for the multifamily segment).

10. Multifamily buildings undergoing significant upgrades offer opportunities for targeted, proactive ESA Program outreach.

In interviews with low-income housing stakeholders and advocacy groups, respondents expressed the importance of integrating ESA Program recruitment with building recapitalization events (Section 4). Respondents suggested that better collaboration with utilities to synchronize property recapitalization and asset management events with utility energy-efficiency programs could lead to a more cost-effective distribution of program benefits to both building owners and tenants.

[114] California Public Utilities Commission Decision 12-08-044. August 23, 2012. Section 3.10.6.3. Also listed in Appendix A. Note that examination of these eight strategies or determining whether the steps were successful in reaching the multifamily segment were outside the scope of the Multifamily Segment Study.

Respondents indicated that many large and subsidized multifamily properties typically undergo major building upgrades every 15 to 20 years and that housing certified under the HUD program typically provide a 5-year investment strategy. These building renovations are thought to be the best time for property owners and managers to install energy efficiency upgrades as part of an overall building rehabilitation project. While this particular cycle may be specific to subsidized properties, market rate properties may or may not have comparable investment cycles presenting opportunities for energy efficiency upgrades.

All interview respondents (representing both market rate and rent-assisted housing) reported that multifamily property owners and managers use a layered approach to finance large retrofits and energy-efficiency improvements. Respondents representing affordable housing mentioned the importance of long-term planning for financing building upgrades due to the complicated financing arrangements that are frequently required. Some properties have multiple investors, each requiring a separate approval process before making upgrades that will increase debt to the property. Also, the investor approval process tends to be affected by the type of improvement under consideration. This suggests a potentially complex and long lead time for the investment decision making and approval process(we are not suggesting that they need higher levels of subsidies).

Note that these findings may be applicable to a relatively small population of large multifamily complexes and rent-assisted housing. Smaller and privately held properties might not undergo large-scale rehabilitation events, instead making equipment upgrade decisions as needed to address equipment failure or other small-scale improvements.

For those properties that engage in large scale rehabilitation projects, these significant upgrade events present the most advantageous opportunity for ESA to overcome barriers associated with attracting building owners' and decision makers to the program, encouraging investment in upgrades, and limiting inconvenience. The complicated financing process inherent in recapitalization highlights the need for property owners to coordinate with utility programs to scale the timing of major multifamily building upgrades with the ESA Program or another IOU-sponsored program in order to integrate efficiency improvements as part of the overall building rehabilitation project.

In a different set of surveys with multifamily building owners and operators, nearly half of rent-assisted housing operators indicated they plan for equipment purchases one to two years in advance with just one-quarter indicating they planned equipment upgrades less than one year in advance. In market rate housing, respondents reported nearly the inverse with one-quarter planning for equipment purchases one to two years in advance and almost half planning less than one year in advance. Both sectors reported they were most likely to upgrade or replace equipment when it breaks, which explains the relatively short planning horizon to replace equipment.

For subsidized multifamily housing, the building owners and managers tend to use HUD funds, grants, rebates, tax credits (for new buildings or solar upgrades), and cash reserve accounts. For market rate housing on the other hand, the building owners and managers depend primarily on cash accounts and

use a combination of bank loans, real estate investment trusts, and joint-venture partnerships to pay for building upgrades. The primary factor influencing decisions to make equipment upgrades or repairs is cost (which can hinder energy efficiency upgrades) (76%), with energy efficiency lagging, but ranking second (32%). Respondents identified a lack of access to capital as the primary factors that made it difficult to make energy efficiency upgrades. The majority, 65%, said they were not aware of any financing options that may assist with the expenses to upgrade or replace equipment.

11. ***Better coordination and technical support is needed for multifamily building owners and tenants who are eligible for multiple programs to ensure their participation derives maximum energy savings and other benefits.***

Cadmus' research found two key areas where offering technical and administrative support could improve both building operators and the tenants' experience with the program and help overcome barriers associated with navigating complex enrollment and implementation processes, particularly where multiple programs are involved and with complicated financing options.

Enrollment and Implementation

Among the strategies identified in Decision 12-08-044, several point to the need to streamline program delivery and in particular highlight an emphasis on a single point of contact. This need was echoed by low-income stakeholders and advocacy organizations Cadmus interviewed, who indicated there was a lack of contact people to help building owners and managers navigate participation. We note that while some efforts are underway to designate a single point of contact through the pilot EUC MF program, that role is limited to supporting building owner-participants in that program. Under the current ESA Program design, a single point of contact may not be appropriate, particularly in delivery efforts focused on a single tenant unit. However, efforts to broaden program services – either through the existing ESA Program or by bridging ESA to other programs – may create a greater need for a single point of contact to help coordinate program enrollment and implementation support for building owners and operators.

All of the in-depth comparison programs Cadmus reviewed use established systems to help building owners identify retrofits and guide them through the retrofit process, including providing some analysis of the building's energy use, conducting assessments to identify energy-saving opportunities, identifying the range of incentive and financing options building-owners can use to fund their retrofits, assisting these owner-participants in selecting installation contractors, and verifying the quality of installed measures. In most cases, providing this level of support involves designating an individual – either an external consulting engineer or internal program staff – to work with participating building owners and managers. While the comparison programs are not directly applicable to the ESA Program because they all address efficiency at a building level rather than at an individual tenant household level, the provision of technical support is cited as a key factor in the programs' success.

The comparison programs were notable for the presence and role of nonprofit and public benefit organizations in both administering and delivering services to multifamily buildings. These organizations sought to identify buildings and work closely with owners to develop scopes of work that captured all

cost effective opportunities. Several were able to facilitate or offer financing opportunities that further encouraged building representatives to take action.

As a whole, the comparison programs prioritized a comprehensive treatment of the buildings they targeted, with some covering substantial (if not all) of the retrofit costs. The wide range of costs per unit treated and spending relative to the total number of units in the comparison programs' respective territories can be found in Section 6, and illustrates the range of cost tolerance associated with reaching this challenging population. (In Tables 52 and 53 we compare the costs of electric efficiency measures and gas efficiency measures *per unit treated* for all of the comparison programs. In Table 54, we compare the comparison programs' spending *per multifamily unit in their service territory*.)

Complex Financing Options

The Cadmus team found that numerous financing opportunities may be available to multifamily building owners to support more costly energy efficiency upgrades. While a number of options exist, these programs vary widely in terms of the support they offer and their eligibility requirements. Existing options are limited by different factors, such as geography, eligible measures, eligible applicants, and available funding. This can make it difficult for building owners unfamiliar with the various options to identify the programs for which they might qualify, and to navigate the application process. The multifamily funding landscape is constantly changing and new financing programs continue to emerge. (Section 7 reviews 16 separate financing or grant programs that are currently active and applicable to the state of California.)

In surveys with property owners and managers, more than half the respondents (65%) stated they were not aware of financing options to help them pay for energy efficiency upgrades. Market rate owners were less aware of options (68%) than rent-assisted (41%). Cost was the primary reason respondents said they did not replace equipment with energy efficient models (53% of market rate and 21% of rent-assisted buildings).

The most prevalent theme to emerge from interviews with building owners, managers, and other stakeholders[115] was that the complexity of the financing landscape calls for a need for IOUs to provide help in navigating the energy-efficiency programs, the offerings, the requirements, and funding sources. This includes providing technical expertise and administrative support.

Recommendations: Reaching More Income-Qualified Households

The California IOUs have contributed to helping low-income populations reduce their utility costs and improve the comfort and safety of their homes through the ESA Program. Each utility is committed to continuous improvement of the ESA Program: they are working to align the program with the Strategic Plan goals and making steady progress to streamline operations and improve outreach to target low-income multifamily tenant populations. The individual IOUs should continue these efforts. The research

[115] Stakeholders and advocacy groups interviewed are listed in Appendix G.

team recognizes that the IOUs operate in fidelity to an existing programmatic framework that entails rules, policies, and procedures set by the Commission that may limit their ability to implement significant program design adjustments.

However, the research team also recognizes the potential challenge that lies ahead for the utilities in achieving their long term objective of addressing 100% of eligible and willing income-qualified populations by 2020. As the program continues to mature, it will become more difficult – and more costly – to recruit and enroll income qualified multifamily tenant participants that are harder to reach due to geographic constraints, absentee or uninterested landlords and other constraints that characterize the "high-hanging fruit."

Thus, the following recommendations are geared toward doing more within the existing ESA Program framework to reach the increasingly hard-to-reach populations and attract more income qualified households to the program. In general, the research team believes implementing the recommendations in this section would be feasible under existing ESA Program rules and do not require significant regulatory involvement.

1. ***Consider adopting customized recruitment and delivery strategies (by IOU) to target identified opportunities based on climate zone, measure and buildings characteristics, and geographic areas.***

The California IOUs have historically focused ESA Program marketing and delivery in areas with larger numbers of low-income populations based on census tract data. While this strategy is sound and should be continued, our research found that there may be pockets of low-income housing located amid more affluent households with higher median income, and low-income tenants living in market rate housing that, in some cases are not being captured by the current program approach. Furthermore, our analysis, of building and equipment saturations and vintages indicates there are likely remaining opportunities for upgrades to various measures within the existing ESA Program framework. Specifically, our research indicated that the ESA Program may be able to capture significant energy savings by targeting the following:

- Low-income populations residing in market rate housing and in areas with lower density low-income populations
- Older building vintages, indicating potential for shell improvements
- Heating and cooling systems at or near the end of their useful lives
- Climate zones corresponding to the greatest needs for heating and cooling
- Common area lighting measures, which are typically cost effective

The Low-Income Needs Assessment[116] currently underway could shed light on additional measures that could be offered to individual low-income units as well as buildings.

As tenant participants become more difficult to reach, the IOUs will likely need to reallocate some marketing resources away from other approaches to conduct more specific research and targeted outreach and messaging to harder-to-reach income-qualified tenants. Although the costs to capture these hard-to-reach customers are likely to increase as the program matures, conducting research and directing outreach dollars strategically to capture potential tenant participants meeting the criteria above can be more efficient and effective than broad-based outreach and messaging campaigns. (Relevant conclusion statements are 1, 2, and 3.)

2. In buildings where 80% of the tenants are income-qualified, treat all units in the building whether they are vacant or occupied, as well as the building shell.

Treating all units at one time should create cost savings for contractors since they do not need to go back to the building to treat single units and is likely to save administrative costs for the program. Due to the mobility of rental populations, treating all units in buildings that meet the 80% low-income threshold is likely to benefit a qualified low-income household at some time over the life of installed measures.

Under current program offerings, the IOUs may have data in their ESA Program databases to determine the number of units that could have been treated but were not, using the 80%-20% rule. To assess the costs and benefits of this recommendation, the IOUs should conduct further research to identify the portion of buildings their contractors have sought to qualify at the 80% threshold, but that failed to qualify because an insufficient number of residents were able or willing to provide the income documentation required for verification. Quantifying the savings that could have been achieved had the building gone forward with shell improvements and installed measures in every tenant unit could help the IOUs and Commission determine whether the cost to deliver these services would be outweighed by the cost savings associated with a more relaxed income verification threshold. (Relevant findings, including estimated costs to support this recommendation are provided under conclusion statements 6 and 7.)

3. Consider options for expanding current process exceptions to subsidized buildings.

The ESA Program allows exceptions to its income verification procedures under two scenarios:

1. The Program allows individual tenants *categorical eligibility* when they qualify under a range of other specified assistance programs.
2. Under *targeted self-certification* protocols, the Program treats buildings in specific geographic areas where census or other demographic data suggests that 80% or more of the population

[116] Evergreen Economics. Needs Assessment for the Energy Savings Assistance and the California Alternate Rates for Energy Programs – Volume 1: Summary Report and Volume 2: Detailed Findings. November 25, 2013.

meets ESA's income eligibility criteria. This allowance enables tenants within the targeted building to self-certify their income eligibility to receive program services.

Recognizing that these exceptions to the existing income verification rules have already been adopted by the Program, the Cadmus team recommends the IOUs consider whether expanding the variances under which a ***building*** qualifies for relaxed income verification requirements would increase the number of tenants the program is able to identify and serve and offer other program benefits.

For example, this might include expanding the categorical eligibility concept to a building level by allowing documentation that certifies a building for any income-based subsidy program (e.g., Section 8, deed-restricted, HUD, TCAC, HCD or USDA) to serve as qualification to enroll tenants through a targeted self-certification process or to enroll the building based on assistance program documentation provided by the landlord or building owner and therefore bypassing individual tenant verification requirements. Buildings that meet this classification would be eligible for the same services provided by the current ESA Program under the 80%-20% rule (i.e., treating all eligible tenant units and installing building shell upgrades). It is important to note that the Commission is currently reviewing policies associated with categorical eligibility for individual households; therefore prudence dictates that decisions around expanding these rules be delayed until they can be informed by the results of this review process.

The evaluation of the ESA Program's categorical eligibility policies was limited to a review of whether the income qualification requirements for various programs were consistent with the ESA Program's requirements at the household level. The recommendation suggests that the IOUs and Commission expand on this to investigate the implications of applying categorical eligibility at the multifamily building level. This investigation would involve not only determining which buildings have income qualification requirements consistent with the ESA Program, but also the potential impact on the ESA Program of revising categorical eligibility policies in terms of the number of units likely to qualify under any new standard.

The potential benefits of expanding the rules that allow for relaxed income verification procedures at the building level include: administrative cost savings associated with a simpler verification process (building rather than tenant-based income verification); faster, less onerous process for program contractors, tenants and building owners (supporting the study research question "How can the current multifamily program offering, in particular the multifamily component of the ESA program, be modified to better meet the needs of low-income multifamily residents?"); and increased opportunity for the program to serve more income-qualified households. We note that this recommendation impacts a relatively small population of buildings, estimated at approximately 18,000 buildings or about 2% of the residential population or 6% of the low-income population, thus the potential benefits to the program overall are likely to be relatively small. Additionally, implementing the recommendation would increase program costs by enabling treatment of more tenant units, and potentially increasing the number of buildings to qualify for expanded measures under the 80-20 rule.

Under a less rigorous self-certification process, this recommendation may increase the potential risk of unqualified tenants receiving program services. However, the Cadmus team's research indicating that more than 90% of a building's units will be inhabited by low-income households during a three-year cycle, suggests that low-income households will eventually benefit from program efforts to treat all units in an otherwise income qualified building.

To determine the viability and potential costs and benefits of implementing this recommendation, the Cadmus team recommends additional research be undertaken first to determine whether potential building-level assistance programs' income eligibility requirements align with those of the ESA Program. Additional data and analysis are needed to accurately quantify the potential costs and savings associated with this recommendation, including:

- Calculate the average cost to income-verify a single unit.
- Quantify average energy efficiency savings available in a single unit.
- Determine the potential magnitude of buildings that qualify for housing assistance subsidies that have not already been addressed by the Program, and the number of untreated units within that population (taking care to accurately quantify the number of potentially qualifying units in buildings where individual units are treated but not the whole building).
- Calculate the total cost savings associated with not verifying income for every unit, individually, in the total population of potentially qualifying buildings.
- Calculate the cost of treating all untreated units in the population.
- Calculate the potential magnitude of energy savings that could be captured by treating additional units and buildings under the expanded rules.

(Relevant findings, including estimated costs to support this recommendation are provided under conclusion statements 6 and 7.)

Recommendations: Maximizing Cost-Effective Energy Savings

Guidance provided by the Commission and Decision 12-08-044 to strive for maximizing cost effective energy savings points toward a comprehensive approach to treating low-income multifamily buildings. This approach, in turn, requires that the ESA program treat building owners and managers as the customer and therefore requires an adjustment to the ESA Program's underlying marketing and delivery approach.

The research team recognizes that the IOUs have designed and implemented the ESA Program to comply with state level policies, rules and procedures and to achieve specific objectives associated with providing services to low-income populations (at the household level). The research team is not recommending that the ESA Program eliminate a tenant-based offering for multifamily residents of buildings whose owners are unwilling to pursue a whole-building approach, nor does it advocate that the ESA Program support upgrades that only benefit building owners. In implementing this report's recommendations, there are steps the IOUs can take to ensure that tenants benefit from larger upgrades that building owners undertake.

The recommendations offered below provide suggestions that entail more significant programmatic changes and potentially adjustments at a higher level than can be accomplished by the individual IOUs. They are, therefore, offered for consideration and further exploration with program sponsors and partners, stakeholders, and the Commission. In many cases, the research team does not have specific data to help inform the costs and potential benefits of implementing the recommendations; further research is recommended to determine the likely impacts of implementation.

1. ***Review the rationale behind the 80-20 threshold for treating all units and building shell to ensure it remains consistent with the current policy objectives.***

The Cadmus team understands that the rules requiring 80% of a building's tenants be income qualified to treat unoccupied units and the building shell were established with specific policy objectives in mind. However, adopting a lower threshold, such as, for example, the 66% threshold used by CSD, for qualifying unit upgrades building-wide could potentially produce benefits. Potential benefits could include reduced verification costs, and allowing the program to reach a greater number of low-income households and provide greater overall energy savings. Since low-income multifamily households are mobile and hard to reach, the advantage of income-qualifying a building at a lower threshold is that additional units can be treated, and over time, additional low-income multifamily households are likely to benefit. Aligning the building-level income qualification rules to be more consistent with the CSD program could also provide ancillary benefits such as reducing confusion, easing coordination between the two programs and contributing to the ESA Program's long term goal, but of course, lowering the threshold comes with additional cost.

Potentially negative consequences associated with this approach could include some risk associated with providing program services to non-income-eligible households, thereby straining program resources and/or diverting spending from other areas, e.g., the single family segment of the ESA Program, and inappropriately allocating ratepayer funds. Data were not available to determine the additional number of units and building shell upgrades that could potentially qualify if the rules for treating buildings were changed from 80% verification to 66% (or some other lower level of verification) and it is not known whether the administrative cost savings associated with a reduced verification burden would outweigh the additional resources required to address potentially non-eligible households. However, as we noted previously in this section, due to the level of mobility among renters in multifamily housing, and particularly in buildings where the majority of tenants qualify as low-income, it is likely that a qualified low-income tenant would benefit from installed upgrades at some point during the lifetime of installed equipment.

The Cadmus research team recognizes that income eligibility requirements around building upgrades are set by the Commission. It is important to note that the IOUs are implementing these programs with fidelity to current program rules. This recommendation considers an option that would involve rule changes. Therefore we recommend the Commission revisit the rationale behind setting the building level threshold at 80% within the context of current policy objectives and market characteristics.

Researching the impacts of lower eligibility criteria in other jurisdictions in greater detail can help inform this exercise.

If such a change is determined to be consistent with state and program objectives, the IOUs should work with the Commission to determine what would be involved in changing eligibility rules to be more consistent across programs. It is possible that with additional research, the Commission might decide that reaching every low-income single family household is more important, more feasible, and more cost-effective than reaching every low-income multifamily household. (Relevant findings to support this recommendation are provided under conclusion statements 8.)

2. Offer cost-effective common area measures and incentives that cover the incremental cost of central heating and cooling system replacements.

Cadmus' research found that a majority of building owners and operators of both low-income and market rate buildings make equipment upgrades only when the existing equipment fails and consider cost as a primary decision-making factor. Thus, these building operators are unlikely to opt for high efficiency equipment over standard efficiency models in emergency replacement situations; these decisions have 20-year implications and represent a lost opportunity to capture viable energy savings.

In buildings where 80% of tenants are income qualified (i.e., meet the 80-20 rule), we can assume that any ESA Program funds invested in central system upgrades in buildings where tenants pay their utility costs (or electricity and gas are included in the rent) would be consistent with existing program rules, produce tenant benefits and provide additional savings for the IOUs. Investments in brighter, safer hallway and parking lot lighting also contribute to tenant health, safety and quality of life, all objectives of the ESA Program.

The IOUs could consider offering incentives for common area and central system upgrades through the ESA Program under two possible conditions:

1. In low-income multifamily properties that qualify for whole-building shell upgrades currently under the 80-20 rule, and
2. In buildings where individual households that pay their own electricity and gas bills (or these costs are included in the rent) rely on central heating and/or cooling systems. Under these conditions, improvements made to central heating and cooling systems accrue directly to the tenants in the building and benefits are consistent with the ESA Program's mission.

Common area lighting measures are generally cost effective, as are some typical common-area direct installation measures (e.g., exit signs, vending machine controllers). These could be offered through a delivery mechanism, consistent with the MFEER program, for qualifying ESA Program buildings (possibly through pooled MFEER and ESA funding).

Through a building assessment that includes estimating the costs and savings of potential upgrades, the program can investigate the cost-effectiveness of installing larger measures such as central heating and cooling system upgrades. In cases where the building meets the qualification for central system

upgrades and the assessment finds upgrades to be cost-effective, the ESA program could offer incentives covering incremental costs of upgrading to higher efficiency equipment (above standard efficiency required by codes or standards).

In addition, the IOUs can offer support to identify and apply for available financing opportunities. As discussed in Section 7, there are a number of options available and the market is changing quickly. (A designated contact person, such as the single point of contact, who is aware of these and other options could guide building owners to appropriate financing.)

To help manage overall program costs and capture 20-year savings opportunities, we recommend offering central system incentives that cover the full incremental cost of high efficiency equipment when building owners are replacing failed equipment.

Typically, different contractors offer lighting and HVAC services. Common area measures could be offered in a staged approach, with direct install measures installed at the time of the assessment and larger measures installed at a later time. High efficiency lighting equipment could be installed while the building owner and contractor research the costs and feasibility of HVAC measures. A single point of contact approach could facilitate this research and work with the building owner to design a phased approach that best supports their needs.

(Relevant findings, including estimated costs to support this recommendation are provided under conclusion statements 2 and 4.)

3. Research building recapitalization cycles to inform marketing strategies that target building owners.

The IOUs could consider investigating and investing in a research strategy to identify buildings that are planning major recapitalization events to facilitate targeted, direct outreach to appropriate property owners. Our research findings indicate that a significant portion of buildings that conduct major building rehabilitation projects are those that qualify for housing subsidy programs. We estimate approximately 18,000 buildings fall into this category. Market rate housing may or may not undergo a comparable investment cycle.

Working with subsidized housing agencies can identify properties slated for recapitalization or other investments. The IOUs could develop a system to receive notice about buildings planning recapitalization through the Low Income Housing Tax Credit (LIHTC) administered by the State Treasurer's office. This information could help the IOUs to work closely with multifamily building owners to reach eligible low income customers. This is one area where information appears to be readily available and no regulatory changes are needed.

Research can be conducted to determine where (market rate and/or subsidized) building vintages indicate an upcoming need for upgrades, supported by building permit and land use data to identify an approximate schedule of upgrades. The IOUs may also wish to coordinate with banks and lenders that

are active in (low-income) multifamily property investment to develop communication strategies that might help inform targeted outreach and schedules.

As major building rehabilitation projects would likely benefit from a whole-building approach, we recommend that ESA Program staff work closely with the EUC MF program to develop a plan for implementing this strategy. Using an integrated implementation approach will further enable ESA and EUC MF to provide services that benefit low-income tenants while producing significant energy savings.

Because building recapitalization events are likely infrequent and irregular, the Cadmus team recommends using this research to conduct targeted, in person outreach, rather than developing general marketing messages and materials.

(Relevant findings to support this recommendation are provided under conclusion statement 10.)

4. Identify options for integrating the ESA Program with MFEER and/or EUC MF to create a comprehensive project path for multifamily building owners.

Some strategies advocated by the Commission in Decision 12-08-044 and multiple findings in our research point to the need for better coordination between the suite of California's programs serving multifamily buildings and a higher level of technical and administrative support. Creating low-income incentives within the existing market rate multifamily programs coupled with a higher level of program integration and technical support would effectively enable the ESA Program to offer comprehensive services for low-income multifamily buildings. Potential advantages of using a more integrated approach include filling the gap in the existing California programs by encouraging central system and common area upgrades in low-income multifamily buildings, maximizing energy savings in buildings that qualify for larger upgrades, providing healthier and safer buildings for low-income tenants, and mitigating energy cost increases to building operating expenses. Also, a whole-building implementation path could be offered specifically for low-income multifamily properties within the existing MFEER and/or EUC MF programs. [117]

Early results from the EUC MF program's first year of implementation in PG&E's territory indicate that there is interest among low-income multifamily building owners and operators in installing more comprehensive building upgrades, as nine participants in the pilot phase of the program are deed restricted buildings.

[117] The net impact on employment resulting from adding a whole building option to the current low-income multifamily program landscape is not clear. Contractors currently focused on recruiting and treating ESA Program participants at a unit level would continue to be needed.

Implementing this recommendation will require careful consideration of several key features:

- Delivering broader building wide energy efficiency services will require enabling low-income multifamily buildings to participate in the more comprehensive audit processes offered through MFEER and EUC MF as a key first step to ensure that all available *cost-effective* upgrade opportunities are captured. The MFEER program offers two tiers of building assessment with different levels of rigor based on the building type and property owner or managers' project objectives. EUC MF also provides a comprehensive, whole-building assessment at a cost to the program of $5,000 to $10,000 per building depending on building size, as shown in Table 70.

Table 70. Building Assessment Cost Estimate

Service/Measure	Specification	Incremental Cost
Whole building assessment*	5-20 units	$5,000
	21 -100 units	$10,000

* In EUC MF, a $5,000 incentive is offered for building assessments in properties with 5-20 units (SoCal REN) or 5-30 units (PG&E); and a $10,000 incentive for assessments in properties with 21-50 units (SoCal REN) or 31-100 units (PG&E). See Table 59.

- The building owners and operators will need to be treated as the program participant since they have the decision making authority for expenditures and measures installed. This approach will entail adopting a marketing strategy that targets building owners and operators and aligns messaging with the benefits of building upgrades from an investment perspective.
- To support a multi-program implementation approach, the IOUs should implement a new role for a program-wide intake contractor or internal program staff to screen potential building owner and tenant participants, and to help them determine which program(s) may be best suited to meet their individual needs and the participation approach that offers the greatest benefit. The IOUs have already begun efforts to implement a higher level of technical support through a single point of contact in the MF EUC program. In a more integrated multi-program delivery strategy, expanding the role of this single point of contact to include broad services across programs with support for all building segments (including for low-income multifamily buildings) could serve several functions.

  The single point of contact's responsibilities may include supporting participants to: [118]
  - Navigate the various program options available to them based on eligibility criteria and their likely approach to upgrading the building;
  - Complete the income verification and application processes;

[118] The discussion of the comparison programs noted the single point of contact typically plays a somewhat broader role than proposed here. In the comparison programs, the contact person also typically provides technical support in conducting or reviewing the assessment, helping to define the scope of work, helping to evaluate contractor bids, and overseeing installation. In the MF EUC plans, a HERS rater, who is separate from the SPOC typically takes on this technical function. The contact persons for some of the comparison programs are also knowledgeable about the financing options for retrofits available to building owners.

- Identify and apply for available financing options; and
- Select qualified installation contractors.

The multifamily programs could pool their resources to provide this level of intake and technical support services through a third party contractor, state agency, or internal program staff – —spreading the cost across the programs targeting multifamily buildings and minimizing the potential competition between them.

In this scenario, it will be important to structure the single point of contact as a "program-neutral" feature, whereby technical support does not emphasize one program's offering over another.[119]

To specifically address the capital constraints common for low-income buildings, the IOUs could provide larger incentives for low-income multifamily buildings treated through MFEER and EUC. Each program offers measures and an incentive structure that is well suited to multifamily housing; however, higher incentives may be needed to help overcome cost barriers prevalent in low-income multifamily housing. The need for these buildings to receive higher incentives does not come from the personal incomes of the owners but from the market they serve. That is, there is less opportunity for these owners to increase rents to cover the costs of upgrades or to market their building as "green," which effectively makes retrofits more costly and requires higher incentives.

Consider the following:

- Offer free direct installation measures for multifamily building common areas, consistent with measures provided by MFEER and EUC MF during the comprehensive assessment phase.
- Prescriptive incentives offered through the MFEER program should be analyzed to determine whether higher incentive levels are needed to overcome cost barriers in the low-income segment. Incentives for cost effective measures such as common area lighting could be designed to cover the full project cost. Incentives for large upgrades such as central heating and cooling system replacements could be designed to cover the full incremental cost and offered to building owners replacing equipment at the end of its useful life.
- Custom incentives for whole building upgrades offered through the EUC MF program could offer either a higher performance based incentive to overcome low-income cost barriers, or a per-unit adder based on the number of verified low-income tenant units in the building. As

[119] As stated in the Commission Decision 12-08-044 Section 3.10.6.4, the study shall "Review and investigate coordination concerns related to any new delivery methods that streamline the ESA process with external financing and energy efficiency options such as how a single point of contact will be responsible for coordinating IOU-administered energy efficiency, renewable, incentive, and financing programs as well as non-IOU-administered, external multifamily efficiency, renewable, incentive, and finance programs in California."

in the comparative programs examined, the adder could be contingent upon installation of all cost effective measures in each apartment unit. [120]

- To facilitate consideration of this recommendation, we provide some information on the estimated costs of installing common area and central system measures on a per building basis in Table 61. As the EUC MF program continues to evolve, it is likely to provide useful data on potential program costs and benefits that could be expected from implementation of these strategies.
- To streamline delivery among the various available multifamily programmatic options, the IOUs should consider methods to synchronize the program's policies and procedures related to installation contractors. This could include developing consistent contractor qualification protocols, a single application process across all multifamily programs, using similar contractor participation requirements, providing contractor training that touches all programs, and using analogous quality control procedures.

We understand that this recommendation entails expanding the offering currently available to ESA participants beyond the tenant-focused approach and addressing low-income customers' needs at a building level. Further, this recommendation likely will require an institutional change to the ESA Program and Commission involvement. However, it is important to note that adopting a whole building strategy will have these results:

1. It will benefits low-income tenants by increasing the comfort and safety of the building as a whole and by mitigating building operating costs which can help mitigate potential rent increases; in some cases, upgrades may reduce tenant utility costs directly.
2. It is consistent with direction provided via the Commission, in the California Long-Term Energy Efficiency Strategic Plan and in Decision 08-11-031 that the ESA program must evolve into a resource program that garners "significant energy savings" while providing an improved quality of life for California's low-income population and with the ALJ's recommended Strategies 3, 4, and 5 which suggest a desire for the ESA Program to work more directly with multifamily building owners and managers and provide a more comprehensive whole-building energy assessment by better leveraging other existing multifamily programs.[121]

[120] Installing all cost effective measures within a tenant unit as a condition of the receiving the adder, and/or not raising rents, may be challenging to enforce. However, one jurisdiction reported that as part of tenant's energy education, the tenant is informed the landlord agreed not to raise rents. The jurisdiction follows up with building owners after tracking a year of post-retrofit billing data to discuss how the owner is using the cost savings. If the building owner does not comply, they are not eligible for future program (many participants have multiple buildings). Some building owners have had to pay back the incentives they received when they sell the building to someone who will not keep the rent affordable.

[121] California Public Utilities Commission Decision 12-08-044. August 23, 2012. Section 3.10.6.3.

In consideration of this recommendation, it will be important for the IOUs and the Commission to carefully weigh the potential costs and benefits to each program, funding allocations, impacts on the programs' overall cost-effectiveness, logistics and program delivery constraints, and feasibility.