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Abstract

In 2012, the California Public Utility Commission authorized two new program administrators to conduct ratepayer funded energy efficiency programs in the State of California. Authorized as provisional pilots, the Regional Energy Networks (RENs) operate independently of the Investor Owned Utilities (IOUs) (i.e., the RENs design and administer energy efficiency programs without utility oversight). The two RENs operate with a two-year budget of approximately $67 million or 2.6% of California's $2.6 billion 2013–2014 energy efficiency portfolio budget.

This study summarizes research on the RENs' value and effectiveness. The Consultant Team gathered primary data via participant surveys for three of the 17 programs in the RENs portfolios and in-depth interviews with REN and IOU staff. The Consultant Team also conducted a secondary review of program tracking data and other program materials.

For the purposes of this study, the RENs will have demonstrated value if their programs, as implemented, break new ground in areas not presently served by utilities, if their activities and programs have the potential to be widely replicated, or if their programs serve hard-to-reach markets. Additionally, the RENs would have demonstrated value if their activities promote Workforce Education & Training (WE&T), technology development, or the water-energy nexus. Positive program participant perceptions of the RENs are considered a strong indicator of value.

Study findings were that the RENs provided technical expertise that was beneficial. Close to two-thirds (64%) of BayREN Home Upgrade Advisor participants described some sort of benefit with the technical expertise provided by the Home Upgrade Advisor. Additionally, participants found the Advisor professional, knowledgeable, and responsive to their needs. All SoCalREN Public Agency Program participants stated that, as a result of the program, they now had access to such technical services as audits, design, or construction management assistance, and 93% of the participants indicated that they had access to EE expertise that their organizations did not have. Three-quarters of participants stated that working with the Public Agency Program reduced the amount of time needed to implement projects. Across the board, participants indicated a high level of knowledge by the SoCalREN team implementing the Public Agency Program (scores from 9.2 to 9.6 on a 0–10 scale where 10 is completely knowledgeable.)

The RENs will have demonstrated effectiveness if the RENs clearly show an ability to manage program implementation and adjust to necessary changes as they arise. Additionally, the RENs would be considered effective if program participants are satisfied and the RENs successfully mitigated program participants' challenges.

The study findings were that the RENs put in place and successfully implemented their $67 million portfolio within an 18-month period. This is commendable, especially given the high level of coordination required between the RENs and the IOUs to determine in how to create and deploy programs that target the same pool of customers. The three programs studied all had high levels of customer satisfaction, which indicates good management and effective service delivery. Additionally, the RENs navigated the new regulatory environment with some difficulties to begin with, but are now performing adequately (according to ED staff). A six-month regulatory delay occurred in the start-up of the RENs that the management of both RENs successfully overcame, although the delay made it difficult for the RENs to meet previously planned participation goals.

Glossary

To assist the reader, this section includes a list of abbreviations used throughout the report. This list does not include all abbreviations used in the report, only key terms that may help a reader who is not familiar with the area.

Abbreviations	Definitions
AAPOR RR1	American Association for Public Opinion Research Response Rate 1
AB32	Assembly Bill 32
ABAG	Association of Bay Area Governments
ARRA	American Recovery and Reinvestment Act of 2009
BayREN	Bay Area Regional Energy Network
BKi	Bevilacqua Knight Inc.
C&S	Codes and Standards
CALMAC	California Measurement Advisory Council
CAP	Climate Action Plan
CDC	Community Development Commission
CEEPMS	Community Energy Efficiency Project Management System
CHERP	Community Home Energy Retrofit Program
CPUC	California Public Utilities Commission
DSM	Demand Side Management
EBMUD	East Bay Municipal Utility District
ECC	Emerald Cities Collaborative
ED	Energy Division
EE	Energy Efficiency
EM&V	Evaluation, Measurement, and Verification
EUC	Energy Upgrade California
FTE	Full-Time Equivalent
GHG	Greenhouse Gas
HVAC	Heating, Ventilation, and Air Conditioning
IDEEA	Innovative Designs for Energy Efficiency Activities
IOU	Investor-Owned utility
LA	Los Angeles
LARC	Los Angeles Regional Collaborative for Climate Action and Sustainability
LGP	Local Government Partnership
MCE	Marin Clean Energy
ME&O	Marketing, Education, and Outreach
MFEER	Multifamily Energy Efficiency Rebate
MOU	Memorandum of Understanding
MUSH	Municipal, University, School, and Hospital
NAR	National Association of Realtors
PAC	Program Administrator Cost
PACE	Property Assessed Clean Energy

Abbreviations	Definitions
PAYS®	Pay As You Save®
PG&E	Pacific Gas & Electric Company
PIP	Program Implementation Plan
PPM	Program Performance Metrics
PROP	Permit Resource Opportunity Program
RCPA	Regional Climate Protection Authority
REN	Regional Energy Network
SCE	Southern California Edison
SCG (SoCalGas)	Southern California Gas Company
SEEC	Statewide Energy Efficiency Collaborative
SFPUC	San Francisco Public Utilities Commission
SoCalREN	Southern California Regional Energy Network
TEC	The Energy Coalition
TEN	The Energy Network
TRC	Total Resource Cost
UCLA	University of California, Los Angeles
WE&T	Workforce Education and Training

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Executive Summary

In 2012, the California Public Utility Commission (CPUC) authorized two new program administrators to conduct ratepayer funded energy efficiency programs in the State of California. Authorized as provisional pilots, the Regional Energy Networks (RENs) operate independently of the Investor Owned Utilities (IOUs) (i.e., the RENs design and administer energy efficiency programs without utility oversight) and implement programs that the IOUs cannot or do not intend to do. The CPUC requires that the RENs address hard-to-reach markets and test programs that have the potential to be replicated. The two RENs operate with a two-year budget of approximately $67 million or 2.6% of California's $2.6 billion 2013–2014 energy efficiency portfolio budget.

To test the feasibility of this new program administrator model, the CPUC authorized the San Francisco Bay Area Regional Energy Network (BayREN), spanning nine member counties entirely within the Pacific Gas & Electric (PG&E) service territory, and the Southern California Regional Energy Network (SoCalREN), which spans most of the Southern California Edison (SCE) and Southern California Gas Company (SCG) service territories. The BayREN administers seven distinct programs that focus on residential, commercial and multifamily customers; SoCalREN has 10 programs that focus on both residential customers and public agency organizations.

This report summarizes research on the RENs' value and effectiveness. Part of the study's purpose is to inform the CPUC on key performance aspects of the RENs that would be considered in weighting whether the RENs should be continued and/or expanded. Specifically, the CPUC would like to know if the RENs are fulfilling designated charter assignments, providing value to the State, and performing effectively.

The Consultant Team gathered primary data via participant surveys from three of the 17 REN programs and in-depth interviews with REN and IOU staff. The Consultant Team also conducted a secondary review of program tracking data and other program materials. These data sources inform the conclusions and provide the basis for recommendations within this report. In addition to this study, the CPUC has commissioned four additional studies to inform its decision as to whether to continue and/or expand the RENs. Those studies are either in the planning stages or in progress, with expected completion by the end of 2016.

Summary of Findings and Conclusions

Value

For the purposes of this study, the RENs will have demonstrated value if their programs, as implemented, break new ground in areas not presently served by utilities, if their activities and programs have the potential to be widely replicated, or if their programs serve hard-to-reach markets. Additionally, the RENs would have demonstrated value if their activities promote Workforce Education & Training (WE&T), technology development, or the water-energy nexus. Positive program participant perceptions of the RENs are considered a strong indicator of value.

The Consultant Team found some level of value in all areas assessed, but as indicated above, the primary data collection was from three of the 17 programs and REN and IOU staff. The findings below derive from both primary and secondary information.

- **EE programs new to California that hold potential for energy savings:** The RENs unveiled to the California EE community two new programs in the 2013-2014 program cycle that, although presently non-resource programs, hold potential to contribute to State energy savings goals: Pay As You Save® (PAYS) and two Southern California Regional Energy Center (SoCalREC) software packages.

- **BayREN PAYS:** The BayREN PAYS program addresses the water-energy nexus and deploys new and existing water-saving technologies. Akin to an on-bill financing program, customers pay for the implementation of the program on their water bills. Energy ratepayer funds support the program design and assure availability of technical assistance in the early stages of water agency implementation. The program promotes water and energy savings, in turn lowering consumer water and electric costs. Additionally, energy savings accrue from the embedded energy savings that water conservation brings. Measures include ultra-efficient indoor water saving devices, drought tolerant landscaping, and weather-based irrigation controls. BayREN PAYS pilots were first started in 2012, funded through a Better Building Program grant administered by the Sonoma County Regional Climate Protection Agency (RCPA). As of July 2015, two communities are implementing PAYS – the Town of Windsor and the City of Hayward..
- **SoCalREN software packages:** SoCalREN (through its Regional Energy Center, SoCalREC) assists local governments in tracking and building energy use and upgrade requirements via software packages. The first software package tracks energy use across several facilities. As of the end of 2014, 56 local governments have licensed this software through SoCalREC and are monitoring nearly 150 buildings. The second software package, now in the prototype phase, is an online building permitting software platform that lends local governments greenhouse gas (GHG) reduction tracking capability. SoCalREC has developed two prototypes and one local government has enrolled for product launch.

- **Program Overlap**: Overlap of customers is present, but services offered are distinct. Within the assessed programs, both the REN and IOU staff agreed that the Home Upgrade offerings vary, as do the offerings within the Public Agency Program. The multi-family programs also include the same customers, although BayREN program has experienced significant participation by market-rate buildings and PG&E has primarily served low-income complexes. Within SoCalREN, IOU account representatives often market both the IOU and SoCalREN multifamily program to customers.
- **Hard-to-Reach Populations:** The RENs are supporting energy efficiency in hard-to-reach markets, specifically in the Multifamily sector. The RENs employ Spanish speakers for outreach and marketing of the Home Upgrade program to non-English-speaking households.
- **Perceptions by program participants:** The RENs provide beneficial technical expertise to program participants. The Consultant Team found value in all three programs studied (BayREN Home Upgrade Advisor, SoCalREN Public Agency Program, and PAYS). Close to two-thirds (64%) of BayREN Home Upgrade Advisor participants described receiving benefit from the technical expertise of their Home Upgrade Advisor. Participants found the Advisor professional, knowledgeable, and responsive to their needs. All SoCalREN Public Agency Program participants said they now had access through the program to technical services such as audits, design, or construction management assistance. A large majority of the Public Agency Program participants (93%) indicated that they also have access to energy efficiency expertise that exceeds that of their local agency. Within the Public Agency Program, three quarters of participants said that working with the program reduced the amount of their time needed to implement projects. Across the board, participants indicated a high level of knowledge by the SoCalREN team implementing the Public Agency Program (i.e., scores from 9.2 to 9.6 on a 0-10 scale where 10 is completely knowledgeable.) The three water utilities that received support to develop and enhance a PAYS program also found value in the assistance that BayREN provided.

Effectiveness

The RENs will have demonstrated effectiveness if the RENs clearly show an ability to manage program implementation and adjust to necessary changes as they arise. Additionally, the RENs would be considered

effective if program participants are satisfied and the RENs successfully mitigated program participants' challenges.

The RENs successfully navigated the CPUC regulatory environment and mitigated administrative challenges to bring their $67 million dollar portfolio of programs to fruition within 18 months.

- **Navigating the regulatory environment:** The RENs have successfully surmounted significant barriers to entry and have gained proficiency within the complex energy efficiency regulatory environment. As new program administrators, the RENs by necessity had to navigate the complex and rigorous regulatory processes that the IOUs had been responding to for years. This includes filing program implementation plans, preparing advice letters, preparing cost-effectiveness calculators, and responding to data requests and proceeding comments. In early 2013 as the RENs were submitting their first round of compliance documents such as E3 calculators, there was a tremendous learning curve and the RENs experienced difficulties. Recent interviews reveal that RENs staff now indicates that they have developed adequate processes for managing regulatory processes; Energy Division (ED) staff generally concurs with this opinion.
- **Adjusting to management challenges:** The RENs responded well to management challenges. When faced with delays in CPUC decision making and funding, the RENs took stock, made adjustments, and responded to mitigate the late start and to advance their goals in a responsive manner.
  - For example, SoCalREN explained that they cut some non-resource activities in order to meet resource activity goals under a constrained timeframe. To help with the multiple regulatory requirements, the Association of Bay Area Governments (ABAG, the lead agency for BayREN) added an assistant to manage most regulatory processes for BayREN.
  - Another management challenge mentioned by both RENs was that the Home Upgrade Single-Family programs' designs required significant re-tooling. According to SoCalREN, in the initial Home Upgrade design, the incentive levels were too low, the incentives calculations were too complicated, and the application process was too difficult for customers. To address this, SoCalREN developed what they considered to be a more attractive incentive structure (replicated statewide), more streamlined program requirements and simplified prescriptive rebates. BayREN staff indicated that the Home Upgrade Single Family program also had initial design issues. Improvements in conversion rate data over time for the BayREN Home Upgrade program support an effective management of program implementation activities.
- **Program participant satisfaction and benefits:** Program participants have high satisfaction. The high level of satisfaction noted from surveyed respondents across the three different programs demonstrates effective program service delivery. Additionally, REN staff implementing the studied programs —i.e., BayREN Home Upgrade Advisor staff and SoCalREN Public Agency Program staff — are effectively assisting participants in overcoming challenges they face in planning, procuring, and completing energy efficiency projects.

Informing CPUC Policy

The CPUC seeks to better understand the differences between the two REN models as well as whether the REN non-resource programs are scalable.

- **Scalability of present offerings, ability to add new programs, and adding new RENs:** Existing program offerings can be replicated and scaled up but as explained below, new REN programs may encounter added difficulty and new RENs could face significant barriers to entry.
  - The management structures of the RENs allow for scaling up of existing small-scale efforts because they use consultants for program implementation. The RENs have demonstrated the

management capability to oversee consultants; the RENs and their implementing consultants are performing well in the three studies programs mentioned previously.

- If provided an opportunity to add new programs, the SoCalREN model may have a slight advantage over the BayREN model because of its fewer number of applicable decision makers, but both would potentially face challenges with oversight of a new program.
  - Within the SoCalREN model, the choice to pursue a new program is made by a single organization, although the Advisory Committee (composed of several local governments) likely would provide guidance on the appropriateness of any new program. BayREN has an additional coordination hurdle to overcome, as five of its nine members would need to agree to add a program.
  - For any new proposed program considered by BayREN, a lead agency would need to volunteer to manage any necessary consultant. Because BayREN member county staff reps indicate that they are often serving close to full time in their REN capacities, it may be problematic to shoulder additional work responsibility.[1] SoCalREN, with fewer full-time in-house staff, may have a slightly lower ability to oversee a new program.
  - Examples of potential areas for new programs, submitted by the REN staff, include a regional code compliance "clearing house", small business programs, agriculture, and Integrated Demand Side Management pilots for local governments.
- Since the existing RENs cover a large part of the IOU service territories, the primary geographic areas remaining within California to potentially establish a new REN would be within those areas defined by the central coast, the northern coast, the Sierra, the Central Valley, and San Diego County.
  - Collaboration was a key factor to successfully launching an existing REN given the significant time investment and consensus building required across multiple local government agencies.
  - Because in-person meetings are generally superior for building rapport and promoting diplomacy, the existing RENs enjoyed a comparative advantage in terms of their proximity to the IOU main offices. For any new REN, in-person meetings with the IOUs could prove to be time consuming and costly with the exception of the San Diego region.
  - Additionally, the existing RENs indicated that any new REN would incur costs at several levels, with the initial investment estimated by one person at about $250,000 for those startup costs not supported by the State (a cost that may prove prohibitive to smaller organizations and less affluent local governments). There are also the ongoing costs of collaboration among program administrators, which increases program costs.

Recommendations

The study supports a few specific recommendations and five areas to consider for any new potential REN.

- **The RENs should continue.** They should continue owing to the value that they demonstrate to their constituencies (within the three programs studied most closely) in several important areas: technical expertise, targeting hard-to-reach markets, and linkages with other utility offerings. While the study

[1] According to BayREN, with additional resources they would have the ability to add new programs without difficulty.

found value as described, this study is indeterminate on whether the RENs should continue as program administrators in either a probationary or a permanent status.

- **The RENs should maintain their new programs and document customer response**. Both the PAYS program and the two software packages within SoCalREC are new and their full potential is uncertain. They are providing value now in the form of new technologies and savings via a water-energy nexus, but both have few participants. Tracking uptake will help the RENs determine whether customers find the program designs appealing enough to participate or if design changes are necessary.
- **The RENs and IOUs should ensure tracking of key pilot metrics in order to compare activities across program administrators.** The RENs believe that their relationships with local governments (and with community organizations) increase long-term energy savings. One way to determine this is to track specific metrics such as conversion rates. For example, BayREN Home Upgrade did track conversion rates (which increased from 4% in 2013 to 19% in 2014). If this metric were available for both SoCalREN and the IOUs, a stronger correlation would emerge of the presence or absence of an advantageous influence of the RENs relationship.

If the CPUC were to invite applications for new proposed RENs, this study identified several areas to consider. The CPUC could potentially benefit by:

- Creating a set of guidelines regarding the full regulatory processes by which any new proposed REN would be expect to adhere. This would reduce uncertainty about the significant coordination, time, and cost required in becoming a REN.
- Providing seed money to assist a new potential REN with preparing its first set of regulatory filings.
- Allowing for a prudent increase in administrative costs to facilitate collaboration through in-person meetings.
- Reviewing the associated Energy Division staffing requirements for overseeing additional RENs to assure appropriate coverage for ongoing interactions with additional program administrators.
- Assuring that any new REN leverages and borrows from the experience, models, and lessons learned from the existing RENs.

1. Introduction

In 2012, the CPUC created two Regional Energy Networks (RENs) to administer EE programs in Northern and Southern California. The RENs grew out of past efforts by local governments through the federal American Recovery and Reinvestment Act of 2009 (ARRA) and were established by CPUC Decisions D.12-05-015 and D.12-11-015. With a two-year budget of approximately $67 million, the RENs account for 2.6% of California's 2013–2014 EE portfolio budget of $2.6 billion. Independent of the IOUs, but supported by ratepayer funds, the RENs are unique. The CPUC evaluated initial REN proposals on the following criteria: undertake activities that the utilities cannot or do not intend to do, perform pilot activities that have the potential for scalability to a broader geographic reach, and take on pilot activities in hard-to-reach markets..[2]

1.1 RENs Overview

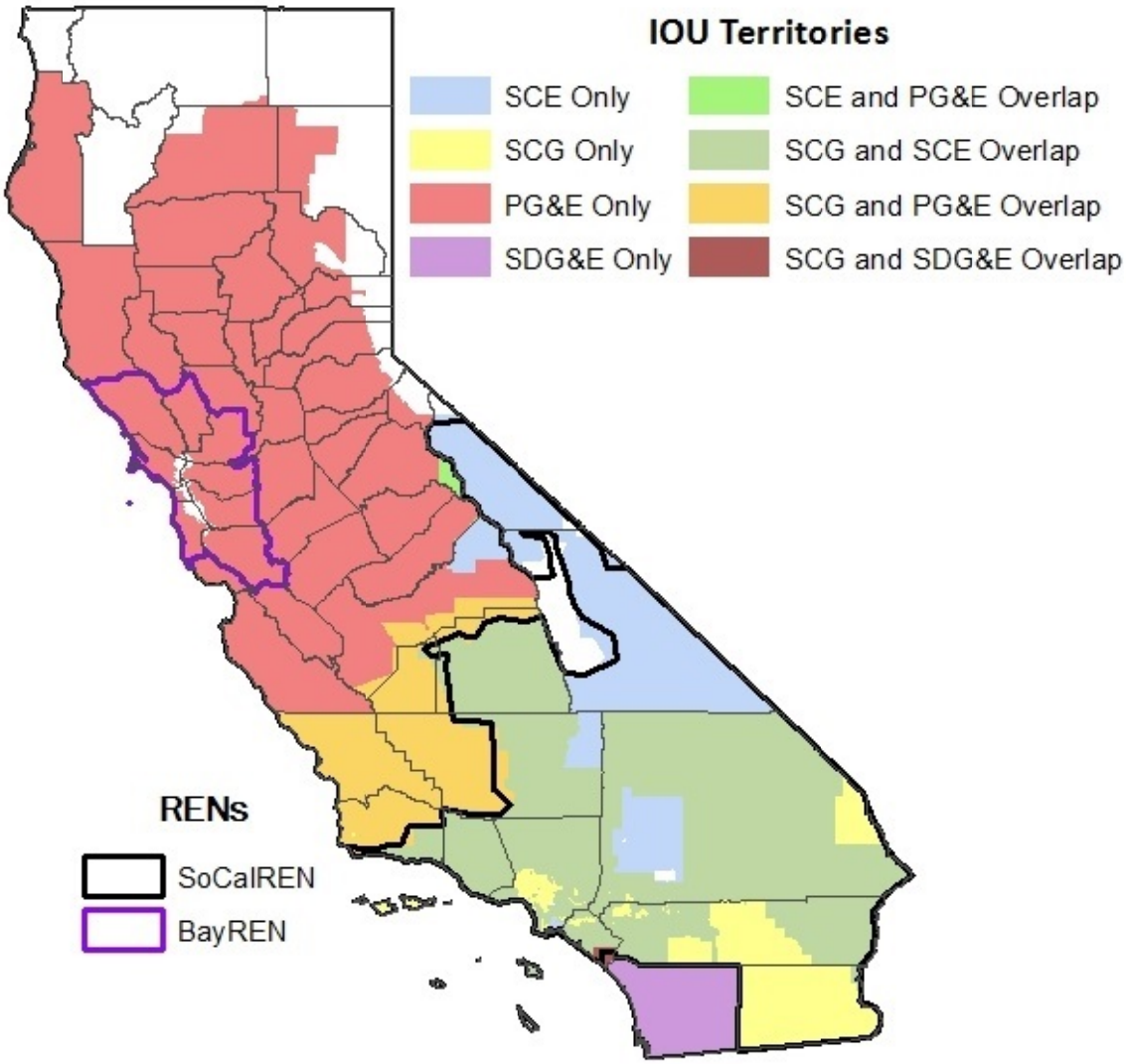
The BayREN is entirely within the PG&E service territory. The SoCalREN covers much of the SCE and SCG service territories. Although SoCalREN markets itself as The Energy Network (TEN) within its territory, the term SoCalREN is used here to maintain clarity between the two RENs examined in this study. Figure 1, below, shows the coverage areas of the two RENs, and listed in Table 1, below.

Table 1. Counties covered by the two RENs

BayREN	SoCalREN
1. Sonoma 2. Napa 3. Marin 4. Solano 5. San Francisco 6. San Mateo 7. Contra Costa 8. Alameda 9. Santa Clara	1. Los Angeles 2. San Bernardino 3. Riverside 4. Ventura 5. Inyo 6. Imperial 7. Mono 8. Orange (partial) 9. Kern (partial) 10. Tulare (partial) 11. Santa Barbara (partial) 12. Kings (partial)

[2] D.12-11-015 (November 2012)

Figure 1. Map of BayREN and SoCalREN



Sources: Geographic information system (GIS) mapping from the California Energy Commission site for IOU service territories, GIS mapping from SoCalREN, knowledge of counties covered by BayREN.

1.2 Background on the RENs

In guidance Decision D.12-05-015 (May 2012), the CPUC invited local governments to submit proposals to provide PIPs and budgets for regional energy efficiency (EE) pilots. Local governments were required to demonstrate the extent to which the pilots would:

- "Leverage additional state and federal resources so that EE programs were offered at lower cost to ratepayers,
- Address the water-energy nexus,

- Develop and deploy new and existing technologies,
- Address workforce training issues, and
- Address hard-to-reach customer segments, such as low- to moderate-income residential households and small- to medium-sized businesses."[3]

In authorizing REN pilots in the 2013–2014 funding cycle portfolio, the CPUC provided coalitions of local governments the opportunity to develop records of accomplishment as administrators of EE programs. As such, a key objective underlying the proposed REN pilots was to determine whether local governments are capable of planning and administering EE programs "without utility interference or direction as it relates to the design and delivery of their programs".[4] Recognizing that there would be a "learning curve"[5] with significant start-up costs, D.12-11-015 declined to establish a "threshold cost-effectiveness level"[6], either Total Resource Cost (TRC) or Program Administrator Cost (PAC), for the REN pilots during the 2013–2014 funding cycle. The CPUC extended this special exception to 2015 (the one-year extension of the EE portfolio funding cycle).[7]

Applicants developed proposals that responded to the five criteria above. However, the CPUC's stated criteria for evaluating proposals changed slightly within budget Decision D.12-11-015 (November 2012), Thus, expectations for the RENs were re-characterized as three criteria requiring that the RENs support:

- "Activities that utilities cannot or do not intend to undertake,
- Activities for which there is no current utility program offering and for which there is the potential for scalability to a broader geographic reach, if successful, and
- Activities in hard-to-reach markets, whether or not there is currently a utility program that may overlap."[8]

In November 2012, the CPUC approved two RENs, BayREN and SoCalREN, weighing some combination of both sets of screening criteria and authorized the RENs to begin service in January 2013. Due to additional IOU reimbursement contract requirements and additional CPUC submittal requests -- including revised and corrected cost-effectiveness calculators -- the RENs received final CPUC approval to begin offering EE services in July 2013, with many programs rolling out by September 2013.[9]

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[3] D.12-05-015, pages 149–150.

[4] D.12-11-015, page 11.

[5] D.12-11-015, page 14.

[6] D.12-11-015, page 19.

[7] Regardless of this exception, the CPUC expects the RENs to estimate the cost-effectiveness of their pilots via cost-effectiveness calculators.

[8] D.12-11-015, page 17.

[9] Subsequent to the issuance of D.12-11-015, the BayREN, on January 14, 2013, submitted Advice Letter 1, which included a revised PIP. On April 2, 2013, in compliance with Ordering Paragraph 5 of D.12-11-015, the IOUs and RENs filed revised PIPs in a joint Advice Letter for the Energy Upgrade California Enhanced Basic and Modified Flex Path programs (renamed to Home Upgrade and Advance Home Upgrade, respectively), requesting approval for program changes directed in the Decision. On May 31, 2013, the ED partially approved the joint Advice Letter via Disposition Letter, and directed the administrators to file a Tier 2 Advice Letter to address the issues that were deemed non-compliant. An additional Advice Letter was filed on July 14, 2013, and was approved later that summer. On May 8,

1.2.1 Portfolio of Programs

While the RENs continue to implement programs in 2015, this study covers only the first 18 months (June 2013 to December 2014). Therefore, although there may be changes in the portfolios of the two RENs in 2015, these changes are not included in this report.

1.2.2 2013–2014 REN Budgets

The RENs offer different suites of programs to their constituents, although both include Energy Upgrade California (EUC) and Financing program activities (see Table 2 and Table 3, below).

Table 2. SoCalREN Programs and 2013–2014 Budgets

Programs	2013–2014 Budget
EUC – 6 programs	**$ 21,158,104**
Multifamily	$ 9,543,801
Single-Family	$ 4,616,309
Local Marketing and Outreach	$ 3,273,744
Green Building Labeling	$ 2,010,000
Contractor Training and Outreach	$ 1,014,250
Low-Income Single-Family	$ 700,000
Regional Energy Center[a]	**$ 16,586,725**
Financing – 3 programs	**$ 5,558,499**
Single-Family Loan Loss Reserve	$ 3,475,000
Non-Residential Property Assessed Clean Energy (PACE)	$ 1,411,500
Public Agency Financing Assistance	$ 671,999
Total	**$ 43,303,328**

Note: Budget source is Page 8, Advice Letter 3, 2013-2014 Budgets, March 26, 2014.

[a] This includes the following activities: Aggregated Regional Procurement; Integrated Comprehensive Whole Building Retrofits (including Data Management and Benchmarking); Enterprise Energy Management Information System (EEMIS); Climate Action and Energy Plan; Water-Energy Nexus Pilot; Marketing, Outreach, Education, and Training; Workforce Development; and Energy Project Tracking and Permitting.

2013, BayREN, after receiving feedback from subject matter experts within the ED, filed a Second Amended PIP proposing slight modifications to all program offerings. On June 11, 2013, the CPUC approved the Second Amended PIP. The Multifamily Capital Advance and Single Family Loan Loss Reserve programs were part of a separate Financing decision released after the Energy Efficiency decision.

Table 3. BayREN Programs and 2013–2014 Budgets

Programs	2013–2014 Budget
Energy Upgrade California – 2 programs	**$ 18,393,644**
Single-Family	$ 6,744,779
Multifamily	$ 11,618,865
Codes and Standards (C&S)	**$ 2,761,418**
Financing – 3 programs	**$ 2,633,659**
Multifamily Capital Advance	$ 1,605,928
PAYS® Water Efficiency Pilot	$ 721,612
Commercial PACE Administration and Marketing	$ 306,119
Total	**$ 23,788,721**

Note: Budget source is Page 8, Advice Letter 3, 2013-2014 Budgets, March 26, 2014.

1.2.3 Structure and Governance Model

SoCalREN encompasses the seven counties of Los Angeles (LA), San Bernardino, Riverside, Ventura, Inyo, Imperial, and Mono, as well as portions of Orange, Kern, Tulare, Santa Barbara, and Kings counties. BayREN encompasses the nine Bay Area counties of San Francisco, Santa Clara, San Mateo, Alameda, Contra Costa, Solano, Napa, Sonoma, and Marin. The RENs differ in geographic size, budget, and governance structure (see Table 4, below).

Table 4. Summary of the RENs Organizational Structures

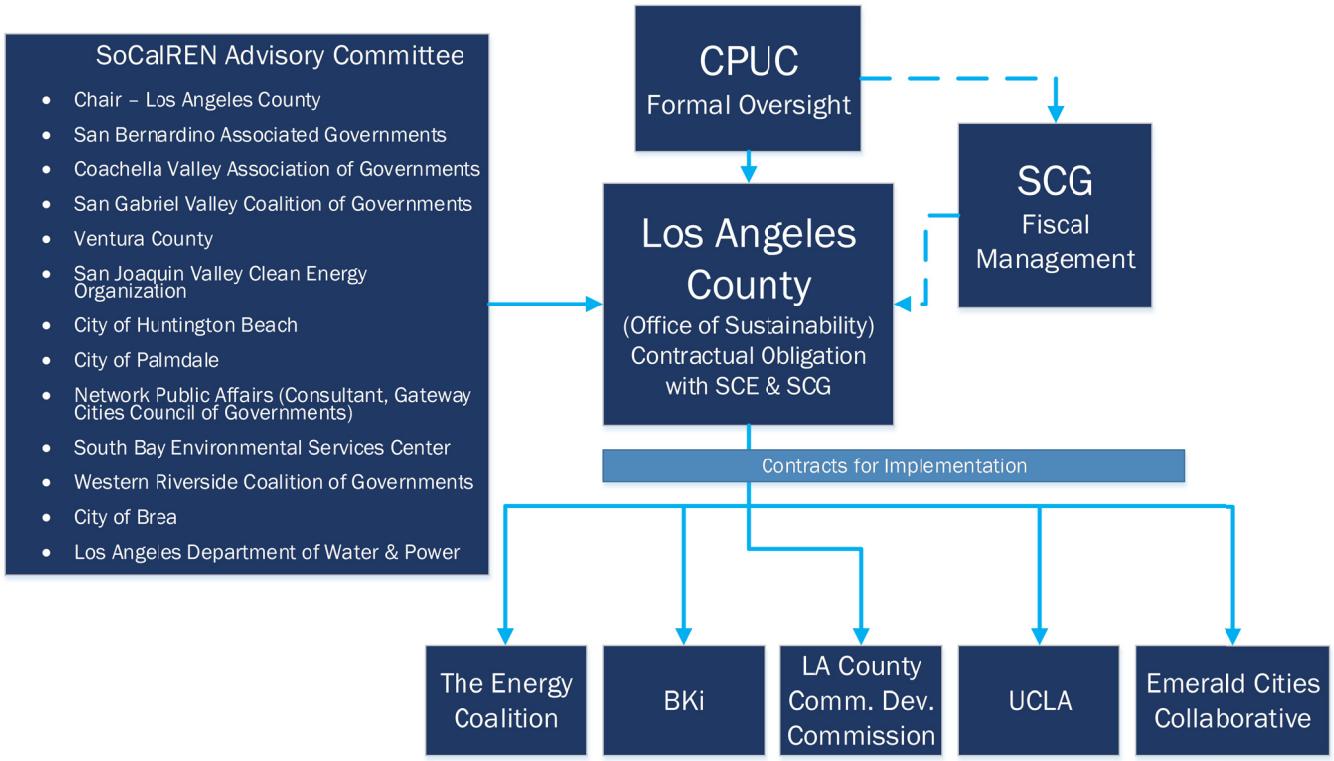
Element	SoCalREN	BayREN
Service Territory	More than 700 eligible public agencies served: 12 counties; 216 cities, townships, tribes, and unincorporated areas; 104 water/wastewater districts; 398 education agencies; other special districts	All nine counties and 101 cities that comprise the San Francisco Bay Area.
Governance Structure	1) The County of LA is the Administrator. 2) The County of LA convenes an Advisory Committee composed of 13 representatives of municipalities covering its entire territory. 3) The Advisory Committee counsels the Administrator, but does not directly determine its programs and activities.	1) ABAG is the fiscal agent and contractual grantee of CPUC/PG&E funds for pilot activities. 2) ABAG chairs a Coordinating Circle, composed of representatives of the nine counties, that directly determines programs and activities by voting. ABAG and the counties have equal votes. 3) Each program is assigned a committee, with at least one representative from each county as committee members.
Number of Programs	10	6
Total 2013–14 Budget	**$43,300,329**	**$22,742,750**

Note: Budget source is EESTATS December 2014 reports.

SoCalREN Governance and Implementation Structure

An Advisory Committee composed of 13 local governments provides advice on REN administration and programs, but does not directly determine SoCalREN activities.[10] The LA County Office of Sustainability holds the funding contract with both SCE and SCG for the REN and maintains five contracts with other agencies to support SoCalREN's programs (see Figure 2, below).

Figure 2. SoCalREN Management Structure



LA County manages the SoCalREN through a "consultant" model in which the County of LA acts as the REN Administrator and employs the services of the consulting firms Bevilacqua Knight, Inc. (BKi) and The Energy Coalition (TEC). These firms are the prime contractors implementing the Home Upgrade residential customer program and the SoCalREC public agency programs, respectively. The two firms jointly implement the Financing program. The County of LA contracts with the LA County Community Development Commission/Public Housing Authority to manage the Low-Income Single-Family Home Upgrade program and manages two other programs with the University of California, Los Angeles (UCLA) and Emerald Cities Collaborative. Table 5, below, shows the specific managing agency for each program.

[10] As an added layer of complexity to the SoCalREN governance structure, eight members of the Advisory Committee contractually connect to SCE and nine governments contractually connect to SCG as IOU LGPs. According to SoCalREN, only two of the Advisory Committee members are not directly connected to an LGP.

Table 5. SoCalREN Implementation Structure

Program ID	Program Description	BKI	TEC	LA County - County Community Development Commission/Public Housing Authority	UCLA	Emerald Cities
SCR-EUC	**EUC (in the County of LA only)**					
SCR-EUC-A1	Local Marketing and Outreach	x				
SCR-EUC-A2	Green Building Labeling	x				
SCR-EUC-A3	Flex Path Incentives	x				
SCR-EUC-A4	Contractor Outreach and Training	x				
SCR-EUC-A5	Multifamily Incentives	x				
SCR-EUC-A6	Low-Income Single-Family Residential			x		
SCR-FIN	**Financing**					
SCR-FIN-B2	Single-Family Loan Loss Reserve	x				
SCR-FIN-B4	Non-Residential PACE	x				
SCR-FIN-B5	Public Agency Revolving Loan Fund		x			
SCR-REC	**SoCalREC**					
SCR-REC-C1	Aggregated Regional Procurement		x			
SCR-REC-C2	Integrated Comprehensive Whole Building Retrofits		x			
SCR-REC-C3	Regional Climate Action and Energy Plan				x	
SCR-REC-C4	Water-Energy Nexus		x			
SCR-REC-C5	Regional Energy Project Tracking and Permitting (CEEPMS)		x			
SCR-REC-C6	Marketing, Outreach, Education, and Training		x			
SCR-REC-C7	Workforce Development					x

BayREN Governance and Implementation Structure

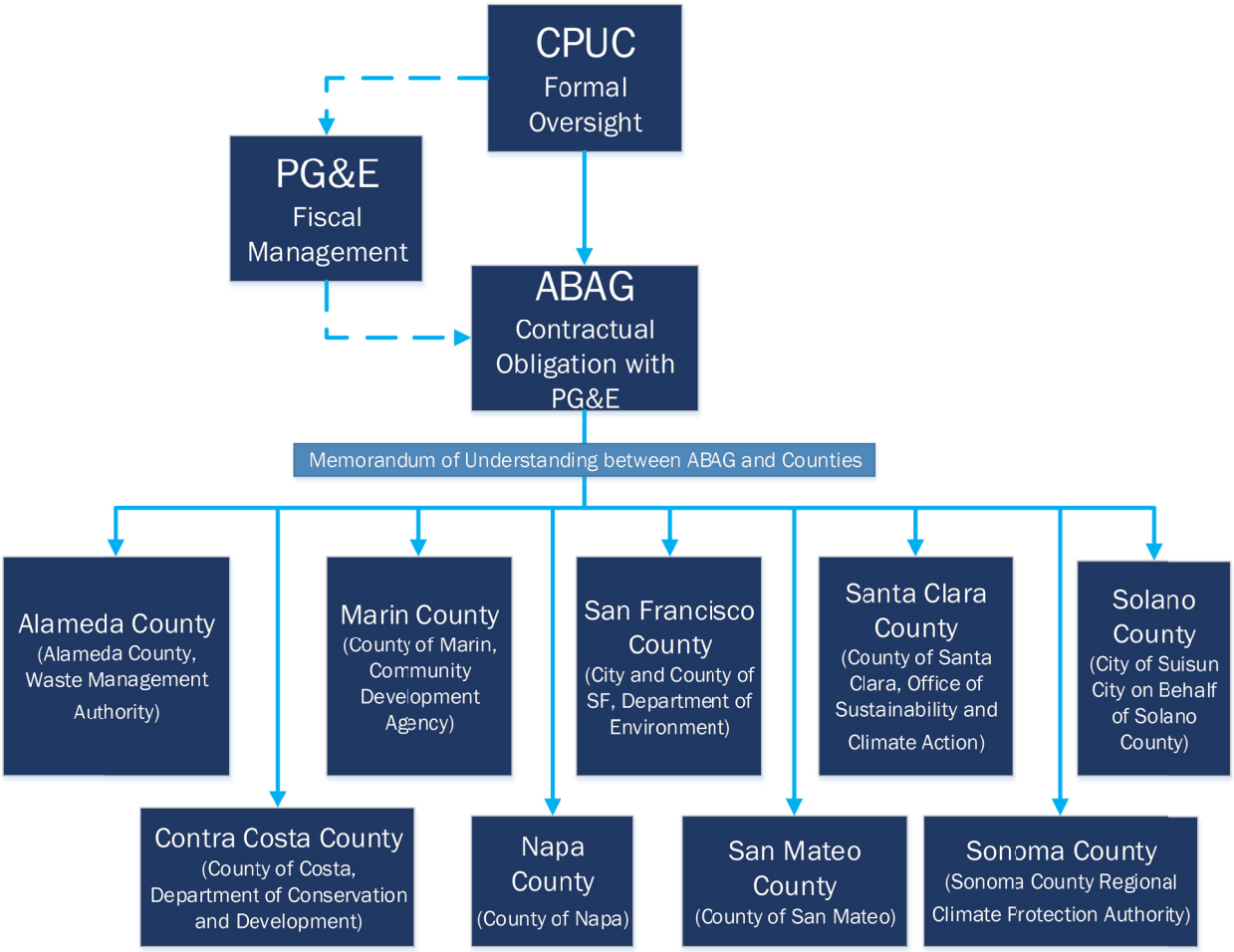
A Coordinating Circle composed of ABAG and its nine member agencies governs BayREN. The REN makes decisions on programs and budgets by vote, with each member having equal voting rights. A majority of the Coordinating Circle constitutes a quorum, with action taken by a majority vote of those present at a meeting. In addition, each program has its own decision-making committee. During the course of implementing BayREN, ABAG restated and revised the Memorandum of Understanding (MOU) between the participating members. According to BayREN staff, this new MOU helped codify improvements in the functioning of the REN. Specifically, what had been a single Coordinating Committee became three different groups (the Coordinating Circle, Lead Links, and Program Circles). The Coordinating Circle is responsible for coordination of activities for all other local government jurisdictions within their counties, especially with Local Government Partnerships (LGPs).[11] Each BayREN member agency appoints a representative to the

[11] The IOUs form LGPs through a contractual arrangement between an IOU and an organization representing a single or multiple local governments. An LGP consists of the LGP Implementer (i.e., the contract holder) and may have many members (i.e., member governments). An older 2010-2012 study provides a description of LGPs (*Program Assessment Study: Local Government Partnership Programs.* Located on Calmac.org under CPU0063.01) and a forthcoming LGPs Value and Effectiveness Study (expected to be available in Q3 2015) provides further information about LGPs.

Coordinating Circle. The Coordinating Circle elects Lead Links who are responsible for management of a single program. Program Circles, made up of volunteer members, provide input to the Lead Links on budgets and PIPs. In addition, the updated MOU stated the powers and roles of each of the three groups.

BayREN operates under an "in-house" model in which ABAG acts as the REN Administrator and has signed nine distinct MOUs with each REN member agency for funds disbursement. Contracts connect ABAG to a sole public agency in each member county through the MOU (see Figure 3, below).

Figure 3. BayREN Management Structure

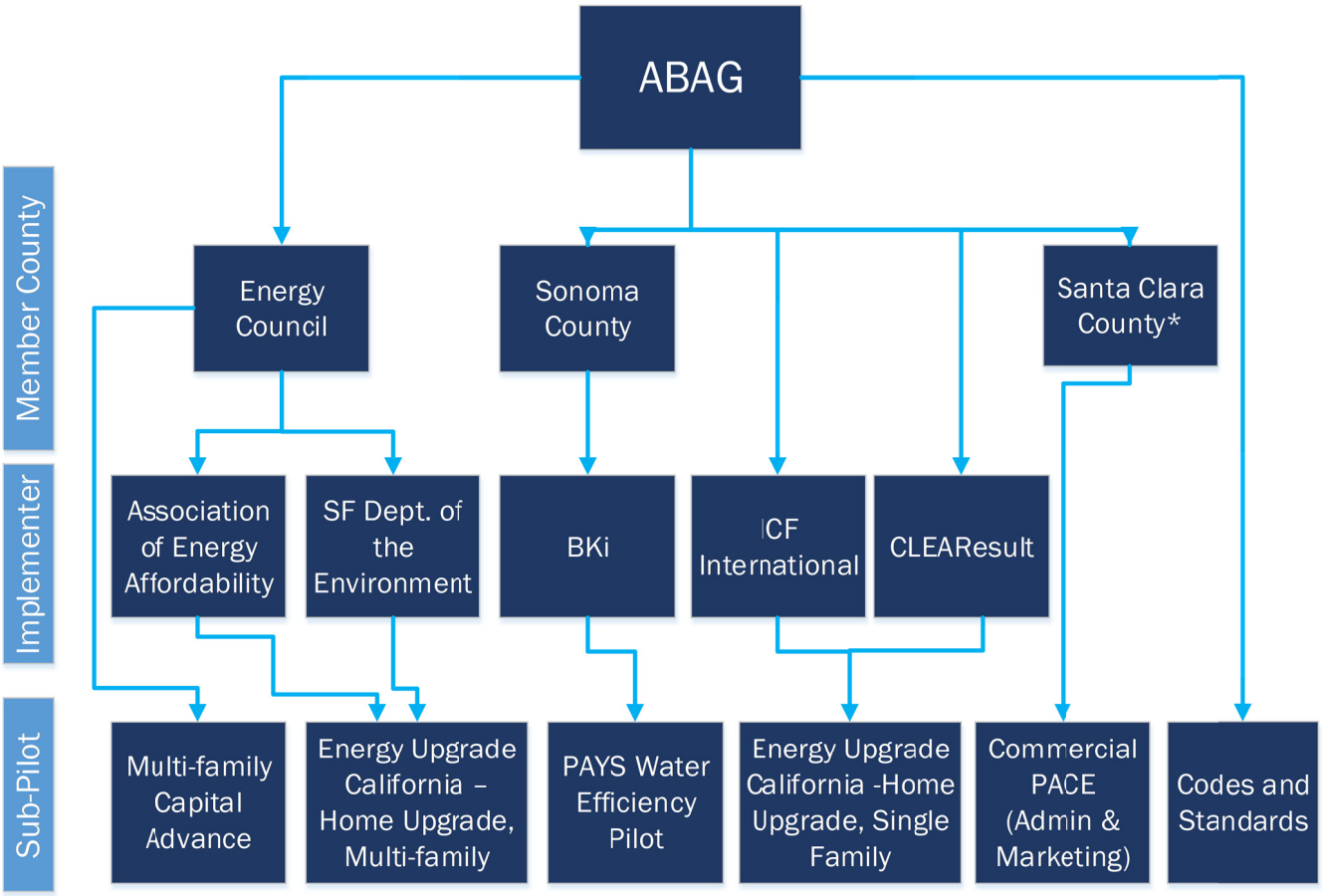


In addition, in 2013–2014, three member agencies—Alameda, Santa Clara, and Sonoma counties—served as the Lead Links for specific programs, with all three leads also contracting with other organizations for implementation.

As Figure 4, below, shows, the Energy Council is the lead for the Energy Upgrade California – Multifamily program, which two other organizations implement, and Alameda County directly implements the Multifamily Capital Advance program. In 2013–2014, Santa Clara County was the lead for the Single-Family Home Upgrade program (which also uses two other entities for implementation) and the Commercial PACE

program.[12] Sonoma County is the lead for the PAYS program. One exception is the C&S program, which ABAG directly implements.

Figure 4. BayREN Program 2013–2014 Lead County Implementation Structure



Note: Since the Evaluation Plan document, CLEAResult purchased Populus. The same team is implementing the Home Upgrade program, just under a different name.

*ABAG held the contracts with ICF International and Clear Result. However, SCC was the lead for the Single Family program.

[12] In 2015, Santa Clara County relinquished both lead activities. San Mateo County is now the Home Upgrade Single-Family program lead and San Francisco County leads the Commercial PACE program.

2. Study Methodology

This study was originally labeled a process study, but the goals and objectives for the research caused the Consultant Team to change the name to a value and effectiveness study. A process study is typically called for when there are new and innovative components in a program, there has been no previous process study, or there is a new vendor for the program.[13] Although the RENs have not been fully studied, California Energy Efficiency Evaluation Protocols[14] indicate that a process study is primarily *"an in-depth investigation and assessment of one or more program-related characteristics in order to provide specific and highly detailed recommendations for program changes."* The RENs are pilots, however, and the CPUC needs information on such topics as scalability and overlap—not information to improve the programs within the RENs, but rather to help decide whether to continue the pilots. This study, therefore, provides information on the value and effectiveness of the RENs, as described below in Section 2.1.

This study is not the sole source of information that the Consultant Team expects the CPUC to use to facilitate its decision on the RENs. The ED is planning four studies.

- The ED is performing a process study of the BayREN C&S Compliance Improvement program, expected to be completed late in 2015.
- The ED is performing a study of the Multifamily program, expected to be completed in the first quarter of 2016.
- An energy impact evaluation of the RENs, with a preliminary draft due in November 2015, will cover the 2013–2014 program years and the first two quarters of 2015.
- The ED is planning a second phase of this RENs value and effectiveness study, to be completed in 2016.

Additionally, ABAG has completed one study that is available publicly. The study was designed to identify and share best practices and improve building code enforcement and building performance rates within the region.

- A study of the BayREN C&S Permit Resource Opportunity Program is completed and available to the public. (The study is available at www.calmac.org.)

2.1 Study Goals and Objectives

As described in Section 1.2, the RENs are a pilot initiative authorized by the CPUC with certain expectations and with established criteria by which to assess their ability to deliver energy efficiency in an innovative and non-redundant manner. The guiding language within the authorizing Commission Decision states that the "RENs and the IOUs should coordinate and cooperate for seamless program offerings and to avoid customer confusion." Mindful of this and other Decision language, the Consultant Team assessed the value and effectiveness of the RENs at two levels: a broad view of how the RENs are managing the programs, based on

[13] Paraphrased from information provided by Katherine Johnson, the ED EM&V advisor, and as written in the Arkansas and New York Process Evaluation Protocols.

[14] The TecMarket Works Team. April 2006. *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*. Prepared for the CPUC.

discussions with both REN and IOU staff members, and a narrower view from a select number of constituents in the REN programs. (Table 16, page 24, Section 2.5 defines the constituents[15].)

The two objectives of this study are to:

1. Determine the value of the RENs through two views:

   Broad View: The REN pilots will have demonstrated value if their programs, as implemented, break new ground in areas not currently served by utilities or if their activities and programs have the potential to scale to a broader geographic area or serve hard-to-reach markets. The RENs also will have demonstrated value if there is little to no overlap with the IOU programs and the RENs and IOUs coordinate on programs. Further, as the Consultant Team described in Section 1.2, above, additional criteria judging the merits of the RENs proposed programs was introduced after the applications had been received and at the time the RENs were approved in November 2012[16]. Because the November 2012 REN expectations criteria were introduced at the time the RENs were approved, the Consultant interprets the three criteria as appropriate performance criteria by which to evaluate the RENs for 2013-2014. However, because the RENs developed their proposals under the original criteria of promoting WE&T, technology development, and the water-energy nexus, the Consultant Team accounts for additional value REN activities provide in these areas.

   Narrow View: The RENs will have demonstrated value if program participants provide positive responses when queried about the program in which they participate.

2. Determine the effectiveness of the RENs through two views:

   Broad View: The RENs will have demonstrated effectiveness if they have sufficiently addressed management issues as they arise (or there is a definite plan to mitigate them going forward). Additionally, they will demonstrate effectiveness if they clearly demonstrate an ability to manage program implementation and adjust to necessary changes as they arise.

   Narrow View: The RENs will have demonstrated effectiveness if program participants consider the offerings of reasonable benefit.

2.2 Scope of This Study

Applying the original decisions authorizing the REN pilots as guidance, this study explores two aspects of the REN organizations. The Consultant Team takes a broad look at the RENs' governance structure and implementation model for all programs. The study also examines three non-resource programs that do not directly count toward energy savings goals. Some programs fall within the study scope, while others do not (see Table 6 and Table 7, below).

The justification to include only non-resource programs has two parts. First, impact evaluations forthcoming in 2015 and 2017 will assess resource programs. Second, budget constraints necessitate that the overall scope of the evaluation be narrow. The Consultant Team collated the RENs data across all activities so readers could see the full breadth of activities that the RENs undertook in 2013–2014. The Consultant Team used secondary data obtained from the RENs (e.g., the annual narratives provided to the CPUC), but did not verify those activities due to the limited scope of this study. The Consultant Team only collated data with no subsequent analysis and, thus, makes no evaluative statements about the activities listed.

[15] The term "constituents" and "program participants" are interchangeable in this report.

[16] D. 12-05-015, invited proposals in May 2012 and D.12-11-015 chose proposals in November 2012.

Table 6. SoCalREN Activities inside and outside of Study Scope

Programs	Activities	Reason for Excluding
INSIDE STUDY SCOPE		
Regional Energy Center	Aggregated Regional Procurement	Refer to Table 16, page 24 for a discussion of how these five activities changed to become the one Public Agency Program assessment within this study. Specifically, the Regional Climate Action and Energy Plan Support, Water-Energy Nexus, and CEEPMS were not evaluated.
	Integrated Comprehensive Whole Building Retrofits	
	Regional Climate Action and Energy Plan Support	
	Water-Energy Nexus	
	Regional Energy Project Tracking and Permitting (CEEPMS)	
OUTSIDE STUDY SCOPE (although descriptive statistics included)		
Regional Energy Center	Marketing, Outreach, Education, and Training	A 2013–2014 study of marketing, education, and outreach (ME&O) is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team does not include any ME&O activities.
	Workforce Development	There is a 2013–2014 study of WE&T that is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team does not include any WE&T activities.
EUC – Home Upgrade	Multifamily	Resource activity
	Flex Path Incentives	Resource activity
	Local Marketing and Outreach	Covered in the ME&O evaluation. A 2013–2014 study of ME&O is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team does not include any ME&O activities.
	Green Building Labeling	No local government constituents are associated with this program.
	Contractor Training and Outreach	There is a 2013–2014 study of WE&T that is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team does not include any WE&T activities.
	Low-Income Single-Family	Resource activity
Financing	Single-Family Loan Loss Reserve (LLR)	A 2013–2014 study of Financing is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team did not include any Financing activities.
	Non-Residential PACE	Covered in the Financing evaluation
	Public Agency Financing Assistance	Covered in the Financing evaluation

Table 7. BayREN Activities inside and outside of Study Scope

Programs	Activities	Reason for Excluding
INSIDE STUDY SCOPE		
EUC — Home Upgrade, Single-Family	Home Upgrade Advisor	
Financing	PAYS Water Efficiency Pilot	
OUTSIDE STUDY SCOPE (although descriptive statistics included)		
EUC — Home Upgrade, Single-Family	Home Upgrade/Advanced Home Upgrade Incentives	Resource activity
	Contractor Recruitment and Training	A 2013–2014 study of WE&T is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team does not include any WE&T activities.
	Marketing and Outreach	A 2013–2014 study of ME&O is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team does not include any ME&O activities.
	Leveraging Statewide Financing	Simply includes leveraging the statewide financing pilots (which are not yet being implemented) and is not a specific program that can be assessed
EUC — Home Upgrade, Multifamily	Multifamily incentives	Resource activity
	Coordination with financing pilots	Coordination activity
	Consultation to property owners	Insufficient evaluation funds to field a separate data collection and analytical effort
Financing	Multifamily Capital Advance	Covered in separate evaluation
	Commercial PACE administration and marketing	A 2013–2014 study of Financing is ongoing. Due to the potential for coverage in a different study and the targeted focus of our study, the Consultant Team did not include any Financing activities except PAYS, which the Financing study had not targeted for assessment.
Codes and Standards	Baseline Compliance with Energy Codes	The evaluations of C&S activities are unique and typically require substantial effort. There is a CPUC-led C&S study in 2013–2014, which may cover these activities. Because of the targeted focus of our study and the potential for this area to be addressed within a different study, Consultant Team does not include these activities.
	Establish Compliance Metrics and Monitoring	
	Training Program	
	Advanced Code Advocacy and Support	

2.3 Study Research Questions

Seventy stakeholders participated in the CPUC's public webinar on July 15, 2014, to discuss the main areas of this study. A set of research questions derived from the draft study scope and modified based on webinar participant comments is presented below in Table 8, Table 9, and Table 10. In addition, the Consultant Team categorized the specific research questions into the two categories of value and effectiveness, as well as a third set of policy-based questions.

2.3.1 Research Questions to Inform the Value Assessment of the RENs

Value is a subjective concept. The Consultant Team used information from the CPUC guidance and budget Decisions to appropriately frame the evaluation of the value to attribute to the RENs. Table 8, below, shows the research questions used to gauge the value of the RENs.

Table 8. Research Questions to Inform the Value Assessment of the RENs

Research Question	Sub-Questions
1) What overlap, if any, is occurring between the RENs programs and activities and IOU programs and activities?	a) Do they fill a niche or provide additive benefit that is not provided by IOU program offerings? b) Do they serve hard-to-reach markets?[a] c) Additional questions for non-resource programs/activities: i) How successful have the programs and activities been in terms of participation? ii) How many customers or constituents have participated in the programs or activities? iii) What was the expected rate of uptake for the programs or activities by the RENs and how well has the actual rate met that expectation? iv) Have expectations about participation changed based on program roll-out? v) Have the RENs demonstrated a level of responsiveness or innovative approaches to customer service beyond those traditionally delivered by the IOUs (SoCalREN and BayREN PAYS programs only)? vi) Is there cooperation and synergy between the IOUs and the RENs? What is the level of coordination?
2) What are the goals of the programs or activities undertaken by the RENs?	None
3) What is the history of the programs or activities?	None
4) How are the programs or activities being implemented?	a) Where is the implementation of the programs or activities geographically located? b) How are they marketed? c) To whom are they marketed?
5) How do the costs associated with the non-resource programs and activities compare to the overall RENs portfolio of programs?	None

[a] The *Energy Efficiency Policy Manual* (v. 5) defines hard-to-reach residential customers as "those customers who do not have easy access to program information or generally do not participate in energy efficiency programs due to a language, income, housing type, geographic, or home ownership (split incentives) barrier." Hard-to-reach business customers also include such factors as business size and lease (split incentive) barriers.

2.3.2 Research Questions to Inform the Effectiveness Assessment of the RENs

Similarly, it can be difficult to agree on what is effective in terms of EE programs. Table 9, below, shows the final research questions that provide the framework for the effectiveness assessment of the RENs. The Consultant Team applied the answers obtained from these research questions to assess the effectiveness of the RENs, but acknowledges there may be other ways to consider effectiveness.

Table 9. Research Questions to Inform the Effectiveness Assessment of the RENs

Research Question	Sub-Questions
1) What are the pros and cons of the two RENs' implementation models?	a) What have been the areas of difficulty as the RENs have taken on their role as program administrators? b) How do the RENs manage regulatory processes? c) How do they manage their program managers/implementers? d) What are the pros of their administrative models? e) What are the cons of their administrative models?
2) How do the RENs manage their programs?	a) How many staff are included in the management of the portfolio and all other aspects of program administration? b) Who is implementing the programs and how many staff are involved with each program activity? c) How are decisions made when issues arise? d) How well are they able to mitigate problems when they arise? e) How are the services delivered? f) How have delays or other issues (anticipated or not) affected implementation? How have the RENs attempted to mitigate these issues? g) Do the RENs' constituents consider the REN offerings to be well serviced, sufficient, and adequate? h) How effective do participating constituents rate the REN programs? Do they feel the REN programs could be improved or made more effective? i) Are there differences within program funding allocations among the RENs local governments? If so, why? j) How often do the RENs communicate with their constituent local governments? For those local governments that have IOU partnerships, is it more or less often than they communicate with the IOUs (SoCalREN and BayREN PAYS only)? k) What offerings, if any, do the RENs provide in terms of capacity building for local governments? l) What activities do the RENs encourage or discourage, if any, within the local governments?

2.3.3 Research Questions to Inform Policy

In addition to gauging the value and effectiveness of the RENs as outlined above, the ED staff would like to provide credible findings to the Commission and other decision makers on the scalability of the non-resource program activities examined here and insights on question such as whether the CPUC should continue to discourage the overlapping of IOU and REN programs and activities. Questions that address CPUC policy decisions are presented below in Table 10.

Table 10. Research Questions to Inform Policy

Research Questions
1) Can or should the non-resource programs be scaled up or introduced to other areas of the state?
2) Would allowing more duplication of programs among RENs and IOUs create healthy competition or would it lead to added consumer confusion, redundancy, and waste?

The Consultant Team used a mixed-mode approach to collect primary data, meaning that data was gathered from both structured surveys (one via the telephone and one via the Internet) and unstructured in-depth interviews. Because of the varied nature of the data, analysis is qualitative, meaning that the Consultant Team is drawing conclusions from the multiple data sources through a "preponderance of evidence" approach.

2.4 Sampling

This study required minimal sampling, as the Consultant Team performed all but one of the primary data collection activities with the respective populations (i.e., a census approach). Data collection from IOU staff required a sample. Table 11, below, presents the data collected within the study and the respective response rates.

Table 11. Sample Frame and Targeted Number of Completes

Task Description	Respondent Type	Population (N)	Number of Completes	Response Rate[a]
In-Depth Interviews	SoCalREN Staff[b]	48	7	n/a
	BayREN Staff[b]	43	14	n/a
	IOU Staff	Unknown	10	n/a
	PAYS Water Agency Staff	3	3	100%
Internet Survey	SoCalREN Public Agency Participants	53	28	56%
	BayREN: residential customers that participated in Home Upgrade Advisor program	238	77	32%

[a] For the two Internet surveys, the Consultant Team calculated the response rate using the American Association for Public Opinion Research (AAPOR) Response Rate 1 (RR1) method. Please see the appendices for details on this specific response rate.
[b] Neither REN indicated the specific staff numbers associated with the REN. The Consultant Team expects that the true population of people working on the RENs in some capacity is closer to 50. Interviews were with all main contacts within the REN and consulting staff organizations; therefore, a response rate is not applicable because we did not attempt to talk to other staff members.

For the IOU staff sample, the Consultant Team approached IOU staff whose areas were related to those programs the RENs were conducting for the purpose of assessing whether the IOUs had identified any duplication of efforts with the RENs and whether IOU customers had reported any confusion as a result of the RENs entering the EE arena. The Consultant Team also wanted to discuss how the IOUs and RENs were collaborating. To this end, the Consultant Team created a list of potential IOU staff interviewees from three sources: 1) ED staff who have some oversight of the specified areas, 2) REN staff, and 3) internal contact information. The list was then narrowed to a targeted group of 24. Finally, the Consultant Team conducted interviews with the 10 IOU staff members drawn from these three sources as illustrated in Table 12, below.

Table 12. Sample Disposition for IOU Staff Interviews

Source of List Name	Number in List	Number Targeted	Number Completed
ED Staff	63	12	7
REN Staff	10	10	2
Internal Consultant Team	2	2	1
Total	**75**	**24**	**10**

The 10 interviewees covered all IOUs and the majority of programs, as shown below in Table 13. The Consultant Team did not ask about potential C&S activity overlap with BayREN.

Table 13. Number of IOU Staff Interviews by REN Areas of Potential Overlap

IOU	REN Program with Potential Overlap				Total
	Financing	EUC – Home Upgrade Single-Family	EUC - Home Upgrade Multifamily	Public Agency Program	
PG&E	1	1	0	0	2
SCE	0	1	1	2	4
SCG	0	0.5[a]	1	2.5[a]	4
Total	**1**	**2.5**	**2**	**4.5**	**10**

[a] One person was able to discuss possible overlap in two areas, so the Consultant Team split the number in the table.

The list of IOU contacts provided by multiple sources put the Consultant Team in contact with the appropriate people to answer questions, especially for issues around customer confusion or overlap. Table 14, below, shows which IOU programs were represented in the interviews.

Table 14. IOU Programs in Which Interviewed IOU Staff Were Involved and Areas of Potential REN Overlap

Sample	Entity	Utility Program	Potential Overlap Area
2	PG&E	emPower Central Coast	BayREN Financing (PAYS)
	PG&E	Residential Programs	BayREN Home Upgrade
4	SCE	Prop 39 lead	SoCalREN Public Agency Program – Schools
	SCE	Energy Upgrade California - Multifamily Path	SoCalREN Multifamily
	SCE	Partnerships	SoCalREN Home Upgrade and Advanced Home Upgrade, SoCalREC, Financing (PAYS)
	SCE	Home Upgrade and Advanced Home Upgrade	SoCalREN Home Upgrade and Advanced Home Upgrade
4	SCG	SCG Local Government Special Projects Energy Efficiency Partnership Customer Programs & Assistance	SoCalREN Home Upgrade and Advanced Home Upgrade, Public Agency Programs (SoCalREC)
	SCG	Custom and Express Programs	SoCalREN Commercial Programs (SoCalREN Public Agency)
	SCG	EUC Multifamily Path and Multifamily Energy Efficiency Rebate (MFEER)	SoCalREN Multifamily
	SCG	Prop 39 lead	SoCalREN Public Agency Program – Schools

2.5 Data Collection

Data collection occurred from December 2014 through May 2015 (Table 15, below).[17]

Table 15. Data Collection Time Frame

Task Description	Respondent Type	Time Frame of Data Collection	Average Length of Data Collection per Respondent (minutes)
In-Depth Interviews	SoCalREN Staff	12/17/14 to 12/18/14	50
	BayREN Staff	12/15/14 to 12/19/14	56
	IOUs Staff	1/29/15 to 2/19/15	35
	PAYS Water Agency Staff	4/1/15 to 5/6/15	60
Internet Survey	SoCalREN Public Agency Participants	4/24/15 to 5/14/15	23
	BayREN: residential customers who participated in Home Upgrade Advisor program	4/6/15 to 4/22/15	21

Each data collection task provided one or more inputs to the research questions. Appendix B in Volume II provides the mapping of research question to data collection activity.

The REN interviews, performed early in the data collection, provided a good basis for understanding the knowledge and opinions of those directly implementing the REN activities. However, the Consultant Team also needed to interview staff who are not directly involved with the RENs in order to gain a different perspective. The IOU staff interviews, PAYS water agency staff interviews, and the two Internet surveys provided primary data to round out the Consultant Team's understanding of the RENs in those areas.

The Consultant Team labeled the PAYS interviews and two Internet surveys as "constituent" surveys to provide a single name for these three disparate data collection activities. Table 16, below, describes the full set of constituents from the plan, why the Consultant Team considered the group constituents, and the changes that took place during the evaluation plan implementation.

As shown in Table 16, below, SoCalREC included five programs originally planned for primary data collection. However, one program received such low interest that SoCalREN has discontinued it and two other programs were not yet ready for evaluation. Therefore, the primary data collection occurred for the SoCalREC program from two programs – which SoCalREN had combined into a single program labeled "Public Agency Program".

[17] During this effort, the SoCalREN staff members were instrumental in helping the Consultant Team reach out to participants and encourage survey completion. BayREN staff also encouraged the PAYS staff to perform the interviews.

Table 16. SoCalREN and BayREN Constituents for Chosen Programs

REN	Constituents chosen for data collection	Why these are considered constituents	Changes from original plan
SoCalREN	190 local governments and public agencies that participate in one or more of the following programs within the SoCalREC: 1) Aggregated Regional Procurement 2) Integrated Comprehensive Whole Building Retrofits 3) Regional Climate Action and Energy Plan Support 4) Water-Energy Nexus 5) Regional Energy Project Tracking and Permitting	SoCalREN implements many of its programs directly to end-use consumers, such as residential customers within EUC, through consultants. Due to budget constraints, the Consultant Team has limited any constituents served to those programs in which SoCalREN implementers work directly with local governments and public agencies.	▪ The Consultant Team combined Items 1 and 2 (in the second column in this row in this table) into a single data collection effort (the Public Agency Survey) ▪ The Regional Climate Action and Energy Plan Support program (Item 3) is web-based and is scheduled to launch in June 2015. Therefore, the Consultant Team did not include this program in the study. ▪ The Water-Energy Nexus program (Item 4) planned to bring in water agencies and IOUs for this program, but found no interest after a small piloting of the effort. Given that SoCalREN was no longer pursuing this program, the Consultant Team did not include this program in the study. ▪ The Regional Energy Project Tracking and Permitting program (Item 5) is a software-based effort that originated from an SCE grant. SoCalREN is now funding the next steps and implementers plan to create the product in 2015. This program was not yet ready for an evaluation effort.
BayREN	Residential customers and local governments that participate in the following programs: 1) Home Upgrade Advisor program (part of Home Upgrade Single-Family) 2) PAYS program	The evaluation sought to understand how effective the REN members are at supporting program participants within their territory. The nine lead counties comprising BayREN do not interact directly with local governments when implementing every program. Thus, it is not appropriate to consider local governments as the sole constituents of BayREN programs.	▪ The Consultant Team learned that the BayREN activities in the PAYS program consisted of working directly with three water utilities to support a PAYS program within the water utility service territory. Therefore, the originally planned survey data collection with participants of a PAYS program changed to in-depth interviews with the water utilities.

2.6 Evaluation Protocols

As required, the Consultant Team adhered to the three relevant chapters of the California Energy Efficiency Evaluation Protocols.

Process Protocol: This Protocol comprises several areas, including three relevant to this study:

- **Interviews:** In accordance with the Protocols, the Consultant Team assigned experienced staff to conduct the interviews, which were designed to be the appropriate length for the respondent population. The in-depth interviews with REN and IOU staff ran about an hour, which is typical for this type of data collection. Interviews with participants were shorter (slightly over 20 minutes) and at the top of the range in terms of length suggested for this type of data collection.
- **Surveys:** The Consultant Team used qualified staff to design, test, and field the survey instruments.
- **Independence:** An objective third party independent of the studied organization conducted this study.

Sampling Protocol: The Protocols have no required rigor levels for process evaluations, so the Consultant Team provided no rigor level for the tasks within this study. The Consultant Team acknowledges that the Internet surveys are susceptible to potential non-response bias or framing issues. The Consultant Team mitigated non-response bias to the best of its ability by alerting potential respondents to the upcoming survey via a trusted source (for the SoCalREN Public Agency Survey) and by using multiple email reminders (for both Internet surveys). In addition, the Consultant Team enlisted the same trusted source to provide an email reminder of the SoCalREN Public Agency Survey. The Consultant Team ensured construct validity through iterations of the survey within the Consultant Team.

Reporting Protocol: The Consultant Team adhered to the reporting protocol as it applies to process evaluations.

2.7 Study Limitations

This is the first of several expected forthcoming studies of the RENs' activities. While planning the evaluation, budget considerations and other expected studies led the Consultant Team to target those areas that other assessments were not planning to address. As such, the value and effectiveness described here is limited to the areas supported by primary data collection.[18] While not a study limitation per se, the targeted nature of this study limits how well the CPUC can make choices about the RENs overall based solely on these results. Section 4.3, on page 71, provides the study findings that may inform CPUC policy.

Therefore, it is worth noting that this evaluation study is not intended to convey or capture the full value of the RENs and their program activities, but only a sample, which is limited to the three programs addressed here;

- BayREN Pay As You Save Program
- BayREN Home Upgrade Advisor Program
- SoCalREN Public Agency Program

[18] This included the RENs staff, IOU staff, and participants in the BayREN Home Upgrade Advisor program, the BayREN PAYS program, and the SoCalREN Public Agency Program.

Remaining REN program areas not covered here may be addressed in the companion studies, which are catalogued in Section 2, p. 15.

2.8 Report Structure

The report has two volumes. This volume is the main report and Volume II contains the appendices.

Volume I contains five numbered sections and the executive summary.

- The Report's executive summary.
- Section 1 introduces the study and provides information about the RENs.
- Section 2 provides the study methods and sample sizes.
- Section 3 presents descriptions of each of the programs and progress through the end of 2014. The RENs provided this information and the Consultant Team has not verified the data. However, because of the targeted focus of this study, the Consultant Team felt it was important to provide the reader with a full description of the various activities the RENs undertake.
- Section 4 contains the study findings. RENs' value is first, followed by the RENs' effectiveness and finally data to inform CPUC policy.
- Section 5 provides study conclusions and recommendations.

Volume II has 11 appendices.

A – Public Comments to Draft Report and Evaluator Response

B - PAYS Program Information

C – Mapping of Research Question Results to Report Area

D – Data Collection Activities by Research Question

E – REN Staff In-Depth Interview Guide

F– IOU Staff In-Depth Interview Guide

G – BayREN PAYS In-Depth Interview Guide

H – BayREN Home Upgrade Advisor Data Collection Instrument

I – BayREN Home Upgrade Advisor Survey Disposition and Frequencies

J – SoCalREN Public Agency Data Collection Instrument

K – SoCalREN Public Agency Survey Disposition and Frequencies

3. REN Progress in 2013–2014

In this section, the Consultant Team reports on the progress of specific activities in 2013–2014 to help readers understand areas of activity not covered by this study. In addition, the sections below include brief descriptions of the programs.

The progress shown in these sections includes both resource and non-resource programs. A resource program has specific energy savings goals while a non-resource program has no energy savings goals, but may have other expected metrics. For BayREN and SoCalREN, the only resource programs are the Home Upgrade and Multifamily programs.

3.1 BayREN Program Progress in 2013–2014

In the subsequent sections, the Consultant Team presents the progress of BayREN's program as of December 2014. Where applicable, for each program, quantitative program performance metrics (PPM) goals[19] and accomplishments stated in the 2014 Annual Narrative are included.[20] Also documented are accomplishments beyond the quantitative metrics that, where they exist, the RENs include in their narratives.

The Consultant Team did not verify the values in this section, as it was outside the study scope.

3.1.1 Home Upgrade: Energy Upgrade California

Home Upgrade Description: BayREN is the sole implementer of the Single-Family Home Upgrade program within its territory. (PG&E implements the Single-Family Advanced Home Upgrade Program within BayREN territory.) The Single-Family Home Upgrade program is a points-based, prescriptive incentive program. It does not require energy modeling, and it reduces the number of homeowner interactions in an attempt to demystify the whole house EE upgrade approach. The program is open to the owners of single-family, detached homes in BayREN territory who are customers of PG&E. Homeowners can receive incentives of up to $3,150 for completing a project. An EUC Home Upgrade Participating Contractor must perform all work.

To drive uptake of PG&E's Advanced Home Upgrade Program in the Bay Area (for which homeowners can receive incentives of up to $6,500), BayREN conducts a multi-tiered ME&O campaign, offers an additional home energy assessment incentive of $300, and provides technical and referral assistance through BayREN's Home Upgrade Advisor program.

BayREN developed a Home Upgrade Training curriculum to attract and enroll a broad pool of Home Upgrade participating contractors throughout its region. These trainings are free two-day informational sessions that cover the basics of building science and that train contractors on how to sell Home Upgrades and identify EE upgrade opportunities. BayREN partnered with Build It Green to provide this training and commenced its Home Upgrade Certification Training Schedule in November 2013.

Home Upgrade Advisor Description: BayREN's Single-Family Home Upgrade Program includes the Home Upgrade Advisor program. Home Upgrade Advisors supports residential customers through the entire process of planning a Home Upgrade or Advanced Home Upgrade retrofit project. Support services include

[19] As presented in the Revised BayREN Program Implementation Plan (February 2014).

[20] Bay Area Regional Energy Network 2014 Energy Efficiency Annual Report (April 2015).

planning home upgrades, finding contractors to complete home upgrades, overseeing the completion of home upgrades (i.e., engaging with contractors), and reviewing the results of completed projects.

Progress: BayREN did not begin implementation of this program until September 2013, more than halfway through the first year of its funding cycle.[21] In addition to the PPM tracked below, the Home Upgrade Program achieved the following:

- 2,012 referrals to complementary programs through the Home Upgrade Advisors
- 7 Home Upgrade Curriculum Trainings held in 2014

Table 17. BayREN Home Upgrade Savings Goals and Accomplishments in 2013–2014

Savings Type	Goal	Accomplished in 2013–2014	Percent of Goal
Energy Savings (kWh)	2,128,378	128,234	6%
Peak Demand Savings (kW)	3,438	454	13%
Gas Savings (Therms)	293,803	53,870	18%

[21] According to BayREN staff, the regulatory delays with program approval were not anticipated when the goals were established.

Table 18. BayREN Home Upgrade Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Number of trained contractors and real estate professionals[a]	125	125	203 specialty contractors	81%
Number of participants in Home Upgrade Advisor Program	500	1,000	549[b]	37%
Number of units incented through Home Upgrade	360	2,142	684	27%
Number of PG&E Advanced Home Upgrade projects rebated in the Bay Area	1,320	1,380	561	21%
Number of audit incentives funded through BayREN[c]	586	743	1,245	94%
Percentage of Home Upgrade Advisor participants who complete a Home Upgrade project	15%	25%	43%[d]	108%
Number of Home Upgrade Advisor participants who complete a Home Upgrade project[e]	75	250	92	29%
Number of Home Upgrade Advisor participants that complete an Advance Home Upgrade project[e]	100	100	201	100%
Number of Participating Contractors who have completed one or more Home Upgrade projects	30	70	46	46%

[a] While BayREN did propose a Green Labeling program, which the CPUC approved, it did not allocate any funding to this effort in 2013–2014. Accordingly, BayREN did not train any real estate professionals.
[b] The 2014 Annual Report indicates that 549 customers participated in the Home Upgrade Advisor program; however, according to BayREN staff, BayREN received 2,455 inquiries about the service, which could signify "participation" within the program. Lacking specific guidance on what is considered "participation," the Consultant Team kept the lower value in the table as inquiry does not appear to be full participation.
[c] BayREN offers an audit rebate of $300 for Advanced Home Upgrade and Home Upgrade projects, but does not implement the Advanced Home Upgrade program. BayREN does implement and provide incentives for Home Upgrade projects. BayREN paid 561 audit rebates for Advanced Home Upgrade projects and incentives for 684 for Home Upgrade projects (total of 1,245).
[d] As reported in BayREN tracking data the Consultant Team received on December 18, 2014.
[e] These PPM were not in the revised PIPs. However, BayREN indicated that they track these goals and provided progress on these goals directly to the Consultant Team.

3.1.2 Multifamily Program: Energy Upgrade California

Description: BayREN's Multifamily program provides free consultation services and incentives to owners of multifamily properties. BayREN designed this program to provide a "middle of the road" offering that achieves deeper savings than single-measure programs, but requires less upfront investment than the IOU's whole building program. Through this program, BayREN conducts targeted outreach to multifamily property owners to promote participation. Property owners receive no-cost technical assistance to assess energy upgrade opportunities and develop a customized scope of work designed to reduce building energy use by a minimum percentage through installation of multiple measures. BayREN refers projects with deeper energy savings scopes of work or wish to work with their own third-party Rater to PG&E's Multifamily Upgrade Program. The program is presently open to multifamily buildings with five or more attached units. The program pays property owners a flat $750 rebate per unit.

Progress: While BayREN originally planned to conduct two contractor workshops (training a total of 50 contractors), due to the high demand among customers, BayREN elected to conduct only one workshop and shift funds to issuing rebates for more projects.

Table 19. BayREN Multifamily Savings Goals and Accomplishments in 2013–2014

Savings Type (Annual Ex Ante Gross)	Goal	Accomplished in 2013–2014	Percent of Goal
Gross Energy Savings (kWh)	1,365,019	1,672,439	123%
Peak Demand Savings (kW)	1,111	205	18%
Gas Savings (Therms)	152,850	171,940	113%

Note: BayREN states these are gross values

Table 20. BayREN Multifamily Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Number of units receiving technical assistance	3,000	6,000	36,031	400%
Number of units incented	1,250	3,750	8,384	168%
Number of multifamily contractors trained[a]	25	25	20	40%
Number of projects receiving technical assistance	75	150	220	98%
Number of property owners reached by outreach activities	150	150	400[b]	133%

[a] BayREN reports that the number of contractors trained was low because, due to quick uptake from customers, BayREN transferred funds from contractor trainings to rebates in order to enroll more units in the program.

[b] BayREN received interest forms from 400 property owners. Notably, BayREN estimates that they contacted thousands of property owners through various outreach activities. However, they are unable to track this accurately.

3.1.3 Codes and Standards

Description: BayREN works with local governments to measure, monitor, and improve energy code compliance, as well as develop EE policies and ordinances. To accomplish this, the C&S program conducted three activities. First, BayREN established Regional Forums, which were bimonthly, half-day meetings that included elected officials, policy board members, chief building officials, C&S advocates, and other stakeholders. The purpose of these forums was to share best practices and lessons learned and to build regional expertise in green building and energy policy. Second, BayREN conducted a baseline evaluation of city and county building departments, which included interviewing key building staff, observing their permitting processes, and conducting plan reviews and field inspections of several permitted projects. Third, BayREN delivered a number of code compliance and enforcement trainings to local officials and the private sector building community.

Progress: BayREN developed permit guides as well as building science and other quick reference guides for building departments.

Table 21. BayREN Codes and Standards Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Compliance Baseline and Tracking (number of counties)[a]	All Nine Bay Area Counties		n/a[a]	n/a[a]
Code Enforcement Education and Training (number of trainings)	33	38	72	101%
Code Enforcement Education and Training (number of trainees)	750	900	469	28%
Policy Support and Advocacy (number of forum participants)	150	200	413	118%

[a] Fifteen city and county building departments participated in the Permit Resource Opportunity Program (PROP). BayREN used the results of these activities to prioritize compliance improvement efforts for each jurisdiction and to develop a regional energy code compliance baseline.

3.1.4 Financing

Description of the Multifamily Capital Advance Program: BayREN's Multifamily Capital Advance Program co-finances with private lenders to provide up to half of an EE loan amount at zero percent interest rate. The private lender underwrites to its own criteria and applies its market interest rate. The effect is a lowering of the blended interest rate for the overall EE loan by up to half. The loan pool is $1.5 million and the marketing and administration budget is $500,000. BayREN leverages the technical assistance, scope qualification, and post-installation QA services of EUC-Home Upgrade Multifamily program from BayREN or PG&E by pre-qualifying scopes that are determined to be eligible under one of these programs.

Description of the PAYS Water Efficiency Pilot: BayREN provides technical assistance services to help water utilities develop new PAYS programs or enhance existing PAYS programs to reach additional customers. Examples of the services that BayREN provides include contract development, templates for program materials, procurement assistance, marketing materials, and assistance gaining buy-in from internal stakeholders. PAYS programs install energy and water efficiency measures in residential and commercial buildings with no upfront costs to the customer. The pilots attach a regular charge on the customer's water bill as a method of repayment.

Description of the Commercial PACE Administration and Marketing: BayREN provides marketing and administrative support to drive uptake in Commercial PACE programs. PACE loans are available to commercial, agricultural, and industrial customers, as well as multifamily properties with five or more units. PACE loans appear on the customer's property tax bill and cover such measures as weatherization, windows, doors, HVAC systems, efficient appliances, thermostats, solar photovoltaics, and other demand response measures. To support PACE, BayREN developed a county-by-county commercial inventory and profiling tool, using a baseline of 25 construction, ownership, performance, and financial indicators (additional custom indicators are also available). BayREN also uses this tool to provide market segmentation and commercial customer targeting. BayREN also performs validation of PACE programs in the Bay Area, which is part of the approval process for offering the program.

Progress by Program Performance Metric: Table 22, below, shows BayREN's progress in 2013–2014 on PPM across Financing activities. Following the table are additional details on progress in 2013–2014 for each of the Financing programs.

Table 22. BayREN Financing Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Number of multifamily projects served by the Multifamily Capital Advance Financing Pilot	10	30	0	0%
Number of multifamily units served by the Multifamily Capital Advance Financing Pilot	400	800	0	0%
Number of projects forecast under the PAYS program	0[a]	2,000	0	0%
Percentage of Home Upgrade Projects facilitated through the Financing Portfolio Subprogram	16%	22%	n/a: The Single-Family LLR was not approved by the CPUC.	
Percentage of PG&E Home Upgrade projects facilitated through the Financing Portfolio Subprogram	25%	36%		

[a] While PAYS programs supported with CPUC funds did not result in installed projects as of December 2014, the initial Windsor Efficiency PAYS pilot supported with Better Buildings Program funding administered by the Sonoma County Regional Climate Protection Agency had installed PAYS projects in 231 single family homes and 233 multifamily units as of December, 2014.

Progress for Multifamily Capital Advance: As of December 2014, BayREN had developed the partnerships necessary for implementation, but the program had not supported any loans. Specifically, BayREN recruited a consultant for lender outreach, recruited a loan servicer for the program, and signed participation agreements with two lending institutions.

Progress for PAYS Water Efficiency Pilot: BayREN conducted outreach to 16 water agencies and is working with three to design or expand PAYS services: Town of Windsor, East Bay Municipal Utility District (EBMUD), and City of Hayward. While two of these projects are still in the development stage, the utilities expect to launch them between June and August 2015. In addition, BayREN performed preliminary research for the San Francisco Public Utilities Commission (SFPUC), but development efforts are presently on hold.

Progress as of mid-May 2015 is summarized for each of the three water utilities below. This information was collected through in-depth interviews with these water agencies:

- **Town of Windsor:** BayREN has been working with the Town of Windsor to expand PAYS services to commercial customers. Windsor had done a soft launch, but experienced delays due to challenges with one of its supply-side partners. BayREN helped Windsor find a new partner, and Windsor began offering PAYS to commercial customers in early May.
- **City of Hayward:** In February 2014, the city council approved a PAYS program, but complications arose in terms of securing funding. As of May 2015, the City of Hayward had identified a new funding source and expects to launch its PAYS program by August 2015.
- **EBMUD:** BayREN is presently working with EBMUD to finalize program design, such as developing project contracts and contractor criteria, and has not yet launched.

Progress for Commercial PACE Administration and Marketing: For this program, BayREN has begun developing the Commercial Building Inventory & Profiling Tool, which includes over 25 baseline indicators. BayREN has also begun developing county-by-county reports that analyze commercial building patterns and

market segmentation profiles. Finally, BayREN has completed judicial validation[22] for two counties to begin offering Commercial PACE in their jurisdictions.

3.2 SoCalREN Program Progress in 2013–2014

This section presents the progress of SoCalREN's program as of December 2014. Where applicable for each program, the quantitative PPM goals[23] and stated accomplishments in the 2014 Annual Narrative[24] are included. SoCalREN told the Consultant Team that values in SoCalREN's 2014 Annual Narrative were not cumulative for 2013–2014 and then provided the updated cumulative values. The Consultant Team provides the cumulative 2013–2014 values as provided by SoCalREN, which for the most part were relatively minor changes. In the few cases where the changes were larger, such as trainings, the larger update made sense to the Consultant Team as the programs were ramping up in 2013.

The Consultant Team did not verify the values in this section, as it was outside the study scope.

3.2.1 Home Upgrade: Energy Upgrade California

Description: Through the Single-Family Incentives program, SoCalREN offers Home Upgrade incentives of up to $3,000 to homeowners in LA County who receive service from both SCE and SCG. An EUC Home Upgrade Participating Contractor must perform all work, and SoCalREN actively recruits and trains these contractors into its program. Although SoCalREN does not directly implement Home Upgrade in areas the municipal utilities serve (such as the LA Department of Water and Power, Pasadena Water and Power, or Long Beach Gas and Oil) or outside of LA County, SoCalREN promotes both Home Upgrade and Advanced Home Upgrade across the SoCalREN territory in an effort to drive participation in all Whole House programs. As described in the sections below, SoCalREN also engaged in a number of marketing and contractor support activities related to this program.

Progress: The Home Upgrade program is one of two programs with resource activities undertaken by SoCalREN. There were 29 contractors submitting participation agreements exclusively to SoCalREN in 2013–2014.

Table 23. SoCalREN Home Upgrade Savings Goals and Accomplishments in 2013–2014

Savings Type (Annual Ex Ante Gross)	Goal	Accomplished in 2013–2014	Percent of Goal
Home Upgrade			
Energy Savings (kWh)	2,335,784	87,817	4%
Peak Demand Savings (kW)	2,681	145	5%
Gas Savings (Therms)	164,629	12,056	7%

Source: EESTATS December 2014 Monthly Report, which are annual gross ex ante savings values.

[22] This is a legal formality to allow the county to offer PACE

[23] As presented in the Revised SoCalREN Program Implementation Plan (February 2014).

[24] 2015 SoCalREN Energy Efficiency Annual Report (April 2015)

Table 24. SoCalREN Home Upgrade Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Number of homes or buildings treated[a]	951	1,425	188	7.9%
Number of units incented or rebated	2,378	3,563	506	8.5%

[a] SoCalREN defines "treated" as total project applications in the pipeline, but not complete.

3.2.2 Multifamily Program: Energy Upgrade California

Description: The Multifamily Incentives program provides free consultation to owners of multifamily properties to identify EE upgrade improvements. SoCalREN also offers incentives to offset the cost of receiving an energy audit,[25] as well as incentives for the actual upgrades (up to $1,200 per unit). These services and incentives are available to any owner of a multifamily property of three or more units within the joint SCE/SCG service territory. Customers must complete projects with a participating rater and reduce building energy use by at least 10%.

In addition to providing incentives, SoCalREN completed a host of design changes for the Single-Family and Multifamily programs to encourage more participation. These included, for example, changing the incentive structure, expanding the pool of contractors, changing measure requirements, and adding new measures and incentives.

Progress: The Multifamily program is the other resource activity undertaken by SoCalREN.

Table 25. SoCalREN Multifamily Savings Goals and Accomplishments in 2013–2014

Savings Type	Goal	Accomplished in 2013–14	Percent of Goal
Multifamily			
Energy Savings (kWh)	6,264,000	385,255	6%
Peak Demand Savings (kW)	1,357.20	80	6%
Gas Savings (Therms)	269,280	14,650	5%

Source: EESTATS December 2014 Monthly Report

In addition to the PPM, SoCalREN supported multifamily contractors by delivering California Multifamily Existing Building training to 43 raters (representing 30 companies) with subsequent approval to participate. Additionally, SoCalREN stated that they assessed 16 buildings during the 2013–2014 period, with 2,037 incentives paid as part of the assessment activity.

[25] $5,000 for buildings with between 5 and 49 units, $10,000 for buildings with between 50 and 100 units, and an additional $20/unit for every additional unit.

Table 26. SoCalREN Multifamily Incentives Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Number of homes or buildings treated[a]	90	90	26	14%
Number of units incented or rebated	4,000	4,000	384	5%

[a] SoCalREN defines "treated" as total project applications in the pipeline, but not complete.

3.2.3 Local Marketing and Outreach

Description: To support transforming the whole building upgrade market, SoCalREN engages in a number of activities and tactics to increase awareness of residential EE programs available to customers. Activities included homeowner workshops, community events, maintaining a "Residents" webpage on TEN's website, social media campaigns, and a Home Upgrade Advisor hotline. SoCalREN also leverages community stakeholders in three ways. First, it engages in outreach with local government stakeholders to promote Home Upgrade through their channels and helps develop Community Home Energy Retrofit Program (CHERP) pilots, which are community-based education and outreach campaigns. Second, the Energy Champions campaign provides incentives of up to $400 to local organizations that refer homeowners to the Advanced Home Upgrade and Home Upgrade programs. Lastly, SoCalREN offers $200 Energy Coupons for participation in SCE/SCG's Advanced Home Upgrade Program.

Progress: SoCalREN engaged in a variety of marketing and outreach efforts.

Table 27. SoCalREN Local Marketing and Outreach Progress

Outputs	Accomplished in 2013–2014
Workshops and Events	
Direct interactions with individuals at events	2,542
Homeowner workshop attendees	150
Community events held	27
Homeowner workshops held	9
Online Marketing and Outreach	
TEN's '"Residents" webpage views	18,100
Facebook page "likes"	444
Other Outreach and Support	
Residents assisted via Home Upgrade Advisor hotline	476
CHERP pilots supported	2
Number of Advanced Home Upgrade Energy Coupons issued	172
Number of Energy Champion referrals	2

3.2.4 Green Building Labeling

Description: The Green Building Labeling program seeks to encourage homebuyers to pursue EE as part of their home purchase decision. The program employs an integrated outreach, training, and support approach to help real estate professionals understand the value of "green" buildings and incorporate "green buildings" into their professional services. This includes conducting National Association of Realtors (NAR) Green Designation and Appraisal Institute trainings, which certify realtors, brokers, and appraisers as green

real estate professionals. SoCalREN complements these efforts with a consumer-facing "green realtor" marketing campaign to build demand for green-certified real estate professionals among homebuyers.

Progress: SoCalREN stated that it evaluated the impacts of its NAR Green Designation training through a pre- and post-survey. The results indicate a large increase in the number of realtors referring customers to EE programs—from 22% before the training to 64% afterward.

Table 28. SoCalREN Green Labeling Progress

Outputs	Accomplished in 2013–2014
Online Marketing and Outreach	
Green realtor campaign website page views	112,161
Realtor Training	
Number of realtors certified through Certified Green Real Estate Professional and NAR Green Designation trainings	516
Number of NAR Green Designation trainings	11
Number of workshops delivered to associations or realtors	6
Home Appraiser Training	
Number of appraisers trained	23
Number of appraiser trainings delivered	2

3.2.5 Contractor Outreach and Training

Description: The purpose of the Contractor Outreach and Training program is to recruit, train, and support Home Upgrade contractors. SoCalREN hosts several Contractor Recruiting Workshops across its territory. The program assigns Account Managers to recruited contractors, and the managers provide the contractors with continual information and support for completing Home Upgrades. These Account Managers also conduct outreach to contractors via events and office visits. SoCalREN also maintains a "Contractors" page on its website and a Home Upgrade Advisor hotline that contractors can call.

Progress: The HVAC Contractor Training took two forms: 93 one-on-one trainings with single companies and six "event trainings" with multiple companies.

Table 29. SoCalREN Contractor Outreach and Training Progress

Outputs	Accomplished in 2013–2014
Outreach to Contractors	
Contractor impressions at all events	259
New Home Upgrade contractor registrations	74
Contractor recruitment workshops held	6
Training and Technical Support	
Contractors assisted via Home Upgrade Advisor	473
Contractors supported via Account Managers	74
Email blasts to contractors	45
Number of HVAC Contractor Trainings	99
Number of HVAC Contractor Training attendees	206
Website Activity	
Contractor Resources webpage views	3,044

Online interest forms submitted	50
Co-Op Marketing	
Funding provided to contractors	$656,322[a]
Number of Co-op Marketing Projects incented	201
Number of contractors participating in co-op marketing	48

[a] $358,145 (or 55%) was ratepayer funds

3.2.6 Low-Income Single Family

Description: The goal of the Low-Income Single-Family program is to encourage the same comprehensive upgrades in low-income homes that occur in standard Home Upgrade single-family residences. SoCalREN works with the Community Development Commission (CDC) of LA County to develop and implement a business process that connects CDC program participants with EUC Home Upgrade programs. SoCalREN also educates and trains residential building rehabilitation contractors working with low-income homeowners on the Home Upgrade programs and encourages them to become Home Upgrade Participating Contractors.

Progress: Table 30, below, shows SoCalREN's progress in 2013–2014 in supporting low-income Home Upgrades.

Table 30. SoCalREN Low-Income Program Progress

Outputs	Accomplished in 2013–2014
Contractor Outreach and Training	
Number of CDC contractors contacted about the joint CDC-Home Upgrade Program	390
Number of Building Performance Institute (BPI) Building Analyst Trainings incentivized	25
Number of contractor incentivized for full cost of BPI certification	5
Marketing and Outreach	
Number of flyers sent to low-income residents	48,000
Application packages sent to low-income residents	226

3.2.7 Financing

SoCalREN supported loans for single-family, non-residential, and public agency customers in 2013 and 2014. However, because SoCalREN did not provide PPM goals for Financing in its updated PIP, it is difficult to gauge how it performed in comparison to original goals.

Single-Family Loan Loss Reserve

Description: The Residential LLR program targets the single-family residential market and supports two loan products: Home Energy Loans that support residential EE and solar upgrades through Home Upgrade and Cool Comfort Financing Loans that support the installation of HVAC measures above code. The LLR covers 90% of the loans, resulting in lower interest rates and making these loans more affordable and attractive to customers. In theory, this results in increased participation in Home Upgrade and high-efficiency HVAC installations.

Progress: Of the three Financing activities, SoCalREN supported the greatest number of projects through Single-Family LLR, although the loan value of each of these projects was smaller compared to other activities.

Table 31. SoCalREN Single-Family LLR Progress

Outputs	Accomplished in 2013–2014[a]
Number of applications received	535
Number of loans funded	272
Total value of loans	$4,745,105
Number of projects funded through loans	272
Number of loans paid off	36 (13%)

[a] SoCalREN states that the data are inclusive of both programs backed by single-family LLRs: Home Energy Loans and Cool Comfort Financing Loans.

Non-Residential PACE

Description: SoCalREN provides marketing and administration support for Commercial PACE projects in joint SCE/SCG service territories in LA County. SoCalREN uses the implementation funds for general project management, project development support, consumer outreach, marketing, application support, pre-approval support, and website management. PACE projects are available to commercial, agricultural, and industrial customers, as well as multifamily properties with five or more units. PACE loans appear on the customer's property tax bill and cover such measures as weatherization, windows, doors, HVAC systems, efficient appliances, thermostats, solar photovoltaics, and other demand response measures.

Progress: SoCalREN supported loans for five Non-Residential PACE projects through 2014. As of December 2014, an additional $41.9 million in projects are in the pipeline.

Table 32. SoCalREN Non-Residential PACE Progress

Outputs	Accomplished in 2013–2014
PACE applications received	144
PACE projects supported	5
Total loan value of PACE projects supported	$14.4 million

Public Agency Financing Program

Description: The CPUC did not approve funding for a Public Building LLR or Public Agency Revolving Loan Fund. Instead, SoCalREN uses these funds to support the Public Agency Financing Program. Through this program, SoCalREN provides "turnkey" technical assistance support to public agencies (such as cities, counties, and schools) by assisting them with evaluating financing options for energy upgrades and completing financing and incentive applications. One of the services is the development of a calculator that helps participating agencies evaluate the options for financing EE projects.

Progress: Although the value of the loans supported by the Public Agency Financing Program is the smallest of the Financing activities, the technical assistance activities SoCalREN provided allowed for high levels of engagement with public agencies. For instance, SoCalREN created a number of tools and materials to help overcome conceptual barriers commonly faced by public agencies, increasing their interest in SoCalREN and IOU financing options. Many projects remain in the pipeline for the Public Agency Financing Program in 2015.

Table 33. SoCalREN Public Agency Financing Program Progress

Outputs	Accomplished in 2013–2014
Loans Closed	
Value of financing loans closed	$1 million
Financing Application Assistance	
Number of financing applications completed for agencies	69
Potential loan value of financing applications completed	$10.2 million
Number of project proposals delivered to agencies	17
Marketing and Outreach	
Number of outreach events and presentations	37
Number of inboxes reached through email blasts	1,165

3.2.8 Southern California Regional Energy Center

Through the SoCalREC program, SoCalREN offers a number of different services to local governments and public agencies. The Public Agency Program, which is the focus of one of the constituent surveys (see the Study Methodology section), includes the Project Delivery activities below in addition to the Public Agency Financing Program described above.

Description of Aggregated Regional Procurement and Integrated Comprehensive Whole Building Retrofits (Project Delivery): SoCalREN offers start-to-finish project management support (including audits, performance design specifications, and financing and incentive application support) for comprehensive mechanical, lighting, street lighting, water/wastewater pumping, process optimization, and other demand-side management (DSM) projects. It also offers a pool of competitively bid specialty contractors. SoCalREN also offers public agencies the Enterprise Energy Management Information System (EEMIS) that enables agencies to track the impacts of their projects over time. This software monitors facility energy consumption and provides hourly and system-level usage profiles.

Description of Climate Action Plan/Los Angeles Regional Collaborative for Climate Action and Sustainability: The Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) includes LA County and several cities and councils of governments (COGs). The LARC coordinates regional climate action and sustainability strategies. SoCalREN is using the LARC and program funds to develop a countywide climate action and sustainability plan. To support this effort, SoCalREN, contracting with UCLA, has developed an Interactive Energy Atlas, which displays energy consumption and similar data on neighborhood, city, or other regional level.

Description of Water Energy Nexus: The high-level goal of this program was to support the development of a standardized methodology to quantify the value of embedded energy in water, perform combined water and energy audits and integrated retrofit project recommendations for 10 school districts, and develop a targeted marketing model to promote consumer awareness of the water-energy nexus. Notably, this program was halted due to lack of interest from water utilities and the IOUs.

Description of Regional Energy Project Tracking and Permitting System: Now under the name "On-Ramp," SoCalREN used implementation funds to develop the Community Energy Efficiency Project Management System (CEEPMS). The CEEPMS is an online building permitting software that means to build customer awareness of EE upgrades and lends local governments a tool for tracking GHG reductions in their jurisdictions. To increase customer awareness of EE opportunities, the CEEPMS matches customers to

rebates via the construction permits contractors pull. The CEEPMS also incorporates Title 24 processes and allows for measurement of GHG savings at the project level within permitting software presently available to local governments.

Description of Marketing, Outreach, Education, and Training: SoCalREN engaged with residents, business, and public agencies to promote EE and program participation. Examples of activities included developing a communication plan and brand and style guidelines for SoCalREN, maintaining a "Public Agencies" webpage, setting up a toll-free number for program inquiries, distributing SoCalREN Technical Reports, and attending conferences and events.

Description of Workforce Development: Through the Workforce Development program, SoCalREN partnered with the Emerald Cities Collaborative (ECC) to develop training and employment opportunities for minority, low-income, and disadvantaged workers. The ECC distributes a variety of resources on apprenticeship and training at local events. Further, the ECC developed the E-Contractor Academy, where it conducts weekly seminars for small and minority contractors on how to compete for and execute EE projects in the municipal, university, school, and hospital (MUSH) sector.

Progress: Intertwined with the Public Agency Financing Program above, SoCalREN supported public agencies with a wide variety of audit, project development, benchmarking, and educational services. SoCalREN far exceeded its PPM goals for this program (see Table 34 and Table 35, below).

Table 34. SoCalREN SoCalREC Progress by PPM

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014	Percent of 2013–2014 Goal Accomplished
Number of homes or buildings treated	7	8	149	993%

Note: SoCalREN staff indicate that accomplishments are much higher than the original goals, as the PIP goals were put in place prior to a fully designed Public Agency Program.

Table 35. SoCalREN SoCalREC Progress

Outputs	Accomplished in 2013–2014
Aggregated Regional Procurement and Integrated Comprehensive Whole Building Retrofits (Project Delivery)	
Number of in-progress projects[a]	130
Number of completed projects[a]	5
Number of public agencies enrolled[b]	50
Number of public agencies that have adopted EEMIS	56
Number of facilities monitored by EEMIS	~150
Number of streetlights in process of retrofit	17,814
Climate Action Plan/LARC	
Interactive Energy Atlas website developed (launch in June 2015)	1[c]
Number of Energy Atlas stakeholder workshops delivered	2
Number of LA County COGs engaged regarding GHG inventories	6 (all COGs in LA County)
Water-Energy Nexus	
Number of facility-wide water and energy audits to public agencies	10
Regional Energy Project Tracking and Permitting System (CEEPMS)	
Number of CEEPMS prototypes developed	2
Number of cities enrolled for product launch	1
Marketing, Outreach, Education, and Training	
SoCalREN developed a number of marketing and outreach tools and resources in 2013–2014, such as a communications plan, branding and style guides, a "Public Agencies" website, toll-free numbers and email inquiry systems, and flyers and other marketing collateral.	
Workforce Development	
E-Contractor Academy Program created	1
Number of small, minority, and disabled contractors who have graduated from the E-Contractor Academy	110
Number of graduates who have become prequalified to perform work for LA County	7
Number of LA County contracts awarded to graduates	2
Number of graduates assisted with prequalification for LA Unified School District projects	3

[a] Based on SoCalREN's tracking dataset as of 12/17/2014; in-progress includes all projects flagged as "active" or "pilot," but excludes the five marked as "completed."
[b] Includes all agencies enrolled between July and December 2013 according to SoCalREN's tracking database we received on 12/19/2014.
[c] According to SoCalREN staff, this is a single website with 98 public agency profiles available upon launch.

4. Findings

This section first describes findings related to **value**, followed by information about the **effectiveness** of the RENs. The majority of the analysis presented in this section is qualitative, meaning that the Consultant Team is drawing conclusions from multiple data sources through a "preponderance of evidence" approach.

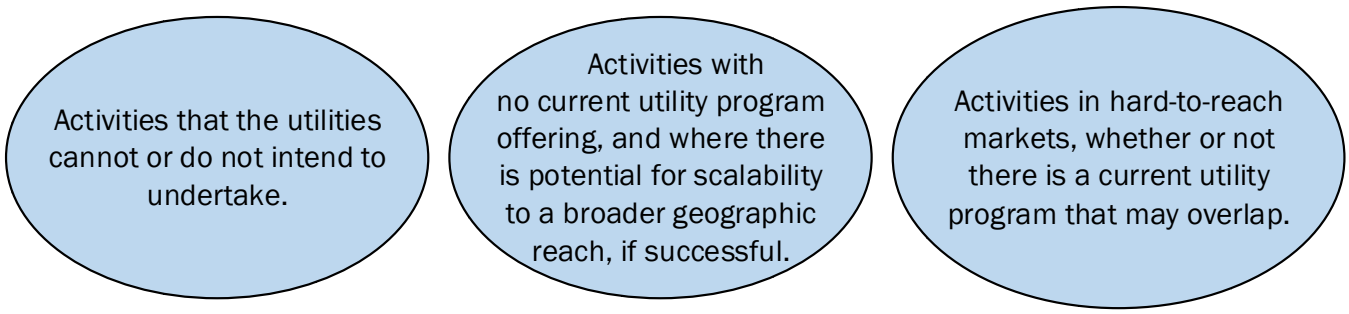
4.1 Value of the RENs

The REN pilots will have demonstrated value if their programs, as implemented, broke new ground in areas not presently served by utility offerings and if their activities and programs had the potential to scale up to a broader geographic area or to serve hard-to-reach markets. In addition, the RENs would have demonstrated value if their activities promote WE&T, new technology (i.e., software), or the water-energy nexus.

4.1.1 Value Compared to CPUC Pilot Evaluation Areas

The CPUC authorized the creation of the BayREN and SoCalREN to understand whether RENs could provide value as new program administrators entering an EE program space already occupied by IOUs and Marin Clean Energy (MCE). The RENs were expected to uncover opportunity areas overlooked by utility programs and to capture EE in marginalized program market areas where locating energy savings is difficult. The CPUC expected the RENs to undertake activities in one or more of the three categories shown in Figure 5, below.

Figure 5. CPUC Broad Categories for Expected REN Program Activities



Category 1: Activities that the utilities cannot do or do not intend to undertake

The CPUC specified that the RENs were to provide activities the utilities cannot or do not intend to undertake and approved the portfolio of programs proposed by the RENs and included in this study. It was outside the scope of this study to determine if those authorization choices were appropriate. Therefore, the Consultant Team looked for activities unique to the RENs that were providing value outside of the existing IOU programs and did not specifically query IOU staff regarding whether the current REN program was an activity that the IOU could not do or may not perform in the future.

REN presence and unique contribution to the local government EE sector as characterized by REN staff. In interviews with REN staff, they cited the organizational and governance structure of the RENs, the types of services and measures that they offer, the markets that they reach, and their level of engagement with local governments and communities as activities outside the IOU sphere. In the opinion of REN staff, the RENs' organization and governance provide greater credibility, trust, and flexibility than do the IOUs.

Further, REN staff offered three attributes that the RENs offer to local governments, which could result in increased program operational effectiveness and reach:

- **Credibility and Trust:** According to members of their staffs, BayREN and SoCalREN use pre-existing connections, credibility, and trust with their constituents to gain access and foster collaboration with the community. They suggest that this allows local governments to form partnerships with community-based training efforts or develop co-marketing campaigns to reach additional customers.
- **Flexibility:** As one BayREN staffer explained, because nine counties participate in BayREN's governance, local concerns or ideas for local program implementation are more easily elevated to the decision makers within BayREN (i.e., the Lead Link or the Coordinating Circle). The quick and easy access leads to greater flexibility in making small program changes. Conversely, according to BayREN staff, while local governments can easily access their IOU LGP representative,[26] some concerns need to be elevated to higher-level decision makers within PG&E (i.e., the supervisor of PG&E's Local Government Partnership programs).[27] Two county representatives mentioned that BayREN has less bureaucracy to navigate and makes decisions faster than the IOUs. The Consultant Team did not ask specifically about accessibility within SoCalREN since there is a single-decision maker. However, it seems plausible to the Consultant Team that this same ease of accessibility, leading to greater flexibility, occurs within SoCalREN.
- **Regional Resource Sharing:** Staff from both RENs mentioned that aggregation of resources across the REN counties allows local governments to save time and money by borrowing approaches or designs that other governments have developed and then customizing those resources to fit their needs. For instance, a county can use predesigned marketing materials for Home Upgrade programs. Further, LA County acquired and adapted an EEMIS, a benchmarking type of software that compares energy use across buildings in a city or region. SoCalREN is presently sharing the EEMIS licensing at cost to other governments in SoCalREN territory and plans to provide training and consulting services.

While the RENs' staff point out several important benefits to local governments, it is unclear that all these benefits are unique to the RENs. The LGPs most likely have similar levels of credibility and trust as the RENs (especially since they are the same people in some cases). However, the flexibility afforded to the RENs in terms of quick program changes is positive and most likely is a quality that the LGPs lack simply due to the IOU oversight.

IOU staff position on value of RENs vis a vis the LGPs. While local governments clearly benefit in the ways described above, interviews with the IOUs suggest that the LGPs provide similar value.[28] The LGPs consist of cities and counties with a partnership implementer and one or more local governments as members, which have networks and rapport within the communities they serve that may be similar to those of the RENs. Additionally, the line between an LGP and the REN can be blurred, as there are several cases where a

[26] Each LGP Implementer has an IOU counterpart who is their point of contact within the IOU.

[27] One REN member county said, "The REN has a much better relationship with oversight and programs than the LGP Energy Watch program. The nine voting members that are approving the programs are the same people who are deploying programs in the field. The PG&E representative for our county is not able to influence what is in the portfolio and we can at the REN. At the REN, good ideas can rise to the top and be approved much faster than at PG&E."

[28] As of the end of 2014, the IOUs held contracts with 47 LGPs. LGPs funding for 2013–2014 was approximately $158 million.

BayREN county representative also has a LGP role and ties with PG&E and 11 of the 13 SoCalREN Advisors are part of an LGP.

LGPs also provide opportunities for sharing best practices and resources. For instance, the IOUs' LGP budgets support the Statewide Energy Efficiency Collaborative (SEEC),[29] which holds an annual EE forum for local governments and offers several no-cost resources, such as a quick-start guide for developing GHG inventories.

Overlap with IOU Programs

If the RENs are performing activities that the IOUs cannot or do not intend to perform, overlap of activities would be minimal. Discussions with both the RENs and the IOUs revealed that, although overlap of customers exists, the services offered are distinct.

- **Home Upgrade Offerings:** The customers for Home Upgrade and Public Agency Program programs fully overlap between the IOUs and the RENs. However, the RENs offer different services or higher levels of engagement to the same customers. BayREN and SoCalREN offer Home Upgrade while the IOUs offer Advanced Home Upgrade.[30] Both RENs help customers find the most appropriate program, as they refer customers to the Advanced Home Upgrade program when necessary.
- **Technical Assistance through SoCalREC:** One key area where SCE/SCG and REN services overlap is technical assistance. According to the IOUs, they offer similar technical assistance to local government (and public agencies) through the LGPs, schools programs, and Custom and Express Efficiency programs.[31] However, SoCalREN and the IOUs agree that their offerings are distinct in terms of the level of engagement involved. For instance, the IOUs' technical assistance may address one piece of the process of developing EE projects, while SoCalREN provides assistance through the entire process. Public Agency Program survey respondents provided similar feedback. Half of the respondents (13 of 28) mentioned that SCE/SCG offers services similar to those of SoCalREN. Six respondents mentioned similar technical assistance services, such as audits, project design assistance, savings estimates, incentive application assistance, and procurement assistance. Additionally, one survey participant highlighted the different level of engagement that SoCalREN offers: "[*The IOUs] do offer programs, but do not go above and beyond the way [SoCalREN] does*." One other participant offered a different opinion, stating, "*…a lot of the time it seems like they are duplicating what is offered through the local government partnership programs with SCE and SoCalGas*."

Similarly, the RENs' and IOUs' Multifamily programs fully overlap in terms of customers, but offer slightly different program designs.

- **BayREN has the same Multifamily program customer targets as PG&E:** The BayREN and PG&E Multifamily programs target the exact same populations, but with different measure mix offerings. While their implementation plans indicate service to any multifamily building, the Consultant Team heard that BayREN has experienced significant participation by market-rate multifamily complexes while PG&E has primarily served low-income (affordable) complexes. This may be due to differences

[29] http://californiaseec.org/.

[30] SoCalREN offers Home Upgrade only to homeowners in LA County, while BayREN offers Home Upgrade to any homeowner in the entire BayREN region.

[31] The Consultant Team did not examine the IOU technical assistance offerings or verify the self-reported accounts of the IOU staff.

in program design. BayREN's Multifamily program allows customers to utilize program-provided technical staff and an assessment process they consider streamlined while PG&E requires participants to invest in an in-depth upfront assessment by a participating Rater (subsidized with an assessment incentive).

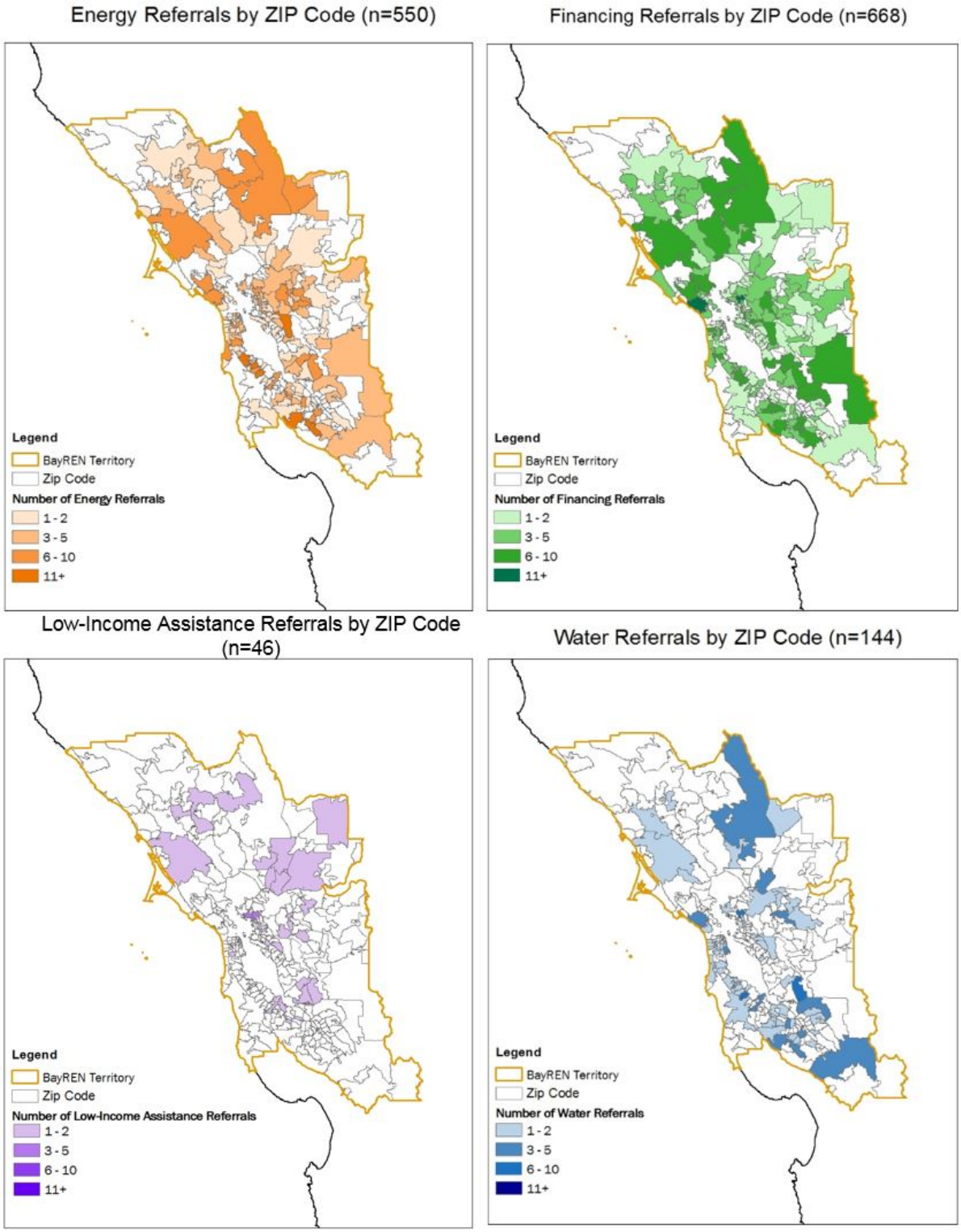
- **SoCalREN has the same Multifamily program customer targets as SCG:** Both SoCalREN and SCG are undertaking programs at multifamily sites in the same territory, and IOU account representatives often market both programs to customers. Although marketed to the same customers, the programs offer different measures and have different approaches to obtaining the final rating of the building.[32]

Within the BayREN Home Upgrade Advisor program, REN staff described a level of customer support that they feel is unlike other advisor offerings. Specifically, the RENs staff refers customers to a suite of complementary programs that may be relevant. Six BayREN staff members noted that referrals and lead generation are the main areas where coordination results in synergistic benefits for both administrators. As Figure 6, below, shows, the Home Upgrade Advisors program refers hundreds of customers throughout BayREN's territory to a wide variety of programs.[33]

[32] SoCalREN uses an open-rater model, whereas the IOUs assign a rater to the projects. The Consultant Team heard from the RENs that an open-rater model provides greater flexibility in the rater, but the Consultant Team did not verify that statement.

[33] BayREN provided the data in this figure. The Consultant Team neither collected nor validated this information.

Figure 6. BayREN Home Upgrade Advisor Number of Referrals to Other Programs, by Program Type



Source: BayREN Home Upgrade Advisor implementation team (CLEAResult).

From interviews with both REN and IOU staff, the Consultant Team determined that the two RENs have collaborated with the IOUs to carve out niches in the markets within the Home Upgrade and public agency technical assistance programs, two areas that we most closely reviewed. While many REN and IOU offerings overlap, in these cases the RENs provide differentiated services, measures, and/or enhanced levels of engagement to customers.

Availability of Services to Local Governments

The RENs have provided local governments with a wider array of EE services and products, compared to previous years. Since the RENs began in September 2013, local governments in the SoCalREN area report that more EE services and products have been available to them. As shown in Figure 7, below, more than half (17 of 28) of the Public Agency Program participants surveyed reported that a greater number and variety of services and products were now available.

Local governments in SoCalREN's territory that belong to LGPs (i.e., who were also in the LGP survey for the 2013–2014 LGPs study[34]) indicated that more services and products were available to them. Compared to LGP Implementers[35] in the LGP survey, a statistically larger number of participants in the Public Agency Program indicated a substantially greater number and variety of EE services and products available to them since the RENs began.[36] A possible reason for this difference is that Public Agency Program participants have greater exposure to SoCalREN's portfolio of offerings.

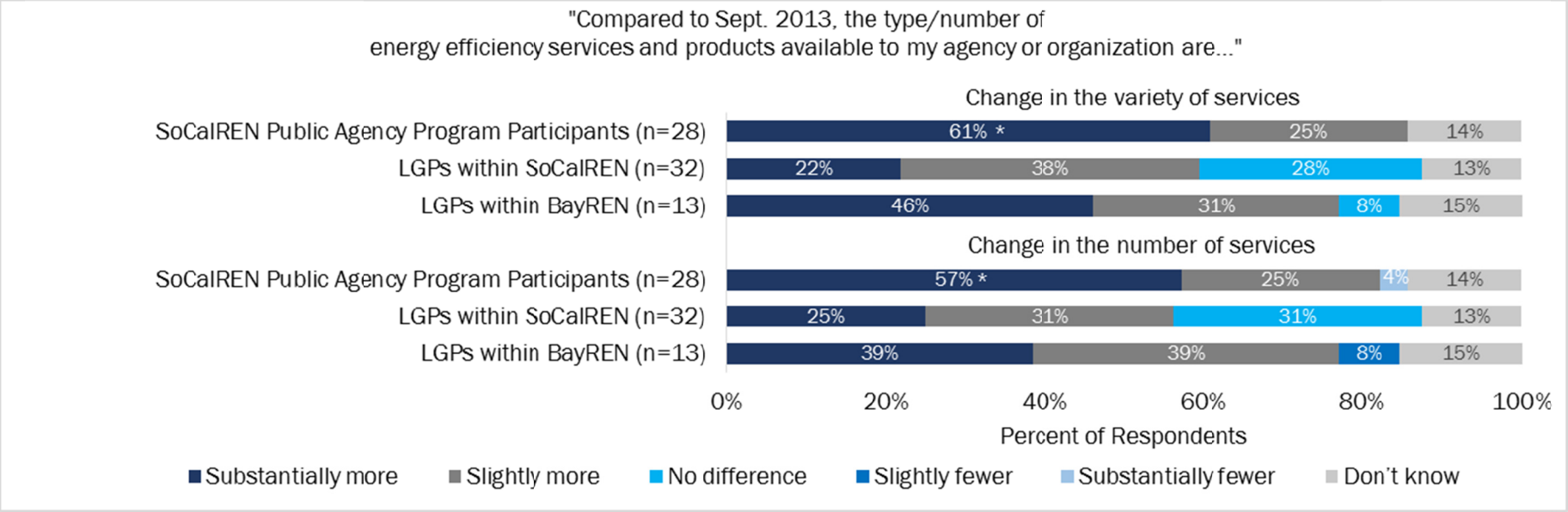
Of the 13 local governments in BayREN's territory also in the LGP survey for the 2013–2014 LGPs study, nearly one-half indicated substantially more variety of services were available to them (6 of 13), while 5 of 13 indicated substantially more services were available.

[34] The survey is within *Local Government Partnerships Value and Effectiveness Study* by Opinion Dynamics. The study is located on Calmac.org

[35] As described earlier, LGP Implementers hold the contract with an IOU to conduct activities within an LGP.

[36] A statistical difference at the 90% confidence level means that the Consultant Team has 90% certainty that the differences seen within the sample are actual differences in the full populations of SoCalREN Public Agency participants and LGPs in SoCalREN's area.

Figure 7. Change in the Number of EE Services and Products since RENs Began



* Difference between Public Agency Participants and SoCalREN Agencies are statistically different at the 90% confidence level.
Source: LGP Survey by Opinion Dynamics as part of the 2013–2014 LGP study. Respondents are only LGP respondents within the RENs territory who were familiar with the RENs.

Category 2: Activities where there is no utility program offering and where there is potential for scalability to a broader geographic reach, if successful

Early on, the RENs, faced with the prospect of program design with little allowance for duplication, had few choices in drawing from markets that had not been addressed by the IOUs, which had a 10-year head start in the local government EE sector.

The RENs introduced new program offerings to the California EE community—one addresses the water-energy nexus, another is a software platform for building permit tracking, and a third software package addresses building energy tracking and management.

- **BayREN PAYS program:** BayREN offers support to water agencies developing PAYS programs, enabling them to provide new EE offerings to their customers.[37] Within the program and through an on-bill financing arrangement, customers can pay for new energy- or water-savings devices by adding payments for the chosen devices cost to their water bills. Eligible devices must be approved by the sponsoring water agency. The two energy savings devices included in PAYS are high-efficiency shower heads and faucet aerators[38]. Water savings from measures such as toilets also include embedded energy savings (i.e., energy savings due to water conservation and therefore less need for energy to move water). Water agencies typically see PAYS as an innovative tool to overcome customers' upfront cash barriers because it offers financing that guarantees positive cash flow to the customer from day one. The Consultant Team also heard that BayREN's support yielded several internal benefits to the water agencies, such as helping them meet Climate Action Plan (CAP) goals and improving water-billing systems. A small-scale effort with three water agencies, the BayREN effort is an activity not previously performed by the IOUs. It has the potential for scaling anywhere in the state, if found successful.[39] (Because this program is different from other EE programs, the Consultant Team pulled in information from the implementer and placed it in Appendix A.) As of July 2015, two agencies are implementing PAYS: the Town of Windsor and the City of Hayward.
- **SoCalREC CEEPMS**: SoCalREC offers the Regional Energy Project Tracking and Permitting System software called CEEPMS, which links the building community to available rebates. While still in its early stages,[40] this is not an activity previously performed by the IOUs. It appears to have the potential for scaling anywhere in the state, if found successful. This software may be comparable to point-of-sale type marketing. Theoretically, an individual has already decided to move forward with a specific project requiring a permit; while going through the permit process, the opportunity to install an energy-efficient option as part of the project, supported by rebates, becomes available. Because of this timely information, the individual may take an EE action not previously planned. Thus, this software package shows promise for calculating indirect energy savings.

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[37] PAYS is an on-bill financing program supported by water agency funding whereby savings from both water- and energy-saving devices are estimated to significantly exceed program charges used to repay the financed cost of the devices.

[38] Subsequent to the reporting of this study, Hayward updated their website to indicate that they also allow Common Area Lighting and Hot Water System Upgrades (pipe wrap, demand controllers, etc.).

[39] All three water agencies are still in the early stages of their piloting of PAYS, so the Consultant Team cannot determine the success of the individual water programs at this point.

[40] As of the end of 2014, SoCalREN has developed two prototypes, and one local government has enrolled for product launch.

- **SoCalREC EEMIS**: In addition, the EEMIS system through SoCalREC, which provides enhanced benchmarking for local governments, is still new. As of the end of 2014, 56 local governments have licensed the software package through SoCalREC and are tracking approximately 150 buildings. The Consultant Team does not know if the cost of providing training and support for this new system would preclude scaling. Similar to CEEPMS, this software package has the potential for indirect energy savings, but the level of savings is not yet known.

Category 3: Activities in hard-to-reach markets, whether or not there is a current utility program that may overlap

The RENs are supporting hard-to-reach areas and SoCalREN has a small WE&T program that is putting disadvantaged contractors to work.

Both RENs serve hard-to-reach customers with the incentives and technical assistance offerings on the residential side available through their Multifamily programs. The multifamily sector overall is a difficult market. Renters are willing to pay for smaller measures that they can take with them when they move, yet the cost of more substantive energy-savings measures is borne by the owner of the buildings, who do not reap the financial rewards of energy savings (i.e., creating a "split incentives" barrier). Program implementers have been attempting to overcome this barrier for years, and the REN programs are no exception. The BayREN Program Implementation Plan (PIP) indicates that the customized technical assistance and long-term energy upgrade and cash flow plan that fit the buildings' capital investments plan helps overcome split incentives. The SoCalREN PIP indicates that they expected available PACE financing to reduce this barrier.

Both RENs have bilingual (Spanish/English) contractors and conduct bilingual outreach. BayREN has printed collateral materials in Spanish, and the contractor finder tool on the BayREN website includes options for specifying bilingual contractors. According to BayREN staff, contractor training has brought 94 Spanish-speaking contractors into the program.

Finally, SoCalREN targets disadvantaged populations for training through the WE&T program. According to REN records, 110 small, minority, and disabled contractors have graduated from the E-Contractor Academy, with seven prequalified to perform work for LA County, and two contracts have been awarded to graduates.

4.1.2 Value as Viewed by Program Participants

As described in the Evaluation Plan, the RENs will have demonstrated value if their participants respond positively when asked about the program in which they participated. For this evaluation, the study targets were drawn from the BayREN residential Home Upgrade Advisor program, PAYS, and the SoCalREN Public Agency Program. As such, our examination does not include all REN programs. Since the RENs work with local governments (which are often part of an LGP), information from the LGP study is also useful in gauging the value of the RENs.

In this section, the Consultant Team assessed value across three areas and determined value is present when:

1. The REN program participants found the REN offering and approach beneficial
2. The REN engagement with LGPs was similar to or better than LGP engagement with the IOUs
3. The REN helped local governments build capacity

REN Program Offerings and Implementation Approach

REN participants in the PAYS, Home Upgrade Advisor, and Public Agency Program programs indicated that they received substantial benefit from the RENs activities, as described below.

PAYS: While the Consultant Team earlier indicated a degree of uncertainty about the energy savings potential of the energy-saving devices available through the program, the quotes below describe an intervention that participating PAYS program water agencies staff found useful.

> "Without their help, it wouldn't be happening at all; too busy [with other] work."
>
> "They are very helpful - they were always there to look for ways to help push the program along."
>
> "Individuals have been great, committed, nice having a team that understands my challenges, my aspirations."

BayREN Home Upgrade Advisor: For BayREN Home Upgrade Advisor survey respondents, the most commonly mentioned positive benefits of working with a Home Upgrade Advisor were high satisfaction with the home upgrade process (83%) and increased likelihood of performing a home upgrade (77%). In general, improved comfort and bill savings were the top benefits of participating in the Home Upgrade program, according to participants.

Working with the Home Advisor made a difference for nearly two-thirds (64%) of the homeowners. Although no more than 12% of homeowners mentioned any single reason that working with a Home Advisor made a difference, the top four areas were that they would:

- Not have done a home upgrade otherwise (12%)
- Have done less-extensive upgrades (12%)
- Have felt less informed/knowledgeable (12%)
- Have had less confidence in work performed/decisions made (10%)

SoCalREN Public Agency Program: The Public Agency Program participants were pleased with the services provided by the implementer; 86% said that staff met or exceeded their expectations, and 71% said that staff always met their needs. Ten of the Public Agency Program respondents are also LGP Implementers, and five Non-Partner Local Government respondents have worked with an LGP. For these five:

- They tend to work frequently with LGP, but tend to work more frequently with SoCalREN.
- Three of the five say LGP and SoCalREN services are different.

A very high proportion of Public Agency Program participants indicated having received beneficial support from the SoCalREN program (see Table 36, below). Because each participant is in a different phase of project implementation, the fact that support like "fast procurement of goods and services" is showing for only half of the participants is to be expected. The satisfaction levels and proportion of beneficial support are very high and indicative of an effective program that is meeting the needs of its participants.

Table 36. Number of SoCalREN Public Agency Participants Who Received Support and the Type of Support They Received

Support from SoCalREN	n	Percent
Access to technical services, such as audits, design, or construction management assistance	28	100%
Access to EE expertise that our organization does not have	26	93%
Increased knowledge of ways to save energy within our organization	23	82%
Reduction in the amount of your organization's staff's time needed to design projects	23	82%
Reduction in the amount of your organization's staff's time needed to implement projects	21	75%
Increased knowledge of EE financing options available to our organization	20	71%
A greater understanding of energy use in our facilities	20	71%
Reduction in the amount of your organization's staff's time needed to procure goods and services for projects	19	68%
Access to external resources to secure EE financing (such as on-bill financing)	16	57%
Fast procurement of goods or services	15	54%
Access to a pool of prequalified contractors	14	50%

Local Government Engagement with RENs and IOUs

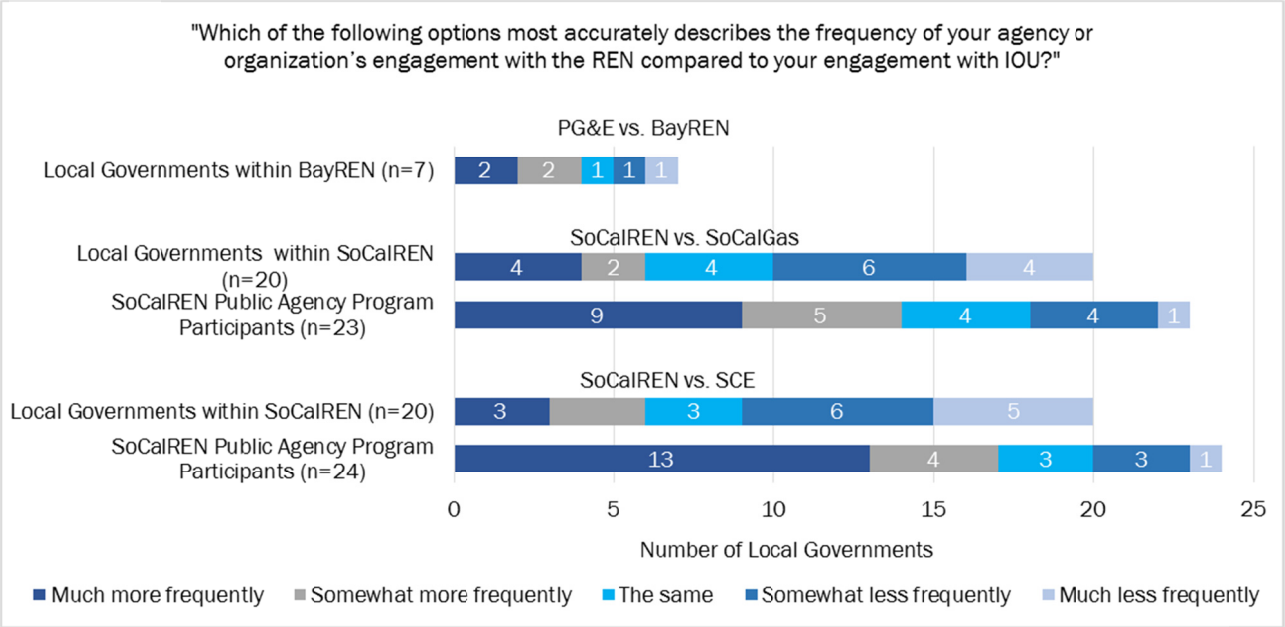
Both RENs have multiple local governments within their coverage areas, and many of them are also LGPs. For the RENs to provide value to this group there would need to be additive engagement compared to what is already occurring through IOU engagement with the LGPs. Unfortunately, the small sample size does not provide a clear answer to the question of whether or not the RENs provide additive engagement beyond that provided by the IOUs and LGPs.

Local governments in REN and LGP territories tend to work with both the RENs and the IOUs. Although these are small numbers (i.e., qualitative findings that cannot be extrapolated across the entire population), Figure 8, below, shows a trend that when the LGPs do engage, it is less frequent with the RENs than with their respective IOU. However, consistent with the program design, this trend is not evident for SoCalREN Public Agency Participants, as these participants engage much more frequently with SoCalREN than they do the IOUs.

Local governments interact often with other local governments, creating a web of information flow as staffs across different local governments discuss various issues with their colleagues. Because some of the local governments have close ties to the RENs[41], we made an effort to understand respondents with these ties to not inflate results. After close review, none of the Public Agency Program participants responding to our survey has close ties with SoCalREN, four of the 24 LGP respondents have close ties to SoCalREN, and five of the 12 LGP respondents have close ties to BayREN. Because we are discussing frequency of responses and inclusion of LGPs with close ties to the RENs could bias the results, we removed any LGP with close ties in Figure 8.

[41] We considered a local government who was on the SoCalREN advisory committee or a member agency for BayREN to have close ties. Several Advisory Committee members, such as COG, represent more than one local government. However, we did not include COG members for purposes of determining a 'close tie'.

Figure 8. Local Government Engagement with RENs vs. IOUs



Note: Does not include local governments with close ties to the RENs.

REN Local Government Capacity Building

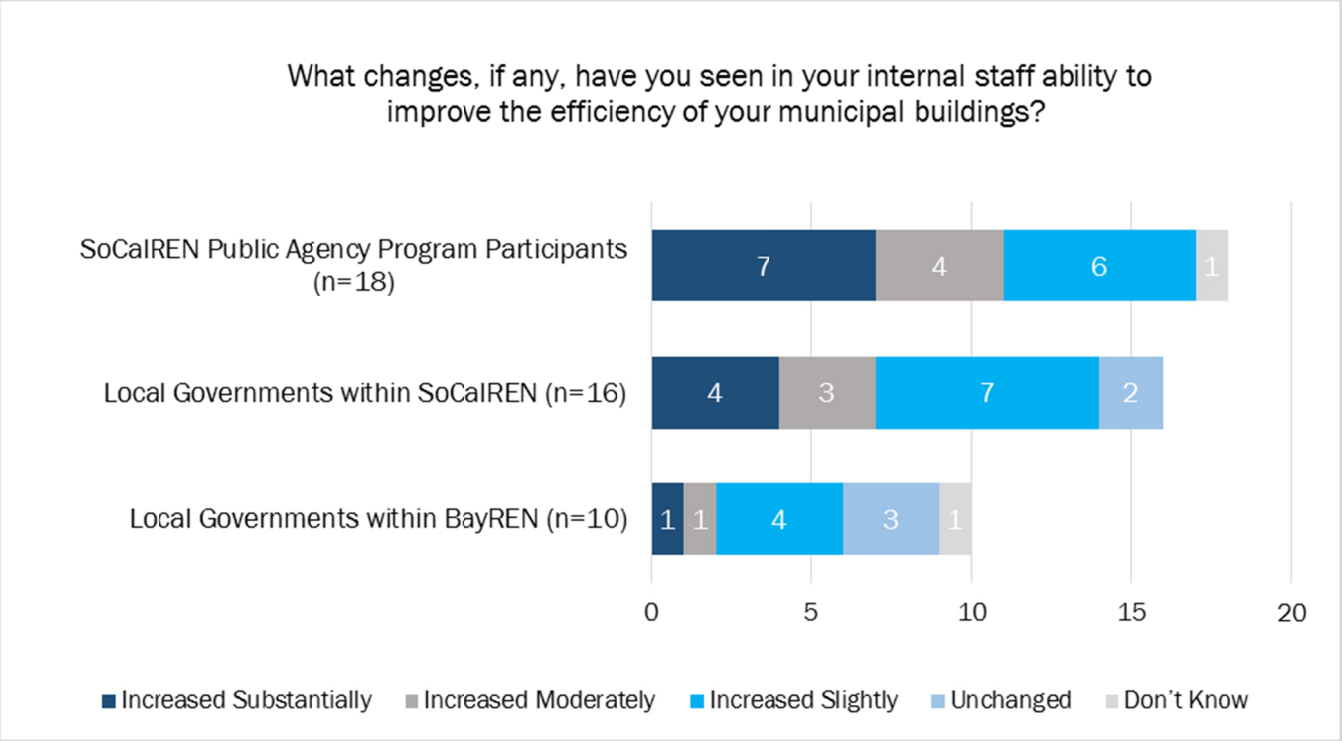
The RENs are helping to build local government capacity to increase EE within their municipal buildings and to deliver EE to their residents. For the purposes of this study, the Consultant Team is using the definition of capacity building from the Global Development Research Center.[42] Within this context, capacity building has three aspects:

- **Human resource development:** The process of equipping individuals with the understanding, skills, and access to information, knowledge, and training that enables them to perform effectively.
- **Organizational development:** The elaboration of management structures, processes, and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private, and community).
- **Institutional and legal framework development:** Making legal and regulatory changes to enable organizations, institutions, and agencies at all levels and in all sectors to enhance their capacities.

Public Agency Program participants said that the RENs help with building capacity among their staff by increasing their staffs' ability to improve EE within municipal buildings, with about the same number indicating either a significant increase (7 of 18) or a slight increase (6 of 18). Local governments that belong to LGPs note a more moderate increase in this same capacity (see Figure 9, below). (As indicated in the Program Implementation Plans and demonstrated in the results of the LGPs Value and Effectiveness report, the LGPs also perform activities to help local governments build capacity.)

[42] http://www.gdrc.org/uem/capacity-define.html. There is more than one definition of capacity building. Lacking a specific definition within EE for the RENs, the Global Development Research Center, which covers community development around the world and has a specific area for the environment, provided a holistic and community-based definition. Since the RENs are local governments themselves, this appeared to be an appropriate fit.

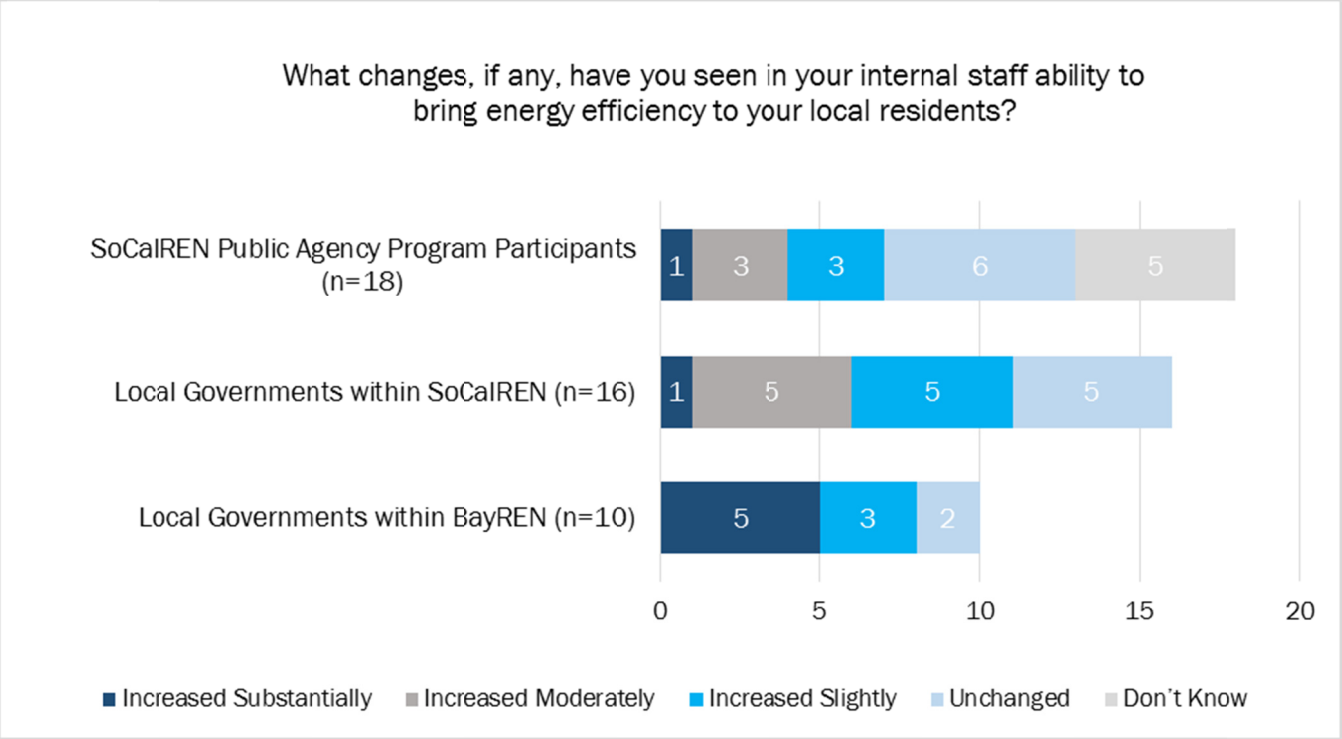
Figure 9. Changes in Internal Staff Ability to Improve Energy Efficiency in Municipal Buildings



Note: Only local governments that indicated that they worked with the RENs to build this capacity received this question. Includes local governments with close ties to the RENs.

As Figure 10 shows below, this arrangement appears to flip for in-house local agency staff capacity to deliver EE to their residents. Partner Local Governments that also work or coordinate with the RENs have a greater increase in this capacity than Public Agency Program participants. This is unsurprising given that the Public Agency Program intervention does not aim to increase residential EE (Figure 10).

Figure 10. Changes in Internal Staff Ability to Bring Energy Efficiency to Local Residents



Note: Only local governments that indicated that they worked with the RENs to build this capacity received this question. Includes local governments with close ties to the RENs.

The BayREN PAYS also provides local governments with technical services, expertise, and resources, such as contract templates and marketing materials for water agencies. This fits under the first bullet point of the Global Development Research Center definition of capacity building, whereby water agency staff are given the knowledge to perform effectively, at least in the short term.

The nature of the RENs' organizational and governance structure also builds capacity among local governments that administer the REN or implement REN activities. We note that prior to forming a REN, both ABAG and the LA County Office of Sustainability (the lead agencies administering the RENs) provided EE programs through ARRA funding, as did at least three other BayREN counties, so there was some level of expertise present already. Additionally, over time several of the REN member agencies have been involved as LGPs. Capacity continues to grow as the RENs implement programs. According to one BayREN staffer, one of the member counties started with a manager who had no EE knowledge and now has a sustainability office with a staff of six.

The presence of BayREN appears to have resulted in added helpful knowledge and capacity to those involved in managing it. As a new organization, BayREN has tested management structures that have been refined over time and, in the process, initiated institutional changes within its member county lead agencies that appear to enhance the EE capacities at these local governments. For example, the lead county agency responsibility of two of the programs has shifted among counties, which the Consultant Team expects to have a capacity-building effect. However, the full extent of capacity change is not explored in this study. Note that much of the institutional memory of how to effectively run a program resides with the consultants implementing the programs, and these consultants have not changed even though the manager may have.

However, it is unclear whether that capacity would continue to exist without REN support. Fundamentally, this is a question of whether the REN models enable temporary capacity to deliver EE programs (i.e., only with the REN) or if they build permanent capacity that would remain if the REN no longer offered support. There is some evidence that capacity would be permanent, in that the REN budget does not pay for certain local government staff. However, the Consultant Team also heard from at least one BayREN local government staff that reduced budgets meant that supporting consultant staff would not be available. Because local government staff within BayREN have multiple roles, while the knowledge may be present, without REN-supported consultants, the ability to perform EE-related actions might be reduced.

4.1.3 Summary of REN Value

The REN pilots will have demonstrated value if their programs, as implemented, broke new ground in areas not currently served by utility offerings and if their activities and programs had the potential to scale up to a broader geographic area or serve hard-to-reach markets. In addition, the RENs would have demonstrated value if their activities promote WE&T, new technology (i.e., software), or the water-energy nexus. Table 37, below, summarizes the findings on value for the RENs.

Table 37. Summary of Value Findings

Value Component	Rationale
Values Compared to CPUC Pilot Evaluation Areas (Broad View)	
Activities that the utilities cannot or do not intend to undertake	▪ **RENs provide additional technical expertise**. The additional technical expertise provided by the Home Upgrade Advisor and the staff within the SoCalREN Public Agency Program are areas not covered by the IOUs and bring added benefit. ▪ **SoCalREN provides new activities.** LA County licenses an EEMIS, a benchmarking type of software that compares energy use across buildings in a city or region. SoCalREN is presently sharing EEMIS licenses at cost to other governments in SoCalREN territory and plans to provide training and consulting services. ▪ **Overlap of customers is present, but services offered are distinct.** Within the assessed programs, both the REN and IOU staff agreed that the Home Upgrade offerings vary, as do the offerings within the Public Agency Program. The multi-family programs also include the same customers, although BayREN program has experienced significant participation by market-rate buildings and PG&E has primarily served low-income complexes. Within SoCalREN, IOU account representatives often market both the IOU and SoCalREN multifamily program to customers.
Activities where there is no current utility program offering, and where there is potential for scalability to a broader geographic reach, if successful	▪ **The RENs introduced two new program offerings to the California EE community.** Within the areas more closely studied by the Consultant Team, the RENs began two programs that were outside of IOU offering, although both of these described areas are too early in the process to determine if the REN actions have been successful and whether the REN may want to scale up the effort. ▪ **Energy savings from one new program addresses the water-energy nexus.** The direct energy savings potential for PAYS is low due to the low-level savings from the two measures. However, the embedded energy savings from installation of all water devices may go well beyond the direct energy savings. In addition, participants in the program pay for the program through a water rate surcharge. ▪ **The SoCalREC program software packages are useful technology offerings.** The other program includes two software packages put forward by SoCalREN that show promise for indirect savings, although their full potential will come only from extensive use.
Activities in hard-to-reach markets, whether or not there is a current utility program that may overlap	▪ **The RENs are supporting hard-to-reach areas.** The RENs are doing their part to continue helping this segment become more energy efficient through work within the multifamily sector (which is a hard-to-reach sector) and bringing in bilingual Spanish speakers for outreach and marketing for the Home Upgrade program. Additionally, SoCalREN has a small WE&T program that is putting disadvantaged contractors to work. The E-Contractor Academy has graduated 110 small, minority, and disabled contractors, with seven prequalified to perform work for LA County, and two contracts have been awarded to graduates.
REN Value to Program Participants (Narrow View)	
REN Program Offerings and Implementation Approach	▪ **The programs in this study provide benefit to participants.** The responses across all three programs indicate benefit from the RENs' activities. Water agencies felt that the REN staff was very helpful. Nearly two-thirds (64%) of the homeowners stated some type of benefit (such as feeling more informed and having higher confidence in the contractor). A very high proportion of Public Agency Program participants indicated receiving beneficial support from the SoCalREN program.
Local Government Engagement with RENs	▪ **LGPs may engage less with RENs than IOUs.** For SoCalREN, unless they are specifically involved with the Public Agency Program, the LGPs engage less with SoCalREN than with the relevant IOUs. For BayREN, these data are insufficient to determine if there is a clear difference.

Value Component	Rationale
Local Government Capacity Building by RENs	▪ **The RENs build local government capacity.** Simply by performing the activities of the RENs, whether as part of the Coordinating Circle for BayREN or the Advisory Committee for SoCalREN, EE knowledge transfer occurs. In addition, the management and procedures that have advanced by way of REN implementation are indicators of capacity growth. Outside of the organizations directly involved with the RENs, the SoCalREN provides a moderate level of capacity building to enable local governments to deliver EE within their municipal buildings and to their residents. SoCalREN also offers a public agency assistance program—the SoCalREC—that has a core purpose of leveraging local government resources. Although the SoCalREC appears replicable, it was not evaluated within this study. Thus, this program may hold value for capacity building not conveyed here.

4.2 Effectiveness of the RENs

In Section 2.1, the Consultant Team defined the effectiveness of the RENs both broadly and narrowly. This section includes findings regarding REN effectiveness, first within the broad area of management, followed by the more narrow area based on program participant information.

4.2.1 Management of the RENs and Programs: The Broad View

At the outset of the study, the Consultant Team indicated that the RENs would have demonstrated effectiveness if they have sufficiently addressed management issues as they arise (or there is a definite plan to mitigate them going forward). The RENs also would have demonstrated effectiveness in their ability to manage program implementation and adjust to necessary changes as they arise.

Allocating Staff Resources to REN Activities

The RENs have sufficient and experienced staff resources to conduct REN activities. There are 14 organizations conducting BayREN activities (10 local governments and four consultants) and five organizations conducting SoCalREN activities (one local government and four consultants). Table 38, below, presents the full-time equivalents (FTEs) across the organizations conducting REN activities. These staffing levels appear to be sufficient, as no REN staff indicated that he or she does not have enough resources to conduct REN activities when being asked about implementation challenges.

Table 38. Number of Staff and FTEs Conducting REN Activities

Organization Type	BayREN				SoCalREN			
	Number of Orgs.	Number of People[a]	Number FTEs	Percentage of FTEs	Number of Orgs.	Number of People[a]	Number of FTEs	Percentage of FTEs
Counties and Local Governments	10	29	22.2	70%	1	10	4.5	11%
Implementing Consultants	4	14	9.6	30%	4	38	35.0	89%
Total	**14**	**43**	**31.7**	**100%**	**5**	**48**	**39.5**	**100%**

[a] Some respondents did not provide staff counts. Thus, these counts are slightly less than the actual number of staff.

Many REN staff and organizations have a proven record of accomplishment of EE work. Interviews with the REN staff and consultants showed that they have a history of providing EE services to their local governments (for local government staff) and residential customers (for consultant staff). Four of the 10 local government staff were involved with similar ARRA-funded programs, and one is also part of the RCPA.[43] Many of the consultants also have years of experience in EE. For example, one implementing consultant staff member indicated close to 20 years working in the same sector, while another was involved with ARRA programs prior to his role in the REN.

When local government staff are involved with EE, the REN may not always reimburse local agencies for their billable time. For example, two of the primary SoCalREN managers within local agencies do not charge their

[43] The RCPA was created in 2009 to improve coordination on climate change issues and establish a clearinghouse for efforts to reduce GHG emissions. The RCPA is made up of the same Board of Directors as the Sonoma County Transportation Authority and includes representatives from each of the nine cities in Sonoma County and the Board of Supervisors. http://www.sctainfo.org/rcpa.htm.

time to the REN due to accounting difficulties, and two in BayREN donate their time (while working at least 50% for BayREN). Additionally, as shown in Table 38, above, many of the local government staff work part-time for the REN and, therefore, have other requirements for their position. Balancing different types of jobs may be difficult for some local government staff and could pull staff away from REN activities in the future.

Consultant staff account for a higher number of FTEs for SoCalREN based simply on its design. BayREN has a higher percentage of local government staff involved in implementing BayREN than SoCalREN. In addition, each BayREN staff spends a greater amount of his or her time on BayREN than do SoCalREN staff members. This supports the noted increase in capacity building presented in Figure 10, page 55, Section 4.1.2 (i.e., increased ability to provide EE to local residents).

Ability to Navigate the Regulatory Environment

The RENs faced challenges related to delays in decision making and managing regulatory requirements. For those staff involved with ARRA EE programs, coming into the California regulatory environment was different. Both RENs indicated regulatory challenges but, where possible, seem to have navigated these challenges. In general, REN staff mentioned two categories of regulatory challenges:

- **Extended Period for Decision Making:** The extended period for CPUC approval meant that the RENs were unable to begin program implementation until June 2013, making it difficult for them to meet their initial two-year goals. In addition, delays in funding and decision making after the REN began have had impacts on one program, the BayREN's Multifamily program. This program had unexpectedly higher demand and could not serve all interested customers in 2013–2014 until it secured additional funding, an activity that took several months. Once secured, the program moved forward to serve additional customers.
- **Managing Regulatory Requirements:** As new program administrators, the RENs needed to fulfill new requirements and learn the complex and detailed regulatory processes that the IOUs had been performing for years.
  - Regulatory processes include filing PIPs, preparing advice letters, preparing cost-effectiveness calculators, and responding to data requests and proceeding comments. After initial challenges with submissions, REN staff indicated that they had developed adequate processes for responding to regulatory process logistics and ED staff generally concurs. (The Consultant Team was unable to verify this because examining REN filings for this purpose was outside the study scope.) An informal query of ED staff indicates that recent REN submittals have been considered adequate. According to ED staff, recent concerns surrounding REN operations have stemmed from minor "brushfire" issues, such as third-party protests and other low-level political controversies that have typically risen to the CPUC's attention in an indirect manner (i.e., the ED learns about issues via complaints or indirectly through others).
  - Any program administrator, in addition to regularly responding to data requests is expected to perform substantial reporting of program metrics. The RENs expeditiously provided two large data requests from the Consultant Team. In addition, the Consultant Team made several small, informal requests for information, which the RENs always provided within a reasonable amount of time. To help with the multiple regulatory requirements, ABAG added an assistant to manage most regulatory processes for BayREN. Although the RENs typically did not mention challenges

with staff resources, two BayREN staff did mention that the REN member counties face time and staff constraints that prevent them from fully engaging in activities around regulatory reporting.[44]

Ability to Mitigate Administrative Challenges

Outside the regulatory environment, the RENs encountered several administrative difficulties. First, they struggled with problems common to "start-ups," specifically, the time and money required to become a new EE program administrator in California. Second, they also faced obstacles coordinating with other program administrators in their territories. Last, the RENs had to overcome several hurdles with program design. The RENs have effectively overcome these administrative challenges by developing inclusive decision-making processes and redesigning programs in cooperation with the CPUC.

- Learning to be a Program Administrator:
  - BayREN in particular encountered challenges developing a REN model and decision-making processes that met the needs of all nine Bay Area member counties. One BayREN member county staffer said that the REN launch effort was a "big, difficult, and expensive process." According to BayREN staff, when internal conflicts between the counties arose early on, BayREN increased the transparency of its decision-making process by specifying county-specific governance roles. These changes, described earlier in Section 1.2.3, included the move from a single Coordinating Council to a Coordinating Circle and Lead Links. Even in BayREN's early stages, it was not always clear that every member could continue to participate. The Consultant Team learned that one of the counties was having administrative difficulties that would preclude its participation. While resolved, this situation points to the potential for the BayREN membership to change should other local issues arise. Though these initial challenges have been overcome, for BayREN, there may be future challenges if member counties choose to leave the REN; any member can withdraw with 30 days' notice to the other members.
  - SoCalREN faced fewer challenges in this area, as it does not have to balance the needs of multiple counties to administer the REN. However, one SoCalREN staff member described the $250,000 upfront investment to develop the initial REN application as extraordinary relative to the available means of typical local agencies.
- Program Design: Both RENs mentioned that the Home Upgrade Single-Family program designs required significant retooling. According to SoCalREN, in the initial design, the incentive levels were too low, the incentives calculations were too complicated, and the application process was too difficult for customers. To address this, SoCalREN developed what they considered a more attractive incentive structure (replicated statewide), more streamlined program requirements and incorporated simplified prescriptive rebates. BayREN staff indicated that the Home Upgrade Single-Family also had initial design issues.[45] After making adjustments, the staff indicated that the program is running well; in particular, the conversion rate from Home Upgrade Advisor to Home Upgrade projects has improved. (As of the end of December 2014, the conversion rate for Home Upgrade moved from 4% in 2013 to 19% in 2014, while the conversion rate for the Advanced Home Upgrade moved from 23% in 2013 to 34% in 2014.)

[44] Both the RENs and their program implementers (BayREN's lead counties and SoCalREN's consultants) use the EnergyOrbit software (http://energy-orbit.com/) to track progress and develop routine monthly reports to the CPUC.

[45] The RENs described to the Consultant Team that the issues were due to being "handed" a program design by the CPUC; however, following up on the specifics of this was outside the study scope.

There was an 18-month gap between when LA County implemented the Home Upgrade program under ARRA programs (2012) and when it began again as SoCalREN (mid 2013). During this time, the IOUs implemented the program. When SoCalREN resumed the program, the contractor base had dwindled significantly. The Home Upgrade program staff indicated that they needed to work hard to restore the contractor network to the more than 100 contractors now enlisted in the program. An additional challenge for this program centered on the requirement for contractors to conduct pre- and post-combustion safety testing that was new to these contractors. Many contractors viewed this as such a significant hassle that they were hesitant to participate in the program. To surmount these protests, program staff decided to offer the contractors a $150 combustion test incentive to offset half the cost of the additional time required for the test.

Coordinating with the IOUs

The RENs and the IOUs have coordinated well. They use ongoing communication processes to synchronize services to the same customers and maintain differentiation in their offerings. However, several staff at both RENs mentioned that it was difficult and time-consuming learning how to manage having multiple program administrators in the same space. They accomplished this through IOU and REN conversations that took place early on with great frequency and continue, albeit less frequently.

The RENs and IOUs meet monthly and often discuss technical details. Staff at the BayREN's Home Upgrade Advisor and at SoCalREN's Public Agency Program programs mentioned meeting with IOU staff in person typically on a monthly basis to discuss coordination. SCE/SCG and SoCalREN's offerings for local governments are highly integrated in that many projects receive support from both the IOU and SoCalREN. Thus, for SoCalREN, the monthly meetings are often technical discussions on how SoCalREN and the IOUs can work together to serve these customers. According to SCE/SCG staff, the IOUs and SoCalREN developed a coordination plan and co-designed strategies to help address customer barriers together.

Other activities between SoCalREN and the IOUs are coordinated largely through the SCG coordination staff lead. Modes of communication include monthly meetings for the Home Upgrade, SoCalREN Financing, and SoCalREC programs. Other activities between SoCalREN and the IOUs are coordinated largely through the SCG coordination staff lead. There is also an administrative committee for budgeting and reporting activities. There are opportunities for informal communication and ad hoc meetings as well, but the IOU staff the Consultant Team interviewed indicated that most coordination appears to occur either at the monthly meetings or through the IOU coordination lead.[46]

PG&E reported regular meetings with BayREN and monthly calls for such programs as Home Upgrade. The monthly meetings with the IOUs typically involve discussions of how to coordinate marketing and how to differentiate their programs and offerings. PG&E also reported completing a co-branded outreach campaign for residential customers and Home Upgrade and described the level of coordination with the BayREN as high.

Meeting Program Goals

This study did not verify the multiple program progress activities shown in Section 3. However, Table 39, below, shows the metrics associated with the three programs that had primary data collection from participants to orient the reader to their progress. There were fewer Home Upgrade Advisor participants than planned, unless we count an inquiry as participation, in which case the program met 163% of the goal. While the program may not have met their specific participation goals, the conversion rate between the Advisor

[46] Some of the utility staff reported having no coordination or coordination only through the SCG coordination lead.

program and completion of a Home Upgrade Project was slightly over 100% of goal. The PAYS metrics does not appear to be the best metric of how well BayREN is progressing since they facilitate the local agency as they implement the program. As such, the local agency captures data on specific number of projects, not BayREN. The Public Agency Program met substantially more than its goal.

Table 39. Select Program Performance Progress Metrics for Programs within the Study

Administrator	Program	Program Performance Metric	2013-2014 Goal	Accomplished as of December 2014	Percent of 2013-2014 Goal Accomplishment
BayREN	Home Upgrade Advisor	Number of participants in the Home Upgrade Advisor Program	1,500	549[a]	37%
		Percent of Home Upgrade Advisor participants who complete a Home Upgrade project	40%	43%	108%
		Number of Home Upgrade Advisor participants who complete a Home Upgrade project[b]	275	92	29%
		Number of Home Upgrade Advisor participants who complete an Advance Home Upgrade project[b]	100	100	100%
	PAYS	Number of projects forecast under PAYS program[c]	2,000	0	0%
SoCalREN	Public Agency Program	Number of homes or buildings treated	15	149	993%

[a] The 2014 Annual Report indicates that 549 customers participated in the Home Upgrade Advisor program; however, according to BayREN staff, BayREN received 2,455 inquiries about the service, which could signify "participation" within the program. Lacking specific guidance on what is considered "participation," the Consultant Team kept the lower value in the table as inquiry does not appear to be full participation.
[b] These PPM were not in the revised PIPs. However, BayREN indicated that they track these goals and provided progress on these goals directly to the Consultant Team.
c The program is implemented by the local agency and data on specific number of projects is unavailable. We present this datapoint as it is the set metric. Going forward, either additional data collection must occur between the local agencies and BayREN or BayREN should adjust this metric.

4.2.2 Service Delivery as Viewed by Program Participants: The Narrow View

The ability of the RENs to effectively manage EE programs can be gauged by the satisfaction of those with whom the programs interact, the level of communication between the RENs and their program participants, and the RENs' ability to mitigate program participant challenges. Each is detailed below.

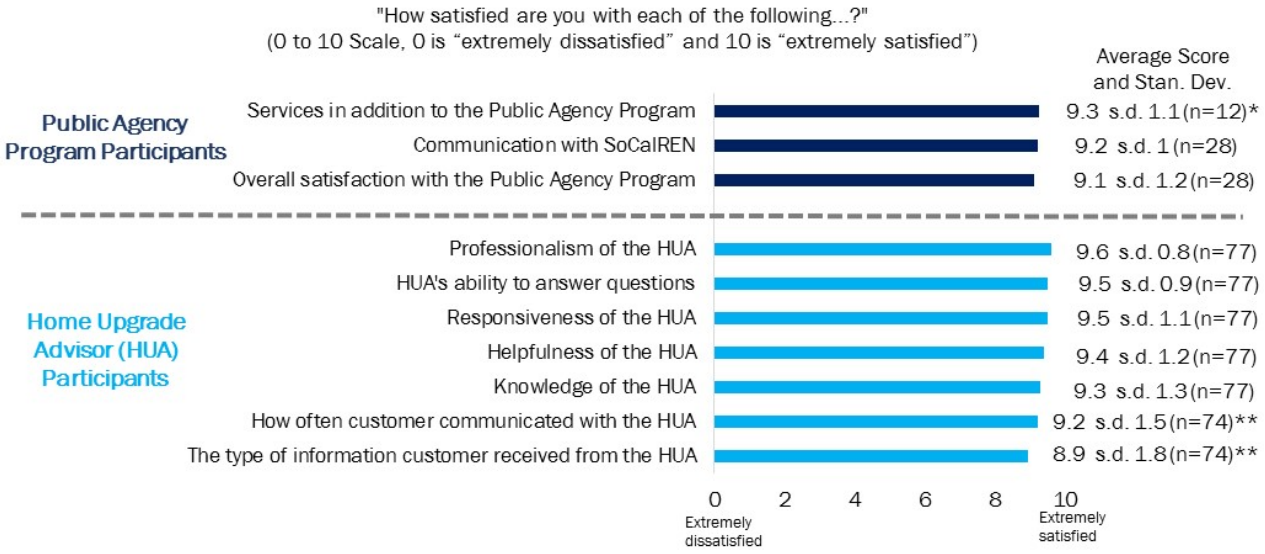
Program Participant Satisfaction with REN Services

For all the three REN programs assessed by the Consultant Team, REN participants stated the were highly satisfied with the services provided.

The water agencies that BayREN served through the PAYS program reported high satisfaction, with all three rating BayREN's support as "very helpful."

As Figure 11, below, shows, participants in the Home Upgrade Advisor and Public Agency programs provided high ratings for all the elements of these programs that the Consultant Team explored. Asked to assess their entire experience with the programs, 66% of Home Upgrade Advisor participants and 71% of Public Agency Program participants reported that the REN met all their needs, with the remaining respondents typically indicating that the program met their needs "most of the time." In addition, 86% of Public Agency Program participants reported that the REN met or exceeded their expectations.

Figure 11. Participant Satisfaction with REN Services

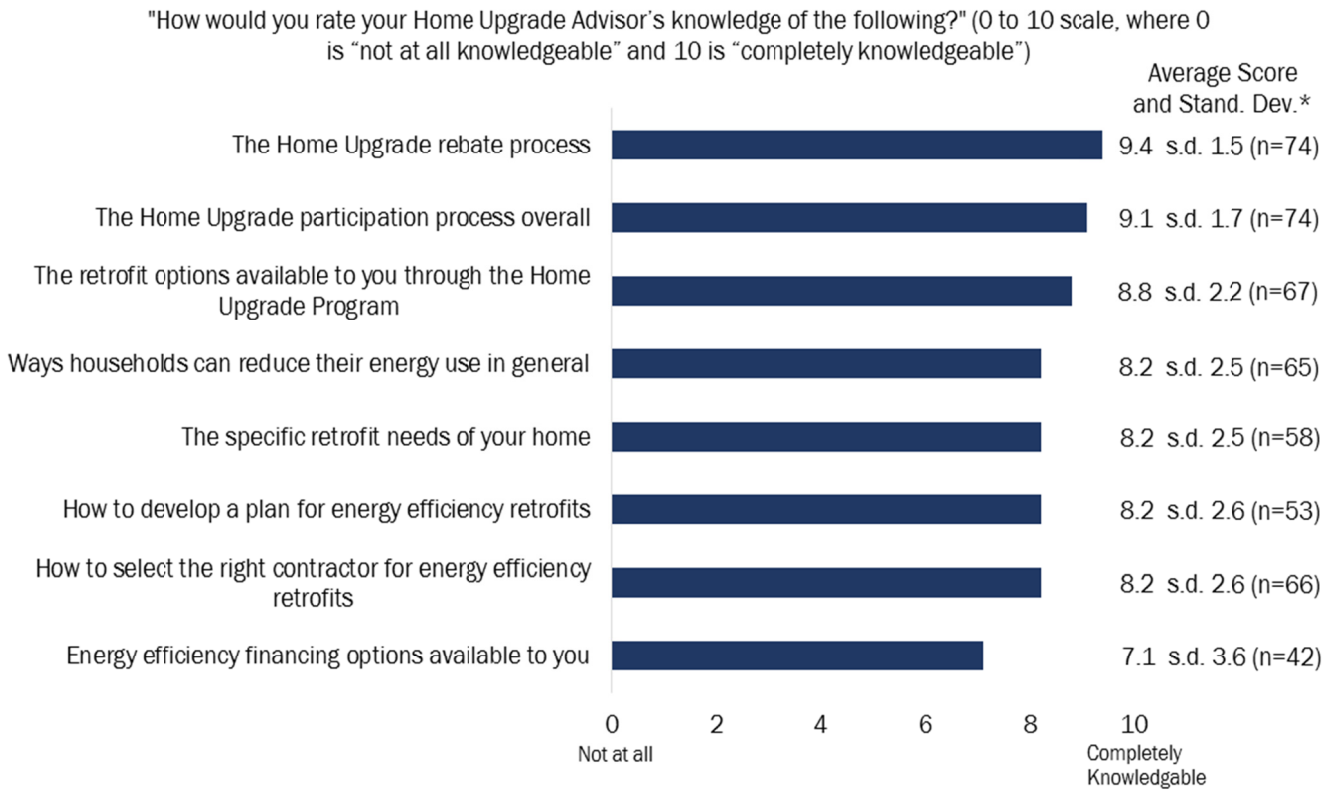


* Average score excludes 14 respondents who did not identify any additional services and two who did not provide a valid satisfaction score

** Average score excludes three respondents asked an older version of this question that did not differentiate between satisfaction with frequency or type of information. Of the three asked only about satisfaction with communication, two provided a score of 10 out of 10 and one provided a score of 6 out of 10.

Home Upgrade Advisor participants indicated that their advisor was capable of providing a high level of knowledge and expertise in most aspects of planning and implementing EE projects, although the Home Upgrade Advisor had a more moderate level of knowledge of EE financing options (see Figure 12, below).

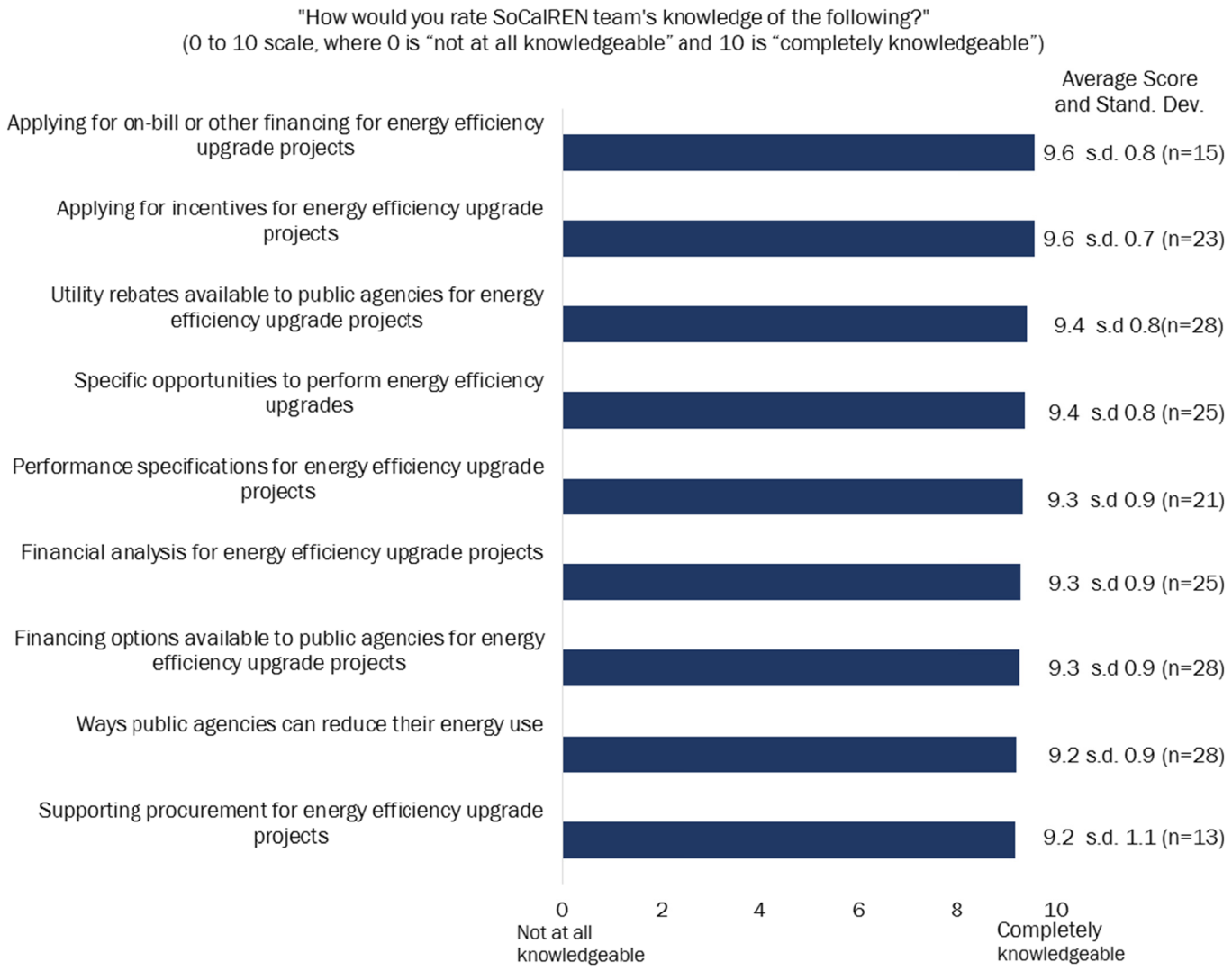
Figure 12. Home Upgrade Advisor Participants' Ratings of Advisor's Knowledge



* Of the 77 respondents, the average scores excludes between three and 35 respondents who indicated "Not applicable" or "Don't Know" (number of excluded respondents varies by question).

The depth of knowledge demonstrated by the SoCalREN staff (shown in Figure 13, below) bolsters the already positive feedback from program participants about the Public Agency Program.

Figure 13. SoCalREN Public Agency Program Participants' Ratings of SoCalREN Team's Knowledge



Despite participants' high satisfaction ratings with BayREN's Home Upgrade Advisor programs, respondents reported feeling confused. As described above in Section 3.1.1, p. 27, PG&E is also present in the Home Upgrade space and handles payment of incentives in cases where a customer selects an Advanced Home Upgrade package. Nearly two-thirds of customers surveyed (64%) understood the roles that the two organizations played in the program. Still, half of all participants experienced some level of confusion, with a

small number (8%) describing the program as "very confusing." Also, 44% found the program "somewhat confusing,"[47] on level with the number, who found the program "not at all confusing" (44%).

A few BayREN staff respondents reported that even some contractors who were involved in SoCalREN and the BayREN Home Upgrade programs were left confused, at least at the beginning of the program. However, the BayREN implementers also felt the presence of the implementation team staff reduced this confusion over time.

Lastly, a BayREN member government county indicated that a marketing effort with information for both BayREN and the IOU programs fell flat and led to customer confusion. This same member county indicated that customer confusion occurs particularly in small towns where customers typically learn about the programs via word-of-mouth.

REN Communication with Program Participants

The frequency of customer communications with the Home Upgrade Advisor varies from less than once per month to multiple times per week, with email being the most common communication method for both programs (see Table 40, below). In-person communication was the least frequent mode. More than half of Home Upgrade Advisor participants never met with their advisor in person. Regardless of the mode of communication, participants were highly satisfied with the frequency of communication with their advisor (9.3 out of 10). For Public Agency Program participants, in-person communication was also the least frequent, but all participants met with SoCalREN staff in-person at least once. As was shown in Figure 11, above on p. 65 in section 4.2.2, participants are highly satisfied with the frequency of communication with SoCalREN (9.2 out of 10, n=28).

Table 40. Frequency of Communication between Program Participants and REN Staff

Frequency of Communication with Home Upgrade Advisor/SoCalREN Staff		Home Upgrade Advisor Participants (n=77)			Public Agency Program Participants (n=28)		
		Phone	Email	In-Person	Phone	Email	In-Person
More Frequent	Multiple times per week	4%	16%	1%	14%	32%	0%
	Once per week	17%	12%	1%	12%	14%	0%
	Multiple times per month	26%	45%	6%	24%	32%	14%
	Once per month	21%	17%	10%	20%	11%	32%
	Less than once per month	26%	10%	19%	27%	11%	54%
Less Frequent	Never	6%	0%	58%	1%	0%	0%
	Don't know	0%	0%	3%	0%	0%	0%

REN Ability to Mitigate Program Participant Challenges

REN staff implementing these programs—i.e., Home Upgrade Advisors and SoCalREN staff—are effectively assisting participants in overcoming the challenges encountered in planning, procuring, and completing EE projects. Nearly two-thirds of both Home Upgrade Advisor and Public Agency Program participants (49 of 77

[47] The Consultant Team has no information against which to benchmark this finding so this level of confusion may be typical for a program even with one implementer involved.

and 18 of 29, respectively) faced challenges planning or implementing an EE project. As Table 41, below, shows, REN staff could not assist participants in all cases (as the difficulty was not one where staff could have helped overcome the challenge according to the respondent), but when they could assist, the REN staff were usually successful in resolving customers' needs. Further, when REN staff helped, participants provided very high ratings for their assistance in overcoming challenges.

Table 41. REN Staff's Ability to Mitigate Program Participant Challenges

Program	Number of Respondents Who Faced Challenges	Instances Where Respondents Faced Challenges[a]	Instances Where REN Staff Could Have Helped	Indicated REN Staff Tried to Help Overcome Challenge	Helpfulness Rating of REN Staff in Overcoming Challenge[b]
Home Upgrade Advisor	49	87	34 of 87 (48%)	32 of 34 (94%)	8.8 (2.0) (n=30)
Public Agency Program	18	29	18 of 29 (62%)	17 of 18 (94%)	9.5 (0.94) (n=17)

[a] The Consultant Team asked about challenges at several different stages in the participation process. Thus, the count of instances is larger than the total number of respondents.
[b] Based on scale questions where 0 is "not at all helpful" and 10 is "extremely helpful." Mean scores do not include "don't know" responses. Standard deviations shown in parentheses under the mean.

PAYS program participants were similarly satisfied with BayREN's assistance in overcoming challenges. Regarding the helpfulness of BayREN in overcoming barriers, one water agency staff member said, "I wouldn't be where I am today without their support."

One water agency encountered challenges with homeowner disclosure of the PAYS surcharge during a home sale transaction. The agency mentioned that the BayREN staff had been extremely helpful in taking the lead to update customer contracts to avoid this problem in the future. Another agency reported that the BayREN staff had been essential in helping convince internal decision makers to approve a PAYS program, by, for instance, developing a tool for estimating the potential benefits of a PAYS program and developing slides and materials for presentations to the public and boards of directors.

4.2.3 Summary of REN Effectiveness

Table 42, below, summarizes the findings on effectiveness for the RENs. Management of the RENs and programs is "sufficiently effective"; however, the information gathered through this study was limited. For the service delivery component, the Consultant Team gathered data from multiple sources to enable a clear determination of effectiveness. For other areas, the only data were self-reported. As such, there is no balancing information from an alternative or outside source.

Table 42. Summary of Effectiveness Findings

Effectiveness Component	Rationale
Management of the RENs and Programs (Broad View)	
Allocating Staff Resources to REN Activities	▪ **The RENs have sufficient staff.** The organizations that comprise the REN have sufficient staff resources to conduct REN activities; no staff member at either of the RENs mentioned challenges regarding the number of staffers dedicated to implementing REN activities when asked about implementation challenges. Both RENs use consultants to implement programs, with SoCalREN having a higher percent of consultant FTEs than BayREN. ▪ **The RENs have experienced staff.** Four of the 10 local government staff were involved with similar ARRA-funded programs, and one is also part of the RCPA. Many of the consultants also have years of experience in EE. For example, one implementing consultant staff member indicated close to 20 years working in the same sector, while another was involved with ARRA programs prior to his role in the REN
Ability to Navigate the Regulatory Environment	▪ **The RENs responded well to management challenges.** When encountered with delays in CPUC decision making and funding, the RENs took management actions to help ameliorate the late start and continue to move toward reaching their goals. ▪ **The RENs needed to learn a new regulatory environment.** After initial challenges with submissions, RENs staff indicated that they had developed adequate processes for managing regulatory processes and ED staff concurs. ▪ **The RENs provided data when required.** The Consultant Team made two formal data requests of the RENs, asking for a substantial amount of information. The RENs filled these requests expeditiously. In addition, the Consultant Team made several small, informal requests for information, which the RENs always provided within a reasonable amount of time.
Ability to Mitigate Administrative Challenges	▪ **The BayREN made needed adjustments in its internal structure to clarify decision making.** The BayREN realized early that the original MOUs lacked clarity for decision making and responsibilities. They made needed mid-course corrections that reduced ambiguity. ▪ **The RENs worked to overcome administrative challenges.** The RENs have effectively mastered the administrative challenges primarily by developing inclusive decision-making processes, maintaining frequent communication within their organizations and with the IOUs, and redesigning programs in cooperation with the CPUC. ▪ **The RENs made changes in program implementation as needed.** Improvements in conversion rate data for the BayREN Home Upgrade program support an effective management of program implementation activities. The changes implemented within the SoCalREN Home Upgrade program also indicate effective management of the program.
Coordination with the IOUs	▪ **The RENs are coordinating well with the IOUs.** The RENs entered markets with existing program administrators, such as the IOUs and MCE. Learning how best to cooperate with other stakeholders in California was a necessary hurdle to overcome. Several staff at both RENs mentioned that it was difficult and time-consuming learning how to manage having multiple program administrators in the same space. However, both RENs have developed processes for coordinating with the IOUs to differentiate their products and attempt to create synergies through cooperation. The IOUs and the RENs indicate that regular meetings help with this needed coordination.
Service Delivery (Narrow View)	
Program Participant Satisfaction with RENs	▪ **Program participants have a high level of satisfaction.** The high level of satisfaction noted from surveyed respondents across the three different programs shows effective program service delivery.
REN Communication with Program Participants	▪ **The RENs have regular communication with program participants.** A large share of participants surveyed are in regular communication with the program staff. This regular communication combined with high satisfaction ratings with the communication level supports effective service delivery.
REN Ability to Mitigate Program Participant Challenges	▪ **The RENs help participants overcome challenges.** REN staff implementing the studied programs—i.e., Home Upgrade Advisors and SoCalREN staff—are effectively assisting participants in overcoming the challenges that they encounter planning, procuring for, and completing EE projects.

4.3 Informing CPUC Policy

In addition to gauging the value and effectiveness of the RENs, with this study report, ED staff would like to have new and useful data to provide an update and recommendation to the Commission and other decision makers on the prospects for REN success, scalability, benefit, and related policy issues that remain to be fully addressed. As part of this research, the ED sought knowledge on the pros and cons of the BayREN and SoCalREN models to guide future policy decisions. In this section, the Consultant Team pairs findings from the research activities conducted for this report with additional data sources to examine three aspects of the policy issues that pertain to REN continuation and expansion:

- Scalability of the RENs
- Customer Confusion from REN and IOU Programs
- Comparison of the REN Administrative Models

4.3.1 Scalability of the RENs

The RENs could scale activities by increasing the intensity of their existing programs through additional budget or adding new programs. California could scale the RENs pilot by adding RENs in the future. The Consultant Team explored these areas with REN staff and with the few IOU staff interviewed.

- Scaling Up Existing Programs
- Adding New Programs
- Allowing New RENs

Scaling up of Existing Programs: REN staff identified several programs that would benefit from scaling up. BayREN staff said the oversubscription of the Multifamily program shows a need for a larger program. Similarly, they indicated that participation in their single-family program is growing rapidly and may need to ramp up with more funding to meet demand. SoCalREN staff suggested they should expand the CEEPMS permitting software beyond the pilot agencies. SoCalREN also suggested that, if allowed, they could implement CEEPMS in their full territory.[48]

The management structure of each REN appears to permit the scaling up of any existing small-scale efforts. Using consultants to implement the programs means that the RENs would have to procure additional consulting support, but they have the management capability to do so. In addition, the RENs and their implementing consultants are delivering services well in the three program areas in which the Consultant Team performed primary data collection (BayREN Home Upgrade Advisor Program, BayREN PAYS, and SoCalREN Public Agency Program).

Adding New Programs within Existing RENs: REN staff generally said that the RENs should have the opportunity to implement new programs in areas where they can add value to the IOUs' activities. Examples of potential new programs, provided by the REN staff, include additional support for code compliance (a regional "clearinghouse" for code compliance), small business programs, agriculture, and Integrated Demand Side Management pilots for local governments.

[48] As stated in Section 3.2.1, SoCalREN offers Home Upgrade only in LA County.

Both RENs could design new programs, but may have difficulty staffing them. SoCalREN may be able to choose a new program more quickly than BayREN simply due to its single decision-making structure. However, both RENs may have difficulty in staffing oversight of a new program with their current structures. For BayREN, a lead agency would need to volunteer to manage any consultant implementing a new program. From the data provided to the Consultant Team, local government staffers within the BayREN are often close to full-time, so they may not be in a position to oversee a new program unless they could fit it into their existing work. SoCalREN could add a consultant (or leverage the current suite of implementing consultants) to implement the new program. However, because there is fewer full-time staff, they may not have the capability to oversee a new program.

Allowing New RENs: A new REN could emerge outside of the geographic locations already served by the existing RENs (geographic areas shown above on p. 7, section 1.1, in Figure 1) or through spinning off a portion of an existing REN. Nearly all REN staff supported the idea of having new RENs in new unserved geographic locations. However, they emphasized that any new REN should not reinvent the wheel, but rather should leverage the experience, program models, and lessons learned from the existing RENs. Further, a few REN staff mentioned that the CPUC should carefully consider which areas the IOUs and LGPs could expand into, rather than create a new program administrator to meet those needs. Lastly, REN staffers were largely skeptical of the idea of allowing a few cities to create a smaller REN within the current REN, indicating that it might lead to duplication of activities.

The few IOU staff who expressed an opinion on this issue were not necessarily opposed to new RENs, but they were unsure that the REN model was a cost-effective way to obtain savings. One IOU staffer indicated that if the CPUC were to consider a new REN, clear standards should be set for what constitutes a REN, and any REN should be subject to the same rules and cost-effectiveness requirements as the IOUs. Another IOU staffer indicated that the multi-layer structure of the RENs requires intensive and close collaboration, which costs time and money.

The existing RENs cover a large part of the IOU service territories, and the major opportunities would be to establish a new REN would be within the areas defined by the central coast, the northern coast, the Sierra, the Central Valley, and San Diego County. Collaboration was a key part of starting the RENs and took considerable time at the beginning, with ongoing efforts required to maintain smoothly running programs. While collaboration can occur via the phone, face-to-face meetings typically are better to work through difficulties, reach agreements, and create a plan for moving forward. The existing REN organizations are located either in the same city as or within an hour drive from where the IOU staffs engaged in EE programs reside (i.e., San Francisco, Los Angeles), or San Diego), which meant that collaboration is relatively convenient. For any new REN based in a remote rural area, in-person meetings with the IOUs would likely be a time-consuming and costly prospect.

Additionally, any new REN incurs costs at several levels. A new organization faces a high cost to become a REN. As described by one interviewee, “They spent a lot of consultant dollars to become a REN,” while another indicated $250,000 in out-of-pocket costs to file (a cost that may be prohibitive to smaller organizations). There are ongoing costs of collaboration among program administrators, which increases program costs. While not a specific cost to the REN, the ED currently has constraints to oversee more REN administrators.

4.3.2 Innovation and Competition between REN and IOU Programs

The ED asked the Consultant Team to examine whether there was duplication of customer-facing activities by the RENs and the IOUs. Duplication of program offerings is detrimental if it leads to customer confusion over which program to participate in or customers choosing to not participate at all and taking a less efficient action than they would otherwise (i.e., losing EE savings). If, however, duplication of efforts leads to

innovative and more-efficient programs (and the ultimate demise of the less-efficient programs), the existence of duplication could be beneficial to ratepayers. Through this research, the Consultant Team sought to understand if there is duplication and, if so, whether it affects ratepayers positively or negatively. This report provided information earlier regarding customer confusion, so it not duplicated here (Please see Section 4.2.2). This section explores whether competition is needed to obtain innovative programs.

Innovative Programs: REN staff identified a number of potential benefits to allowing RENs to compete with IOUs by providing different offerings to the same customers. For example, they suggested that this type of competition would encourage RENs and IOUs to become more efficient and to develop more innovative and attractive programs. However, within the EE portfolio overseen by the CPUC, the ability to undercut a program administrator by obtaining more savings for less money (i.e., being more efficient) is less certain. The CPUC holds all program administrators to a specific set of savings per measure incented, which means that program designs must have higher conversion rates to be considered more efficient.

Competition is not required to obtain (or at least pursue) innovative programs, as previous efforts occurred in periods absent specific competition between the RENs and the IOUs. California has spent time and money in the past decade in the pursuit of more innovative program designs. For example, in the 2004–2005 cycle, SCE funded 13 third-party programs through its Innovative Designs for Energy Efficiency Activities (IDEEA) Program.[49] In the 2013–2014 cycle, PG&E chose five new third-party programs also through an "innovative program" path.[50]

However, RENs have an advantage over the IOUs in their ability to communicate relatively quickly with a set of local governments, which supports efficient marketing. For example, one BayREN member county scheduled a workshop in each of the nine counties. Those counties were responsible for "filling the room" because each has its own network of building owners. The turnout was so high in one county; back-to-back workshops had to be held because the site would not hold everyone. As such, the RENs may be able to draw on these abilities to create programs with higher conversion rates that more efficiently obtain savings.

4.3.3 Comparison of the REN Administrative Models

Any organizational structure has specific points of authority and implementation models.

Points of Authority: The two REN models have different points of authority. As the Consultant Team described earlier (Section 1.2.3), a single organization administers SoCalREN, with advice from 13 local governments. The 13 local governments do not set the programs and activities of SoCalREN, but do advise on all SoCalREN activities. The BayREN has dispersed points of decision-making authority. BayREN has a single organization managing many of the REN activities, with voting privileges for member on the direction and activities of the programs. BayREN's committee members have more weight in decision-making processes compared to SoCalREN's committee members. Specifically, BayREN's Coordinating Circle consists of the nine Bay Area counties plus ABAG (the Administrator); decisions are made by a simple majority vote.

These two models yield different benefits. While SoCalREN considers constituent feedback, as the sole organization deciding on program direction, it can more easily choose to go in a specific direction. The committee organization for BayREN has the benefit of allowing members to vote on activities that directly affect them.

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[49] Southern California Edison 2004–2005 IDEEA Constituent Program Evaluations (CALMAC ID SCE0234.01).

[50] Four of the five programs focus on retro-commissioning in schools and municipal buildings, most likely to dovetail with the new Prop 39 funds available in the state. The fifth program is on pump overhaul and retro-commissioning in water agencies.

Implementation Models: As described previously, both models use consultants to implement programs, although BayREN also implements some programs directly. BayREN designates a single county as the Lead Link of a program, thereby involving those counties in the direct administration of the programs. The Lead Links can change over time, which has unknown consequences.[51] Conversely, SoCalREN contracts with several nongovernmental organizations (the "implementing consultants") to implement the programs.

Both models have an organizational structure with few people between those needing decisions and those making the decisions (a "flat" organizational structure). As discussed previously, the flexibility brought about by this type of accessibility supports quick changes to small program issues.

Implementation success often hinges on good marketing. BayREN has a built-in marketing path with the member counties being responsible for coordination activities with all other local government jurisdictions within their county, members as leads for an LGP, and the business networks of several of their members with other local government organizations. SoCalREN has the potential for a similar type of marketing path, but the Advisory Committee is not obligated to perform the type of coordination required by BayREN. (The Advisory Committee interactions with SoCalREN were outside the scope of this study, so there may be more marketing abilities present than stated here.)

Local Governments as Administrators: The CPUC has no regulatory oversight of local governments apart from the RENs' role as EE program administrators, except for oversight of IOU local government partnerships programs. While the Consultant Team heard nothing that would indicate that the RENs lack commitment to EE,[52] there is a potential for vulnerability should key supporting local governments shift priorities away from supporting EE.[53]

BayREN members can withdraw from the REN with a 30-day notice to the other members. If this were to occur, programs would still be available to residents of that county, although marketing and outreach would be curtailed since much of this work is done by the member agency. If the withdrawing member were a Lead Link, it would be paramount to quickly move the implementation management to a new member, under the assumption that a member was able to support being a Lead Link.

SoCalREN, as a single local government administration design, has no substitute public agency available to take the reins if LA County were to experience a change in its priorities away from sustainability and EE.

Table 43, below, presents the pros and cons of the two REN model based on the information presented in this study. The Consultant Team analyzed information from the RENs to arrive at the information in the table.

[51] The Lead Links changed for two programs at the beginning of 2015, a period outside the scope of the study.

[52] LA County has been involved with the EE of its municipal buildings for at least 10 years. For example, in the 2004–2005 program cycle, they partnered with SCE and SCG to retrofit 70 county buildings (California Measurement Advisory Council [CALMAC] ID SCE0226.01). Both LA County and ABAG implemented ARRA energy programs.

[53] The Consultant Team believes that, because of Assembly Bill 32 (AB32), local governments have a strong desire to reduce GHG emissions. EE is only one way to achieve such reductions, and local governments may choose to shift their focus to other sectors, such as transportation, to reach GHG reduction goals.

Table 43. Pros and Cons of REN Models

BayREN		SoCalREN	
Pro	*Con*	*Pro*	*Con*
▪ Involves multiple local governments, which supports increased local government capacity. ▪ Member voting means that each member matters in decision making. ▪ Flexibility brought about by the accessibility within a flat organizational structure supports quick changes to small program issues. ▪ When REN member counties are also an LGP, there is a natural synergy.	▪ Local governments may have difficulty engaging in the REN and withdraw, causing cascading implementation difficulties.	▪ Single decision maker reduces time to make choices, although the Advisory Committee most likely is included in any major decision, which could slow the process. ▪ Flexibility brought about by the accessibility within a flat organizational structure supports quick changes to small program issues.	▪ Presently housed within LA County. If the administrator county chooses to stop supporting the REN, there is no specific local government to step in.

While outside the scope of this study, a thorough comparison of activities to date versus goals that include 2015 activities would provide a good indication of the differences between the two models. Any evaluator comparing the two models would need to have deep knowledge of each of the programs to determine if differences in goal attainments seen (if any) between BayREN and SoCalREN are because of the models or due to program design. In addition, the energy savings obtained by each model, from both direct implementation and indirect actions, would be most useful if such estimates accounted for savings brought to the IOU programs by the REN contributions. The future impact study report on the RENs will provide additional information in this area.

4.3.4 Summary of Policy Research Questions

The Consultant Team provides insights on the policy research questions in Table 44 below.

Table 44. Summary of Policy Research Questions

Policy Component	Summary
Scalability of the RENs	▪ **Existing programs can scale up.** The management structures of the RENs seem to allow for ramping up of any existing small-scale efforts. The use of consultants to implement the programs means that the RENs must procure additional consulting support, but they have the management capability to do so. In addition, the RENs and their implementing consultants are performing well in the three program areas where the Consultant Team performed primary data collection. ▪ **New programs may have more difficulty.** When considering the addition of new programs, the SoCalREN model may have a slight advantage over the BayREN model since the former has a single decision-making organization. Both RENs may have difficulty in staffing oversight of a new program with their existing structures. For any new program in BayREN, a lead agency would need to volunteer to manage any consultant. Because BayREN member counties indicated that they are often close to full-time, it may be a problem to oversee a new program unless they could fit it into their current work. SoCalREN, with fewer full-time staff, may have a slightly lower ability to oversee a new program. ▪ **No opposition to new RENs, but some considerations present.** The Consultant Team heard no strong opposition to additional RENs. There were, however, several considerations about what a new REN would need to be. According to the RENs, any new REN should leverage the experience, program models, and lessons learned from the existing RENs. From the IOU side, clear standards should be set for what it means to be a REN, and any REN should be subject to the same rules and cost-effectiveness requirements as the IOUs. ▪ **New RENs incur costs at several levels**. Any new REN faces a high cost of entry, which may be prohibitive for smaller agencies. Additionally, the ongoing costs of participating in all regulatory areas and maintaining collaboration with the IOUs increase program costs. ▪ **New RENs may need more support.** Collaboration was a key aspect of starting the RENs and took considerable time at the beginning, with ongoing efforts required to maintain smoothly running programs. While collaboration can occur via the phone, face-to-face meetings typically are better to work through difficulties, reach agreements, and create a plan for moving forward. For any new REN, in-person meetings with the IOUs would be time-consuming and costly.
Customer Confusion from REN and IOU Programs and Competition between RENs and IOUs	▪ **Customer confusion exists, but the full level of confusion is unknown.** Although the RENs worked with the IOUs to ensure non-duplication of existing activities, there is some evidence that the addition of the RENs caused customer confusion. A BayREN member government indicated that a marketing effort with information for both BayREN and the IOU programs fell flat and confused customers. This same member county indicated customer confusion occurs especially in small towns, where customers typically learn about the programs via word-of-mouth. While half of the BayREN Home Upgrade Advisor program customers indicated that they had experienced some level of confusion, they tempered that statement by indicating that the Advisor helped reduce their confusion. Additionally, multiple sources noted the level of coordination required to reduce confusion and include the RENs as a new program administrator was substantial and is an ongoing cost. Thus, there is incomplete information on how deep any customer confusion may be; this should be studied further. ▪ **Competition between RENs and IOUs is not necessary to pursue innovation.** While REN staff brought up that competition could encourage RENs and IOUs to become more efficient and to develop more innovative and attractive programs, the 10-year history of searching for program innovation in California suggests that competition has not been the key pathway to obtain more innovative programs. RENs have an advantage over the IOUs in their ability to communicate relatively quickly with a set of local governments, which could lead to marketing that is more efficient. While RENs are not the only organizations working with local governments, their monthly meetings and ties with other local government organizations are advantageous to information dissemination.
Comparison of the REN Administration Models	▪ **BayREN** has a dispersed point of authority for decision making, with each member having equal voting rights. This organization brings the benefit of members knowing their vote matters. Any member county can withdraw from BayREN with a 30-day notice. While not expected, it this occurred, it would cause difficulties. Some member counties directly implement programs and consultants implement many of the program activities with member county oversight. Member counties can change who is managing a program—an event that occurred in 2015, when oversight of two programs moved to different member counties. The flat organizational structure provides for accessibility to decision makers, which supports quick changes to small program issues. With members involved as LGPs and participating in other local government groups, the marketing for programs is built in with little cost. ▪ **SoCalREN**, with a single point of authority, can easily choose to go in a specific direction. Similar to BayREN, the short organization decision-making structure provides accessibility to decision makers, which supports quick changes to small program issues. Consultants implement all but one program. SoCalREN, as a single local government administration design, has no other specific organization to step in if there is a change in focus in LA County and they chose to not continue supporting the REN.

5. Conclusions and Recommendations

As a pilot, the CPUC needed data to inform whether to continue the RENs as EE program administrators. Specifically, the CPUC wanted to know if the RENs were meeting the expected activities, provided value to the State, and were effective in their actions.

5.1 Conclusions on Value and Effectiveness

5.1.1 The Value of the RENs

The RENs provided technical expertise that was beneficial. Close to two-thirds (64%) of BayREN Home Upgrade Advisor participants described some sort of benefit with the technical expertise provided by the Home Upgrade Advisor. Additionally, participants found the Advisor professional, knowledgeable, and responsive to their needs. All SoCalREN Public Agency Program participants stated that, as a result of the program, they now had access to such technical services as audits, design, or construction management assistance, and 93% of the participants indicated that they had access to EE expertise that their organizations did not have. Three-quarters of participants stated that working with the Public Agency Program reduced the amount of time needed to implement projects. Across the board, participants indicated a high level of knowledge by the SoCalREN team implementing the Public Agency Program (scores from 9.2 to 9.6 on a 0–10 scale where 10 is completely knowledgeable.)

The RENs designed programs that were new to California and, while still small, have the potential to scale up. Additionally, the BayREN PAYS program meets several criteria in Ordering Paragraph 34 of D.12-05-015, as it addresses the water-energy nexus and deploys new and existing technologies. Akin to an on-bill financing program, local water utility customers pay for the implementation of the program. Energy ratepayer funds help design the program and ensure availability of technical assistance when the water agencies begin implementation. The program seeks both water and energy savings on site with resulting reductions in both utility bills As of July 2015, two agencies are implementing PAYS: the Town of Windsor and the City of Hayward.

SoCalREC offers technology development in the form of two software packages – one for tracking energy use; another for online building permitting – that show promise for indirect savings, although their full potential will come only from extensive use, which has not yet occurred. As of the end of 2014, 56 local governments have licensed a software package through SoCalREC that tracks energy use across several facilities and are monitoring close to 150 buildings. The other software package is an online building permitting software that means to build customer awareness of EE upgrades and lends local governments a tool for tracking GHG reductions. SoCalREC has developed two prototypes and one local government has enrolled for product launch.

The RENs and IOUs put forward differing opinions about the value brought by the RENs, which this study acknowledges; the Consultant Team has no strong evidence to support either position. The RENs believe that their relationships with local governments have a high level of credibility and trust that affords them better access to foster community collaboration than the IOUs that eventually leads to higher savings. The IOUs counter that the LGPs program run by the IOUs has similar abilities. The BayREN Multifamily program performed well and achieved higher than expected savings, which one REN staff member attributed to the positive relationship between the REN and the local government. The possibility of this type of impact merits further study, as it is a fundamental component of the value of the RENs.

5.1.2 The Effectiveness of the RENs

The RENs put in place and successfully implemented their $67 million portfolio within an 18-month period. This is commendable, especially given the high level of coordination required between the RENs and the IOUs to determine in how to create and deploy programs that target the same pool of customers[54]. The three programs studied all had high levels of customer satisfaction, which indicates good management and effective service delivery.

The RENs navigated the new regulatory environment with some difficulties to begin with, but are now performing adequately (according to ED staff). A six-month regulatory delay occurred in the start-up of the RENs that the management of both RENs successfully overcame, although the delay made it difficult for the RENs to meet previously planned participation goals.

As in all programs, there are areas of difficulty. For the RENs, beginning to implement programs in areas where the IOUs had been providing programs for years resulted in some customer confusion. However, this study found that the level of confusion did not influence the satisfaction of customers.

Management of the RENs and programs is "sufficiently effective"; however, the information gathered through this study was limited. For the service delivery component, the Consultant Team gathered data from multiple sources to enable a clear determination of effectiveness. For other areas, the only data were self-reported. As such, there is no balancing information from an alternative or outside source.

5.1.3 CPUC Policy Implications

When considering the addition of new programs to the current RENs, the SoCalREN model may have a slight advantage over the BayREN model since the former has a single decision-making organization. Both RENs may have difficulty in staffing oversight of a new program with their existing structures. For any new program in BayREN, a lead agency would need to volunteer to manage any consultant. Because BayREN member counties indicated that they are often close to full-time, it may be a problem to oversee a new program unless they could fit it into their current work. SoCalREN, with fewer full-time staff, may have a slightly lower ability to oversee a new program.

New RENs could come from carving out a portion of the existing RENs or by creating a REN outside of the geographic locations already covered by the existing RENs (shown above on p. 7, section 1.1, in Figure 1).

The existing RENs cover a large part of the IOU service territories and the major opportunities to potentially establish a new REN would be within areas defined by the central coast, the northern coast, the Sierra, the Central Valley, and San Diego County. Collaboration was a key aspect of starting the RENs and took considerable time at the beginning, with ongoing efforts required to maintain smoothly running programs. While collaboration can occur via the phone, face-to-face meetings typically are better to work through difficulties, reach agreements, and create a plan for moving forward. The current REN organizations are located either in the same city or within an hour drive from where the IOU staffs engaged in EE programs reside (i.e., San Francisco, Los Angeles, or San Diego), which meant that collaboration is relatively easy. For any new REN in a rural area, in-person meetings with the IOUs would be time-consuming and costly.

[54] The SoCalREN program labeled SoCalREC planned for seven programs. During the course of the pilot, SoCalREN discontinued one due to lack of interest and combined two others into a single program. Additionally, the Consultant Team planned to assess two other SoCalREC programs, but they were not yet in a position for evaluation.

Additionally, any new REN would incur costs at several levels. A new organization can expect significant upfront investment costs with no guarantee of success along with costs of collaborating with IOUs

The existing RENs have demonstrated value and effectiveness in the course of implementing their programs. A new REN may provide equally valuable and effectively run programs, but it is not an inexpensive proposition. The full impact of the RENs and their ability to increase the level of EE savings across the state over what it would have been absent their presence needs further study to determine if new RENs are a worthwhile addition to California.

5.2 Recommendations

The study supports five specific recommendations and five areas to consider for a new REN.

- **The RENs should continue.** They should continue owing to the value that they demonstrate to their constituencies (within the three programs studied most closely) in several important areas: technical expertise, targeting hard-to-reach markets, and linkages with other utility offerings. While the study found value as described, this study is indeterminate on whether the RENs should continue as program administrators (in either a probationary or a permanent status).
- **The RENs should maintain their new programs and document customer response**. Both the BayREN PAYS program and the two SoCalREN software packages within are new and their full potential is uncertain. SoCalREN software packages are providing value now in the form of new technologies and BayREN's PAYS with savings via a water-energy nexus, but both have few participants. Tracking uptake will help the RENs determine whether customers find the program designs appealing enough to participate or if design changes are necessary.
- **The RENs and IOUs should ensure tracking of key pilot metrics in order to compare activities across program administrators.** The RENs believe that their relationships with local governments (and with community organizations) increase long-term energy savings. For example, looking at BayREN Home Upgrade conversion rates (which increased from 4% in 2013 to 19% in 2014), when compared to conversion rates by SoCalREN and the IOUs, presents a clearer picture of the presence or absence of an advantageous influence of the RENs relationship.
- **A future study should determine the full level of customer and contractor confusion and, if found, provide better approaches to mitigate it.** A BayREN member government indicated that a marketing effort with information for both BayREN and the IOU programs fell flat and confused customers. This same member county indicated customer confusion occurs especially in small towns, where customers typically learn about the programs via word-of-mouth. While half of the BayREN Home Upgrade Advisor program customers indicated confusion, they tempered that statement by indicating that the Advisor helped reduce their confusion. Any future assessment of the RENs should systematically gather additional data specifically about customer confusion and contractor confusion before determining that the RENs caused market confusion.
- **The ED should sponsor additional studies to gauge the long-term effectiveness and viability of the REN program administrator models.** The ED plans for three additional studies on the RENs that will help provide a more complete picture of the value and effectiveness of these two new program administrators. While those studies have a set of research objectives, the Consultant Team suggests the three upcoming studies also consider the following areas noted within this study report, but outside this study's scope.

- **Multifamily Study:** Is the high number of units under retrofit for BayREN because of close local government ties with BayREN? If so, why does this high number of retrofits not occur in SoCalREN?
- **RENs Impact Study:** Are more projects moving into IOU resource programs because of the non-resource activities by RENs?
- **RENs Phase II Value and Effectiveness Study** (the several questions presented here will need to be prioritized to fit the Phase II budget):
  - Are Home Upgrade contractors confused by the presence of both the RENs and the IOUs?
  - What are the costs, if any, of changing a BayREN Lead Link for a program? Does changing the Lead Link for a program have any effect on the program?
  - How valuable and easy to use do customers find the SoCalREN EEMIS and CEEPMS software?
  - How does the SoCalREN Advisory Committee interact with SoCalREN and what are its responsibilities?
  - What would be the costs to scale up EEMIS training and what are the prospects for deploying across California?
  - How well does the SoCalREC leverage local government resources and what level of local government capacity is the result of SoCalREC activities?

If the CPUC were to invite applications for new proposed RENs, this study identified several areas to consider. The CPUC could potentially benefit by:

- Creating a set of guidelines regarding the full regulatory processes by which any new proposed REN would be expect to adhere. This would reduce uncertainty about the significant coordination, time, and cost required in becoming a REN.
- Providing seed money to assist a new potential REN with preparing its first set of regulatory filings.
- Allowing for a prudent increase in administrative costs to facilitate collaboration through in-person meetings.
- Assuring that any new REN leverages and borrows from the experience, models, and lessons learned from the existing RENs .
- Reviewing the associated ED staffing requirements of overseeing additional RENs to assure appropriate coverage for ongoing interactions with additional program administrators.

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REGIONAL ENERGY NETWORKS
VALUE AND EFFECTIVENESS STUDY
VOLUME II OF II - APPENDICES

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Appendix A. PUBLIC COMMENT ON DRAFT REPORT AND EVALUATOR RESPONSE

#	Commenter	Page	Comment	Evaluator's Response
1	Joint IOUs	Overarching	Evaluation of Three Pilot Subprograms Does Not Support Generalization to the RENS in their Entirety. We understood from the published Research Plan that the evaluators would exclude all resource programs. However, in the draft report it appears that the evaluators further narrowed the scope to evaluate only three pilot subprograms. Could the report explain why its recommendations (p4-5) are generalized to all RENs when only three of approximately 17 non-resource subprograms were evaluated?	We assume that this statement is specific to the continuation of the RENs as the other recommendations are specific to the programs included in the study. We will add language to more clearly indicate the results are based on the programs more closely studied. (See comment 5)
2	Joint IOUs	Overarching	The research plan for this evaluation did not include definitions of the “value” or “effectiveness” criteria, and review of the draft report suggests that the definitions used were not fully aligned with the three criteria as defined by D.12-11-015.	We disagree. Page 12 of the research plan stated "Specifically, the REN pilots will have demonstrated value if their programs, as implemented, break new ground in areas not currently served by utility offerings and if their activities and programs have the potential to be scaled to a broader geographic area or service hard-to-reach markets." Page 13 stated "The REN non-resource programs and associated activities would be considered effective if there is a clear demonstration of an ability to manage sub-pilot implementation and to adjust to necessary changes as they arise, as well as if constituents consider the offerings to be equitable and of reasonable benefit."

#	Commenter	Page	Comment	Evaluator's Response
3	Joint IOUs	Overarching	Unanswered Fundamental Question: Did Each Subprogram Achieve Its Objectives? The current organization of the report does not enable the reader to see the linkage between the REN's objectives in their implementation plans, their actual performance, and a conclusion whether or not their performance met their objective. Could the report be amended to include a summary matrix listing each subprogram, their stated objective, their evaluated performance towards those objectives, and a conclusion as to whether or not the subprogram achieved their stated objectives? We would suggest that the matrix should include data-driven conclusions on whether or not each subprogram met each of the three criteria for Value listed in the Decision. Our review also noted that the Values section of the Findings seems to present only positive examples of REN activities under the evaluators' own criteria. We request that the report be amended to more systematically determine for each subprogram whether or not each of the three Value criteria of the Decision is met – including both positive and negative conclusions.	While the IOUs put forward this specific unanswered question, we note that this was not a research question within the study, although the success in terms of participation was a research question (question 1ci in table 8). We plan to add in the participation data for the three programs more closely studied as per our response to comment 40. As shown by the data in Section 3, there were several objectives for the RENs programs. The suggested option of creating a matrix for all objectives and filling it in is impracticable since this was not the original intent of the study.
4	Joint IOUs	Overarching	It appears that the draft report deviates materially from the final research plan. Could the evaluation clarify where it deviated from the final research plan and why?	We are unclear why the IOUs believe there has been material deviation from the study research plan. The changes in data collection activity is described on page 23 and within Table 16. This includes the changes from the original plan and why.
5	Joint IOUs	Page 1	Please state clearly that the evaluation team only assessed value and effectiveness of three subprogram "pilots. This is difficult to tell, yet is very important to the overall conclusions."	We will add a sentence regarding the number of subprograms to the executive summary.

#	Commenter	Page	Comment	Evaluator's Response
6	Joint IOUs	Page 1	Please state clearly that the evaluation team's conclusions about REN value were informed solely by "statements made by the REN program administrators. This is difficult to tell, yet is very important to the overall conclusions."	The conclusions regarding the REN value were not informed solely by the REN program administrators. Data gathered from program participants and IOU staff were included.
7	Joint IOUs	Page 1	Evaluators should add the statement they used later in the report: "Unfortunately, the small sample size does not provide a clear answer to the question of whether or not the RENs provide additive engagement beyond that provided by the IOUs and LGPs"	The sentence called out is specific to the engagement, which is not directly discussed in the executive summary. As such, we will not add in this sentence.
8	Joint IOUs	Page 2	Utility programs are usually evaluated on whether or not they achieved the objectives in the implementation plans. Please explain why this was not done in this evaluation study.	Determining the achievement of objectives as described in the implementation plans was not a research question.
9	Joint IOUs	Page 4	Because the evaluators only assessed the value and effectiveness of three subprogram pilots, they need to "restrict this recommendation to the three subprogram pilots, and not generalize to the rest of the RENs."	We will add a sentence indicating that the recommendation regarding RENs continuation is based on the areas of close study.
10	Joint IOUs	Page 4	Can the evaluation team formulate their conclusions and recommendations along the "three criteria for the REN's existence? "Activities that utilities cannot or do not intend to undertake," "n Activities for which there is no current utility program offering and for which there is the potential for scalability to a broader geographic reach, if successful, and" "n Activities in hard-to-reach markets, whether or not there is currently a utility program that may overlap."1"	The value section in the executive summary is already structured to describe the new programs and the hard-to-reach areas. We agree that the study information regarding the activities that the utilities cannot or do not intend to undertake is not currently included in the executive summary. We will add this to the summary.
11	Joint IOUs	Page 4	This conflicts with the first sentence. How does a REN continue if it does not also continue as program administrators?	The statement is around the status of the RENs as being either probationary or permanent. As such, we do not see a conflict.

#	Commenter	Page	Comment	Evaluator's Response
12	Joint IOUs	Page 4	Please state the value or purpose of making such a comparison.	The comment is directed towards the comparison of the conversion rates. We believe the sentence is clear around the purpose of the comparison. That is, the ability to compare conversion rates for the Home Upgrade programs across all program administrators could allow future analysis to determine any correlation between the hypothesized influence of the RENs relationship and program uptake.
13	Joint IOUs	Page 15	Can you highlight your conclusions about overlap, and include them in the Executive Summary?	There is no conclusion about overlap on page 15. However, as stated in our response to comment 10, we will include information from this section in the Executive summary and the value section summary table.
14	Joint IOUs	Page 16:	This is confusing: what is the benefit of looking at this through two views, and why does the Broad View "cover some of measures of value, while the Narrow View covers others? In addition, what is “broad” or “narrow” about these views?"	The evaluation team asked broad "portfolio-level" questions of the RENs and IOU staff regarding several topics (such as program management and coordination). The narrower view is from a select number of constituents in the REN programs and is therefore specific to programs as opposed to the larger portfolio.
15	Joint IOUs	Page 16:	Why did the evaluators choose not to address effectiveness as measured by goal achievement?	How the evaluators planned to assess effectiveness is laid out in the research plan. Goal achievement was not included, nor was this issue raised by any stakeholder at the time of the plan.
16	Joint IOUs	Page 17	Please clearly annotate this table to make clear that these three subprograms were not evaluated; including them as “within scope” without noting that they were not evaluated may mislead the reader into thinking you evaluated them.	We will add in language to this table that indicates that three of the programs are not evaluated.

#	Commenter	Page	Comment	Evaluator's Response
17	Joint IOUs	Page 22	Please report the methodology used to select the three subprograms: why should these be considered "representative of the entire REN programs? For example, do these three subprograms provide the bulk of savings for the RENs, are they the most active subprograms, or have they spent the largest percentage of" their budget and can be considered more fully-deployed than the other subprograms…? This needs to be explained within the Sampling section.	The study makes no claims that the three chosen sub-programs are representative of the entire REN suite of programs. Language on page 16 and Tables 6 and 7 describe the reasons for sub-program exclusion.
18	Joint IOUs	Page 25	The fact that a subprogram is no longer being pursued should be a significant evaluation finding. A program that is not ready for an evaluation effort two years after its inception should be a significant evaluation finding. Please provide a table showing all subprograms that are no longer being offered or not "ready for evaluation, as well as an explanation why."	This comment is referring to Table 16. This table includes the subprograms that are no longer offered. Since we did not attempt to evaluate other programs, we cannot add information about programs that may or may not be ready for evaluation. We will add in language prior to Table 16 describing the program change because the information on these two programs that were dropped or delayed may be more difficult to notice in the Table. Additionally, we will note the dropped program in the conclusions.
19	Joint IOUs	Page 26:	Please add to this section the following additional study limitations: 1) Value and Effectiveness were only "assessed using REN program administrator self report, and findings may be biased 2) This evaluation did not fully assess value as laid out in the three Decision criteria; namely, the first criterion on whether or not REN activities were ones that IOUs “cannot do or will not undertake” was not addressed. Please also acknowledge the limitation that because all three criteria were not assessed, it will be difficult to present a" clear picture of value even for the three subprograms that were selected for evaluation in this study.	Refer to our response to comment 6. We disagree with the limitations described here and will not add in the suggested language.

#	Commenter	Page	Comment	Evaluator's Response
20	Joint IOUs	Page 26:	Why was this significant change in evaluation scope not reflected in an revised research plan that was posted for public comment?	This comment is addressing the change for the original plan. The changes were included in a public meeting of the stakeholder advisory group on 1/21/15.
21	Joint IOUs	Page 26:	Because Table 16 shows that the evaluators ended up only evaluating two of the five subprograms that they "designated the Public Agency Programs, it would be much clearer to the reader if you just used the names of the two subprograms: Aggregated Regional Procurement and Integrated Comprehensive Whole Building Retrofits, instead of "Public Agency Program" Also, it may be clearer to" refer to this as SoCalREC.	We disagree that it would be clearer to use the names of the two programs throughout the study. Additionally, these sub-programs are not the only activities included in SoCalREC, so it would be inappropriate to call this SoCalREC. See Table 6 for other components of SoCalREC not included in the study.
22	Joint IOUs	Page 43	Please provide at the beginning of this section a summary statement of which (if any) activities the IOUs cannot do or do not undertake. The content in this section does not seem to address this criterion at all. Why did the evaluators not ask the IOUs whether REN activities were ones they "cannot do or do not intend to undertake?"	We asked the IOU staff to describe whether the utility has any programs with offerings similar to those of the REN in their area and if the RENs fill a gap in the IOU program offerings or provide a benefit not provided by the IOUs. These questions aimed to determine if the IOUs were performing specific activities now and inform if the RENs added benefit. We agree that this is not a direct line of questioning regarding whether the IOUs cannot perform an activity or does not plan to do so in the future and have added language to indicate as such.
23	Joint IOUs	Page 43	The evaluators seem to be confusing two concepts: activities "unique" to the RENs are not the same as activities "the utilities cannot do or do not intend to undertake." Please acknowledge in the text that these two concepts are not equivalent.	We will add language in this specific section to clarify why the word "unique" is in use as described in Comment 22.
24	Joint IOUs	Page 50:	The criterion of scalability is predicated upon the success of the activity. Because the evaluators "did not evaluate goal achievement, their conclusions about scalability are premature. In this section, and throughout the report, we suggest that the evaluators first identify which subprograms are successful, and	We agree that an activity should be successful if the plan is to expand upon it and explicitly stated that the programs described in this section are in their early stages. We did not make conclusive remarks regarding scaling here or elsewhere regarding these programs. We did recommend

#	Commenter	Page	Comment	Evaluator's Response
			only discuss scalability for those."	that the RENs track customer uptake to determine if customers find the programs appealing and if future design changes are needed.
25	Joint IOUs	Page 51	EEMIS is being phased out, and customer data will soon be available through the Green Button Connect "Phase 2, removing the need for a separate EEMIS."	Our understanding from SoCalREN is that EEMIS is not being phased out. Additionally Green Button Connect is an avenue for moving data from the utility to a customer, but does not have the other capabilities that EEMIS has (as described in the PIP). As such, we will make no changes in the report.
26	Joint IOUs	Page 52	Please include the data from the Appendix where these participants mention confusion. In particular, one "participant reported, “a lot of the time it seems like they are duplicating what is offered through the local government partnership programs with SCE and SoCalGas.” (p. 8). Also, another participant suggests that SoCalREN could be improved if they, “Coordinate regional procurement with similar projects. Work with SoCal specific JPA for procurement” (p.8). All data should be considered since the" evaluators stated they are using the “preponderance of evidence” approach.	We disagree that duplication equates with confusion, but agree that this statement could be included in the overlap portion of the report and will add this piece of information there (i.e., the bullet beginning "Technical Assistance through SoCalREC). We are unclear how the coordination statement aligns with customer confusion and will make no updates that include this statement.
27	Joint IOUs	Page 54	SCE’s Energy Leader Model explicitly works to help local governments build capacity (c.f. program implementation plans circa 2009). Can the evaluation please acknowledge this? This is not a new offering by the RENs.	We will add that the LGPs also seek to build local capacity.
28	Joint IOUs	Page 56:	Can the evaluators please clarify: Didn’t these entities also participate for years in IOU LGP programs? If "yes, why only mention ARRA?"	We agree that LA County and some of the BayREN members were involved in the past within an LGP. While this section specifically described capacity building within program administration and implementation, we will add in their participation as an LGP here as well.

#	Commenter	Page	Comment	Evaluator's Response
29	Joint IOUs	Page 58	Appendix C Table 3 shows that these findings on the three value criteria are all based upon REN self report. Please acknowledge that this self report may present a biased view of REN value.	Please see our response to comment 6. IOU staff data are included in two of the three value criteria, with the hard-to-reach data arising from how the programs are implemented. Stating that the RENs are including Spanish speakers for outreach is not a biasing statement.
30	Joint IOUs	Page 58	The evaluators did not seem to ask this question of anyone, so should not make any conclusions on whether the three subprograms met this criterion or not.	The comment addresses the criterion of "activities that the utilities cannot or do not intend to undertake". Please see our response to comment 22.
31	Joint IOUs	Page 59	How do you reconcile this conclusion with the low percentage of goal achievement reported for many subprogram in Section 3: REN Progress?	The comment addresses the statement: "The RENs have sufficient and experienced staff resources to conduct REN activities." We agree that some of the program metrics were below the planned level. However, our study did not focus on the specific reasons for possible underachievement. As stated in the report, we indicated that the numbers appear sufficient as no REN staff indicated they had insufficient resources to conduct their activities.
32	Joint IOUs	Page 65	Why did the evaluators not survey SoCalREN participants on whether they experienced any confusion?	Our understanding, based on interviews with REN and IOU staff, was that the participants in the Public Agency Program worked with both groups at different times in the project with close coordination between the REN and IOU staff. As such, we did not focus on the potential for confusion. In retrospect, this may have been a good question to ask.

#	Commenter	Page	Comment	Evaluator's Response
33	Joint IOUs	Page 67	Please include this statement in the Study Limitations section.	The comment references the sentence "For other areas, the only data were self-reported. As such, there is no balancing information from an alternative or outside source." We state already in this area that the value and effectiveness described here is limited to the areas supported by primary data collection. The area that has no balancing information is clearly stated in the report at the appropriate location (just prior to the effectiveness summary). We feel this is sufficient and will not add language to the Study Limitations section.
34	Joint IOUs	Page 72	Please acknowledge that this information comes solely from REN program administrator self report and "thus may be biased in favor of RENs. If there are data that come from a source other than REN self reports, please clearly state where those data came from."	This comment addresses the information in Table 42, that highlights the pros and cons of the RENs. We added a sentence indicating that the information is based on our analysis of REN information.
35	Joint IOUs	Page 75:	What data shows this? Please refer to the page on which this data is presented: There doesn't seem to be any mention of differing opinions on REN value in Section 4.1 "Value of RENs".	The conclusions is based on data presented on page 42 and 43 of the study. Specifically, the sections that start with "REN presence and unique contribution to the local government EE sector as characterized by REN staff" and "IOU staff position on value of RENs vis a vis the LGPs."
36	Joint IOUs	Page 76	What data did you use to determine that the RENs spent $75 million in 18 months?	The $75 million is an error. The correct value is $66 million based on the sum of the two budgets (Tables 2 and 3). Also, we did not state that the budget was spent, only that this was the sum of their portfolio.
37	Joint IOUs	Page 76	There is no mention in this summary of the evaluator's conclusion that RENs may have difficulty staffing new programs. Please add that conclusion to this summary.	We agree that this finding was not included in the conclusions and will add.

#	Commenter	Page	Comment	Evaluator's Response
38	Alexander Cole	Conclusions and Summary/Pages 77-79	The study has based its conclusions on criteria that have limited or secondary relevance when drawing conclusions about whether the Commission should continue to fund organizations that have spent $75 million in ratepayer money over the course of two years (Page 1). When evaluated in terms of effectiveness in implementing programs that meet Commission goals, more differentiated conclusions are merited. Specifically, some of the programs designed by the RENs were effective while others were strikingly ineffective. For example, BayREN's Policy Support and Advocacy forum (Table 21, Page 32) showed participation well in excess of goals. Therefore it can be considered effective. However, the Financing program (Table 22, page 33) did not serve a single project. It was ineffective. Similarly, SoCalREN's Multifamily program (Table 25, page 36) achieved less than 10 percent of its savings goals whether measured by Energy Savings, Peak Demand Savings, or Gas Savings. The report should replace its overall conclusion that the RENs were 'effective' with a more nuanced and meaningful conclusion informing readers in which aspects RENs were effective and where RENs were ineffective. This would be much more useful for parties as they consider the appropriate role for RENs in California's EE ecosystem, going forward.	We agree that a more nuanced set of conclusions may be beneficial. However, because the study did not have sufficient budget to determine why specific goals were or were not met, we are reluctant to state that an activity is effective based just on the percent of goal. We will, however, add in some of the language from earlier in the report to help the reader understand the limitations. Specifically, we will add "Management of the RENs and programs is "sufficiently effective"; however, the information gathered through this study was limited. For the service delivery component, the Consultant Team gathered data from multiple sources to enable a clear determination of effectiveness. For other areas, the only data were self-reported. As such, there is no balancing information from an alternative or outside source."

#	Commenter	Page	Comment	Evaluator's Response
39	Alexander Cole	Study Methodology/Pages 15	The methodology used in this study is inappropriate. The REN's are pilots and the Commission needs information on whether to continue them or not. The almost exclusive use of survey and long-form interviews is a poor methodological choice for determining either value or effectiveness. Such qualitative research methods are excellent for understanding processes and for discovering both positive and negative outcomes of a program that might not be evidenced through more codified metrics. They would also be useful in informing program change and in guiding organizational adaptation as they might reveal 'weak signals' that don't show up in the metrics. However, they are a poor basis for making an evaluation of the value or effectiveness of the RENs as alternate program administrators. Established metrics such as energy savings and cost-effectiveness tests provides a better indication of whether an organization is meeting key Commission goals. Survey data alone cannot inform us about the cost-effectiveness with which services were delivered. Therefore, on their own, survey data and long-form interviews form an inadequate basis for judging the value or effectiveness of the REN's performance. The report should be altered to reflect the limited scope of the conclusions on value and effectiveness given the study design and data.	We disagree with your overarching statement that the methodology is inappropriate. This study is one of several studies providing information on the RENs. The energy saving and cost effectiveness tests are covered under a different study, which is also complete and available to the CPUC. As stated in the report, this study was originally a process study, but was relabeled to align better with the research questions.

#	Commenter	Page	Comment	Evaluator's Response
40	Alexander Cole	Executive Summary/Pages 2-3	Definition of Effectiveness - The report gives a definition of effectiveness that is based on "organizational competence": sufficient staffing, adjusting to necessary changes, and managing implementation. But this is not the 'effectiveness' that should interest the Commission. The evaluation should be based on the RENs' effectiveness at achieving their stated public-policy goals; specifically, the RENs effectiveness at providing innovative resource and non-resource programs or devising innovative strategies to address hard-to-reach populations (D.12-11-015, p.17). For a non-resource program, effectiveness means the targeted population was reached, that this population found the program useful, and that this useful service was delivered at a reasonable cost. For a resource program, effectiveness means that energy efficiency savings goals were met and in a cost-effective manner. The evidence contained in the report does not support the conclusion that the RENs have met this more reasonable definition of effectiveness. Instead, the evidence presented in this report shows that in some cases the RENs failed to even achieve 10% of their Commission-approved savings goals (Table 25, page 36). Overall, a determination that the RENs are effective is not supported by the available evidence.	Your input on specifically how to define effectiveness would have been useful at the outset of the research. The three non-resource programs studied in our research includes information from program participants, which covers one of your areas that you consider should have been studied. We agree that outside of Section 3, the study is silent on either reaching the targeted population or reasonableness of the cost for the programs. Within Section 4 of the report, we will include data from Table 18 on the number of Home Upgrade Advisor program participants, Table 22 on the number of projects forecast under PAYS, and Table 34 on the number of contacts for SoCalREC to include reach for the targeted population when discussing effectiveness. We will not include cost data as this is outside the study scope. Also, please see our response to comment 38 which will add statements regarding effectiveness to the executive summary. We note that the cost effectiveness was never included in the scope of this study, although is included in a different study. Also, the REN programs were specifically not held to a cost-effectiveness rubric per decision (D.12-11-015, p.19), but were considered as part of the entire approved portfolio.
41	SoCalREN	ii	"Bevilacqua" not "Bevilaqua". Spelling.	Thank you for the correction. We will make that change.
42	SoCalREN	1	"Edison" not "Electric". Accuracy.	Thank you for finding this error. We do know that it is Edison and will make the change.
43	SoCalREN	3	"Home Upgrade" added for clarity.	We are fine with this addition and will make the change.

#	Commenter	Page	Comment	Evaluator's Response
44	SoCalREN	3	"a more attractive incentive structure (replicated statewide), " added. Regarding the deletion, there might be confusion as to the difference between Advanced Home Upgrade and Home Upgrade. Home Upgrade has always been a prescriptive program.	We agree that this change (the addition and deletion) is useful. However, we will add language to indicate that SoCalREN considered this a more attractive incentive structure (as we did not review the structure).
45	SoCalREN	11	The contract is directly between LAC and SCG (not Edison).	This is new information to us. The graphic was shown to staff early in the process and agreed to when the evaluation plan was drafted. Regardless, we can change this in the report.
46	SoCalREN	11	Regarding Figure 2, LA County Dept. of Comm Dev. Should be LA County Community Development Commission.	We will make the change.
47	SoCalREN	38	212 projects funded through loans per the REN Progress to Date DRAFT 06 22 15_SoCalREN comments final	We will update the information in this table with the new data sent to us on 11/5/15. This new data changes the number of projects to 272, but does not change other data in the table.
48	SoCalREN	61	Added: "a more attractive incentive structure (replicated statewide), "	See our response to comment 44.
49	SoCalREN	61	Deleted: "rather than custom incentive calculations"	See our response to comment 44.
50	BayREN	iii	PAYS and Pay As You Save are registered trademarks; first mention of each must contain ®	Noted. We will make this change.
51	BayREN	1, para 2	BayREN administers seven distinct residential programs; this is not accurate. We have two residential programs; a Codes and Standards program that is not residential; a commercial PACE program; a multifamily loan program (maybe this is residential) and our PAYS program that may or may not be residential.	We agree and apologize for the mischaracterization. Table 3, later in the report, does show this differentiation. We will update.
52	BayREN	1	PAYS and Pay As You Save are registered trademarks; first mention of each must contain ®	See our response to comment 50.

#	Commenter	Page	Comment	Evaluator's Response
53	BayREN	2	Replace last sentence in first para with: "Measures include ultra-efficient indoor water saving devices, drought tolerant landscaping, and weather-based irrigation controls. As of July 2015, two communities are implementing PAYS – the Town of Windsor and the City of Hayward." with "Measures include ultra-efficient indoor water saving devices, drought tolerant landscaping, and weather-based irrigation controls. BayREN PAYS pilots were first started in 2012, funded through a Better Building Program grant administered by the Sonoma County Regional Climate Protection Agency (RCPA). As of July 2015, two communities are implementing PAYS – the Town of Windsor and the City of Hayward."	We are fine with this addition and will make the change.
54	BayREN	2	Unclear as to what is meant by early on, the RENs having experienced difficulties with submissions to the CPUC.	We clarified this statement.
55	BayREN	4	With additional resources, BayREN would have the ability to add new programs without any difficulty.	We will add this statement as a footnote to the document.
56	BayREN	6 - end of first para	Change last sentence to: "Initial REN proposals were evaluated on the following criteria: undertake activities that the utilities cannot or do not intend to do, to perform pilot activities that have the potential for scalability to a broader geographic reach, and to take on pilot activities in hard-to-reach markets." See Conclusion of Law 13, p 118, D.12.11.015. There has not been a decision that states that this is the criteria for future REN programs.	We are fine with this clarification and will make the change.
57	BayREN	8	PAYS, since it began under ARRA, was allowed to continue. (See p 118, Conclusion of Law 11, D.12.11.015.) Further, the Multifamily Capital Advance and Single Family Loan Loss Reserve were part of the separate financing decision, which was issued much later than the Energy Efficiency decision. BayREN requests that this clarification be made in at least a	Footnote 8 on page 8 does describe the timing of some of the regulatory documents. The fact that PAYS was allowed to continue does not seem to belong in this section, but the additional decision for the financing programs is a clear addition to the footnote. We will add in about the financing decision to the foot note, but not PAYS.

#	Commenter	Page	Comment	Evaluator's Response
			footnote.	
58	BayREN	10, table 4	Service territory: unclear as to the reference to selected public agencies and districts. Would suggest replacing that language with: All nine counties and 101 cities that comprise the San Francisco Bay Area.	We will make the change.
59	BayREN	12	(text below Table 5): replace "its nine member county governments" with "its nine member agencies govern BayREN".	We will make the change.
60	BayREN	p 12-13	Add after the sentence ending in (LGPs) fn. 10: Each BayREN member agency appoints a representative to the Coordinating Circle.	We will make the change.
61	BayREN	p 12-13	Replace "appoints" with "elects" Lead Links. Next paragraph: replace "county" with "agency"	We will make the change.
62	BayREN	p 13	Para starting with "In addition", add after 2013-2014 "the three member agencies in - Alameda, Santa Clara and Sonoma counties -"	We will make the change.
63	BayREN	p 14, Fig 4	Replace "Alameda County" with "Energy Council"	We will make the change.
64	BayREN	p 13	last paragraph: replace "Alameda County" with "Energy Council"	We will make the change.
65	BayREN	14; Figure 4	ABAG held the contract with ICF and CLEAResult. The arrows should reflect that and perhaps a footnote can explain that while SCC was the lead, the contract with the implementers was with ABAG	We will add a note to the figure regarding Santa Clara using ABAG as the procurement agency for this contract, but that Santa Clara was the lead.
66	BayREN	15	ABAG has not conducted any EMV studies. Request removal of the sentence: "ABAG has completed one study" and change to: ED is planning four studies.	ABAG managed this study (see comment 67) using ratepayer funds. As such, it is an EM&V study.

#	Commenter	Page	Comment	Evaluator's Response
67	BayREN	15	Remove the bullet in bold as it is not an EMV study and to have in this section is misleading. (see page 28 comment below.) n *A study of the BayREN C&S Permit Resource Opportunity Program is completed and available to the public. (The study is available at www.calmac.org.)*	We disagree. This is an EM&V study, just one that supports program design (a perfectly acceptable use of evaluation resources). We do not plan to remove this bullet. However, we will move the location of the bullet and clarify the purpose of the study (as stated in the report).
68	BayREN	15	There are additional studies being conducted by ED. There is an impact assessment of both RENs with a preliminary report due in early November 2015.	We agree. The draft report inadvertently includes this impact assessment as due in 2016. We will update.
69	BayREN	15	ABAG held the contract with ICF and CLEAResult. The arrows should reflect that and perhaps a footnote can explain that while SCC was the lead, the contract with the implementers was with ABAG	Please see our response to comment 65.
70	BayREN	26	Pay As You Save is registered trademark; first mention in main body (not executive summary); request maintain ®	Please see our response to comment 52. We will include the trademark in the first mention only.
71	BayREN	28	The C&S Permit Resource Opportunity Program was a report that was written by BayREN. This was not an EMV study. Mention of this study in this section is confusing as it sounds like it was EMV. This clarification is important as the Decision precluded the RENs from conducting their own EMV.	Please see our response to comment 67.
72	BayREN	30	BayREN's Home *Upgrade* Advisor Program *not* Home Energy Advisor, which is an IOU program name	We note that this original language was from BayREN. Regardless, we will make this change.
73	BayREN	30, Sec 3.1.2	Second sentence changed as follows: "BayREN designed this program to provide a “middle of the road” offering that achieves deeper savings than single-measure programs, but requires less upfront investment than the IOU's whole building program." third sentence delete "market rate". Fourth sentence change to: "Property owners receive no-cost technical assistance to assess energy upgrade opportunities and develop a customized scope of work designed to reduce building energy use by a minimum percentage	We note that this original language was from BayREN. Regardless, we will make this change.

#	Commenter	Page	Comment	Evaluator's Response
			through installation of multiple measures." Fifth sentence change to: "BayREN refers projects with deeper energy savings scopes of work or wish to work with their own third-party Rater to PG&E's Multifamily Upgrade Program." No change to the last sentence in this paragraph.	
74	BayREN	31, table 19	Change in Note "gross" to "net"	After further discussion with BayREN, the values were determined to be gross and therefore, we will not make this change.
75	BayREN	p 31, table 31	Replace "incentives" with "rebates"	The metric is labeled as "incentives" in the PIP, so we will keep as written.
76	BayREN	32, Section 3.1.4	Replace Description of Multifamily Capital Advance Program as follows: BayREN's Multifamily Capital Advance Program co-finances with private lenders to provide up to half of an EE loan amount at zero percent interest rate. The private lender underwrites to its own criteria and applies its market interest rate. The effect is a lowering of the blended interest rate for the overall EE loan by up to half. The loan pool is $1.5 million and the marketing and administration budget is $500,000. BayREN leverages the technical assistance, scope qualification, and post-installation QA services of EUC-Home Upgrade Multifamily program from BayREN or PG&E by pre-qualifying scopes that are determined to be eligible under one of these programs. "	We note that this original language was from BayREN. Regardless, we will make this change.

#	Commenter	Page	Comment	Evaluator's Response
77	BayREN	32	Description of PAYS, replace last sentence with: "The pilots attach a monthly charge on the customer's water bill as a method of repayment." with "The pilots attach a regular charge on the customer's water bill as a method of repayment. [Reason: Bills are typically bi-monthly. While the charge is applied monthly, regular avoids confusion as to whether the bill or the charge in monthly or bimonthly.] BayREN PAYS is an extension of efforts funded through a Better Building Program grant administered by the Sonoma County Regional Climate Protection Agency (RCPA)."	We note that this original language was from BayREN. Regardless, we will make this change.
78	BayREN	32	Request an explanation (in a footnote) as to why the number of contractors trained (third row) was low. As explained, due to quick uptake in program, we transferred funds for contractor trainings to rebates so that we could enroll more units in the program.	This is table 20 - will add table note
79	BayREN	32, Table 22	Add footnote next to third box re PAYS: "While PAYS programs supported with CPUC funds did not result in installed projects as of December 2014, the initial Windsor Efficiency PAYS pilot supported with Better Buildings Program funding administered by the Sonoma County Regional Climate Protection Agency had installed PAYS projects in 231 single family homes and 233 multifamily units as of December, 2014."	Noted. We will make this change.
80	BayREN	45	Third bullet: Replace the paragraph as follows: The BayREN and PG&E Multifamily programs target the exact same populations, but with different measure mix offerings. While their implementation plans indicate service to any multifamily building, the Consultant Team heard that BayREN has experienced significant participation by market-rate multifamily complexes while PG&E has primarily served low-income (affordable) complexes. This may be due to differences in program design. BayREN's Multifamily program allows customers to utilize program-provided	We discussed the factual aspects of this information with BayREN and adjusted the language somewhat.

#	Commenter	Page	Comment	Evaluator's Response
			technical staff and a streamline assessment process, while PG&E requires participants to invest in an in-depth upfront assessments by a participating Rater (subsidized with an assessment incentive)."	
81	BayREN	50	After: "Within the program and through an on-bill financing arrangement, customers can pay for new energy- or water-savings devices by adding payments for the chosen devices cost to their water bills." Insert: "Eligible devices must be approved by the sponsoring water agency."	Noted. We will make this change.
82	BayREN	50	Comment re: "The two energy savings devices included in PAYS are high-efficiency shower heads and faucet aerators." - Hayward is also allowing Common Area Lighting and Hot Water System Upgrades (pipe wrap, demand controllers, etc.)	We will add a qualifier to the report. We had checked the website for both Hayward and Windsor just prior to finalizing the draft. Since then the Hayward website now lists the values you indicate, but they were not present at the time of our writing.
83	BayREN	50	Edit to footnote: Replace" PAYS is a financing program supported by water agency funding whereby savings from both water- and energy-saving devices, which the program expects to be equal to the financed cost of the devices." with " PAYS is an on-bill financing program supported by water agency funding whereby savings from both water- and energy-saving devices are estimated to significantly exceed program charges used to repay the financed cost of the devices."	We will make the change.
84	BayREN	61	The first bullet refers to *post*-approval program launch efforts and not pre-approval proposals. The text is confusing appearing under the heading of "Becoming New Program Administrators".	Noted. We will change this to be "Learning to be a Program Administrator"

#	Commenter	Page	Comment	Evaluator's Response
85	BayREN	63	customer targeting; not customers targeting	The only place we see "customers targeting" is on page 32. It makes sense to change to "customer targeting" on this page, though, and we will do so.
86	BayREN	66	(last paragraph). Providing EE financing options is not part of the Home Upgrade Advisor's scope of work for BayREN. Accordingly, request deletion of the last phrase of the last sentence starting with "although the Home Upgrade Advisor had a more moderate...."	After further discussions with BayREN, there is no change needed.
87	BayREN	66	First sentence of first para: request change, based on Table 39: "The frequency of customer communications with the Home Upgrade Advisor varies from less than once per month, to multiple times per week."	We will make the change.
88	BayREN	72	3rd to last paragraph fist sentence is not correct. If a member agency representative decided to withdraw from BayREN, programs would still be available to residents of that county, although marketing and outreach would be curtailed since much of this work is done by the member agency	Thank you for the clarification. We will adjust this sentence to appropriately indicate that programs would be available, but M&O would be curtailed.
89	BayREN	Appendix 1	Replace "The BayREN PAYS program provides on-bill financing for water saving measures via a charge on the customer's water bill." with: "The BayREN PAYS® program provides on-bill financing for water saving and energy saving measures via a charge on the customer's water bill."	Since this is the first instance of PAYS showing up in the appendix, we will add in the trademark. Also, please see our response to comments 50 and 52.
90	BayREN	Appendix 1	Edit "The energy savings for the program come from 1) direct on-site energy savings from reduced water heating or pumping, and 2) embedded energy saved by the local water utility from avoided water treating and pumping. " –> "The energy savings for the program come from 1) energy efficiency measures, 2) direct on-site energy savings from reduced water heating or pumping, and 3) embedded energy saved by the local water utility from avoided water treating and pumping. "	We will add in energy efficiency measures as requested.

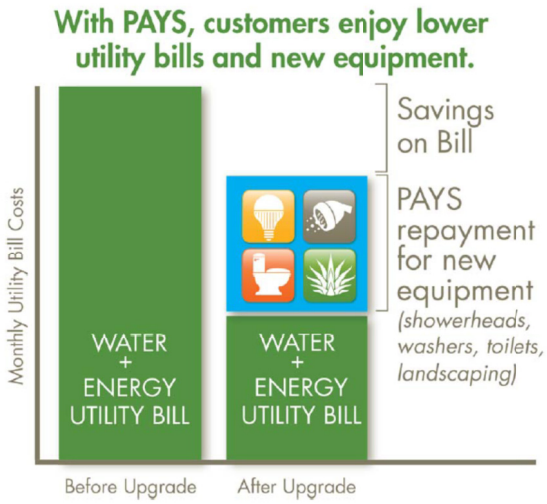
#	Commenter	Page	Comment	Evaluator's Response
91	BayREN	Appendix 1 + 2	Update all "WEPAYS" to Windsor Efficiency PAYS. WEPAYS connotes something very different from the meaning of PAYS - ("we pay" vs. "Pay As You Save")	We will make the change.
92	BayREN	Appendix 1	Replace: "The program also offers hot water recirculation pumps as a co-pay measure for customers willing to pay a portion of the cost upfront. The WEPAYS commercial landscaping pilot provides weather-based irrigation control (WIBIC) system retrofits, pressure reducing valves, as well as irrigation system leak and spray-head repair." with "The program also offers hot water recirculation pumps as a co-pay measure for customers willing to pay a portion of the cost upfront. Windsor Efficiency PAYS had installed PAYS projects in 231 single family homes and 233 multifamily units as of December, 2014. The Windsor Efficiency PAYS commercial landscaping pilot provides weather-based irrigation control (WIBIC) system retrofits, pressure reducing valves, as well as irrigation system leak and spray-head repair. "	Because the PAYS projects were not funded under the BayREN funding (see comment 79 above), we will not add in the number of projects here. The information has been added via a footnote earlier in the report.

Appendix B. PAYS PROGRAM INFORMATION

This information describes the program in more detail that within the main body of the study report. The documentation herein is from implementer information, the Internet, and knowledge of the Consultant Team regarding CPUC decisions.

The BayREN PAYS® program provides on-bill financing for water saving and energy saving measures via a charge on the customer's water bill. The energy savings for the program come from 1) energy efficiency measures, 2) direct on-site energy savings from reduced water heating or pumping, and 3) embedded energy saved by the local water utility from avoided water treating and pumping.

Figure 1: Illustration of how PAYS bill savings occur



Source: RCPA PAYS Overview 11/25/2014

Participants must be customers of both the energy utility (PG&E) and a water utility offering the program. BayREN PAYS has three participating water utilities: the Town of Windsor, East Bay Municipal Utility District, and the City of Hayward. The Town of Windsor was the first to begin implementing the program.

Windsor Efficiency PAYS Measures

The Windsor Efficiency PAYS program has a residential and a commercial component. The residential offering, began in 2014, provides indoor plumbing fixtures and outdoor turf conversation to drought-tolerant landscapes for single family and multi-family customers. Indoor measures include high-efficiency showerheads, low-flow toilets, faucet aerators, and CFLs. The program also offers hot water recirculation pumps as a co-pay measure for customers willing to pay a portion of the cost upfront. The Windsor Efficiency PAYS commercial landscaping pilot provides weather-based irrigation control (WIBIC) system retrofits, pressure reducing valves, as well as irrigation system leak and spray-head repair. [1]

For both residential and commercial customers, the combined energy and water bill savings must substantially exceed the cost of the retrofit. The table below shows the cost of typical residential measures, bi-monthly finance surcharge, payback period (surcharge duration), and bi-monthly savings estimate.

[1] Windsor Efficiency PAYS website. http://www.townofwindsor.com/index.aspx?nid=819. Accessed 7/9/15.

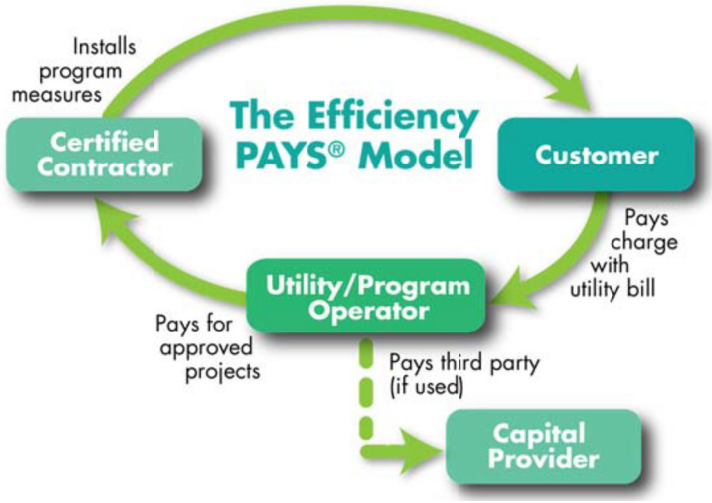
Figure 2: Typical cost estimates for Windsor Efficiency PAYS residential customers (Source: Windsor Efficiency PAYS FAQS: 5/27/15)

ESTIMATED WINDSOR EFFICIENCY PAYS® COSTS AND SAVINGS	Total Installed Measure Cost[1]	Co-pay	Bi-Monthly Surcharge	Surcharge Duration	Average Bi-Monthly Estimated Savings[2]	Average Bi-Monthly Estimated Net Savings[2]
Basic						
High-efficiency toilet, shower-head, and two (2) aerators	$334.56	$0.00	$7.78	10 years	$15.90	$8.12
Basic Plus						
Compact fluorescent light (ea.)	$5.18	$0.00	$0.20	5 years	$1.71	$1.51
Drought-resistant landscaping[3] (assumes 1,000 square feet)	$2,650.00	$0.00	$37.26	15 years [2]	$49.66	$12.40
Co-Pay						
Hot water-recirculation pump	$160.00	$75.00	$3.36	5 years	$4.72	$1.36

[1] Reflects known program costs as of July 1, 2013.
[2] PAYS® upgrade measures have been selected to provide an estimated minimum of $1.00 in savings on your utility (water and energy) bill for every $0.75 of PAYS® surcharge. Exact savings will vary among participants and is dependent upon the accuracy of self-reporting usage estimates.
[3] Landscaping package offers savings, and so is billed, only during the summer season.

Windsor Efficiency PAYS financing model

Figure 3: Illustration of PAYS financing model



Source: RCPA PAYS Overview 11/25/2014

In addition to participating water utility partner, the BayREN PAYS program requires a 1) program operator, 2) capital provider, 3) pool of certified contractors. Participating contractors are trained to only undertake PAYS projects that will "produce enough customer bill savings to cover the costs of installation, financing, and program management." An independent program operator typically supports the utility with contractor oversight and project quality assurance activities to ensure proper measure installation and provide for data tracking and reporting. The utility may use internal resources, or a third-party capital provider, to fund the up-front costs of measures. All program costs are paid back over time by the customer.[2]

[2] RCPA PAYS Overview 11/25/2014.

- A certified contractor markets the PAYS system, identifies qualifying measures for each project, installs those measures, and is paid by the utility upon successful installation.
- The customer pays monthly charge as long as they remain at the premises and the product functions.
- The utility uses a program operator to provide oversight, bills PAYS charges, collects payments from customers with PAYS measures, and coordinates repayment to internal account or the capital provider

Water-energy nexus

The CPUC has identified the water-energy nexus as an area of programmatic synergy where additional knowledge and testing is needed. The 2013-2014 portfolio guidance decision directs the energy utilities to pursue "new or expanded efforts" towards the "expansion of cost-effective water-energy nexus programs" in the 2015+ timeframe. The CPUC instructs the utilities to target small and medium sized utilities since they are "the least likely to make system improvements without IOU-assisted intervention," and emphasizes the need to focus on industrial and agricultural customers.

Since the adoption of D.12-05-015 in 2012, California has found itself in one of the worst droughts in its history. In 2015, the Governor issued an Executive Order calling for mandatory water restrictions for urban customers. The focus on urban water use has resulted in more opportunity for water-energy nexus programmatic offerings in the residential and commercial sectors. The BayREN PAYS program is an example of a leveraged response that satisfies multiple objectives, responding to the call for reduced urban outdoor water-use, using funds from the DOE Better Buildings Program for local government capacity building, and energy ratepayer funds to administer and implement the an embedded energy pilot effort.

Direction in D.12-05-015 on the water energy nexus

p.286, dicta	We now provide further guidance on new or expanded efforts. Overall, we expect that expanded programs should produce tangible savings through the investments being made.
p.287, dicta	in light of the potential for energy savings identified in the pilots, we will pursue three sets of activities during the 2013-2014 period to support the potential expansion of such programs in the 2015+ timeframe..... we ask the IOUs to note ways to accelerate the expansion of cost-effective water-energy nexus programs where possible.
p.288, dicta	The IOUs should focus their outreach to target small and medium sized water and wastewater utilities, since they are the least likely to make system improvements without IOU-assisted intervention
OP113, p. 423	shall include proposals in their 2013-2014 applications to increase targeting of **agricultural and industrial** customers.
OP114	shall propose to continue to offer measures and services to the water sector through their **calculated energy efficiency savings programs** in the 2013-2014 portfolio, as they currently do.
OP115	propose 2013-2014 efforts (either through limited, water sector focused pilot programs or through targeted efforts within the existing calculated savings programs) that go to **leak-loss detection and remediation**, and pressure management services for water entities that are utility customers.
OP116,	Commission Staff shall develop a robust record in the 2013-2014 application proceedings or in another energy efficiency rulemaking to identify potential cost-effective water-energy nexus efficiency programs, including **strategies to overcome barriers to adoption and deployment of the identified measures**.

Appendix C. MAPPING OF RESEARCH QUESTION RESULTS TO REPORT AREA

Table 1. Results Report Location by Value Research Question

Value Research Questions	Where Addressed in Report	Research Question Brief Answer
1) What overlap, if any, is occurring between the RENs programs and activities and IOU programs or activities?	4.1.1: Overlap with IOU Programs	Both program administrators target the same customers in their programs, but the RENs and IOUs have collaborated to differentiate their programs.
a) Do they fill a niche or provide additive benefit that is not provided by IOU program offerings?	4.1.1: Category 1 and 2	Yes, the RENs have provided additive benefit through more engagement within their technical assistance (Home Upgrade Advisor and Public Agency Program) as well as new software not provided by the IOUs (EEMIS).
b) Do they serve hard-to-reach markets?	4.1.1: Category 3	Yes, the RENs are doing their part to continue helping this segment become more energy efficient through work within the multi-family sector (which is a hard-to-reach sector) and bringing in bilingual Spanish speakers for outreach and marketing for the Home Upgrade program.
ci) How successful have the programs and activities been in terms of participation?	3: REN Progress	The goals in the report are two-year goals, although the RENs had only 18 months (3/4 of the time) in which to attempt to meet them due to delays. BayREN held close to the number of expected trainings within the Home Upgrade program and accomplished higher than expected savings in the Multifamily program. They held the expected number of code enforcement trainings (72) although the attendance was less than expected (469 versus 1650). No financing progress occurred compared to their performance metrics. SoCalREN performed a high level of outreach, but reached accomplishments in the single digits
cii) How many customers or constituents have participated in the programs or activities?	3: REN Progress	Varied by program
ciii) What was the expected rate of uptake for the programs or activities by the RENs and how well has the actual rate met that expectation?	See civ as received information from the same question in data collection instrument.	See below
civ) Have expectations about participation changed in the context of program roll-out?	This was not specifically in the report as it did not fit	Not specifically addressed in report, but staff indicated that: 1) they were unable to complete projects in 13-14 due to delays in

Value Research Questions	Where Addressed in Report	Research Question Brief Answer
	the structure.	CPUC approval 2) they were looking at ways to reduce a task due to reduced budgets 3) participation may be skewed from goals due to creating a unified approach with Home Upgrade 4) found less interest than expected in local governments and water agencies
cv) Have the RENs demonstrated a level of responsiveness or innovative approaches to customer service beyond those traditionally delivered by the IOUs? (SoCalREN and BayREN PAYS sub-pilots only)	4.2.2: Service Delivery	The RENs have provided technical expertise to customers unlike that of the IOUs. Both RENs help customers find the most appropriate program as they refer customers to the Advanced Home Upgrade program when necessary. SoCalREN and the IOUs agree that their offerings are distinct in terms of the level of engagement involved. For instance, the IOUs' technical assistance may address one piece of the process of developing energy efficiency projects, while SoCalREN provides assistance through the entire process. Additionally, one survey participant highlighted the different level of engagement that SoCalREN offers: *"They [the IOUs] do offer programs, but do not go above and beyond the way The Energy Network [SoCalREN] does."*
cvi) Is there cooperation and synergy between the IOUs and the RENs? What is the level of coordination?	4.2.1: Management of the RENs and Sub-Pilots	The RENs and the IOUs have coordinated well. They use on-going communication processes to manage services to the same customers and maintain differentiation in their offerings. They accomplished this through IOU and REN conversations that took place early on with great frequency and continue in a moderate effort. The RENs and IOUs meet monthly and often discuss technical details.
2) What are the goals of the programs or activities undertaken by the RENs?	3: REN Progress	These vary based on the program and a single program may have had several goals. See data in Section 3: REN Progress
3) What is the history of the programs or activities?	1.2 History of the RENs	In 2012, the California Public Utility Commission (CPUC) created two Regional Energy Networks (RENs) to administer energy efficiency programs in Northern and Southern California. The RENs grew out of past efforts by local governments through the federal American Recovery and Reinvestment Act of 2009 (ARRA) and were established by CPUC Decisions D.12-05-015 and D.12-11-015.
4) How are the programs or activities being implemented?	3: REN Progress	These vary based on the program and a single program may have had several goals. See data in Section 3: REN Progress
a) Where are the implementation of the programs or activities geographically located?	1.1 RENs Overview, Figure 1	BayREN is in the nine counties around San Francisco Bay; SoCalREN is a large part of Southern California, but not SDG&E.

Value Research Questions	Where Addressed in Report	Research Question Brief Answer
b) How are they marketed?	3: REN Progress	These vary based on the program and a single program may have had several goals. See data in Section 3: REN Progress
c) To whom are they marketed?	3: REN Progress	These vary based on the program and a single program may have had several goals. See data in Section 3: REN Progress
5) How do the costs associated with the non-resource programs and activities compare to the overall RENs portfolio of sub-pilots?	1.2.2 Budgets	BayREN garners energy and demand savings for two programs – Single Family and Multi-Family Energy Upgrade California Home Upgrade programs. These two program are 72% of their budget. SoCalREN garners energy and demand savings from the same two programs – Single Family and Multi-Family Energy Upgrade California Home Upgrade programs. These two program are 33% of their budget.

Table 2. Results Report Location by Effectiveness Research Objectives

Effectiveness Research Questions	Where Addressed in Report	
1) What are the pros and cons of the two RENs' implementation models?	Various	
a. What have been the areas of difficulty as the RENs have taken on their role as program administrators?	4.2.1: Ability to Mitigate Administrative Challenges	BayREN in particular faced challenges developing a REN model and decision-making processes that met the needs of all nine Bay Area member counties. According to BayREN staff, when internal conflicts between the counties arose early on, BayREN increased the transparency of its decision-making process by specifying county-specific governance roles. SoCalREN faced fewer challenges in this area, as it does not have to balance the needs of multiple counties to administer the REN. However, one SoCalREN staff member described the $250,000 upfront investment to develop the initial REN application as extraordinary relative to the available means of typical local agencies.
b. How do the RENs manage regulatory processes?	4.2.1: Ability to Navigate the Regulatory Environment	The RENs faced challenges related to delays decision-making and managing regulatory requirements. Both RENs indicated regulatory challenges but, where possible, seem to have navigated these challenges. For example, The BayREN's Multi-Family program had unexpectedly higher demand and could not serve all interested customers in 2013–2014 until they secured additional funding, an activity that took several months. Once secured, the program moved forward to

Effectiveness Research Questions	Where Addressed in Report	
		serve additional customers.
c. How do they manage their program managers/implementers?	1.2.3 Structure and Governance Model	BayREN operates under an "in-house" model in which ABAG acts as the REN Administrator and has signed nine distinct MOUs with each REN member county for funds disbursement. The BayREN makes decisions on programs and budgets by vote, with each member having equal voting rights. A majority of the Coordinating Circle constitutes a quorum with action taken by a majority vote of those present at a meeting. In addition, each program has its own decision-making committee. The Coordinating Circle is responsible for coordination of activities for all other local government jurisdictions within their county, especially with LGPs. Lead Links are appointed by the Coordinating Circle and are responsible for management of a single program. Program Circles, made up of volunteer members, provides input to the Lead Links on budget and implementation plans. Los Angeles County manages the SoCalREN through a "consultant" model in which the County of Los Angeles acts as the REN Administrator and employs the services of the consulting firms Bevilaqua Knight Inc. (BKI) and The Energy Coalition (TEC).[3] These firms are the prime contractors implementing the Home Upgrade - Energy Upgrade California (Home Upgrade) residential customer program and the Southern California Regional Energy Center (SoCalREC) public agency programs, respectively. The two firms jointly implement the financing program. The County of Los Angeles contracts with one other Los Angeles County agency to manage the Low Income Single Family Home Upgrade program and manages two other programs with UCLA and Emerald Cities Collaborative.
d. What are the pros of their administrative models?	4.3.3: Comparison of the REN Administrative Models	BayREN pros are: ▪ Involves multiple local governments, which supports increased local government capacity. ▪ Member voting means that each member matters in decision-making.

[3] The County of Los Angeles has been participating in energy efficiency for at least 10 years. In the 2004–2005 program cycle, they partnered with SCE and SoCalGas to retrofit 70 county buildings (Calmac ID SCE0226.01).

Effectiveness Research Questions	Where Addressed in Report	
		▪ Flexibility brought about by the accessibility within a short organizational structure supports quick changes to small program issues. ▪ When REN member counties are also an LGP, there is a natural synergy. SoCalREN pros are: ▪ Single decision-maker reduces time to make choices, although the advisory committee most likely is included in any large decision, which would have the potential to slow the process. ▪ Flexibility brought about by the accessibility within a short organizational structure supports quick changes to small program issues.
e. What are the cons of their administrative models?	4.3.3: Comparison of the REN Administrative Models	BayREN cons: BayREN members can withdraw from the REN with a 30-day notice to the other members. If this were to occur, customers would have a short period of notice that certain BayREN activities were no longer available to them and BayREN would spend time and money on rearranging where they can implement programs. If the withdrawing member were a Lead Link, it would be paramount to quickly move the implementation management to a new member, under the assumption that a member was able to support being a Lead Link. SoCalREN cons: As a single local government administration design, has no other specific organization to step in if there is a change in focus in the County of Los Angeles.
2. How do the RENs manage their programs?	1.2.3 Structure and Governance Model	See 1c above.
a. How many staff are included in the management of the portfolio and all other aspects of program administration?	4.2.1: Allocating Staff Resources to REN Activities	BayREN has 31.7 Full Time Equivalents (FTEs) across 43 people. 70% of the FTEs are for LG staff. SoCalREN has 39.5 FTEs across 48 people. 89% of the FTE are for implementing consulting staff.
b. Who is implementing the programs and how many staff are involved with each sub-pilot activity?	4.2.1: Allocating Staff Resources to REN Activities	BayREN has five implementation contractors and implements two programs on their own. Implementation consultants have 9.6 FTEs across 14 people.

Effectiveness Research Questions	Where Addressed in Report	
		SoCalREN has five implementing contractors (one of which is an arm of the County of Los Angeles). Two consulting firms (BKi and The Energy Coalition) perform the majority of implementation activities. Implementation consultants have 35 FTEs across 38 people.
c. How are decisions made when issues arise?	1.2.3 Structure and Governance Model 4.3.3: Comparison of REN Models	See item 1c
d. How well are they able to mitigate problems when they arise?	4.2.1: Ability to Mitigate Administrative Challenges 4.2.1: Ability to Navigate the Regulatory Environment 4.2.2: Ability to Mitigate Program Participant Challenges	RENs mentioned that the Home Upgrade Single-Family programs' designs required significant re-tooling. According to SoCalREN, in the initial design, the incentive levels were too low, the incentives calculations were too complicated, and the application process was too difficult for customers. To address this, SoCalREN developed more streamlined program requirements and incorporated simplified prescriptive rebates rather than custom incentive calculations. BayREN staff indicated that the Home Upgrade Single Family also had initial design issues. (As of the end of December 2014, the conversion rate for Home Upgrade moved from 4% in 2013 to 19% in 2014, while the conversion rate for the Advanced Home Upgrade moved from 23% in 2013 to 34% in 2014.)
e. How are the services delivered?	1.2.3 Structure and Governance Model	See item 1c above
f. How have delays or other issues (anticipated or not) affected implementation? How have the RENs attempted to mitigate these issues?	4.2.1: Ability to Mitigate Administrative Challenges 4.2.1: Ability to Navigate the Regulatory Environment	See b. and d. above.
g. Do the RENs' constituents consider the REN offerings to be well-serviced, sufficient and adequate?	4.2.2: Program Participant Satisfaction with REN Services	In the three programs assessed by the Consultant Team, REN participants are highly satisfied with the RENs' services. The water agencies that BayREN served through the PAYS program reported high satisfaction as all three rated BayREN's support as "very helpful." BayREN Home Upgrade Advisor participants indicated that their Advisor was capable of providing a high level of knowledge and expertise in most aspects of planning and implementing energy efficiency project. Working with the Home Advisor made a difference

Effectiveness Research Questions	Where Addressed in Report	
		for two-thirds (64%) of the homeowners. A very high proportion of Public Agency Program participants indicated receiving beneficial support from the SoCalREN program.
h. How effective do participating constituents rate the REN programs? Do they feel the REN programs could be improved or made more effective?	4.2.2: Constituent Satisfaction with REN Services	Improvements were not included in the report as this is more of a process question, but the information is below this table.
i. Are there differences within program funding allocation among the RENs local governments? If so, why?	1.2.2 Budgets	The report does not any differences why as this information was not specifically collected. However, there does not appear to be any specific funding allocation within either REN to local governments based on the knowledge of the Consultant Team.
j. How often do the RENs communicate with their constituent local governments? For those local governments that have IOU partnerships, is it more or less often than they communicate with the IOUs? (SoCalREN and BayREN PAYS only)	4.1.2 Local Government Engagement with RENs and IOUs	Local governments in REN and LGP territories tend to work with both the RENs and the IOUs. Although these are small numbers (i.e, qualitative findings that cannot be extrapolated across the entire population), there is a trend that when the LGPs do engage, it is less frequent with the RENs than with their respective IOU. However, consistent with the program design, this trend is not evident for SoCalREN Public Agency Participants, as these participants engage much more frequently with SoCalREN than they do the IOUs.
k. What offerings, if any, do the RENs provide in terms of capacity building for local governments?	4.1.2: REN Local Government Capacity Building	Public Agency Program participants said that the RENs help with build capacity among their staff by increasing their staffs' ability to improve energy efficiency within municipal buildings, with about the same number indicating a significant increase (7 of 18) as those indicating a slight increase (6 of 18). Local governments that belong to LGPs note a more moderate increase in this same capacity. Partner LGs that also work with or coordinate with the RENs have a greater capacity increase in bringing energy efficiency to local residents than Public Agency Program Participants. This is unsurprising given that the Public Agency Program intervention does not aim to increase residential energy efficiency. The BayREN PAYS also provides local governments with technical services, expertise, and resources such as contracts and marketing materials to water agencies. This fits under the first bullet point of the Global Development Center definition of capacity building, whereby water agency staff are given the knowledge to perform effectively, at least in the short term.

Effectiveness Research Questions	Where Addressed in Report	
I. What activities do the RENS encourage or discourage, if any, within the local government?	This was not specifically in the report as it did not fit the structure.	REN staff indicated they did not discourage any local government activities.

Details on Effectiveness Research Question 2h – improvements to the program.

Public Advisory Program Participants (n=28)

- 79% (22 of 28) indicated they had nothing to add about improvements to the program. The six comments received are shown verbatim next.
- The Energy Network could have better kept track of the projects and followed up with the consultant if a milestone was not being met (1 of 28).
- The Energy Network team has limited capacity to decide the types of projects they can support due to the regulations. I would like to have more support in measurement and verification. I also would like to see actual results of implemented projects like case studies. I also love to see whether they can give us advice on behavioral changes program. I love to implement behavioral change in energy consumption but want to show the savings quantified. I know that we cannot do anything like that. I hope that Public Utilities Commission supports this type of projects. (1 of 28).
- Tough to say…a lot of the time it seems like they are duplicating what is offered through the local government partnership programs with SCE and SoCalGas. (1 of 28).
- Coordinate regional procurement with similar projects. Work with SoCal specific JPA for procurement; [my city] has procurement criteria that prefer local vendors; preselect vendors to perform work or contract with ESCOs. (1 of 28).
- If they had more funding, they could help us fund detailed engineering and construction plans for projects. (1 of 28).
- Updates more often. (1 of 28)

Home Upgrade Advisor Participants (n=77)

- Seventy one percent of Home Advisor Participants had no suggestions. (55 of 77)
- More explanation on rebates and rebate options (7 of 77)
- Would like to have the Advisor available earlier in the process (2 of 77)

- More explanation on how the program works (2 of 77)
- Customer satisfaction ratings for contractors (2 of 77)
- Estimates on job costs (2 of 77)
- More assistance selecting contractors (1 of 77)

PAYS Water Agencies (n=3)

- Two of the three had no suggestions.
- One asked whether BayREN could come up with a cookie cutter program that could be most easily integrated.

Appendix D. DATA COLLECTION ACTIVITIES BY RESEARCH QUESTION

Secondary data collection and depth interviews with REN staff form the core of evaluation activities, addressing all research questions. The internet survey information addresses management of the RENs' sub-pilots based on the constituents' viewpoints. The table below shows the specific research questions and the data collection tasks.

Table 3: Data Collection Activities by Research Question

Research Question	Secondary Materials and Data Review	Depth Interviews with REN Staff	Depth Interviews with IOU Staff	Internet Surveys with Constituents
Research Questions to Inform Value				
1) What overlap, if any, is occurring between the REN sub-pilots and IOU programs or activities? Do they fill a niche or provide additive benefit that is not provided by IOU program offerings? *(all sub-questions included here, but not shown to simplify the table)*	☑	☑	☑	
2) What are the goals of the sub-pilots or activities undertaken by the RENs?	☑	☑		
3) What is the history of the sub-pilots or activities?	☑	☑		
4) How are the sub-pilots or activities being implemented? *(all sub-questions a through c included here, but not shown to simplify the table)*	☑	☑		
5) How do the costs associated with the non-resource sub-pilots and activities compare to the overall RENs portfolio of sub-pilots?	☑	☑		
Research Questions to Inform Effectiveness				
1) What are the pros and cons of the two RENs implementation models? *(all sub-questions a through e included here, but not shown to simplify the table)*	☑	☑		
2) How do the RENs manage their sub-pilots? *(all sub-questions a through k included here, but not shown to simplify the table)*	☑	☑		☑
Questions to Inform Policy				
1) Can or should the non-resource sub-pilot activities be scaled up or introduced to other areas of the state?	☑	☑		
2) Would allowing more duplication of programs among RENs and IOUs create healthy competition or would it lead to added consumer confusion, redundancy and waste?	☑	☑	☑	

Appendix E. REN STAFF DEPTH INTERVIEW GUIDE

Opinion Dynamics

Regional Energy Networks Value and Effectiveness Study
REN Staff Depth Interview Guide
December 8, 2014

FINAL

The Evaluation Team expects to conduct 20 in-person depth interviews with implementer and administrator staff at the Southern California Regional Energy Network (SoCalREN) and Bay Area Regional Energy Networks (BayREN). The Evaluation Team expects to conduct 14 of the interviews with BayREN staff while the remaining 6 interviews will be with staff from the SoCalREN. These numbers represent an additional four interviews from what is in the plan to ensure coverage of the entire set of implementers for BayREN.

The purpose of the interviews is to do the following:

- *Understand the goals of the RENs and how their sub-pilots are implemented*
- *Document and quantify overlap between REN sub-pilots and IOU programs*
- *Understand if duplication of programs between IOUs and RENs would create healthy competition or lead to increased customer confusion, redundancy, and waste*
- *Understand value of the targeted non-resource sub-pilots in terms of sub-pilot participation and uptake*
- *Understand sub-pilot metrics for targeted non-resource sub-pilots*
- *Understand if the existing Program Administrators should scale up the current targeted non-resource sub-pilots, if the current REN portfolios should have additional sub-pilots, or if the CPUC should allow other RENs within the overall energy efficiency portfolio.*

Depth Interview Guide

Interviewee: _____
Date: _____ Time Begun: _____

Introduction

While we recognize that your organization engages in multiple activities, for the purpose of the REN Value and Effectiveness Study we want to focus on the administration of the RENs and specific targeted sub-pilots. The evaluation team will be asking questions about the REN overall, interactions with local governments, possible overlap with IOU programs, challenges you may have encountered during the implementation of the program, and specific sub-pilots with which you have experience.

There may be questions shown below that are not relevant to your organization. However, if that is the case, we will simply read the question and skip any discussion point as needed.

Introduction

For those people we have not yet talked to, we would first like to understand:

- your current role within the REN,
- how long you have worked in any capacity within the REN, and
- if your role has changed over time within the REN or you expect it to change in the near future.

REN Administration

The evaluation team expects that we will ask the first two questions of only Jenny Berg and Howard Choy (or his designee), although other entities are welcome to add any comments on these questions if they so choose.

1. We are seeking additional specifics on the management of your REN to add to what we learned from our first interview.

    a. How does your REN manage implementation of the sub-pilots?
    b. For a given sub-pilot, are there differences in funding amounts that the REN provides to the local governments it serves? If so, why?
    c. All energy efficiency portfolios have unforeseen barriers or conflicts that arise over time. How do you make decisions when these types of issue arise?

2. From past filings, the RENs appear to have many different goals. We have past information received from Howard Choy (which covers both BayREN and SoCalREN goals, see Appendix A at the end of this guide). I would like to use it to help us understand:

    a. How you are tracking progress towards the goals? [discuss specific metrics if any]
    b. What specific data are you collecting and how frequently do you collect it to help track progress?

3. How many staff are responsible for contributing to the management of the REN portfolio and other aspects of program implementation? Specifically, we presented the implementation structure for the two RENs in the evaluation plan and repeated it here as Appendix B included at the end of this guide. We would like to assign an FTE staff (Full Time Equivalent) value to each of the boxes for Figure 5 (p. 41) and Figure 6 (p. 44).

Interactions with Local Governments

For some of the questions below, we have indicated "REN/sub-pilot" within the question. This is to allow us to differentiate the question depending on the role of the interviewed person. The REN

portfolio consists of the multiple sub-pilots, but we expect to obtain different perspectives on these questions based on to whom we are talking.

4. What offerings, if any, does your REN/sub-pilot provide for capacity building for local governments?

5. What activities does your REN/sub-pilot encourage or discourage, if any, within the local governments it serves?

6. How often and in what format does your REN/sub-pilot communicate with your broader constituent local governments [not just the ones identified in the evaluation plan]?

Overlap with IOU Programs

7. To your knowledge, does [IOU] have any programs with offerings similar to those of your REN and/or sub-pilots?

    a. Which IOU programs?
    b. Which elements are similar?
    c. Which elements are different?
    d. To your knowledge, has this led to confusion on the part of your customers?

8. Do the RENs fill a gap in IOU program offerings or provide a benefit not provided by the IOUs?

    a. If so, what is the gap or additional benefit?
    b. If there is a gap, how does the REN fill that gap?

9. The *Energy Efficiency Policy Manual* (v. 5) defines hard-to-reach residential customers as "those customers who do not have easy access to program information or generally do not participate in energy efficiency programs due to a language, income, housing type, geographic, or home ownership (split incentives) barrier." Hard-to-reach business customers also include factors such as business size and lease (split incentive) barriers.

    To your knowledge, does your REN/sub-pilot serve hard-to-reach customers? If so, which customer groups and in what capacity?

10. Please discuss the type and level of cooperation between your REN and the IOU in your area.

    a. What form does it take?
    b. What is the level of cooperation?
    c. Are there programmatic synergies that your REN and the IOUs are leveraging such as co-marketing?

Implementation Metrics and Challenges

11. How is your REN/sub-pilot tracking progress towards REN/sub-pilot program goals? Are there specific metrics that you are focusing on other than the Program Performance Metrics from the latest PIPs (included in Appendix C)?

    a. If so, what are these?
    b. How are you assessing the metrics and what data are you collecting?

12. Based on our experience, most programs have some implementation challenges.

a. Could you describe what has been most challenging for the implementation of the REN / sub-pilot?
b. If they affected the REN/sub-pilot, could you describe how?
c. How did you overcome them?

Regulatory Challenges

13. Please describe your involvement and experience with the regulatory processes [reporting, budget approval, start-up dates, etc.] to date.

14. How do you manage reporting requirements? Does this process differ for the sub-pilots?

15. Have you experienced any regulatory challenges?

    a. If so, what were they?
    b. If they affected the REN/sub-pilot, could you describe how?
    c. Are there aspects of these challenges that remain unresolved?

[For Implementers of the following Sub-Pilots only]

Implementer	Sub-Pilot Activity
The Energy Coalition	Regional Energy Center – Aggregated Regional Procurement
	Regional Energy Center – Integrated Comprehensive Whole Building Retrofits
	Regional Energy Center – Regional Climate Action and Energy Plan Support
	Regional Energy Center – Water-Energy Nexus
	Regional Energy Center – Regional Energy Project Tracking and Permitting
BKi (in BayREN area)	Financing – PAYS Water Efficiency Pilot
ICF International / Populus	Energy Upgrade California – Single Family – Home Upgrade Advisor

Sub-pilots

The next set of questions are for the sub-pilots in the table above.

16. Sub-pilot specific information:

    a. Could you describe your role in the implementation of this sub-pilot?

    b. What are the goals of these sub-pilots?
    c. What is the history of these sub-pilots?

17. Have expectations about participation changed in the context of sub-pilot rollout?

18. To whom do you market your sub-pilot and how do you market it?

19. Do the sub-pilots include innovative approaches or responsiveness to customer needs that differ from those delivered by the IOUs? [i.e. do they do anything "special" or bring different value to customers/local governments than the IOU programs?]

   a. If so, what are these approaches and how are they different?

20. As a sub-program implementer, in your view is the frequency of communication between you and the REN more or less often than what you know to be the frequency with which IOUs communicate with their local government partnership implementers?

21. Specifically for the sub-pilot(s) that we are discussing with you,

    a. What are your participation goals for the sub-pilot? How much uptake has there been for this sub-pilot(s) to date? Given current program activity, do you expect to reach those goals?
    b. Do you think the sub-pilot is worth expanding within the REN? [IF YES] Why and what would it take to scale up the sub-pilot? Do you think it would be worth expanding it outside of the REN? If so, how do you think that could occur?

Policy

22. Based on your experience so far, do you think the REN should:

    a. expand the current set of sub-pilots offered by the REN?
    b. grow the participation rates of the current suite of sub-pilots?

23. Should the CPUC allow for the addition of other RENs within California? If so, should they be distinctly different from the current RENs or should any new REN be able to take over existing REN sub-pilots? Should a new REN in a different location be able to replicate or borrow existing REN programs?

24. Would allowing duplication of energy efficiency programs offered to local governments by RENs and IOUs create healthy competition or would it lead to consumer confusion, redundancy and waste?

25. As you know, this is a targeted evaluation of a large and complex set of programs and activities. What aspects of the REN do you believe would benefit from further evaluation in the future if the Energy Division chose to expand the current assessment?

26. If you could share one or two things that the CPUC could do to improve the RENs' ability to achieve their proposed charter goals (outlined in Appendix A), what would they be?

Closing

27. Those are all the questions that I have for you today. Is there anything else that you think would be important for me to know about either your REN or the sub-pilots?

28. Would it be ok to contact you if we have any additional or follow-up questions?

Thank you very much for your time.

Time Ended: _____

APPENDIX A: REN GOALS

Below is an excerpt from the Motion filed by Los Angeles County and ABAG seeking authorization and funding for the SoCalREN and the BayREN. The evaluation team received this information from Howard Choy in August 2014. In it, he stated the information was a broad description of the RENs' overall objectives. The evaluation team added in underlines to easily find and discuss specific goals within this information.

REGIONAL ENERGY NETWORKS WILL INCREASE LOCAL GOVERNMENT PARTICIPATION IN ENERGY EFFICIENCY INITIATIVES

The goals of the RENs are to access untapped markets to drive greater reductions in energy use, meet or exceed final adopted cost-effectiveness measures, create jobs, and invest ratepayer funds for energy management benefits in local communities. RENs will be accountable to meet or exceed final cost-effectiveness criteria adopted by the Commission, and will achieve energy savings and other identified outcomes. Because RENs are managed by local governments, no shareholder incentives will be required.

The RENs will provide a one-stop shop for local governments to implement larger scale, cross-sector energy management strategies that complement and supplement services provided by existing utility local government partnerships. RENs will provide integrated energy management capabilities for local governments that include the following measures and activities:

Original List of Activities	Status of activities
Technical assistance, resources, expertise, capacity building;	
Regional aggregation of projects and energy management actions;	
Shared procurement and contracting approaches;	
Shared use of innovative technical tools, software, and systems;	
Regional financing programs for municipal and private building retrofit projects;	
Cost savings through collaborative joint funding and contracting mechanisms;	
Implementation of multi-jurisdictional projects encompassing underserved and low income customer segments;	
Mobilization of local resources and local vendors, creating local jobs and stimulating green economic activity; and	
Education, information and empowerment at a grassroots level to change individual energy behaviors and create energy accountability within communities.	

The RENs will provide specific services that include: residential, commercial, and municipal building retrofits; financing programs; implementation of energy/climate action plan projects through collective procurement and contracting for services; acceleration of reach codes and standards development and implementation; and community engagement for energy behavior change.

The RENs will expand the number of local governments participating in energy efficiency programs, creating better institutional capacity to undertake comprehensive energy management activities. Between the SoCalREN and the BayREN, more than two-thirds of California's population will have access to REN services. The RENs will be peer-driven organizations, where local governments assist and learn from one another.

APPENDIX B: REN AND SUB-PILOT ORGANIZATION

Figure 4: SoCalREN Management Structure

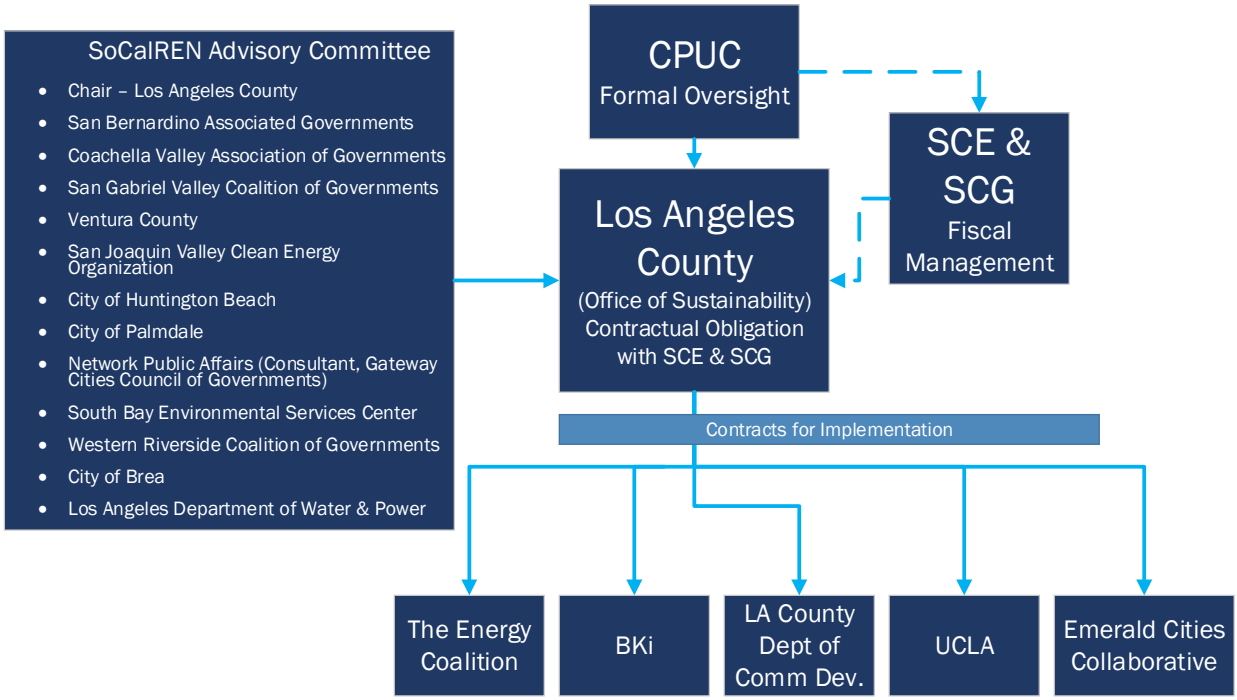


Table 4:SoCalREN Implementation Structure

Sub-pilot ID	Sub-pilot Description	BKi	The Energy Coalition	LA County - Office of Sustainability	LA County - County Community Development Commission / Public Housing Authority	UCLA[a]	Emerald Cities[a]
SCR-EUC	Energy Upgrade California						
SCR-EUC-A1	Local Marketing and Outreach	x					
SCR-EUC-A2	Green Building Labeling	x					
SCR-EUC-A3	Flex Path Incentives	x					
SCR-EUC-A4	Contractor Outreach and Training	x					
SCR-EUC-A5	Multi-family Incentives	x					
SCR-EUC-A6	Low-Income Single Family Residential				x		
SCR-FIN	Financing						
SCR-FIN-B1	Public Building Loan Loss Reserve		x				

Sub-pilot ID	Sub-pilot Description	BKi	The Energy Coalition	LA County - Office of Sustainability	LA County - County Community Development Commission / Public Housing Authority	UCLA[a]	Emerald Cities[a]
SCR-FIN-B2	EUC Residential Loan Loss Reserve	x					
SCR-FIN-B3	EUC Multi-family Loan Loss Reserve (not funded)						
SCR-FIN-B4	Non-Residential PACE	x					
SCR-FIN-B5	Public Agency Revolving Loan Fund		x				
SCR-REC	SoCalREC						
SCR-REC-C1	Aggregated Regional Procurement		x				
SCR-REC-C2	Integrated Comprehensive Whole Building Retrofits		x				
SCR-REC-C3	Regional Climate Action and Energy Plan					x	
SCR-REC-C4	Water-Energy Nexus		x				
SCR-REC-C5	Regional Energy Project Tracking and Permitting (CEEPMS)		x				
SCR-REC-C6	Marketing, Outreach, Education, and Training		x				
SCR-REC-C7	Workforce Development						x
[a] Managed by the Los Angeles County Office of Sustainability							

Figure 5: BayREN Management Structure

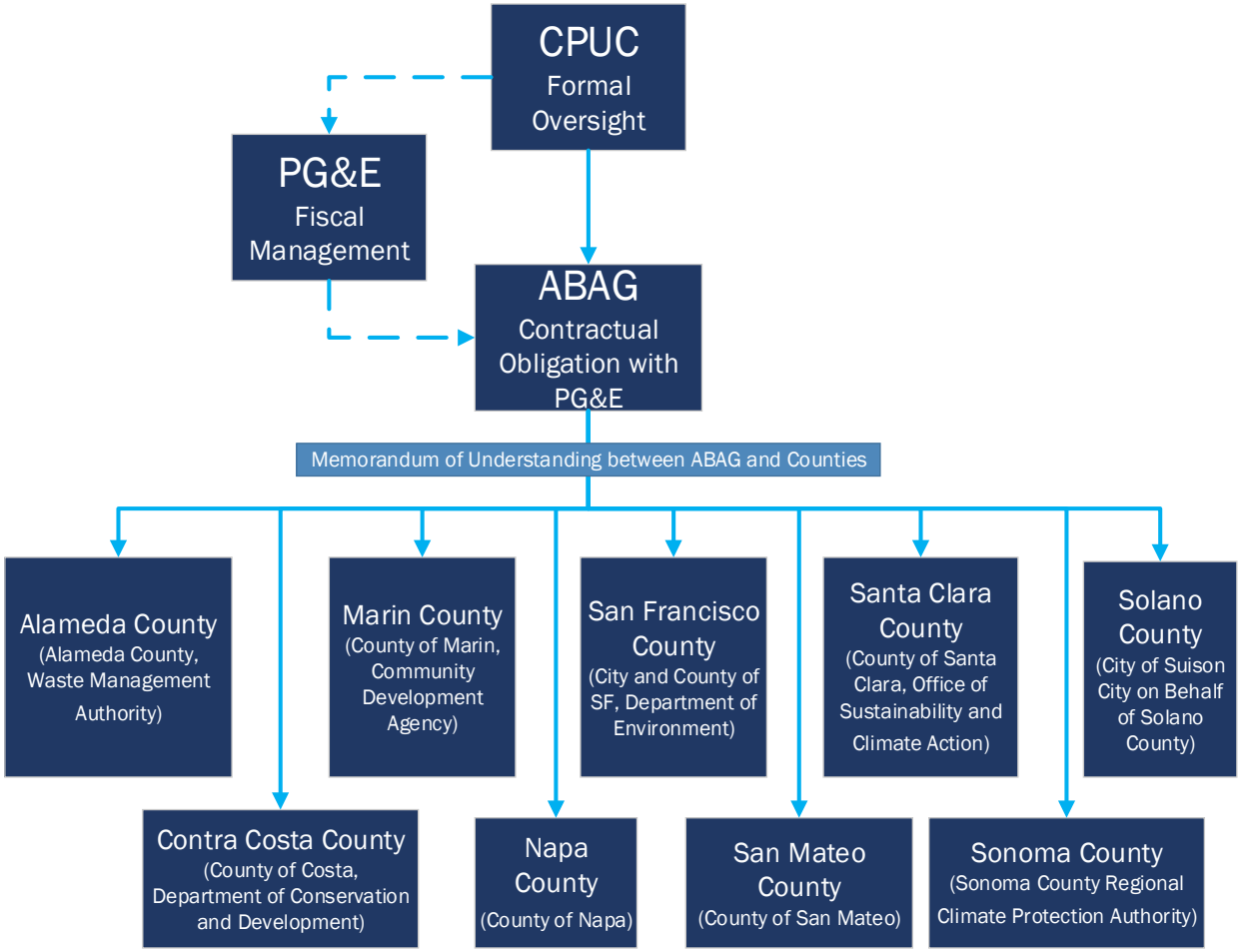
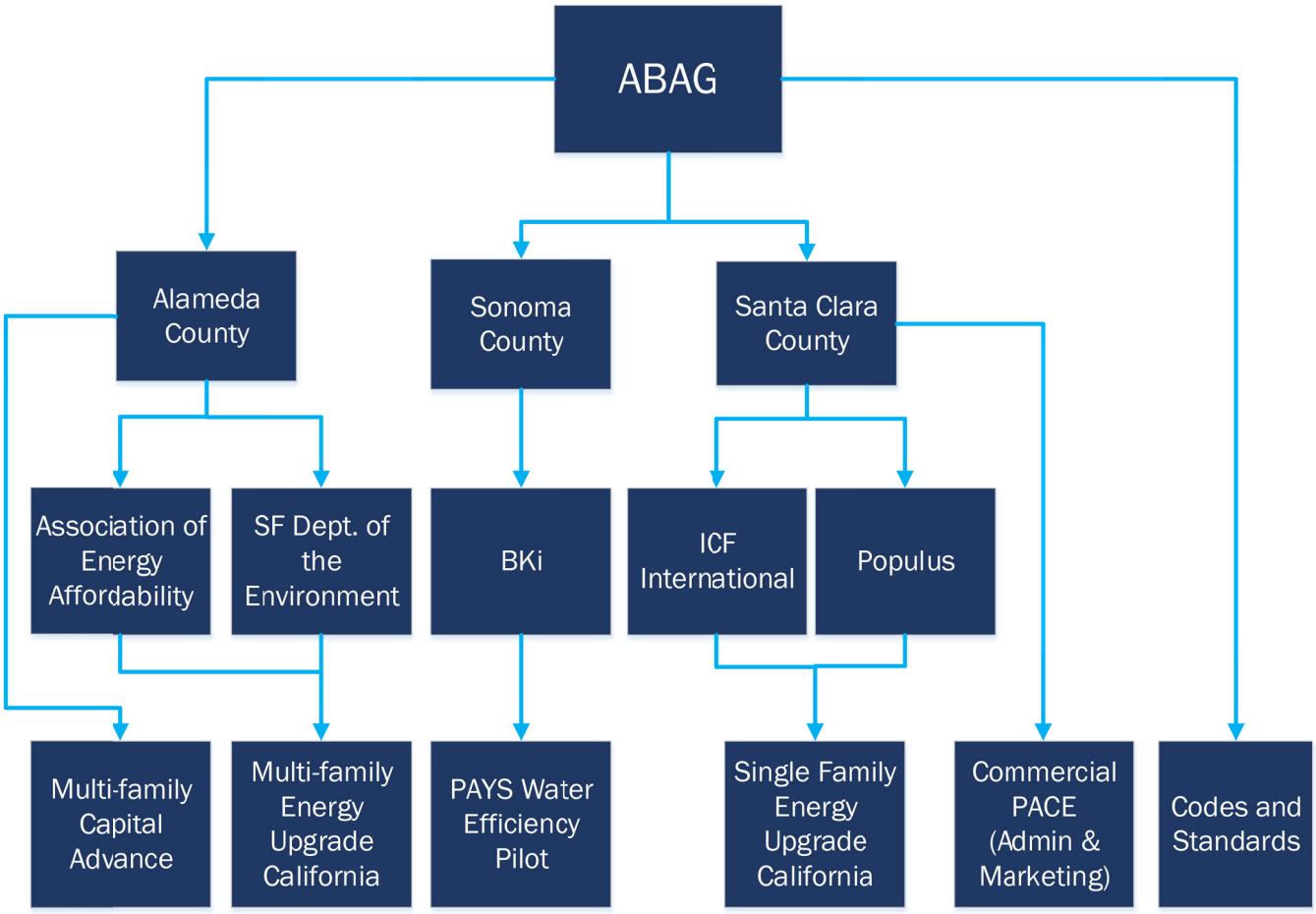


Figure 6: BayREN Program Lead Implementation Counties



Note: Single Family LLR was not approved by the CPUC and therefore is not represented in this figure

The evaluation team updated the figure above from the evaluation plan based on further conversations with BayREN in November. Specifically, we moved the arrow signifying the implementer for multi-family Capital Advance directly to Alameda County where previously we had connected the arrow to the Association of Energy Affordability and the SF Department of the Environment. Additionally, we learned recently that San Mateo will become the overseer of the Single Family Energy Upgrade California effort in 2015 and that San Francisco will oversee the Commercial PACE effort in 2015. We do not reflect these changes above, as they are not relevant to our current data collection effort that focuses on the current implementation teams.

APPENDIX C: REN PROGRAM METRICS

REN Program Performance Metrics
(Source: 2/24/14 Revised PIPs)

BayREN

BayREN01-Single Family Subprogram

BayREN01 Table 3: Quantitative Subprogram Targets (PPMs)

Target	2013	2014
Number of PG&E EUC-SF Advanced Package projects incented in the Bay Area	1,320	1,380
Number of audit incentives funded through BayREN	586	743
Number of participants in Home Upgrade Advisor Program	500	1,000
Number of trained Contractors and Real Estate Professional	125	125
Number of units incented through Flex Package (Home Upgrade)	360	2142
Percentage of Home Upgrade Advisor participants that complete a Flex Package(Home Upgrade) project	15	25

Target	2013	2014
Number of Participating Contractors who have completed one or more Flex Package (Home Upgrade) projects[14]	30	70

BayREN02 – Comprehensive Multi-Family Subprogram

BayREN02 Table 3: Quantitative Subprogram Targets (PPMs)

Target	2013	2014
Number of units incented	1,250	3,750
Number of multi-family contractors trained	25	25
Number of projects & units receiving technical assistance	75 projects 3,000 units	150 projects 6,000 units
Number of property owners reached by outreach activities	150	150

SoCalREN

Subprogram A: Energy Upgrade California

Table 3 (Subprogram A): Quantitative Subprogram Targets (PPMs)

Target	2013	2014
Number of homes or buildings treated	951 (Flex Path) +90 (MF)	1,425 (Flex Path) +90 (MF)
Number of units incented or rebated	2,378 (Flex Path) +4,000 (MF)	3,563 (Flex Path) +4,000 (MF)

Subprogram B: Financing

Table 3 (Subprogram B): Quantitative Subprogram Targets (PPMs)

Target	2013	2014
Number of homes or buildings treated	TBD	TBD
Number of units incented or rebated	TBD	TBD

Subprogram C: SoCalREC

Table 3 (Subprogram C): Quantitative Subprogram Targets (PPMs)

Target	2013	2014
Number of buildings treated	7	8
Number of units incented or rebated	7	8

Appendix F. IOU STAFF DEPTH INTERVIEW GUIDE

Opinion Dynamics

Regional Energy Networks Value and Effectiveness Study
IOU Staff Depth Interview Guide
January 2015

DRAFT FINAL

The Evaluation Team will conduct 9 in-person interviews with IOU staff to determine overlap between IOU and REN programs. These interviews will focus on areas of coordination between the IOU programs and the RENs across IOU core program areas such as EUC and ME&O.

Table 5: IOU Staff Overlap IDI Sample

PG&E	*SCE*	*SDG&E*
3-4	*3-4*	*2*

The purpose of the interviews is to:

- *Document and quantify potential overlap between REN sub-pilots and IOU programs*
- *Understand where collaboration has occurred with REN sub-pilots*
- *Understand if duplication of programs between IOUs and RENs would create healthy competition or lead to increased customer confusion, redundancy, and waste*

Depth Interview Guide

Introduction

This interview is part of an evaluation for the CPUC on the Value and Effectiveness of the Regional Energy Networks (RENs). The purpose of this interview is to understand the interaction between the IOU core programs and the REN in your area. The evaluation team will be asking questions about overlap between the IOU core programs and the REN offerings, collaboration between your IOU and the RENs, and whether customers may benefit from duplication of program offerings.

1. Please describe your role at your utility
    a. How long have you worked in this capacity?
2. As part of this role, have you had any interactions with your local REN?

Potential overlap with REN offerings

3. To your knowledge, does your utility have any programs with offerings similar to those of the REN in your area?

   a. Which IOU programs and REN offerings?
   b. Which elements are similar?
   c. Which elements are different?
   d. To your knowledge, has this led to confusion on the part of your customers?

4. Do the RENs fill a gap in IOU program offerings or provide a benefit not provided by the IOUs?

   a. If so, what is the gap or additional benefit?
   b. If there is a gap, how does the REN fill that gap?

5. The *Energy Efficiency Policy Manual* (v. 5) defines hard-to-reach residential customers as "those customers who do not have easy access to program information or generally do not participate in energy efficiency programs due to a language, income, housing type, geographic, or home ownership (split incentives) barrier." Hard-to-reach business customers also include factors such as business size and lease (split incentives) barriers.

   To your knowledge, does the REN in your area serve hard-to-reach customers? If so, which customer groups and in what capacity?

Collaboration with the RENs

6. Please discuss the type and level of cooperation between your utility and the REN in your area.

   a. What form does it take?
   b. What is the level of cooperation?
   c. Are there programmatic synergies that your REN and the IOUs are leveraging such as co-marketing?

7. How does your IOU's communication with your REN compare to your IOU's communication with your LGPs? [frequency, detail level, type]?

8. Is your utility collaborating with the RENs in other ways not already discussed?

Policy

9. Should the CPUC allow for the addition of other RENs within California? If so, should they be distinctly different from the current RENs or should any new REN be able to take over existing REN sub-pilots? Should a new REN in a different location be able to replicate or borrow existing REN or IOU programs? Should the existing RENs be able to replicate or borrow from the other existing REN or IOU programs?

10. Would allowing duplication of energy efficiency programs offered to local governments by RENs and IOUs create healthy competition or would it lead to consumer confusion, redundancy and waste?

REN/IOU Processes

11. Are you involved with how the REN attributes savings to various programs? If so, does the current process work well? What could improve the process if there are difficulties?

12. Do you know the contractual obligations of the REN to your IOU? If so, does the current arrangement work for you to understand if these obligations are being met? What could improve the process if there are difficulties?

Closing

Those are all the questions that I have for you today. Are there other topics we should cover that we have not already addressed?

Would it be ok to contact you if we have any additional or follow-up questions?

Thank you very much for your time.

Appendix G. BAYREN PAYS DEPTH INTERVIEW GUIDE

Opinion Dynamics

Regional Energy Networks Value & Effectiveness Study
BayREN PAYS Water Utility Staff Interviews
April 2015
Final

Introduction and Methods

The Consultant Team will field depth interviews with staff at three water utilities that have worked with the Bay Area Regional Energy Network (BayREN) to develop (design and implement) or enhance an existing Pay As You Save (PAYS) on-bill water and energy efficiency program.

The goals of these interviews are to:

1) Understand how well BayREN serves the water utility constituents in developing or enhancing a PAYS program.
2) Understand if the constituents perceive the REN offerings to be of significant benefit.

Participants include:

- The Town of Windsor (who has already designed and implemented a residential PAYS program and is enhancing it to include commercial customers),
- East Bay Municipal Utility District (EBMUD),
- City of Hayward

EBMUD and Hayward have not yet implemented a PAYS program. The types of assistance provided by BayREN vary from case to case.

Considering the small number of participants (three water utilities), the Consultant Team will collect data through depth interviews. This will allow us to more thoroughly understand the specific details and challenges of each water utility's experience. Given the unique situations each utility faces and the small respondent population size, data collected cannot be analyzed quantitatively (i.e., with any type of statistical significance). Rather, the Consultant Team will analyze and present data in a qualitative fashion.

We will invite all three utilities to complete the interviews (a census approach).

In January, we had expected to interview the residential customers of Windsor who had participated in the program. Subsequent conversations with BayREN when we requested contact names helped the Consultant Team recognize that BayREN had not supported implementation of initial Windsor Efficiency PAYS residential services, but is playing a part in enhancing the Windsor program and working with others to develop a PAYS program. We changed the targeted population of the interviews in mid-February.

Interviewee: _____

Date: _____

Start Time: _____

Water Utility Overview

"First I'd like to collect a little bit of information about your utility."

U1. How many residential meters are included in your service territory? How many commercial meters?

U2. What water efficiency rebates or financing does your utility currently offer to customers?

[A review of utility websites indicates the following measures are available. Confirm with respondents.]

- **Town of Windsor:** faucet aerators and showerheads; CFLs, toilet and clothes washer, water efficient landscaping all available through the PAYS program; (PG&E rebate available too for clothes washer)
- **EBMUD:** free faucet aerators and showerheads; toilet rebates; drought upgrades (conversion and irrigation); clothes washer rebates; (PG&E rebate available too for clothes washer); pre-rinse spray valve rebates; commercial water broom rebates
- **City of Hayward:** free faucet aerators and showerheads; toilet and clothes washer rebates (PG&E rebate available too for clothes washer); lawn conversion

Questions for Town of Windsor Only

W1. How long has Town of Windsor offered the residential PAYS program? What is the status of the commercial landscape program?

W2. Did someone from BayREN directly call you about potentially including a PAYS program in your service territory (or at least the commercial component)? If not, how did you hear about PAYS?

W3. How do you market the program to your customers?

- Does it vary between residential and commercial target audiences?

W4. How many residential sites have participated to-date? How many commercial?

W5. What measures are included (or do you expect to include) within the commercial landscape program?

W6. What motivated you to develop a PAYS program?

- What, if any, were the potential benefits that you considered?
- What, if any, were the potential drawbacks that you considered?
- Are you seeing any of the benefits or drawbacks play out as you implement the program?

Questions for EBMUD and City of Hayward Only

M1. Did someone from BayREN directly call you about potentially including a PAYS program in your service territory? If not, how did you hear about PAYS?

M2. Was your utility considering offering on-bill financing for water retrofits before knowing about PAYS and the services BayREN could provide?

M3. What motivated you to think about developing a PAYS program?

- What, if any, are the potential benefits to this type of program?
- What, if any, are the potential drawbacks to this type of program?
- If you fully implement a PAYS program, will you offer it to both residential and commercial customers?

M4. Considering that your utility already offers free or rebated water efficiency measures, what are the additional benefits of having a PAYS program, if any, for the utility and for your customers?

M5. Do you expect that a PAYS program would be well received among customers in your service territory? Why or why not?

M6. If you launched a PAYS program, how many residential customers do you expect to participate? How many commercial customers?

BayREN Support

"Now, I'd like to discuss how you work with BayREN and how that process has gone so far."

SP1. What type of support, if any, is BayREN providing to your utility for the design and implementation of a PAYS program?

- How helpful is the support provided by BayREN?
- If BayREN were not available to provide this support, what do you think would be different?

SP2. Aside from BayREN's services around the PAYS program, is the BayREN providing additional support of any type to your utility? If so, what is the specific support BayREN provides?

- How helpful is the additional support provided by BayREN?
- If the BayREN was not available to provide this support, what do you think would be different?

SP3. BayREN PAYS is tasked with saving energy while you are attempting to save water. Where do you see these two activities converge and where do they diverge?

SP4. Have you encountered any challenges while…

- Designing a PAYS program?
- Implementing a PAYS program?
- If so, please describe the challenges you experienced
- Have you been able to overcome any of these challenges? Do you expect to?

[IF ENCOUNTERED CHALLENGES]

SP5. Did BayREN staff attempt to help you address the challenge(s) you mentioned?

[IF BAYREN STAFF ATTEMPTED TO HELP]

SP6. How helpful were program staff in addressing the challenge(s) you mentioned?

SP7. Considering all we've discussed, has your experience designing and implementing a PAYS program met your expectations?

- Why or why not?
- What could be improved?

SP8. Is there anything else you would like to tell me about your experiences with BayREN that we have not discussed?

"Thank you for your time."

End Time: _____

Appendix H. BAYREN HOME UPGRADE ADVISOR DATA COLLECTION INSTRUMENT

Opinion Dynamics

Regional Energy Networks Value & Effectiveness Study
Internet Survey of BayREN Home Upgrade Advisor Participants
April 06, 2015
FINAL

Introduction and Methods

The Consultant Team will field an internet survey to residential customers that participated in one of the activities of the Bay Area Regional Energy Network (BayREN) Home Upgrade sub-pilot – the Home Upgrade Advisor. (Note: Within the survey, we use the term "Program" rather than "sub-pilot" for simplicity and refer to the advisor as a Home Upgrade Advisor.) Through this sub-pilot, a Home Upgrade Advisor supports residential customers through the planning, procurement, and implementation processes for Home Upgrade (HU) or Advanced Home Upgrade (AHU) retrofit projects. While the customer may participate in either a HU or AHU, we make no distinction in this survey between the two. The goals of this survey are to:

3) *Understand how well the Home Upgrade Advisor portion of this sub-pilot is serving residential customers.*
4) *Understand if the customers perceive the Home Upgrade Advisor offerings to be of significant benefit.*

We will send an email link for the survey to all participants who have worked with a Home Upgrade Advisor and have a completed home upgrade. We will work with the CPUC, BayREN, and CLEAResult staff to construct an introductory statement in the email that will help customers understand the legitimacy of the survey request, and provide a name and contact information if the customer has questions about the survey itself. We will also include contact information for Opinion Dynamics if the customer experiences technical difficulties in completing the survey. The email will contain a link to the internet survey that is unique to each individual. Each participant will have up to two reminder emails sent (if they have completed the survey, they will not receive a reminder). We plan to keep the survey in the field for two weeks. The participants will be able to start and stop the survey as needed. Table 6 *below shows the sample size and fielding approach.*

Table 6: Home Upgrade Advisor Internet Survey Sample and Targets

Number of Participants with Valid E-mails	Target Number of Completes	Fielding Approach
238	All	Census

Read-ins

[STAGE]: Reads-in a specific participation stage

a) "planning a home upgrade"

b) "finding a contractor to complete a home upgrade"

c) "completing a home upgrade"

Introduction

"Thank you for agreeing to participate in our survey. We are an independent third-party research company retained by the State of California to gauge customer satisfaction and promote quality control to ensure prudent spending of public monies on energy efficiency programs. Your responses will be kept confidential and your identity will not be revealed. We will start by asking you about your experience interacting with the professional who advised you on your energy efficiency project. We will refer to this professional by the label applied by the State, which is a "Home Upgrade Advisor." If you have only a short amount of time right now, you may complete part of the survey and come back to it where you left off when you have more time."

I1. Do you recall working with a Home Upgrade Advisor?

01. Yes [SKIP TO M1]
02. No

I2. To help jog your memory, the BayREN Home Upgrade Advisor would have provided support and assistance during the Home Upgrade Program process and/or provided you with information about your recent residential energy efficiency project. This person may have helped you find a contractor for your home upgrades, reviewed estimates and/or energy assessment reports with you, assisted with the rebate process, or simply discussed other possible ways to save energy. Do you recall these discussions?

01. Yes [SKIP TO M1]
02. No

I3. Is there anyone else in the household that could answer these questions?

01. Yes
02. No [TERMINATE "Thank you for your time. Unfortunately, we cannot include you in this survey."]

[ASK IF I3=01, THEN TERMINATE]

I4. Please provide this person's name and contact e-mail. [OPEN END]

Motivation

"First, we would like to understand a bit more about why you chose to complete a home upgrade. You may have done one or more upgrades within your home such as adding insulation, installing a new furnace or air conditioner, sealing your ducts, or replacing your light bulbs with very efficient LEDs. "

M1. How important were each of the following factors in motivating you to take actions to complete home upgrades? [Scale of 0 to 10, 0 = "Not at all important", 10 = "very important", ROTATE]

a. Reducing your energy usage
b. Saving money on your energy bills
c. Improving the comfort of your home

d. Addressing health and safety issues in your home
e. Improving the air quality in your home
f. Reducing the environmental impact of your home
g. Increasing the value of your home
h. Replacing failing or broken equipment
i. Incentives available from PG&E
j. Incentives available from BayREN
k. Assistance from a Home Upgrade Advisor
l. The home energy assessment you received

M2. Are there any other reasons that prompted you to make home upgrades? [OPEN END; 96="No other reasons"]

M3. What motivated you to work with a Home Upgrade Advisor? [OPEN END, 96="No comment"]

Home Upgrade Advisor Interaction

"Thanks for that feedback. Now let's focus on how you worked with your Home Upgrade Advisor."

P1. Thinking about the time when you had the most interaction with your Home Upgrade Advisor, how often did you communicate with that person? Please respond for each of the methods below. (01=Multiple times per week; 02=Once per week; 03=Multiple times per month; 04=Once per month; 05=Less than once per month; 96=Never; 98=Don't know)

a. Phone
b. E-mail
c. In-person

[ASK IF ANY P1a-c<98]

P2aa. How satisfied are you with how often you communicated with your Home Upgrade Advisor? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied"]

[ASK IF ANY P1a-c<98]

P2ba. Could you briefly explain why you give that rating? [OPEN END, 96="Nothing to add"]

[ASK IF ANY P1a-c<98]

P2ab. How satisfied are you with the types of information you received while communicating with your Home Upgrade Advisor? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied"]

[ASK IF ANY P1a-c<98]

P2bb. Could you briefly explain why you give that rating? [OPEN END, 96="Nothing to add"]

[LOOP ONCE FOR EACH STAGE]

[START LOOP]

P3a-c. Did you encounter any challenges while [STAGE]?

01. Yes
02. No
98. Don't know

[ASK IF P3=01]

P4a-c. Please describe the challenges you experienced. [OPEN END, 96="Nothing to add"]

P5a-c. Were you working with a Home Upgrade Advisor while [STAGE]?

01. Yes
02. No
98. Don't know

[ASK IF P3=01]

P6a-c. Were these challenges something where a Home Upgrade Advisor could have helped?

01. Yes
02. No
98. Don't know

[ASK IF P5=01 AND P6=1, ELSE END LOOP]

P7a-c. Did your Home Upgrade Advisor attempt to help you overcome these challenges?

01. Yes
02. No
98. Don't know

[ASK IF P7=01]

P8a-c. How helpful was your Home Upgrade Advisor in overcoming these challenges? [0-10, where 0 is "not at all helpful" and 10 is "extremely helpful", 98="Don't know"]

[ASK IF P8<98]

P8a_a-c. Could you briefly explain why you give that rating? [OPEN END, 96="Nothing to add"]

[END LOOP]

P9. How would you rate your Home Upgrade Advisor's knowledge of the following? (0 to 10, where 0 is "not at all knowledgeable" and 10 is "completely knowledgeable", 97="Not Applicable", 98="Don't know") [ROTATE OPTIONS, EXCEPT FOR THE LAST OPTION]

a. Ways households can reduce their energy use in general
b. The specific retrofit needs of your home
c. The retrofit options available to you through the Home Upgrade Program
d. How to develop a plan for energy efficiency retrofits
e. How to select the right contractor for energy efficiency retrofits
f. Energy efficiency financing options available to you
g. The Home Upgrade rebate process
h. The Home Upgrade participation process overall

P10. Which of the following options best applies to your Home Upgrade Advisor's ability to meet your needs while participating in the program?

01. Completely met my needs
02. Met my needs most of the time
03. Met my needs some of the time
04. Did not meet my needs at all
98. Don't know

[ASK IF P10=02, 03, 04]

P11. Please briefly describe why you say that. [OPEN END, 96="Nothing to add"]

P12. What ways, if any, could your Home Upgrade Advisor improve the support they provide to customers like you? [OPEN END, 96="Nothing"]

P13. How satisfied are you with your Home Upgrade Advisor for each of the following? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied", ROTATE]

a. Helpfulness
b. Knowledge
c. Responsiveness
d. Professionalism
e. Ability to answer questions so you could understand them

Program Benefits

B1. Which of the following benefits, if any, would you credit to your time spent with your Home Upgrade Advisor? Please select all that apply. [MULTIPLE RESPONSE, ROTATE OPTIONS 01 to 07]

01. Increased knowledge of ways to save energy within your home
02. Increased knowledge of energy efficiency financing options available to you
03. Increased knowledge of the benefits of energy measures suggested for your home
04. A greater understanding of energy use in your home
05. Increased satisfaction with the home upgrade process
06. Increased likelihood to participate in the Home Upgrade Program
07. Increased reassurance of the qualifications of your contractor
96 None of the above
98. Don't know

B2. What benefits, if any, have you experienced by participating in the Home Upgrade Program? (Note: For this question, please think about the Program itself, not your experiences with the Home Upgrade Advisor) [OPEN END, 96="No benefits", 98="Don't know"]

B3. Thinking about your participation in the Home Upgrade Program, if you had not worked with a Home Upgrade Advisor, what, if anything, do you think would be different in your home upgrade? [OPEN END, 96="Nothing to add"]

Interaction with PG&E

"Multiple companies deliver the Home Upgrade Program. PG&E provided the rebate you received for your home upgrades and the BayREN provided your Home Upgrade Advisor. We have a few questions about the rebate process to understand your level of satisfaction with that portion of the program."

E1. How satisfied are you with the following? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied"; 96="Not applicable"] [ROTATE OPTIONS]

a. The amount of time it took to receive the rebate.
b. The total amount of the rebate.

E2. Is there anything you would like to tell us about any interactions you had with PG&E regarding your home upgrades? [OPEN END, 96="Nothing to add"]

E3. As we mentioned earlier, both the BayREN and PG&E were involved in providing you with the Home Upgrade Program. Did you understand the roles that PG&E and BayREN played within this program?

01. Yes

02. No
98. Don't Know

E4. As you think about your experience in the program, which of the following best describes your opinion of this program being shared by PG&E and BayREN?

01. Very confusing
02. Somewhat confusing
03. Not at all confusing
96. Not applicable

[ASK IF E4<96]

E5. Why do you say that? [OPEN END, 96="Nothing to add"]

Segmentation

"You are almost done. We have just a few final questions about your household."

[The questions beginning with the letter "G" feed into the algorithm that allows CCSE to segment into California's five existing marketing segments and the wording cannot change since they must be consistent with the algorithm.]

G1. Has your household ever taken the following actions? [ROTATE, RECORD 01=Yes, 02=No, 98=Don't Know]

a. Installed programmable thermostats in your home?
b. Installed a vent in your attic area to keep the attic cooler?
c. Installed ceiling fans?
d. Installed motion detectors for your lights? (This includes outside lighting.)

G2. A carbon footprint is a measure of the energy you use throughout your life, either directly or indirectly. This includes but is not limited to the energy consumption from your home, your transportation, your diet, and your purchases. Have you heard of a carbon footprint before today?

01. Yes
02. No
98. Don't Know

G3. How much do you agree or disagree with the following statements: [1 to 7 where 1 is "strongly disagree" and 7 is "strongly agree", 98=Don't Know]

a. I do NOT feel responsible for conserving energy because my personal contribution is very small.
b. I compare prices of at least a few brands before I choose one.

G4. Below are 6 reasons why people might change their daily actions to save energy. Which of these would motivate you the MOST? [Have a note come up if the respondent attempts to pick more than one option that states: "Please just pick the one choice that fits you best. There is no right or wrong answer."]

01. Saving money
02. Health
03. Protecting the environment
04. For the benefit of future generations
05. Reducing our dependence on foreign oil
06. Helping California lead the way on saving energy
08. Don't know

C1. Those are all our questions for you. Is there anything else you would like us to know about? [OPEN END, 96="Nothing to add"]

"Thanks again for taking the time to complete this survey. Have a great day!"

Appendix I. BayREN Home Upgrade Advisor Survey Disposition and Frequencies

Disposition	N
Total Emails Sent	239
Completes (may include partials used in analysis)	75
Bounce Backs	5
Known Ineligibles (replied with reason)	0
Known Ineligibles (screened out)	0
Refused (replied but refused)	2
Mid-interview Terminates	22
No Response	135
Eligible	234
Ineligible	5

Response Rate: AAPOR RR1 = 32%

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Table QP1A1 Page 1
Jun. 12, 2015

Do you recall working with a Home Upgrade Advisor?

	Total
Total	77 100.0%
Yes	75 97.4%
No	2 2.6%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A2 Page 2
Jun. 12, 2015

The BayREN Home Upgrade Advisor provided support and assistance during the Home Upgrade Program process and/or provided you with information about your recent residential energy efficiency project. This person may have helped you find a contractor for your home upgrades, reviewed estimates and/or energy assessment reports with you, assisted with the rebate process, or simply discussed other possible ways to save energy. Do you recall these discussions?

	Total
Total	2
	100.0%
Yes	2
	100.0%
No	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A3 Page 3
Jun. 12, 2015

Is there anyone else in the household that could answer these questions?

	Total
Total	-
Yes	-
No	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A4 Page 4
Jun. 12, 2015

Please provide this person's name and contact-email

Total

BayREN Home Upgrade Advisor Survey 2015

Table QP1A5 Page 5
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Reducing your energy usage

	Total
Total	77 100.0%
0 - Not at all important	-
1	-
2	1 1.3%
3	1 1.3%
4	-
5	1 1.3%
6	2 2.6%
7	3 3.9%
8	16 20.8%
9	16 20.8%
10 - Very important	37 48.1%
Mean	8.90

BayREN Home Upgrade Advisor Survey 2015

Table QP1A6 Page 6
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Saving money on your energy bills

	Total
Total	77 100.0%
0 - Not at all important	1 1.3%
1	-
2	2 2.6%
3	-
4	4 5.2%
5	2 2.6%
6	1 1.3%
7	7 9.1%
8	11 14.3%
9	15 19.5%
10 - Very important	34 44.2%
Mean	8.42

BayREN Home Upgrade Advisor Survey 2015

Table QP1A7 Page 7
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Improving the comfort of your home

	Total
Total	77 100.0%
0 - Not at all important	1 1.3%
1	-
2	-
3	-
4	-
5	2 2.6%
6	1 1.3%
7	2 2.6%
8	15 19.5%
9	10 13.0%
10 - Very important	46 59.7%
Mean	9.09

BayREN Home Upgrade Advisor Survey 2015

Table QP1A8 Page 8
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Addressing health and safety issues in your home

	Total
Total	77
	100.0%
0 - Not at all important	8
	10.4%
1	3
	3.9%
2	3
	3.9%
3	1
	1.3%
4	4
	5.2%
5	8
	10.4%
6	5
	6.5%
7	9
	11.7%
8	10
	13.0%
9	7
	9.1%
10 - Very important	19
	24.7%
Mean	6.42

BayREN Home Upgrade Advisor Survey 2015

Table QP1A9 Page 9
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Improving the air quality in your home

	Total
Total	77 100.0%
0 - Not at all important	9 11.7%
1	2 2.6%
2	-
3	4 5.2%
4	1 1.3%
5	8 10.4%
6	5 6.5%
7	10 13.0%
8	13 16.9%
9	5 6.5%
10 - Very important	20 26.0%
Mean	6.58

BayREN Home Upgrade Advisor Survey 2015

Table QP1A10 Page 10
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Reducing the environmental impact of your home

	Total
Total	77 100.0%
0 - Not at all important	2 2.6%
1	-
2	2 2.6%
3	-
4	2 2.6%
5	5 6.5%
6	3 3.9%
7	10 13.0%
8	18 23.4%
9	8 10.4%
10 - Very important	27 35.1%
Mean	7.94

BayREN Home Upgrade Advisor Survey 2015

Table QP1A11 Page 11
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Increasing the value of your home

	Total
Total	77 100.0%
0 - Not at all important	8 10.4%
1	3 3.9%
2	1 1.3%
3	8 10.4%
4	4 5.2%
5	9 11.7%
6	7 9.1%
7	4 5.2%
8	8 10.4%
9	7 9.1%
10 - Very important	18 23.4%
Mean	6.06

BayREN Home Upgrade Advisor Survey 2015

Table QP1A12 Page 12
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Replacing failing or broken equipment

	Total
Total	77 100.0%
0 - Not at all important	12 15.6%
1	1 1.3%
2	-
3	4 5.2%
4	5 6.5%
5	2 2.6%
6	2 2.6%
7	3 3.9%
8	13 16.9%
9	7 9.1%
10 - Very important	28 36.4%
Mean	6.79

BayREN Home Upgrade Advisor Survey 2015

Table QP1A13 Page 13
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Incentives available from PG&E

	Total
Total	77 100.0%
0 - Not at all important	2 2.6%
1	1 1.3%
2	-
3	-
4	1 1.3%
5	4 5.2%
6	4 5.2%
7	7 9.1%
8	13 16.9%
9	10 13.0%
10 - Very important	35 45.5%
Mean	8.34

BayREN Home Upgrade Advisor Survey 2015

Table QP1A14 Page 14
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Incentives available from BayREN

	Total
Total	77 100.0%
0 - Not at all important	1 1.3%
1	1 1.3%
2	-
3	-
4	2 2.6%
5	1 1.3%
6	6 7.8%
7	8 10.4%
8	16 20.8%
9	11 14.3%
10 - Very important	31 40.3%
Mean	8.35

BayREN Home Upgrade Advisor Survey 2015

Table QP1A15 Page 15
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - Assistance from a Home Upgrade Advisor

	Total
Total	77 100.0%
0 - Not at all important	5 6.5%
1	2 2.6%
2	3 3.9%
3	2 2.6%
4	5 6.5%
5	6 7.8%
6	4 5.2%
7	9 11.7%
8	14 18.2%
9	8 10.4%
10 - Very important	19 24.7%
Mean	6.82

BayREN Home Upgrade Advisor Survey 2015

Table QP1A16 Page 16
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades? - The home energy assessment you received

	Total
Total	77 100.0%
0 - Not at all important	5 6.5%
1	-
2	1 1.3%
3	5 6.5%
4	2 2.6%
5	12 15.6%
6	5 6.5%
7	8 10.4%
8	8 10.4%
9	13 16.9%
10 - Very important	18 23.4%
Mean	6.91

BayREN Home Upgrade Advisor Survey 2015

Table QP1A17 Page 17
Jun. 12, 2015

Are there any other reasons that prompted you to make home upgrades?

	Total
Total	77 100.0%
Improving the comfort of your home	8 10.4%
Replacing failing or broken equipment	5 6.5%
Replacing old equipment	5 6.5%
Reducing your energy usage	3 3.9%
Saving money on your energy bills	2 2.6%
Reducing the environmental impact of your home	2 2.6%
Rebates available (general)	2 2.6%
Increasing the value of your home	1 1.3%
The home energy assessment you received	1 1.3%
Nothing to add	52 67.5%
Other	4 5.2%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A18 Page 18
Jun. 12, 2015

What motivated you to work with a Home Upgrade Advisor?

	Total
Total	77 100.0%
Wanted information on rebate options available	12 15.6%
Needed help understanding program processes	11 14.3%
Rebates (general)	9 11.7%
Needed help determining which upgrades were best for my home	9 11.7%
Independent/impartial/ unbiased consultation	8 10.4%
Wanted someone to provide expertise and advice on retrofits	6 7.8%
Needed help selecting a contractor	4 5.2%
Did not sign up for a Home Upgrade Advisor	4 5.2%
Recommendations from contractor	2 2.6%
Service was free of charge	2 2.6%
Needed help deciding whether to participate in the program	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A18 Page 19
Jun. 12, 2015
(Continued)

What motivated you to work with a Home Upgrade Advisor?

	Total
No comment	11 14.3%
Other	10 13.0%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A19 Page 20
Jun. 12, 2015

Thinking about the time when you had the most interaction with your Home Upgrade Advisor, how often did you communicate with that person? Please respond for each of the methods below. - Phone

	Total
Total	77 100.0%
Multiple times per week	3 3.9%
Once per week	13 16.9%
Multiple times per month	20 26.0%
Once per month	16 20.8%
Less than once per month	20 26.0%
Never	5 6.5%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A20 Page 21
Jun. 12, 2015

Thinking about the time when you had the most interaction with your Home Upgrade Advisor, how often did you communicate with that person? Please respond for each of the methods below. - E-mail

	Total
Total	77 100.0%
Multiple times per week	12 15.6%
Once per week	9 11.7%
Multiple times per month	35 45.5%
Once per month	13 16.9%
Less than once per month	8 10.4%
Never	-
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A21 Page 22
Jun. 12, 2015

Thinking about the time when you had the most interaction with your Home Upgrade Advisor, how often did you communicate with that person? Please respond for each of the methods below. - In-person

	Total
Total	77 100.0%
Multiple times per week	1 1.3%
Once per week	1 1.3%
Multiple times per month	5 6.5%
Once per month	8 10.4%
Less than once per month	15 19.5%
Never	45 58.4%
Don't know	2 2.6%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A22 Page 23
Jun. 12, 2015

How satisfied are you with your communication with your Home Upgrade Advisor?

	Total
Total	3 100.0%
0 - Extremely dissatisfied	-
1	-
2	-
3	-
4	-
5	-
6	1 33.3%
7	-
8	-
9	-
10 - Extremely satisfied	2 66.7%
Mean	8.67

BayREN Home Upgrade Advisor Survey 2015

Table QP1A23 Page 24
Jun. 12, 2015

Could you briefly explain why you give that rating?

	Total
Total	3 100.0%
Nothing to add	1 33.3%
Other	2 66.7%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A24 Page 25
Jun. 12, 2015

How satisfied are you with how often you communicated with your Home Upgrade Advisor?

	Total
Total	74 100.0%
0 - Extremely dissatisfied	-
1	-
2	-
3	-
4	1 1.4%
5	4 5.4%
6	1 1.4%
7	1 1.4%
8	9 12.2%
9	8 10.8%
10 - Extremely satisfied	50 67.6%
Mean	9.20

BayREN Home Upgrade Advisor Survey 2015

Table QP1A25 Page 26
Jun. 12, 2015

Could you briefly explain why you give that rating?

	Total
Advisor was very responsive/prompt	17 100.0%
Advisor was very knowledgeable/ informative	5 29.4%
Advisor was always available to help me	4 23.5%
Advisor was a good communicator/was polite or nice	3 17.6%
Advisor was very helpful	3 17.6%
Advisor was proactive/ eager in his communication	2 11.8%
Advisor answered all my questions	2 11.8%
Advisor did not bug me/ was not pushy	1 5.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A26 Page 27
Jun. 12, 2015

How satisfied are you with the types of information you received while communicating with your Home Upgrade Advisor?

	Total
Total	74 100.0%
0 - Extremely dissatisfied	-
1	1 1.4%
2	-
3	-
4	3 4.1%
5	2 2.7%
6	1 1.4%
7	3 4.1%
8	9 12.2%
9	12 16.2%
10 - Extremely satisfied	43 58.1%
Mean	8.92

BayREN Home Upgrade Advisor Survey 2015

Table QP1A27 Page 28
Jun. 12, 2015

Could you briefly explain why you give that rating?

	Total
Total	74 100.0%
Advisor was very knowledgeable/ informative	27 36.5%
Advisor was very helpful	8 10.8%
Advisor was a good communicator/was polite or nice	3 4.1%
Advisor did not communicate with me frequently	1 1.4%
Nothing to add	32 43.2%
Other	8 10.8%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A28 Page 29
Jun. 12, 2015

Did you encounter any challenges while planning a home upgrade?

	Total
Total	77 100.0%
Yes	37 48.1%
No	38 49.4%
Don't know	2 2.6%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A29 Page 30
Jun. 12, 2015

Please describe the challenges you experienced.

	Total
Total	39 100.0%
Challenges working with the contractor	10 25.6%
Challenges selecting a contractor	7 17.9%
Challenges determining which measures to install	7 17.9%
Process took a long time	6 15.4%
Didn’t fully understand program processes	4 10.3%
Project was too expensive/not worth the cost	3 7.7%
Challenges determining if I was getting a fair price from contractors	3 7.7%
Participating was expensive	2 5.1%
Contractor did not fully understand program	2 5.1%
Other	5 12.8%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A30 Page 31
Jun. 12, 2015

Were you working with a Home Upgrade Advisor while planning a home upgrade?

	Total
Total	77 100.0%
Yes	60 77.9%
No	14 18.2%
Don't know	3 3.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A31 Page 32
Jun. 12, 2015

Were these challenges something where a Home Upgrade Advisor could have helped?

	Total
Total	37 100.0%
Yes	17 45.9%
No	10 27.0%
Don't know	10 27.0%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A32 Page 33
Jun. 12, 2015

Did your Home Upgrade Advisor attempt to help you overcome these challenges?

	Total
Total	15 100.0%
Yes	14 93.3%
No	-
Don't know	1 6.7%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A33 Page 34
Jun. 12, 2015

How helpful was your Home Upgrade Advisor in overcoming these challenges?

	Total
Total	14 100.0%
0 - Extremely dissatisfied	-
1	-
2	-
3	-
4	-
5	-
6	1 7.1%
7	-
8	2 14.3%
9	1 7.1%
10 - Extremely satisfied	9 64.3%
Don't know	1 7.1%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A33 Page 35
Jun. 12, 2015
(Continued)

How helpful was your Home Upgrade Advisor in overcoming these challenges?

	Total
Mean	9.31

BayREN Home Upgrade Advisor Survey 2015

Table QP1A34 Page 36
Jun. 12, 2015

Could you briefly explain why you gave that rating?

	Total
Total	13 100.0%
Nothing to add	5 38.5%
Other	8 61.5%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A35 Page 37
Jun. 12, 2015

Did you encounter any challenges while finding a contractor to complete a home upgrade?

	Total
Total	77 100.0%
Yes	23 29.9%
No	54 70.1%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A36 Page 38
Jun. 12, 2015

Please describe the challenges you experienced.

	Total
Total	23 100.0%
Challenges selecting a contractor	14 60.9%
Challenges determining if I was getting a fair price from contractors	4 17.4%
Challenges working with the contractor	2 8.7%
Process took a long time	1 4.3%
Contractor did not fully understand program	1 4.3%
Project was too expensive/not worth the cost	1 4.3%
Challenges determining which measures to install	1 4.3%
Nothing to add	2 8.7%
Other	1 4.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A37 Page 39
Jun. 12, 2015

Were you working with a Home Upgrade Advisor while finding a contractor to complete a home upgrade?

	Total
Total	77 100.0%
Yes	53 68.8%
No	23 29.9%
Don't know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A38 Page 40
Jun. 12, 2015

Were these challenges something where a Home Upgrade Advisor could have helped?

	Total
Total	23 100.0%
Yes	11 47.8%
No	9 39.1%
Don't know	3 13.0%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A39 Page 41
Jun. 12, 2015

Did your Home Upgrade Advisor attempt to help you overcome these challenges?

	Total
Total	11 100.0%
Yes	11 100.0%
No	-
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A40 Page 42
Jun. 12, 2015

How helpful was your Home Upgrade Advisor in overcoming these challenges?

	Total
Total	11 100.0%
0 - Extremely dissatisfied	-
1	-
2	-
3	-
4	-
5	-
6	-
7	1 9.1%
8	2 18.2%
9	-
10 - Extremely satisfied	7 63.6%
Don't know	1 9.1%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A40 Page 43
Jun. 12, 2015
(Continued)

How helpful was your Home Upgrade Advisor in overcoming these challenges?

	Total
Mean	9.30

BayREN Home Upgrade Advisor Survey 2015

Table QP1A41 Page 44
Jun. 12, 2015

Could you briefly explain why you gave that rating?

	Total
Total	10 100.0%
Nothing to add	4 40.0%
Other	6 60.0%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A42 Page 45
Jun. 12, 2015

Did you encounter any challenges while completing a home upgrade?

	Total
Total	77 100.0%
Yes	27 35.1%
No	49 63.6%
Don't know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A43 Page 46
Jun. 12, 2015

Please describe the challenges you experienced.

	Total
Total	27 100.0%
Challenges working with the contractor	17 63.0%
Process took a long time	5 18.5%
Challenges selecting a contractor	1 3.7%
Project was too expensive/not worth the cost	1 3.7%
Challenges determining which measures to install	1 3.7%
Nothing to add	1 3.7%
Other	5 18.5%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A44 Page 47
Jun. 12, 2015

Were you working with a HUA when completing a home upgrade?

	Total
Total	77 100.0%
Yes	62 80.5%
No	14 18.2%
Don't know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A45 Page 48
Jun. 12, 2015

Were these challenges something where a Home Upgrade Advisor could have helped?

	Total
Total	27 100.0%
Yes	9 33.3%
No	12 44.4%
Don't know	6 22.2%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A46 Page 49
Jun. 12, 2015

Did your Home Upgrade Advisor attempt to help you overcome these challenges?

	Total
Total	8 100.0%
Yes	7 87.5%
No	-
Don't know	1 12.5%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A47 Page 50
Jun. 12, 2015

How helpful was your Home Upgrade Advisor in overcoming these challenges?

	Total
Total	7 100.0%
0 - Extremely dissatisfied	-
1	1 14.3%
2	-
3	-
4	-
5	-
6	2 28.6%
7	-
8	1 14.3%
9	-
10 - Extremely satisfied	3 42.9%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A47 Page 51
Jun. 12, 2015
(Continued)

How helpful was your Home Upgrade Advisor in overcoming these challenges?

	Total
Mean	7.29

BayREN Home Upgrade Advisor Survey 2015

Table QP1A48 Page 52
Jun. 12, 2015

Could you briefly explain why you gave that rating?

	Total
Total	7 100.0%
Nothing to add	3 42.9%
Other	4 57.1%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A49 Page 53
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - Ways households can reduce their energy use in general

	Total
Total	77 100.0%
0-Not at all important	2 2.6%
1	-
2	1 1.3%
3	2 2.6%
4	-
5	5 6.5%
6	-
7	10 13.0%
8	4 5.2%
9	12 15.6%
10-Very important	29 37.7%
Not applicable	9 11.7%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A49 Page 54
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - Ways households can reduce their energy use in general

	Total
Don't know	3
	3.9%
Mean	8.20

BayREN Home Upgrade Advisor Survey 2015

Table QP1A50 Page 55
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - The specific retrofit needs of your home

	Total
Total	77 100.0%
0-Not at all important	2 2.6%
1	-
2	-
3	1 1.3%
4	1 1.3%
5	7 9.1%
6	-
7	5 6.5%
8	4 5.2%
9	13 16.9%
10-Very important	25 32.5%
Not applicable	17 22.1%
Don't know	2 2.6%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A50 Page 56
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - The specific retrofit needs of your home

	Total
Mean	8.21

BayREN Home Upgrade Advisor Survey 2015

Table QP1A51 Page 57
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - The retrofit options available to you through the Home Upgrade Program

	Total
Total	77 100.0%
0-Not at all important	2 2.6%
1	-
2	-
3	1 1.3%
4	1 1.3%
5	2 2.6%
6	2 2.6%
7	3 3.9%
8	3 3.9%
9	17 22.1%
10-Very important	36 46.8%
Not applicable	5 6.5%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A51 Page 58
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - The retrofit options available to you through the Home Upgrade Program

	Total
Don't know	5
	6.5%
Mean	8.76

BayREN Home Upgrade Advisor Survey 2015

Table QP1A52 Page 59
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - How to develop a plan for energy efficiency retrofits

	Total
Total	77 100.0%
0-Not at all important	2 2.6%
1	-
2	2 2.6%
3	-
4	-
5	3 3.9%
6	1 1.3%
7	6 7.8%
8	6 7.8%
9	9 11.7%
10-Very important	24 31.2%
Not applicable	17 22.1%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A52 Page 60
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - How to develop a plan for energy efficiency retrofits

	Total
Don't know	7
	9.1%
Mean	8.23

BayREN Home Upgrade Advisor Survey 2015

Table QP1A53 Page 61
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - How to select the right contractor for energy efficiency retrofits

	Total
Total	77 100.0%
0-Not at all important	3 3.9%
1	-
2	-
3	1 1.3%
4	-
5	7 9.1%
6	4 5.2%
7	4 5.2%
8	4 5.2%
9	9 11.7%
10-Very important	34 44.2%
Not applicable	9 11.7%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A53 Page 62
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - How to select the right contractor for energy efficiency retrofits

	Total
Don't know	2
	2.6%
Mean	8.23

BayREN Home Upgrade Advisor Survey 2015

Table QP1A54 Page 63
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - Energy efficiency financing options available to you

	Total
Total	77 100.0%
0-Not at all important	6 7.8%
1	1 1.3%
2	-
3	-
4	1 1.3%
5	4 5.2%
6	2 2.6%
7	3 3.9%
8	3 3.9%
9	5 6.5%
10-Very important	17 22.1%
Not applicable	30 39.0%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A54 Page 64
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - Energy efficiency financing options available to you

	Total
Don't know	5
	6.5%
Mean	7.07

BayREN Home Upgrade Advisor Survey 2015

Table QP1A55 Page 65
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - The Home Upgrade rebate process

	Total
Total	77 100.0%
0-Not at all important	1 1.3%
1	-
2	-
3	-
4	-
5	1 1.3%
6	1 1.3%
7	2 2.6%
8	4 5.2%
9	12 15.6%
10-Very important	53 68.8%
Not applicable	2 2.6%
Don't know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A55 Page 66
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - The Home Upgrade rebate process

	Total
Mean	9.39

BayREN Home Upgrade Advisor Survey 2015

Table QP1A56 Page 67
Jun. 12, 2015

How would you rate your Home Upgrade Advisor's knowledge of the following? - The Home Upgrade participation process overall

	Total
Total	77 100.0%
0-Not at all important	1 1.3%
1	-
2	-
3	-
4	1 1.3%
5	2 2.6%
6	1 1.3%
7	3 3.9%
8	5 6.5%
9	16 20.8%
10-Very important	45 58.4%
Not applicable	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A56 Page 68
Jun. 12, 2015
(Continued)

How would you rate your Home Upgrade Advisor's knowledge of the following? - The Home Upgrade participation process overall

	Total
Don't know	2
	2.6%
Mean	9.12

BayREN Home Upgrade Advisor Survey 2015

Table QP1A57 Page 69
Jun. 12, 2015

Which of the following options best applies to your Home Upgrade Advisor's ability to meet your needs while participating in the program?

	Total
Total	77 100.0%
Completely met my needs	51 66.2%
Met my needs most of the time	20 26.0%
Met my needs some of the time	1 1.3%
Did not meet my needs at all	2 2.6%
Don't know	3 3.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A58 Page 70
Jun. 12, 2015

Please briefly describe why you say that.

	Total
Total	23 100.0%
Nothing to add	13 56.5%
Other	10 43.5%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A59 Page 71
Jun. 12, 2015

What ways, if any, could your Home Upgrade Advisor improve the support they provide to customers like you?

	Total
Total	77 100.0%
Completely satisfied	6 7.8%
More explanation on rebates	5 6.5%
More information on retrofit options	2 2.6%
Would like to have the Advisor earlier in the process	2 2.6%
More explanation of how the program works	2 2.6%
Estimates of job cost	2 2.6%
Customer satisfaction ratings for contractors	2 2.6%
More assistance selecting contractors	1 1.3%
Nothing/No suggestions	49 63.6%
Other	6 7.8%
Don’t know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A60 Page 72
Jun. 12, 2015

How satisfied are you with your Home Upgrade Advisor for each of the following? - Helpfulness

	Total
Total	77 100.0%
0-Extremely dissatisfied	-
1	-
2	1 1.3%
3	-
4	-
5	-
6	1 1.3%
7	2 2.6%
8	5 6.5%
9	15 19.5%
10-Extremely satisfied	53 68.8%
Mean	9.44

BayREN Home Upgrade Advisor Survey 2015

Table QP1A61 Page 73
Jun. 12, 2015

How satisfied are you with your Home Upgrade Advisor for each of the following? - Knowledge

	Total
Total	77 100.0%
0-Extremely dissatisfied	-
1	-
2	-
3	-
4	1 1.3%
5	2 2.6%
6	1 1.3%
7	2 2.6%
8	8 10.4%
9	13 16.9%
10-Extremely satisfied	50 64.9%
Mean	9.29

BayREN Home Upgrade Advisor Survey 2015

Table QP1A62 Page 74
Jun. 12, 2015

How satisfied are you with your Home Upgrade Advisor for each of the following? - Responsiveness

	Total
Total	77 100.0%
0-Extremely dissatisfied	-
1	-
2	1 1.3%
3	-
4	-
5	-
6	-
7	2 2.6%
8	5 6.5%
9	14 18.2%
10-Extremely satisfied	55 71.4%
Mean	9.51

BayREN Home Upgrade Advisor Survey 2015

Table QP1A63 Page 75
Jun. 12, 2015

How satisfied are you with your Home Upgrade Advisor for each of the following? - Professionalism

	Total
Total	77 100.0%
0-Extremely dissatisfied	-
1	-
2	-
3	-
4	-
5	-
6	1 1.3%
7	2 2.6%
8	5 6.5%
9	11 14.3%
10-Extremely satisfied	58 75.3%
Mean	9.60

BayREN Home Upgrade Advisor Survey 2015

Table QP1A64 Page 76
Jun. 12, 2015

How satisfied are you with your Home Upgrade Advisor for each of the following? - Ability to answer questions so you could understand them

	Total
Total	77 100.0%
0-Extremely dissatisfied	-
1	-
2	-
3	-
4	-
5	1 1.3%
6	1 1.3%
7	1 1.3%
8	5 6.5%
9	15 19.5%
10-Extremely satisfied	54 70.1%
Mean	9.52

BayREN Home Upgrade Advisor Survey 2015

Table QP1A65 Page 77
Jun. 12, 2015

Which of the following benefits, if any, would you credit to your time spent with your Home Upgrade Advisor? Please select all that apply.

	Total
Total	77 100.0%
Increased satisfaction with the Home Upgrade process	64 83.1%
Increased likelihood to participate in the Home Upgrade Program	59 76.6%
Increased knowledge of the benefits of energy measures suggested for your home	53 68.8%
Increased reassurance of the qualifications of your contractor	45 58.4%
Increased knowledge of ways to save energy within your home	43 55.8%
A greater understanding of energy use in your home	32 41.6%
Increased knowledge of energy efficiency financing options available to you	16 20.8%
None of the above	4 5.2%
Don’t know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A66 Page 78
Jun. 12, 2015

What benefits, if any, have you experienced by participating in the Home Upgrade Program? For this question, please think about the Program itself, not your experiences with the Home Upgrade Advisor.

	Total
Total	77 100.0%
Improved comfort in home	24 31.2%
Energy savings/lower energy bills	21 27.3%
Rebates	15 19.5%
Better understanding of home upgrade options available	13 16.9%
Increased energy efficiency in home	5 6.5%
Home is in improved condition/a better home	5 6.5%
Other feedback about Advisor	4 5.2%
A greater understanding of energy use in your home	3 3.9%
Increased reassurance of the qualifications of your contractor	3 3.9%
Better understanding/ confidence in the work being performed	3 3.9%
Home is more environmentally friendly/ ”green”	3 3.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A66 Page 79
Jun. 12, 2015
(Continued)

What benefits, if any, have you experienced by participating in the Home Upgrade Program? For this question, please think about the Program itself, not your experiences with the Home Upgrade Advisor.

	Total
Increased satisfaction with the home upgrade process	2 2.6%
No benefits	2 2.6%
Other	2 2.6%
Don't know	9 11.7%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A67 Page 80
Jun. 12, 2015

Thinking about your participation in the Home Upgrade Program, if you had not worked with a Home Upgrade Advisor, what, if anything, do you think would be different in your home upgrade?

	Total
Total	77 100.0%
Would not have done a home upgrade	9 11.7%
Would have felt less informed/knowledgeable	9 11.7%
Would have performed less extensive upgrade	9 11.7%
Would have had less confidence in the work performed/decisions made	8 10.4%
Participation would have taken longer	6 7.8%
Would not have received rebates	5 6.5%
Might have done upgrades that weren't the best choices for my home	5 6.5%
Would not have known how to proceed	2 2.6%
Would not have found as good of a contractor	2 2.6%
Would not have known how the program works	2 2.6%
Nothing to add	28 36.4%
Other	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A67 Page 81
Jun. 12, 2015
(Continued)

Thinking about your participation in the Home Upgrade Program, if you had not worked with a Home Upgrade Advisor, what, if anything, do you think would be different in your home upgrade?

	Total
Don’t know	2
	2.6%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A68 Page 82
Jun. 12, 2015

How satisfied are you with the following? - The amount of time it took to receive the rebate

	Total
Total	77 100.0%
0-Extremely dissatisfied	5 6.5%
1	2 2.6%
2	1 1.3%
3	4 5.2%
4	5 6.5%
5	10 13.0%
6	3 3.9%
7	9 11.7%
8	6 7.8%
9	9 11.7%
10-Extremely satisfied	22 28.6%
Not applicable	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A68 Page 83
Jun. 12, 2015
(Continued)

How satisfied are you with the following? - The amount of time it took to receive the rebate

	Total
Mean	6.79

BayREN Home Upgrade Advisor Survey 2015

Table QP1A69 Page 84
Jun. 12, 2015

How satisfied are you with the following? - The total amount of the rebate

	Total
Total	77 100.0%
0-Extremely dissatisfied	1 1.3%
1	-
2	1 1.3%
3	2 2.6%
4	2 2.6%
5	5 6.5%
6	3 3.9%
7	13 16.9%
8	11 14.3%
9	9 11.7%
10-Extremely satisfied	29 37.7%
Not applicable	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A69 Page 85
Jun. 12, 2015
(Continued)

How satisfied are you with the following? - The total amount of the rebate

	Total
Mean	8.01

BayREN Home Upgrade Advisor Survey 2015

Table QP1A70 Page 86
Jun. 12, 2015

Is there anything you would like to tell us about any interactions you had with PG&E regarding your home upgrades?

	Total
Total	77 100.0%
Rebate process took a long time	7 9.1%
PG&E staff were helpful/ satisfied with PG&E	5 6.5%
Did nto get enough feedback/information from PG&E	4 5.2%
Dissatisfied with rebate amount	2 2.6%
Had limited interaction with PG&E	1 1.3%
Did not see reduction in PG&E bill	1 1.3%
Did not interact with PG&E	59 76.6%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A71 Page 87
Jun. 12, 2015

As we mentioned earlier, both BayREN and PG&E are involved in providing you with the Home Upgrade Program. Did you understand the roles that PG&E and BayREN played within this program?

	Total
Total	77 100.0%
Yes	49 63.6%
No	18 23.4%
Don't know	10 13.0%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A72 Page 88
Jun. 12, 2015

As you think about your experience in the program, which of the following statements best describes your opinion of this program being shared by PG&E and BayREN?

	Total
Total	77 100.0%
Very confusing	6 7.8%
Somewhat confusing	34 44.2%
Not at all confusing	34 44.2%
Not applicable	3 3.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A73 Page 89
Jun. 12, 2015

Why do you say that?

	Total
Total	74 100.0%
Contractor/advisor helped me understand	15 20.3%
Program is confusing in general	11 14.9%
Generally dissatisfied with PG&E	8 10.8%
Had no problems/ everything was clear	7 9.5%
Didn't understand PG&E's processes	5 6.8%
Was not aware of PG&E's involvement	1 1.4%
Nothing to add	23 31.1%
Other	5 6.8%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A74 Page 90
Jun. 12, 2015

Has your household ever taken the following actions? - Installed programmable thermostats in your home?

	Total
Total	77 100.0%
Yes	64 83.1%
No	13 16.9%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A75 Page 91
Jun. 12, 2015

Has your household ever taken the following actions? - Installed a vent in your attic area to keep the attic cooler?

	Total
Total	77 100.0%
Yes	32 41.6%
No	42 54.5%
Don't know	3 3.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A76 Page 92
Jun. 12, 2015

Has your household ever taken the following actions? - Installed ceiling fans?

	Total
Total	77 100.0%
Yes	37 48.1%
No	40 51.9%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A77 Page 93
Jun. 12, 2015

Has your household ever taken the following actions? - Installed motion detectors for your lights? (This includes outside lighting.)

	Total
Total	77 100.0%
Yes	38 49.4%
No	39 50.6%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A78 Page 94
Jun. 12, 2015

A carbon footprint is a measure of the energy you use throughout your life, either directly or indirectly. This includes but is not limited to the energy consumption from your home, your transportation, your diet, and your purchases. Have you heard of a carbon footprint before today?

	Total
Total	77 100.0%
Yes	74 96.1%
No	3 3.9%
Don't know	-

BayREN Home Upgrade Advisor Survey 2015

Table QP1A79 Page 95
Jun. 12, 2015

How much do you agree or disagree with the following statements: - I do NOT feel responsible for conserving energy because my personal contribution is very small.

	Total
Total	77 100.0%
1 Strongly disagree	53 68.8%
2	12 15.6%
3	5 6.5%
4	-
5	1 1.3%
6	2 2.6%
7 Strongly agree	3 3.9%
Don't know	1 1.3%
Mean	1.71

BayREN Home Upgrade Advisor Survey 2015

Table QP1A80 Page 96
Jun. 12, 2015

How much do you agree or disagree with the following statements: - I compare prices of at least a few brands before I choose one.

	Total
Total	77 100.0%
1 Strongly disagree	3 3.9%
2	-
3	-
4	-
5	3 3.9%
6	17 22.1%
7 Strongly agree	52 67.5%
Don't know	1 1.3%
Refused	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A81 Page 97
Jun. 12, 2015

Below are 6 reasons why people might change their daily actions to save energy. Which of these would motivate you the MOST? Please just pick the one choice that fits you best. There is no right or wrong answer

	Total
Total	77 100.0%
Saving money	23 29.9%
Protecting the environment	23 29.9%
For the benefit of future generations	12 15.6%
Health	11 14.3%
Helping California lead the way on saving energy	5 6.5%
Reducing our dependence on foreign oil	2 2.6%
Don’t know	1 1.3%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A82 Page 98
Jun. 12, 2015

Those are all our questions for you. Is there anything else you would like us to know about?

	Total
Total	77 100.0%
Nothing to add	59 76.6%
Other	18 23.4%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A Page 99
Jun. 12, 2015

Thinking about the time when you had the most interaction with your Home Upgrade Advisor, how often did you communicate with that person? ALL modes

	Total
Total	231 100.0%
Multiple times per week	16 6.9%
Once per week	23 10.0%
Multiple times per month	60 26.0%
Once per month	37 16.0%
Less than once per month	43 18.6%
Never	50 21.6%
Don't know	2 0.9%

BayREN Home Upgrade Advisor Survey 2015

Table QP1A83 Page 100
Jun. 12, 2015

How important were each of the following factors in motivating you to take actions to complete home upgrades?

	Total
Improving the comfort of your home	77 9.09
Reducing your energy usage	77 8.90
Saving money on your energy bills	77 8.42
Incentives available from BayREN	77 8.35
Incentives available from PG&E	77 8.34
Reducing the environmental impact of your home	77 7.94
The home energy assessment you received	77 6.91
Assistance from a Home Upgrade Advisor	77 6.82
Replacing failing or broken equipment	77 6.79
Improving the air quality in your home	77 6.58
Addressing health and safety issues in your home	77 6.42
Increasing the value of your home	77 6.06

BayREN Home Upgrade Advisor Survey 2015

Table QP1A84 Page 101
Jun. 12, 2015

Summary of Satisfaction with Home Upgrade Advisor Communication

	Total
Total Respondants	77 100.0%
How satisfied are you with how often you communicated with your Home Upgrade Advisor?	74 9.20
How satisfied are you with the types of information you received while communicating with your Home Upgrade Advisor?	74 8.92

BayREN Home Upgrade Advisor Survey 2015

Table QP9A_1 Page 102
Jun. 12, 2015

Rating of Home Upgrade Advisor's Knowledge of...

	Total
Ways households can reduce their energy use in general	65 8.20
The specific retrofit needs of your home	58 8.21
The retrofit options available to you through the Home Upgrade Program	67 8.76
How to develop a plan for energy efficiency retrofits	53 8.23
How to select the right contractor for energy efficiency retrofits	66 8.23
Energy efficiency financing options available to you	42 7.07
The Home Upgrade rebate process	74 9.39
The Home Upgrade participation process overall	74 9.12

BayREN Home Upgrade Advisor Survey 2015

Table QP13A_1 Page 103
Jun. 12, 2015

Satisfaction with Home Upgrade Advisor on their....

	Total
Helpfulness	77 9.44
Knowledge	77 9.29
Responsiveness	77 9.51
Professionalism	77 9.60
Ability to answer questions so you could understand them	77 9.52

BayREN Home Upgrade Advisor Survey 2015

Table SEGMENT Page 104
Jun. 12, 2015

Table: SEGMENT

	Total
Total	77 100.0%
Striving Believers	17 22.1%
Leading Achievers	43 55.8%
Thrifty Conservers	6 7.8%
Practical Spenders	8 10.4%
Disconnected	3 3.9%

BayREN Home Upgrade Advisor Survey 2015

Appendix J. SoCalREN Public Agency Data Collection Instrument

Opinion Dynamics

Regional Energy Networks Value & Effectiveness Study
Internet Survey of Public Agency Program Participants
April 13, 2015
FINAL

Introduction and Methods

The Consultant Team will field an internet survey to local governments/agencies that participated in the Southern California Regional Energy Network (The Energy Network)'s Public Agency Program sub-pilot (note: within the survey we use the term "program" rather than "sub-pilot" for simplicity). Through this sub-pilot, public agencies receive technical assistance and project management services for project identification, energy use analysis, energy audits, design performance specifications, project financials, utility incentive application support, utility on-bill and other financing support, financial analysis, procurement assistance, and construction management support for energy efficient upgrades to municipal facilities and infrastructure. The goals of this survey are to:

1) Understand how well the RENs and the Public Agency Program sub-pilot are serving local government constituents.
2) Understand if the constituents perceive the REN offerings to be of significant benefit.

We will send an email link for the survey to all participants who have signed an agreement to work with The Energy Coalition through this program, regardless of how far they are within the process. For example, we will include local governments/agencies that indicated interest in a project or have designed a project but have not yet implemented it. Skips will align the survey questions to the furthest stage that the respondent has completed. We will work with the CPUC, The Energy Network, and The Energy Coalition staff to construct an introductory statement in the email to participants that will help customers understand the legitimacy of the survey request, and provide a name and contact information if the customer has questions about the survey itself. We will also include contact information for Opinion Dynamics if the customer experiences technical difficulties in completing the survey. The email will contain a link to the internet survey that is unique to each individual. Each participant will have up to two reminder emails sent (if they have completed the survey, they will not receive a reminder). We plan to keep the survey in the field for two weeks. The participants will be able to start and stop the survey as needed. Table 6 below shows the sample size and fielding approach.

Table 7: LGP Survey Sample and Targets

Number of Local Governments/Agencies in Sample	Target Number of Completes	Fielding Approach
53	ALL	Census

Note: Western Riverside County Regional Wastewater governs the Western Municipal Water District. Both are included in the count of 53, but have the same contact person. We have handled this person separately in this survey.

Flags

[AUDIT]: Indicates whether the organization has begun or completed an audit or had technical review of past audit of their facilities; 1=has completed an audit, 0=has not completed an audit

[DESIGN]: Indicates whether the organization has begun or completed project design performance specifications; 1=has begun/completed design, 0=has not begun design.

[INCENTIVE]: Indicates whether the organization has begun or received incentive application support; 1=has begun/received incentive application support, 0=has not begun incentive application support.

[FINANCE]: Indicates whether the organization has begun or received project finance support; 1=has begun/received finance support, 0=has not begun finance support.

[PROJECT]: Indicates whether the organization has begun or completed construction of a project; 1=has begun/completed construction, 0=has not begun construction.

[LGP]: Indicates whether the local government/agency is also part of a Local Government Partnership (LGP); 1=is part of an LGP, 0=is not part of an LGP. (Eighteen agencies are also part of an LGP and have the opportunity to respond to this survey as well as a different survey that is in place specifically for LGPs.)

[WMWD]: Flag to indicate this is the one person answering for two distinct entities

Read-ins

[DATE]: Enrollment date from program tracking database, month and year

[LGPNAME]: Name of the LGP if in an LGP

Introduction

"Thank you for your interest in taking our survey. We are an independent third party research company that will keep your responses anonymous. The State of California has retained our company to assure quality control and responsible spending by the energy efficiency programs as well as help improve this specific program. We will ask you about your organization's participation in The Energy Network's Public Agency Program, which is implemented by The Energy Coalition. Within this program, The Energy Network team (project managers and engineering firms) work side-by-side with your staff from project identification through construction to help your organization accomplish energy efficiency projects within your municipal facilities. Your comments will help improve the program.

You are the only person in your organization to receive this survey, so it is very important we hear from you. We expect the survey to take approximately 20-25 minutes. If you have only a short amount of time right now, you may complete part of the survey and come back to it where you left off when you have more time."

[IF WMWD=01, ELSE SKIP TO I1]

"We are aware that you represent both the Western Riverside County Regional Wastewater Agency and the Western Municipal Water District. For the purposes of this survey, please only think about the Western Riverside County Regional Wastewater Agency's participation in the program.

I1. Our records show that your organization enrolled in this Public Agency Program in [DATE]. Is that correct?

03. Yes [GO TO I3]
04. No
98 Don't know

I2. When do you think you enrolled? Please enter the date in this format: mm/dd/yyyy. If you do not know the exact day, please enter your best estimate for month and year and 01 for day. [OPEN END, 98="Don't know"]

I3. Do you recall enrolling or working with someone from The Energy Network team on energy efficiency projects?

01. Yes [GO TO I4a]
02. No
03. I am not familiar with the Public Agency Program
[ASK IF I3=02 or 03]

I4. Can you suggest a different person in your organization who should receive this survey?

01. Yes
02. No [TERMINATE: "Thank you for your time. Unfortunately, we cannot include you in this survey."]

[ASK IF I4=01]

I5. Please enter this person's name and contact e-mail. [OPEN END].

[IF I3=02, 03 TERMINATE]

"First, we would like to quickly learn a few things about your organization's participation in the Public Agency Program."

I4a. Which of the following activities has your organization either started or completed through the Public Agency Program? Please choose the best option for each line in the table. [Set specified flag for item in parentheses=1 for items B-G if option "started" or "completed" is chosen]

	Activity	Have not done this activity [01]	Started [02]	Completed [03]	Don't Know [98]
A	Analysis of facilities and infrastructure energy consumption	❍	❍	❍	❍
B	Energy audit on one or more of your facilities and/or streetlights [AUDIT]	❍	❍	❍	❍
C	Design performance specifications for one or more of your projects [DESIGN]	❍	❍	❍	❍
D	Financial analysis showing costs and savings for one or more of your projects [FINANCIAL ANALYSIS]	❍	❍	❍	❍
E	Incentive application for one or more of your projects [INCENTIVE]	❍	❍	❍	❍
F	Securing on-bill or other financing for one or more of your projects [FINANCE]	❍	❍	❍	❍
G	Construction of at least one energy efficiency upgrade project [PROJECT]	❍	❍	❍	❍

Motivations

"Next, we'd like to understand what motivated your organization to participate in the Public Agency Program."

M1. Please describe why your organization decided to participate in the program. [OPEN END, 96="No comment"]

M2a. To what extent has the program met your expectations thus far? Would you say…

01. The program has exceeded your expectations
02. The program has met all your expectations
03. The program has met most of your expectations
04. The program has met some of your expectations
05. The program has met none of your expectations

M4b. Please briefly explain why you provided the response you did. [OPEN END, 96="Nothing to add"]

Implementation

"Now, we'd like hear about your experiences participating in the Public Agency Program. As you answer these questions, please think about all staff that you may have worked with as you implemented activities. This can include The Energy Network staff or technical consultants."

P1. We know that activity for energy efficiency projects can go up and down. On average, how often do or did you communicate with The Energy Network team on the energy efficiency activities you just told us about? Please respond once for each of the communication types below.

Communication Type	Multiple times per week [01]	Once per week [02]	Multiple times per month [03]	Once per month [04]	Less than once per month [05]	Never [06]	Don't Know [98]
a. Phone	❍	❍	❍	❍	❍	❍	❍
b. e-Mail	❍	❍	❍	❍	❍	❍	❍
c. In-person	❍	❍	❍	❍	❍	❍	❍

[ASK IF ANY P1a-c<98]

P2a. How satisfied are you with your communication with The Energy Network team? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied"]

P2b. Please briefly explain why you provided the rating you did. [OPEN END, 96="Nothing to add"]

[PROGRAMMING NOTE LOOP THE FOLLOWING SECTION UP TO FIVE TIMES, ONCE FOR EACH STAGE SHOWN BELOW]

a. IF AUDIT=1, THEN LOOP 1: [STAGE]= "completing an audit or technical review of a past audit through the program"
b. IF DESIGN=1, THEN LOOP 2: [STAGE]= "completing design performance specifications through the program"
c. IF INCENTIVE=1, THEN LOOP 3: [STAGE]= "applying for utility incentives through the program"
d. IF FINANCE=1, THEN LOOP 4: [STAGE]= "applying for on-bill or other financing through the program"
e. IF PROJECT=1, THEN LOOP 5: [STAGE]= "completing construction of a project through the program"

[BEGIN LOOP]

P3a-e. Did your organization encounter any challenges while [STAGE]?

01. Yes
02. No [GO TO NEXT LOOP OR NEXT SECTION IF LAST LOOP]
99. Don't know
[IF P3a-e=01]

P4a-e. Please describe the challenges your organization experienced. [OPEN END, 96="Nothing to add"]

[IF P3a-e=01]

P5a-e. Were these challenges something The Energy Network team could have helped you with?

01. Yes
02. No
98. Don't know
[ASK IF P5a-e=01]

P6a-e. Did The Energy Network team attempt to help you overcome the challenges you mentioned?

01. Yes
02. No
99. Don't know
[ASK IF P6a-e=01]

P7a-e. How helpful was The Energy Network team in overcoming the challenges you mentioned? [0-10, where 0 is "not at all helpful" and 10 is "extremely helpful", 98="Don't know"]

[END LOOP]

P9. How would you rate The Energy Network team's knowledge of the following (0 to 10, where 0 is "not at all knowledgeable" and 10 is "completely knowledgeable", 98="Don't know"?) [ROTATE OPTIONS]

a. Ways public agencies can reduce their energy use
b. Financing options available to public agencies for energy efficiency upgrade projects
c. Utility rebates available to public agencies for energy efficiency upgrade projects
d. [IF AUDIT=1] Specific opportunities to perform energy efficiency upgrades
e. [IF DESIGN=1] Performance specifications for energy efficiency upgrade projects
f. [IF FINANCIAL ANALYSIS=1] Financial analysis for energy efficiency upgrade projects
g. [IF INCENTIVE=1] Applying for incentives for energy efficiency upgrade projects
h. [FINANCE=1] Applying for on-bill or other financing for energy efficiency upgrade projects
i. [IF DESIGN=1 OR PROJECT=1] Supporting procurement for energy efficiency upgrade projects

P10. How often did The Energy Network team meet your organization's needs while participating in the program?

01. All of the time
02. Most of the time
03. Some of the time
04. None of the time
99. Don't know
[ASK IF P10<98]

P11. Please briefly explain why you provided the response you did. [OPEN END, 96="Nothing to add"]

P12. What ways, if any, could The Energy Network team improve the support they provide to public agencies through the Public Agency Program? [OPEN END, 96="Nothing to add"]

Participation Process

[IF AUDIT=0]

PP1a. Does your organization plan to complete an audit or third party technical review through The Energy Network?

01. Yes
02. No
03. Maybe
98. Don't know

[IF PP1a=02]

PP1b. Why not? [OPEN END, 96="Nothing to add", 98="Don't know"]

[IF PP1a=03]

PP1c. What support, if any, could The Energy Network team provide to help you decide whether to complete an audit? [OPEN END, 97= "Nothing they can do", 98="Don't know"]

[IF AUDIT=1 AND PROJECT=0]

PP2a. Does your organization plan to move forward with implementing a project?

01. Yes
02. No
03. Maybe
98. Don't know

[IF PP2a=02]

PP2b. Why not? [OPEN END, 96="Nothing to add", 98="Don't know"]

[IF PP2a=03]

PP2c. What support, if any, could The Energy Network team provide to help you decide whether to move forward with the project? [OPEN END, 97= "Nothing they can do", 98="Don't know"]

Sub-pilot Satisfaction

SAT1a. How satisfied are you with the Public Agency Program overall? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied"]

SAT1b. Please briefly explain why you provided the rating you did. [OPEN END, 96="Nothing to add"]

Program Benefits

B1. Which of the following, if any, has your organization experienced from the support offered by The Energy Network team? Please select all that apply. [MULTIPLE RESPONSE, ROTATE OPTIONS 1-10]

01. Increased knowledge of ways to save energy within our organization
02. Increased knowledge of energy efficiency financing options available to our organization
03. Access to energy efficiency expertise that our organization does not have
04. Access to technical services, such as audits, design, or construction management assistance
05. Reduction in the amount of your organization's staff's time needed to design projects

06. Reduction in the amount of your organization's staff's time needed to procure goods and services for projects
07. Reduction in the amount of your organization's staff's time needed to implement projects
08. Access to external resources to secure energy efficiency financing (such as on-bill financing)
09. A greater understanding of energy use in our facilities
10. Fast procurement of goods or services
11. Access to a pool of pre-qualified contractors
97. None of the above
99. Don't know

B2. What additional benefits, if any, has your organization experienced by participating in the program? [OPEN END, 96="No other benefits", 98="Don't know"]

Other Energy Network Services

"Our next questions are about other services that The Energy Network may offer your organization."

B3. Has your organization received any of following additional services from The Energy Network team? Please select all that apply.

01. Access to the Enterprise Energy Management Information System (EEMIS)
02. Training staff on using EEMIS
03. Training staff on analyzing data collected via EEMIS
04. IT services for integrating EEMIS
05. Access to do-it-yourself Energy Efficiency Project Implementation Guide Books
06. Opportunities to attend workshops, forums or other events
97. None of the above
98. Don't know

B4. Aside from those you've mentioned in this survey, what additional services, if any, has The Energy Network team delivered to your organization? [OPEN END, 96="No other services", 98="Don't know"]

[ASK IF B3<97 OR B4<96]

SAT2a. How satisfied are you with services you just indicated you received from The Energy Network team? [0-10, 0 is "extremely dissatisfied" and 10 is "extremely satisfied", 97="Not applicable"]

[ASK IF SAT2a<97]

SAT2b. Please briefly explain why you provided the rating you did. [OPEN END, 96="Nothing to add"]

Overlap with LGPs

[ASK IF LGP=1, ELSE SKIP TO IOU00a]

LGP00. Is your organization the contract holder for [LGPNAME]?

01. Yes
02. No
98. Don't Know

[ASK IF LGP00=2, ELSE SKIP TO IOU00a]

"The next set of questions asks about any similar services offered by Local Government Partnerships."

LGP00a. How often do you work with the [LGPNAME] regarding energy efficiency projects?

01. Never

02. Rarely
03. Sometimes
04. Frequently
98. Don't know

[ASK IF LGP00a= 2, 3, 4]

LGP00b. How often do you work with representatives at The Energy Network compared to staff at the [LGPNAME] regarding energy efficiency projects?

01. Much less frequently
02. Somewhat less frequently
03. The same
04. Somewhat more frequently
05. Much more frequently
98. Don't know

LGP1a. Does the [LGPNAME] offer energy efficiency services similar to The Energy Network?

01. Yes
02. No
98. Don't know

[IF LGP1a=01]

LGP1b. What are these similar energy efficiency services that the [LGPNAME] offers? [OPEN END, 96="Nothing to add", 98="Don't know"]

Overlap with SCE/SoCalGas

"The next set of questions asks about any similar services offered by SCE or SoCalGas."

IOU00a. How often do you work with SCE or SoCalGas regarding to energy efficiency projects? (Note: please consider engagement outside the Local Government Partnerships, if applicable, and make one choice per row)

Utility	Never [01]	Rarely [02]	Sometimes [03]	Frequently [04]	Don't Know [98]
a. SCE	❍	❍	❍	❍	❍
b. SoCalGas	❍	❍	❍	❍	❍

[ASK IF IOU00aa 2, 3, 4 or IOU00ab=2, 3, 4]

IOU00b. How often do you work with The Energy Network compared to SCE or SoCalGas regarding energy efficiency projects?

Compared to this utility, we work with The Energy Network....	Much less frequently [01]	Somewhat less frequently [02]	The same [03]	Somewhat more frequently [04]	Much more frequently [05]	Don't Know [98]
a. [HIDE IF IOU00AA=01,98] SCE	❍	❍	❍	❍	❍	❍
b. [HIDE IF IOU00AB=01,98] SoCalGas	❍	❍	❍	❍	❍	❍

IOU1a. Does SCE or SoCalGas offer energy efficiency services similar to The Energy Network?

	Yes [01]	No [02]	Don't Know [98]
a. SCE	❍	❍	❍
b. SoCalGas	❍	❍	❍

[IF IOU1aa=01]

IOU1b. What are the similar energy efficiency services that SCE offers? [OPEN END, 96="Nothing to add", 98="Don't know"]

[IF IOU1ab=01]

IOU2b. What are the similar energy efficiency services that SoCalGas offers? [OPEN END, 96="Nothing to add", 98="Don't know"]

S01. The Energy Network launched in September of 2013 and offers various energy efficiency services. To answer the next two questions, please consider ALL the energy efficiency services available to your agency or organization (through ratepayer funded programs from SoCalGas and SCE in addition to The Energy Network) since September 2013, regardless of who provides the service.

		Substantially fewer	Slightly fewer	No difference	Slightly more	Substantially more	Don't know
a.	Compared to Sept. 2013, the number of energy efficiency services and products available to my agency or organization is...	❍	❍	❍	❍	❍	❍
b.	Compared to Sept. 2013, the type of energy efficiency services and products available to my agency or organization is....	❍	❍	❍	❍	❍	❍

S02. Does your organization work with any staff from The Energy Network to increase your staff knowledge and ability to identify opportunities to improve the efficiency of your municipal buildings or bring energy efficiency to your local residents?

01. Yes
02. No
98 Don't know

[ASK IF S02=1]

S03. What changes, if any, have you seen in your internal staff ability to improve the efficiency of your municipal buildings?

01. Unchanged
02. Increased slightly
03. Increased moderately
04. Increased substantially

98 Don't know

[ASK IF S02=1]

S04 What changes, if any, have you seen in your internal staff ability to bring energy efficiency to your local residents?

01. Unchanged
02. Increased slightly
03. Increased moderately
04. Increased substantially
98 Don't know

S05. Those are all our questions for you. Is there anything else you would like us to know about? [OPEN END, 96="Nothing to add"]

[ASK IF WMWD=01]

S06. We would also like to hear about your experiences with the program from the viewpoint of the Western Municipal Water District. We know that the survey can take time and are willing to call you to discuss differences. Are you willing to talk with us? (If so, we will follow up with an email to determine a good time for you.)

01. Yes
02. No

"Thank you for taking the time to complete this survey. Have a great day!"

Appendix K. SoCalREN Public Agency Survey Disposition and Frequencies

Disposition	N
Total Emails Sent	53
Completes (may include partials used in analysis)	28
Bounce Backs	3
Known Ineligibles (replied with reason)	0
Known Ineligibles (screened out)	0
Refused (replied but refused)	1
Mid-interview Terminates	4
No Response	17
Eligible	50
Ineligible	3

Response Rate: AAPOR RR1 = 56%

Note that the page numbers in this index do not match the page number of the document. The page numbers noted here are on the top left of each page within this appendix.

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SoCalREN (Opinion Dynamics #8110)

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Table QI1 Page 1

SoCalREN (Opinion Dynamics #8110)

Our records show that your organization enrolled in this Public Agency Program on [DATE]. Is that correct?

	Total
Total	28 100%
Yes	28 100%
No	-
Don’t know	-

Table QI3 Page 2

SoCalREN (Opinion Dynamics #8110)

Do you recall enrolling or working with someone from The Energy Network team on energy efficiency projects?

	Total
Total	28 100%
Yes	28 100%
No	-
I am not familiar with the Public Agency Program	-

Table QI4 Page 3

SoCalREN (Opinion Dynamics #8110)

Can you suggest a different person in your organization who should receive this survey?

	Total
Total	-
Yes	-
No	-

Table QI4AA Page 4

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Analysis of facilities and infrastructure energy consumption

	Total
Total	28 100%
Have not done this activity	2 7.1%
Started	4 14.3%
Completed	20 71.4%
Don't know	2 7.1%

Table QI4AB Page 5

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Energy audit on one or more of your facilities and/or streetlights

	Total
Total	28 100%
Have not done this activity	3 10.7%
Started	2 7.1%
Completed	23 82.1%
Don't know	-

Table QI4AC Page 6

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Design performance specifications for one or more of your projects

	Total
Total	28 100%
Have not done this activity	6 21.4%
Started	4 14.3%
Completed	17 60.7%
Don't know	1 3.6%

Table QI4AD Page 7

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Financial analysis showing costs and savings for one or more of your projects

	Total
Total	28 100%
Have not done this activity	3 10.7%
Started	2 7.1%
Completed	23 82.1%
Don't know	-

Table QI4AE Page 8

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Incentive application for one or more of your projects

	Total
Total	28 100%
Have not done this activity	5 17.9%
Started	3 10.7%
Completed	20 71.4%
Don't know	-

Table QI4AF Page 9

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Securing on-bill or other financing for one or more of your projects

	Total
Total	28 100%
Have not done this activity	13 46.4%
Started	3 10.7%
Completed	12 42.9%
Don't know	-

Table QI4AG Page 10

SoCalREN (Opinion Dynamics #8110)

Which of the following activities has your organization/WRCRWA either started or completed through the Public Agency Program? Please choose the best option - Construction of at least one energy efficiency upgrade project

	Total
Total	28 100%
Have not done this activity	13 46.4%
Started	5 17.9%
Completed	10 35.7%
Don't know	-

Table QM2A Page 11

SoCalREN (Opinion Dynamics #8110)

To what extent has the program met your expectations thus far? Would you say…

	Total
Total	28
	100%
The program has exceeded your expectations	12
	42.9%
The program has met all your expectations	12
	42.9%
The program has met most of your expectations	3
	10.7%
The program has met some of your expectations	-
The program has met none of your expectations	1
	3.6%

Table QP1A Page 12

SoCalREN (Opinion Dynamics #8110)

We know that activity for energy efficiency projects can go up and down. On average, how often do or did you communicate with The Energy Network team on the energy efficiency activities you just told us about? - Phone

	Total
Total	28
	100%
Multiple times per week	4
	14.3%
Once per week	6
	21.4%
Multiple times per month	7
	25.0%
Once per month	5
	17.9%
Less than once per month	5
	17.9%
Never	1
	3.6%
Don't know	-

Table QP1B Page 13

SoCalREN (Opinion Dynamics #8110)

We know that activity for energy efficiency projects can go up and down. On average, how often do or did you communicate with The Energy Network team on the energy efficiency activities you just told us about? - Email

	Total
Total	28
	100%
Multiple times per week	9
	32.1%
Once per week	4
	14.3%
Multiple times per month	9
	32.1%
Once per month	3
	10.7%
Less than once per month	3
	10.7%
Never	-
Don't know	-

Table QP1C Page 14

SoCalREN (Opinion Dynamics #8110)

We know that activity for energy efficiency projects can go up and down. On average, how often do or did you communicate with The Energy Network team on the energy efficiency activities you just told us about? - In-person

	Total
Total	28 100%
Multiple times per week	-
Once per week	-
Multiple times per month	4 14.3%
Once per month	9 32.1%
Less than once per month	15 53.6%
Never	-
Don't know	-

Table QP2A Page 15

SoCalREN (Opinion Dynamics #8110)

How satisfied are you with your communication with The Energy Network team?

	Total
Total	28 100%
Extremely Dissatisfied-0	-
1	-
2	-
3	-
4	-
5	-
6	1 3.6%
7	-
8	6 21.4%
9	6 21.4%
Extremely Satisfied-10	15 53.6%
Mean	9.21

Table QP3R1 Page 16

SoCalREN (Opinion Dynamics #8110)

Did your organization encounter any challenges while completing project/applying through program?

	Total
Total	28 100%
Yes	13 46.4%
No	14 50.0%
Don’t know	1 3.6%

Table QP5R1 Page 17

SoCalREN (Opinion Dynamics #8110)

Were these challenges something The Energy Network team could have helped you with?

	Total
Total	13 100%
Yes	6 46.2%
No	5 38.5%
Don’t know	2 15.4%

Table QP6R1 Page 18

SoCalREN (Opinion Dynamics #8110)

Did The Energy Network team attempt to help you overcome the challenges you mentioned?

	Total
Total	6 100%
Yes	5 83.3%
No	1 16.7%
Don’t know	-

Table QP7R1 Page 19

SoCalREN (Opinion Dynamics #8110)

How helpful was The Energy Network team in overcoming the challenges you mentioned?

	Total
Total	5 100%
Not at all helpful-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	1 20.0%
8	1 20.0%
9	1 20.0%
Extremely helpful-10	2 40.0%
Mean	8.80

Table QP3R2 Page 20

SoCalREN (Opinion Dynamics #8110)

Did your organization encounter any challenges while completing project/applying through program?

	Total
Total	24 100%
Yes	4 16.7%
No	16 66.7%
Don’t know	4 16.7%

Table QP5R2 Page 21

SoCalREN (Opinion Dynamics #8110)

Were these challenges something The Energy Network team could have helped you with?

	Total
Total	4 100%
Yes	3 75.0%
No	1 25.0%
Don’t know	-

Table QP6R2 Page 22

SoCalREN (Opinion Dynamics #8110)

Did The Energy Network team attempt to help you overcome the challenges you mentioned?

	Total
Total	3 100%
Yes	3 100%
No	-
Don’t know	-

Table QP7R2 Page 23

SoCalREN (Opinion Dynamics #8110)

How helpful was The Energy Network team in overcoming the challenges you mentioned?

	Total
Total	3 100%
Not at all helpful-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	-
9	-
Extremely helpful-10	3 100%
Mean	10.00

Table QP3R3 Page 24

SoCalREN (Opinion Dynamics #8110)

Did your organization encounter any challenges while completing project/applying through program?

	Total
Total	21 100%
Yes	6 28.6%
No	12 57.1%
Don’t know	3 14.3%

Table QP5R3 Page 25

SoCalREN (Opinion Dynamics #8110)

Were these challenges something The Energy Network team could have helped you with?

	Total
Total	6 100%
Yes	5 83.3%
No	1 16.7%
Don’t know	-

Table QP6R3 Page 26

SoCalREN (Opinion Dynamics #8110)

Did The Energy Network team attempt to help you overcome the challenges you mentioned?

	Total
Total	5 100%
Yes	5 100%
No	-
Don’t know	-

Table QP7R3 Page 27

SoCalREN (Opinion Dynamics #8110)

How helpful was The Energy Network team in overcoming the challenges you mentioned?

	Total
Total	5 100%
Not at all helpful-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	-
9	1 20.0%
Extremely helpful-10	4 80.0%
Mean	9.80

Table QP3R4 Page 28

SoCalREN (Opinion Dynamics #8110)

Did your organization encounter any challenges while completing project/applying through program?

	Total
Total	16 100%
Yes	5 31.2%
No	8 50.0%
Don’t know	3 18.8%

Table QP5R4 Page 29

SoCalREN (Opinion Dynamics #8110)

Were these challenges something The Energy Network team could have helped you with?

	Total
Total	5 100%
Yes	3 60.0%
No	2 40.0%
Don’t know	-

Table QP6R4 Page 30

SoCalREN (Opinion Dynamics #8110)

Did The Energy Network team attempt to help you overcome the challenges you mentioned?

	Total
Total	3 100%
Yes	3 100%
No	-
Don’t know	-

Table QP7R4 Page 31

SoCalREN (Opinion Dynamics #8110)

How helpful was The Energy Network team in overcoming the challenges you mentioned?

	Total
Total	3 100%
Not at all helpful-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	-
9	-
Extremely helpful-10	3 100%
Mean	10.00

Table QP3R5 Page 32

SoCalREN (Opinion Dynamics #8110)

Did your organization encounter any challenges while completing project/applying through program?

	Total
Total	10 100%
Yes	1 10.0%
No	6 60.0%
Don’t know	3 30.0%

Table QP4R5 Page 33

SoCalREN (Opinion Dynamics #8110)

Please describe the challenges your organization experienced.

	Total
Total	-
Nothing to add	-

Table QP5R5 Page 34

SoCalREN (Opinion Dynamics #8110)

Were these challenges something The Energy Network team could have helped you with?

	Total
Total	1 100%
Yes	1 100%
No	-
Don’t know	-

Table QP6R5 Page 35

SoCalREN (Opinion Dynamics #8110)

Did The Energy Network team attempt to help you overcome the challenges you mentioned?

	Total
Total	1 100%
Yes	1 100%
No	-
Don’t know	-

Table QP7R5 Page 36

SoCalREN (Opinion Dynamics #8110)

How helpful was The Energy Network team in overcoming the challenges you mentioned?

	Total
Total	1 100%
Not at all helpful-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	1 100%
9	-
Extremely helpful-10	-
Mean	8.00

Table QP9A Page 37

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Ways public agencies can reduce their energy use

	Total
Total	28 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	8 28.6%
9	6 21.4%
Completely knowledgeable-10	14 50.0%
Don't know	-
Mean	9.21

Table QP9B Page 38

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Financing options available to public agencies for energy efficiency upgrade projects

	Total
Total	28 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	1 3.6%
8	5 17.9%
9	6 21.4%
Completely knowledgeable-10	14 50.0%
Don't know	2 7.1%
Mean	9.27

Table QP9C Page 39

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Utility rebates available to public agencies for energy efficiency upgrade projects

	Total
Total	28 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	1 3.6%
8	3 10.7%
9	7 25.0%
Completely knowledgeable-10	17 60.7%
Don't know	-
Mean	9.43

Table QP9D Page 40

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Specific opportunities to perform energy efficiency upgrades

	Total
Total	25 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	5 20.0%
9	5 20.0%
Completely knowledgeable-10	14 56.0%
Don't know	1 4.0%
Mean	9.38

Table QP9E Page 41

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Performance specifications for energy efficiency upgrade projects

	Total
Total	21 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	5 23.8%
9	4 19.0%
Completely knowledgeable-10	12 57.1%
Don't know	-
Mean	9.33

Table QP9F Page 42

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Financial analysis for energy efficiency upgrade projects

	Total
Total	25 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	1 4.0%
8	4 16.0%
9	6 24.0%
Completely knowledgeable-10	13 52.0%
Don't know	1 4.0%
Mean	9.29

Table QP9G Page 43

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Applying for incentives for energy efficiency upgrade projects

	Total
Total	23 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	2 8.7%
9	5 21.7%
Completely knowledgeable-10	14 60.9%
Don't know	2 8.7%
Mean	9.57

Table QP9H Page 44

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Applying for on-bill or other financing for energy efficiency upgrade projects

	Total
Total	15 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	-
8	2 13.3%
9	2 13.3%
Completely knowledgeable-10	10 66.7%
Don't know	1 6.7%
Mean	9.57

Table QP9I Page 45

SoCalREN (Opinion Dynamics #8110)

How would you rate The Energy Network team's knowledge of the following: - Supporting procurement for energy efficiency upgrade projects

	Total
Total	13 100%
Not at all knowledgeable-0	-
1	-
2	-
3	-
4	-
5	-
6	-
7	1 7.7%
8	2 15.4%
9	2 15.4%
Completely knowledgeable-10	6 46.2%
Don't know	2 15.4%
Mean	9.18

Table QP10 Page 46

SoCalREN (Opinion Dynamics #8110)

How often did The Energy Network team meet your organization's needs while participating in the program?

	Total
Total	28 100%
All of the time	20 71.4%
Most of the time	7 25.0%
Some of the time	1 3.6%
None of the time	-
Don't know	-

Table QPP1A Page 47

SoCalREN (Opinion Dynamics #8110)

Does your organization plan to complete an audit or third party technical review through The Energy Network?

	Total
Total	3 100%
Yes	-
No	1 33.3%
Maybe	2 66.7%
Don’t know	-

Table QPP2A Page 48

SoCalREN (Opinion Dynamics #8110)

Does your organization plan to move forward with implementing a project?

	Total
Total	12 100%
Yes	7 58.3%
No	-
Maybe	4 33.3%
Don’t know	1 8.3%

Table QPP2C Page 49

SoCalREN (Opinion Dynamics #8110)

What support, if any, could The Energy Network team provide to help you decide whether to move forward with the project?

	Total
Total	3 100%
Nothing they can do	3 100%
Don't know	-

Table QSAT1A Page 50

SoCalREN (Opinion Dynamics #8110)

How satisfied are you with the Public Agency Program overall?

	Total
Total	28 100%
Extremely Dissatisfied-0	-
1	-
2	-
3	-
4	-
5	-
6	1 3.6%
7	3 10.7%
8	3 10.7%
9	6 21.4%
Extremely Satisfied-10	15 53.6%
Mean	9.11

Table QB1M1 Page 51

SoCalREN (Opinion Dynamics #8110)

Which of the following, if any, has your organization experienced from the support offered by The Energy Network team?

	Total
Total	28 100%
Access to technical services, such as audits, design, or construction management assistance	28 100%
Access to energy efficiency expertise that our organization does not have	26 92.9%
Increased knowledge of ways to save energy within our organization	23 82.1%
Reduction in the amount of your organization's staff's time needed to design projects	23 82.1%
Reduction in the amount of your organization's staff's time needed to implement projects	21 75.0%
Increased knowledge of energy efficiency financing options available to our organization	20 71.4%
A greater understanding of energy use in our facilities	20 71.4%
Reduction in the amount of your organization's staff's time needed to procure goods and services for projects	19 67.9%
Access to external resources to secure	16 57.1%

energy efficiency
financing (such as on
bill financing)

Table QB1M1 Page 52
(Continued)
SoCalREN (Opinion Dynamics #8110)

Which of the following, if any, has your organization experienced from the support offered by The Energy Network team?

	Total
Fast procurement of goods or services	15 53.6%
Access to a pool of pre-qualified contractors	14 50.0%

Table QB3M1 Page 53

SoCalREN (Opinion Dynamics #8110)

Has your organization received any of following additional services from The Energy Network team? Please select all that apply.

	Total
Total	28 100%
Opportunities to attend workshops, forums or other events	12 42.9%
Access to the Enterprise Energy Management Information System (EEMIS)	3 10.7%
Training staff on analyzing data collected via EEMIS	3 10.7%
Training staff on using EEMIS	2 7.1%
Access to do-it-yourself Energy Efficiency Project Implementation Guide Books	2 7.1%
IT services for integrating EEMIS	1 3.6%
None of the above	9 32.1%
Don’t know	6 21.4%

Table QSAT2A Page 54

SoCalREN (Opinion Dynamics #8110)

How satisfied are you with the services you just indicated you received from The Energy Network?

	Total
Total	19 100%
Extremely Dissatisfied-0	-
1	-
2	-
3	-
4	-
5	-
6	1 5.3%
7	-
8	1 5.3%
9	4 21.1%
Extremely Satisfied-10	9 47.4%
Not Applicable	97.00
Mean	9.33

Table QLGP00 Page 55

SoCalREN (Opinion Dynamics #8110)

Is your organization the contract holder for the SCE/SCG Partnership?

	Total
Total	21 100%
Yes	10 47.6%
No	5 23.8%
Don’t Know	6 28.6%

Table QLGP00A Page 56

SoCalREN (Opinion Dynamics #8110)

How often do you work with the SCE/SCG Partnership regarding energy efficiency projects?

	Total
Total	5 100%
Never	-
Rarely	-
Sometimes	2 40.0%
Frequently	3 60.0%
Don’t know	-

Table QLGP00B Page 57

SoCalREN (Opinion Dynamics #8110)

How often do you work with representatives at The Energy Network compared to staff at the SCE/SCG Partnership regarding energy efficiency projects?

	Total
Total	5 100%
Much less frequently	1 20.0%
Somewhat less frequently	1 20.0%
The same	-
Somewhat more frequently	3 60.0%
Much more frequently	-
Don’t know	-

Table QLGP1A Page 58

SoCalREN (Opinion Dynamics #8110)

Does the SCE/SCG Partnership offer energy efficiency services similar to The Energy Network?

	Total
Total	5 100%
Yes	2 40.0%
No	3 60.0%
Don’t know	-

Table QIOU00AA Page 59

SoCalREN (Opinion Dynamics #8110)

How often do you work with SCE or SoCalGas regarding energy efficiency projects?

	Total
Total	28 100%
Never	2 7.1%
Rarely	5 17.9%
Sometimes	7 25.0%
Frequently	12 42.9%
Don't know	2 7.1%

Table QIOU00AB Page 60

SoCalREN (Opinion Dynamics #8110)

How often do you work with SCE or SoCalGas regarding energy efficiency projects?

	Total
Total	28 100%
Never	3 10.7%
Rarely	7 25.0%
Sometimes	15 53.6%
Frequently	1 3.6%
Don't know	2 7.1%

Table QIOU00BA Page 61

SoCalREN (Opinion Dynamics #8110)

How often do you work with The Energy Network compared to SCE or SoCalGas regarding energy efficiency projects? - SCE

	Total
Total	24 100%
Much less frequently	3 12.5%
Somewhat less frequently	1 4.2%
The same	3 12.5%
Somewhat more frequently	4 16.7%
Much more frequently	13 54.2%
Don't know	-

Table QIOU00BB Page 62

SoCalREN (Opinion Dynamics #8110)

How often do you work with The Energy Network compared to SCE or SoCalGas regarding energy efficiency projects? - SoCalGas

	Total
Total	23 100%
Much less frequently	5 21.7%
Somewhat less frequently	1 4.3%
The same	4 17.4%
Somewhat more frequently	4 17.4%
Much more frequently	9 39.1%
Don't know	-

Table QIOU1AA Page 63

SoCalREN (Opinion Dynamics #8110)

Does SCE or SoCalGas offer energy efficiency services similar to The Energy Network? - SCE

	Total
Total	28 100%
Yes	13 46.4%
No	7 25.0%
Don't know	8 28.6%

Table QIOU1AB Page 64

SoCalREN (Opinion Dynamics #8110)

Does SCE or SoCalGas offer energy efficiency services similar to The Energy Network? - SoCalGas

	Total
Total	28 100%
Yes	10 35.7%
No	6 21.4%
Don't know	12 42.9%

Table QSO1A Page 65

SoCalREN (Opinion Dynamics #8110)

The Energy Network launched in September of 2013 and offers various energy efficiency services. To answer the next two questions - Compared to Sept. 2013, the number of energy efficiency services and products available to my agency or organization is…

	Total
Total	28 100%
Substantially fewer	1 3.6%
Slightly fewer	-
No difference	-
Slightly more	7 25.0%
Substantially more	16 57.1%
Don’t know	4 14.3%

Table QSO1B Page 66

SoCalREN (Opinion Dynamics #8110)

The Energy Network launched in September of 2013 and offers various energy efficiency services. To answer the next two questions - Compared to Sept. 2013, the type of energy efficiency services and products available to my agency or organization is…

	Total
Total	28 100%
Substantially fewer	-
Slightly fewer	-
No difference	-
Slightly more	7 25.0%
Substantially more	17 60.7%
Don’t know	4 14.3%

Table QSO2 Page 67

SoCalREN (Opinion Dynamics #8110)

Does your organization work with any staff from The Energy Network to increase your staff knowledge and ability to identify opportunities to improve the efficiency of your municipal buildings or bring energy efficiency to your local residents?

	Total
Total	28 100%
Yes	18 64.3%
No	7 25.0%
Don't know	3 10.7%

Table QSO3 Page 68

SoCalREN (Opinion Dynamics #8110)

What changes, if any, have you seen in your internal staff's ability to improve the efficiency of your municipal buildings?

	Total
Total	18 100%
Unchanged	-
Increased slightly	6 33.3%
Increased moderately	4 22.2%
Increased substantially	7 38.9%
Don't know	1 5.6%

Table QSO4 Page 69

SoCalREN (Opinion Dynamics #8110)

What changes, if any, have you seen in your internal staff's ability to bring energy efficiency to your local residents?

	Total
Total	18 100%
Unchanged	6 33.3%
Increased slightly	3 16.7%
Increased moderately	3 16.7%
Increased substantially	1 5.6%
Don't know	5 27.8%

Table QSO6 Page 70

SoCalREN (Opinion Dynamics #8110)

We would also like to hear about your experiences with the program from the viewpoint of the Western Municipal Water District. We know that the survey can take time and are willing to call you to discuss differences. Are you willing to talk with us?

	Total
Total	1 100%
Yes	1 100%
No	-

(END OF ATTACHMENT A)

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2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment

Final Report and Appendices

Prepared for the Energy Division of the California Public Utilities Commission

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Executive Summary

This document presents the evaluation report for the impact assessment of the energy efficiency programs offered by the 2013-14 Regional Energy Networks (RENs) and Community Choice Aggregator (CCA). The primary goal of this study was to perform an impact assessment on specific measures offered by the RENs and CCA to develop more reliable estimates of program cost effectiveness.[1] This study report presents results from a set of quick turnaround tasks that update some key impact parameters using primary data collection (for net-to-gross (NTG) analysis) and utilizing results from recent gross ex post impact evaluations (for key nonresidential lighting measures), which are then used to develop more reliable estimates of program cost effectiveness. Furthermore, because most of the ex ante claimed savings are associated with measures that do not have recent impact evaluation findings that can be directly applied, a high level assessment of the ex ante savings assumptions, including a comparison between RENs/CCA and investor owned utility (IOU) ex ante impact assumptions, was made to identify if there are any obvious over- or understatements of savings being claimed. Therefore, this study includes:

- A high level assessment of the gross ex ante savings values being used for all programs claiming ex ante savings. This includes:
  - Reviewing the ex ante work papers and, for the CCA program, correcting errors in the program tracking databases for the ex ante calculations of deemed measures,
  - Comparing the ex ante assumptions used by the RENs and CCA with those used by the IOUs,
  - Updating gross savings values for selected nonresidential lighting measures for the CCA program based on recent CPUC ex post impact evaluations, and
  - Performing a review of a sample of custom lighting applications for the CCA program and updating gross savings values.
- Development of ex post net-to-gross ratios (NTGRs) for selected measures, and
- Estimation of program cost effectiveness using the updated savings values developed in the gross impact assessment and NTGR analysis described above.

In addition, this study documents the non-resource program accomplishments of the RENs and CCA and assesses the ability of the current tracking systems for these activities to support future evaluations (an evaluability assessment). Although no specific attribution of savings was made based on these accomplishments, this documentation of additional activities that are being

[1] A more rigorous ex post impact evaluation is planned for the programs in 2016.

conducted by the programs may provide value beyond that which can be measured by the cost effectiveness tests. Future studies may wish to try to better quantify these non-resource accomplishments, which is why an evaluability assessment has been conducted.

One CCA and two REN Program Administrators (PAs) offer various programs:

- Marin Clean Energy (MCE)
  - The MCE Multifamily Program is a program designed to reduce barriers to retrofits by providing technical assistance and incentives to multifamily property owners. Incentives are offered for window film, CFLs, linear fluorescents, LEDs, pipe insulation, and a variety of domestic hot water measures.
  - The MCE Small Commercial Program is a multiple measure program for small commercial high energy use segments. The program reduces barriers to retrofits by providing technical assistance and incentives to building owners. Incentives are offered for CFLs, occupancy sensors, LEDs, linear fluorescents, delamping of linear fluorescents, and selected refrigeration measures.
  - The MCE Single Family Program enables energy and water savings with associated cost reductions through behavior changes, upgrading of appliances, and water conservation measures that affect energy. Program activities include encouraging customers to register for the online My Energy Tool and sending out Home Utility Reports. No measures are rebated under this program.
  - The MCE Finance Pilots Program includes two innovative finance programs to ensure that retrofits are financially competitive and accessible to a broader and more diverse range of property owners. The two financing program elements are On-Bill Repayment (OBR) and a Standard Offer (SO) Energy Efficiency pilot.
- San Francisco Bay Area Regional Energy Network (BayREN)
  - BayREN Single Family Home Upgrade is a service available to owners of single family detached homes in the BayREN territory who are customers of PG&E. This program pays incentives for whole house retrofits and offers assistance to customers and contractors going through the process through its Home Upgrade Advisor segment.
  - The Bay Area Multifamily Whole Building Program is a service that allows multifamily property owners to receive free technical assistance designed to lower barriers to multiple measure upgrades through technical and financing assistance. Property owners receive customized scopes of work designed to reduce building energy use and receive incentives for whole building retrofits.
  - The BayREN Codes and Standards Subprogram consists of three components: enforcement of existing codes, training, and sharing best practices for reach codes. The BayREN Energy Efficiency Financing Portfolio contains three programs to help

make energy efficiency upgrades more affordable. The components are: (1) Pay As You Save, (2) Commercial PACE, and (3) Multifamily Capital Advance.

- Southern California Regional Energy Network (SoCalREN)
  - The SoCalREN pilot includes a set of program activities as follows: Single Family Home Upgrade, Multifamily Whole Building retrofits, Local Marketing and Outreach, Contractor Outreach and Training, Green Building Labeling, and Low-Income Single Family Housing Upgrades. Note that through the Single Family Home Upgrade and Multifamily Whole Building program components, SoCalREN provides incentives for both single family and multifamily whole house/building retrofits.
  - Financing options are also made available by SoCalREN to local governments to supplement the on-bill financing offered by the IOUs and, therefore, enable greater investments in deep energy savings.
  - SoCalREN's Regional Energy Center offers comprehensive technical support to local governments and other public entities to enable them to implement deeper and more cost effective energy management practices.

Each program administrator (PA) offers a combination of resource programs (those that claim ex ante savings) and non-resource programs. All resource programs are included in the gross savings assessment, while only a subset are covered under the net-to-gross analysis, as described below. Note that the Financing program elements and the Codes and Standards-related program elements are not included in either portion of the impact assessment as there are separate California statewide evaluations being conducted for Financing and for Codes and Standards.[2] All other non-resource programs are included in the evaluability assessment and accomplishments documentation.

The resource program savings of the RENs come from the residential sector while the savings from MCE come from both residential and commercial energy efficiency upgrades. The two REN PAs offer the Single Family Home Upgrade and Multifamily Whole Building programs, both of which are whole building retrofit programs with a suite of measures. The MCE program offers a wide variety of energy efficiency measures in both the residential and nonresidential sectors. Note that 91% of the MCE program's claimed electric savings are in the nonresidential sector, and 82% are focused on nonresidential lighting. The MCE's claimed gas savings are

[2] The Codes and Standards study is the 2013-2014 Codes & Standards Impact Evaluation. The series of CPUC impact evaluations that cover financing programs are: Impact Evaluation #1 – Cross-Cutting Background and Attribution Research, Impact Evaluation #2 – Multiphase On-Bill Financing Study, Impact Evaluation #3 – Annual Snapshot and Verification Study, and Impact Evaluation #4 – End of Cycle Studies: 1) ARRA-Originated and Regional Finance Pilots; 2) Statewide Pilots. The studies are cited in the Energy Division and Program Administrator Energy Efficiency Evaluation, Measurement & Verification Plan, Version 5. May 2015.

focused on residential faucet aerators and showerheads, which comprise 69% of the claimed savings.

As mentioned above, all of these measures are included in the gross impact assessment. However, only the BayREN Multifamily Whole Building Retrofit and the MCE Small Commercial measures are included in the NTG analysis.

Table ES-1 below summarizes the analyses that were conducted for each of the PA's programs.

Table ES-1: Analyses Conducted for REN and CCA 2013-2014 Programs

PA	Program	Gross Impact Assessment	NTG Analysis	Cost Effectiveness Analysis	Evaluability Assessment	Accomplishments Assessment
BayREN	Single Family Home Upgrade	X		X	X	X
	Multifamily Whole Building	X	X	X	X	X
	Codes and Standards Program					
	Energy Efficiency Financing Portfolio					
SoCalREN	SF Home Upgrade and MF Whole Building	X		X	X	X
	Financing					
	Regional Energy Center				X	X
MCE	Multifamily Program	X		X	X	X
	Small Commercial Program	X	X	X	X	X
	Single Family Program				X	X
	Financing Program					

ES.1 Summary of Findings and Recommendations

This section provides an integrated summary of very high level findings from the analysis presented in this report. Table ES-2 below provides a summary table of all conclusions and recommendations made in the report, including which PA(s) the recommendation is relevant to and the section of the report that supports the conclusion and recommendation. More detailed descriptions of these conclusions and recommendations are provided at the end of each of the relevant sections of the report (Sections 4-7).

Table ES-2: Summary of Conclusions and Recommendations

ID	PA	Section	Conclusion	Recommendation
Gross-1	MCE	4.1.1	MCE did not provide key references for their ex ante assumptions or provide detailed measures descriptions.	MCE should set up an internal process to check the quality and consistency of ex ante data reported to the CPUC and ensure they are providing detailed measure descriptions and references to ex ante assumptions.
Gross-2	MCE	4.1.1	Critical impact parameter fields for savings calculation purposes were not valid or were found to be inconsistent for MCE.	MCE should ensure critical fields needed for savings calculations are filled in and valid
Gross-3	MCE	4.1.1, 4.1.2	Significant variability was found between MCE's claimed ex ante values, corrected ex ante values, and evaluation values for deemed measures.	Collaboration between all stakeholders (i.e., MCE, PG&E, and CPUC) should work to incorporate evaluation results to update ex ante deemed values.
Gross-4	MCE	4.1.3	MCE's ex ante EULs for LED measures were much greater than evaluated estimates for calculated measures, and EUL estimates were not calculated or documented as part of the project calculation workbooks.	MCE should estimate EULs as part of the calculated application process using site-specific operating hours developed for the project, and DEER based service lives.
Gross-5	MCE	4.1.3	Although MCE's measure installations were provided at the activity area level, all calculated lighting projects used DEER default hours of operation.	For calculated measures, MCE should consider either collecting site-specific operating hours that are developed at the activity area in the applications, or applying deemed savings values if they are going to rely on default values.
Gross-6	MCE	4.1.3	MCE's evaluated annual operating hours were generally less than ex ante assumptions for calculated measures.	For calculated measures, if site-specific operating hours are not collected, MCE should utilize the operating hour and coincidence factor values documented in the 2010-2012 and 2013-2014 nonresidential lighting impact evaluations conducted by the CPUC, which were developed by building type and space type.
Gross-7	MCE	4.1.3	While ex ante first and second baselines were documented in MCE's calculation workbooks based on an ER or ROB designation, they were provided as annualized savings with no lifecycle estimates.	MCE should calculate lifecycle savings for all measures as part of their project calculation workbooks and ensure the calculation is done correctly in their claimed database for ER (or dual baseline) measures, which is (first baseline savings * RUL) + (second baseline savings * (EUL-RUL)).

Table ES-2 (Cont'd): Summary of Conclusions and Recommendations

ID	PA	Section	Conclusion	Recommendation
Gross-8	MCE	4.1.3	The evaluation team was only able to update roughly 53% of MCE's first year ex ante claim for calculated measures.	MCE's project calculation workbooks should go through an extensive QC process to validate that the savings estimates in the workbooks are identical to the claimed savings in the tracking data.
Gross-9	BayREN, SoCalREN	4.2.1	The IOU and REN Multifamily Whole Building program tracking data have varying levels of completeness.	IOUs and RENs should adjust data collection and program tracking to ensure all key fields, including participant contact information, measure details, pre-existing conditions, property systems, property details, and utility meter numbers are collected and easily accessible for all completed projects.
Gross-10	BayREN, SoCalREN	4.2.2	BayREN, SoCalREN, and SDG&E all use different approaches to calculating savings for multifamily measures, and these differences may lead to differences in savings estimates for similar measures.	The RENs and IOUs should collaborate and agree on consistent methods to estimate savings for similar multifamily measures.
Gross-11	BayREN, SoCalREN	4.2.4	Matching BayREN and SoCalREN program data to billing data by different accountIDs was largely unsuccessful, likely because of the high turnover rate for multifamily tenants.	The RENs should collect meter numbers for multifamily participants to allow for improved matching of program and billing data.
Gross-12	BayREN, SoCalREN	4.2.2	The inability to calibrate to actual bills for BayREN and SoCalREN multifamily participants may lead to savings estimates that are either overestimated or under the targeted per-project savings threshold for the program.	The RENs should have access to building level billing data so the savings assumptions and models can be calibrated to actual customer bills.
Gross-13	BayREN, SoCalREN	4.2.3	It was difficult to validate the program claimed savings via an engineering desk review for BayREN and SoCalREN multifamily participants because of factors such as interactive effects, stacking effects, and differences in baseline assumptions.	Simulation models would provide a more effective approach to validating the claimed savings for multifamily projects, and site visits would allow verification of the key model inputs.

Table ES-2 (Cont'd): Summary of Conclusions and Recommendations

ID	PA	Section	Conclusion	Recommendation
Gross-14	BayREN, SoCalREN	4.2.5	Although the RENs have assumed early replacement savings for all multifamily measures, this research indicated that a substantial portion of projects may not qualify for early replacement because of planned improvements, installation of new equipment, or replacement of equipment that was in poor condition.	The RENs should set up a survey for multifamily participants at intake to better determine the appropriate baseline for each project and measure.
Gross-15	BayREN, SoCalREN	4.2.5	While the RENs have assumed an early replacement baseline on their first year savings for multifamily projects, they are not always calculating lifecycle savings to reflect a change in baseline after the end of the project RUL.	The RENs should calculate lifecycle savings for early replacement multifamily projects using the early replacement baseline for the RUL period, then using a code baseline for the remainder of the EUL: Lifecycle Savings=(RUL*〖Savings〗_ER)+((EUL-RUL)*〖Savings〗_Code)
Gross-16	BayREN, SoCalREN	4.2.2	Though the RENs indicated they use project-level savings-weighted EULs (and the associated one-third EUL for the RULs) for multifamily projects, the application of this logic leads to the potential of miscalculation of lifecycle savings and the tracking database did not suggest this logic was actually being implemented.	The RENs should be sure to use the correctly weighted and calibrated EUL and RUL for multifamily projects that results in the correct lifecycle savings values, rather than the 18-year EUL currently reported in the tracking database.
Gross-17	BayREN, SoCalREN	4.3.1, 4.3.2	The RENs utilized five different sets of workpapers during the 2013-2014 single family Home Upgrade program.	All implementers should use consistent workpapers for the single family Home Upgrade program. If workpapers are not approved by the CPUC, the same set of workpapers should be used throughout the program year..
Gross-18	BayREN, SoCalREN	4.3.1, 4.3.2	The most recent version of the EUCA calculator was not being used by the RENs for the single family Home Upgrade program, which resulted in the miscalculation of lifecycle savings	The RENs should ensure they are using the most recent approved version of the EUCA calculator for the single family Home Upgrade program, or whatever other tool they are using to develop ex ante savings estimates

Table ES-2 (Cont'd): Summary of Conclusions and Recommendations

ID	PA	Section	Conclusion	Recommendation
Gross-19	BayREN, SoCalREN	4.3.1, 4.3.2	CPUC tracking data changed over time for the RENs single family Home Upgrade programs. This problem is bigger than only the Home Upgrade program and is being addressed with the data management team.	The RENs should conduct data quality checks quarterly when single family Home Upgrade program data are submitted.
Gross-20	BayREN, SoCalREN	4.3.1, 4.3.2	There were no common measure codes in the workpapers or tracking data across IOU or REN for the single family Home Upgrade programs.	The RENs should ensure that measure codes represent measures or bundles of measures, and be consistent across implementers for their single family Home Upgrade programs.
Net-1	MCE, BayREN	5.1, 5.2	The research found a net-to-gross ratio of 62% for MCE small commercial measures (weighted by evaluated kWh savings) and 58% for BayREN multifamily measures.	MCE and BayREN should consider using the researched net-to-gross ratio from this study and update them as future evaluation results become available.
CostEff-1	MCE, BayREN, SoCalREN	6.2, 6.5	The RENs' and MCE's tracking data are not in agreement with their 2013-2014 monthly reports.	The RENs and MCE should set up an internal process to ensure that all data sources submitted to the CPUC are in agreement.
CostEff-2	MCE, BayREN, SoCalREN	6.2, 6.5	The quality of the RENs' and MCE's tracking data with respect to cost effectiveness parameters was found to be low.	The RENs and MCE should set up a quality control process where submitted tracking data is run through cost effectiveness to ensure data runs smoothly and the expected TRC and PAC values are returned.
CostEff-3	SoCalREN	6.2	SoCalREN combines its single family and multifamily Home Upgrade program elements into a single program, which makes it difficult to assess the cost effectiveness of each element individually.	SoCalREN should consider breaking its single family and multifamily Home Upgrade program elements into two separate programs or else tracking the costs associated with each element separately to allow for each element to be assessed individually for cost effectiveness.
CostEff-4	MCE, BayREN, SoCalREN	6.2	The TRC and PAC cost effectiveness values for the RENs and MCE include costs associated with various non-resource activities within their resource programs that do not directly benefit or support the resource program.	The RENs and MCE should consider tracking the costs associated with non-resource activities that do not directly benefit the resource elements of their programs to support a more accurate calculation of cost effectiveness.

Table ES-2 (Cont'd): Summary of Conclusions and Recommendations

ID	PA	Section	Conclusion	Recommendation
Non-Resource – 1	MCE, BayREN, SoCalREN	7.1.1, 7.2.1, 7.3.1	The accomplishments documented in each PA's annual report are reasonably reliable and do not tend to overstate what they have achieved. Generally speaking, BayREN's Single Family Home Upgrade and Multifamily Upgrade non-resource accomplishments for 2013-14 could be verified.	The RENs and MCE should archive copies of the databases from which the accomplishments are taken when non-resource accomplishments are reported so that all accomplishments can be verified in the future.
Non-Resource - 2	MCE, BayREN, SoCalREN	7.1.2, 7.2.2, 7.3.2	The databases provided by the RENs and MCE are generally collecting the necessary data to support future evaluations, although more complete information would improve the evaluability of their non-resource efforts.	The RENs and MCE should attempt to gather key contact information, electric and gas SAIDs, and document audit/assessment recommendations and participation in other programs whenever possible and relevant.
Non-Resource - 3	MCE, BayREN, SoCalREN	7.1.2, 7.2.2, 7.3.2	MCE and BayREN have a unique customer identifier, but it is not used in all of their customer databases, and SoCalREN does not have a unique customer identifier.	MCE and BayREN should track their unique customer identifier on all customer related databases, and SoCalREN should develop a unique customer identifier that is assigned to every customer as they come into contact with someone.
Non-Resource - 4	MCE, BayREN, SoCalREN	7.1.2, 7.2.2, 7.3.2	The quality of the RENs' and MCE's non-resource databases reviewed was inconsistent.	The RENs and MCE should consider reviewing the structure, format, and contents of their databases to improve consistency and usability; developing a data dictionary documenting variable names (with the exception of SoCalREN, who provided data dictionaries with all provided datasets); and documenting calculations.
Non-Resource - 5	MCE, BayREN, SoCalREN	7.1.3, 7.2.3, 7.3.3	The ability to merge the REN's and MCE's databases that track non-resource accomplishments related to energy audits, referrals, site visits, and advisor hotlines to CPUC tracking data is based on the collection of variables that can be used to link the records across sources, such as electric and/or gas service account IDs.	The RENs and MCE should record names, addresses, phone numbers, and e-mail addresses in a consistent format, and collect IOU customer account IDs and service account IDs whenever possible, as part of their non-resource tracking systems in order to increase the ability to merge non-resource tracking records to CPUC tracking data.

Table ES-2 (Cont'd): Summary of Conclusions and Recommendations

ID	PA	Section	Conclusion	Recommendation
Non-Resource – 6	MCE, BayREN, SoCalREN	7.1.3, 7.2.3, 7.3.3	The results of the merge for a sample of non-resource databases provide some evidence that the RENs and MCE are influencing customers to participate in IOU energy efficiency programs.	Future evaluations of the RENs and MCE could replicate this analysis with additional program years and non-resource databases and attempt an attribution analysis in order to quantify the benefits of the non-resource activities.

Gross Assessment

The results of the gross assessment on MCE's small commercial and multifamily measures indicate that ex ante lifecycle savings for gross kW, kWh and therms are overestimated, with resulting gross realization rates of 76%, 80% and 97%. The evaluation team proposes specific recommendations summarized above in Table ES-2 that would improve the quality of the ex ante data reported to the CPUC by providing detailed measure descriptions and references to ex ante assumptions, and ensure that critical fields needed for savings calculations are filled in and accurate. Recommendations are also made on ways to improve ex ante estimates by utilizing recent relevant CPUC impact evaluation results and methodologies.

Although this evaluation did not update gross savings values for the RENs' multifamily measures, there is not a high level of confidence in the reliability of these values either. This statement is based on the following findings:

- The engineering review methodology used in this evaluation was unable to replicate the savings profiles for programs that claim whole building savings over existing baselines,
- The consumption analysis indicated that more than a quarter of the sites had a first year savings to annual bill ratio outside of a typical range (either less than 10% or over 50%), and
- The baseline analysis indicated that the programs claimed 100% early replacement, but participant survey responses indicated that this was not the case.

Recommendations relevant to the REN multifamily measures are also made that will ideally lead to more consistent savings values across Program Administrators, aid future evaluation efforts by collecting meter numbers to support a billing analysis, and have results more accurately reflect baseline conditions by classifying installations as either early replacement or replace on burnout.

With respect to the REN single family measures, inconsistencies between the RENs and IOUs make it difficult to assess the reliability of the current savings values. Also, a previous version of the Energy Upgrade California® (EUCA) calculator was being used by SoCalREN which incorrectly resulted in lifecycle savings being highly negative for a number of measures. This caused program level lifecycle savings, and therefore TRC and PAC ratios to also be negative (i.e., the savings claim indicated an increase in usage as a result of the installed measures).

Recommendations are made encouraging more consistency in the methods and tools used among all of the implementers for single family measures. Additional recommendations are suggested that will make future workpaper reviews more effective.

Net-to-Gross Assessment

The net-to-gross assessment was performed only for MCE small commercial measures and BayREN's multifamily measures.[3] Ex post NTGRs are found to be lower than ex ante estimates as follows: MCE small commercial ex post NTGRs weighted by kWh are 0.62 compared to the ex ante NTGR of 0.86; BayREN multifamily ex post NTGRs are 0.58 compared to the ex ante NTGR of 0.85.

MCE's small commercial NTGR is compared to the NTGRs from recent CPUC evaluations for various groupings of program types (e.g., deemed, direct install, third party and LGP program groups), which offered similar measures. Results are very similar and are not statistically significantly different. Therefore, there is no indication that MCE's program delivery is resulting in lower free ridership than other IOU programs.

Table ES-3 presents the final reported and evaluated net lifecycle MW, GWh, and MMTherms along with the associated net realization rates after applying the results of the gross and NTG assessments. Reported values are generated from the PAs' program tracking data submitted to the CPUC. The negative realization rates for SoCalREN single family measures are a result of the reported savings values being negative and corrected to be positive. Other than these negative values, and the ex ante pass-through values for BayREN single family and SoCalREN multifamily measures, realization rates are in line with what is typically seen in similar IOU program evaluations.

Table ES-3: Comparison Between Reported Versus Evaluated 2013-14 Net Lifecycle Savings with Net Realization Rates

	Reported Net Lifecycle			Evaluated Net Lifecycle			Net Realization Rates		
Program Name	MW	GWh	MM-Therms	MW	GWh	MM-Therms	MW	GWh	MM-Therms
BayREN-Multifamily	3.0	24.3	2.6	2.1	16.6	1.8	68%	68%	68%
BayREN-Single Family	5.7	1.8	0.7	5.7	1.8	0.7	100%	100%	100%
MCE-Multifamily	0.0	0.6	0.1	0.0	0.5	0.1	70%	88%	89%
MCE-Small Commercial	1.2	9.0	(0.0)	0.7	4.9	(0.0)	61%	55%	52%
SoCalREN-Multifamily	0.4	2.6	(0.0)	0.4	2.6	(0.0)	100%	100%	100%
SoCalREN -Single Family	(0.4)	(1.9)	(0.4)	1.4	0.9	0.2	-342%	-49%	-45%

[3] The MCE multifamily program had only nine unique participants and the SoCalREN multifamily program had only two unique participants. These small populations were not considered large enough to provide a reliable net-to-gross ratio (NTGR). Furthermore, there was no existing NTGR algorithm or survey battery for single family Home Upgrade participants for this study to utilize, so this program was not evaluated either for NTGRs.

Cost Effectiveness Analysis

Table ES-4 presents the projected, reported and evaluated TRC and PAC ratios by program for the 2013-2014 program years. Projected TRC and PAC values come directly from the PAs' program implementation plans (PIPs).[4] Reported TRC and PAC values are generated using the data from the PAs' program tracking data and program cost information submitted to the CPUC. Because the BayREN single family savings values are all ex ante pass through, the evaluated TRC and PAC values are the same as the reported values. Also, the corrected SoCalREN savings values for single family have resulted in positive TRC and PAC values, as expected. Otherwise, evaluated results have changed from reported in roughly the same proportion as the net realization rates presented above.

For the most part, there were very little program activities and program-related costs during the 2013 program year. The MCE small commercial program, did however, have some level of activity that occurred in 2013. Because 2013 was a start-up year, the TRC and PAC ratios were also calculated for just the 2014 program year, as shown in Table ES-5. The only values that changed significantly were for the MCE small commercial program. The TRC and PAC ratios increased when looking only at 2014, as expected. Given that the evaluated program period occurred during ramp up, one might also expect to see increased levels of participation, which may change their TRC and PAC values.

Table ES-4: Comparison Between Projected, Reported and Evaluated TRC and PAC Ratios for the 2013-14 Program Period

	TRC Ratios			PAC Ratios		
Program Name	**Projected**	**Reported**	**Evaluated**	**Projected**	**Reported**	**Evaluated**
BayREN-Multifamily	0.67	0.39	0.28	0.97	0.44	0.30
BayREN-Single Family	0.56	0.05	0.05	1.29	0.06	0.06
MCE-Multifamily	1.06	0.22	0.21	2.42	0.24	0.21
MCE-Small Commercial	1.94	1.10	0.76	9.36	1.28	0.73
SoCalREN-All*	0.74 (elec) 0.51 (gas)	(0.04)	0.02	1.26 (elec) 0.79 (gas)	(0.04)	0.03

*SoCalREN projected separate TRC and PAC Ratios for gas and electric fuels.

[4] The MCE, BayREN and SoCalREN program implementation plan can be retrieved using the following urls:
http://eestats.cpuc.ca.gov/EEGA2010Files/MEA/PIP/2013/Clean/MEA%20PIP_5%207%2013_final.pdf
http://eestats.cpuc.ca.gov/EEGA2010Files/BayREN/PIP/2013/Clean/A.12-07-001%20Supp%2002_Appendix_A_BayREN_PIP_Revised%20091813%20clean.pdf
http://eestats.cpuc.ca.gov/EEGA2010Files/SoCalREN/PIP/Clean/2014%2002%2014_Amended%20SoCalREN%20PIP_Clean%20Final.pdf

Table ES-5: Comparison Between Projected, Reported and Evaluated TRC and PAC Ratios for the 2014 Program Year

Program Name	TRC Ratios			PAC Ratios		
	Projected	Reported	Evaluated	Projected	Reported	Evaluated
BayREN-Multifamily	0.67	0.38	0.27	0.97	0.44	0.30
BayREN-Single Family	0.56	0.05	0.05	1.29	0.06	0.06
MCE-Multifamily	1.06	0.25	0.25	2.42	0.28	0.26
MCE-Small Commercial	1.94	1.52	1.15	9.36	1.95	1.05
SoCalREN-All*	0.74 (elec) 0.51 (gas)	(0.05)	0.03	1.26 (elec) 0.79 (gas)	(0.06)	0.04

*SoCalREN projected separate TRC and PAC Ratios for gas and electric fuels. Furthermore, SoCalREN TRC and PAC are for their multifamily and single family claims combined. The program costs are not reported by multifamily versus single family in the tracking data, so calculating an individual TRC and PAC was not possible.

The TRC and PAC values for MCE were compared to three PG&E programs that have a similar distribution of measure mix and participant characteristics. Table ES-6 presents a comparison of the MCE Small Commercial program and the PG&E small commercial lighting and refrigeration focused programs. Shown are the number of participants, net lifecycle savings (evaluated for MCE and the RENs, ex ante for the IOUs), and the TRC and PAC ratios. The MCE Small Commercial program was found to have TRC and PAC ratios that are less than half the size of PG&E's Madera[5] and Energy Fitness[6] programs, but not that significantly different from PG&E's Local Government Energy Action Resource[7] (LGEAR) program. Participation levels are lower by an order of magnitude compared to the LGEAR and Energy Fitness program, and about half that of the Madera program. Given the relatively small service territory of MCE, it should be expected that their participation levels are relatively low.

5 Pacific Gas and Electric Company, 2013-2014 Energy Efficiency Portfolio Local Program Implementation Plan: Government Partnerships – Madera – PGE211012, April 23, 2013.

6 Pacific Gas and Electric Company, 2013-2014 Energy Efficiency Portfolio Local Program Implementation Plan: Third Party – Energy Fitness Program – PGE210113, January 14, 2013.

7 Pacific Gas and Electric Company, 2013-2014 Energy Efficiency Portfolio Local Program Implementation Plan: Government Partnerships – Master – PGE211005-1, April 23, 2013.

Table ES-6: Comparison of 2013-14 Savings and Cost Effectiveness among MCE and PG&E Small Commercial Lighting/Refrigeration Programs

Program Name	Number of Participants	Net Lifecycle Savings			Cost Effectiveness	
		MW	GWh	MMTherms	TRC	PAC
MCE-Small Commercial	85	0.7	4.9	(0.0)	0.76	0.73
PGE-Energy Fitness	658	18.4	94.0	(0.3)	1.99	1.99
PGE-LGEAR	4,805	15.6	176.2	(0.5)	0.82	0.88
PGE-Madera	117	1.4	8.4	(0.0)	1.70	1.66

The REN Home Upgrade and Whole Building Retrofit programs' TRCs and PACs were compared to the IOU Home Upgrade and Whole Building Retrofit programs, as shown in Table ES-7. Although the BayREN multifamily program's TRC and PAC are also significantly below 1.0, they are in line with the IOUs' programs. (The IOUs do not separate out costs for their single family Home Upgrade and multifamily Whole Building programs, so TRCs cannot be developed separately for single family and multifamily components.) The REN and IOU Home Upgrade and Whole Building programs all have TRCs in the range of 0.02 and 0.21. The SoCalREN program, which is primarily comprised of single family home upgrades, and the BayREN single family program have TRC and PAC values that are barely positive and are significantly lower than the other IOU programs which, as mentioned above, do not break out single family and multifamily components. Given the similarity in REN and IOU TRC and PAC values, it is unlikely that these program types will achieve values that are near or above 1.0, without any major programmatic structural change. However, there are other important objectives that these programs strive to achieve, such as serving hard-to-reach customers and providing a greater depth of retrofit in the measures installed. These issues are discussed in greater detail below.

Table ES-7: Comparison of 2013-14 Savings and Cost Effectiveness among REN and IOU Home Upgrade and Multifamily Whole Building California Programs

Program Name	Number of Participants	Net Lifecycle Savings			Cost Effectiveness	
		MW	GWh	MMTherms	TRC	PAC
BayREN-Multifamily	95	2.1	16.6	1.8	0.28	0.30
BayREN-Single Family	684	5.7	1.8	0.7	0.05	0.06
SoCalREN-Multifamily	2	0.4	2.6	(0.0)	0.02*	0.03*
SoCalREN - Single Family	120	1.4	0.9	0.2	0.02*	0.03*
PGE-Home Upgrade and MF Whole Building	4,931	86.7	66.7	15.3	0.23	0.83
SCE-Home Upgrade and MF Whole Building	1,700	29.9	22.8	2.0	0.21	0.35
SCG-Home Upgrade and MF Whole Building	2,669	0.0	11.6	4.7	0.24	0.48
SDGE-Home Upgrade and MF Whole Building	642	5.6	4.0	0.6	0.08	0.14

*The SoCalREN TRC and PAC are for their multifamily and single family claims combined. The program costs are not reported by multifamily versus single family in the tracking data, so calculating an individual TRC and PAC was not possible.

Recommendations are made that could significantly improve the reporting accuracy of ex ante claimed cost effectiveness, savings and cost values for all the REN and MCE programs. This study found significant issues with the values provided that led to the miscalculation of first year and lifecycle savings values, and TRC and PAC ratios (which in some cases overstated the TRC and PAC values, and in another case resulted in a negative TRC value implying the program caused an increase in usage as a result of the installed measures). A comparison between the tracking data and the monthly report (2013-2014 inception-to-date fields) showed discrepancies in program expenditures, demand reduction, energy savings, and gas savings that varied from 1% up to 87,540%. Section 6 describes in more detail many of the issues found and provides some suggestions to improve future reporting of key information that leads to the assessment of cost effectiveness. The following section summarizes these issues.

Tracking Data Quality and Reliability

A number of issues arose related to the quality and reliability of the program tracking data that were received from the PAs, which are used to determine ex ante savings claims and are key inputs to calculating TRC and PAC cost effectiveness metrics.

One major hurdle encountered with the gross assessment for MCE's Small Commercial and Multifamily programs was the difficulty of tracking the source of ex ante assumptions. MCE did not provide adequate references for their deemed measures for all ex ante assumptions in their program tracking data, which could have been either specific references from the DEER or a workpaper. Also, necessary fields from the MCE tracking data that were left blank include: RUL ID, EUL ID, NTG ID, ex ante source, version of source, description of source, and measure code. Furthermore, measure descriptions were not detailed enough to determine baseline conditions or other specifics about the measure being installed. There is also a measure application type designation (e.g., ER, ROB) that describes whether a given measure should be calculated with a single baseline or dual baseline. MCE claimed an ER designation for some installations, yet failed to provide second baseline UES values making calculations of lifecycle savings values impossible.

When comparing the deemed impact parameters provided in the program tracking data to those documented in DEER (which are the correct values to be used), it was found that approximately two-thirds of the energy savings for the multifamily program and all of the energy savings from the small commercial program needed at least one update to an impact parameter. The main reason for discrepancies when comparing to the ex ante savings seems to have been due to reporting errors. For measure groups with small discrepancies, it was found the reason was usually due to small rounding errors in ex ante parameters or a mismatch in building types. For measure groups with larger discrepancies, it was found that improper references were being made to ex ante assumptions. Further, there were claims for the exact same measure code, same measure name, same building type, and same climate zone, yet there were drastically different UES values for each claim. Given the same ex ante categorizations, one should expect the same ex ante assumptions. These types of inconsistencies were found throughout the data to varying degrees.

As part of the custom lighting analysis for MCE's small commercial program, the evaluation team requested the project workbooks and applications for all of the calculated lighting projects that were conducted in 2014. These calculation workbooks detail each of the impact parameters that were used to develop the site-specific ex ante gross savings that are documented in the tracking data. There were discrepancies between the savings calculated in the workbooks and the final savings claimed in the tracking data for roughly half of the projects.

As part of the multifamily Whole Building gross assessment, the evaluation team requested tracking databases for review as part of a database assessment task. As part of this assessment, the evaluation team reviewed key fields to determine if they were adequately populated in the provided databases, including participant contact information, measure details, pre-existing conditions, property systems, property details, and utility meter numbers. The completeness of multifamily Whole Building data varied substantially between implementers. For example, initially, BayREN was not tracking necessary measure-level details; however, BayREN chose to review past project data to populate a database to facilitate this evaluation. Also, SoCalREN provided the number, quantity, and efficiency of installed measures, but not the location. Recommendations are made to ensure key fields are being adequately tracked.

There were also some issues with the calculation of ex ante lifecycle savings for the RENs in their tracking data. BayREN is calculating lifecycle savings by multiplying the EUL by first year savings, which overestimates lifecycle savings as it does not account for the replacement of the unit after the RUL. SoCalREN, however, appears to be using the correct calculation.

For SoCalREN, there are some single family measures that do not have an applicable code baseline value for the second baseline for cases when the measure is ER. The model should then just assume that the existing baseline is applicable for both baseline values, and they should be set to equal. However, the model appears to be setting the second baseline value to zero, so that the delta wattage is calculated as zero minus the installed wattage, which results in an impact that is equal to the negative value of the annual consumption. Because of this, the lifecycle savings for some measures were extremely highly negative, which had the effect of causing the overall net lifecycle savings for the program to be negative.

Finally, as mentioned above, the RENs' and MCE's tracking data are not in agreement with their 2013-2014 monthly reports. A comparison between the tracking data and the monthly report (2013-2014 inception-to-date fields) showed discrepancies in program expenditures, demand reduction, energy savings, and gas savings. As mentioned earlier, discrepancies varied from 1% up to 87,540%. It was found that the PAs did not always ensure that consistency persisted between annual reports, monthly reports, and tracking data. For example, some costs were included in the annual report, but not in the tracking data.

Overall, the quality of tracking data with respect to cost effectiveness parameters was found to be low. There are many obvious data errors that should be fixed before reporting and submitting to the CPUC. Some quality issues include: program IDs were not always consistent between measure and program data, program IDs were not consistent throughout the 2013-14 program cycle, total costs and incentives were filled in when per unit values were expected, both installation rates and realization rates were set to less than one for a particular claim, many claims reported a NTGR equal to one (which is not an approved ex ante value), and many claims

reported null NTGRs for non-zero savings. In general, data reporting protocols were not followed and as a result low quality program tracking data was produced.

Non-Resource Assessment

The RENs and MCE programs provide a number of services that do not result in direct ex ante energy savings claims, but may very well influence energy efficiency adoptions both within their own programs, in IOU programs, or actions taken outside of an energy efficiency program. Most activities are reported in their annual report and were found to be reasonably reliable, and do not tend to overstate what they have achieved.

An attempt was made to merge a sample of key non-resource tracking databases to IOU ex ante claim databases as a test to see if any IOU program participants were potentially influenced by the non-resource efforts. The number of records that merged to IOU program tracking data was on the order of the number of participants participating in the REN/MCE programs.[8] Therefore, there is evidence that REN and MCE non-resource activities have the potential to influence IOU participants. The magnitude of this effect could be significant relative to amount of participation occurring in each of the REN and MCE resource programs. However, these activities likely have a negligible effect relative to the amount of participation occurring in the IOU programs that they may be influencing. It is also important to note that a complete assessment of all non-resource efforts was not made. Also, no effort was made to identify what influence these programs have had on adoptions made outside of IOU programs (or intentions to adopt measures), which was outside the scope of this project, but could be another topic for a future evaluation.

This assessment also found that the non-resource databases provided by the RENs and MCE are generally collecting the necessary data to support future evaluations, although the quality, consistency and usability of these data sources varied considerably.

Recommendations are provided that would improve the quality of these tracking data and support future evaluation efforts of these activities, particularly if some form of an attribution assessment was to be performed on measures adopted outside of these PAs' programs.

Overall Conclusion

Overall for MCE small commercial and multifamily measures, ex ante savings values are found to be less than claimed ex ante savings but not much lower than what has been typically found in CPUC evaluations of similar IOU programs. NTGRs are no different than those found for IOU

[8] For example, 734 single family site IDs in BayREN's Home Upgrade Advisor tracking data merged to PG&E's resource program tracking data. This compares to BayREN's 684 participants in their single family program.

programs, and ex ante claimed data quality will likely be improved over time if recommendations are followed.

For BayREN and SoCalREN multifamily measures, current ex ante savings values are not considered to be reliable based on the ex ante savings review, and the NTGRs for BayREN's multifamily measures are significantly lower than ex ante estimates. Future evaluations can be aided if recommendations are followed, and may help improve the reliability of ex ante savings values.

The RENs and MCE programs also conduct a number of activities that do not result in direct ex ante energy savings claims, but may very well influence energy efficiency adoptions within their own programs, in IOU programs, or on actions taken outside of an energy efficiency program. It is important to consider the benefits that these activities may have when reviewing the program TRCs and PACs presented in this study, especially when comparing to other IOU programs that may be more focused on delivering ex ante resource savings. The magnitude of this effect could be significant relative to the level of participation occurring in each of the REN and MCE resource programs (although negligible relative to statewide IOU program participation levels). It is important to note this was not a comprehensive analysis, and did not attempt to assess the potential influence on intentions or adoptions made outside of any energy efficiency programs.

As the REN and MCE programs are still relatively new, one might expect to see increases in participation, over 2015 and into 2016. This would likely result in an increase in the programs' cost effectiveness if costs do not increase proportionally to the increase in savings. Furthermore, if there was a process available to quantify the benefits that the non-resource activities have had on influencing customers to participate in IOU programs and adopt measures outside of energy efficiency programs, this would also increase the programs' cost effectiveness. It is highly unlikely that the TRC and PAC ratios of the RENs' programs will approach 1.0 given the current values and the values of comparable IOU programs, but increased values might be more acceptable when considering other objectives that these types of programs may be trying to achieve.

As for the MCE programs, it is unlikely that the multifamily program will be cost effective in the near term based on current performance. But, the small commercial program has demonstrated in its 2014 program year that it can be cost effective.

Other important aspects to consider regarding these programs outside of a cost effectiveness metric is the ability to serve hard-to-reach (HTR) customer segments, and the depth of retrofit that is achieved by the programs' installations. All three PAs have a program component that focuses on multifamily customers, which in the past has been identified as an HTR segment. In addition, the MCE small commercial program serves a number of small and very small commercial customers, also an HTR segment. Although these are all important markets to serve,

it is not necessarily unique to the statewide portfolio for programs to be targeting these segments, as there are various IOU programs that also serve HTR markets.

Depth of retrofit metrics are meant to identify programs that are more successful in getting customers to install as many energy efficiency measures as possible and not leave energy efficiency opportunities unaddressed. Programs that focus on just the highest impact measures, in other words, those that have missed energy efficiency opportunities, may have higher resulting TRCs. These higher resulting TRCs arise because these programs only address the most cost effective measures; however they will have a lower depth of retrofit. The Home Upgrade and Multifamily Whole Building programs offered by the RENs offer a whole home/building approach, which results in a high depth of retrofit, but also has the effect of a lower project based cost effectiveness. MCE's small commercial program also delivers a wide array of indoor and outdoor lighting measures and some select refrigeration measures. While, this measure mix is not uncommon, MCE was found to install a fewer number of different types of lighting and non-lighting measures than other similar programs offered in PG&E's territory.

Finally, for the performance of these programs to be accurately assessed, the RENs and MCE need to significantly improve the accuracy and reliability of their reported savings claims and program expenditures. A number of recommendations are made in this study that will hopefully lead to more reliable estimation of ex ante savings claims, and more accurate reporting of key impact and cost parameters; and better support future evaluations of these programs.

1

Introduction

1.1 Goals and Objectives

This document presents the evaluation report for the impact assessment of the energy efficiency programs offered by the 2013-14 Regional Energy Networks (RENs) and Community Choice Aggregator (CCA). The primary goal of this study was to perform an impact assessment on specific measures offered by the RENs and CCA to develop more reliable estimates of program cost effectiveness. It is important to note that a more rigorous ex post impact evaluation is planned for these programs in 2016. Therefore, the objective of this study was to perform a set of quick turnaround tasks that update some key impact parameters using primary data collection (for NTG analysis) and utilizing results from recent gross ex post impact evaluations (for key nonresidential lighting measures), which can be used to develop more reliable estimates of program cost effectiveness. Furthermore, because most of the ex ante claimed savings is associated with measures that do not have recent impact evaluation findings that can be directly applied, a high level assessment of the ex ante savings assumptions, including a comparison between RENs/CCA and investor owned utility (IOU) ex ante impact assumptions was made to identify if there are any obvious over- or understatements of impacts being claimed. Therefore, this study includes the following.

- A high level assessment of the gross ex ante savings values being used for all programs claiming ex ante savings. This includes:
  - Reviewing the ex ante work papers and, for the CCA program, correcting errors in the program tracking databases for the ex ante calculations of deemed measures,
  - Comparing the ex ante assumptions used by the RENs and CCA with those used by the IOUs,
  - Updating gross savings values for selected nonresidential lighting measures for the CCA program based on recent CPUC ex post impact evaluations, and
  - Performing a review of a sample of custom lighting applications for the CCA program and updating gross savings values.
- Development of ex post net-to-gross ratios (NTGRs) for selected measures, and
- Estimation of program cost effectiveness using the updated savings values developed in the gross impact assessment and NTGR analysis described above.

In addition, this study documents accomplishments of the non-resource program components and assesses the ability of the current tracking systems in place for these activities to support future evaluations (i.e., an evaluability assessment). Although no specific attribution of savings is made based on these non-resource accomplishments, this documentation of additional activities that are being conducted by the programs may provide value beyond that which can be measured by the cost effectiveness tests. Future studies may wish to try to better quantify these non-resource accomplishments, which is why an evaluability assessment has been made.

This report includes the evaluation goals and objectives, the researchable issues, information on the programs and measures included in the evaluation, data sources used, the sampling approach, the methods by which these measures are evaluated, results of the analysis, and conclusions and recommendations.

1.2 Overview of 2013-2014 Programs to be Studied

Three PAs (two RENs and one CCA) offer various programs:[9]

- Marin Clean Energy (MCE),[10]
- San Francisco Bay Area Regional Energy Network (BayREN),[11] and
- Southern California Regional Energy Network (SoCalREN).[12]

Each program administrator (PA) offers a combination of resource programs (those that claim ex ante savings) and non-resource programs. All resource programs are included in the gross savings assessment, while only a subset are covered under the net-to-gross analysis, as described below. The majority of the non-resource programs are included in the evaluability assessment and accomplishments documentation. Note that the Financing program elements and the Codes and Standards related program elements are not included in either assessment as there are

[9] Subprogram descriptions were taken from Program Implementation plans and were revised based on comments provided by BayREN during the evaluation plan public comment period.

[10] The MCE program implementation plan can be retrieved using the following url: http://eestats.cpuc.ca.gov/EEGA2010Files/MEA/PIP/2013/Clean/MEA%20PIP_5%207%2013_final.pdf

[11] The BayREN program implementation plan can be retrieved using the following url: http://eestats.cpuc.ca.gov/EEGA2010Files/BayREN/PIP/2013/Clean/A.12-07-001%20Supp%2002_Appendix_A_BayREN_PIP_Revised%20091813%20clean.pdf

[12] The SoCalREN program implementation plan can be retrieved using the following url: http://eestats.cpuc.ca.gov/EEGA2010Files/SoCalREN/PIP/Clean/2014%2002%2014_Amended%20SoCalREN%20PIP_Clean%20Final.pdf

separate California statewide evaluations being conducted for Financing[13] and for Codes and Standards.[14]

1.2.1 MCE Program Components

MCE's program consists of the following for sub-programs.

- **The MCE Multifamily Program** consists of customized improvements designed to maximize investment in energy efficiency while overcoming the split incentive barrier. The program has been designed to reduce barriers to retrofits by providing technical assistance and incentives to multifamily property owners. MCE promotes these retrofits through targeted outreach and training to property owners and contractors, and makes financing options available through MCE On-Bill Repayment OBR or future Bay Area Regional Energy Network (BayREN) Programs that may include Property Assessed Clean Energy ("PACE") and loan loss reserve. The program also broadens the engagement of stakeholders in messaging and marketing campaigns that factor social and economic co-benefits to customers into the value of energy efficiency upgrades.

  This program is included in the gross impact assessment, but is not included in the NTG analysis due to the low number of participants. Any non-resource sub-elements are also included in both the evaluability and the accomplishments assessments.

- **The MCE Small Commercial Program** is a multiple measure program for small commercial high energy use segments which include, but are not limited to, restaurants, retail, and professional services. The Small Commercial Program reduces barriers to retrofits by providing technical assistance and incentives to building owners. MCE promotes these retrofits through targeted outreach and training to property owners and contractors, and will make financing options available through MCE OBR or future BayREN Programs that may include commercial PACE and loan loss reserve.

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[13] The series of impact evaluations that cover financing programs are: Impact Evaluation #1 – Cross-Cutting Background and Attribution Research, Impact Evaluation #2 – Multiphase On-Bill Financing Study, Impact Evaluation #3 –Annual Snapshot and Verification Study, and Impact Evaluation #4 – End of Cycle Studies: 1) ARRA-Originated and Regional Finance Pilots; 2) Statewide Pilots. The studies are cited in the Energy Division and Program Administrator Energy Efficiency Evaluation, Measurement & Verification Plan, Version 5. May 2015.

[14] The Codes and Standards study is the 2013-2014 Codes & Standards Impact Evaluation. The study is cited in the Energy Division and Program Administrator Energy Efficiency Evaluation, Measurement & Verification Plan, Version 5. May 2015.

This program is included in both the gross impact assessment and the NTG analysis. Any non-resource sub-elements are also included in both the evaluability and the accomplishments assessments.

- **The MCE Single Family Program** enables energy and water savings with associated cost reductions through behavior changes, upgrading of appliances, and water conservation measures that affect energy. Funding is primarily for innovative education and outreach programs, web-based action plan tools, and support services. The program includes targeted canvassing and outbound mailer "Energy Reports" to drive participation in the web-based tools and help customers identify key savings opportunities. Additionally, the program supports the MCE finance pilots with targeted marketing and markets other regional programs, including the Pacific Gas & Electric (PG&E) Advanced Home Upgrade California program and the BayREN Home Upgrade program.

  This program is included in both the evaluability and the accomplishments assessments.

- **Finance Pilots Program**. MCE is piloting two innovative finance programs to ensure that retrofits are financially competitive and accessible to a broader and more diverse range of property owners for each of MCE's direct service elements: an On-Bill Repayment (OBR) and a Standard Offer (SO) Energy Efficiency pilots program. The funding is available to help build the OBR and SO frameworks to enable financing of underserved markets. The OBR program allows private banks or financing entities to provide financing to building owners, with the repayment charge placed as a line item on the bill that includes MCE charges. The OBR also includes a credit enhancement for programs to meet the needs of these underserved segments. For Standard Offer, there is no need for capital investment by the property owner. Energy savings will be bid in from an applicant (or implementer) from either customer category. Energy savings will then be paid based on ″avoided costs″ of energy demand or other energy-related savings.

  This program was not evaluated as there is a set of ongoing California Statewide Financing program evaluations being conducted. This study does provide a listing of Financing program non-resource accomplishments that were presented in MCE's 2014 Annual Report in Appendix B.

1.2.2 BayREN Program Components

BayREN offers four different program elements.

- **The BayREN Single Family Home Upgrade** service is available to owners of single family detached homes in the BayREN territory who are customers of PG&E. BayREN

offers the Home Upgrade program. BayREN does not implement the Advanced Home Upgrade program, but does provide rebate of up to a maximum of $300 to customers that have completed an Advanced Home Upgrade project with PG&E. PG&E pays the incentive. Participants of the Home Upgrade program choose a minimum of three upgrade measures, each with a predetermined point value. The more points earned, the higher the incentive. Incentives are awarded at $10 per point, up to a maximum of $3,000.[15] By lowering logistical costs and overcoming technological and education barriers for participants, as well as by reducing costs for participating contractors through streamlined program design and implementation, Home Upgrade is poised to broaden participation of skilled, specialty contractors and deliver a highly accessible upgrade product to market. Key program elements include the addition of an alternative and multiple upgrade package incentives, enhanced marketing efforts, development of targeted audit incentives (Advanced Home Upgrade available through PG&E only), streamlined enrollment and reporting systems, integration of improvements related to the water-energy nexus, and the implementation of the Home Upgrade Advisor service to support homeowners and contractors through the process.

This program is included in the gross impact assessment, but is not included in the NTG analysis. Any non-resource sub-elements are also included in both the evaluability and the accomplishments assessments.

- **The Bay Area Multifamily Whole Building** service conducts targeted outreach to multifamily property owners to promote participation. It is marketed under Energy Upgrade California®. This service allows property owners to receive free technical assistance designed to lower barriers to multiple measure upgrades through technical and financing assistance. Property owners receive customized scopes of work designed to reduce building energy use. Projects with larger scopes of work are referred to the utility whole-building program rebates. Building owners are eligible for a $750 per unit rebate upon completing the energy efficiency improvements identified in the scope of work.

  This program is included in both the gross impact assessment and the NTG analysis. Any non-resource sub-elements are also included in both the evaluability and the accomplishments assessments.

- **The BayREN Codes and Standards Subprogram** consists of three components: enforcement of existing codes, training, and sharing best practices for reach codes. The enforcement effort focuses on establishing a baseline for current code compliance within

[15] In order to offset the cost of the requisite combustion appliance zone (CAZ) test, BayREN began to offer a $150 rebate to offset the cost of the test beginning in February of 2014.

jurisdictions from each of the nine Bay Area counties, creating metrics for ongoing measurement and identifying mechanisms for improving the current level of compliance. Simultaneously, the program is designed to enhance the enforcement of existing codes through training for local government personnel and building professionals. The menu of training opportunities is targeted to specific functional areas. BayREN intends to work closely with key industry associations, such as the California Building Officials (CalBO), in delivering these trainings and regularly hosts regional forums for local government staff to share and align their enforcement activities.

This sub-program was not evaluated as there is an ongoing California Statewide Code and Standards program evaluation being conducted. This study does provide a listing of this sub program's non-resource accomplishments that were presented in BayREN's 2014 Annual Report in Appendix B.

- **The BayREN Energy Efficiency Financing Portfolio** (the Financing Portfolio) has three programs:

  1. Pay-as-you-Save™: BayREN partners with municipal water utilities to design and support the implementation of an on- bill water and energy financing program that allows customers to pay for efficiency improvements on their water bill.

  2. Commercial PACE: BayREN has a limited budget designated for marketing and outreach activities, and has conducted extensive contractor outreach and trainings.

  3. The Multifamily Capital Advance subprogram offers co-financing at zero interest, leveraging an equivalent amount or more of private capital, to help remove the barriers of upfront costs of energy efficiency upgrades to property owners in the hard-to-reach multifamily market.[16]

  This portfolio was not evaluated as there is an ongoing California Statewide Financing program evaluation being conducted. This study does provide a listing of these program non-resource accomplishments that were presented in BayREN's 2014 Annual Report in Appendix B.

[16] D.12-11-015 deferred consideration of this program to D.13-09-044 regarding the statewide Financing pilots. Consequently, this program's approval was delayed until September, 2013.

1.2.3 SoCalREN Program Components

The SoCalREN offers services in the following three key program areas:

- **Home Upgrade and Multifamily Whole Building Upgrade.** The SoCalREN offers the Home Upgrade and Multifamily Whole Building Upgrade program components to all interested participants in Southern California Edison's (SCE's) and Southern California Gas' (SCG's) service territories. Additional services offered through the SoCalREN pilot are as follows:
  - Local Marketing and Outreach,
  - Green Building Labeling,
  - Single Family and Multifamily Upgrades,
  - Contractor Outreach and Training, and
  - Low-Income Single Family Housing Upgrades.

This suite of programs is included in the gross impact assessment. Any non-resource sub-elements are also included in both the evaluability and the accomplishments assessments.

- **Financing.** The SoCalREN offers financing options to local governments to supplement the on-bill financing offered by the IOUs and, therefore, enable greater investments in deep energy savings. Specific services offered are as follows:
  - Public Building Financing Programs Information and Outreach,
  - Private residential financing Loan Loss Reserve,
  - Nonresidential PACE, and
  - Public Building Revolving Loan Fund Information and Outreach.

This program was not evaluated as there is an ongoing California Statewide Financing program evaluation being conducted. This study does provide a listing of these program non-resource accomplishments that were presented in SoCalREN's 2014 Annual Report in Appendix B.

- **Regional Energy Center.** Building on the current Regional Energy Center which was launched with Flight 5.6 funds,[17] the SoCalREN is offering comprehensive technical support to local governments and other public entities to enable them to implement

[17] Flight 5.6 funds refers to a competitive grant program initiated by Southern California Edison (using ratepayer EE funds) that was a part of their Local Government Partnership program efforts to fund local government actions that were in alignment with and supported the local government-related efforts described in the California Energy Efficiency Strategic Plan.

deeper and more cost effective energy management practices. Specific services include the following:

- An aggregated regional procurement and contracting program,
- Utilization of the Enterprise Energy Management Information System (EEMIS) for integrated and comprehensive energy data management,
- Region-wide building benchmarking and EM&V,
- Support of local Climate Action and Energy Action plans to move to implementation,
- Creation of a water-energy nexus pilot with water utilities,
- Development of a regional energy project tracking and permitting system, and
- Workforce development.

This program is included in both the evaluability and the accomplishments assessments.

Table 1-1 below summarizes the analyses that were conducted for each of the PA's programs.

Table 1-1: Analyses Conducted for REN and CCA 2013-2014 Programs

PA	Program	Gross Impact Assessment	NTG Analysis	Cost Effectiveness Analysis	Evaluability Assessment	Accomplishments Assessment
BayREN	Single Family Home Upgrade	X		X	X	X
	Multifamily Whole Building	X	X	X	X	X
	Codes and Standards Program					
	Energy Efficiency Financing Portfolio					
SoCalREN	SF Home Upgrade and MF Whole Building	X		X	X	X
	Financing					
	Regional Energy Center				X	X
MCE	Multifamily Program	X		X	X	X
	Small Commercial Program	X	X	X	X	X
	Single Family Program				X	X
	Financing Program					

1.3 Overview of Measures to be Studied

Table 1-2 presents the first year gross ex ante savings values 2013-2014 for each program, by sector and measure group. This summary includes all measures for which there was an ex ante savings claim. The two REN PAs offer the Single Family Home Upgrade and Multifamily Whole Building programs, both of which are whole building retrofit programs with a suite of measures. The MCE program offers a wide variety of energy efficiency measures in both the residential and nonresidential sectors. However, 91% of the MCE program's claimed electric savings are in the nonresidential sector, and 82% of claimed savings are focused on nonresidential lighting. The MCE's claimed gas savings are focused on residential faucet aerators and showerheads, which comprise 69% of the total claimed savings.

As mentioned above, all of these measures are included in the gross impact assessment. However, only the BayREN Multifamily Whole Building Retrofit and the MCE Small Commercial measures are included in the NTG analysis.

Table 1-2: Summary of 2013-2014 First Year Gross Ex ante kW, kWh and Therm Savings by Program and Measure Group

			First Year Ex Ante Claimed Savings 2013-2014		
PA	**Sector**	**Measure Group**	**kW**	**kWh**	**Therms**
BayREN	Multifamily	Whole building retrofit	198	1,590,268	169.808
BayREN	Single family	Whole building retrofit	289	188,323	49,105
		Total	**488**	**1,778,591**	**218,912**
SoCalREN	Multifamily	Whole building retrofit	80	385,255	14,650
SoCalREN	Single family	Whole building retrofit	135	81,014	11,281
		Total	**215**	**466,269**	**25,931**
MCE	Multifamily	Building envelope Window film	-	-	19
MCE	Multifamily	Lighting indoor CFL basic	2	24,315	(598)
MCE	Multifamily	Lighting indoor CFL fixture	1	5,807	(35)
MCE	Multifamily	Lighting indoor CFL globe	0	100	(3)
MCE	Multifamily	Lighting indoor linear fluorescent	1	5,662	-
MCE	Multifamily	Lighting outdoor CFL basic	-	16,895	-
MCE	Multifamily	Lighting outdoor LED fixture	-	23,183	-

Table 1-2 (Cont'd): Summary of 2013-2014 First Year Gross Ex ante kW, kWh and Therm Savings by Program and Measure Group

PA	Sector	Measure Group	First Year Ex Ante Claimed Savings 2013-2014		
			kW	kWh	Therms
MCE	Multifamily	Other	0	1,168	1,417
MCE	Multifamily	Pipe insulation hot application	-	-	296
MCE	Multifamily	Water heating faucet aerator	0	194	2,423
MCE	Multifamily	Water heating showerhead	-	-	3,220
MCE	Multifamily	Water heating storage water heater	0	15	753
MCE	Small Commercial	Lighting indoor CFL basic	1	3,028	(22)
MCE	Small Commercial	Lighting indoor CFL other	12	54,811	(365)
MCE	Small Commercial	Lighting indoor occupancy sensor	-	554	(2)
MCE	Small Commercial	Lighting indoor LED fixture	2	9,271	(66)
MCE	Small Commercial	Lighting indoor LED lamp	24	164,447	(1,076)
MCE	Small Commercial	Lighting indoor LED other	8	56,070	(358)
MCE	Small Commercial	Lighting indoor LED reflector lamp	6	26,404	(172)
MCE	Small Commercial	Lighting indoor linear fluorescent	34	116,134	(516)
MCE	Small Commercial	Lighting indoor linear fluorescent delamping	9	28,470	(157)
MCE	Small Commercial	Lighting outdoor CFL basic	-	24,745	-
MCE	Small Commercial	Lighting outdoor LED other	14	229,370	(484)
MCE	Small Commercial	Other	0	640	(3)
MCE	Small Commercial	Refrigeration case LED lighting	4	21,103	(163)
MCE	Small Commercial	Refrigeration door closer	0	3,005	-
MCE	Small Commercial	Refrigeration other	8	57,569	(87)
		Total	**125**	**872,920**	**4,021**

2

Overview of Evaluation Approach

This impact assessment of the REN and CCA programs consists of four distinct components, each of which are discussed in detail in this section.

- Assessing the gross ex ante savings values being used, and developing evaluated gross savings values based on this assessment utilizing recent impact evaluation results from relevant studies for key measures,
- Developing ex post net-to-gross ratios (NTGRs) for selected measures,
- Estimating program cost effectiveness using the updated savings values, and
- Documenting the accomplishments that the non-resource components of the programs have had and assessing the ability of the current tracking systems in place for these activities to support future evaluations.

2.1 Gross Ex ante Savings Assessment and Updated Savings Development

Table 1-2 presents the first year gross ex ante savings values for 2013-2014 for each program, by measure group. The programs saw little to no participation in 2013 and were still in the "ramp-up" phase throughout 2014. Because of this, a rigorous impact evaluation was not proposed. Rather, an assessment of the ex ante savings values was conducted. A more detailed impact evaluation is planned for the next evaluation cycle that will include 2015 participation.

2.1.1 MCE Small Commercial and Multifamily Measures

For the MCE programs, there were a variety of residential and nonresidential measures offered. The assessment of these measures included both a review of the ex ante assumptions and a comparison to the IOU values. This task included correcting errors in the program tracking databases for the ex ante calculations of deemed measures, such as applying incorrect DEER parameters, and comparing the corrected ex ante values to the claimed values.

A number of the nonresidential lighting measures were recently evaluated as part of the 2013 Nonresidential Downstream Deemed Efficiency Savings and Performance Incentives (ESPI) Impact Evaluation. This study updated unit energy savings (UES) values for some of the

nonresidential lighting measures offered by MCE. Also, the 2010-12 Nonresidential Downstream Lighting (NRL) Impact Evaluation[18] evaluated additional measures offered by the MCE program. These studies included the following nonresidential lighting measures – compact fluorescent lamps (CFLs), light emitting diode (LED) lamps and reflector lamps, linear fluorescents, high bay linear fluorescents, delamping, high intensity discharge lamps (HIDs) and occupancy sensors. For measures covered under these recent studies, the evaluation results were applied to develop updated savings values.

Although lighting measures comprise 90% of the gross first year claimed savings for MCE's small commercial program, only 12% are deemed indoor lighting measures. Custom lighting measures, however, comprise 78% of the first year claimed gross savings. Because of this, a sample of custom lighting applications was also reviewed and savings values were developed based on this review.

As a result of these activities, savings values were developed for the majority of small commercial measures. For the multifamily measures and the remaining small commercial measures, corrected ex ante values were developed as mentioned above. These evaluated and corrected ex ante values were used to update the cost effectiveness values as described in more detail below.

Note that no new data collection was used for this task.

2.1.2 BayREN and SoCalREN Multifamily Measures

This task consisted of both an assessment of ex ante savings claims, as well as a baseline assessment. The assessment of ex ante savings used three methods to evaluate the reasonableness of savings claims: (1) a review of engineering simulation model assumptions, (2) an engineering desk review, and (3) a consumption analysis.

Each task is described in more depth in the following sections.

Savings Assessment

The evaluation team conducted a high-level assessment of the ex ante savings assumptions, including a comparison between REN and investor-owned utility (IOU) ex ante impact assumptions and potential over- or understatements of impacts being claimed. Each of the three related savings assessment tasks includes the following.

[18] http://www.energydataweb.com/cpuc/deliverableView.aspx?did=1155&uid=0&tid=0&cid=

- **Engineering simulation model review.** The goal of this task was to verify that the key input assumptions for similar measures were being recorded and entered into the simulation software in a consistent manner, ensuring comparable energy savings claims where appropriate.
- **Engineering desk review.** The goal of this task was to compare the ex ante savings claims, as calculated by the RENs through simulation models, to savings claims that would have been generated using engineering algorithms for individual measures.
- **Consumption analysis.** The goal of this task was to confirm that modeled savings were proportionate to the actual energy savings of the project.

Baseline Assessment

Typically, two baseline options are used to calculate savings claims for retrofit (existing construction) projects:

- **Early replacement (ER),** whereby the building owner/manager was not planning to upgrade the equipment in absence of the program. This means that the existing equipment could serve as the baseline with an adjusted measure life based on the equipment's expected remaining useful life (RUL).
- **Replace on burnout (ROB),** which can occur either when existing equipment fails or the building owner/manager was already planning to upgrade—by installing new equipment—in absence of the program. In these cases, current codes/standards would serve as the baseline for the entire expected useful life (EUL) of the equipment. The assumption is that the equipment would have been replaced anyway, but the program motivated the decision maker to upgrade from standard efficiency to high efficiency equipment.

The evaluation team used a decision-maker telephone survey to estimate the percentages of ER and ROB participant measures, respectively. The results of this assessment help to inform baseline determinations for both past and future program efforts.

Additionally, the evaluation team reviewed the CPUC tracking databases to assess whether the lifecycle savings correctly accounted for the ER baseline in the REN calculations. Specifically, lifecycle savings for early replacement projects should be calculated using the early replacement baseline for the RUL period, then using a code baseline for the remainder of the EUL, or

$$Lifecycle\ Savings = (RUL * Savings_{ER}) + \big((EUL - RUL) * Savings_{Code}\big)$$

To do this, the evaluation team recalculated the lifecycle savings using the data provided in the CPUC tracking database and assessed whether this calculation was followed.

2.1.3 BayREN and SoCalREN Single Family Measures

The focus on the gross assessment for the BayREN and SoCalREN single family measures was to analyze and compare savings calculations contained in the PA workpapers with the savings reported in the CPUC claimed savings tracking data. Workpapers were analyzed in order to:

- Assess program documentation quality,
- Assess consistency of assumptions across program administrators,
- Assess measure and package level savings estimates, and
- Assess accuracy of savings claims.

This analysis also identified the critical inputs and assumptions used by each workpaper to estimate baseline energy and how these were adjusted to produce energy savings estimates.

Although there was no initial plan to develop ex post savings values for these single family measures as a result of these analyses, errors were identified in the development of ex ante savings values. These errors were corrected and resulting adjusted ex ante savings values were developed and presented in this study.

2.2 Net-to-Gross Analysis

A net-to-gross (NTG) analysis was conducted for selected measures. For the commercial measures offered under the MCE program, a sample of participants was surveyed by phone to estimate net-to-gross ratios (NTGRs). The survey battery and analysis approach for estimating NTGRs relied on the existing NTGR algorithm used for the 2013 Nonresidential Deemed ESPI Impact Evaluation.[19] The NTGRs developed for the MCE program were compared to the NTGRs developed as part of the 2010-12 Nonresidential Downstream Lighting Impact Evaluation[20] for third party programs and the 2013 Nonresidential Deemed ESPI impact evaluation of lighting measures. These are the most recent and relevant studies to be completed, and the algorithm and survey battery are currently being used for the 2014 Nonresidential Deemed ESPI Impact Evaluation.[21]

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19 2013 Nonresidential Deemed ESPI Impact Evaluation Final Report: http://www.energydataweb.com/cpuc/deliverableView.aspx?did=1253&uid=0&tid=0&cid=

20 2010-12 Nonresidential Downstream Lighting Impact Evaluation Final Report: http://www.energydataweb.com/cpuc/deliverableView.aspx?did=1155&uid=0&tid=0&cid=

21 2014 Nonresidential Deemed ESPI Impact Evaluation Research Plan: http://www.energydataweb.com/cpucFiles/pdaDocs/1210/PY2013-2014%20Deemed%20ESPI%20Research%20Plan_PDA.pdf

Similarly, a sample of BayREN multifamily Whole Building program participants were surveyed to estimate NTGRs. The survey battery and analysis approach for estimating NTGRs relied on the existing approach and survey instrument that was developed for the 2013-2014 statewide multifamily evaluation that is currently being conducted.[22]

NTGR analysis was not conducted for any single family Home Upgrade whole building retrofit suite of measures as there is no existing approach that has been utilized by the statewide single family study. Furthermore, because of the small number of participants in MCE's multifamily program and in the SoCalREN multifamily Whole Building program, a NTGR analysis was not conducted. With only two unique customers in SoCalREN's multifamily program and only nine in MCE's multifamily program, a reliable estimate of the NTGR could not be developed.

2.3 Cost Effectiveness Analysis

Utilizing the evaluated results from the gross and NTG analyses, revised cost effectiveness metrics were developed for each of the programs evaluated. The results were compared to those based solely on claimed ex ante savings values. Finally, a comparison was made to a variety of IOU programs that are considered to have some similarities in program delivery and measures offered.

2.4 Non-Resource Program Component Assessment

This task consists of two activities: documenting the accomplishments of the non-resource program components and assessing the ability of the current tracking systems in place for these activities to support future evaluations. In addition, merges to IOU tracking data were conducted using a selected set of databases provided by the RENs and CCA to gauge how effectively non-resource program activities have led to participation in PA resource programs.

The purpose of documenting the accomplishments of the non-resource program components is to identify the value these programs might have provided beyond the ex ante energy savings claims they have made. The PAs have documented a number of accomplishments in their Annual Reports. This includes various activities, such as local outreach, contractor outreach and training, green building labeling, financing, technical assistance and others. The evaluation team worked with the PAs to identify other accomplishments not already documented in their Annual Reports as well. In addition, the team also examined their participant tracking records and summarized any activities that are being recorded in those databases.

The purpose of the tracking system assessment was to determine if the PAs have collected sufficient data on customers and contractors that participate in their non-resource activities, such

22 The CPUC multifamily evaluation study being conducted is 2013-2014 Multifamily Focused Impact Evaluation.

that a future evaluation could be conducted. For example, the evaluation team investigated if contact information is available so customers and contractors participating in the various activities (such as those mentioned above) can be interviewed. The databases were also investigated to see if they contained data fields, such as account numbers or service addresses, such that records can be merged to IOU program tracking data to determine if the non-resource program participants have gone on to participate in IOU programs. For a select number of non-resource activities, merges of the related datasets to IOU program tracking data were attempted to determine if any of non-resource program participants have gone on to participate in IOU programs. Finally, the quality of the data being recorded was assessed to determine how often key fields are missing or contain unusable data. As a result of this assessment, recommendations were made on how to improve the quality of the tracking databases so that future evaluation work can be performed.

Although no new data collection was required for this activity, it required a substantial amount of coordination with the PAs to obtain and assess their tracking data.

3

Data Sources and Sample Design

This section of the report outlines key primary and secondary sources of information that were used to support the research activities of this evaluation, which included the following:

- Resource and non-resource program tracking data
- Decision-maker survey,
- Calculated measure applications and calculation workbooks,
- REN and IOU simulation models,
- The Database for Energy Efficiency Resources (DEER),
- Utility workpapers, and
- Utility Customer Information System (CIS) energy consumption (billing) data.

In addition, the team used previously vetted analysis methods, such as the CPUC Energy Division's Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers[23] (referred to hereafter as the "framework"). This ensures consistency across evaluations, allows comparisons between programs, and ensures that the survey batteries have been properly vetted. Both the free ridership (FR) and early replacement (ER) batteries have been customized to the unique characteristics of the RENs.

3.1 Key Data Sources

This section outlines the primary and secondary data sources the evaluation team used in the impact assessment tasks.

3.1.1 Resource and Non-resource Program Tracking Data

Program tracking data were utilized from each of the PAs for all of their programs. For the resource program elements, these databases served as the source of the ex ante claimed savings,

[23] Energy Division, CPUC. Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers. Prepared by the Nonresidential Net-To-Gross Ratio Working Group. October 16, 2012.

and the NTG sample was drawn from these data. Although the evaluation focused on 2013-14, participants in the first half of 2015 were also included in the NTGR sample to increase the sample frame population so more surveys could be completed.

Furthermore, program tracking data corresponding to all non-resource activities were also obtained to support the non-resource assessment. This allowed for the verification of non-resource accomplishments and an evaluability assessment of the tracking data to be performed.

3.1.2 NTGR and REN Baseline Participant Phone Surveys

This study implemented a phone survey of commercial MCE and multifamily Whole Building BayREN customers to support the NTG analysis. The participant populations for the MCE commercial and BayREN multifamily programs are limited, so a census was attempted. Table 3-1 summarizes participation by Program Administrator and program for these program elements, presenting the ex ante savings values for 2013-14 along with the number of applications contained in the tracking data, the targeted sample size, the number of completed phone surveys, and the percentage of the first year ex ante claimed savings that the completed phone survey sample represents.

Table 3-1: NTGR Phone Survey Completes by Program Administrator and Program

PA	Program	First Year Ex Ante Claimed Savings			Number of Applicants	Target Sample	Completed Surveys	% of kWh Completed
		kW	kWh	Therms				
BayREN	Multifamily	198	1,590,268	169,807	125	20	43	47%
MCE	Small Commercial	121	795,622	(3,471)	84	20	20	23%

For both surveys, customers were surveyed via telephone interviews, by seasoned interviewers who could schedule and adjust telephone appointments, make additional phone calls to talk with multiple decision makers (as necessary or when recommended by the primary contact), and had ample time to complete the interviews.

The REN multifamily participant survey was also used to support the baseline review portion of the impact assessment. The REN multifamily survey targeted property managers, owners, or other primary decision makers involved in executing the program at the property level, whereas

the MCE small commercial survey targeted participating customers.[24] Contacts for these surveys were derived from the program tracking databases. Survey topics included the following:

- Confirmation/verification of installed measures,
- Anticipated actions in absence of program intervention,
- Importance of program education and incentives on the decision to install high efficiency equipment,
- Working status and estimated age of replaced units, and
- Timing for building maintenance/upgrades.

For the multifamily survey, past evaluations have found that property owners and managers are challenging to contact. To increase the response rate, the evaluation team worked with the RENs to send notifications to participant contacts to inform them that the survey was pending and to encourage them to participate. As shown in Table 3-1, this effort resulted in a very high response rate. Of the 92 property owners representing 125 project applications in the 2013–2015 REN multifamily programs, the evaluation team completed surveys with 43 respondents.[25] Projects where contact information was not provided by the RENs were excluded from the telephone survey efforts.[26]

3.2 Additional Data Sources Supporting the MCE Assessment

3.2.1 Calculated Applications

To support the development of the updated savings values for calculated indoor lighting projects rebated under MCE's Small Commercial Program, applications and supporting calculation workbooks were obtained for a sample of projects. These calculation workbooks detail each of the impact parameters that were used to develop the site-specific ex ante gross savings that are documented in the tracking data.

[24] The REN multifamily programs target whole building multifamily retrofits that are conducted and implemented by the property owner. As such, these surveys did not target the tenant population because they were not assumed to be part of the decision-making process.

[25] In cases where a single property owner has more than one property participating in the REN program, the interviewer first completed the survey on a single property, then conducted the survey on a second or third property record.

[26] In instances where there was a participant address, but no telephone information, the evaluation team mailed a recruitment letter (with a callback phone number to complete the survey), in hopes that the participant would call the research firm and take the survey. This occurred in seven of the 125 applications, or 6%.

3.3 Additional Data Sources Supporting the Multifamily REN Assessment

The engineering simulation model review, engineering desk review, and consumption analysis relied on a wide variety of data sources to compile a complete picture of the reliability of savings claims. The evaluation team required a number of sources because comprehensive multifamily projects are often large in scope and experience high tenant turnover. In addition, program databases often have only limited details on pre-existing and installed measures. These characteristics require more complex analysis than traditional measure-level incentive programs.

3.3.1 Engineering Simulation Model Review

The RENs and IOUs both use the EnergyPro building simulation software[27] to estimate measure impacts associated with the multifamily Whole Building program. The evaluation team's primary goal with the model review task was to understand the similarities and differences between the BayREN and SoCalREN inputs and assumptions and the IOU models, and ensure that there were no significant differences that could result in inconsistent model use. Using the models inconsistently could ultimately affect the energy savings estimates resulting from the models. PG&E, San Diego Gas & Electric (SDG&E), SCE, and SCG all offered comprehensive multifamily programs in 2013 and 2014, similar to the REN programs. The SDG&E projects were chosen (over the other California IOUs) to compare with the REN programs because SDG&E had full measure-level data and had completed Multifamily Whole Building projects in the 2013–2014 program cycle.

To accomplish the model review task, the team used three data sources and two distinct sets of interviews. The data sources included (1) the tracking database from each REN and from SDG&E; (2) the EnergyPro building simulation files; and, if available, (3) any supplemental (external to EnergyPro) project calculation files provided by the RENs and SDG&E. The interviews included (1) discussions with evaluation team engineers who were familiar with the EnergyPro model and (2) in-depth interviews with three independent staff members responsible for either running or reviewing the EnergyPro models for the two RENs and for SDG&E.

The evaluation team covered the following topics during the interviews.

- Who enters the building data? Who is in charge of calculating savings both within and outside the EnergyPro Software?
- Does anyone with your organization or outside of your organization review the model inputs?

[27] Please see http://www.energysoft.com/ for additional model details.

- If contractors are using this, how are they trained? Do they follow standard practices, and if so, what are those practices? Do they have standard certifications? Is there a guidebook or handbook on your internal EnergyPro standard inputs or practices?
- What happens to savings estimates from the models? Are they shared with your group for review?
- Do the contractors or your team also develop or use other models or spreadsheets outside the EnergyPro software for other measures (which might include appliances, lighting, and small water heating measures such as showers and faucets)? Are all measures input into the model, or are some calculated outside the model?
- If calculated outside the model, what programs are used?
- Do other entities use these external programs, or just your organization?
- What baseline assumptions are used (ROB [code] versus ER)? How do contractors make this distinction?
- Do you use the residential model, commercial model, or some combination of the two?
- Do you use actual billing data to calibrate to actual building consumption?

3.3.2 Engineering Desk Review

The evaluation team chose six projects for the engineering desk review. The projects were stratified and chosen based on relative contributions of savings (in kBtu, to combine electric and gas savings) to the total program portfolio. The evaluation team chose two high-savings projects, two mid-level savings projects, and two small/low-level savings projects. In this manner, the evaluation team could determine if the models more closely matched engineering savings based on their size. Table 3-2 illustrates the projects evaluated during the engineering desk review and the associated ex ante savings. In total, these projects represented approximately 21% of the claimed savings for the combined BayREN and SoCalREN projects, with the top two projects representing 11.3% and 8.7% of savings, respectively.

Table 3-2: Engineering Desk Review Evaluated Sample, By Project

Project Number	REN	Ex Ante kBtu	Type
Project 1	BayREN	2,856,337	High Savings
Project 2	SoCalREN	2,192,862	High Savings
Project 3	BayREN	133,014	Mid-Level Savings
Project 4	BayREN	122,192	Mid-Level Savings
Project 5	BayREN	11,391	Low Savings
Project 6	BayREN	9,135	Low Savings

The six projects included a variety of energy efficiency savings measures, including attic, roof, and pipe insulation; dishwashers; heat pumps; faucet aerators; CFL and LED lamps; lighting controls; low-flow showerheads; pool covers, heaters, and pumps; refrigerators; space heating systems; water heaters and water heating controls; windows; and vending machines.

For this review, the evaluation team relied on the quantity and details of each installed measure provided by the RENs in their backup documentation. The team performed an in-depth review of the test-in and test-out documents, savings calculations, EnergyPro models, measure-level savings databases, CPUC tracking data, and initial survey assessments. This review allowed the team to extract pertinent information on the projects and installed measures, including the following:

- Quantity of tenant units,
- Location, efficiency, size, and quantity of installed measures, and
- Climate zone.

In addition, results from the baseline assessment fed into measure-level savings estimates when the savings estimates or calculations differentiated between these baseline types. For example, DEER provides separate savings estimates for ER and ROB baseline conditions. The team's baseline assessment showed that most REN multifamily insulation measures were classified as ER. As a result, the measure-level savings used the ER per unit savings values.

The evaluation team relied on the 2013–2014 DEER, the 2013 ESPI Performance Statement Report,[28] the IL TRM v4.0,[29] utility evaluations and work papers, and U.S. Department of Energy (DOE) guidelines[30] for the evaluated savings estimates and algorithms. DEER savings estimates were the first choice for savings estimates because they represent California-specific weather and usage conditions. When an installed measure was not present in the DEER database, however, the team used secondary sources. In a few instances, such as pool heaters and hot water pipe insulation, the evaluation team relied on savings calculations provided by the implementer because the algorithms and savings were deemed sufficient for this purpose. Table 3-3 presents evaluated measures and sources for savings estimates.

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[28] CPUC. 2013 Ex post Efficiency Savings and Performance Incentive (ESPI) Performance Statement Report and supporting documents. August 2015.

[29] IL TRM. Version 4.0. January 23, 2015; Navigant Consulting, Inc. Home Energy Efficiency Rebate Program. GPY2 Evaluation Report. February 27, 2014; and The Cadmus Group, Inc. 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to Gross, Market Effects, and Equipment Replacement Timing. Volume 1. Part of the Massachusetts Residential Retrofit and Low Income Program Area Evaluation. June 2013.

[30] DOE. Measure Guideline: Replacing Single-Speed Pool Pumps with Variable Speed Pumps for Energy Savings. May 2012.

Table 3-3: Engineering Desk Review Project Measures and Savings Sources

Measure	Savings Source
Attic/Roof Insulation	DEER
Hot Water Demand Controls	IL TRM
Hot Water Pipe Insulation	BayREN Savings Calculations
Dishwasher	DEER
Ductless Heat Pump	DEER
Faucet Aerator	ESPI Report
CFLs and Fixtures	DEER
LED Bulbs and Fixtures	DEER (adjusted)[1]
Lighting Controls	DEER
Low-Flow Showerheads	ESPI Report
Pool Covers	Work-Paper Disposition[2]
Pool Heaters	BayREN Savings Calculations
Pool Pumps	DOE Guidelines
Refrigerators	DEER
Space Heating Boilers	DEER
Storage Water Heaters	DEER
Vending Machines	IL TRM
Water Heating Boiler Controls	DEER
Water Heating Boilers	IL TRM
Windows	Northwest Energy Efficiency Alliance (NEEA) Evaluation[3]

[1] DEER values were adjusted to account for LED wattage.

[2] CPUC, Energy Division. Work-Paper Disposition for Commercial Pool Covers. March 1, 2013.

[3] Navigant Consulting, Inc. Long-Term Monitoring and Tracking Report on 2011 Activities. Prepared for NEEA. July 23, 2012.

3.3.3 Consumption Analysis

One of the challenges associated with performing a consumption analysis on multifamily properties is the availability of gas and electric account numbers at the tenant and common area levels. Because the REN multifamily programs are comprehensive, a consumption analysis is successful only if the evaluation team can access consumption information for the entire project, including all tenant and common areas in the buildings. This consumption analysis was dependent, then, on REN program implementers supplying gas and electric account numbers for the tenant and common areas for participant projects. Both SoCalREN and BayREN furnished the participant account numbers they had collected; however, these account numbers captured only a fraction of the participant units (details are discussed in Section 4).

The evaluation team conducted two types of searches to capture consumption data for the participant properties: account number matching and address matching. These two methods were an attempt to capture the most comprehensive consumption data on the participant projects. Details about each of the matching approaches follow.

1) Matches by account number(s) allow the extraction of electric and gas consumption data from the REN-provided unit- and building-level account numbers. If the account numbers are not accurate or present, though, this match will be unsuccessful.
2) Matches by address allow extraction of all the consumption data for the address that is available based on the street addresses provided by the RENs. If associated units have a different street address, though, they will not be captured (e.g., "996 Main St." in the database will not match "998 Main St." in the consumption data, even if they are two units in the same building).

3.4 Additional Data Sources Supporting the Single Family REN Assessment

3.4.1 Workpapers

The workpapers provide the assumptions and critical inputs used to estimate energy savings values. Critical inputs include dwelling size in total square feet, construction vintage, and location in terms of California Energy Commission climate zones. Some inputs are used to identify appropriate DEER deemed savings and some are used to calculate scaling factors.

REN workpapers were never officially approved by the CPUC. Consequently, the workpaper assumptions changed with each refinement made to the program, and, as a result, multiple methodologies were used to estimate savings at various points during the programs operation. The workpapers used in this analysis included:

- SCE - Workpaper SCE13MI005, Revision 0 (Feb. 27, 2012),
- Energy Upgrade California® (EUCA) Calculator Version 10,
- EUCA Calculator Version 11, and
- Work Paper SCE13MI005 Revision 2, which produced EUCA Phase 2 WP Calc Tool V3.

The EUCA calculator was developed and built by PECI (now CLEAResult). PECI explains the model's calculations this way,

> *The calculator estimates the energy savings that will result from home upgrade packages completed under the [Home Upgrade] program. It is built on eQuest simulations of energy saving measures and packages of measures using DEER single family home prototypes.*[31] *Those simulations produced the ModeledResults_DB. It wasn't possible to simulate every possible combination of measures, so this calculator was created to accommodate measure package combinations not included in the simulations. The calculator takes one Core Measure or Package and adds or subtracts up to three individual measures. It is not a simple addition or subtraction, because the measures have interactions. When an individual measure is added, that measure's energy savings is first reduced by the percentage savings achieved in the package that the measure is being added to. This reconciliation is done on an end use basis. For example, if an efficient AC that saves 25 kWh of cooling energy is added to a package that has already saved 10% of the home's cooling energy, then only 22.5 kWh savings would be added to the package.*

The workpapers and calculators base all measure combination savings on three modeled[32] home vintages: pre-1978, 1978-1992, and 1993-2001.

The final PG&E workpaper used in this review was PGECOALL108, Home Upgrade Program, Revision #0, Sept. 30, 2013.

For SCE, the evaluation team used SCE13MI005, Basic Path Enhancement for the Whole House Upgrade Program, Feb. 27, 2012.[33]

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[31] These are developed using findings from the Residential Appliance Saturation Survey (RASS) data collected by the California Energy Commission.

[32] The model used depends on the source document. Workpapers cite Energy Pro. EUCA cites eQuest.

[33] Extracted from the Workpaper Archive at www.deeresources.info

4

Gross Assessment

This section presents the detailed approach to conduct the gross assessment, along with the findings from those analyses. This section reports separately the MCE small commercial and multifamily measures, the REN multifamily measures and the REN single family measures. Finally, an integration section of conclusions and recommendations is provided.

4.1 MCE Small Commercial and Multifamily Measures

This section discusses the various analysis methods and results for the gross savings assessment for the MCE small commercial and multifamily measures. Three separate analyses were conducted as described in detail below.

- A review of the ex ante savings values for all MCE small commercial and multifamily measures, which resulted in correcting a number of values in the tracking data that did not line up with the workpapers.
- The development of evaluation savings values for a number of deemed lighting measures offered under MCE's Small Commercial program, which were based on results from recent CPUC evaluations.
- The development of evaluation savings values for a number of calculated lighting projects rebated under MCE's Small Commercial program, which were based on a desk review of a sample of project applications and documentation and utilized results from recent CPUC evaluations.

4.1.1 Ex Ante Review of Deemed Measures

Overview

The objective of this task was to determine if the ex ante savings provided in MCE's tracking data and associated with deemed measures were reported correctly according to documented ex ante assumptions. This activity included a review of each individual line item in MCE's tracking data for small commercial and multifamily deemed measures. Each impact parameter for each line item was compared to the values documented in the DEER and/or PG&E's workpapers. Whenever discrepancies were identified, the impact parameters were updated with the correct

value. Savings values were then re-computed with the correct impact parameter values, and measure group and program level aggregated savings values were developed, as reported below.

Approach and Findings

The ex ante review of deemed measures was based on program tracking data submitted June 2015, which contained all claims for the 2013-2014 program years, including lighting claims that refer to the updated Lighting Disposition values. The parameters reviewed include:

- Unit Energy Savings (first and second baselines if applicable),
- Realization rates,
- Installation rates,
- Remaining Useful Life (if applicable),
- Effective Useful Life, and
- Net-to-Gross ratios.

As stated above, the listed ex ante parameters were reviewed and compared against DEER or an applicable workpaper for each claim. One major hurdle encountered was the difficulty of easily tracking the source of ex ante assumptions. Although there were some measure IDs given, critical information was not referenced, such as net-to-gross IDs or whether the ex ante source is from the DEER or an IOU workpaper. This lack of proper references proved difficult for the review of ex ante assumptions. Regardless, from the measure descriptions in conjunction with the READI tool,[34] workpaper documentation, and supplemental information from the tracking data, the reviewers were able to find ex ante documentation for each deemed measure line item in MCE's tracking data.

Results

Through this effort, it was found that approximately two-thirds of the energy savings for the multifamily program and all of the energy savings from the small commercial program needed at least one update to an impact parameter. Table 4-1 through Table 4-3 compares the corrected reviewed savings values to the ex ante reported savings values for all of MCE's deemed measures. Reported savings come directly from the PA's program tracking data submitted to the CPUC. Each table contains the first year and lifecycle savings values and realizations rates grouped by program and measure group.

[34] http://www.deeresources.com/index.php/deer-versions/readi

Table 4-1: Comparison Between Reported Versus Reviewed First Year and Lifecycle kW Savings with Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year kW			Life Cycle kW		
		Reported	Reviewed	GRR	Reported	Reviewed	GRR
Multifamily	Lighting indoor CFL basic	2.19	2.18	100%	24.04	21.05	88%
Multifamily	Lighting indoor CFL fixture	1.22	0.77	63%	13.46	2.53	19%
Multifamily	Lighting indoor CFL globe	0.01	0.01	99%	0.10	0.08	87%
Multifamily	Lighting outdoor CFL basic	-	-		-	-	
Multifamily	Other	0.15	0.15	97%	2.30	2.23	97%
Multifamily	Water heating faucet aerator	0.01	0.01	99%	0.15	0.15	99%
Multifamily	Water heating showerhead	-	-		-	-	
Multifamily	Water heating storage water heater	0.01	-	0%	0.13	-	0%
Small Commercial	Lighting indoor CFL basic	0.62	0.55	89%	6.83	6.63	97%
Small Commercial	Lighting indoor LED fixture	1.90	1.89	100%	22.77	22.74	100%
Small Commercial	Lighting indoor LED lamp	5.70	8.17	143%	68.45	48.47	71%
Small Commercial	Lighting indoor LED reflector lamp	5.57	6.28	113%	64.24	36.01	56%
Small Commercial	Lighting indoor linear fluorescent delamping	9.16	0.78	8%	70.17	12.41	18%
Small Commercial	Other	0.20	0.20	100%	2.40	1.60	67%
Small Commercial	Refrigeration door closer	0.32	0.32	100%	2.58	2.58	100%
Small Commercial	Refrigeration other	7.72	7.72	100%	80.66	69.59	86%
MCE Total		**34.78**	**29.03**	**83%**	**358.28**	**226.06**	**63%**

Table 4-2: Comparison Between Reported Versus Reviewed First Year and Lifecycle kWh Savings with Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year kWh			Life Cycle kWh		
		Reported	Reviewed	GRR	Reported	Reviewed	GRR
Multifamily	Lighting indoor CFL basic	24,315	23,841	98%	267,464	230,544	86%
Multifamily	Lighting indoor CFL fixture	5,807	3,658	63%	63,873	12,020	19%
Multifamily	Lighting indoor CFL globe	100	101	101%	1,104	976	88%
Multifamily	Lighting outdoor CFL basic	16,895	16,895	100%	50,893	50,893	100%
Multifamily	Other	1,168	1,370	117%	17,664	20,695	117%
Multifamily	Water heating faucet aerator	194	192	99%	1,939	1,924	99%
Multifamily	Water heating showerhead	-	-		-	-	
Multifamily	Water heating storage water heater	15	-	0%	302	-	0%
Small Commercial	Lighting indoor CFL basic	3,028	2,691	89%	33,311	32,297	97%
Small Commercial	Lighting indoor LED fixture	9,271	9,292	100%	111,253	111,509	100%
Small Commercial	Lighting indoor LED lamp	26,459	38,151	144%	317,502	224,055	71%
Small Commercial	Lighting indoor LED reflector lamp	26,404	29,834	113%	304,139	168,892	56%
Small Commercial	Lighting indoor linear fluorescent delamping	28,470	2,441	9%	218,080	39,055	18%
Small Commercial	Other	640	640	100%	7,680	5,120	67%
Small Commercial	Refrigeration door closer	3,005	3,005	100%	24,038	24,040	100%
Small Commercial	Refrigeration other	57,569	57,518	100%	596,488	519,060	87%
MCE Total		**203,339**	**189,629**	**93%**	**2,015,731**	**1,441,080**	**71%**

Table 4-3: Comparison Between Reported Versus Reviewed First Year and Lifecycle Therm Savings with Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year Therms			Life Cycle Therms		
		Reported	Reviewed	GRR	Reported	Reviewed	GRR
Multifamily	Lighting indoor CFL basic	(598)	(579)	97%	(6,576)	(5,595)	85%
Multifamily	Lighting indoor CFL fixture	(35)	(22)	63%	(385)	(72)	19%
Multifamily	Lighting indoor CFL globe	(3)	(2)	95%	(28)	(24)	84%
Multifamily	Lighting outdoor CFL basic	-	-		-	-	
Multifamily	Other	1,417	1,176	83%	21,638	18,028	83%
Multifamily	Water heating faucet aerator	2,423	2,405	99%	24,226	24,045	99%
Multifamily	Water heating showerhead	3,220	3,207	100%	32,199	32,068	100%
Multifamily	Water heating storage water heater	753	361	48%	15,053	5,414	36%
Small Commercial	Lighting indoor CFL basic	(22)	(18)	85%	(237)	(220)	93%
Small Commercial	Lighting indoor LED fixture	(66)	(61)	94%	(789)	(738)	94%
Small Commercial	Lighting indoor LED lamp	(170)	(220)	129%	(2,039)	(1,316)	65%
Small Commercial	Lighting indoor LED reflector lamp	(172)	(184)	107%	(1,942)	(1,060)	55%
Small Commercial	Lighting indoor linear fluorescent delamping	(157)	(13)	8%	(1,206)	(212)	18%
Small Commercial	Other	(3)	(3)	100%	(36)	(24)	67%
Small Commercial	Refrigeration door closer	-	-		-	-	
Small Commercial	Refrigeration other	(87)	(87)	100%	(1,042)	(1,040)	100%
MCE Electric Subtotal		**(1,312)**	**(1,190)**	**91%**	**(14,280)**	**(10,300)**	**72%**
MCE Gas Subtotal		**7,812**	**7,148**	**92%**	**93,116**	**79,556**	**85%**
MCE Total		**6,500**	**5,959**	**92%**	**78,836**	**69,256**	**88%**

The main reason for discrepancies when comparing to the ex ante savings likely stems from reporting errors. The reason for measure groups with small discrepancies is usually due to small rounding errors in ex ante parameters or a mismatch in building types. For measure groups with larger discrepancies, it was found that improper references were being made to ex ante assumptions. In the case of the delamping measure group, a low realization rate was calculated due to a major difference in UES savings values. Further, there were claims for the exact same measure code, same measure name, same building type, and same climate zone yet there were drastically different UES values for each claim. Given the same ex ante categorizations one should expect the same ex ante assumptions. These types of inconsistencies were found throughout the data to varying degrees. Updates to the EUL parameter also played a large role for kW and kWh lifecycle realization rates. The largest impact of this update was found to be in the refrigeration other, LED lamp, and LED reflector lamp measure groups. The largest discrepancies occurred for claims with reported EULs of 12, whereas the ex ante review found the correct EULs to be between 4 and 9.

4.1.2 Evaluation Update of Deemed MCE Commercial Lighting Measures

Overview

The objective of this task was to develop evaluation savings values for key indoor lighting measures offered under MCE's Small Commercial program. To do so, various results were utilized from two recent CPUC evaluations: the 2013 Nonresidential Downstream Deemed ESPI Impact Evaluation, and the 2010-12 Nonresidential Downstream Lighting (NRL) Impact Evaluation. The following nonresidential indoor lighting measures were evaluated under these studies – CFLs, LED lamps and reflector lamps, linear fluorescents, high bay linear fluorescents, delamping, HIDs and occupancy sensors. The approach used to develop these evaluated savings values and the results of this analysis are presented below.

Approach and Findings

The nonresidential studies from 2010-12 and 2013 provided robust results that are directly applicable to measures claimed by MCE. Applicable results were provided for MCE's deemed CFLs, LED lamps and reflector lamps, and delamping measures. These results updated approximately two-thirds of the demand reduction and more than half of the energy savings claimed through MCE's small commercial deemed measures. In particular, updates were provided for the following gross impact parameters:

- Unit Energy Savings (first and second baselines where applicable),
- Installation rates,
- Remaining Useful Life (where applicable), and
- Effective Useful Life.

To apply results, a decision was made for each claim to determine which specific evaluation results to utilize. The measure name, measure code, and building type information from the tracking data was used to determine which set of results to apply. These fields were populated reasonably well, allowing for the assignment of a proper evaluation result. However, much improvement can be made in populating these fields. Specifically, proper references to ex ante documentation should be included in the tracking data. These references provide insight to critical information such as baselines assumed, operating hours, and sector applicability. This supplemental information would have provided background to further ensure proper application of evaluation results. On a related note, MCE should avoid using the "Com" building type whenever possible as this is not descriptive and limits the depth of evaluation results. MCE should make extra efforts to fill in building types with proper classifications, though it is understood that this cannot always be done. Another opportunity for improvement is in the measure description and measure code fields. There were some claims that did not include measure codes and/or had measure descriptions lacking detail. A descriptive measure name and valid measure code supply critical information related to baseline and retrofit assumptions. Overall, information provided in the tracking data was sufficient enough to apply proper evaluation results.

Results

Table 4-4 and Table 4-5 present results of the reported claimed savings versus evaluation results where parameter updates were applied. Each table contains the first year and lifecycle savings values and realizations rates grouped by program and measure group.

Table 4-4: Comparison Between Reported Versus Evaluated First Year and Lifecycle kW Savings with Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year kW			Life Cycle kW		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Small Commercial	Lighting indoor CFL basic	0.62	0.26	43%	6.83	2.24	33%
Small Commercial	Lighting indoor LED lamp	5.70	4.05	71%	68.45	58.57	86%
Small Commercial	Lighting indoor LED reflector lamp	5.57	9.39	169%	64.24	58.40	91%
Small Commercial	Lighting indoor linear fluorescent delamping	9.16	1.84	20%	70.17	15.31	22%
MCE Total		**1.05**	**15.55**	**74%**	**209.68**	**134.53**	**64%**

Table 4-5: Comparison Between Reported Versus Evaluated First Year and Lifecycle kWh Savings with Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year kWh			Life Cycle kWh		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Small Commercial	Lighting indoor CFL basic	3,028	1,405	46%	33,311	11,932	36%
Small Commercial	Lighting indoor LED lamp	26,459	16,482	62%	317,502	237,522	75%
Small Commercial	Lighting indoor LED reflector lamp	26,404	38,678	146%	304,139	240,578	79%
Small Commercial	Lighting indoor linear fluorescent delamping	28,470	7,291	26%	218,080	60,694	28%
MCE Total		**84,361**	**63,857**	**76%**	**873,032**	**550,726**	**63%**

The main reasons for discrepancies is due to differences in UES values for first year gross realizations rates and EUL values for life cycle realization rates. Installation rates played a small factor in the discrepancies and were relatively consistent when comparing evaluation installation rates to reported installation rates. For all measure groups, with the exception of LED reflector lamps, UES values were overstated in the tracking data when compared to evaluation results. For LED reflector lamps and CFL basics, EUL values were overstated in comparison to evaluation results. Ex ante documentation was not readily available due to the absence of references. This documentation could have shown the details into why discrepancies exist, particularly in wattage, coincidence factor, and operating hour assumptions. For the measures evaluated, delamping had the lowest realization rates. This result is consistent with the ex ante review of deemed measures discussed in section 4.1.1. This finding reveals an opportunity of improvement for MCE related to the process of claiming savings (e.g., proper references, correct values, quality control checks).

Further analysis determined what realization rates would have been if MCE had used the corrected deemed values found in the ex ante review as discussed in section 4.1.1. Table 4-6 and Table 4-7 present results of the claimed savings updated with values from the ex ante review versus evaluation results. Each table contains the first year and lifecycle savings values and realizations rates grouped by program and measure group for the deemed measures updated though evaluation results.

Table 4-6: Comparison Between Ex Ante Reviewed Versus Evaluated First Year and Lifecycle kW Savings With Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year kW			Life Cycle kW		
		Reviewed	Evaluated	GRR	Reviewed	Evaluated	GRR
Small Commercial	Lighting indoor CFL basic	0.55	0.26	48%	6.63	2.24	34%
Small Commercial	Lighting indoor LED lamp	8.17	4.05	50%	48.47	58.57	121%
Small Commercial	Lighting indoor LED reflector lamp	6.28	9.39	150%	36.01	58.40	162%
Small Commercial	Lighting indoor linear fluorescent delamping	0.78	1.84	237%	12.41	15.31	123%
MCE Total		**15.77**	**15.55**	**99%**	**103.51**	**134.53**	**130%**

Table 4-7: Comparison Between Ex Ante Reviewed Versus Evaluated First Year and Lifecycle kWh Savings With Gross Realization Rates – Deemed Measures Only

Program Name	Measure Group	First Year kWh			Life Cycle kWh		
		Reviewed	Evaluated	GRR	Reviewed	Evaluated	GRR
Small Commercial	Lighting indoor CFL basic	2,691	1,405	52%	32,297	11,932	37%
Small Commercial	Lighting indoor LED lamp	38,151	16,482	43%	224,055	237,522	106%
Small Commercial	Lighting indoor LED reflector lamp	29,834	38,678	130%	168,892	240,578	142%
Small Commercial	Lighting indoor linear fluorescent delamping	2,441	7,291	299%	39,055	60,694	155%
MCE Total		**73,117**	**63,857**	**87%**	**464,299**	**550,726**	**119%**

In a comparison between corrected ex ante values versus evaluation results, realization rates were found to be different to varying degrees. Even though both the evaluated and ex ante reviewed numbers are in agreement that the reported life cycle savings are overstated, each piece of analysis states this overestimation to different levels. For LED lamps, the evaluated unit energy savings are less than the corrected ex ante numbers, but the evaluated EUL values are larger than the corrected ex ante values. For LED reflector lamps it was found that the evaluated unit energy savings are larger than the corrected ex ante numbers. These two measure groups drive the total realization rates and counteract each other's variance. Although the overall realization rates may seem to suggest consistency between the ex ante review and application of evaluation results, there is still much variability. Further work is needed to reconcile the evaluation data and ex ante data for the measures reviewed. This reconciliation should reveal

discrepancies in ex ante assumptions and inputs vital to accurately estimating energy savings for future program cycles.

4.1.3 Evaluation Update of Calculated Commercial Lighting Measures

Overview

This section details the approach that the evaluation team used to estimate evaluated gross impacts associated with calculated commercial lighting measures in MCE. Along with the approach, this section documents the data sources used, the results of the evaluation, as well as conclusions and recommendations that are intended to help inform future program planning.

Approach and Findings

The evaluation team conducted a site-specific gross impact evaluation for a number of program participants in MCE. The goal of this impact evaluation was to, not only update gross impacts associated with these calculated projects, but to compare those impacts to the ex ante gross impact assumptions.

In order to perform this analysis, the evaluation team requested the project workbooks and applications for all of the calculated lighting projects that were conducted in 2014. These calculation workbooks detail each of the impact parameters that were used to develop the site-specific ex ante gross savings that are documented in the tracking data.

As detailed below in Table 4-8, ex ante calculated savings were represented in 66 claims, representing 38 projects within 35 unique sites. Of those 66 claims, the evaluation team analyzed 36 claims or 53% of total first year ex ante savings. While the initial intent was to evaluate a much greater percentage of the overall claim, there were discrepancies between the savings calculated in the workbooks and the final savings claimed in the tracking data for a number of projects. These projects were excluded from the evaluation analysis given the inherent difficulty in truing up the ex ante savings. The first year kW and kWh savings that are detailed below represent the ex ante claimed savings before the 0.90 ex ante realization rate was applied to them.

Table 4-8: MCE Calculated Evaluation Analysis

Evaluated Update	Claims	Site Projects	Sites	First Year Savings (kW)	First Year Savings (kWh)
No	30	20	20	45	334,342
Yes	36	19	18	55	377,632
Total	**66**	**38**	**35**	**100**	**711,973**

The 36 claims that were updated represent a heterogeneous distribution of measures. Table 4-9 details that distribution. Of the 36 claims, 21 represented LED measures, eight represented linear fluorescents, two represented occupancy sensors and four represented CFLs. This was an important consideration when developing the evaluation analysis plan as each of these measures tend to have very different unit energy savings values and EUL considerations. Due to the representativeness of the sample evaluated across all measure groups, the gross realizations that were developed for the evaluated population were used to update the measures that were not evaluated.

Table 4-9: MCE Calculated Evaluation Analysis by Measure Group

Measure Group	Evaluation Update	Claims	Site Projects	Sites	Ex ante First Year Savings (kW)	Ex ante First Year Savings (kWh)
Lighting indoor CFL other	No	3	3	3	7	36,495
Lighting indoor CFL other	Yes	3	3	3	6	24,406
Lighting indoor controls wall or ceiling mounted occupancy sensor	Yes	2	2	1	-	616
Lighting indoor LED lamp	No	4	4	4	9	43,305
Lighting indoor LED lamp	Yes	9	8	8	12	110,016
Lighting indoor LED other	No	3	3	3	5	29,472
Lighting indoor LED other	Yes	4	4	4	4	32,828
Lighting indoor linear fluorescent	No	7	7	7	6	22,535
Lighting indoor linear fluorescent	Yes	8	8	7	32	106,503
Lighting outdoor CFL basic	No	1	1	1	-	435
Lighting outdoor CFL basic	Yes	1	1	1	-	27,060
Lighting outdoor LED other	No	11	10	10	15	183,814
Lighting outdoor LED other	Yes	8	8	8	0	71,041
Refrigeration case LED lighting	No	1	1	1	4	18,286
Refrigeration case LED lighting	Yes	1	1	1	1	5,162

Each of the calculation workbooks provided detailed information regarding how the ex ante savings claims were developed. The calculated savings were developed using the following.

- Measure quantity – This represents the number of units (lamps/controls/fixtures) that were removed and had been installed.
- Baseline wattage – Two baseline wattage values were provided. These two values represented the wattage of the replaced equipment as well as an industry standard

practice (or code) baseline. For replacement on burn-out (ROB) measures, the code wattage represents the baseline condition. For early replacement (ER), the code baseline is used as the second baseline (or post-RUL) period. The wattage of the replaced equipment is used for the remaining useful life (RUL) of the baseline equipment for ER measures.

- Retrofit Wattage – This is the wattage associated with the installed lighting measure.
- Activity Area – This field detailed where the measure installation was made (i.e., restroom, sales area, outdoors). While the activity area designation was provided for each measure in every calculation workbook, activity area level operating hours and coincidence factors were never used.
- ER Flag – This flag details whether or not the measure was ER or ROB. For ROB measures, the code baseline is used to calculate first year savings and extends throughout the lifecycle of the measure. For ER measures, the lifecycle savings are calculated over two distinct time periods. During the first period (RUL), the wattage of the replaced equipment is used as the baseline and, throughout the post-RUL period, the code baseline is used for the remaining EUL of the measure.
- Operating Hours – This represents the annual operating hours for the facility. Every custom project utilized DEER default operating hours (which are based on the building type of the facility). All exterior measures were assumed to be 4,100 hours.
- Coincidence Factor (CF) – This represents the percentage of time that the measure is operating throughout the peak demand period. DEER default CFs were used for every project.
- Interactive Effects – These demand and energy factors are incorporated into the measure impact. The kWh factors are multiplied by the annual kWh impact and the kW factors are multiplied by the kW demand impact. The factors differ based on whether a measure is a CFL or not, the PA, the climate zone of the participant, the building type, and whether or not the facility is new or existing.
- Occupancy Sensor flags – If occupancy sensors were installed and weren't required by code, these fields are filled in. These fields include the activity area of installation, the quantity installed, and the change in operating hours with the control installation (or, the percent time off [PTO]).

Overall, the ex ante assumptions that were detailed in the workbooks were detailed and complete. For example, when an LED or T8 fixture was replacing a T12 fixture, the ex ante code baseline was a first generation T8 since T12 lamps began being phased out in 2012. When metal halides were replaced by an LED or high occupancy (HO) T5, the code baseline was a pulse start metal halide which is consistent with Title 20. Measure installations were provided at the activity area level even though operating hour assumptions were made at the building type

level. Two baseline savings estimates were also provided – one for measures that were assumed to be ROB and one for measures that were assumed to be ER.

The evaluation team analyzed each of these parameters at the site-specific level and applied evaluated results to many of the parameters on a case-by-case basis. Several of the parameters, however, were not updated. For example, the measure quantities installed, wattage estimates (baseline and retrofit) and interactive effects were not updated. This analysis did not involve on-site verification so it was impossible to confirm or deny the measure disposition or wattage of the equipment. However, if the ER/ROB designation was updated that would have the effect of changing the first and second baseline wattages for those measures.

In order to estimate first year demand and energy savings, several key variables were updated. These included the operating hours, coincidence factor and the PTO for occupancy sensor measures. The ER/ROB designation was also updated if there was a preponderance of evidence that the measure was in fact ROB rather than ER. An example of that type of update is if a measure was classified as ER, but the baseline equipment was an incandescent lamp. Since incandescent lamps have such a short EUL, these replacements should be considered ROB. Code baselines were also updated to reflect the first year savings for ROB measures and the second baseline for ER measures. As mentioned above, these ex ante code baselines were often accurate, but sometimes were left blank (or a hard-coded value was used). In these instances, the evaluated baselines accurately reflected the correct code baseline associated with the measure.

The evaluated operating hours were developed at the measure, building type, and activity area level using logger data from the 2006-08 and 2010-12 evaluation periods as well as adjusted self-report operating schedules for the 2013 program period. In total, previously collected data from over 8,000 loggers representing 1,700 sites were used in the adjustment process. The logger data was combined with the adjusted self-reports to develop market segment-activity area lighting profiles for LED lamps, linear fluorescents, high bay fluorescents, CFL lamps and occupancy sensors. The calculation workbook provided detailed information regarding the measure installed (LED A-lamp vs. LED reflector lamp), the activity area of installation (restroom vs. retail area) and the building type (office vs. retail). The evaluated operating hours were applied at that level. If a specific combination of measure-activity area-building type was represented in the ex ante workbook and the evaluated operating hours associated with that combination were either absent or unreliable, an overall hours of use was created at the measure-building type level. A similar process was developed for the CF which was represented as the percent "ON" throughout the peak demand period.

Two other parameters that were updated were the measure EUL and the RUL (for ER measures). For most lighting measures, the EUL represents the service life in hours of the measure retrofitted – which typically represents the lamp life for CFLs and LEDs and the ballast service life for linear fluorescent measures – divided by the evaluated operating hours or 15 years,

whichever is less. The service life that was used for each of the measures that were evaluated are as follows; CFL lamps – 10,000 hours, LED lamps – 25,000 hours, CFL/LED fixtures – 49,000 hours, linear fluorescents – 70,000 hours. For occupancy sensor measures the evaluated EUL was set to 8 years. If it was determined that an installation was ER, the RUL was estimated as one third of the EUL, following the DEER methodology.

One final consideration that had a significant impact on the overall GRRs (especially lifecycle savings) is how the ex ante savings were reported in the tracking data. As mentioned above, if a measure was determined to be ER in the ex ante case, the calculation workbook provided two baseline savings estimates – one for the RUL period using the baseline wattage and one for the post-RUL period using a code baseline. These two values were presented as annualized savings. In other words, the workbooks did not detail ex ante EUL or RUL assumptions and, by extension, no lifecycle savings estimates. Rather, depending on whether or not the measure was ER or ROB, the first year savings represented that baseline condition. These savings were then multiplied by the EUL reported in the tracking data. One consequence of this calculation methodology is that it potentially overstates the lifecycle savings of the measure. For example, if a linear measure has a 15 year EUL and was determined to be ER, the ex ante lifecycle savings represents the first baseline (using the baseline wattage) times the 15 years. The evaluated analysis examined the lifecycle savings over two periods – the RUL period which would be 15 divided by three, resulting in an RUL of five years. The annualized savings over those five years would include the first baseline. However, the second period or the post-RUL uses the second baseline (or code), which is generally lower than the first period for the remaining 10 year EUL (15 years minus five years).

Overall, the gross first year realization rate for the claims that were evaluated was 82% and 94% for kW and kWh, respectively. The gross lifecycle realization rate was 68% and 75% for kW and kWh, respectively. In order to explain why the gross realization rates (GRR) differ from 100%, the evaluation team compared the ex ante and evaluated parameter estimates for each of the calculated measures. Below is a discussion of each evaluated measure and an explanation of how each of the parameters contribute to the GRR differing from 100%

Indoor CFL

For indoor CFL measures, the first year kWh GRR was roughly 96% and the lifecycle kWh GRR was 124%. The main reason why the first year GRR was less than 100% is that evaluated operating hours were roughly 15% less than ex ante assumptions. The lower evaluated operating hours led to a higher evaluated EUL which translated into greater evaluated lifecycle savings. A similar trend is evident for first year and lifecycle kW GRR (94% and 124%, respectively). The evaluated coincidence factors were roughly 15% less than ex ante assumptions.

Indoor and Outdoor LED

For indoor LED lamp measures, the first year kWh GRR was roughly 91% and the lifecycle kWh GRR was 58%. The main reason why the first GRR was less than 100% is that evaluated operating hours were roughly 18% less than ex ante assumptions. Unlike CFLs, the lower evaluated operating hours led to much lower evaluated lifecycle savings. The main reason for this is that the ex ante EUL for all LED measures was 15 years whereas the evaluated EUL was closer to 10 years. A similar trend is evident for first year and lifecycle kW GRR (94% and 46%, respectively). The evaluated coincidence factors were roughly 15% less than ex ante assumptions.

For indoor LED "Other" measures which consists of LED fixture installations, the first year kWh GRR was roughly 93% and the lifecycle kWh GRR was 58%. The evaluated EUL is roughly 38% less than the ex ante assumption, thus leading to a lower evaluated lifecycle GRR. The first year and lifecycle kW GRR are much lower than the kWh GRR (54% and 40%, respectively). While the evaluated and ex ante delta wattages are identical and the evaluated CF, on average, is 30% higher than ex ante assumptions, one site claimed demand savings even though the measures were installed on the exterior of the building. The evaluated peak demand savings were zeroed out, which led to a significant reduction in the overall kW GRR.

For outdoor LED measures, the first year kWh GRR was roughly 100% and the lifecycle kWh GRR was 76%. Since the vast majority of these measures were installed on the exterior of buildings, both the evaluated and ex ante operating hours assumptions were the DEER default of 4,100 hours. A 21% reduction in lifecycle GRR is explained again by higher ex ante EUL assumptions.

Linear Fluorescents

For indoor linear fluorescent measures, the first year kWh GRR was roughly 85% and the lifecycle kWh GRR was 80%. Overall, the evaluated operating hour estimates were roughly 12% less than ex ante assumptions and the evaluated EUL was roughly 7% less than ex ante assumptions. The first year and lifecycle kW GRR were 76% and 72%, respectively. The evaluated CF was roughly 27% less than ex ante assumptions.

Occupancy Sensors

For indoor occupancy sensors, the first year kWh GRR was roughly 47% and the lifecycle kWh GRR was 47% as well. The primary reason for the relatively low realization rate was that the ex ante baseline operating hours were much greater than evaluated estimates. The controlled wattage was identical going from ex ante to evaluated wattage having little effect on the realization rate, and the evaluated percent time off (PTO) was actually greater than ex ante

assumptions which had the effect of increasing the realization rate. An 8 year EUL was used for both the ex ante and evaluated lifecycle savings calculation.

Results

The objective of this analysis was to develop GRRs that could be used to estimate PA-level savings across all custom lighting measure groups. The results of that analysis are presented in the tables below. As presented in Table 4-9 earlier, the evaluation team was able to perform an evaluated analysis on a majority of the claims and ex ante claimed savings for each measure group. The GRRs that were developed for each of the evaluated measure groups were then applied back to each non-evaluated project in the custom population (by measure group). It is important to note that the ex ante savings and, by extension, the GRRs that are presented below include the 0.9 ex ante realization rate. The data that were presented above in the findings do not have that realization rate applied to them so that a more direct comparison could be made with the application calculations. Table 4-10 presents the kW savings, Table 4-11 presents the kWh savings, and Table 4-12 presents the therm savings.

Overall, the first year kW, kWh, and therm GRR were 100%, 105% and 101%, respectively. As discussed in the previous section, the GRR incorporates several impact parameters including installation rates, operating hours, coincidence factors, installed/replaced wattages and industry standard practice (or code) baselines. These parameters are different depending on the building type of installation, the activity area of installation, the measure installed and the measure that was replaced. These nuances explain the differences that can be seen in the GRR when examined at the measure group level.

Overall, the lifecycle kW, kWh and therm GRR were 77%, 81% and 74%, respectively. Along with the parameters discussed above, the differences associated with the EUL for ROB measures and a combination of the EUL and RUL for ER measures create an additional layer of complexity. The lower lifecycle GRRs (both overall and at the measure group level) are explained by significant differences in the ex ante and evaluated ULs for certain measures along with differences in calculating the lifecycle savings associated with dual baseline measures.

Table 4-10: Comparison Between Reported Versus Evaluated First Year and Lifecycle kW Savings – Calculated Measures Only

	First Year kW			Life Cycle kW		
Measure Group	**Reported**	**Evaluated**	**GRR**	**Reported**	**Evaluated**	**GRR**
Lighting indoor occupancy sensor	-	-		-	-	
Lighting indoor CFL other	11.92	12.40	104%	75.75	104.01	137%
Lighting indoor LED lamp	18.55	19.32	104%	220.86	112.33	51%
Lighting indoor LED other	7.60	4.60	61%	108.35	47.78	44%
Lighting indoor linear fluorescent	34.95	28.68	84%	509.27	408.02	80%
Lighting outdoor CFL basic	-	-		-	-	
Lighting outdoor LED other	13.58	19.18	141%	203.69	201.00	99%
Refrigeration case LED lighting	4.24	5.59	132%	63.65	38.86	61%
MCE Small Commercial Total	**89.85**	**89.77**	**100%**	**1,181.58**	**912.00**	**77%**

Table 4-11: Comparison Between Reported Versus Evaluated First Year and Lifecycle kWh Savings – Calculated Measures Only

	First Year kWh			Life Cycle kWh		
Measure Group	**Reported**	**Evaluated**	**GRR**	**Reported**	**Evaluated**	**GRR**
Lighting indoor occupancy sensor	554	287	52%	4,436	2,297	52%
Lighting indoor CFL other	54,811	58,210	106%	312,574	431,734	138%
Lighting indoor LED lamp	137,989	140,042	101%	1,783,313	1,149,413	64%
Lighting indoor LED other	56,070	58,038	104%	812,425	525,678	65%
Lighting indoor linear fluorescent	116,134	110,134	95%	1,741,956	1,547,888	89%
Lighting outdoor CFL basic	24,745	27,495	111%	293,202	325,780	111%
Lighting outdoor LED other	229,370	254,649	111%	3,270,743	2,761,856	84%
Refrigeration case LED lighting	21,103	21,448	102%	316,548	149,016	47%
MCE Small Commercial Total	**640,776**	**670,303**	**105%**	**8,535,196**	**6,893,661**	**81%**

Table 4-12: Comparison Between Reported Versus Evaluated First Year and Lifecycle Therms Savings – Calculated Measures Only

	First Year Therms			Life Cycle Therms		
Measure Group	**Reported**	**Evaluated**	**GRR**	**Reported**	**Evaluated**	**GRR**
Lighting indoor occupancy sensor	(2)	(1)	52%	(18)	(9)	52%
Lighting indoor CFL other	(365)	(390)	107%	(2,033)	(2,811)	138%
Lighting indoor LED lamp	(906)	(840)	93%	(11,066)	(5,679)	51%
Lighting indoor LED other	(358)	(408)	114%	(4,964)	(3,716)	75%
Lighting indoor linear fluorescent	(516)	(492)	95%	(7,740)	(6,887)	89%
Lighting outdoor CFL basic	-	-		-	-	
Lighting outdoor LED other	(484)	(537)	111%	(7,264)	(6,108)	84%
Refrigeration case LED lighting	(163)	(165)	102%	(2,442)	(1,150)	47%
MCE Small Commercial Total	**(2,794)**	**(2,834)**	**101%**	**(35,528)**	**(26,359)**	**74%**

4.1.4 Final Evaluated Results for MCE Small Commercial and Multifamily Measures

As discussed above, evaluated values were developed for all MCE small commercial and multifamily measures through multiple processes. If a measure was part of either the evaluation update for deemed or calculated lighting measures, as described above in sections 4.1.2 and 4.1.3, those evaluated gross values were used. Otherwise, if the ex ante savings were corrected as part of the ex ante review described in section 4.1.1, those corrected values were used for the evaluated gross savings. If neither process resulted in an evaluated value, the ex ante gross savings values were passed through.

Table 4-13 through Table 4-15 provide a comparison of the reported ex ante claimed gross savings values and the evaluated gross savings values. Both first year and lifecycle gross savings values are provided along with the corresponding realization rate for kW, kWh and therm savings, respectively. Overall, first year gross realization rates for kW and kWh are 95% and 101%. Although these numbers may appear to indicate some level of reliability in the individual ex ante values, measure specific realization rates can vary significantly. Lifecycle gross realization rates for kW and kWh are lower for various reasons as explained in the analysis subsections above, and are 76% and 80%, respectively.

First year and lifecycle gross realization rates for therm savings are 86% and 97%, but this result is confounded by a combination of negative and positive therm values. Looking only at the positive therm values (for multifamily non-lighting measures), the first year and lifecycle gross realization rates for therm savings are 92% and 86%.

Table 4-13: Comparison Between Reported Versus Evaluated First Year and Lifecycle kW Savings with Gross Realization Rates – All MCE Measures

Program Name	Measure Group	First Year kW			Life Cycle kW		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Multifamily	Building envelope window film	-	-		-	-	
Multifamily	Lighting indoor CFL basic	2.19	2.18	100%	24.04	21.05	88%
Multifamily	Lighting indoor CFL fixture	1.22	0.77	63%	13.46	2.53	19%
Multifamily	Lighting indoor CFL globe	0.01	0.01	99%	0.10	0.08	87%
Multifamily	Lighting indoor linear fluorescent	0.54	0.48	90%	8.04	7.24	90%
Multifamily	Lighting outdoor CFL basic	-	-		-	-	
Multifamily	Lighting outdoor LED fixture	-	-		-	-	
Multifamily	Other	0.15	0.15	97%	2.30	2.23	97%
Multifamily	Pipe insulation hot application	-	-		-	-	
Multifamily	Water heating faucet aerator	0.01	0.01	99%	0.15	0.15	99%
Multifamily	Water heating showerhead	-	-		-	-	
Multifamily	Water heating storage water heater	0.01	-	0%	0.13	-	0%
Small Commercial	Lighting indoor occupancy sensor	-	-		-	-	
Small Commercial	Lighting indoor CFL basic	0.62	0.26	43%	6.83	2.24	33%
Small Commercial	Lighting indoor CFL other	11.92	12.40	104%	75.75	104.01	137%
Small Commercial	Lighting indoor LED fixture	1.90	1.89	100%	22.77	22.74	100%
Small Commercial	Lighting indoor LED lamp	24.26	23.37	96%	289.31	170.91	59%
Small Commercial	Lighting indoor LED other	7.60	4.60	61%	108.35	47.78	44%
Small Commercial	Lighting indoor LED reflector lamp	5.57	9.39	169%	64.24	58.40	91%
Small Commercial	Lighting indoor linear fluorescent	33.95	28.68	84%	509.27	408.02	80%
Small Commercial	Lighting indoor linear fluorescent delamping	9.16	1.84	20%	70.17	15.31	22%

Table 4-13 (Cont'd): Comparison Between Reported Versus Evaluated First Year and Lifecycle kW Savings with Gross Realization Rates – All MCE Measures

Program Name	Measure Group	First Year kW			Life Cycle kW		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Small Commercial	Lighting indoor other	-	-		-	-	
Small Commercial	Lighting outdoor CFL basic	-	-		-	-	
Small Commercial	Lighting outdoor LED other	13.58	19.18	141%	203.69	201.00	99%
Small Commercial	Other	0.20	0.20	100%	2.40	1.60	67%
Small Commercial	Refrigeration case LED lighting	4.24	5.59	132%	63.65	38.86	61%
Small Commercial	Refrigeration door closer	0.32	0.32	100%	2.58	2.58	100%
Small Commercial	Refrigeration other	7.72	7.72	100%	80.66	69.59	86%
MCE Total		**125.17**	**119.05**	**95%**	**1,547.90**	**1,176.31**	**76%**

Table 4-14: Comparison Between Reported Versus Evaluated First Year and Lifecycle kWh Savings With Gross Realization Rates – All MCE Measures

Program Name	Measure Group	First Year kWh			Life Cycle kWh		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Multifamily	Building envelope window film	-	-		-	-	
Multifamily	Lighting indoor CFL basic	24,315	23,841	98%	267,464	230,544	86%
Multifamily	Lighting indoor CFL fixture	5,807	3,658	63%	63,873	12,020	19%
Multifamily	Lighting indoor CFL globe	100	101	101%	1,104	976	88%
Multifamily	Lighting indoor linear fluorescent	5,622	5,059	90%	84,323	75,891	90%
Multifamily	Lighting outdoor CFL basic	16,895	16,895	100%	50,893	50,893	100%
Multifamily	Lighting outdoor LED fixture	23,183	23,183	100%	292,378	292,378	100%
Multifamily	Other	1,168	1,370	117%	17,664	20,695	117%
Multifamily	Pipe insulation hot application	-	-		-	-	

Table 4-14 (Cont'd): Comparison Between Reported Versus Evaluated First Year and Lifecycle kWh Savings With Gross Realization Rates – All MCE Measures

Program Name	Measure Group	First Year kWh			Life Cycle kWh		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Multifamily	Water heating faucet aerator	194	192	99%	1,939	1,924	99%
Multifamily	Water heating showerhead	-	-		-	-	
Multifamily	Water heating storage water heater	15	-	0%	302	-	0%
Small Commercial	Lighting indoor occupancy sensor	554	287	52%	4,436	2,297	52%
Small Commercial	Lighting indoor CFL basic	3,028	1,405	46%	33,311	11,932	36%
Small Commercial	Lighting indoor CFL other	54,811	58,210	106%	312,574	431,734	138%
Small Commercial	Lighting indoor LED fixture	9,271	9,292	100%	111,253	111,509	100%
Small Commercial	Lighting indoor LED lamp	164,447	156,524	95%	2,100,815	1,386,935	66%
Small Commercial	Lighting indoor LED other	56,070	58,038	104%	812,425	525,678	65%
Small Commercial	Lighting indoor LED reflector lamp	26,404	38,678	146%	304,139	240,578	79%
Small Commercial	Lighting indoor linear fluorescent	116,134	110,134	95%	1,741,956	1,547,888	89%
Small Commercial	Lighting indoor linear fluorescent delamping	28,470	7,291	26%	218,080	60,694	28%
Small Commercial	Lighting indoor other	-	-		-	-	
Small Commercial	Lighting outdoor CFL basic	24,745	27,495	111%	293,202	325,780	111%
Small Commercial	Lighting outdoor LED other	229,370	254,649	111%	3,270,743	2,761,856	84%
Small Commercial	Other	640	640	100%	7,680	5,120	67%
Small Commercial	Refrigeration case LED lighting	21,103	21,448	102%	316,548	149,016	47%
Small Commercial	Refrigeration door closer	3,005	3,005	100%	24,038	24,040	100%
Small Commercial	Refrigeration other	57,569	57,518	100%	596,488	519,060	87%
MCE Total		**872,920**	**878,914**	**101%**	**10,927,628**	**8,789,436**	**80%**

Table 4-15: Comparison Between Reported Versus Evaluated First Year and Lifecycle Therm Savings With Gross Realization Rates – All MCE Measures

		First Year Therms			Life Cycle Therms		
Program Name	Measure Group	Reported	Evaluated	GRR	Reported	Evaluated	GRR
Multifamily	Building envelope window film	19	19	100%	383	383	100%
Multifamily	Lighting indoor CFL basic	(598)	(579)	97%	(6,576)	(5,595)	85%
Multifamily	Lighting indoor CFL fixture	(35)	(22)	63%	(385)	(72)	19%
Multifamily	Lighting indoor CFL globe	(3)	(2)	95%	(28)	(24)	84%
Multifamily	Lighting indoor linear fluorescent	-	-		-	-	
Multifamily	Lighting outdoor CFL basic	-	-		-	-	
Multifamily	Lighting outdoor LED fixture	-	-		-	-	
Multifamily	Other	1,417	1,176	83%	21,638	18,028	83%
Multifamily	Pipe insulation hot application	296	296	100%	3,850	3,850	100%
Multifamily	Water heating faucet aerator	2,423	2,405	99%	24,226	24,045	99%
Multifamily	Water heating showerhead	3,220	3,207	100%	32,199	32,068	100%
Multifamily	Water heating storage water heater	753	361	48%	15,053	5,414	36%
Small Commercial	Lighting indoor occupancy sensor	(2)	(1)	52%	(18)	(9)	52%
Small Commercial	Lighting indoor CFL basic	(22)	(10)	46%	(237)	(85)	36%
Small Commercial	Lighting indoor CFL other	(365)	(390)	107%	(2,033)	(2,811)	138%
Small Commercial	Lighting indoor LED fixture	(66)	(61)	94%	(789)	(738)	94%
Small Commercial	Lighting indoor LED lamp	(1,076)	(961)	89%	(13,106)	(7,432)	57%
Small Commercial	Lighting indoor LED other	(358)	(408)	114%	(4,964)	(3,716)	75%
Small Commercial	Lighting indoor LED reflector lamp	(172)	(257)	149%	(1,942)	(1,592)	82%
Small Commercial	Lighting indoor linear fluorescent	(516)	(492)	95%	(7,740)	(6,887)	89%

Table 4-15 (Cont'd): Comparison Between Reported Versus Evaluated First Year and Lifecycle Therm Savings With Gross Realization Rates – All MCE Measures

Program Name	Measure Group	First Year Therms			Life Cycle Therms		
		Reported	Evaluated	GRR	Reported	Evaluated	GRR
Small Commercial	Lighting indoor linear fluorescent delamping	(157)	(40)	26%	(1,206)	(336)	28%
Small Commercial	Lighting indoor other	-	-		-	-	
Small Commercial	Lighting outdoor CFL basic	-	-		-	-	
Small Commercial	Lighting outdoor LED other	(484)	(537)	111%	(7,264)	(6,108)	84%
Small Commercial	Other	(3)	(3)	100%	(36)	(24)	67%
Small Commercial	Refrigeration case LED lighting	(163)	(165)	102%	(2,442)	(1,150)	47%
Small Commercial	Refrigeration door closer	-	-		-	-	
Small Commercial	Refrigeration other	(87)	(87)	100%	(1,042)	(1,040)	100%
MCE Electric Subtotal		**(4,106)**	**(4,017)**	**98%**	**(49,807)**	**(37,618)**	**76%**
MCE Gas Subtotal		**8,127**	**7,464**	**92%**	**97,349**	**83,789**	**86%**
MCE Total		**4,021**	**3,447**	**86%**	**47,541**	**46,171**	**97%**

4.2 BayREN and SoCalREN Multifamily Measures

This section discusses the various analysis methods and results for the savings and baseline assessments for the BayREN and SoCalREN multifamily measures. The engineering simulation model review, engineering desk review, and consumption analysis assessed savings using differing techniques and methods. Each methodology is described in-depth in the sections that follow. An initial step of these analyses was to conduct a comprehensive review of the tracking and database systems for the multifamily Whole Building programs for both BayREN and SoCalREN, as well as the IOUs. The goal of this assessment was to ensure that the necessary data to assess program impacts were collected and fully populated; this assessment was not intended to verify the accuracy of the data. This review is also discussed below.

4.2.1 Database Assessment

The team requested the IOU and REN tracking databases and CPUC-claimed savings information for review as part of the database assessment task. As part of this assessment, the

evaluation team ensured that the following fields were populated in the IOU- and REN-provided databases:

- Participant contact information
- Measures installed
  - Quantity
  - Location
  - Efficiency
- Preexisting conditions, including measure efficiency[35]
- Types of and fuels for property hot water, cooling, and space heating systems
- Utility account numbers for both common areas and units for each participating property.

The completeness of multifamily Whole Building data varied substantially between implementers. The SDG&E data were the most comprehensive of the programs, and contained nearly every piece of requested information. Initially, BayREN was not tracking necessary measure-level details; however, BayREN chose to review past project data to populate a database to facilitate this evaluation. BayREN and SoCalREN backup documentation, such as work papers, procedures, and project site assessments were very useful to flesh out project specifics. SoCalREN provided some, but not all, necessary information. For example, SoCalREN provided the number, quantity, and efficiency of installed measures, but not the location. PG&E was unable to provide any measure-level information and, as a result, could not be evaluated.[36]

Table 4-16 illustrates the completeness of the multifamily Whole Building databases. In the table, a ● symbol indicates that the data provided were completely populated; the ◐ symbol indicates that some of the data were populated; and the ○ symbol indicates that most or all of the requested data were missing or inaccessible.

[35] Preexisting conditions are important for assessing the baseline for ER measures.

[36] The evaluation team and Energy Division personnel made multiple requests for the PG&E data, including e-mails, EEstats requests, and conference calls. PG&E representatives reported that the program was not tracking this measure-level data during the pilot phase of the program.

Table 4-16: Multifamily Whole Building Database Completeness

Attribute		PA			
		SDG&E	PG&E	BayREN	SoCalREN
Participant Contact Information		●	●	●	●
Measure Details					
	Type	●	○	●	●
	Quantity	◑	○	●	●
	Location	●	○	●	○
	Efficiency	●	○	●	●
Preexisting Conditions		●	○	●	●
Property Systems (Type and Fuel)					
	Hot Water Systems	●	○	○	◑
	Space Cooling	●	○	◑	◑
	Space Heating	●	○	◑	◑
Property Details					
	Quantity of Tenant Units	●	○	●	●
	Bedrooms	●	○	●	●
	Bathrooms	●	○	●	●
Utility Account Numbers					
	Tenant Spaces	●	○	◑	○
	Common Areas	●	●	◑	●

4.2.2 Engineering Simulation Model Review

The goal of the model comparison was to validate the assumptions and understand the magnitude of differences between different entities that are using the same EnergyPro software to model energy savings for the projects. To accomplish this review, the team first reached out to internal engineers (internal to the evaluation team) to understand how the EnergyPro models work and the nuances associated with the inputs and assumptions used for the model. The discussions with engineers were also used to help inform the second task associated with the model review, which was to interview representatives of the three entities that were able to provide model files: SDG&E, BayREN, and SoCalREN.

After the interviews with the engineering team and the three PAs, the evaluation team identified projects deemed to be the most similar across all three entities (SoCalREN, BayREN, and SDG&E). The team leveraged the data provided by program tracking systems to identify similar projects across all three entities, which included the same measures, but was limited by the available project model files. The total number of available project files provided by each organization included two projects for SDG&E, two projects for SoCalREN, and 81 for BayREN. The three site projects selected—one site/project for each organization—are shown in

Table 4-17, along with each site/project associated installed measure quantities. Having three projects that all received identical measures and having additional projects to review would have been ideal, but because of the limited project depth for some of the PAs, the team had to identify the closest match across the three organizations.

Table 4-17: Measures Included for Model Comparison for Similar Projects[1]

Measure	SDG&E	BayREN	SoCalREN	Validation Check
Refrigerator	✓	✓	✓	External Spreadsheets
Windows	✓	✓	✓	EnergyPro
Faucet Aerator		✓	✓	External Spreadsheets
Indoor CFLs		✓	✓	External Spreadsheets

[1] Though the RENs (and SDG&E) report energy savings at the project level, the evaluation team received measures-level data to identify high-impact measures for model review. Unfortunately, measure-level savings were deemed unreliable since they did not sum to project-level savings.

Once the three projects were identified, the team reviewed the EnergyPro input files (and any other file) that included energy savings calculations external to the EnergyPro software. This review was done for the single project identified for each of the three entities. As shown, windows represented the only common measure across the three groups that involved EnergyPro usage, so the team limited the review to the windows measure assumptions as input into EnergyPro.

After the projects for model comparison were identified but before the actual review, the team held discussions with engineers who frequently use the EnergyPro software to better understand how the model works and to gain perspective on how differences in inputs or field staff could affect the model outputs. These discussions revealed several key findings.

- In theory, the results should be similar for similar projects even if all the inputs are not identical.
- There is not a rigid formula to follow because many options exist for entering detailed building data.
- The detail of each model is dependent on the budget and time allotted for each project; there is a trade-off between accuracy and resources.
- EnergyPro was not originally developed with existing building retrofits in mind. Instead, the focus of the software was on new construction, with retrofits as a secondary feature that users are able to “manipulate” the software to model.

- Based on the experience of evaluation engineers, the model has shown poor accuracy for existing retrofits and is better suited to new construction. The engineers did, however, indicate that this issue may have been addressed with recent software upgrades and modules.

The evaluation team's next step was to schedule in-depth interviews with representatives of the two RENs and SDG&E (when this evaluation took place, SDG&E was the only IOU to have completed Whole Building projects outside of a pilot program) to understand how they use EnergyPro. Before the interviews, program implementation staff members for the two RENs were able to provide the team with detailed program technical memos that included policies, procedures, and savings assumptions used for their programs. BayREN and SoCalREN's technical memos include programmatic details, although the details differ. The BayREN document is comprehensive and includes all policies and procedures for program implementation, including, but not limited to, participation process, implementation roles and responsibilities, recruitment, eligibility, rebate process, site visits, data collection, energy savings methodologies, and quality assurance procedures. The SoCalREN document is not as comprehensive, but includes a basic program overview and focuses on measure-specific calculation methodology. RHA, the contractor who manages the SDG&E Multifamily Whole Building program, provided documentation that included statewide guidelines[37] and a presentation[38] on whole building modeling coupled with a process flowchart for how projects are initiated and developed.

Per the SoCalREN technical memo,[39]

> *This Energy Network Multifamily Program (Program) Technical Memo describes a process in which the EnergyPro Nonresidential Performance Module will be utilized to recommend packages of energy efficiency measures, ensure that each project meets minimum program performance thresholds, and describes the reporting process for savings. The Program requires the use of EnergyPro software to provide a consistent energy savings analysis process while allowing a custom, whole building performance approach for each upgrade project completed in the program.*

37 Energy Upgrade CA Multifamily Energy Modeling Guidelines v1.1. www.energysoft.com/Files/Guides/EUC%20MF%20Energy%20Modeling%20Guideline_Version%201.pdf

38 "Energy Upgrade California® – Energy Modeling High-Rise Multifamily", HMG, Inc. 2012

39 SoCalREN Multifamily Program Technical Memo.docx; Build-it-Green, 2014.

The team received valuable feedback on program implementation related to the EnergyPro modeling software from the staff interviews and the technical memos. These two information sources allowed the team to identify common practices and differences among the three PAs. Table 4-18 reviews the key similarities and differences.

Table 4-18: Comparison of Assumptions between the RENs and SDG&E

Model Details	SDG&E	BayREN	SoCalREN
Who Inputs Model?	Trained Contractors/Raters	Association for Energy Affordability (AEA) Staff	Trained Contractors/Raters
Who QA/QCs Model?	RHA	AEA and Bevilacqua-Knight Inc. (BKi)	Build-it-Green
Use of External Calculators?	No	Yes	Yes
Rater Certification?	Home Energy Rating System (HERS) II	Building Performance Institute (BPI), HERS II, Multifamily Green Point Rater, Multifamily Building Analyst	BPI, HERS II, Multifamily Green Point Rater, Multifamily Building Analyst
EnergyPro Training Course?	Yes	No	No
EnergyPro Module	EnergyPro Nonresidential	EnergyPro Lite (Nonresidential)	EnergyPro Nonresidential (for Low-Rise Residential–Performance Module Used)
Dual Baseline Scenarios?[1]	No	No	Yes
Existing Conditions Baseline?	Yes	Yes	Yes
Models Calibrated to Billing Data?	No	No	No
Comprehensiveness of Technical Guidelines Documentation	Basic Process Flowchart, Standard EUC Guidelines	Comprehensive Measure-Level and Implementation Details	Comprehensive Measure-Level Details, but Lacks Implementation Details

[1] Dual baseline scenarios run two models: one using project existing conditions as the baseline and one using code (Title 24) as the baseline.

Some of the notable differences across the three organizations are discussed in greater detail in the following subsections.

EnergyPro Versions

According to the in-depth interviews, BayREN uses a unique version of EnergyPro, called EnergyPro Lite, which has been built specifically for BayREN. The impetus for this version was to allow a more streamlined interface for collecting site information and to generate quicker results. SoCalREN and SDG&E are using EnergyPro in standard nonresidential modules to

develop scopes of work because these modules offer the full range of EnergyPro features. SoCalREN also uses the residential performance module for low-rise buildings. The most significant difference between EnergyPro Lite and the full EnergyPro versions is that the Lite version has a "Wizard" for inputting building details, which allows basic inputs. The Lite version will then run the model with default assumptions for the window and wall areas, based on the square footage of the building, so an analyst does not have to go in and model them. When asked about potential shortcomings of the EnergyPro software related to the focus on code-compliant new construction (per the discussion with team engineers), both REN staff indicated that although EnergyPro was originally developed for code-compliant new construction software, both REN staff indicated that EnergyPro has since created new modules that tackles retrofit. The new modules offer a different software "engine" and associated underlying assumptions. Ultimately, both EnergyPro tools (the nonresidential performance modules) rely on the same DOE2 engine.

Populating EnergyPro

SoCalREN and SDG&E both use trained contractors or raters; BayREN uses the Association for Energy Affordability (AEA) for project initiation, model inputs, and savings calculations. According to AEA staff members, their job is based on a three-fold objective. The first task is conducting the initial intake call with the participant to start building the initial model with a "ballpark" high-level project overview. The second task is conducting site visits, confirming what goes into the model (e.g., actual existing conditions and equipment verified while on site). Finally, EnergyPro is used to close out the project based on actual installations with a more detailed verification process. For SoCalREN and SDG&E, the modeling involves the second two steps (the initial site-visit-based project initiation and the final project closeout with actual installation verification). Both RENs and SDG&E all require rigorous levels of training and certification requirements for their contractors/raters. Separate in-house staff performs QA/QC for each project.

Exclusive Use of EnergyPro versus Other External Calculators

Both BayREN and SoCalREN get savings calculations from three main sources: EnergyPro, CPUC-specific dispositions (if any), and work papers or DEER-based calculations (the defaults). According to Richard Heath and Associates (RHA) (SDG&E), contractors have the ability to use other software, including external calculators and workbooks, but they only use EnergyPro. The technical memos from the two RENs contained detailed descriptions of the measures that are modeled outside the EnergyPro model, mostly common area and exterior lighting; small domestic hot water (DHW) measures (low-flow showerheads, faucet aerators, pipe insulation, and thermostatic control valves); and various plug loads (common appliances, particularly refrigerators). Table 4-19 reviews the measures for which savings are estimated outside EnergyPro. As the table shows, RHA (SDG&E) does not use spreadsheet templates outside the

EnergyPro model for these measures; the two RENs do. This made it impossible to assess whether the same measures that normally receive energy savings outside EnergyPro receive the same assumptions and calculations for SDG&E as for the two RENs.

Table 4-19: Measures Calculated Outside EnergyPro

Measure Group	SDG&E	BayREN	SoCalREN
Small domestic hot water measures (Including Showerheads, Aerators, Pipe Insulation, and Thermostatic Control Valves)	No	Yes	Yes
Common Area and Exterior Lighting	No	Yes	Yes
Appliances (Refrigerators)	No	No	Yes

A review of the external spreadsheets for two projects (one for BayREN, one for SoCalREN) showed some differences in the assumptions being used in these models. Furthermore, the spreadsheets themselves were developed independently and were not a consistent "template" that ensured that the same savings assumptions were ultimately used for each project. As an example, differences for low-flow showerheads between the BayREN and SoCalREN DHW spreadsheet models included the following:

- Average shower time (BayREN uses 7.4 minutes versus 8.0 minutes for SoCalREN)
- Hot and cold water temperature (BayREN uses 65 cold/106 hot and SoCalREN uses 70 cold/100 hot)
- Throttling factor[40] (BayREN uses 0.9 throttling factor and the team could find only "line loss" of 2% for the SoCalREN worksheet).

For lighting worksheets, the only difference between the RENs is that BayREN uses annual operating hours (e.g., 4,340 for exterior lighting) and SoCalREN annualizes a rounded daily estimate (12 hours/day, translating to 4,368 annual hours). The team would expect to find differences attributable to climate zones and other jurisdiction-based differences. The lack of consistent assumptions, however, leads the team to believe that the lack of a standard template may be contributing to differences (though in some instances minor) in savings claims that should not be occurring.

The team reviewed the EnergyPro input files across the three selected projects as part of the third and final task for the model comparison. In this review, the team focused exclusively on windows because windows were selected as the only applicable measure common across the three projects. Specifically for windows, the project rater or contractor is required to input the

[40] Throttling factor is defined as a percent reduction in hot water flow to account for the warm-up period of that flow.

existing fenestration type (number of panes, frame material type), the area, the surface geometry, the overhang, and the side fin. The details are well documented in the EnergyPro documentation guide (see footnote 21 in the guide). As noted previously, windows are one of the measures where the actual efficiency of the baseline equipment is unknown and defaults are required for a baseline. According to the SoCalREN technical memo, older existing windows "will not have gone through NFRC [National Fenestration Rating Council] testing and will not have U-values or SHGC [solar heat gain coefficient] noted." Accordingly, the team was able to perform only a cursory review of window inputs for each project and verify that all three organizations followed the Whole Building program protocols as defined for windows upgrades.

Baseline Conditions

All three implementers (SDG&E, SoCalREN, and BayREN) are using actual existing building conditions as the assumption of baseline conditions for all participants and all measures.[41] This consistent approach is detailed within the CPUC-based working group — titled the MF Project Coordination Group (PCG)—which is administered by CPUC staff. According to AEA, BKi, and REN staff, PAs and implementers check in continuously on the details and general collaboration on the Multifamily Whole Building programs. Furthermore, AEA serves as the technical implementer for BayREN, MCE, and SCG and is a participating rater in the SoCalREN, PG&E, and SDG&E programs. AEA has completed modeling across these administrators, and is therefore also familiar with each organization's procedures and sets of guidelines. Although the ideal is to enter actual known equipment specifications, some measures require defaulting because efficiency levels cannot be determined. Measures that require defaults may consist of wall insulation conditions (staff cannot always have ready access to assess the baseline), windows (older windows do not have NFRC efficiency specifications), and older HVAC and large DHW units that often do not have efficiency ratings on nameplate data. To demonstrate the process for determining the baseline equipment, during one interview the team learned that during the audit, the contractor might enter the boiler information along with the nameplate details. The QA/QC process will then involve validating the specifications for that exact boiler and potentially changing them to match the actual on-site values.

Projects also require establishing the RUL because ER is used as the baseline condition for all projects. All organizations follow a consistent procedure for estimating the RUL:

- Each measure receives the standard DEER-based EUL.
- Each measure's lifetime is then weighted by the EnergyPro-based energy savings.

[41] Per Energy Division guidance, SoCalREN will run dual-baseline scenarios, one for existing equipment and one for the Title 24 code baseline.

- The final project-level RUL is then assumed to be one-third of the weighted project estimated life, consistent with the DEER approach.

The evaluation team has found that the application of this logic will result in flawed lifecycle savings estimates. The team applied the above project-level RUL logic in an example project to demonstrate the impacts on lifecycle savings. For this example, the team used two measures with different EULs and first year savings. Measure 1 has an EUL of six years (RUL is on-third of EUL or two years) and saves 10 kWh in the ER period (RUL) and 2 kWh thereafter (code baseline kWh applied for EUL-RUL years). Total lifecycle savings for Measure 1 is 28 kWh. Measure 2 has an EUL of 15 years (RUL is five years) and saves 10 kWh in the ER period (RUL) and 5 kWh thereafter. Total lifecycle savings for Measure 2 is 100 kWh. The total project lifecycle savings is 128 kWh. All of these details are included in Table 4-20 below.

Based on the EUL weighting logic described to the team in the above bullets, to derive the weighted EUL the six-year EUL for measure 1 would be weighted by 10 kWh and the measure 2 15-year EUL would be weighted by 10 kWh, to arrive at an overall project average of 10.5 years. The resulting RUL would be 3.5 years. The savings for the project-level RUL period would be 20 kWh and the post RUL period would be 7 kWh. This results in a total lifecycle savings for the project of 119 kWh, a difference of 9 kWh (or 7% of original lifecycle savings).

Table 4-20: Lifecycle Savings Demonstration using Example Project and REN-based Project-level EUL Logic

Parameter	Measure A	Measure B	Weighted EUL
EUL (years)	6	15	10.5
RUL (years)	2	5	3.5
ER Baseline (kWh)	10	10	20
Code Baseline (kWh)	2	5	7
Lifetime kWh	28	100	119
Total Project kWh	**128**		**119**
Lifetime kWh Difference	**9**		

The evaluation team also discovered, during the review of the EUL and RUL logic detailed here, that both RENs are estimating lifecycle savings using an 18 year EUL in the tracking database. SDGE assigned a 16 or 16.5 EUL for their four EUC-MF projects completed during the 2013-2014 program period. Though large variations in project-EULs were not expected, the evaluation team did expect to see variation in project-level EUL due to the logic described above and knowing that projects received different measure combinations.

Calibrating to Usage (Billing) Data

According to BayREN, actual utility bill data is collected from participants when available. Until then, the program continues to work through avenues such as the CPUC to collect billing data. The availability of billing data can help to refine savings estimations by calibrating the building energy usage. One interviewee, stated that obtaining usage data would place an additional burden on contractors. Although it would be ideal to have access to project-level billing information, this aspect of building calibration has been notoriously difficult because privacy and security concerns have prevented the RENs and their implementers from obtaining this information though recent legislation (AB-802) has been proposed that may help overcome these obstacles.[42]

In another interesting finding from the in-depth interviews, several different staff members mentioned that the results of the previous single family whole house retrofit evaluation[43] showed that the EnergyPro software was greatly over-predicting the realized energy savings for the projects. According to that evaluation,[44]

> *Staff analysis showed that this software greatly over-predicted program eligible end uses (space heating/cooling and water heating). The over-prediction is not due to any fundamental problems with the modeling software. Rather, the assumptions built into the EnergyPro models about pre retrofit energy consumption of key end uses were not consistent with DEER assumptions and generally predicted far more energy use than indicated by the latest Residential Appliance Saturation Survey (RASS). The RASS yields energy consumption estimates for residential end-uses and application saturations based on household surveys. EnergyPro can generally be expected to provide reasonable results if the input assumptions are revised (such as thermostat set-points, occupancy hours and HVAC faults). Gas use was over-predicted by more than 50%. Final staff direction required electricity consumption savings to be reduced by 60% (instead of the 75% indicated by the staff analysis) and gas savings to be reduced by 20% (instead of the 37% indicated by the staff analysis).*

Although the results of the single family Advanced Home Upgrade evaluation are not directly applicable to this multifamily research, the findings support the idea that it is important to look

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42 https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB802

43 DNV GL; Whole House Retrofit Impact Evaluation; http://www.calmac.org/publications/CPUC_WO46_Final_ReportES.pdf (Sep 9, 2014)

44 CPUC, Ex Ante Review Fact Sheer #3, HVAC Equipment Savings Estimates Assumptions; http://www.cpuc.ca.gov/NR/rdonlyres/21D8C436-72AA-4254-AE44-5E036B8C11AA/0/ExAnteReviewFactSheet3HVAC.pdf

more closely at the input and output assumptions from EnergyPro, and if possible calibrate to actual billing data as a validity check on the savings estimates.

4.2.3 Engineering Desk Review

This analysis consisted of applying inputs found in REN backup documentation to DEER or engineering algorithms, and documenting the resulting savings numbers. The team combined the measure-level evaluated savings into projects and compared these to the project-level savings from the CPUC data to determine a realization rate for kW, kWh, and therm savings estimates.

Savings from the engineering desk review widely varied from the ex ante (modeled) savings. Ratios of ex ante to engineering review savings varied from 4% (Project 4, kWh savings, Table 4-21) to 857% (Project 3, kW savings, Table 4-22). Various factors may be affecting the comparison, including the following:

- **Baseline Assumptions:** Ex ante modeled savings assumed ER (existing conditions) on all project measures. In many instances, engineering review sources did not differentiate savings between ER and ROB estimates, or used a "blended baseline" for savings calculations. This would mean that the modeled and desk review savings were using different baseline assumptions.
- **Stacking Effect:** Simulation models can account for the combination of installed measures, or a "stacking effect," whereby the cumulative savings from installing multiple measures is less than the savings from the measures individually. The engineering review did not account for these interactions.
- **Available Data:** In some instances, not all data required for engineering review were available in program tracking data. This included values such as size (capacity), location, and/or pre-existing (baseline) conditions. In these cases, the evaluation team had to make assumptions to estimate savings.

These three factors bias the savings in different directions. For example, using a blended baseline in the engineering review would result in lower savings than a purely ER baseline (as used in the EnergyPro models). The stacking effect, however, would mitigate this effect, and would (typically) result in overestimating savings in the engineering review. These two effects work in different directions, but are also of differing magnitudes. Consequently, they may not be completely offsetting each other. Table 4-21, Table 4-22, and Table 4-23 present the results of the engineering desk review, comparing first year gross kW, kWh and therm savings values, respectively.

Table 4-21: Engineering Desk Review Gross First Year Energy Results, By Project

Project	Ex Ante Savings (kWh)	Desk Review Savings Estimates (kWh)	kWh Savings Ratio
Project 1	435,941	162,137	37%
Project 2	237,371	34,175	14%
Project 3	4,437	3,212	72%
Project 4	352	15	4%
Project 5	0	0	NA
Project 6	1,219	761	62%
Total Sample	**679,320**	**200,300**	**29%**

Table 4-22: Engineering Desk Review Gross First Year Demand Results, By Project

Project	Ex Ante Savings (kW)	Evaluated Savings from Desk Review (kW)	kW Realization Rate (Evaluated/Ex Ante)
Project 1	42.74	7.34	17%
Project 2	71.64	0.02	0%
Project 3	0.23	1.97	857%
Project 4	0.00	3.20	NA
Project 5	0.00	0.00	NA
Project 6	0.00	0.03	NA
Total Sample	**114.60**	**12.56**	**11%**

Table 4-23: Engineering Desk Review Gross First Year Gas Results, By Project

Project	Ex Ante Savings (therm)	Evaluated Savings from Desk Review (therm)	Therm Realization Rate (Evaluated / Ex Ante)
Project 1	13,679	54,191	396%
Project 2	12,115	7,364	61%
Project 3	1,178	805	68%
Project 4	1,209	1,163	96%
Project 5	114	609	535%
Project 6	50	39	79%
Total Sample	**28,345**	**64,171**	**226%**

4.2.4 Consumption Analysis

The primary goal of the consumption analysis was to ensure that the savings assumptions for the projects were within reasonable bounds relative to the annual consumption (gas and/or electric) of the projects. This analysis involved three primary steps: (1) link the billing data back to project data, (2) validate the comprehensiveness of the billing and savings data, and (3) compare the reported savings to actual pre-program billing data. Linking the billing to the tracking data involved using the accountIDs (including serviceaccountID and SAID) and the physical address of the property. In the second step, the team evaluated the completeness of the consumption data as the information pertains to a particular project. As discussed previously, the billing analysis must have complete building usage data in order to accurately incorporate the full impact of the program. If only partial consumption data are available, this analysis may over- or underestimate program impacts, depending on the spaces covered by the analyzed billing data.

Once the evaluation team evaluated billing data completeness, analysts reviewed consumption data from projects for which 100% of consumption information was available.[45] For these projects, the evaluation team calculated annual savings in two ways. The first and primary approach used 12 months of gas and electric usage before program participation (based on installation date in the tracking database). The second approach, used only as a validation check against the primary approach, used a three-year average (2012—2014). This pre-program consumption was compared with the ex ante annual savings for the project to determine the proportion of consumption represented by the ex ante savings claims.[46]

The first step required billing data to be available. Billing data for each multifamily project were made available to the evaluation team via the CPUC central consumption data repository, managed by DNV-GL. For the SoCalREN projects, only one of the two projects had available billing data. The team received billing data for most of the BayREN projects. To match the project with the billing data, the evaluation team used address, service account (SA_ID) and customer account (accountID) numbers to merge. Each of these parameters provided varying levels of successful merges to the projects. The most successful matches were for address; the least successful were for SA_ID. Note that even though several sites were matched using the accountID or SA_ID that were not matched using the address, none of the billing data for these sites were sufficient to allow benchmarking the savings against the data, and were therefore not included in the remaining analysis. The first step results, billing data matching, are shown in Table 4-24.

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[45] Projects with <100% of consumption data available were excluded from this analysis.

[46] See www.energysoft.com/Files/Guides/EUC%20MF%20Energy%20Modeling%20Guideline_Version%201.pdf. According to this EnergySoft guide, calibrating the models to utility data is not a program requirement.

Table 4-24: Billing Data Match by REN and Fuel Type

Entity	Total Projects	Address Match	AccountID Match	SA_ID Match
Electric				
SoCalREN	2	1	0	0
BayREN	95	81	28	8
Gas				
SoCalREN	2	0	0	0
BayREN	95	83	27	14

The second step involved assessing the comprehensiveness of the billing and savings data. The primary issue with matching by accountID or SA_ID was that it provided incomplete billing data for the site. There were no projects that included all units by matching via the account or SA_ID. As an example, one-quarter of the address matches also had accountID and one-sixth of address matches had an SA_ID match. Of these matches though, the billing data represented only 24% of the electric billing usage (kWh) based on the three-year average billing data provided. The same for gas usage—of those that matched with the address match, only 55% of the usage was accounted for using these other joins. Furthermore, it was clear from reviewing the billing data that matching usage by account or SA_ID does not make sense. Using one project as an example, the same unit showed three different accounts one year. For other years, there was only a single account, with accounts changing from year to year. This intuitively makes sense because tenants are constantly moving into and out of these sites, and accountIDs will change as a result. If the database were able to track meter numbers for an entire complex, however, program tracking and billing data could be more effectively matched.

To summarize the billing data, each project was rolled up to annual billing, using the projectID. The next step was to ensure that the number of units for each site in the billing data matched or exceeded the number of units associated with each project in the tracking data. The number of units for each site was derived from data provided by the RENs, which included multifamily property details, such as number of units in each building, the number of buildings, and the total number of rooms. If the units matched or exceeded the units listed in the reference file, the team deemed the billing data to be sufficient to compare. Otherwise the site was listed as insufficient and excluded from the analysis. One additional step was to ensure that the energy savings was greater than zero because there were several projects with zero savings depending on the fuel type associated with the project.[47] Ultimately, the team used 27 electric (out of 81) and 24 gas projects (out of 83) for BayREN and no SoCalREN projects for this consumption analysis (Table 4-25).

[47] As an example, one site may have received gas (therm) savings for boiler installation but no electric savings; other projects may have received only electric (kWh) savings but no associated gas savings.

Table 4-25: Billing Data Validity Check

Entity	Total Projects Matched	Meet or Exceed Unit Counts?	Savings Greater than Zero
Electric			
SoCalREN	1	0	0
BayREN	81	39	27
Gas			
SoCalREN	0	0	0
BayREN	83	24	24

The third and final step was to compare the savings with the annual usage data by fuel (kWh electric and therm gas usage). To compare usage, the team reviewed the billing data from the 12 months of consumption before the project was installed.[48] Any project with a savings ratio over 50% was flagged for further scrutiny. In addition, after reviewing the technical memos from each of the RENs as part of the model comparison task, the team also decided to identify those projects that fell below the 10% savings threshold, because that threshold was deemed to be the minimum standard to accept a project for participation in the Multifamily Whole Building program. Table 4-26 reviews the savings-to-usage ratio strata.

Table 4-26: Review of Projects by Savings-to-Usage Ratio

REN	Billing Period	Total Number of Projects Reviewed	Savings to Usage Ratio			
			<10% Savings	10%–19% Savings	20%–50% Savings	>50% Savings
Electric						
BayREN	12 Month Pre-Installation	25	14	8	3	0
Gas						
BayREN	12 Month Pre-Installation	23	5	9	6	3

The electric savings ratios were skewed toward the lower end of the savings strata, with only three sites showing savings ranging from 20% to 50% of annual consumption. The gas savings ratios, however, were significantly greater. Three of the 23 sites (13%) show very high expected savings of more than 50% over pre-program usage, and six projects (25%) showed savings ratios of 20%–50% of pre-program usage. All three of the >50% gas projects were validated against the project detail to ensure that potentially common areas were not excluded. Only one of these

[48] The team also reviewed the consumption data using three-year averages to ensure the 12-month pre-installation consumption data did not include outliers and found similar conclusions. Sufficient data for all projects, using three-year average of as the denominator, were not available.

three showed potential for having a common area missing from the billing data; in the other two projects all units and common areas were likely accounted for.[49]

On the low end of the savings ratio, although more than half (57%) of electric projects and 21% of gas projects showed savings less than the program threshold of 10%, the program threshold was based on both fuels (i.e., as long as expected savings for either gas or electric exceed 10% of usage than the project should qualify). In total, the evaluation team found three projects with both gas and electric savings below the 10% savings threshold.[50] It appears, then, that the same number of projects (three) showed abnormally high savings (>50%) and an equivalent number of projects (three) showed abnormally low savings (<10%). This represents almost one-quarter of the projects (six out of 25) with savings ratios outside of reasonable ranges.

4.2.5 Baseline Assessment

The early replacement (ER) phone survey battery in this effort was based on research and lessons learned from a variety of evaluations and TRMs.[51] The ongoing challenge in ER evaluations is finding a balance between the data needed to assess a measure as ER, and that which can be reasonably collected during a phone survey. To achieve that balance, the ER assessment was based on the following five metrics:

1) Working status,
2) Age,
3) Expected remaining life,
4) Part of regularly scheduled/government-mandated upgrade, and
5) Standard practices during the scheduled upgrade.

Specifically, measures qualified for ER if they were *not* part of a regularly scheduled or government-mandated replacement and if they:

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[49] Even though the evaluation team used a multilevel data-matching approach with the number of units as a proxy for comprehensiveness, there was still the possibility that a common area or other non-tenant-occupied area of the multifamily complex may have been excluded from the billing data received by the team. If indeed projects that are potentially missing units or accounts associated with the complex are included in this analysis, the results would overstate the savings percentage.

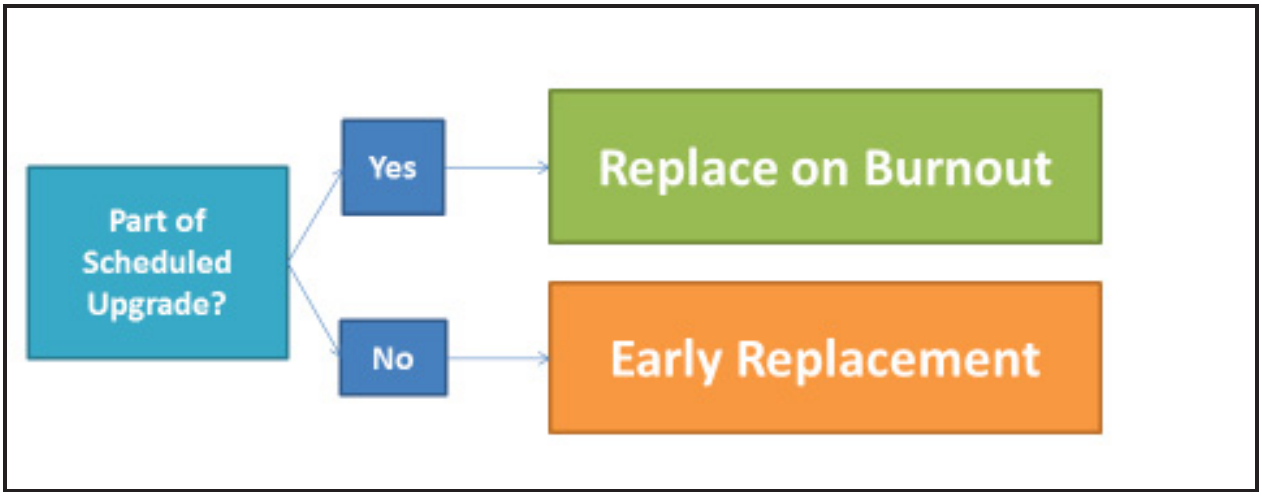
[50] Note that there were six additional projects with single fuel savings below the 10% threshold and insufficient data to estimate the savings ratio for the other fuel type.

[51] IL TRM. Version 4.0. January 23, 2015; Navigant Consulting, Inc. Home Energy Efficiency Rebate Program. GPY2 Evaluation Report. February 27, 2014; and The Cadmus Group, Inc. 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to Gross, Market Effects, and Equipment Replacement Timing. Volume 1. Part of the Massachusetts Residential Retrofit and Low Income Program Area Evaluation. June 2013.

- Replaced existing equipment,
- Replaced equipment that was functional and in need of only minor repairs (if any), or
- Replaced equipment with self-reported ≥2 years left on its expected life.

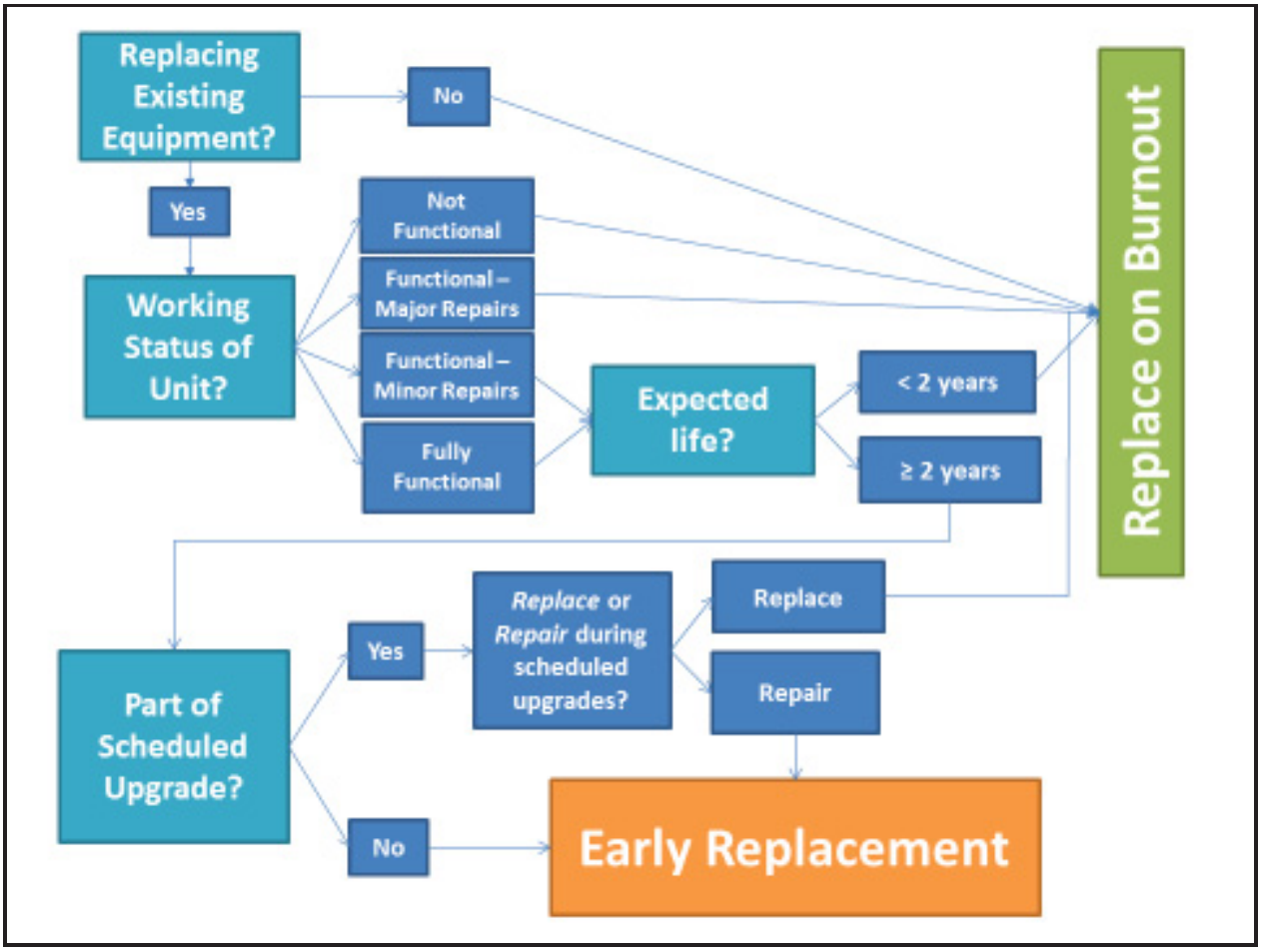
The evaluation team assessed baselines at the measure level to account for the possibility that the likelihood of ER could differ by measure. To derive a single ER estimate for each measure, each project-level measure quantity was used to proportionally weight up to the overall sampled quantity for that measure. For example, lighting and thermostat setback measures were excluded from the baseline analysis and assumed to be ER measures. Windows, roofing, small domestic hot water (DHW; e.g., faucet aerators and low-flow showerheads), and insulation measures were assumed to be ROB unless they were not part of a regularly scheduled, planned, or government-mandated upgrade process. All other surveyed measures required a more detailed ER logic, which factored in working status of the replaced equipment, expected remaining life,[52] and whether the equipment was part of a regularly scheduled upgrade. Figure 4-1 and Figure 4-2 illustrate the two-tiered ER logic schemes.

Figure 4-1: ER Logic for Small DHW, Roofing, and Shell Measures



[52] Two years was chosen as the cutoff for remaining useful life because this cutoff is analogous to that often used for FR analysis. It is deemed a reasonable time frame to indicate short-term outlook relative to a less-certain mid-or-long-term time frame.

Figure 4-2: ER Logic for All Other Surveyed Measures



The ER analysis was divided into two distinct groups based on the end-use type. Shell and small DHW measures were included in the first group and all other measures were included in the second group. To derive a single ER estimate for each measure, each project-level quantity was used to weight relative to the overall sampled quantity for that measure.

The program assumes ER savings for all measures, comparing the efficient measure against the efficiency of the existing installed measure/conditions; the results of this analysis, however, demonstrate that because many of the participants had planned upgrades before they participated in the program, the program should be claiming an ROB/new construction baseline rather than an ER baseline. For example, only 48% of the window projects, 67% of the small DHW projects, and 83% of the insulation projects qualified as ER (Table 4-27).

Table 4-27: ER for Shell and Small DHW Measures

Measure Category	Measure(s)	% ER
Shell/Insulation (n = 19)	Insulation (Attic, Wall, Floor, Crawlspace)	83%
Shell/Windows (n = 16)	Windows	48%
Small DHW (n = 41)	Faucet Aerator, Low-Flow Showerhead, Pipe Insulation	67%

For all other measures, respondents were able to provide ER details on all but one-quarter of the surveyed measures (9 of the 36 measures). The sample sizes were small, however, for most of the measure groups, but the results do show that not all projects were ER. For example, while 84% of the large DHW savings came from ER projects (Table 4-28), only 20% of the other DHW were designated ER. Approximately half of non-ER responses resulted from the measure being a new installation (i.e., not replacing existing equipment). The other half was attributable to existing equipment that was either nonfunctional or in need of major repairs.

Table 4-28: ER for Appliances, Large and Other DHW, and Space Heating Measures

Measure Category	Measures	% ER
Appliance (n = 3)	Clothes Washer, Refrigerator	100%
Large DHW (n = 21)	Storage/Tankless/Boiler Water Heaters, Hot Water Demand Control	84%
Other DHW (n = 5)	Water Heater Pump, Water Heater Boiler Controls	20%
Space Heating (n = 3)	Space Heating Boiler, Thermostatic Radiator Valve	100%

The evaluation team used DEER-based EUL as a validity check on the measures listed in Table 4-28. All respondents were asked the age of the equipment and their expectations for the RUL. The average RUL for each measure was then compared against the DEER-based RUL (one-third of the EUL). The tankless water heaters was the measure where the average respondent RUL did not match or exceed the DEER-based RUL, although with an expected RUL of five years, this measure still exceeded the two-year cutoff to be considered an ROB measure. All other measures reviewed in Table 4-28 showed RULs that met or exceeded the DEER-based RUL.

Additionally, the evaluation team reviewed the CPUC tracking databases to assess whether the lifecycle savings correctly accounted for the ER baseline in the REN calculations. Specifically, lifecycle savings for early replacement projects should be calculated using the early replacement baseline for the RUL period, then using a code baseline for the remainder of the EUL, or

$$Lifecycle\ Savings = (RUL * Savings_{ER}) + \big((EUL - RUL) * Savings_{Code}\big)$$

To do this, the evaluation team recalculated the lifecycle savings using the data provided in the CPUC tracking database and assessed whether this calculation was followed. As a result, the

evaluation team could not confirm that BayREN is using both the early replacement savings and code savings when calculating lifetime savings. It appears that BayREN is calculating lifecycle savings by multiplying the EUL by first year savings.[53] This calculation would over estimate lifecycle savings as it does not account for the replacement of the unit after the RUL. SoCalREN, however, appears to be using the correct calculation (RUL times early replacement baseline savings plus EUL-RUL times code (ROB) baseline savings).

4.3 BayREN and SoCalREN Single Family Measures

The objective of the gross assessment for the BayREN and SoCalREN single family measures was to analyze and compare savings calculations contained in the PA workpapers with the savings reported in the CPUC claimed savings tracking data. More specifically, workpapers were analyzed in order to:

- Assess program documentation quality,
- Assess consistency of assumptions across program administrators,
- Assess measure and package level savings estimates, and
- Assess accuracy of savings claims.

The single family measures are offered under the Home Upgrade Program , which is a whole-house retrofit program administered by IOUs and RENs. PG&E and BayREN offer the Home Upgrade Program in Northern California; and SCE, SCG, SDG&E and SoCalREN offer it in Southern California. During the 2013-14 program period, the RENs offered the Home Upgrade Program component exclusively within their respective territories. However, each IOU offered two package options: Home Upgrade and Advanced Home Upgrade. Home Upgrade is based on savings that are deemed as part of the workpapers.[54]

The workpapers are used to understand the applicable baseline for each building type, home size, and climate zone. An accurate baseline is essential to knowing what can be adjusted to accurately estimate the savings. The evaluation team approached this task first by identifying the appropriate workpapers. As discussed earlier in the section, there were workpaper revisions and EUCA calculator updates that changed throughout the cycle as the program evolved. The team verified the applicable workpaper versions with the respective implementers (PG&E, BayREN, SCE, and SoCalREN).

[53] First year savings is calculated only under early replacement baseline conditions.

[54] Advanced Home Upgrade uses simulation software to model the entire building and estimate savings for each project.

The next step was to review the program activity in the tracking data provided by the CPUC. The IOU tracking data for the 2013-2014 program year changed three times during the analysis period: April, July and September 2015. The findings reported here are based on the September data.

Once the program tracking data were identified, the team attempted to recreate the reported savings using the workpaper equations and assumptions along with the corresponding inputs from the program tracking data. This task was more difficult than first estimated.

Another step of the analysis was to compare the REN savings values with the IOU values to see if there was consistency across the PAs, and help assess the reliability of the values. Because savings varies by climate zone, BayREN was compared to PG&E and SoCalREN was compared to SCE.

During the 2013-14 program years, all four implementers' methods were largely similar conceptually. Each PA modeled prototype buildings but differed on the specific methods used to calculate and report whole house upgrade savings. For example, according to SCE workpaper SCE13M1005, SCE developed savings using the DEER 2011 Single Family Home prototypes to complete base case simulations in eQUEST v3.64. In contrast, SoCalREN used a calibrated EnergyPro model rather than DEER inputs. House characteristics for both PAs were from the Residential Appliance Saturation Survey. In addition, the RENs did not have standardized measure codes thereby making comparisons with the IOUs difficult. The measure codes given by the IOUs relate to a specific code from the workpaper, but the RENs measure codes are a description created by combining measure abbreviations. As a result there were far more measure codes reported by the RENs than by the IOUs. The rest of this section presents findings for BayREN and PG&E first, followed by findings for SoCalREN and SCE.

4.3.1 BayREN and PG&E Workpaper and Tracking Data Comparison

BayREN

BayREN had no workpaper approved by CPUC for the 2013-14 program cycle. The subcontractor that provides program reporting both for BayREN and SoCalREN (BKi), verified that five methods were used to calculate the savings throughout the 2013-14 program period. This consisted of workpapers, calculators or a combination of both. These methods changed as the program evolved and included the following.

- FlexPackage was the name of BayREN's predecessor Home Upgrade suite of programs (https://www.bayareaenergyupgrade.org/sites/default/files/BayRenHomeUpgradeInfo.PDF). These early programs were similar in design and the savings estimates were prepared using similar methodology, however each set of calculations for this program was

tailored to the climate zones in which they operated. These can be considered "pre-workpaper" calculations.

- SCE Workpaper SCE13MI005, Revision 0 (Feb. 27, 2012). Overall, this Home Upgrade Program workpaper describes the savings calculation method used in the EUCA Calculator. However, the workpaper document itself does not present deemed values for the packages that could be used to verify the energy savings claim. As a result, there is no standalone workpaper method that is separate from the EUCA Calculator method.
- EUCA Calculator Version 10.
- EUCA Calculator Version 11.

The EUCA V11 model uses DEER building prototypes and weights them using square feet from the Residential Appliance Saturation Survey (RASS) to assign square footage depending on climate zone and vintage. Individual project home square footage is collected but is not provided in the CPUC tracking database.

The measure names reported in the CPUC database are unique and specific for the measure combinations at each site, but omit the methodology, or calculator version, that was used to perform the savings calculation.

PG&E

The measure names from the PG&E workpaper (PGECOALL108, Home Upgrade Program, Revision #0, Sept. 30, 2013) did match CPUC tracking data. In the tracking data, each measure is adjusted based on a combination of climate zone and home vintages based on previously developed model runs. Figure 4-3 shows the variation for one Measure Code - LM 268.

Figure 4-3: PG&E Home Upgrade Program Variations for Measure Code – LM 268

							1st Baseline			2nd Baseline		
Measure Code	DEER ID	Measure Description	Measure Application Type	Building Type	Building Vintage	Climate Zone	KWh Electric Savings	THM Gas Savings	LIFE CYCLE (RUL or EUL)	KWh Electric Savings	THM Gas Savings	LIFE CYCLE (RUL or EUL)
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z01	0.00	10.70000	11.00	0.00	0.00000	0.00
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z01	0.00	10.60000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z01	0.00	10.60000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z02	0.00	10.10000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z02	0.00	9.89000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z02	0.00	10.10000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z03	0.00	10.10000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z03	0.00	9.98000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z03	0.00	10.00000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z04	0.00	9.98000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z04	0.00	9.85000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z04	0.00	9.87000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z05	0.00	9.99000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z05	0.00	9.93000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z05	0.00	9.84000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z11	0.00	9.78000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z11	0.00	9.69000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z11	0.00	9.66000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z12	0.00	9.93000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z12	0.00	9.79000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z12	0.00	9.80000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z13	0.00	9.34000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z13	0.00	9.22000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z13	0.00	9.27000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	75	Z16	0.00	10.80000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	85	Z16	0.00	10.70000	11.0	0.00	0.00000	0.0
LM268	IOU WP	62 EF Gas WH	ROB	SFM	96	Z16	0.00	10.70000	11.0	0.00	0.00000	0.0

BayREN compared with PG&E

As previously described, the evaluation team was provided savings based on measure names in an Excel workbook based on workpaper PGECOALL108, Home Upgrade Program, Revision #0, Sept. 30, 2013. This workpaper includes a calculator also developed by PECI.

In addition, the evaluation team was provided a similar document with BayREN projects. Neither the workpaper nor calculator addressed home square footage. These are embedded in the savings calculation and driven by vintage and climate zone. The expectation was that if measure codes are the same (or very similar) and given the same vintage and climate zone, the reported savings should be similar.

Overall, the BayREN and PG&E values were the same or similar for the measure the evaluation team was able to compare. There were exceptions however that could not be explained by the available data. Two examples comparing PG&E and BayREN tracking data are provided below.

Example 1: PG&E reported 21 records for measure LM-161 and described it as, "*1FL.AC:R8 DCT INS;6% DCT LKG;SEER 14 AC*".

BayREN does not reference measure codes but instead provides descriptions. The closest description provided by BayREN to the PG&E measure description is *"AC >= 14 SEER/12*

EER, DUCT AIR SEALING 6%, FURNACE AFUE >= 92%, DUCT INSULATION". BayREN reported three records – two matched values with PG&E.

Table 4-29 compares the savings reported by each implementer for the given measure using the same assumptions (Climate Zone 12, vintage 1975). Two BayREN records are provided as an example of tracking data. BayREN 1 is aligned with PG&E. BayREN 2 has higher savings than BayREN 1 and PG&E. This may be due to the fact that BayREN 2 represents a two story prototype home instead of a single story home, but this is not evident from the tracking data, is not consistent with the EUCA model output and may simply be an entry error.

Table 4-29: Measure LM-161 Comparison (Average Values from Tracking Data)

Tracking Data Field	BayREN 1	BayREN 2	PG&E
Measure Name	N/A	N/A	LM161
Climate Zone	12	12	12
Measure Type	ER	ER	ER
Square Feet	Unknown	Unknown	Unknown
Vintage	1975	1975	1975
Effective Useful Life (EUL)	18.7	18.6	18.0
Remaining Useful life (RUL)	6.2	6.2	6.0
Installation Rate	0.85	0.85	0.68
Net to gross (NTG)	0.85	0.85	0.85
Realization Rate	0.85	0.85	1.00
Baseline 1 kWh	313.9	728.2	313.9
Baseline 2 kWh	119.3	258.8	119.3
1st year kWh savings gross	226.8	526.1	212.1
1st year kWh savings gross no realization rate applied	266.8	526.1	212.1
Lifecycle kWh	2,493.3	5578.3	2,239.9
Lifecycle kWh no realization rate applied	2,933.3	5578.3	2,239.9
Baseline 1 Therms	65.3	104.1	32.5
Baseline 2 Therms	53.9	89.6	21.1

The PG&E and BayREN baseline kWh values match in two of the three BayREN records. The evaluation team could not find any field in the tracking data to explain why one BayREN record is different than the other two. Comparing between PG&E and BayREN there are two main differences. First, the BayREN baseline therms (reported at the bottom of the table) are at least twice as PG&E baseline therms. These should be similar given the same climate zones and not two to three times greater across homes. Second are the assumptions. BayREN reports the same installation rate, NTG and realization rate across projects (0.85). PG&E is consistent internally, reporting the same values for NTG (0.85), realization rate (1.00) and installation rate (0.68). Due

to the differences in realization rates between BayREN and PG&E, first year savings and lifecycle savings differ when the realization rate is applied.

Example 2: PG&E reported 30 records of measure LM-101 and described it as, "*1FL.AC:R30 ATC INS;-15% LKG;R8 DCT INS;6% DCT LKG*".

BayREN does not reference measure codes but instead provides descriptions. The closest description provided by BayREN to the PG&E measure description is, *"DUCT INSULATION, ATTIC INSULATION, DUCT AIR SEALING 6%, BUILDING AIR SEALING 15%"*. BayREN reported one record for this measure.

The savings reported by BayREN and PG&E for the same vintage and climate zone are very different for electric baselines, but reasonably close for natural gas.

Table 4-30: Comparison of BayREN and PG&E

Tracking Data Field	BayREN	PG&E
Measure Name	N/A	LM101
Climate Zone	12	12
Measure Type	ER	ER
Square Feet	Unknown	Unknown
Vintage	1985	1985
Effective Useful Life (EUL)	16.8	18.0
Remaining Useful life (RUL)	5.6	6.0
Installation Rate	0.90	0.77
Net to gross (NTG)	0.85	0.85
Realization Rate	0.90	1.00
Baseline 1 kWh	-8.6	195.8
Baseline 2 kWh	-14.1	156.1
1st year kWh savings gross	-7.0	151.0
1st year kWh savings gross no realization rate applied	-7.7	151.0
Lifecycle kWh	-166.9	2351.2
Lifecycle kWh no realization rate applied	-166.9	2351.2
Baseline 1 Therms	56.9	74.0
Baseline 2 Therms	45.3	59.4

4.3.2 SoCalREN and SCE Workpaper and Tracking Data Comparison

SoCalREN

Like BayREN, SoCalREN had no workpaper approved by CPUC. BKi was interviewed and reported that three methodologies were used to calculate the savings throughout the period including the following.

1) SCE Workpaper SCE13MI005, Revision 0 (Feb. 27, 2012). Overall, the statewide Home Upgrade workpaper describes the savings calculation method used in the EUCA calculator. The workpaper document however, does not present deemed values to be reported the energy savings claim. As a result, there is no standalone workpaper method that is separate from the calculator method.
2) EUCA Calculator Version 10.
3) EUCA Calculator Version 11.

A review of the calculator findings found a calculation error in baseline 2 which has an effect on the savings output for baseline 2 but not on baseline 1 or other aspects of the calculator.

More specifically, there are some single family measures that do not have an applicable code baseline value for the second baseline for cases when the measure is ER. The model should then just assume that the existing baseline is applicable for both baseline values, and they should be set to equal. However, the model appears to be setting the second baseline value to zero, so that the delta wattage is calculated as zero minus the installed wattage, which results in an impact that is equal to the negative value of the annual consumption. Because of this, the lifecycle savings for some measures were extremely highly negative, which had the effect of causing the overall net lifecycle savings for the program to be negative. In instances when this appeared to have occurred, the evaluation team corrected the error by setting the second baseline unit energy savings baseline value equal to the first baseline value. Table 4-31 below summarizes this affect by comparing the reported MW, GWh and MMTherm ex ante savings values, to the corrected values.

Table 4-31: Comparison Between Reported Versus Reviewed Lifecycle MW, GWh and MMTherm Savings for SoCalREN Single Family Measures

Lifecycle Gross Savings	Reported	Reviewed
MW	(0.50)	1.70
GWh	(2.23)	1.10
MMTherms	(0.44)	0.20

It should be noted that there is a version 12 of the EUCA calculator that has rectified this issue. Going forward, the most recent version of the EUCA should be used when reporting annual savings values.

The measure names from the CPUC tracking data mirror the names listed in the workpapers and calculators but did not include certain specific data such as HVAC SEER levels.

The measure codes listed in the tracking data are for combinations of measures at specific sites and do not reflect the SCE workpaper codes.

SCE

1) From the Workpaper Archive deeresources.info, we used Workpaper SCE13MI005, Basic Path Enhancement for the Whole House Upgrade Program, Feb. 27, 2012.
2) The measure names from the tracking database do match the measure codes in the workpaper.
3) The measure codes however do match the workpaper measure codes.
4) Savings utilize the MASControl tool, but with an old version (v2.00.10). We did not check the values against this tool since it was not needed to verify if the reported savings methods were the same as SoCalREN.

SoCalREN compared with SCE

There are very few comparison points between SoCalREN and SCE so comparing savings directly was difficult. The evaluation team searched for comparable measure descriptions to provide a comparison. To illustrate the similarities and differences between SoCalREN and SCE four examples are provided.

Example 1: SCE uses Measure Code WB-29806. In the workpaper, the code equates to a description of "*R30 Atc Ins; R13 WI; -15% Lkg; R8 Dct Ins*".

SoCalREN does not reference measure codes but instead provides descriptions. The closest description provided by SoCalREN to SCE-29806 is *"Attic Insulation and Attic Plane Sealing; Duct Insulation; Duct Replacement; Wall Insulation"*.

Since these descriptions reference similar measures the evaluation team used them as comparison points between SCE and SoCalREN tracking data. The averages across all records for the measure are shown in Table 4-32. Average values vary greatly between the two implementers. Within the SCE program measure WB-29806 first year gross savings ranges from a low for one project of -2,040kWh (negative savings) to 10,258kWh (positive savings) for another. The savings reported by SoCalREN do fall within the relatively wide range of reported SCE values and are similar to multiple SCE projects. There are several differences to note.

- SCE reports vintage as "Ex". This is a weighted average of homes built from 1978 to 1992 based on RASS data.
- According to the SCE workpaper, EUL should be 17.8 years and RUL 5.9 years. For some measures SCE reports both values as 14 years.
- The SoCalREN EUL and RUL values match the SCE workpaper values.
- NTG ratios are very different between the two implementers. SoCalREN is higher in most cases.
- Realization rates are close, but do not always match. SoCalREN is higher in most cases.

Table 4-32: Measure WB-29806 Comparison (Average Values from Tracking Data)

Tracking Data Field	SoCalREN	SCE
Measure Name	N/A	WB-29806
Climate Zone	9	9
Measure Type	ER[1]	ROBNC
Square Feet	Unknown	Unknown
Vintage	1975	Ex
Effective Useful Life (EUL)	17.7	14
Remaining Useful life (RUL)	5.9	14
Installation Rate	1.00	1.00
Net to gross (NTG)	0.85	0.55
Realization Rate	1.00	0.90
Baseline 1 kWh	610.1	1.0
Baseline 2 kWh	471.0	0.0
1st year kWh savings gross	610.1	2,212.6
1st year kWh savings gross no realization rate applied	610.1	2,458.4
Lifecycle kWh	9,157.4	30,976.4
Lifecycle kWh no realization rate applied	9,157.4	34,418.2

[1] For SCE, where measure type is reported as "ER", the tracking data include the comment, "WP in development" under Measure Description.

Example 2: Another measure for comparison is SCE Measure Code WB-71850. In the tracking data this is described as *"-30% Lkg; R8 Dct Ins; 6% Dct Lkg; SEER 14 AC"*.

The closest SoCalREN measure description is *"Air Conditioner; Whole Building Air Sealing (30% or More Leakage Reduction); Attic Insulation and Attic Plane Sealing; Duct Insulation; Duct Sealing"*.

The values for these measures are listed in Table 4-33.

Table 4-33: Measure WB-71850 Comparison (Average Values from Tracking Data)

Tracking Data Field	SoCalREN	SCE
Measure Name	N/A	WB-71850
Climate Zone	9	9
Measure Type	ER	ER
Square Feet	Unknown	Unknown
Vintage	1975	EX
Effective Useful Life (EUL)	14.7	17.3
Remaining Useful life (RUL)	4.9	5.7
Installation Rate	1.00	1.00
Net to gross (NTG)	0.85	0.85
Realization Rate	1.00	1.00
Baseline 1 kWh	944.3	22.1
Baseline 2 kWh	383.5	18.3
1st year kWh savings gross	944.3	95.8
1st year kWh savings gross no realization rate applied	944.3	95.8
Lifecycle kWh	8,385.37	1,467.16
Lifecycle kWh no realization rate applied	8,385.37	1,467.16

To determine why these are so different involves investigating the specific details of the measure descriptions for each specific site. These data are outside the tracking data and not available for review.

Example 3: SCE uses Measure Code WB-52042 which is described in the workpaper as *"-30% Lkg; R8 Dct Ins; SEER 14 AC; 92 AFUE Furnace"*.

SoCalREN does not reference measure codes but the closest description they list is *"Whole Building Air Sealing (15% or More Leakage Reduction); Duct Replacement; Furnace"*.

Both are listed as ER measure application type. The baselines are again not directly comparable and so the savings also are not comparable. It is possible we are comparing the wrong SoCalREN measure but this is the closest one to the SCE description. EUL should be 16.3 and RUL 5.4 according to workpaper. These are reported as 13.0 and 4.3 for SoCalREN and 18.2 and 6.0 for SCE.

Table 4-34: Measure WB-52042 Comparison (Average Values from Tracking Data)

Tracking Data Field	SoCalREN	SCE
Measure Name	N/A	WB-52042
Climate Zone	9	9
Measure Type	ER	ER
Square Feet	Unknown	Unknown
Vintage	1975	Ex
Effective Useful Life (EUL)	13.0	18.2
Remaining Useful life (RUL)	4.3	6.0
Installation Rate	1.00	1.00
Net to gross (NTG)	0.85	0.85
Realization Rate	1.00	1.00
Baseline 1 kWh	315.7	17.4
Baseline 2 kWh	3,694.1	13.0
1st year kWh savings gross	315.7	69.4
1st year kWh savings gross no realization rate applied	315.7	69.4
Lifecycle kWh	35,723.3	1,050.2
Lifecycle kWh no realization rate applied	35,723.3	1,050.2

Example 4: SCE uses Measure Code WB-34982 which is described in the workpaper as *"R30 Atc Ins;R13 WI Ins; -15% Lkg;R8Dct Ins; 6% Dct Lkg"*.

SoCalREN does not reference measure codes but the closest description they list is *"Attic Insulation and Attic Plane Sealing; Duct Insulation; Duct Replacement; Wall Insulation"*.

SCE lists the vintage as Ex, and SoCalREN as 1975. The baseline 2 and savings for SCE are listed as "0" and are not comparable with SoCalREN. According to the workpaper, EUL should be 16.4 years and RUL 5.5 years. The tracking data do not match the workpapers and are reported as 14 years and 14 years respectively for SCE and 17.7 years and 5.9 years for SoCalREN.

Table 4-35: Measure WB-34982 Comparison (Average Values from Tracking Data)

Tracking Data Field	SoCalREN	SCE
Measure Name	N/A	WB-34982
Climate Zone	9	10
Measure Type	ER	ER
Square Feet	Unknown	Unknown
Vintage	1975	Ex
Effective Useful Life (EUL)	17.7	14.0
Remaining Useful life (RUL)	5.9	14.0
Installation Rate	1.00	1.00
Net to gross (NTG)	0.85	0.55
Realization Rate	1.00	1.00
Baseline 1 kWh	610.1	92.4
Baseline 2 kWh	471.0	0
1st year kWh savings gross	610.1	92.4
1st year kWh savings gross no realization rate applied	610.1	92.4
Lifecycle kWh	9,157.4	1,293.6
Lifecycle kWh no realization rate applied	9,157.4	1,293.6

SCE does not supply natural gas in the region SoCalREN operates in. For a final comparison we reviewed SCG tracking data to compare reported gas savings values with SoCalREN.

Example 5: SCG uses measure code 530600 described in the workpaper as *"-30% Lkg;R8 Dct Ins;SEER 14 AC"*.

SoCalREN does not reference measure codes. The closest description they list is *"Air Conditioner; Whole Building Air Sealing (30% or More Leakage Reduction); Duct Insulation; Duct Replacement"*.

SCG reported 339 projects under measure code 530600. The average values for the measure are provided in Table 4-36.

Table 4-36: Measure 530600 Comparison (Average Values from Tracking Data)

Tracking Data Field	SoCalREN	SCG
Measure Name	N/A	530600
Climate Zone	9	9
Measure Type	ER	RET
Square Feet	Unknown	Unknown
Vintage	1975	1975
Effective Useful Life (EUL)	14.3	16.5
Remaining Useful life (RUL)	4.8	0.0
Installation Rate	1.00	1.00
Net to gross (NTG)	0.85	0.85
Realization Rate	1.00	1.00
Baseline 1 therm	69.6	74.4
Baseline 2 therm	57.8	0.0
1st year therm savings gross	69.6	74.4
1st year therm savings gross no realization rate applied	69.6	74.4
Lifecycle therm	882.8	1,211.6
Lifecycle therm no realization rate applied	882.8	1,211.6

With the exception of baseline 2 value the measure level therm savings are less than 10% apart for these two implementers.

4.4 Gross Assessment Conclusions and Recommendations

4.4.1 MCE Small Commercial and Multifamily Measures

This section presents conclusions and recommendations related to the findings developed for the gross assessment of MCE's Small Commercial and Multifamily measures. Some of the recommendations are measure or parameter specific, while others address project documentation and data-related issues. Separate recommendations are provided for deemed and calculated measures.

Deemed Commercial and Multifamily Measures

Conclusion Gross-1 [MCE]: MCE did not provide key references for their ex ante assumptions or provide detailed measures descriptions. As part of the data reporting, MCE did not provide adequate references for their deemed measures for all ex ante assumptions in their program tracking data, which could have been either specific references from the DEER or a workpaper. Also, necessary fields from the MCE tracking data that were left blank include RUL ID, EUL ID, NTG ID, ex ante source, version of source, description of source, and measure

code. Furthermore, measure descriptions were not detailed enough to determine baseline conditions or other specifics about the measure being installed. In general, application of evaluation results to tracking data can only be as reliable as the tracking data reported. MCE submitted sufficiently useful information in their tracking data, but without more detailed information and references to ex ante documentation, evaluation updates become limited.

Recommendation Gross-1 [MCE]: MCE should set up an internal process to check the quality and consistency of ex ante data reported to the CPUC and ensure they are providing detailed measure descriptions and references to ex ante assumptions. As part of the data reporting protocol, all PAs should give adequate references for their deemed measures for all ex ante assumptions in their program tracking data. These can either be specific references from the DEER or a workpaper. Even if ex ante data is updated, references provide documentation of which set of ex ante data is being utilized. This provides key information for reporting and evaluations. For the Small Commercial program, MCE should collaborate with PG&E to ensure references to ex ante data are included, develop more descriptive measure names, develop and report consistent measure codes, and provide a clear link to ex ante data. Some specific recommendations include the following: avoid putting measure names in the measure code field and avoid using general values such as "Com" in key fields such as building type. Also, MCE should setup quality control checks to systematically ensure consistency. For example, if two claims are offering identical types of measures with all other factors being the same, then all classifications and numeric values should be consistent.

Conclusion Gross-2 [MCE]: Critical impact parameter fields for savings calculation purposes were not valid or were found to be inconsistent for MCE. In the tracking data, there is a measure application type designation (e.g., ER, ROB) that describes whether a given measure should be calculated with a single baseline or dual baseline. MCE claimed an ER designation for some installations, yet failed to provide second baseline UES values. Furthermore, some numeric impact parameters were found to be null or invalid.

Recommendation Gross-2 [MCE]: MCE should ensure critical fields needed for savings calculations are filled in and valid. For deemed measures, numeric values should be translated directly from the DEER or a workpaper. These ex ante values should be applied systematically to measures of the same type to avoid inconsistencies. It is recommended that MCE calculate out totals to ensure that individual parameters multiply out to be the intended overall amount.

Conclusion Gross-3 [MCE]: Significant variability was found between MCE's claimed ex ante values, corrected ex ante values, and evaluation values for deemed measures. This lack of consistency seems to suggest an update is needed in the ex ante data for at least the measures reviewed in this analysis to more closely reflect recent evaluation results.

Recommendation Gross-3 [MCE]: Collaboration between all stakeholders (i.e., MCE, PG&E, and CPUC) should work to incorporate evaluation results to update ex ante deemed values. All stakeholders should collaborate to discuss and find the applicability of evaluation results to supplement ex ante data.

Calculated Commercial Lighting Measures

Conclusion Gross-4 [MCE]: MCE's ex ante EULs for LED measures were much greater than evaluated estimates for calculated measures, and EUL estimates were not calculated or documented as part of the project calculation workbooks. The evaluation team found that ex ante EULs for LED measures were 15 years, whereas the evaluated analysis found them to be closer to 10 years. The typical lamp life for an LED lamp is roughly 25,000 hours. Given the 15 year ex ante EUL, that translates over to roughly 1,660 annual hours of operation. Both ex ante and evaluated hours of operation estimates are generally much higher than this. Furthermore, for all measures, the EULs were not calculated as part of the workbook, nor were they documented. EULs are a function of the operating hours for lighting measures, per the DEER methodology.

Recommendation Gross-4 [MCE]: MCE should estimate EULs as part of the calculated application process using site-specific operating hours developed for the project, and DEER based service lives. The DEER methodology should be employed for estimating EULs and site-specific lighting operating hour data should be used when available. For most lighting measures, the EUL is calculated as the service life in hours of the measure retrofitted – which typically represents the lamp life for CFLs and LEDs and the ballast service life for linear fluorescent measures – divided by the evaluated operating hours, or 15 years, whichever is less. If site-specific operating hours are not gathered, DEER EULs should be used, which was not the case for the LED EUL which was set to 15 years.

Conclusion Gross-5 [MCE]: Although MCE's measure installations were provided at the activity area level, all calculated lighting projects used DEER default hours of operation. The evaluated analysis revealed that all lighting projects assume DEER default hours of operation at the building type level. While calculation workbooks disaggregated measure installation into activity areas (i.e., restroom vs. retail sales space), an overall building type hours of operation was applied to every installed measure. The annual hours of use differ based on space type.

Recommendation Gross-5 [MCE]: For calculated measures, MCE should consider either collecting site-specific operating hours that are developed at the activity area in the applications, or applying deemed savings values if they are going to rely on default values. Because MCE is relying on default EUL and operating hours of use, it may be more cost effective to use deemed savings values than using the calculated approach. A hybrid approach

may also be worth considering, where smaller projects use a deemed approach, and larger projects use a calculated approach and are based entirely on site-specific data gathered as part of the application process.

Conclusion Gross-6 [MCE]: MCE's evaluated annual operating hours were generally less than ex ante assumptions for calculated measures. As mentioned above, the ex ante savings values relied on current DEER values. The DEER is in the process of being updated for nonresidential lighting measures. The operating hours and coincidence factors will be based on data collected as part of the 2006-08, 2010-12 and 2013-14 nonresidential lighting impact evaluation studies that have been conducted by the CPUC.

Recommendation Gross-6 [MCE]: For calculated measures, if site-specific operating hours are not collected, MCE should utilize the operating hour and coincidence factor values documented in the 2010-2012 and 2013-2014 nonresidential lighting impact evaluations conducted by the CPUC, which were developed by building type and space type. Results from these studies are readily available, and should be utilized until the revised DEER values are available, which will be based on the data collected from these studies.

Conclusion Gross-7 [MCE]: While ex ante first and second baselines were documented in MCE's calculation workbooks based on an ER or ROB designation, they were provided as annualized savings with no lifecycle estimates. The ex ante lifecycle savings estimates that were reported in the tracking data represent first year savings (first baseline for ER measures or second baseline for ROB measures) multiplied by the EUL. If a measure was determined to be ER within the calculation workbook, those first year savings were multiplied out for the full EUL of the measure.

Recommendation Gross-7 [MCE]: MCE should calculate lifecycle savings for all measures as part of their project calculation workbooks and ensure the calculation is done correctly in their claimed database for ER (or dual baseline) measures, which is (first baseline savings * RUL) + (second baseline savings * (EUL-RUL)). For lighting measures, the EUL would represent the DEER-rated life of the measure divided by the site-specific operating hours as discussed in the above recommendation, and the RUL would represent the calculated EUL divided by 3. If MCE does not calculate lifecycle savings as part of the project calculation workbooks, the calculation used in the claimed database should be corrected. The lifecycle savings, as they are calculated right now, represent an ROB-type savings estimate assuming the baseline wattage is the replaced equipment. This can significantly overstate lifecycle savings.

Conclusion Gross-8 [MCE]. The evaluation team was only able to update roughly 53% of MCE's first year ex ante claim for calculated measures. For several claims, the first year

savings that were reported in the calculation workbooks were different from the claimed first year savings in the tracking data. For a few projects, the evaluation team was able to drag down formulas in Excel that had been previously hard-coded to true up the ex ante claim. However, the evaluation team was not able to successful complete this exercise for several other projects.

Recommendation Gross-8 [MCE]. MCE's project calculation workbooks should go through an extensive QC process to validate that the savings estimates in the workbooks are identical to the claimed savings in the tracking data. This effort may include making sure that all lookups are dragged down throughout the workbook and, if hard-coded values are used, there should be a detailed explanation for why they were used. Likewise, when providing applications and workbooks to satisfy a data request, the team putting together the request should make sure that they are providing the evaluation team the final iteration of the calculations. If measures or quantities change from one iteration to another, they should be documented as well.

4.4.2 BayREN and SoCalREN Multifamily Measures

Database Assessment

Conclusion Gross-9 [BayREN, SoCalREN]: The IOU and REN Multifamily Whole Building program tracking data have varying levels of completeness. As examples, PG&E is tracking inadequate levels of data and SDG&E had nearly all required fields.

Recommendation Gross-9 [BayREN, SoCalREN]: IOUs and RENs should adjust data collection and program tracking to ensure all key fields, including participant contact information, measure details, pre-existing conditions, property systems, property details, and utility meter numbers are collected and easily accessible for all completed projects.

Assessment of Savings

Conclusion Gross-10 [BayREN, SoCalREN]: BayREN, SoCalREN, and SDG&E all use different approaches to calculating savings for multifamily measures, and these differences may lead to differences in savings estimates for similar measures. For example, BayREN uses a unique, customized version of EnergyPro called EnergyPro Lite. SoCalREN uses the EnergyPro residential performance module for low-rise buildings. In addition, although both BayREN and SoCalREN use external spreadsheets to calculate savings for selected measures, a review found that they used inconsistent templates with some differences in the assumptions. SDG&E, on the other hand, calculates all savings within EnergyPro.

Recommendation Gross-10 [BayREN, SoCalREN]: The RENs and IOUs should collaborate and agree on consistent methods to estimate savings for similar multifamily measures. This

may include using EnergyPro Lite, which was customized for multifamily complexes, if that is deemed to be the most robust modeling tool. If external spreadsheets are also used, they should be based on consistent templates and assumptions that allow for customization only to account for legitimate drivers of savings differences, such as climate zone.

Conclusion Gross-11 [BayREN, SoCalREN]: Matching BayREN and SoCalREN program data to billing data by different accountIDs was largely unsuccessful, likely because of the high turnover rate for multifamily tenants. Because tenants are constantly moving into and out of these sites, accountIDs will change, making it difficult to match program tracking to billing data. For example, out of 95 BayREN sites that were examined, only 28 sites were matched by accountID. When matched by address, however, billing data for 81 out of 95 sites could be matched successfully.

Recommendation Gross-11 [BayREN, SoCalREN]: The RENs should collect meter numbers for multifamily participants to allow for improved matching of program and billing data. If the database were able to track meter numbers for an entire complex, program tracking and billing data could be more effectively matched at an even higher rate than using an address match. In addition, tracking meter numbers would increase the likelihood that all bills (i.e., from all tenant units and common areas) from each participating building are included in any analysis.

Conclusion Gross-12 [BayREN, SoCalREN]: The inability to calibrate to actual bills for BayREN and SoCalREN multifamily participants may lead to savings estimates that are either overestimated or under the targeted per-project savings threshold for the program. For example, of the 23 sites with claimed gas savings that could be reviewed for the savings versus consumption analysis, three sites had savings that were higher than 50% of pre-program energy use. In addition, the evaluation team found three projects with both gas and electric savings below the 10% savings threshold (the minimum standard to accept a project for participation in the Multifamily Whole Building program).

Recommendation Gross-12 [BayREN, SoCalREN]: The RENs should have access to building level billing data so the savings assumptions and models can be calibrated to actual customer bills. Although having access to project-level billing information has been difficult because privacy and security concerns have prevented the RENs and their implementers from obtaining this information, gaining access to billing data is the most reliable way to estimate savings. If the RENs cannot gain access to customer bills, as an alternative the RENs could share building-level savings estimates with the IOUs who could then calculate, and thus validate, the expected reduction in energy use.

Conclusion Gross-13 [BayREN, SoCalREN]: It was difficult to validate the program claimed savings via an engineering desk review for BayREN and SoCalREN multifamily participants because of factors such as interactive effects, stacking effects, and differences in baseline assumptions. These three factors bias the savings in different directions. For example, using a blended baseline in the engineering review would result in lower savings than a purely ER baseline (as used in the EnergyPro models). The interactive and stacking effects, however, would mitigate this effect, and would (typically) result in overestimating savings in the engineering review. The magnitude of all of these effects, though, is difficult to assess.

Recommendation Gross-13 [BayREN, SoCalREN]: Simulation models would provide a more effective approach to validating the claimed savings for multifamily projects, and site visits would allow verification of the key model inputs. Simulation models would provide a far more rigorous verification of the modeling and savings assumptions. In addition, site visits would provide true verification of model inputs, which—as identified by the single family assessment of EnergyPro—can significantly affect the accuracy of the claimed savings.

Conclusion Gross-14 [BayREN, SoCalREN]: Although the RENs have assumed early replacement savings for all multifamily measures, this research indicated that a substantial portion of projects may not qualify for early replacement because of planned improvements, installation of new equipment, or replacement of equipment that was in poor condition. For example, only 48% of program window replacements, and 67% of faucet aerator and showerhead installations qualified as early replacement measures.

Recommendation Gross-14 [BayREN, SoCalREN]: The RENs should set up a survey for multifamily participants at intake to better determine the appropriate baseline for each project and measure. The intake survey can follow a similar logic as the logic used in this report or that from the CPUC early retirement guidance document,55 and the baseline assumptions for a sample of projects should then be verified by an independent third-party evaluator.

Conclusion Gross-15 [BayREN, SoCalREN]: While the RENs have assumed an early replacement baseline on their first year savings for multifamily projects, they are not always calculating lifecycle savings to reflect a change in baseline after the end of the project RUL. For example, BayREN appears to be calculating lifecycle savings using early replacement conditions for the entirety of the project EUL.

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55 Early Retirement Using Preponderance of Evidence, Version 1.0; http://www.cpuc.ca.gov/NR/rdonlyres/8AB0DEB5-41B0-4881-BC63-F7EBBEC81318/0/ProjectBasis_EULRUL_Evidencev1July172014.pdf

Recommendation Gross-15 [BayREN, SoCalREN]: The RENs should calculate lifecycle savings for early replacement multifamily projects using the early replacement baseline for the RUL period, then using a code baseline for the remainder of the EUL:

$$Lifecycle\ Savings = (RUL * Savings_{ER}) + \big((EUL - RUL) * Savings_{Code}\big)$$

Conclusion Gross-16 [BayREN, SoCalREN]: Though the RENs indicated they use project-level savings-weighted EULs (and the associated one-third EUL for the RULs) for multifamily projects, the application of this logic leads to the potential of miscalculation of lifecycle savings and the tracking database did not suggest this logic was actually being implemented. This methodology has the potential for either overstating or understating lifecycle savings. In the example provided in the findings section, using the detailed logic described to the team resulted in a 7% understatement of lifecycle savings. Further, the tracking database showed each project had consistently received an 18 year EUL rather than one based on actual measure installations using the logic described in this report.

Recommendation Gross-16 [BayREN, SoCalREN]: The RENs should be sure to use the correctly weighted and calibrated EUL and RUL for multifamily projects that results in the correct lifecycle savings values, rather than the 18-year EUL currently reported in the tracking database.

4.4.3 BayREN and SoCalREN Single Family Measures

A comparison of workpapers across implementers was possible only at the highest level. The RENs used multiple workpapers and calculators, but the sources of the savings calculations were not mapped back to the source documentation or calculator.

BayREN and PG&E reported similar values in most instances. Where values diverged we could not find an explanation in the existing data. In example 1, the evaluation team suspects the difference in BayREN values could be due to house prototype used (i.e., 1-story vs. 2-story), but that could not be verified.

For SoCalREN and SCE, electric savings values were not comparable. This is surprising since the SCE workpapers were identified as the foundation for the REN workpapers. Since comparisons must be made against measure codes and measure descriptions it is possible that the wrong measure were compared. One cross check is to search for similar baseline 1 savings and review the measure description. A scan of the database revealed that SoCalREN baseline values are several orders of magnitude greater than SCE baseline values.

Another difference was with measure life. The SCE workpapers define RUL as 1/3 * EUL. This held true for SoCalREN. For SCE records this rule was applied to EUL and RUL when measure application type was ER[56] (early replacement). For other application types ROBNC and REA (existing equipment) the same value was reported for EUL and RUL.

There are several corrective steps that will make future workpaper reviews more effective. The evaluation team recommends the following.

Conclusion Gross-17 [BayREN, SoCalREN]: The RENs utilized five different sets of workpapers during the 2013-2014 single family Home Upgrade program. IOU workpapers were approved by the CPUC. REN workpapers were not, and this led to multiple revisions as the program evolved or measures changed. Unfortunately the REN tracking data do not include the workpaper source in the "Source Description" field.

Recommendation Gross-17 [BayREN, SoCalREN]: All implementers should use consistent workpapers for the single family Home Upgrade program. If workpapers are not approved by the CPUC, the same set of workpapers should be used throughout the program year. Even when each implementer has different assumptions, approved workpapers provide a structured set of documentation for each program. The version of the workpaper should be part of the project record.

Conclusion Gross-18 [BayREN, SoCalREN]: The most recent version of the EUCA calculator was not being used by the RENs for the single family Home Upgrade program, which resulted in the miscalculation of lifecycle savings.

Recommendation Gross-18 [BayREN, SoCalREN]: The RENs should ensure they are using the most recent approved version of the EUCA calculator for the single family Home Upgrade program, or whatever other tool they are using to develop ex ante savings estimates.

Conclusion Gross-19 [BayREN, SoCalREN]: CPUC tracking data changed over time for the RENs single family Home Upgrade programs. This problem is bigger than only the Home Upgrade program and is being addressed with the data management team. Program data for 2013 and 2014 was first reported in April 2015. The database was not fully populated until after updates in July and again in September.

[56] The SCE workpaper uses the abbreviation RET for "retrofit". REA is used for "existing equipment". ER and ROBNC are not mentioned in the workpaper.

Recommendation Gross-19 [BayREN, SoCalREN]: The RENs should conduct data quality checks quarterly when single family Home Upgrade program data are submitted. A data management plan up front will reduce the nine months it takes for the IOUs to close out program tracking data.

Conclusion Gross-20 [BayREN, SoCalREN]: There were no common measure codes in the workpapers or tracking data across IOU or REN for the single family Home Upgrade programs. This hindered the ability to compare energy savings at the measure or whole house level.

Recommendation Gross-20 [BayREN, SoCalREN]: The RENs should ensure that measure codes represent measures or bundles of measures, and be consistent across implementers for their single family Home Upgrade programs. The IOUs have multiple measure codes to distinguish each measure combination, but the RENs do not. Making the measure codes specific for each implementer and embedding each possible option in a straightforward method to include all data measure necessary to complete a savings calculation.

For example, the evaluation team recommends that methods to calculate and report savings be the same for all program implementers. The first step toward aligning tracking data across implementers is to develop a combination of measure codes that are consistent across implementers. Measure codes could be developed that reflect project elements at the whole-building level. For example "1-WB3-52042-06-1" measure code would mean:

Characteristic/Measure	Code
Implementer (1-5)	1
Single family whole building	WB
Square Feet Bin #	3
R-30 attic insulation	52042
15% building leakage reduction	
R-8 duct insulation	
10% duct leakage	
92 AFUE efficiency furnace	
STV for shower	
Climate zone 6	06
Vintage Bin #1, 2 or 3	1

Any measure code structure similar to this one would create a large number of codes (driven by the number of measure combinations), but would still provide a manageable list of common codes that could be used to streamline future verification activities of CPUC program tracking data.

5

Net-to-Gross Analysis

An NTG analysis was conducted for the commercial measures offered under the MCE program and the BayREN multifamily Whole Building program. A discussion of the approach and resulting NTGRs are presented below.

5.1 MCE Small Commercial Measures

The approach for estimating NTGRs was based on the nonresidential free-ridership approach developed by the NTGR Working Group during the 2010-12 program evaluation cycle and documented in Appendix C, Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers. The NTGR is calculated as the average of three program attribution indices (PAI) known as PAI-1, PAI-2, and PAI-3. Each of these scores represents the highest response or the average of several responses given to one or more questions about the decision to install a program measure. The participant phone survey was the basis for the inputs to each score.

- **Program attribution index 1 (PAI–1)** is a score that reflects the influence of the most important of various program-related elements in the customer's decision to select a given program measure. The PAI-1 score is calculated as the highest program influence factor divided by the sum of the highest program influence factor and the highest non-program influence factor. Some example non-program factors are: previous experience with the measure, recommendation from an engineer, standard practice, corporate policy, compliance with rules or regulations, organizational maintenance or equipment replacement policies and "other – specify." Payback is treated as a program influence factor if the rebate/incentives played a major role in meeting payback criteria, but is treated as a non-program influence factor if it did not play a major role in meeting payback criteria.
- **Program attribution index 2 (PAI–2)** is a score that captures the perceived importance of program factors (including rebate/incentives, recommendation, and training) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score is determined by asking respondents to assign importance values to the program and most important non-program influences so that the two total 10. The program influence score is adjusted (i.e., divided by 2) if respondents

had made the decision to install the measure before learning about the program. The final score is divided by 10 to be put into decimal form, thus making it consistent with PAI-1.

- **Program attribution index 3 (PAI–3)** is a score that captures the likelihood of various actions the customer might have taken at the given time and in the future if the program had not been available (the counterfactual). This score is calculated as 10 minus the likelihood that the respondent would have installed the same measure in the absence of the program. The final score is divided by 10 to put into decimal form, thus making it consistent with PAI-1 and PAI-2.

The NTGR is estimated as an average of these three scores. If one of the scores is not available (generally due to respondents giving a "don't know" or "refusal" response), then the NTGR is estimated as the average of the two available scores. If two or more scores were missing, results are discarded from the calculation.

Table 5-1 presents the NTGRs ratios that were developed for the 2013-14 MCE Small Commercial program, weighted by ex ante gross kWh and kW savings. The resulting values were 0.62 and 0.65, respectively. This compares to ex ante NTGRs of 0.86 and 0.78, respectively. These results were based on a sample size of 20 and had a resulting relative precision of 9% and 7%, respectively, measured at the 90% confidence level.

Table 5-1: MCE Small Commercial NTGRs weighted by kWh and kW

Program	n	Ex ante NTGR kWh	Ex Post NTGR kWh	Relative Precision	Ex ante NTGR kW	Ex post NTGR kW	Relative Precision
MCE Small Commercial	20	0.86	0.62	9%	0.78	0.65	7%

Each of the three equally weighted components comprising the NTGR estimate are shown in Table 5-2. The details behind these estimates are discussed below.

Table 5-2: Three Subcomponents and Overall Free-Ridership

PAI-1 (Influence)	PAI-2 (Relative Importance)	PAI-3 (Install Same Equipment)	Overall NTGR
53%	54%	84%	62%

Table 5-3 compares the results for the 2013-14 MCE Small Commercial program to those developed for the 2010-12 Nonresidential Downstream Lighting and 2013 Nonresidential Deemed ESPI impact evaluations. The 2010-12 study did not include LED measures, so the 2013 LED results are provided. Results are shown by program group, and are weighted by kW and kWh.

Table 5-3: Comparison of NTGRs with 2010-12 and 2013 Evaluations

Evaluation and Program Group	n	NTGR kWh	NTGR kW
2013-14 MCE Small Commercial Program			
Total	**20**	**0.62**	**0.65**
2013 Nonresidential Deemed ESPI Evaluation of LED Measures			
Deemed	46	0.55	0.56
Local Government Partnership/Direct Install	174	0.62	0.61
Third/Local Party Implementer	12	0.60	0.61
Total	**232**	**0.59**	**0.60**
2010-12 Nonresidential Downstream Lighting Study (no LEDs)			
Custom	113	0.50	0.50
Deemed	698	0.60	0.61
Direct Install	326	0.68	0.69
Local Government Partnership	938	0.62	0.61
Third/Local Party Implementer	368	0.60	0.58
Total	**2,443**	**0.61**	**0.61**

Overall, the results compare very well. The MCE result weighted by kWh is one percentage point higher than the overall 2010-12 result and three percentage points higher than the 2013 LED result. The MCE result weighed by kW is four percentage points higher than the overall 2010-12 result and five percentage points higher than the 2013 LED result. However, none of these differences are statistically significant at the 90% confidence level.

5.1.1 Influencing Factors (PAI-1)

Using a 0 to 10 rating scale, where 0 means "not at all important" and 10 means "very important," program participants were asked to rate the importance of several program and non-program influences on the decision to install a measure. Respondents reported that the availability of the MCE rebate and the payback/return on the project were the two most influential factors, slightly higher than a recommendation by an account representative (Table 5-4). These responses fed into the PAI-1 score.

Table 5-4: Influences on Installation Decisions

Influence on Decision	Type of Influence	Average Importance Score
Availability of the MCE Rebate	Program	9.3
Payback or Return on the Project[1]	Program	9.3
Recommendation by Account Rep	Program	9.1
Other Non-Program Factor	Non-Program	8.1
Age or Condition of the Old Equipment	Non-Program	6.8
Information from the Program or PA	Program	6.5
Information from the Program or PA Training Course	Program	6.2
Standard Practice in the Industry	Non-Program	6.2
Corporate Policy	Non-Program	5.9
Improved Product Quality	Non-Program	5.5
Compliance with Remodeling or Equipment Replacement Practices	Non-Program	3.5
Previous Experience with Energy Efficient Projects	Non-Program	3.0
Previous Experience with [MCE] Program	Non-Program	2.6

1 If the rebate moved the project within the acceptable payback range, payback was considered a program factor. However, if the project was within the acceptable payback range without the rebate, it was considered a non-program factor.

The PAI-1 score rates program influence as it relates to non-program influences. Specifically, this score is calculated as the maximum program influence score divided by the sum of the maximum program and non-program influence scores, or

$$PAI1 = \frac{Program_{Max}}{Program_{Max} + NonProgram_{Max}}.$$

Overall, the PAI-1 score was 5.3, or 53%.

5.1.2 Relative Importance (PAI-2)

For the PAI-2 score, respondents were asked about the relative importance of program and non-program influences on their decision to install a particular measure. Most (13) ranked the importance of program influence as higher than or equal to the importance of the non-program factors. The PAI-2 score is the respondent-provided importance of the program to their decision-making process (Table 5-5).

Table 5-5: Relative Importance of Program and Non-program Influences on Installation Decision

Relative Importance of Factors	Count of Responses
Ranked Program Influences More Important than Non-program Influences	8
Ranked Program and Non-program Influences Equally Important	5
Ranked Non-program Influences More Important than Program Influences	7

Respondents were also asked if they had learned about the MCE program before or after deciding to install the equipment. A response of "after" decreases the measure's PAI-2 score (and associated NTGR) by half because they were already planning to install the measure before any program intervention. The majority (70%) of respondents indicated that they had learned about the program before deciding to install the equipment. The average PAI-2 score after the adjustment was 5.4, or 54%.

5.1.3 Likelihood of Installing Same Equipment (PAI-3)

The final component of NTG, PAI-3, is related to what equipment would have been installed if the REN program were not available. Using a likelihood scale from 0 to 10, where 0 is "not at all likely" and 10 is "extremely likely," respondents were asked the likelihood of installing the same efficiency equipment if the REN program were not available. The higher the likelihood of installing the exact equipment, the higher the free ridership (FR), and the lower the NTGR. Respondents, on average, provided a low likelihood of installing the same efficiency equipment in absence of the program, with an average likelihood score of 1.6, resulting in a PAI-3 score of 8.4.

5.2 BayREN Multifamily Measures

The NTG battery used in the participant survey was also based on the NTGR Working Group's Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers documented in Appendix C, to the extent possible. It is important to note that this is a general framework meant to be adjusted for the individual program needs (as stated on page 1 of that document). The multifamily evaluation, therefore, modified the standards appropriately, particularly because multifamily projects represent a unique "crossroads" of residential and commercial decision making. The team believes that the modifications remain consistent with the intent of the framework.

The decision-maker survey questions were designed to measure the influence of the program on participant decisions to implement program-eligible energy efficiency measure(s). Consistent with the framework and method described above for the MCE Small Commercial analysis, the

surveys scored three different components of program attribution PAI-1 through PAI-3. The NTGR was calculated as an average of these three attribution scores.

Survey respondents were divided into one of two groups: those who believed that the decision-making process was applicable to all measures installed relative to those who believed that the decision-making process was unique for each individual installed measure. For those respondents who believed that the decision-making process was unique for individual measures, the battery of questions was asked for each of three randomly selected measures for that project.

Individual project- and measure-level NTG estimates were weighted to the single, program-level estimate using project- and measure-level savings. To estimate an overall NTGR for participants who answered at the measure level, each measure-specific NTG estimate was weighted according to that measure-specific savings.[57,58] For the respondents who indicated that their responses applied to all measures in the project, the NTG value was weighted using the ex ante savings claimed for that project.

A total of 43 respondents took part in the survey, with 32 (74% of the respondents) being able to complete the NTG section. The majority of these (28) noted that their responses were indicative of all the installed measures, so that they did not have to provide measure-specific estimates. The overall ex post NTGR for the BayREN multifamily program was 0.58. This compares to an ex ante NTGR of 0.85.

Table 5-6: BayREN Multifamily NTGR weighted by MMBtu

Program	n	Ex ante NTGR	Ex post NTGR	Relative Precision
BayREN Multifamily	32	0.85	0.58	4%

Each of the three equally weighted components comprising the net-to-gross estimate are shown in Table 5-7. The details behind these estimates follow the table.

Table 5-7: Three Subcomponents and Overall Free-Ridership

PAI-1 (Influence)	PAI-2 (Relative Importance)	PAI-3 (Install Same Equipment)	Overall NTGR
51%	40%	83%	58%

57 Electric (kWh) and gas (therm) savings were both converted to fuel-neutral MMBtu, derived through the engineering desk review process detailed in Section 4.

58 Because the NTGR values for the other installed measures (outside the three that were asked) are unknown, the team believed it proper to attribute the known measure savings only for project-level weighting.

5.2.1 Influencing Factors (PAI-1)

Again, program participants were asked to rate the importance of several program and non-program influences on the decision to install a measure using the same 0 to 10 likelihood scale. Respondents reported that the availability of the REN rebate was slightly more important than the return on the project (Table 5-8). These responses fed into the PAI-1 score.

Table 5-8: Influences on Installation Decisions

Influence on Decision	Type of Influence	Average Importance Score
Availability of the [REN] Rebate	Program	9.6
Payback, or Return on the Project	Non-program	9.1
Feasibility Study, Energy Audit, or Other Types of Technical Assistance Provided by the Program	Program	8.5
Age or Condition of the Old Equipment	Non-program	5.4
Increased Value of Property	Non-program	5.2
Information from Program or Utility Training Course	Program	3.2
Recommendation from an Equipment Vendor	Non-program	4.5
Previous Experience with This Type of Project	Non-program	3.4
Program Marketing Materials	Program	2.3
Compliance with Company's Normal Maintenance Policies	Non-program	3.1
Utility Account Representative	Program	2.0
Previous Experience with the [REN] Program	Program	1.0

Because most respondents rated the program as equally as important as non-program influences, the PAI-1 score was 5.1, or 51%.

The evaluation team also wanted to ensure that savings were not degraded both for ER and FR in instances where company policy (or perhaps scheduled maintenance) influenced decision making. To do this, the team performed a sensitivity analysis around the influence of a "company's normal maintenance policies" on the PAI-1 score and found that removing that influence rating did not change the calculated PAI-1 score at all.

5.2.2 Relative Importance (PAI-2)

For the PAI-2 score, most respondents (24) ranked the importance of program influences as higher than or equal to the importance of the non-program factors. The PAI-2 score is the respondent-provided importance of the program to their decision-making process (Table 5-9).

Table 5-9: Relative Importance of Program and Non-program Influences on Installation Decision

Relative Importance of Factors	Count of Responses
Ranked Program Influences More Important than Non-program Influences	14
Ranked Program and Non-program Influences Equally Important	10
Ranked Non-program Influences More Important than Program Influences	10

Respondents were also asked if they had learned about the REN program before or after deciding to install the equipment. Again, a response of "after" decreases the measure's PAI-2 score by half because they were already planning to install the measure before any program intervention. Nearly all (90%) of respondents indicated that they had learned about the program before deciding to install the equipment. The average PAI-2 score after the adjustment was 4.02, or 40.2%.

5.2.3 Likelihood of Installing Same Equipment (PAI-3)

The final component of NTG, PAI-3, is related to what equipment would have been installed if the REN program were not available. Respondents, on average, provided a low likelihood of installing the same efficiency equipment in absence of the program, with an average likelihood score of 1.7, resulting in a PAI-3 score of 8.3.

5.3 Net-to-Gross Analysis Conclusions and Recommendations

Conclusion Net-1 [MCE, BayREN]: The research found a net-to-gross ratio of 62% for MCE small commercial measures (weighted by evaluated kWh savings) and 58% for BayREN multifamily measures. These values were statistically significantly below the ex ante NTGRs of 86% for MCE small commercial measures (weighted by evaluated kWh savings) and 85% for BayREN multifamily measures. For MCE, the NTGRs were extremely similar to those developed for similar measures in the 2010-12 and 2013 nonresidential lighting CPUC evaluations. For BayREN multifamily measures, the largest contribution to free-ridership was driven by the relative importance and influence of the program in the upgrade choices of decision makers, followed by the relative influence of the most important program-related factor to the most important non-program related factor. For the MCE measures, these two components were nearly identical. For BayREN, several participants with significant savings ranked non-program influences as more important than program influences, which contributed to reducing the program influence scoring. Furthermore, for both sets of measures, participants frequently rated the program as equally as important as non-program factors.

Recommendation Net-1 [MCE, BayREN]: MCE and BayREN should consider using the researched net-to-gross ratio from this study and update them as future evaluation results become available. Because the program is still relatively new, the composition of participants may change over time, so the NTGR may change as the program matures. In addition, the NTGR should be updated if there are changes in the implementation strategies that might reduce or alter the free-ridership (e.g., increasing incentive levels or changing the measure mix). Finally, the MCE results are based on a relatively small sample size, and although the relative precision is high and the results are validated by similar results to recent statewide studies, updating the results with additional sample points would increase the reliability of the values.

6

Cost Effectiveness Analysis

A primary goal of this study was to perform an impact assessment on specific measures offered by the RENs and CCA to develop more reliable estimates of program cost effectiveness. This section presents the final evaluated net savings values and the resulting cost effectiveness analysis utilizing those final evaluated values.

6.1 Final Net Evaluated Savings Values

As discussed in detail in Section 4, evaluated gross savings values were developed for MCE small commercial and multifamily measures. Furthermore, for SoCalREN, corrected ex ante savings values were developed for single family measures. No evaluated gross values were developed for BayREN, or for SoCalREN multifamily measures. Section 5 presents the development of ex post NTGRs for MCE small commercial and BayREN multifamily Whole Building program measures. No ex post NTGR values were developed for MCE multifamily measures, BayREN single family measures, or any SoCalREN measures. Consequently, no evaluation updates were made for SoCalREN multifamily measures and BayREN single family measures; these ex ante values were passed through.

Table 4-8 presents the final reported and evaluated net lifecycle MW, GWh and MMTherms along with the associated net realization rates. Reported savings are generated from the PAs' program tracking data submitted to the CPUC. The negative realization rates for SoCalREN single family measures are a result of the reported savings values being negative, and corrected to be positive. Other than these negative values and the ex ante pass through values for BayREN single family and SoCalREN multifamily measures, realization rates are in the 50-70% for all but MCE multifamily GWhs at 88%.

Table 6-1: Comparison Between Reported Versus Evaluated 2013-14 Net Lifecycle Savings with Net Realization Rates

Program Name	Reported Net Lifecycle			Evaluated Net Lifecycle			Net Realization Rates		
	MW	GWh	MM-Therms	MW	GWh	MM-Therms	MW	GWh	MM-Therms
BayREN-Multifamily	3.0	24.3	2.6	2.1	16.6	1.8	68%	68%	68%
BayREN-Single Family	5.7	1.8	0.7	5.7	1.8	0.7	100%	100%	100%
MCE-Multifamily	0.0	0.6	0.1	0.0	0.5	0.1	70%	88%	89%
MCE-Small Commercial	1.2	9.0	(0.0)	0.7	4.9	(0.0)	61%	55%	52%
SoCalREN-Multifamily	0.4	2.6	(0.0)	0.4	2.6	(0.0)	100%	100%	100%
SoCalREN -Single Family	(0.4)	(1.9)	(0.4)	1.4	0.9	0.2	-342%	-49%	-45%

6.2 Evaluated Cost effectiveness Results

Based on the final evaluated savings values developed for this study, revised cost effectiveness metrics were calculated for the Total Resource Cost (TRC) and the Program Administrator Cost (PAC) ratios, defined as:

$$\text{TRC} = \frac{NPV * \sum Avoided\ Cost}{Gross\ Program\ Cost + Net\ Incremental\ Measure\ Cost}$$

$$\text{PAC} = \frac{NPV * \sum Avoided\ Cost}{Gross\ Program\ Cost + Gross\ Incentive}$$

Costs were not broken out by single family and multifamily measures for SoCalREN so only one overall result can be developed.

Table 6-2 presents the projected, reported and evaluated TRC and PAC ratios by program. Projected TRC and PAC values come directly from the PAs' program implementation plans (PIPs).[59] Reported TRC and PAC values are generated using the data from the PAs' program tracking data and program cost information submitted to the CPUC.

[59] The MCE, BayREN and SoCalREN program implementation plan can be retrieved using the following urls:
http://eestats.cpuc.ca.gov/EEGA2010Files/MEA/PIP/2013/Clean/MEA%20PIP_5%207%2013_final.pdf
http://eestats.cpuc.ca.gov/EEGA2010Files/BayREN/PIP/2013/Clean/A.12-07-001%20Supp%2002_Appendix_A_BayREN_PIP_Revised%20091813%20clean.pdf
http://eestats.cpuc.ca.gov/EEGA2010Files/SoCalREN/PIP/Clean/2014%2002%2014_Amended%20SoCalREN%20PIP_Clean%20Final.pdf

Because the BayREN single family savings values are all ex ante pass through, the evaluated TRC and PAC values are the same as the reported values. Also, the corrected SoCalREN savings values for single family have resulted in positive TRC and PAC values, as expected. Otherwise, evaluated results have changed from reported in roughly the same proportion as the net realization rates presented above. For the most part there was very little program activities and program related costs during the 2013 program year. The MCE small commercial program, did however, have some level of activity that occurred in 2013. Because 2013 was a startup year, the TRC and PAC ratios were also calculated for just the 2014 program year. As shown in Table 6-3, the only values that changed significantly were for the MCE small commercial program. The TRC and PAC ratios increased when looking only at 2014 as expected.

Table 6-2: Comparison Between Projected, Reported and Evaluated TRC and PAC Ratios for the 2013-14 Program Period

	TRC Ratios			PAC Ratios		
Program Name	**Projected**	**Reported**	**Evaluated**	**Projected**	**Reported**	**Evaluated**
BayREN-Multifamily	0.67	0.39	0.28	0.97	0.44	0.30
BayREN-Single Family	0.56	0.05	0.05	1.29	0.06	0.06
MCE-Multifamily	1.06	0.22	0.21	2.42	0.24	0.21
MCE-Small Commercial	1.94	1.10	0.76	9.36	1.28	0.73
SoCalREN-All*	0.74 (elec) 0.51 (gas)	(0.04)	0.02	1.26 (elec) 0.79 (gas)	(0.04)	0.03

*SoCalREN projected separate TRC and PAC Ratios for gas and electric fuels.

Table 6-3: Comparison Between Projected, Reported and Evaluated TRC and PAC Ratios for the 2014 Program Year

	TRC Ratios			PAC Ratios		
Program Name	**Projected**	**Reported**	**Evaluated**	**Projected**	**Reported**	**Evaluated**
BayREN-Multifamily	0.67	0.38	0.27	0.97	0.44	0.30
BayREN-Single Family	0.56	0.05	0.05	1.29	0.06	0.06
MCE-Multifamily	1.06	0.25	0.25	2.42	0.28	0.26
MCE-Small Commercial	1.94	1.52	1.15	9.36	1.95	1.05
SoCalREN-All*	0.74 (elec) 0.51 (gas)	(0.05)	0.03	1.26 (elec) 0.79 (gas)	(0.06)	0.04

*SoCalREN projected separate TRC and PAC Ratios for gas and electric fuels.

6.3 Comparison with IOU Programs

An attempt was made to compare the REN and MCE programs' participation levels, savings values, and resulting TRC and PAC ratios with similar IOU programs. As mentioned in this study, it is difficult to identify similar programs that would make a fair comparison due to the nature of the REN and MCE programs having so many non-resource activities as part of their program delivery. A handful of IOU programs were identified that offer a similar measure mix to a similar classification of customer. Although these IOU programs may not have the same emphasis on marketing, outreach, education and other non-resource activities, it still provides a useful perspective on the performance of the REN and MCE programs, in terms of both the magnitude of participants and savings, on cost effectiveness.

Each of the four IOUs offers a Home Upgrade and Multifamily Whole Building program, which were chosen for comparison for the REN programs as they offer a similar whole building measure to the same customer sectors (single family and multifamily). Unfortunately, those programs do not separate out costs delivered to the single family and multifamily sectors. Therefore, the results shown for these programs combine those two elements.

PG&E offers a number of third party and local government programs, three of which were chosen for comparison to MCE's Small Commercial program based on measure mix and size of the participants (in terms of annual energy consumption). No program was selected for comparison to MCE's Multifamily program due to the inability of identifying a program with a similar measure mix offered to the multifamily sector.

Programs were first identified by those that focused on delivering measures to small commercial customers. As shown below in Table 6-4, approximately 10% of MCE's small commercial participants are medium in size with respect to ex ante gross kWh savings, about a third are small, a third are very small and a quarter are unknown. Therefore, programs were selected such that at least 60% of their savings came from participants in the small and/or very small category, no more than 15% were in the medium category, and no more than 2% in the large category.

Programs were then identified that offered a similar measure mix to those offered by MCE's program. As shown in Table 6-5, 90% of MCE's small commercial ex ante gross kWh savings came from indoor and outdoor lighting measures, and another 10% came from refrigeration measures, with a small fraction of plug load measures. Therefore, programs were selected that had at least 80% of their savings from lighting measures and at least 5% from refrigeration.

The following three programs were identified, whose participant size and end use distributions are all shown in Table 6-4 and Table 6-5:

- PG&E 210113 Energy Fitness Program,
- PGE211012 Madera, and
- PGE2110051 Local Government Energy Action Resources (LGEAR).

Table 6-4: Distribution of Participant Size for MCE's Small Commercial Program and PG&E's Comparison Programs

Program ID	Program Name	Site Size	% of Total kWh	Ex Ante Gross kWh Savings
MCE02	SMALL COMMERCIAL	Medium	9.83%	78,783
		Small	31.39%	251,577
		Very Small	31.01%	248,583
		Unknown	27.77%	222,587
PGE210113	ENERGY FITNESS PROGRAM	Large	0.47%	366,542
		Medium	9.09%	7,016,873
		Small	42.01%	32,448,021
		Very Small	42.29%	32,666,086
		Unknown	6.13%	4,736,568
PGE211012	MADERA	Large	1.87%	93,466
		Medium	6.80%	338,996
		Small	48.44%	2,415,196
		Very Small	29.69%	1,480,170
		Unknown	13.20%	658,319
PGE2110051	LOCAL GOVERNMENT ENERGY ACTION RESOURCES (LGEAR)	Large	1.39%	491,981
		Medium	10.84%	3,831,041
		Small	37.32%	13,191,313
		Very Small	23.57%	8,331,509
		Unknown	26.88%	9,502,407

Table 6-5: Distribution of End Use for MCE's Small Commercial Program and PG&E's Comparison Programs

Program ID	Program Name	End Use	% of Total kWh	Ex Ante Gross kWh Savings
MCE02	SMALL COMMERCIAL	Indoor Lighting	57.81%	463,380
		Outdoor Lighting	31.92%	255,833
		Plug Loads	0.28%	2,252
		Refrigeration	9.99%	80,065
PGE210113	ENERGY FITNESS PROGRAM	Appliance	0.51%	396,552
		HVAC	0.99%	761,257
		Indoor Lighting	89.75%	69,315,598
		Outdoor Lighting	2.00%	1,543,854
		Plug Loads	0.00%	2,112
		Refrigeration	6.75%	5,214,716
PGE211012	MADERA	Appliance	0.29%	14,508
		HVAC	0.43%	21,469
		Indoor Lighting	80.19%	3,998,249
		Outdoor Lighting	9.45%	471,383
		Refrigeration	9.64%	480,539
PGE2110051	LOCAL GOVERNMENT ENERGY ACTION RESOURCES (LGEAR)	Appliance	0.92%	326,297
		HVAC	1.08%	381,702
		Indoor Lighting	56.65%	20,026,394
		Outdoor Lighting	29.58%	10,456,902
		Plug Loads	0.04%	14,688
		Process	0.26%	91,621
		Refrigeration	11.46%	4,050,646

Table 6-6 presents a comparison of the MCE Small Commercial program and the PG&E small commercial lighting and refrigeration focused programs. Table 6-7 presents a comparison between the REN and IOU Home Upgrade and Multifamily Whole Building Programs. Shown are the number of participants, net lifecycle savings (evaluated for MCE and the RENs, ex ante for the IOUs), and the TRC and PAC ratios.

Table 6-6: Comparison of 2013-14 Savings and Cost Effectiveness among MCE and PG&E Small Commercial Lighting/Refrigeration Programs

Program Name	Number of Participants	Net Lifecycle Savings			Cost Effectiveness	
		MW	GWh	MMTherms	TRC	PAC
MCE-Small Commercial	85	0.7	4.9	(0.0)	0.76	0.73
PGE-Energy Fitness	658	18.4	94.0	(0.3)	1.99	1.99
PGE-LGEAR	4,805	15.6	176.2	(0.5)	0.82	0.88
PGE-Madera	117	1.4	8.4	(0.0)	1.70	1.66

Table 6-7: Comparison of 2013-14 Savings and Cost Effectiveness among REN and IOU Home Upgrade and Multifamily Whole Building Programs

Program Name	Number of Participants	Net Lifecycle Savings			Cost Effectiveness	
		MW	GWh	MMTherms	TRC	PAC
BayREN-Multifamily	95	2.1	16.6	1.8	0.28	0.30
BayREN-Single Family	684	5.7	1.8	0.7	0.05	0.06
SoCalREN-Multifamily	2	0.4	2.6	(0.0)	0.02*	0.03*
SoCalREN - Single Family	120	1.4	0.9	0.2	0.02*	0.03*
PGE-Home Upgrade and MF Whole Building	4,931	86.7	66.7	15.3	0.23	0.83
SCE-Home Upgrade and MF Whole Building	1,700	29.9	22.8	2.0	0.21	0.35
SCG-Home Upgrade and MF Whole Building	2,669	0.0	11.6	4.7	0.24	0.48
SDGE-Home Upgrade and MF Whole Building	642	5.6	4.0	0.6	0.08	0.14

*The SoCalREN TRC and PAC is for their MFM and SFM claims combined. The program costs are not reported by multifamily versus single family in the tracking data, so calculating an individual TRC and PAC was not possible.

Because the REN and MCE programs offer a number of non-resource services, one would expect that the TRC and PAC ratios to be lower relative to the IOU programs. However, these IOU programs provide a reasonable baseline for how cost effective the resource components of these programs could be. If one were to assume a percentage of the REN and MCE program costs were associated with non-resource activities, you could scale the TRC and PAC proportionally to

obtain an estimate of what the TRC and PAC ratios would be for the resource components of their programs. For example, if 50% of the program's cost was associated with non-resource activities, then the program's TRC and PAC ratios could be doubled to estimate what those values would be for just the resource activities.

The MCE small commercial TRC and PAC ratios are less than half the size of the Madera and Energy Fitness programs, but not that significantly different from PG&E's LGEAR program. Looking only at the 2014 program year, however, MCE has a TRC and PAC that are both above 1.0. Participation levels are lower by an order of magnitude compared to the LGEAR and Energy Fitness program, and about half that of the Madera. Given the relatively small service territory of MCE, it should be expected that their participation levels are relatively low. Given the program is still ramping up, we might expect to see increased levels of participation, which could increase their TRC and PAC values, possibly more in line with the average TRC and PAC (of 1.5) of the other three programs. However, as shown above, the LGEAR program has much higher participation levels than the Energy Fitness and Madera programs but has a lower TRC, so higher participation does not necessarily mean a higher TRC. MCE's multifamily program, however has TRC and PAC ratios significantly below 1.0 and there is no clear indication that this program is on a trajectory to become cost effective with respect to these metrics.

The REN and IOU Home Upgrade and Multifamily Whole Building programs all have TRCs in the range of 0.02 and 0.21. Although none of these programs are cost effective in the sense that they have a TRC or PAC ratio greater than 1.0, BayREN's multifamily program is relatively comparable to the other IOU programs and has the highest TRC. The SoCalREN program is driven primarily by single family participants and has TRC and PAC scores similar to BayREN's single family program. Both of these programs have significantly lower TRC and PAC ratios than the IOU programs, however, these programs do not break out single family measures. Therefore, it is difficult to make a direct comparison among single family measures. Note that the TRC and PAC ratios for these programs range from only 0.02 to 0.06, which are significantly lower than the typical TRC and PAC ratios for the other Home Upgrade and Multifamily Whole Building programs.

Although the programs for the RENs and IOUs have TRC and PAC ratios that are significantly below 1.0, the BayREN multifamily program's values are in line with the IOUs. The SoCalREN program, which is primarily single family, and the BayREN single family program have TRC and PAC values that are barely positive, and are significantly lower than the other IOU programs (which do not break out single family and multifamily components).

As the REN and MCE programs are still relatively new, one might expect to see increases in participation, over 2015 and into 2016. This would likely result in an increase in the program's cost effectiveness. Furthermore, if there was a way to quantify the benefits of that the non-resource activities have had on influencing customers to participate in IOU programs and adopt

measures outside of energy efficiency programs, this would also increase the programs' cost effectiveness. It is highly unlikely that the TRC and PAC ratios of the RENs' programs will approach 1.0 given the current values and the values of comparable IOU programs, but they may reach values that are acceptable when considering other objectives that these type of program may be trying to achieve.

As for the MCE program, it is unlikely that the multifamily program will be cost effective in the near term based on current performance. But, the small commercial program has demonstrated in its 2014 program year that it can be cost effective.

6.4 Hard-to-Reach and Depth of Retrofit

Other important aspects to consider regarding these programs outside of a cost effectiveness metric is the ability to serve hard-to-reach (HTR) customer segments, and the depth of retrofit that is achieved by the programs' installations. The RENs and MCE each have a program component that focuses on multifamily customers, which in the past has been identified as an HTR segment. In addition, the MCE small commercial program has served a number of small and very small commercial customers, also an HTR segment. Although these are all important markets to serve, it is not necessarily unique to the statewide portfolio for programs to be targeting these segments. Nevertheless, these programs do help serve hard-to-reach markets to some extent.

Depth of retrofit metrics are meant to identify programs that are more successful in getting customers to install as many energy efficiency measures as possible and not leave energy efficiency opportunities unaddressed. Programs that focus on just the highest impact measures, in other words, those that have missed energy efficiency opportunities, may have higher resulting TRCs (i.e., focus only on lighting measures and ignore other end uses that are less cost-effective). These higher resulting TRCs arise because these programs only address the most-cost effective measures; however they will have a lower depth of retrofit. The Home Upgrade and Multifamily Whole Building programs offered by the RENs offer a whole building approach, which result in a high depth of retrofit, but also have the effect of lower project based cost effectiveness as shown above. The concept however, is to bundle as many measures together to maximize total energy savings, but still have an overall project that is relatively cost effective.

MCE's small commercial program also delivers a wide array of indoor and outdoor lighting measures and some select refrigeration measures. While, this measure mix is not uncommon, MCE was found to install a fewer number of different types of lighting and non-lighting measures than other similar programs offered in PG&E's territory. Table 6-8 provides a comparison of the number of end uses and the number of measure groups that are installed per site on average for MCE's program and the three PG&E programs. Most programs are only

installing a little more than one end use per site, which can be expected given that 80% or more of the energy savings from all of these programs comes from lighting. However, when looking at the number of measure groups per site,[60] the MCE program installed only 1.3 on average compared to two or more for each of the PG&E programs. However, none of these results show a high level of depth of retrofit relative to all other programs in the statewide portfolio.

Table 6-8: Comparison of Number of End Uses and Measure Groups Installed per Site among MCE and PG&E Small Commercial Lighting/Refrigeration Programs

Program ID	Program Name	End Uses Per Site	Measure Groups per Site
MCE02	SMALL COMMERCIAL	1.2	1.3
PGE210113	ENERGY FITNESS PROGRAM	1.3	2.1
PGE2110051	LOCAL GOVERNMENT ENERGY ACTION RESOURCES (LGEAR)	1.3	2.1
PGE211012	MADERA	1.2	2.0

6.5 Conclusions and Recommendations

Conclusion CostEff-1 [MCE, BayREN, SoCalREN]: The RENs' and MCE's tracking data are not in agreement with their 2013-2014 monthly reports. A comparison between the tracking data and the monthly report (2013-2014 inception-to-date fields) showed discrepancies in program expenditures, demand reduction, energy savings, and gas savings. Discrepancies varied from 1% up to 87540%. It was found that RENs/CCA did not always ensure that consistency persisted between annual reports, monthly reports, and tracking data. For example, some costs were included in the annual report, but not in the tracking data.

Recommendation CostEff-1 [MCE, BayREN, SoCalREN]: The RENs and MCE should set up an internal process to ensure that all data sources submitted to the CPUC are in agreement. Sources of resource accomplishments should be in agreement across all data submissions and summary reports. An internal process should be set up to ensure that data reported is being drawn from the same source to prevent discrepancies in summary reports.

Conclusion CostEff-2 [MCE, BayREN, SoCalREN]: The quality of the RENs' and MCE's tracking data with respect to cost effectiveness parameters was found to be low. There are many obvious data errors that should be fixed before reporting and submitting to the CPUC. Some quality issues include: program IDs were not always consistent between measure and

[60] There are seven different lighting measure groups which include CFLs, LEDs, linear fluorescents, controls, HIDs, outdoor and other lighting.

program data, program IDs were not consistent throughout the 2013-14 program cycle, total costs and incentives were filled in when per unit values were expected, both installation rates and realization rates were set to less than one for a particular claim, many claims reported a NTGR equal to one (which is not an approved ex ante value), and many claims reported null NTGRs for non-zero savings. In general, data reporting protocols were not followed and as a result low quality program tracking data was produced.

Recommendation CostEff-2 [MCE, BayREN, SoCalREN]: The RENs and MCE should set up a quality control process where submitted tracking data is run through cost effectiveness to ensure data runs smoothly and the expected TRC and PAC values are returned. This quality control process can reveal a multitude of data reporting errors and should be setup in conjunction with other quality control processes recommended in this report. PAs should run their tracking data through cost effectiveness before submitting to the CPUC, so that confidence can be had of the structure and contents of the data.

Conclusion CostEff-3 [SoCalREN]: SoCalREN combines its single family and multifamily Home Upgrade program elements into a single program, which makes it difficult to assess the cost effectiveness of each element individually.

Recommendation CostEff-3 [SoCalREN]: SoCalREN should consider breaking its single family and multifamily Home Upgrade program elements into two separate programs or else tracking the costs associated with each element separately to allow for each element to be assessed individually for cost effectiveness.

Conclusion CostEff-4 [MCE, BayREN, SoCalREN]: The TRC and PAC cost effectiveness values for the RENs and MCE include costs associated with various non-resource activities within their resource programs that do not directly benefit or support the resource program. Excluding costs that do not directly benefit the resource components of their programs would provide a more accurate and comparable calculation of the cost effectiveness for the resource elements.

Recommendation CostEff-4 [MCE, BayREN, SoCalREN]: The RENs and MCE should consider tracking the costs associated with non-resource activities that do not directly benefit the resource elements of their programs to support a more accurate calculation of cost effectiveness.

7

Non-Resource Assessment

This section of the report presents:

- A verification of non-resource accomplishments of selected programs or service areas offered by BayREN, SoCalREN, and MCE, as stated in their latest Annual Reports,
- Selected non-resource accomplishments presented in the CPUC PY2013-14 Regional Energy Networks Value and Effectiveness Study, conducted by Opinion Dynamics Consulting,[61]
- An assessment of the evaluability of selected databases that support these accomplishments based on their quality, completeness, and merging potential,
- The results of data merges between selected non-resource program databases from the above listed Program Administrators (PAs) and CPUC tracking data, and
- A summary of conclusions and recommendations as a result of the findings from the above activities.

The evaluation team submitted data requests to the RENs and MCE, and in response they each sent databases and supporting documentation to confirm the 2013-14 non-resource accomplishments.[62] In order to evaluate the most current accomplishments, the RENs and MCE were also asked to provide updated values for their non-resource accomplishments through the Second quarter of 2015 and to provide any additional accomplishments and supporting data that could be used to verify them.

Next, a selection of the databases were examined to determine whether they are inclusive of data that would be useful in conducting evaluation studies and whether the data fields are well populated (little to no missing data). The goal of examining the evaluability of these databases is

[61] Prepared by Opinion Dynamics Corporation on behalf of the CPUC. Draft date September 9, 2015. The study was conducted under CPUC Contract 12PS5094 with Itron, Inc. Opinion Dynamics, a subcontractor to Itron for this study, conducted the evaluation plan effort under work order ED_I_LnR_1-1.

[62] In addition to non-resource accomplishments, a few salient resource program accomplishments listed in the Annual Reports were also verified using CPUC tracking data. These accomplishments mostly address the number of energy upgrade projects completed and total rebates paid for the PAs' residential and nonresidential programs.

to determine how well information related to non-resource accomplishments is documented and whether this information could subsequently be used to track non-resource activities that ultimately lead to energy savings in resource programs. The evaluability of these databases were based on the availability, quality, and completeness of:

- Contact information, such as contact and/or site name, address, phone numbers, and e-mail addresses;
- Merging variables such as electric and/or gas service account IDs, customer IDs, premise IDs or other unique customer data that could be used to merge the datasets to Program Administrator Customer Information Systems (CIS), billing data, and/or CPUC tracking data; and
- Details about recommendations from assessments, suggestions or referrals to programs, or information about attendance at events, workshops, or trainings, depending on the database type.

Last, selected databases from each PA were merged with CPUC tracking data (two to four databases per PA). The purpose of this exercise was to see if participants of the various non-resource program or service activities carried out by the RENs and MCE have led to participation in energy efficiency resource programs. This is one way to gauge how effectively non-resource program activities have led to participation in PA resource programs.

The non-resource accomplishments of the RENs and MCE are taken from their latest Annual Reports.[63] Additionally, a listing of accomplishments by the RENs was assembled and presented in a draft study entitled, "CPUC PY2013-2014 Regional Energy Networks Value and Effectiveness Study," conducted by Opinion Dynamics Consulting. This ODC study did not verify the values it presented, as it was outside the study scope. A majority of these were included in this assessment as well.

Results for the three PAs are presented below with three major subsections:

- Verification of Non-Resource Accomplishments,
- Evaluability of Databases, and
- Results of CPUC Tracking Data Merges.

[63] The SoCalREN Annual Report is entitled "2015 SoCalREN Energy Efficiency Annual Report" and dated April 15, 2015. The BayREN Annual Report is entitled "Bay Area Regional Energy Network 2014 Energy Efficiency Annual Report" and dated April 15, 2015. The MCE Annual Report is entitled "2014 MCE Energy Efficiency Annual Report" and though no date appears on its cover page, it was posted to the EEStats website on April 15, 2015. The Annual Reports are available at http://eestats.cpuc.ca.gov/Views/Documents.aspx.

The PAs offer multiple programs or services related to single family and multifamily upgrades, small commercial energy upgrades, contractor training, and local marketing and outreach. The non-resource accomplishments for each of these will be discussed within the subsections below, where applicable. Because two statewide studies are being conducted on the Codes & Standards and Financing programs, these program areas are not evaluated in this section of the report. A presentation of non-resource accomplishments for the RENs and CCA in these program areas are included in Appendix B, but are not verified. Additionally, the evaluability of datasets sent to support these program areas was not determined nor were any CPUC tracking data merges conducted with these datasets.

7.1 BayREN

As noted earlier, BayREN offers services in the following four service areas:

- Single Family Home Upgrade,
- Multifamily Upgrade,
- Codes and Standards, and
- Financing.

A verification of non-resource accomplishments is presented below for the Single Family Home Upgrade and Multifamily Upgrade service areas.[64] Next, an evaluability assessment of the databases provided by BayREN is conducted in which the completeness, quality, and applicability of the data is reviewed. A subset of the 24 files of mixed format (i.e., MS Word, MS Excel, .pdf, and .png) is examined and assessed and are presented after the verification of BayREN's non-resource accomplishments. Last, results from merges of two different non-resource datasets to CPUC tracking data are discussed. These merges were carried out to see if customers who interacted with BayREN went on to participate in any California PA energy efficiency resource programs. The first dataset includes customers who participated in BayREN's Single Family Home Upgrade Advisor program[65] and the second contains a list of customers who received technical assistance through BayREN's Multifamily Upgrade services.

[64] The non-resource accomplishments of the Codes and Standards program and the Financing program taken from BayREN's 2014 Energy Efficiency Annual Report are presented in Appendix B and have not been verified.

[65] The Home Upgrade Advisor service features advisors for individuals, contractor representation and other support as necessary to help homeowners feel supported during the upgrade process.

7.1.1 Verification of Non-Resource Accomplishments

This section presents the verification of selected non-resource accomplishments of BayREN's programs as they were presented in the following:

- BayREN's 2014 Energy Efficiency Annual Report,
- A draft "CPUC PY2013-2014 Regional Energy Networks Value and Effectiveness Study" (referred to hereafter as ODC's Value and Effectiveness Study) conducted by ODC, or
- BayREN's response to the data request submitted by the evaluation team that was used to acquire data to support this impact assessment.

Single Family Home Upgrade

Results of the verification of non-resource accomplishments for the Single Family Home Upgrade service from BayREN's 2014 Annual Report are presented in Table 7-1.

Generally speaking, the evaluation team was able to verify the accomplishments BayREN listed for its Single Family Home Upgrade service area. Except in the case of the Home Upgrade Advisor (HUA) account referrals made to complementary programs (row 2), the numbers of Advanced Home Upgrade audits conducted (row 1), and attendees to Home Upgrade trainings held (row 3) were either the same or greater in quantity in the databases provided by BayREN and used in this verification exercise. Note also that the amount of rebates paid for both Home Upgrade and Advanced Home Upgrade were not verified, as the total rebates paid were not provided (row 1).

An additional accomplishment was provided by BayREN stating that through December 2014, the BayREN Home Upgrade Advisor Program recorded 695 assist contractor cases, comprised of 2,726 individual contractor assistance activities. No verification of this accomplishment occurred because supporting data were not provided by BayREN.

BayREN also provided their accomplishments in 2015 through Q2 and as the last column of the table below shows, BayREN's Single Family Home Upgrade program continued to conduct home upgrades and assessments (a total of 680 projects have been implemented through Single Family Home Upgrade and 434 incentives paid out for Advanced Home Upgrade assessments – see row 1). Home Upgrade Advisor also continued to provide support in 2015 to 713 customers and made referrals to complementary programs to 963 customers (row 2). In addition to the 211 contractors who received Home Upgrade training in 2013-14, BayREN provided training to 62 specialty contractors in Q1 and Q2 of 2015 (row 3).

Table 7-1: Selected BayREN Single Family Home Upgrade Accomplishments from 2014 Annual Report

BayREN SF Home Upgrade Non-Resource Accomplishments for 2013-14 from Annual Report	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
By December 2014, 1,245 rebates were paid out to 684 Home Upgrade projects and 561 Advanced Home Upgrade Assessment Incentives, for a total of $1,630,645.50 incentives paid out.	CPUC tracking data show 684 claim IDs (projects) and incentives paid out for these claims equal to $1,463,950; Data from BayREN[1] show 561 Advanced Home Upgrade Assessment Incentives paid. According to BayREN, the total incentives paid for these assessments totals $165,195.50, though the data to verify this were not provided.	CPUC tracking data show a total of 680 claim IDs (projects) for 2015 through Q2. Data from BayREN[1] shows 434 Advanced Home Upgrade Assessment Incentives paid out in 2015 through Q2. Total incentives for these claims and the audits was not calculated.
Deployment of a Home Upgrade Advisor (HUA) providing both consumer- and contractor-facing support to 549 total accounts; also made 2,012 referrals to complementary programs.	Database from BayREN[2] shows 600 qualified accounts[3] and 1,855 general inquiry accounts assisted through Home Upgrade Advisor; a total of 1,030 referrals[4] were made to complementary programs.	Database from BayREN[2] shows 130 qualified accounts and 583 general inquiry accounts assisted through Home Upgrade Advisor and 963 referrals[4] made to complementary programs in 2015 through Q2.
Since implementation, 203 Specialty Contractors have received new Home Upgrade (HU) training	Data from BayREN[5] show 221 specialty contractors received HU training	Data from BayREN[5] show 62 specialty contractors received HU training

1 BayREN provided an Excel file called "Itron_AI_Request_BayREN (1).xlsx" that shows the recipients of Advanced Home Upgrade Assessment Incentives in 2013 through August 2015.

2 BayREN provided an Excel file called "BayREN_HUA_All_Accounts.xlsx," which shows the number of qualified customer accounts that have interacted with the Home Upgrade Advisor program.

3 The 600 HUA accounts refer to qualified accounts and include the 549 total accounts that are referred to in the Annual Report, some of which have changed status since the Annual Report was released. Since then, additional accounts created in 2013 or 2014 became qualified single family accounts due to continued follow up and customer engagement.

4 BayREN provided an Excel file called "BayREN_HUA_Complementary Program Referrals.xlsx" that lists HUA customers who were referred to complementary programs.

5 BayREN provided an Excel file called "Itron_Training_Request_BayREN.xlsx," which showed contractors trained in a variety of programs, including Home Upgrade.

Table 7-2 presents BayREN's progress towards meeting the program performance metrics (PPMs) of the Home Upgrade program for 2013-14 as was presented in ODC's Value and Effectiveness Study. ODC's study did not attempt to verify the data provided by BayREN, so the evaluation team for this study requested databases to support the results reported by ODC. The evaluation team's findings are presented in the last two columns of the table.

As Table 7-2 shows, the databases provided by BayREN support the PPMs reported by ODC. When the ODC-reported progress towards PPMs was checked, the evaluation team found that BayREN exceeded the number of trained contractors and the number of Home Upgrade Advisor participants (see rows 1 and 2) than the numbers reported by ODC. The evaluation team was

able to verify the number of projects incented through the Home Upgrade program and the number of audit incentives funded by BayREN[66] (see rows 3 and 4).

Though the quantities of the last three accomplishments do not match, the numbers retrieved from CPUC tracking data and data provided by BayREN are close to those reported by ODC (rows 5 through 7). ODC's report stated that 92 Home Upgrade Advisor (HUA) participants went on to complete a Home Upgrade project. The evaluation team was able to verify 116 HUA participants who went on to complete a Home Upgrade project (row 5). ODC's report also showed 201 HUA participants who completed an Advanced Home Upgrade project while the evaluation team verified a total of 193 (row 6). Lastly, the number of participating contractors who completed at least one Home Upgrade project is 46 according to ODC's study, while the evaluation team found a total of 52 (row 7). It is possible that these numbers differ slightly because the CPUC tracking database was updated since ODC developed its results. Additionally, Home Upgrade Advisor participant accounts created in 2013-2014 may complete Home Upgrade and Advanced Home Upgrade projects in 2015 and beyond with the ongoing follow up from the Home Upgrade Advisor program, so the project completion numbers may increase with subsequent analyses.

[66] These line items were already verified in Table 7-1, but are included in this table since it is a replication of the table that appears in ODC's report as Table 18.

Table 7-2: BayREN Home Upgrade Progress by PPM for PY2013-14 (Taken from Table 18 in ODC's Value and Effectiveness Study)

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014 from ODC Report	Verified as of December 2014	Verified Percent of 2013–2014 Goal Accomplished
Number of trained contractors and real estate professionals[1]	125	125	**203 specialty contractors**	**221**	88%
Number of participants in Home Upgrade Advisor Program	500	1,000	**549**[2]	**2,455**[3]	164%%
Number of units (projects/Claim IDs) incented through Home Upgrade	360	2,142	**684**	**684**	27%
Number of audit incentives funded through BayREN[3]	586	743	**1,245**	**1,245**	93%
Number of Home Upgrade Advisor participants who complete a Home Upgrade project[5]	75	250	**92**	**116**	36%
Number of Home Upgrade Advisor participants that complete an Advance Home Upgrade project[5]	100	100	**201**	**193**	96%
Number of Participating Contractors who have completed one or more Home Upgrade project	30	70	**46**	**52**	52%

1 While BayREN did propose a Green Labeling program, which the CPUC approved, it did not allocate any funding to this effort in 2013–2014. Accordingly, BayREN did not train any real estate professionals.

2 Footnote taken from ODC's Report: The 2014 Annual Report indicates that 549 customers participated in the Home Upgrade Advisor program; however, according to BayREN staff, BayREN received 2,455 inquiries about the service, which could signify "participation" within the program. Lacking specific guidance on what is considered "participation," the evaluation team kept the lower value in the table as inquiry does not appear to be full participation.

3 Based on a review of the database provided of Home Upgrade Advisor program participants, both qualified customer accounts and general inquiry accounts were considered participants of the program, since one of the purposes of the program is to provide information and services to customers who are trying to determine whether they can participate in the Home Upgrade program.

4 BayREN offers an audit rebate of up to a maximum of $300 for Advanced Home Upgrade and Home Upgrade projects, but does not implement the Advanced Home Upgrade program. BayREN does implement and provide incentives for Home Upgrade projects. BayREN paid 561 audit rebates for Advanced Home Upgrade projects and incentives for 684 for Home Upgrade projects (total of 1,245).

5 As reported in BayREN tracking data, the ODC evaluation team received on December 18, 2014.

6 This PPM was not in the revised PIPs. However, BayREN indicated that they track these goals and provided progress on these goals directly to ODC.

Multifamily Upgrade

Results of the verification of non-resource accomplishments for the Multifamily Upgrade program from BayREN's Annual Report are presented in Table 7-3. Using CPUC tracking data and databases provided by BayREN, the evaluation team was able to verify almost all non-resource accomplishments listed in its Annual Report.

There was one difference in the reported number of projects completed through the Multifamily Upgrade service offering in the database provided by BayREN and the CPUC tracking data (see row 3, cell 2 of Table 7-3). The number of projects was shown to be 95 in the CPUC tracking data (based on a count of Claim IDs), while BayREN's database showed 125 completed projects, which is the total reported in its Annual Report. The amount of rebates paid out also differed; BayREN stated that a total of $6.3 million were paid out in incentives for the 125 projects completed, while CPUC tracking data show $4.3 million paid out for the 95 projects that were claimed in 2013-14. It is not surprising that the total incentives differed across the two data sources since a different number of claims/projects were listed in each. Aside from these differences, the 2013-14 non-resource accomplishments could be verified.

Table 7-3: Selected BayREN Multifamily Upgrade Accomplishments from 2014 Annual Report

BayREN MF Upgrade Non-Resource Accomplishments for 2013-14 from Annual Report	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
Free technical assistance that provides a customized scope of work, serving approximately 36,031 units in 2013/2014	Data from BayREN[1] show 36,020 units received free TA	Data from BayREN[1] show 8,674 units received free TA
Approximately 10,284 units worth of incentives were reserved in 2014	Data from BayREN[1] show incentives reserved by 10,284 units	Data from BayREN[1] show incentives reserved by 2,716 units
A total of 8,384 units[2] completed upgrades, receiving $6,287,172.13 in incentives for a total of 125 completed projects in 2014	Data from BayREN[1] show upgrades completed in 8,384 units for a total of 125 completed projects; CPUC tracking data[3] show 95 claim IDs receiving $4,269,750 in incentives.	Data from BayREN[1] show upgrades completed by 125 units for nine projects. CPUC tracking data were not reviewed for claims in 2015 through Q2.
A total of 6,164 units were referred out to other multifamily incentive programs in the Bay Area that were better suited for their scope of work	Data from BayREN[1] show 6,164 units were referred out to other MF incentive programs.	Data from BayREN[1] show 1,581 units were referred out to other MF incentive programs in 2015through Q2.

1 BayREN provided data in an Excel file called "BayREN Multifamily TA Accomplishments Database.xlsx" in response to a data request submitted for this impact assessment. This dataset shows multifamily properties and the associated number of units that received technical assistance, site visits, were referred to other programs, reservations for rebates, and energy upgrades.

2 The response to the data request notes that there was an error in the number of units that completed upgrades listed in BayREN's 2014 Annual Report. The actual amount was 8,384 and not 8,834 and this was confirmed in BayREN's dataset.

3 CPUC tracking data were used to check the number of multifamily units that completed upgrades during the 2013-14 program years and to verify the amount of incentives paid out. The incentives paid out do not match across the two data sources, but the number of units receiving upgrades does.

The non-resource accomplishments provided by BayREN for 2015 through Q2 shows continued progress in its Multifamily Upgrade service offering. Data from BayREN allowed a verification of technical assistance provided to 8,674 multifamily units (row 1). It also was able to verify 2,716 reservations for incentives (row 2), upgrades carried out in nine projects that represent 125 multifamily units (row 3), and referrals to 1,581 units to other multifamily incentive programs that would be better suited to them than BayREN's offering (row 4).

Table 7-4 presents BayREN's PPMs for the Multifamily Upgrade service area for 2013-14 as was presented in ODC's Value and Effectiveness Study. This evaluation team's findings are presented in the last two columns of the table and show that the data presented in ODC's study could be verified with the databases provided by BayREN. Progress towards meeting the Multifamily PPMs was verified or exceeded the reported progress noted by ODC in all cases.

Table 7-4: BayREN Multifamily Progress by PPM for PY 2013-14 (Taken from Table 20 from ODC Value and Effectiveness Study)

Program Performance Metrics	2013 Goal	2014 Goal	Accomplished as of December 2014 from ODC Report	Verified as of December 2014	Verified Percent of 2013–2014 Goal Accomplished
Number of units receiving technical assistance	3,000	6,000	**36,031**	**36,031**	400%
Number of units incented	1,250	3,750	**8,384**[1]	**8,384**[1]	168%
Number of multifamily contractors trained	25	25	**20**[2]	**20**	40%
Number of projects receiving technical assistance	75	150	**220**	**494**[3]	219%
Number of property owners reached by outreach activities	150	150	**400**[4]	**424**[5]	141%

1 The response to the data request notes that there was an error in the number of units that completed upgrades listed in BayREN's 2014 Annual Report. The actual amount was 8,384 and not 8,834 and this was confirmed in BayREN's dataset. An update was made to the number reported by ODC.

2 A list of trained multifamily contractors was provided by BayREN in a file called "BayREN Multifamily Contractors Trained Database.xlsx"

3 A list of projects receiving technical assistance was provided by BayREN in a file called "BayREN Multifamily TA Accomplishments Database.xlsx".

4 BayREN received interest forms from 400 property owners. Notably, BayREN estimates that they contacted thousands of property owners through various outreach activities. However, they are unable to track this accurately.

5 A list of property owners reached by outreach activities was provided by BayREN in a file called "BayREN Multifamily Interest Form Database.xlsx" listed 424 property owners representing 31,333 units.

Codes and Standards

No verification of non-resource accomplishments, evaluability of non-resource program data, or merging of datasets to CPUC tracking data is being conducted for BayREN's Codes and Standards program. The non-resource accomplishments of the Codes and Standards program can be found in Appendix B.

Financing

No verification of non-resource accomplishments, evaluability of non-resource program data, or merging of datasets to CPUC tracking data is being conducted for BayREN's Financing programs (e.g., Multifamily Capital Advance, Commercial PACE, and Pay as You Save [PAYS]). The non-resource accomplishments of the Financing programs can be found in Appendix B.

7.1.2 Evaluability of Databases

BayREN provided 12 Excel files that contained the data used to verify the non-resource accomplishments presented in the above subsection. Of these files, a total of four were assessed for quality, completeness, and consistency of:

- Contact information (names, addresses, and phone numbers).
- Merging variables (account numbers and customer IDs), and
- Details about recommendations, referrals, and/or attendance at workshops or events.

A subset of the total number of databases provided was selected because not all of the files would be useful in an evaluation of impacts that stem from non-resource activities. The four files that were evaluated are as follows with descriptions of their contents:

- *Itron_AI_Request_BayREN (1).xlsx*, a database containing 1,065 records of customers who had Advanced Home Upgrade Assessments and received incentives for them from BayREN.
  - The database contains the following key fields: project number, contact, e-mail, phone, PG&E account holder full name, electric provider, electric service account number (electric SAID), gas provider, gas service account number (gas SAID), address, incentive request received date, approved date, paid date, primary contractor name, how important the incentive was (as stated by the customer), and source of awareness (also stated by the customer).
  - The database does contain electric and gas SAIDs, which makes it useful for merging to CPUC tracking data as well as Customer Information System (CIS) data.
  - Variables in the dataset are extremely well populated. Of the 561 assessment incentives paid for 2013-14 (the remaining 504 records are assessments paid in 2015), there are no missing project IDs, no missing names, seven missing e-mail addresses, nine missing phone numbers, no missing electric providers (or associated account numbers), no missing gas service providers, a few missing gas service account numbers, no missing addresses, no missing dates, no missing contractor names, and no missing information about the importance of the incentive and source of awareness.
  - Any recommendations that may be developed as part of the assessments are not being tracked or were not included in the dataset provided.
  - Overall, the key variables necessary for contacting customers in the future and merging to CIS and IOU tracking data are being collected and are well populated. However, no information on recommendations that may be developed as part of the

assessments are being tracked (or if they are, they were not provided when requested as part of the dataset).

- *BayREN_HUA_All_Accounts.xlsx*, a database of 730 qualified accounts and 2,438 general inquiry accounts who have participated in the Home Upgrade Advisor program.
  - Data fields provided in this file are: account ID (internally created by program implementer), created date, created year, date first upgrade completed, first name, last name, phone, e-mail, address, county, account phase (a description of the account's status), and project completed status (including if the customer has participated in the Home Upgrade program or Advanced Home Upgrade program, or taken other actions on their own). There are two tabs in this file. The first lists qualified single family accounts and the second lists general inquiry accounts. The qualified accounts represent participants who have qualified for the Home Upgrade program and have taken the beginning steps of participating in the program. General inquiry accounts include customers who have asked general questions about the program, but are not ready and/or interested in taking the next step towards participating in the Home Upgrade program, not interested in participating, or otherwise not qualified.
  - The total number of qualified 2013-14 accounts listed on tab 1 is 600, and is 130 for 2015 through Q2. The grand total of qualified accounts is 730 from 2013 through Q2 of 2015. Tab 2 shows all general inquiry accounts by created date. The total of 2013-14 general inquiry accounts on tab 2 is 1,855 and for 2015 through Q2 is 583. The grand total of general inquiry accounts is 2,438 from 2013 through Q2 of 2015.
  - There are no service account IDs that can be used to merge to CIS, billing, or CPUC tracking data. There are customer account IDs but these are uniquely created and used by the program implementer.
  - All fields are almost completely populated for the qualified accounts tab. There are no missing account IDs, no missing names, seven missing phone numbers, and 35 missing e-mails. The fields are not as populated for the general inquiry accounts. There are 226 missing names, 440 missing phone numbers, 742 missing e-mail addresses, and 374 missing or incomplete addresses on tab 2.
  - Overall, the key variables necessary for contacting customers in the future are being collected. These variables are well populated for the qualified accounts, but less so for the general inquiry accounts. Service account numbers are not being collected that would allow for a direct merge to CIS and IOU tracking data. The qualified accounts are also being tracked regarding their participation in the Home Upgrade program, Advanced Home Upgrade program, or if other actions were taken on their own.

- *BayREN_HUA_Complementary_Program_Referrals.xlsx*, a database of 1,993 Home Upgrade Advisor participants who have been referred to complementary programs.
  - The database shows a total of 1,030 referrals made in 2013-2014 (the remaining 963 records are referrals that were made in 2015). The fields included in the database are: account ID (contractor assigned and not an IOU service account ID), account record type (whether it was a BayREN general inquiry or BayREN single family qualified account), first name, last name, address, county, opened date, year, and solution title (type of program to which referral was made).
  - There are no service account IDs that can be used to merge to CIS, billing, or CPUC tracking data. There are customer account IDs but these are uniquely created and used by the program implementer.
  - All fields are extremely well populated with very few missing addresses. Note also that all accounts included in this file are found in either the Qualified or General Inquiry Accounts lists in BayREN_HUA_All_Accounts.xlsx.
  - Overall, the key variables necessary for contacting customers in the future are being collected and are well populated. Service account numbers are not being collected that would allow for a direct merge to CIS and IOU tracking data. The specific programs to which customers are being referred are also being tracked.
- *BayREN Multifamily TA Accomplishments Database.xlsx*, a database of 633 projects containing just under 44,700 multifamily units that have received technical assistance, were referred out to other programs, received site visits, reserved rebates for the Multifamily program, and completed upgrades through the program.
  - There are a total of 633 rows of data and the fields included are multifamily project ID, project name, address, # of units in building, # of buildings on property, electric SAID, gas SAID, contact name, contact phone, contact e-mail, company account, and date flag (either 2013-2014 or 2015) to indicate whether technical assistance was received, date flag to indicate whether project was referred out, which program the project was referred to, date flag for site visit, date flag for rebate reserved, date flag for upgrade completed, and project scope description.
  - Because the dataset includes electric SAIDs (though only for 130 records) and gas SAIDs (for 120 records), these records can be merged with CPUC tracking data.
  - Most of the customer account fields in the database are extremely well populated. There are no missing multifamily project IDs, 22 missing addresses, 15 missing cities (though in these cases the county is provided), 11 records missing names, 74 missing phone numbers, and 12 missing e-mails; none are missing dates of technical assistance provided.
  - Overall, the key variables necessary for contacting customers in the future are being collected and are well populated. Service account numbers are being collected that

would allow for a direct merge to CIS and IOU tracking data, but not for all customers. Information on recommendations that may be developed as part of the assessments is also being tracked, as are the specific programs to which customers are being referred.

Overall, the databases provided by BayREN are collecting the necessary data to support future evaluations, although a few minor additions could increase their usefulness. Databases where SAIDs are available make it easier to merge them to other data sources that are usable for impact evaluations, such as CPUC tracking data, and utility CIS and billing data. It is recommended that when Home Upgrade Advisor participants become qualified to participate in the Home Upgrade program, their electric and gas SAID be recorded. Also, for customers receiving technical assistance, if recommendations made were tracked, it would allow future evaluators to follow-up on specific actions customers may have taken as a result of the influence of the program. These data are collected for the multifamily assistance efforts but not for the single family Home Upgrade Advisor offering. It is also important to attempt to track when customers go on to participate in IOU programs as a result of BayREN's efforts. This would help support an attribution analysis of the influence of BayREN's efforts on other energy efficiency adoptions that are not made through their programs. While this is happening to some degree (e.g., in the Home Upgrade Advisor), there is potential for improvement in this area. The format of the data collected is consistent and the fields of data collected are appropriate.

7.1.3 Results of CPUC Tracking Data Merges

As mentioned earlier, two non-resource program datasets from each PA were used to merge to the CPUC tracking data to determine whether BayREN customers who have been touched by non-resource program activities, such as audits, marketing, and outreach have gone on to participate in energy efficiency resource programs offered by any of the PAs in California. This is an attempt at linking non-resource activities to participation in programs that have led to energy savings. The two BayREN datasets that were selected for merging are:

- BayREN Single Family Home Upgrade Advisor (HUA) customer data, and
- BayREN Multifamily Technical Assistance data.

<u>Merging BayREN Single Family Home Upgrade Advisor (HUA) Data</u>

The first BayREN dataset to be merged to the CPUC tracking data contains records of customers who participated in BayREN's Single Family Home Upgrade Advisor program.[67] This program

[67] BayREN provided an Excel file called BayREN_HUA_All_Accounts.xlsx in response to the evaluation team's data request.

connects BayREN customers to contractors who can provide them with assessments that include recommendations to improve energy efficiency. The data merge was executed to determine whether the program participants took action on the recommendations given by participating in a California PA energy efficiency program.

The customer information came from an Excel workbook provided by BayREN called "BayREN_HUA_All_Accounts.xlsx." The Excel workbook contains two tabs: (1) General Inquiry Accounts and (2) Qualified Accounts. The General Inquiry Accounts tab includes a list of 2,438 customers that had general questions about the Single Family Home Upgrade program. These are customers that are either not necessarily ready to actually participate in the program, are not interested at the time their inquiry is made, or do not qualify for Home Upgrade. They do receive marketing information about workshops and events and once those who are qualified are ready to engage, they are then listed as a Qualified Account. The number of qualified accounts listed is 730. A customer is considered a Qualified Account when the homeowner is ready to take the next step towards completing a project through the program and is interested in working with an advisor. These customers are all eligible to participate in the program. Interactions with qualified account customers tends to occur more often due to their interest in completing home upgrades. Once an account is classified as a Qualified Account, it does not change back to a General Inquiry Account, even if they do not complete the whole Home Upgrade process.[68]

Both tabs in the Excel workbook list customer information including addresses (street addresses, cities, and zip codes), customers' first and last names, contact phone numbers, contact e-mail addresses, and the account phase (account phase refers to the stage of the account in the process of program participation). Accounts on both tabs are uniquely identified by an Account ID, which does not provide any link to the CPUC tracking data as these are unique to the program implementer's data tracking system.

The account phase is a description of the status of the project. Table 7-5 below lists all the values the variable can take. Among the status phases, if a customer is in the "Closed – Retrofit Complete" phase (row in bold in Table 7-5), it is far more likely that the tracking data might have some information on what the customer has implemented as far as energy upgrades are concerned. This is expected because a project has been completed according to the database.

[68] Description of General Inquiry and Qualified Accounts was provided by BayREN's Single Family Home Upgrade program implementer CLEAResult.

Table 7-5: BayREN Single Family Home Upgrade Advisor Program Account Phase

Account Phase	Qualified Accounts	General Inquiry Accounts
Assessment Scheduled	4	3
Closed - Homeowner DIY	31	379
Closed - Not Interested in Upgrades	91	969
Closed - Not Qualified	0	686
Closed - Not Responsive	12	46
Closed - Retrofit Complete	**423**	**53**
Contractor Bidding	17	2
Contractor Selection	4	29
Education Phase	0	84
In Assessment/Advisor Queue	0	7
On Hold - Scheduled Follow-Up Task	87	100
Planning Phase	12	80
Retrofit in Progress	18	0
Retrofit Scheduled	8	0
Scheduling Contractor	2	0
Upgrade Complete: Finalizing Incentives	12	0
Upgraded & Pursuing Another Upgrade	4	0
Waiting for Assessment Report	5	0
Total	**730**	**2,438**

Not surprisingly, Table 7-5 shows that there is a relatively large number of "Closed – Retrofit Complete" accounts in the qualified accounts list (about 60%) than in the general inquiry accounts list (2%). A large proportion of the general inquiry accounts were either not interested in upgrades or not qualified. Therefore, it would be expected that more qualified accounts would be found in the tracking data than the general inquiry accounts.

The BayREN data was merged to the CPUC tracking data by (1) addresses, (2) names, (3) phone numbers, and (4) contact e-mails sequentially. The number of records and number of customers left (as counted based on Account ID) after each step of merging are presented in Table 7-6 and Table 7-7 below for the qualified accounts and general inquiry accounts respectively. After each merge step, the merged records were manually checked to make sure that the site listed in BayREN's records is the same site as the one merged from the tracking data.

1. Merge by Address: the BayREN Single Family HUA dataset was merged to the CPUC tracking data by addresses. The merge was a valid merge if the two parts had the same city and/or zip code, and if the last name listed in the BayREN SF HUA dataset can be found in the service account name and/or contact name in the tracking data. The names

were manually checked, so that some obviously misspelled names could be merged. A total of 272 qualified accounts and 220 general inquiry accounts were merged.

2. Merge by Name: the BayREN Single Family HUA dataset was merged to the tracking data if the name in the BayREN SF HUA data matched the service account name and/or contact name in the tracking data. The name in the BayREN SF HUA data was constructed as FirstName LastName, and LastName "," FirstName. The merge was a valid merge if the two parts had the same city and/or zip code, and if the addresses in both datasets match. The addresses were manually checked to ensure that the abbreviations accurately merged to the full word. For example, "123 5th Street" would not be merged to "123 Fifth St." in the address merge step, but if the names on those records were the same, they would be merged in this step. A total of 52 qualified accounts and 34 general inquiry accounts were merged to the CPUC tracking data.
3. Merge by Phone Number: the BayREN Single Family HUA dataset was merged to the tracking data by contact phone number. The merge was considered a valid merge if the two parts had the same city and/or zip code, and if the addresses in both datasets matched. The addresses were manually checked.
    a. There were nine merges for nine of the qualified accounts where the address information from one dataset was not available. These were valid merges because they all had matched names and/or e-mails.
    b. There were 15 merges for four of the general inquiry accounts where the address in formation from one datasets was not available. Ten merges for three accounts were considered valid because they had matched names. The other five merges were all for one account, where even the name for the record was missing.
4. Merge by E-Mail: the BayREN Single Family HUA dataset was merged to the tracking data by contact e-mail address. The merge was considered valid if the two parts had the same city and/or zip code, and if the addresses in both datasets matched. The addresses were manually checked.
    a. The qualified account merges were straightforward. There were no addresses missing. Twelve accounts could be merged.
    b. The general inquiry account merges were not very straightforward. When addresses were missing, the merge was considered valid if the city and/or zip codes were matched. When city and zip codes were both missing along with the addresses, the merge was considered valid if the names could be matched. Only three general inquiry accounts were merged.

Based on the above merging steps, the two parts of each merged record should have same street address (may be differently spelled), same city (may be differently spelled) and/or zip code, and

same last name and/or contact information (phone number and/or e-mail), assuming these variables are populated across both datasets.

Table 7-6: Merging Steps for BayREN Single Family HUA Program Qualified Accounts Database to Tracking Data

Merge Steps	# Obs Left	# Account IDs Left	# Closed – Retrofit Complete Left	% Left	% Complete Left
Raw Data	730	730	423	100%	100%
After Address Merge	458	458	189	63%	45%
After Name Merge	406	406	144	56%	34%
After Phone Merge	397	397	135	54%	32%
After E-Mail Merge	385	385	126	53%	30%

Table 7-7: Merging Steps for BayREN Single Family HUA Program General Inquiry Accounts Database to Tracking Data

Merge Steps	# Obs Left	# Account IDs Left	# Closed – Retrofit Complete Left	% Left	% Complete Left
Raw Data	2,438	2,438	53	100%	100%
After Add Merge	2,218	2,218	39	91%	74%
After Name Merge	2,184	2,184	36	90%	68%
After Phone Merge	2,177	2,177	36	89%	68%
After E-Mail Merge	2,174	2,174	36	89%	68%

The "# Obs Left" column lists the number of observations that could not merge to the tracking data after each attempted step, the "# Account IDs Left" column lists the number of unique accounts, and the "# Closed – Retrofit Complete Left" column lists the number of accounts remaining with account phase being "Closed – Retrofit Complete". Note that the # Obs Left always equals to # Account IDs Left. This is because the Account ID is a unique identifier of records in the dataset, and making sure that the two columns are the same can serve as a QC for the merging process.

The "% Left" column lists the percentage of observations that could not merge to the tracking data after each type of merge attempt was made, and the "% Complete Left" is the percentage remaining of the accounts with account phase being "Closed – Retrofit Complete".

Overall, 47% of the qualified accounts (345 out of 730) can be found in the tracking data. This represents 70% of the qualified accounts with account status being "Closed – Retrofit Complete". On the other hand, only 10% of the general inquiry accounts (264 out of 2,438) successfully merged to the tracking data. This represents 32% of the general inquiry accounts with account status being "Closed – Retrofit Complete".

Overall, the BayREN Single Family Home Upgrade Advisor program data are complete and consistent. It is not surprising that a large number of qualified accounts were found in the CPUC tracking data as these customers have shown a greater level of interest in program participation and are eligible to participate in the program. It would be easier to work with if:

1. Its address information is formatted better. The data pulls the street address, the city and the zip code together. It took some effort to separate the three parts.
2. The service account IDs are included in the data.

Note that this task merged BayREN's Single Family Home Upgrade Advisor program records to the whole CPUC tracking database, and it includes all the projects that BayREN's SF HUA customers completed in 2013-2015 through Q2. These projects may or may not be a consequence of the SF HUA program. To determine which records in the tracking data are related to the SF HUA program, more information is needed.

Summaries of the number of SF HUA qualified account IDs and sites and the number of general inquiry account IDs and sites that merged with resource program claims in the CPUC tracking data can be seen in Table 7-8 and Table 7-9. Note that the number of account IDs that merged to resource claims exceeds those described above (345 qualified accounts and 264 general inquiry accounts) because a single customer may be involved in multiple BayREN and/or PG&E claims.

These tables break down the number of HUA qualified and general inquiry account IDs and sites that merged back up to BayREN claims and the number that merged up to PG&E resource claims as a way to determine how much of an effect BayREN's Home Upgrade Advisor service has had in leading customers towards PG&E's Advanced Home Upgrade program versus back to BayREN's Home Upgrade offering. Because the HUA service was designed to lead customers towards home upgrades, either through BayREN or PG&E for the more customized projects, it is not surprising that 266 customers (representing 359 unique sites) of BayREN's HUA qualified accounts merged to PG&E records. It is also notable that 252 account IDs (representing 375 sites) were merged to PG&E resource claims.

Table 7-8: Number of BayREN Single Family HUA Program Qualified Account Observations and Sites Merged to Tracking Data

PA	# of Account IDs Merged	# of Sites Merged
BayREN	104	104
PG&E	266	359
Total	**370**	**463**

Table 7-9: Number of BayREN Single Family HUA Program General Inquiry Account Observations and Sites Merged to Tracking Data

PA	# of Account IDs Merged	# of Sites Merged
BayREN	13	13
PG&E	252	375
Total	**265**	**388**

Merging Multifamily Technical Assistance Data

The customer information for BayREN's Multifamily Technical Assistance (MF TA) program came from an Excel workbook "BayREN Multifamily TA Accomplishments Database.xlsx" and provides a list of customers who have received technical assistance from BayREN, received a site visit, reserved an incentive, and/or been referred out to other programs. The file lists project ID, street address, city, county, service account IDs, contact name, contact phone number, contact e-mail, etc. There are 633 observations and 597 unique project IDs in the dataset. A total of 36 project IDs have two records with different "Received TA" values, which denotes the CPUC cycle in which the site received technical assistance. This field can take the values "2013-2014" or "2015". Since this task was to match all possible projects from the tracking data for each BayREN MF site, the merging was completed at the project ID level, ignoring the CPUC cycle in which the TA was received (5) phone numbers, and (6) contact e-mails.

The number of records and number of customers remaining after each step of merging are listed in Table 7-10 below. After each merging step, the merged records were manually checked to make sure that the site listed in BayREN's records is the same site as the one merged from the tracking data. Note that 161 project IDs merged with records in the CPUC tracking data.

Table 7-10: Merging Steps for BayREN Multifamily TA Program Database to Tracking Data

Merge Steps	# Obs Left	# Unique Project IDs Left	% Obs Left	% Acct Left
RawData	633	597	100%	100%
After Project ID Merge	505	470	80%	79%
After Account ID Merge	496	462	78%	77%
After Address Merge	477	444	75%	74%
After Name Merge	474	441	75%	74%
After Phone Merge	473	440	75%	74%
After E-Mail Merge	469	436	74%	73%

1. Merge by Project ID: BayREN MF TA program data records were merged to the CPUC tracking data by project ID first. A total of 128 observations and 127 unique project IDs

were merged, all to BayREN's tracking records. PG&E's project IDs in the CPUC tracking data were formatted very differently.

2. Merge by Service Account ID: BayREN MF TA program data records were merged to the CPUC tracking data by service account ID. The BayREN MF TA dataset provided both electricity account IDs and gas account IDs, but both ID variables were sometimes confused with the customer account number, which is a completely different identifier. Fortunately, PG&E's service account IDs and their customer account numbers have the same first several digits. Therefore, BayREN MF TA records were merged to the tracking data by the first several digits of the account ID, and then the merged records were checked manually to verify if the two parts had the same addresses. Overall, nine records and eight unique project IDs were merged in this step.
3. Merge by Address: BayREN MF TA program data records were merged to the tracking data by address. BayREN MF TA data also has a project name variable, which sometimes contains address information, though in most cases these were spelled differently than the contents of the address variable for a given record. Therefore, both address and project name were used in the merge. The merge was considered valid if the two parts had the same city and name information. The names from BayREN MF TA records and the tracking data were manually checked to match the names that were differently spelled. Overall, nine observations and eight unique project IDs were merged in this step.
4. Merge by Name: BayREN MF TA program data records were merged to the tracking data by names. The BayREN MF TA data provided two name variables: contact name and account name. The record was merged to the tracking data if either of the variables matched the name variables in the tracking data. Then the merges were checked manually to determine if the addresses were matched. If so, the merge was considered valid. Overall, three observations and three unique project IDs were successfully merged in this step.
5. Merge by Phone Number: BayREN MF TA program data records were merged to the tracking data by phone numbers. Again the merges were checked manually to determine if the addresses matched. Only one observation and one unique project ID merged in this step.
6. Merge by E-Mail Address: BayREN MF TA program data records were merged to the tracking data by e-mail address. Again the merge were checked manually to determine if the addresses matched. Only four observations and four unique project ID were merged in this step.

BayREN Multifamily Technical Assistance program data included a great deal of information, including project IDs and service account IDs, though these are not available for all observations. This greatly aided the merging of the database to the CPUC tracking data. While a substantial

number of variables exist in the database, the information was not very complete. The database would be improved if there was more thorough ID information, address, name, phone number and/or e-mail information. Also, it would be helpful if the zip code were provided. This is because sometimes the city names might be spelled differently, (i.e., "Los Angeles", "LA", "L. A.", etc.). The zip code helps to double check if the matched addresses were indeed the same place.

A summary of the number of BayREN Multifamily TA observations and IDs that merged with resource program claims in CPUC tracking data can be seen in Table 7-11. This table breaks down the number of project IDs and unique sites that merged back up to BayREN claims and the number that merged up to PG&E resource claims as a way to determine how much of an effect the technical assistance provided by BayREN to multifamily customers has had in leading customers towards resource activities offered by the PAs. Based on the findings below, 41 of the 173 project IDs and 79 of the 210 sites were successfully merged to PG&E claims in the tracking data. This shows moderate support for the effect of this non-resource activity on generating energy savings through CA PA energy efficiency programs.

Again, it is important to remember that the number of merged IDs exceeds the number described above (161 IDs) because a single customer may be involved in multiple BayREN and/or PG&E claims.

Table 7-11: Number of BayREN Multifamily TA Program Observations and Sites Merged to Tracking Data

PA	# of IDs Merged	# of Sites Merged
BayREN	132	131
PG&E	41	79
Total	**173**	**210**

7.2 SoCalREN

SoCalREN offers services in three major program areas:

- Single Family Home Upgrade and Multifamily Whole Building Upgrade,
- Financing, and
- Southern California Regional Energy Network Public Agency Program (SoCalREC).

A verification analysis of the non-resource accomplishments is presented below for the Home Upgrade program, the Multifamily Whole Building program, SoCalREN contractor trainings, customer outreach, and SoCalREC[69] among other activities. Next, an evaluability assessment of selected non-resource databases provided by SoCalREN is conducted in which the completeness, quality, applicability of the data is reviewed. A subset of the over 200 files received from SoCalREN of mixed format (i.e., MS Word, MS Excel, and .pdf) were assessed and a selection of datasets that track information about assessments, contractor trainings, and customer support were reviewed in detail for this portion of the assessment. Lastly, merges to CPUC tracking data were carried out using four different non-resource datasets to see if customers who interacted with SoCalREN went on to participate in any California PA energy efficiency resource programs.

7.2.1 Verification of Non-Resource Accomplishments

This section presents the verification of selected non-resource accomplishments of SoCalREN's program areas as listed in:

- SoCalREN's 2015 Energy Efficiency Annual Report;
- ODC's Value and Effectiveness Study; or
- SoCalREN's response to the data request submitted by the evaluation team that was used to acquire data to support this impact assessment.

[69] The non-resource accomplishments of the Financing program area are taken from SoCalREN's 2015 Energy Efficiency Annual Report and are presented in Appendix B. These accomplishments, like those of RENs' Financing offerings, have not been verified.

SoCalREN Upgrade Component

SoCalREN's set of programs includes the following pilots that were carried out during the 2013-14 program years:

- Home Upgrade,
- Multifamily Program,
- Local Marketing and Outreach,
- Contractor Outreach and Training,
- Green Building Labeling, and
- Low Income Single Family.

Non-resource accomplishments and a verification of them are presented in the following tables for each of these pilot program components launched.

Home Upgrade

In the case of the Home Upgrade program, the evaluation team requested data to attempt to verify one resource accomplishment for the Single Family Home Upgrade program taken from ODC's Value and Effectiveness study. This accomplishment, presented in Table 7-12, states that through its Home Upgrade program, 188 homes or buildings were treated and 506 measures were rebated. In this context, SoCalREN defines "treated" as the number of projects that are in the pipeline. Of these 188 treated homes and buildings, the evaluation team was able to verify 120 completed projects that were rebated through the program using CPUC tracking data.. SoCalREN did note in its response to the evaluation team's data request that 188 was the number of projects active at the time of reporting and that since then, projects have been cancelled or deactivated. This explains why all 188 treated projects were not found in the CPUC tracking data.

SoCalREN also provided a Home Upgrade accomplishment for Q1 and Q2 of 2015, which states that it had 211 active projects representing 1,896 measures. CPUC tracking data shows 122 completed projects in 2015 through Q2. The difference in the number of projects rebated could stem from the fact that projects that are currently active does not mean they have been completed, which is what is shown in the CPUC tracking data.

Table 7-12: SoCalREN Home Upgrade Accomplishment from ODC's Value and Effectiveness Study

Selected SoCalREN Home Upgrade Non-Resource Accomplishments for 2013-14 from Annual Report and ODC Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
ODC report states that at the end of December 2014, 188 homes and buildings treated and 506 measures were incented or rebated	Data from SoCalREN[1] and CPUC tracking data both show 120 completed projects/Claim IDs for 2013-14. The number of measures incented was not verified.	Data from SoCalREN[1] shows 211 buildings (projects) and 1,896 measures that have been submitted and are currently active in 2015 through Q2. CPUC tracking data show 122 completed projects/Claim IDs in 2015 through Q2. The number of measures incented was not tabulated.

1 SoCaREN provided data in an Excel file called "SoCalREN Home Upgrade.xlsx" in response to a data request submitted for this impact assessment.

Multifamily Program

Next, non-resource accomplishments for SoCalREN's Multifamily program taken from its Annual Report are presented in Table 7-13. The evaluation team was able to verify the number of professional raters that were trained (row 1) and could verify the number of buildings enrolled in the program (row 2). Additionally, data provided by SoCalREN showed that a greater number of assessment incentives were paid out during 2013-14 than their non-resource accomplishment stated (row 3).

Non-resource accomplishments were also provided for the Multifamily program for 2015 through Q2 or were taken from CPUC tracking data. As shown, SoCalREN trained an additional 10 individuals through its Multifamily Existing Building training (row 1) and paid out rebates for seven projects through the program, as the CPUC tracking database shows in row 2 (note that SoCalREN data only show four projects rebated in 2015 through Q2).

Table 7-13: SoCalREN Multifamily Retrofit Accomplishments from 2015 Annual Report and ODC's Value and Effectiveness Study

Selected SoCalREN Multifamily Non-Resource Accomplishments for 2013-14 from Annual Report and ODC Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
The Multifamily program successfully delivered Multifamily Existing Building Training to 43 professional raters (representing 30 companies).	Data provided by SoCalREN[1] verified the training of 43 raters representing 32 companies.	Data provided by SoCalREN verified 10 attendees to trainings held in early 2015.
The ODC report provides the number of homes or buildings enrolled (26) as well as the number of units incented or rebated (384) through the Multifamily Retrofits program as of December 2014.	CPUC tracking data shows two ClaimIDs in 2013-14in a follow up conversation with SoCalREN, it was stated that 26 homes/buildings enrolled but had not completed the process. Also, it was stated that the number of units in the two buildings that completed retrofits is 384. The evaluation team is unable to verify the quantity of units in the two buildings that completed retrofits.	CPUC tracking data shows seven ClaimIDs for 2015 through Q2. However, data provided by SoCalREN[1] shows four projects that participated in the multifamily retrofits program. There are 457 units in these buildings.
The ODC report notes that through the Multifamily program, 16 projects received a SoCalREN assessment incentive during the 2013-2014 program years comprising 2,037 units as part of the assessment activity.	SoCalREN provided a dataset[1] that showed 16 properties that received assessments in the 2013-14 program years. .	Data provided by SoCalREN listed 8 properties (with a total of 976 units) that received assessments in 2015.

1 A database of Multifamily Existing Building Training attendees was provided by SoCalREN in an Excel file entitled, "SoCalREN Multifamily.xlsx." This file includes attendees of trainings that occurred from 2013 through March 2015. It also includes information about buildings and units that received multifamily program assessments that occurred in 2013-14 and about buildings and units that participated in the multifamily program in 2015.

Local Marketing and Outreach

A number of non-resource accomplishments are presented in Table 7-14 for SoCalREN's Local Marketing and Outreach service area and most of these could be verified using databases provided by SoCalREN. Based on the data provided, the number of homeowner workshops, community events, and individuals assisted through its Home Upgrade Assistance hotline were verified (rows 1 through 3). SoCalREN claimed to have distributed 172 Advanced Home Upgrade coupons, but it did not provide data to verify this. The data it provided only listed the number of paid coupons, which totals 1 in 2014 and none in 2013 (row 4).

In addition to the 2013-14 non-resource accomplishments, SoCalREN provided local marketing and outreach accomplishments that occurred in 2015 through Q2. As shown in the last column of Table 7-14, SoCalREN held 10 workshops to educate homeowners about Home Upgrade programs (row 1), it attended 33 community events to promote its financing and Home Upgrade

services (row 2), it assisted 71 callers through the Home Upgrade Advisor program hotline (row 3), and it recorded the distribution of three Advanced Home Upgrade Coupons (row 4).

Table 7-14: SoCalREN Local Marketing and Outreach Accomplishments from 2015 Annual Report and ODC's Value and Effectiveness Study

SoCalREN Local Marketing and Outreach Non-Resource Accomplishments for 2013-14 from Annual Report and ODC Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
SoCalREN organized nine homeowner workshops to educate homeowners about building science and Home Upgrade programs, and promote participating contractors. About 150 homeowners attended the workshops.	SoCalREN provided a database[1] that verifies nine homeowner workshops were conducted in 2014. A total of 150 attendees were listed.	SoCalREN verified that in 2015 to date.[1] Ten workshops were held to educate homeowners. A total of 65 attendees were listed.
SoCalREN participated in 22 homeowner-facing community events across its service area, promoting financing and single family rebate offerings. ODC's report presents updated data to show that 27 community events were held and a total of 2,542 direct interactions occurred with individuals at events through the 2013-2014 program years	Data provided by SoCalREN[1] verifies that it was present at 27 community events where it hosted a booth. A count of direct interactions by event was provided and totaled 2,779.	Data provided by SoCalREN[1] verified that it was present at 33 community events in 2015 through Q2. A count of direct interactions by event was provided and totaled 4,077.
ODC's draft report states that 476 residents were assisted through the Home Upgrade Advisor hotline during 2013-2014., and that 172 Advanced Home Upgrade Energy Coupons were issued.	Data provided by SoCalREN[1] shows that 476 residents were assisted through the HUA hotline in 2013-14. Names of callers and other identifying information were not tracked until after 2/11/2014.	Data provided by SoCalREN shows 71 residents were assisted through the HUA hotline in 2015 through Q2. Names of callers were recorded.
ODC's draft report states that SoCalREN distributed 172 Advanced Home Upgrade Energy Coupons to individuals.	SoCalREN data[1] only verifies that coupons were paid to one recipient in 2014. Data do not show how many coupons were distributed	SoCalREN data[1] only verifies the payment of coupons to three recipients in 2015 through Q2 and does not show how many were distributed.

1 SoCalREN provided an Excel file entitled, "SoCalREN_Local Marketing and Outreach.xlsx" which lists 19 different workshops and their locations. Nine occurred in 2014 and 10 occurred in 2015. The same file provides a list of 27 community events at which SoCalREN hosted a booth to provide information to homeowners and contractors.

Contractor Outreach and Training

A variety of non-resource accomplishments related to Contractor Outreach and Training taken from SoCalREN's Annual Report and from ODC's Value and Effectiveness study are presented in Table 7-15 below. Databases provided by SoCalREN were able to verify or show larger numbers of trainings and workshops than were stated in their non-resource accomplishments (rows 1-4) for all except one related to the number of contractors who launched co-op marketing projects (row 5). The accomplishments for 2015 through Q2 were also provided and verified using SoCalREN's data and these show continued progress in educating and informing contractors about how they can be involved in implementing its programs.

Table 7-15: SoCalREN Contractor Outreach and Training Accomplishments from 2015 Annual Report and ODC's Value and Effectiveness Study

SoCalREN Contractor Outreach and Training Non-Resource Accomplishments for 2013-14 from Annual Report and ODC Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
The Annual Report notes that SoCalREN began to maintain its own list of contractors in an effort to rebuild a contractor base for its Home Upgrade and Contractor Outreach and Training programs. There were 71 contractors on the list by the end of 2014 (page 4).	Data provided by SoCalREN[1] show 79 records of trained contractors added in 2013-14.	The dataset provided by SoCalREN verifies an additional 28 contractors on its list that were added in 2015 to date.
SoCalREN hosted six Contractor Recruiting workshops to encourage contractors to participate in Home Upgrade.	SoCalREN provided a database[2] of contractor recruiting workshops and a total of six were verified for 2014.	An additional two workshops were held in 2015 by end of Q2.
ODC's report stated that SoCalREN also provided HVAC Contractor Training, which took two forms: 93 one-on-one trainings with single companies and six event trainings with multiple companies with a total of 206 attendees.	Using data provided by SoCalREN[2], a total of 93 one-on-one trainings and six event trainings were verified. Number of attendees listed was 198.	In 2015, SoCalREN provided 61 one-on-one trainings with 116 attendees[2]. The database also shows 17 attendees at contractor workshops (Home Performance Sales Training in May and June).
ODC's report notes that 473 contractors were assisted via Home Upgrade Advisor during the 2013-2014 program years.	Data verifies 476 contractors assisted through HUA[2], though detailed tracking did not start until 2/11/2014. A total of 321 calls were listed as a total number and no details for these were listed.	Data show 35 contractors assisted through HUA in 2015 through Q2.[2]
ODC's report noted that a total of 48 contractors participated in co-op marketing. It also states that a total of 201 co-op marketing projects were incented.	Data from SoCalREN show[2] 40 contractors who participated in co-op marketing projects in 2014 (none in 2013). According to SoCalREN, 8 additional contractors were inducted into the program using ARRA funds. A total of 118 projects were incented as verified by SoCalREN's data. An additional 83 co-op marketing projects were incented using ARRA funds.	Data show an additional 25 contractors who participated in co-op marketing in 2015 through Q2[2]. A total of 77 projects were incented in 2015.

1 SoCalREN provided an Excel file entitled, "SoCalREN_Local Marketing and Outreach.xlsx" which includes the list of contractors maintained by SoCalREN that can provide Home Upgrade services.

2 An Excel file from SoCalREN entitled "SoCalREN_Contractor Outreach and Training.xlsx" includes a list of its contractor recruiting workshops, HVAC contractor trainings, contractors who received assistance through Home Upgrade Advisor, and contractors who participated in and were incented for co-op marketing projects.

Green Building Labeling

SoCalREN has implemented a Green Building Labeling program through which it encourages homebuyers to pursue energy efficiency as part of their home purchase at the time of purchase.

As the non-resource accomplishments listed in Table 7-16 show, the training has reached home appraisers and realtors through certification training courses. The data provided by SoCalREN present the number of attendees at the different trainings held through the program, but the non-resource accomplishments speak to the number of attendees who become certified through the trainings. These accomplishments are therefore not verified based on the databases provided by SoCalREN.

Additional accomplishments for 2015 through Q2 were provided in the databases and are presented in the last column of Table 7-16. These show that the Green Building Labeling trainings continue to be held and are well attended.

Table 7-16: SoCalREN Green Building Labeling Accomplishments from 2015 Annual Report

SoCalREN Green Building Labeling Non-Resource Accomplishments for 2013-14 from Annual Report and ODC Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
According to the Annual Report, the Green Building Labeling program held two Home Appraiser trainings resulting in the certification of 23 appraisers. Training will continue in 2015.	SoCalREN provided data[1] to show that there were a total of 44 individuals who attended two Home Appraiser trainings in 2014 (no trainings were held in 2013). There is no indication which of these 44 attendees became certified, as it requires passing an examination.	Data from SoCalREN shows that 55 individuals attended Home Appraiser trainings held in 2015. There is no indication which trainees were certified.
ODC's draft report states that 516 realtors were certified through Certified Green Real Estate Professional and National Association of Realtors (NAR) Green Designation trainings. The Annual Report supports this claim as it notes that a total of 11 NAR trainings were carried out resulting in the certification of 500 realtors during the 2013-2014 program years.	Data provided by SoCalREN[1] shows that 1,537 trainees attended Certified Green Real Estate Professional and National Association of Realtors trainings in 2013-2014.	The SoCalREN data[1] also show 338 individuals attended NAR trainings in 2015 through end of May 2015.

1 An Excel file entitled, "SoCalREN Green Real Estate.xlsx" lists attendees of Home Appraiser trainings held by SoCalREN and indicates dates during which the trainings were attended from 2014 through Q2 of 2015. The file also includes a database of individuals who attended Certified Green Real Estate Professional and National Association of Realtors (NAR) Green Designation trainings from 2013 through May of 2015.

Low Income Single Family

The Low Income Single Family program is designed to connect participants of the Community Development Commission of the County of Los Angeles to Home Upgrade programs, particularly those who fall in the lower income brackets. Non-resource accomplishments related to the Low Income Single Family service area are taken from SoCalREN's Annual Report and are presented in Table 7-17. SoCalREN provided clarifications for the first two

accomplishments in the table since they were not accurate as initially written and included in the Annual Report. These clarifications are included in column 2 of the table below.

Table 7-17: SoCalREN Single Family Low Income Accomplishments from 2015 Annual Report

SoCalREN SF Low Income Non-Resource Accomplishments for 2013-14 from Annual Report and ODC Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
SoCalREN noted in their Annual Report that it provided 25 contractors incentives to complete a Building Performance Institute (BPI) Building Analyst certification at five marketing workshops held in Southern California in conjunction with the Community Development Block Grant Community meetings held in the fall of 2014. Five contractors were reimbursed for the cost of BPI Certification and completed the training.	In its response to the contractor team's data request SoCalREN noted that contractors were offered a limited time opportunity to receive an incentive for BPI training and only five completed the requirements for reimbursement. Additionally, BPI trainings were coordinated individually by contractors. They were not offered at "five marketing workshops"; rather, contractors were initially notified about this opportunity at said workshops. Data provided by SoCalREN[1] show a list of 28 contractor companies who were informed of the BPI trainings.	The SoCalREN data show[1] that one contractor company completed the requirements for reimbursement for completion of the BPI Building Analyst certification in 2015.
SoCalREN also sent several thousand flyers to low-income residents to encourage upgrades in low-income homes. A total of 226 applications were sent along with flyers to eligible applicants for each District.	SoCalREN clarified this achievement in its response to the data request sent. It noted that 226 was the number of active applications at the time of Annual Reporting. Applications that were active in December 2014 have since been cancelled.	No accomplishment provided.
The original non-resource accomplishment taken from the Annual Report stated the following: SoCalREN also sent several thousand flyers to low-income residents to encourage upgrades in low-income homes. A total of 226 applications were sent along with flyers to eligible applicants for each District.	SoCalREN provided a revision to their non-resource accomplishment and stated the following: Counting inactive applicants, a total of 451 homeowners were educated on Home Upgrade in 2014 through the Low Income program. Every application is sent Home Upgrade program information as well as referred to IOU low income programs such as Energy Savings Assistance Program and California Alternate Rates for Energy. Contact information is only available for those who submitted an application. The database provided by SoCalREN shows that of the customers who submitted program applications, 452 had project start dates in 2014 (this does not verify that these applicants have been educated about the Home Upgrade program). Of these, 72 have active projects.	A total of 453 applicants have project start dates in 2015 and of these, 195 have active projects. The data for 2015 goes through Q2. Again, the data provided do not clarify whether these applicants have been educated about the Home Upgrade program.

1 An Excel file entitled, "SoCalREN Low Income.xlsx" provides a list of contractor companies that were informed of BPI trainings and those who completed the requirements for BPI certification. The data also include names and contact information of low income program applicants and project start dates and status.

Financing

Financing initiatives provided by SoCalREN include the following during the 2013-14 program years:

- Residential Loan Loss Reserve, and
- Nonresidential Property Assessed Clean Energy (PACE) Financing.

No verification of non-resource accomplishments, merging of datasets to CPUC tracking data, or evaluability of non-resource program data is being conducted for these financing options. Appendix B provides selected non-resource accomplishments of SoCalREN's financing initiatives as presented in its Annual Report and provided directly to the evaluation team in response to the data request that was submitted in support of this impact assessment.

Southern California Regional Energy Network Public Agency Program (SoCalREC)

Services are offered to local government and other public agencies through SoCalREC so that they may be able to more cost effectively make energy efficiency upgrades and improve their energy management practices. The areas in which SoCalREC offers services are as follows:

- Aggregated Regional Procurement & Integrated Comprehensive Whole Building Retrofits (Project Delivery);
- Climate Action Plan/Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC);
- Water Energy Nexus;
- Regional Energy Project Tracking and Permitting System (CEEPMS);
- Marketing, Outreach, Education, and Training; and
- Workforce Development.

Databases were requested by SoCalREN to aid in the verification of selected non-resource accomplishments achieved by the Southern California Regional Energy Network Public Agency Program (SoCalREC). Most of these accomplishments were taken from ODC's Value and Effectiveness Study and sent to SoCalREN so they could provide the evaluation team with the appropriate datasets for the verification activity. In response, SoCalREN provided a plethora of information and datasets and after review of the materials, the evaluation team was able to use some of them to verify a subset of the non-resource accomplishments. Below is a presentation of selected non-resource accomplishments for the services offered through SoCalREC and results of the verification analysis, when data were available from SoCalREN.

Aggregated Regional Procurement & Integrated Comprehensive Whole Building Retrofits (Project Delivery)

As described in SoCalREN's 2015 Annual Report, the Project Delivery service offered by SoCalREC supports public agencies in their strategies to carry out integrated demand side management of energy use. Table 7-18 presents the non-resource accomplishments related to project delivery and the data provided by SoCalREN, was able to closely verify one accomplishment (row 2) and report a higher quantity for the other two (rows 1 and 3). No additional accomplishments were provided for 2015 through Q2 for the Project Delivery service area.

Table 7-18: SoCalREN Project Delivery Service Non-Resource Accomplishment from ODC's Value and Effectiveness Study

SoCalREN Project Delivery Non-Resource Accomplishments for 2013-14 from ODC's Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
Five completed projects	Data provided by SoCalREN[1] verifies five completed projects	Data provided by SoCalREN[2] shows a list of 10 project records carried out in 2015 through Q2.
Fifty-six public agencies that have adopted the Enterprise Energy Management Information System (EEMIS)	SoCalREN provided a summary file[1] showing 54 agencies included and using EEMIS	No additional accomplishment provided
Approximately 150 facilities monitored by EEMIS	Data were provided by SoCalREN[2] to show a list of facilities and locations that are monitored by EEMIS. There is no flag to indicate which line items are facilities; however based on the summary file, it appears that 253 facilities and locations are monitored.	No additional accomplishment provided

1 SoCalREN provided ODC an Excel file entitled, "Public Agency Data.xlsx" that lists in progress and completed projects completed or being completed by public agencies through SoCalREN.

2 SoCalREN provided an Excel file entitled, "Tracking Database Excerpts.xlsx" that provided a list of projects carried out in 2015.

3 SoCalREN provided an Excel file entitled, "EEMIS Summary.xlsx" that provided a list of public agencies that have adopted the EEMIS.

Climate Action Plan/Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC)

The Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) coordinates regional climate action and sustainability strategies. SoCalREN is using the LARC and program funds to develop a countywide climate action and sustainability plan. To support this effort, SoCalREN, contracting with UCLA, has developed an Interactive Energy Atlas, which displays energy consumption and similar data on the neighborhood, city, or other regional

level.[70] As stated in ODC's report, LARC held 2 Energy Altas workshops in 2014. Attendance lists and supporting documents for these workshops were provided by SoCalREN in response to the evaluation team's data request. An additional workshop was held in 2015 and an attendance list for this workshop was also provided (see Table 7-19).

Table 7-19: SoCalREN Climate Action Plan/LARC Non-Resource Accomplishment from ODC's Value and Effectiveness Study

SoCalREN Climate Action Plan/LARC Non-Resource Accomplishments for 2013-14 from ODC's Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
Delivery of two Energy Atlas workshops	SoCalREN provided attendance records[1] to verify that two Energy Atlas workshops were held in 2014.	Data from SoCalREN[1] verifies that one additional Energy Atlas workshop was held in

1 Attendance rosters Energy Atlas workshops held in June and September 2014 were provided by SoCalREN. An attendance list was also provided for a workshop held in July 2015.

Water Energy Nexus

The goal of the Water Energy Nexus pilot was to increase awareness about the interconnectedness of water and energy, and educate the public about how saving water can also lead to energy savings. The non-resource accomplishment below in Table 7-20 was taken from ODC's Value and Effectiveness Study and was verified by the evaluation team using reports provided in response to the data request submitted in support of this evaluation. While the evaluation team could verify the 2013-14 non-resource accomplishment associated with the Water Energy Nexus pilot, no additional accomplishments for this pilot project were provided. According to ODC's study, this program was halted due to lack of interest from the IOUs and water agencies.

70 Description of Climate Action Plan/Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC) is taken from ODC's Value and Effectiveness Study, p. 41.

Table 7-20: SoCalREN Water Energy Nexus Non-Resource Accomplishment from ODC's Value and Effectiveness Study

SoCalREN Water Energy Nexus Non-Resource Accomplishments for 2013-14 from ODC's Study	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
Provided 10 facility-wide energy and water audits to public agencies	SoCalREN provided audit reports[1] for 10 schools in two school districts to verify this accomplishment.	No accomplishment provided.

1 Audit reports for 10 schools were provided by SoCalREN in response to the data request submitted by the evaluation team in support of this assessment. The reports are entitled, "Water Audit Report Provided for Conejo Valley Unified School District," May 2015 and "Water Audit Report Provided for Ventura Unified School District," April 2015. Both were provided by SoCalREN through its auditor CLEAResult.

Regional Energy Project Tracking and Permitting System (CEEPMS)

The evaluation team did not request databases to verify the Regional Energy Project Tracking and Permitting System (CEEPMS) non-resource accomplishments listed in the SoCalREN 2015 Annual Report or in ODC's Value and Effectiveness Study. Because the non-resource accomplishments for this service area of SoCalREC have not been verified, a listing of selected accomplishments is presented below (the non-resource accomplishments listed below in italicized text are taken directly from SoCalREN's Annual Report).

- *Completed the CEEPMS prototype for the cities of Santa Monica and Brea.*
- *Produced documentation of lessons learned, training methods for replication and expansion into other jurisdictions, based on the Santa Monica and Brea benchmark prototype.*
- *Demonstrated functionality tests of the original Santa Monica CEEPMS software to serve as a benchmark for the permit-to-rebate matching logic, as well as for database imports of programs and individual incentives.*
- *Created a Product Development Plan for enhanced CEEPMS 2.0 which overcomes technical issues identified in CEEPMS prototype 1.0, and design improvement features.*

Marketing, Outreach, Education, and Training

The evaluation team did not request databases to verify the Marketing, Outreach, Education, and Training non-resource accomplishments listed in the SoCalREN 2015 Annual Report or in ODC's Value and Effectiveness Study. Because the non-resource accomplishments for this service area of SoCalREC have not been verified, a listing of selected accomplishments is presented below (the non-resource accomplishments listed below in italicized text are taken directly from SoCalREN's Annual Report).

- *Prepared, coordinated and implemented a comprehensive communications plan to promote the SoCalREN.*
- *Established and launched website for the SoCalREN and its subprograms.*
- *Set up toll-free number and e-mail inquiry system to respond to program interest from public agencies and general public.*
- *Coordinated with IOU marketing departments on co-branded materials.*
- *Provided information to local governments and other public agencies (e.g., e-mail announcements, flyers, participation at expos, trade shows, etc.) to lead interested parties to website.*
- *Created monthly e-newsletter and distributed regular e-blasts related to the SoCalREN and its subprograms promoting activities and resources while driving traffic back to the website.*
- *Created and distributed SoCalREN Technical Report including metrics collected across all subprograms.*
- *Attended conferences and events to promote the SoCalREC program and engage potential agencies.*
- *Designed and held workshops for local government and public agency facilities managers highlighting best practices while educating local governments about success stories in which energy and budget savings resulted from EE retrofits.*
- *Held joint SCE/SoCalGas/SoCalREC program information sessions for participating jurisdictions.*
- *Educated agencies on the SoCalREC Turnkey Project Delivery model.*

Workforce Development

The evaluation team requested information to verify the non-resource accomplishments related to the SoCalREC Workforce Development service area. Information to support some of the accomplishments listed below was provided by SoCalREN (an * next to the accomplishments below indicates the cases where the accomplishment could be verified based on the information sent). The non-resource accomplishments provided by ODC in its Value and Effectiveness Study and listed in SoCalREN's Annual Report are reproduced here (the non-resource accomplishments listed below in italicized text are taken directly from SoCalREN's Annual Report).

- *Identify need/demand for labor in nonresidential building sectors such as Municipal, University, School, and Hospital (MUSH)*
- *Determine the jobs and investment required to achieve Zero Net Energy in MUSH sector*

- *Connect training and pre-apprenticeship resources with potential labor pools*
- *Establish link to existing registered apprenticeship programs*
- *Expand the competitive capacity of diverse companies to compete for and perform energy efficiency projects in the MUSH sector*
- E-Contractor Academy created*
- 110 small, minority, and disabled, contractors who have graduated from E-Contractor Academy*
- 7 graduates who have become pre-qualified to perform work for L.A. County*
- 3 LA County contracts awarded to graduates*
- 2 graduates assisted with prequalification for LA Unified School District projects*

7.2.2 Evaluability of Databases

SoCalREN provided numerous Excel files that contain the data used to verify the non-resource accomplishments presented in the above subsection. Of these files, a total of 4 were assessed for quality, completeness, and consistency of:

- Contact information (names, addresses, and phone numbers),
- Merging variables (account numbers and customer IDs), and
- Details about recommendations, referrals, and/or attendance at workshops or events.

A subset of the total number of databases provided was selected because not all of the files would be useful in an evaluation of impacts that stem from non-resource activities. The four files that were evaluated are as follows with descriptions of their contents:

- *SoCalREN Multifamily.xlsx, Tab name: Q3 Assessment Incentives*, a database of 24 multifamily customers who have had an energy assessment and received an assessment incentive from SoCalREN.
  - The data fields included in this table are: primary project contact, full name, phone, e-mail, name of building ownership entity, electric utility service account number, gas utility service account number, project name, number of units, address, audit date (Date AHSRAE Level II audit performed by Participating Rater), description of audit, assessment incentive recipient (applicant or rater), and incentive paid date.
  - The database contains electric and gas service account IDs, therefore merges of data to CIS, billing, and CPUC tracking data can be carried out.

  - Fields are very well populated with no missing data in any of the fields. The descriptions of audits field describes in detail the recommendations provided to the customer from the audit.
  - Overall, the key variables necessary for contacting customers in the future and merging to CIS and IOU tracking data are being collected and are well populated. Furthermore, information on recommendations that may be developed as part of the assessments are also being tracked.

- *SoCalREN Low Income.xlsx, Tab name: Q2 Low Income Projects*, a database containing 903 applicants for Home Improvement Program (low income) projects in 2014-2015.
  - Fields of data include: applicant (name), project start date, address, flag to indicate if the project is active, Home Upgrade project name (scarcely populated), and a flag to indicate whether or not the applicant was referred to a utility low income program.
  - Of the applicants 452 had project start dates in 2014. Of these, 72 have active projects. The remaining 453 have project start dates in 2015 and of these, 195 have active projects.
  - There are no customer account IDs or service account IDs, thus making this database difficult to use for merging with CIS, billing, or CPUC tracking data.
  - Almost all fields are completely filled out and use consistent format. The only field that is scarcely populated is the Home Upgrade project name field.
  - Overall, many of the key variables necessary for contacting customers in the future are not being collected, such a phone numbers, e-mails and sometimes names. Service account numbers are not being collected that would allow for a direct merge to CIS and IOU tracking data. Finally, no information is provided on the details of any actions that might have been recommended to or taken by the customer.

- *SoCalREN_Local Marketing and Outreach.xlsx, Tab name: Q1 Contractor Listing*, a database maintained by SoCalREN of trained contractors with 107 records (79 contractors entered in 2013-14 and 28 entered in 2015 through July).
  - Salient fields included in this table are as follows: account (contractor company) name, license number, program name, shipping address, contact name, e-mail, phone, website, a 0/1 flag to indicate whether QC mentoring has been completed or contractor has been granted exempt status, contractor status (active & registered; active & not registered; inactive and registered; inactive & not registered; contractor lead; dead lead; awaiting enrollment paperwork), TEN-Only PC (a 0/1 flag to denote that the participating contractor is active and registered with The Energy Network only), a 0/1 flag to indicate contractor paperwork agreement submitted, expiration dates of various liabilities, and date record was created.
  - Fields are extremely well populated. For the 79 contractors who were entered into the database, there are no missing records for the variables listed above.

  - The ability to merge this database to CIS, billing data, or CPUC tracking data is not applicable as these data could be used to implement a trade ally survey and not necessarily would it be used to directly verify energy efficiency savings from resource programs.
  - Overall, the key variables necessary for contacting contractors in the future are being collected and are well populated.

- *SoCalREN_Local Marketing and Outreach.xlsx, Tab name: Q4 Resident Calls*, a database showing 476 residents who were assisted by phone through SoCalREN.
  - The fields of data available for these residents are as follows: date/time of call, caller's first name, caller's last name, phone, e-mail, electric service provider, gas service provider, county, caller type (the call center identifies the caller type - Resident, Contractor/Auditor/Supplier, Government Official, Commercial Property Owner, Financial Institution, Utility, Public Agency, Trade Union, Other), and call category (the call center identifies the call category - 1099, Application/Rebate Status, Co-op Marketing, Complaint, Cool Comfort Financing, Follow-up to Previous Call, General Inquiry about Home Upgrade or Multifamily Whole Building Upgrade, Home Energy Loans, Home Upgrade, How to Become a Participating Contractor, IOU Rebates/Incentives, LA County PACE, Multifamily, Solar, Upgrade Coupons, Workshops/Events/Educational Opportunities, Other).
  - The database contains 228 individual records from 2/11/2014 through 6/29/2015. A single line item represents the 318 callers who were assisted before 2/11/2014 as detailed records for each of these calls were not recorded before this date. Based on the data provided, a total 476 residents were assisted. Tracking of individual calls began after 2/11/2014. Prior to this, a total number of calls was listed for the period between 2013 and 2/11/2014.
  - There are no customer account IDs or service account IDs, which would make it difficult to merge this dataset to CIS, billing, or CPUC tracking data.
  - The database is moderately well populated. For the records covering calls that were logged in 2014 (beginning on 2/11), there are 39 missing phone numbers, 25 missing first names, 49 missing last names, 128 missing e-mails, 49 missing electric providers, and 50 missing gas providers. Each record does contain detailed notes about the purpose of the call and this information could be used to conduct further inquiry about the usefulness of the information provided on the call in their decisions to participate in energy efficiency or other related programs.
  - Overall, the key variables necessary for contacting customers in the future are being collected and are moderately well populated. Service account numbers are not being collected that would allow for a direct merge to CIS and IOU tracking data. Furthermore, detailed notes about the purpose of the call are being gathered.

Overall, the databases provided by SoCalREN are in moderate to good shape. SoCalREN did provide databases that were relatively well populated, which would allow customers and contractors to be contacted. Additionally, the data contained in the tables were consistent. However, for some key databases some improvements could be made with respect to gathering contact information. Most of the reviewed datasets do not provide variables that would be useful for merging to other datasets for impact evaluation purposes. One positive attribute of these datasets is that details of assessments and resident calls were recorded. This is useful for evaluation work, as the data could be used to follow up with customers to determine if their interactions with SoCalREN led them to participate in energy efficiency resource programs.

7.2.3 Results of CPUC Tracking Data Merges

Attempts to merge four different datasets to CPUC tracking data were made with varying degrees of success. The selection of SoCalREN databases was made based on the activity it tracked and the suitability of the data's ability to merge. The first dataset selected includes 24 records of customers who received incentives for conducting an assessment through SoCalREN's Multifamily program area. The second is a SoCalREN's database of 428 customers who participated in SoCalREN's Home Upgrade program. Note that this dataset does not represent a non-resource activity, but a merge of data was attempted to see how well the CPUC tracking data could be matched to records kept by SoCalREN. The third and fourth datasets are smaller. The third is a database of 228 residents that were assisted through the Home Upgrade Advisor hotline during 2013-2014. The last dataset includes a list of 4 recipients of Advanced Home Energy Upgrade Coupons.

Merging SoCalREN Multifamily Assessment Records

The customer information for recipients of assessment incentives conducted through SoCalREN's Multifamily program came from an Excel workbook provided by SoCalREN called "SoCalREN Multifamily.xlsx". The workbook listed project name, customer name, building owner's name, electricity and gas service account ID, customer phone number, service address, city and zip code, contact e-mail address. There are 24 observations in the dataset, uniquely identified by project name.

The dataset was merged to the tracking dataset by (1) electricity and gas service account ID, (2) addresses, (3) names, (4) phone numbers, and (5) e-mail addresses. The number of unique project names remaining after each merge step are listed in Table 7-21 below. After each step, the merged records were manually checked to make sure that the site listed in SoCalREN's records is the same site as the one merged from the tracking data.

Table 7-21: Merging Steps of SoCalREN Multifamily Program Database to Tracking Data

Merging Steps	# Obs Left	# Project Names Left	% Left
RawData	24	24	100%
After Account Merge	14	14	58%
After Address Merge	14	14	58%
After Name Merge	14	14	58%
After Phone Merge	14	14	58%
After E-Mail Merge	14	14	58%

1. Merge by Service Account ID: SoCalREN MF Assessment program records were merged to the tracking data by service account ID. SoCalREN's dataset provided electric service account ID and gas service account IDs. The information was used first to merge to the tracking data. Overall, 10 records were merged in this step.
2. Merge by Address: SoCalREN MF program records were merged to the tracking data by address. The merge was considered valid if the two fields had the same city/zip and name information. The names from SoCalREN MF Assessment data and the CPUC tracking data were manually checked to match the names that were differently spelled. No additional records were merged in this step.
3. Merge by Name: SoCalREN MF Assessment program records were merged to the tracking data by name. The merges were then checked manually to determine if the addresses matched. No additional projects merged in this step.
4. Merge by Phone Number: SoCalREN MF Assessment program records were merged to the tracking data by phone number. Again the merge were checked manually to determine if the addresses were matched. No extra observations were merged in this step; all were covered in the earlier steps.

Based on the results of this merge, less than half of the customers who received assessment incentives through the multifamily program could be tracked back to the CPUC tracking data (a total of 10 out of 24). This provides moderate support that some customers do go on to participate in resource programs offered by the California PAs.

A summary of the number of SoCalREN Multifamily project names and unique sites that merged with resource program claims in CPUC tracking data can be seen in Table 7-22. These tables break down the project names and unique sites that merged back up to SoCalREN claims and the number that merged up to SCE and SCG resource claims as a way to determine if participation in SoCalREN's multifamily program (albeit a resource program) has led these customers towards resource activities offered by IOUs. The number of project names that merged with SoCalREN claims is nine and is only five for SCE and 1 for SCG. What is more interesting is that while a

total of nine sites merged back up to SoCalREN claims, a total of 30 unique sites merged to SCE and SCG. This shows support for the effect of this program activity on generating energy savings through other CA PA energy efficiency programs.

Note that the number of merged project names in Table 7-22 exceeds the number of project names that merged above. This could be because a single customer may be involved in multiple SoCalREN, SCE, and/or SCG claims.

Table 7-22: Number of SoCalREN Multifamily Program Observations and Sites Merged to Tracking Data

PA	# of Project Names Merged	# of Sites Merged
SoCalREN	9	9
SCE	5	17
SCG	1	13
Total	**15**	**39**

Merging SoCalREN Home Upgrade Assistance Project Records

The information for the customers who participated in SoCalREN Home Upgrade Advisor program came from an Excel workbook provided by SoCalREN called "SoCalREN Home Upgrade.xlsx". As stated earlier, this database tracks participants of a resource program offered by SoCalREN and therefore a reasonably successful merging of this dataset to the CPUC tracking data was expected. The purpose of the other merges to CPUC tracking data was to see if customers who engage in non-resource program activities conducted by the RENs and CCA were found in the CPUC tracking data as participants of resource programs.

The workbook listed:

1) Project name,
2) Applicant information, including application code, applicant name, application date,
3) Utility account IDs, including electricity service account number (from SCE), SCG account name, and gas service account number (from SCG),
4) Home owner information, including address, city, zip, e-mail and phone number,
5) Project contact information, including project contact name, project owner name, project address, city, zip, and project ID, and
6) Recipient information, including recipient name, address, city, and zip.

The dataset was uniquely indexed by Project ID and contained 428 records.

The dataset was merged to the tracking dataset by (1) application code, (2) service account number, (3) addresses, (4) names, (5) phone numbers, and (6) e-mail addresses. The number of unique IDs left after each step of merging is listed in Table 7-23 below. After each step, the merged records were manually checked to make sure that the site listed in SoCalREN's records is the same site as the one merged from the tracking data.

Table 7-23: Merging Steps of SoCalREN Home Upgrade Advisor Database to Tracking Data

Merging Steps	# Obs Left	# Project IDs Left	% Left
RawData	428	428	100%
After Application Code Merge	179	179	42%
After Acct Merge	149	149	35%
After Address Merge	149	149	35%
After Name Merge	148	148	35%
After Phone Merge	148	148	35%
After E-Mail Merge	148	148	35%

1. Merge by Application Code: SoCalREN Home Upgrade Advisor program data records were merged to the tracking data by application code first. A total of 249 unique project IDs were merged.
2. Merge by Account ID: The SoCalREN Home Upgrade Advisor program data records were merged to the tracking data by service account ID. The HUA dataset provided both electricity account ID (SCE) and gas account ID (SCG). Therefore, SoCalREN records were merged to the tracking data relying on both account IDs. Overall, 30 unique project ID were merged in this step.
3. Merge by Address: The SoCalREN program data records were merged to the tracking data by address. The SoCalREN data provided three sets of addresses: home owner address, project address, and recipient address. Both home address and project address were used. The merge was considered valid if the fields had the same city and name information. The names from the HUA records and the CPUC tracking data were manually checked to match the names that were differently spelled.
4. Merge by Name: The SoCalREN program data records were merged to the tracking data by name. The SoCalREN data provided five sets of name variables: 1) applicant name, 2) project contact name, 3) project owner name, 4) recipient name and 5) SCG account name. The records merged to the tracking data if any of the variables matched the name variables in the tracking data. The merges were then checked manually to determine if the addresses matched. If so, the merge was considered valid. Overall, one unique project ID was merged in this step.

5. Merge by Phone Number: The SoCalREN Home Upgrade Advisor program data records were merged to the tracking data by phone number. Again the merges were checked manually to determine if the addresses were matched. No more unique project ID were merged in this step.
6. Merge by E-Mail Address: The SoCalREN Home Upgrade Advisor program data records were merged to the tracking data by e-mail address. Again the merge were checked manually to determine if the addresses were matched. No more unique project ID were merged in this step.

The SoCalREN Home Upgrade Advisor data is the most comprehensive and consistent of all the reviewed datasets. Approximately 65% of the records (a total of 280 project IDs) in this database could be merged to the CPUC tracking data. This is expected as the energy savings from these projects are claimed by SoCalREN in its portfolio of energy efficiency programs. It is interesting to note that all of the projects are not found in the tracking data, however this could be because not all of the projects that were recently completed have been included in the CPUC tracking data yet.

A summary of the number of SoCalREN Home Upgrade Advisor project IDs and unique sites that merged with resource program claims in CPUC tracking data can be seen in Table 7-24. These tables break down the project IDs and unique sites that merged back up to SoCalREN claims and the number that merged up to SCE and SCG resource claims as a way to determine if participation in SoCalREN's Home Upgrade Advisor program has led these customers towards resource activities offered by IOUs. The number of IDs that merged with SoCalREN claims is 249, is 71 for SCE, and is 73 for SCG. This shows some support for the effect of this non-resource activity on generating energy savings through CA PA energy efficiency programs. Not surprisingly, a majority of the IDs and sites that merged up to the tracking data were merged to SoCalREN claims.

Again it is important to remember that the number of merged project IDs in Table 7-24 exceeds the number of merged Project IDs resulting from the merges presented in Table 7-23 because a single customer may be involved in multiple SoCalREN, SCE, and/or SCG claims.

Table 7-24: Number of SoCalREN Home Upgrade Advisor Database Observations and Sites Merged to Tracking Data

PA	# of Project IDs	# of Sites
SoCalREN	249	249
SCE	71	70
SCG	73	84
Total	**394**	**403**

Merging SoCalREN Home Upgrade Residential Hotline Records

The customer information for the SoCalREN Home Upgrade residential phone call records came from an Excel workbook called "SoCalREN_Local Marketing and Outreach.xlsx". The workbook listed customer name and phone number, and in one case, e-mail, too. Therefore, the file was merged to the tracking data if both the phone number and name matched.

Overall, there were 198 observations, and 190 unique sites (different names and/or phone number). Only two observations and two sites were merged to the tracking data, and the other 99% did not find a match. There was too limited information. Many observations did not have name or phone number, and there were 30 observations that had no information at all. Records of those who call for assistance could be improved in order to track this non-resource activity.

Merging SoCalREN Home Upgrade Residential Coupon Records

The customer information for SoCalREN Home Upgrade residential phone call records came from an Excel workbook called "SoCalREN_Local Marketing and Outreach.xlsx". The workbook listed customers' name, addresses, phone number and e-mail addresses. The file only had four observations and hence was merged to the tracking data manually.

Three out of four unique customers found matches in the tracking data. The only one that had no match had the coupon issued date being May 22, 2015, and probably had not been entered into the tracking data yet. SoCalREN had noted in its Annual Report and in response to this data request that a larger number of Advanced Home Upgrade Coupons had been issued but not tracked. Had the issuance of these coupons been recorded, additional records would be available to attempt to merge to the CPUC tracking data and help determine if customers who receive these coupons are using them to participate in PG&E's Advanced Home Upgrade program.

7.3 MCE

The following four programs were offered by MCE during the 2013-14 program years:

- Multifamily,
- Small Commercial,
- Single Family, and
- Financing.

A verification of non-resource accomplishments is presented below for the Multifamily, Small Commercial, and Single Family programs.[71] Next, an evaluability assessment of the databases provided by MCE is conducted in which the completeness, quality, and applicability of the data is reviewed. A subset of the 27 files of mixed format (i.e., MS Word, MS Excel, .pdf, and .msg) were examined and assessed. Lastly, merges to CPUC tracking data were carried out using two different non-resource datasets to see if customers who interacted with MCE went on to participate in any California PA energy efficiency resource programs. The first dataset contains customers who received audits and participated in MCE's Small Commercial program and the second contains the multifamily properties that received Technical Assistance direct install measures.

7.3.1 Verification of Non-Resource Accomplishments

This section presents the verification of selected non-resource accomplishments of MCE's programs as presented in:

- MCE's 2014 Energy Efficiency Annual Report; and
- MCE's response to the data request submitted by the evaluation team that was used to acquire data to support this impact assessment.

The ODC Regional Energy Networks Value and Effectiveness Study did not cover MCE and therefore no non-resource accomplishments for MCE were available from this data source.

Multifamily Program

Results of the verification of non-resource accomplishments for the Multifamily program are presented in Table 7-25. Using CPUC tracking data or databases provided by MCE, the evaluation team was able to verify some of the Multifamily program non-resource

71 The non-resource accomplishments of the Financing program taken from MCE's 2014 Energy Efficiency Annual Report are presented in Appendix B and have not been verified.

accomplishments. In most cases, MCE reached a greater number of customers through technical assistance (row 3), provided rebates for a larger number of multifamily units (row 4), and saved more gallons of water than it had noted in its Annual Report (row 5). For example, MCE claimed to have provided technical assistance to 2,304 units. Based on the database MCE provided, the evaluation team verified that 3,122 units received technical assistance in 2013-14. Additionally, MCE claimed to have trained 12 workforce entrants or re-entrants and it was able to verify that 12 were trained in 2014 with an additional 9 attendees at DI training in 2013 (row 5).

Only one 2015 Multifamily program non-resource accomplishment was shared by MCE in its response to the data request submitted in support of this assessment. MCE has continued to provide technical assistance in the first 2 quarters of 2015 by providing an additional 1,152 units with assistance, as shown in the last column of Table 7-25. This was verified in a database provided by MCE.

Table 7-25: Selected MCE Multifamily Non-Resource Accomplishments Presented in 2014 Annual Report

MCE Multifamily Non-Resource Accomplishments for 2013-14 from Annual Report	Verified Accomplishments for 2013-14	Verified Accomplishments for Q1 and Q2 2015
Held a workshop in Richmond with BayREN which resulted in three applications out of 10 attendees	Verified a total of six attendees and was not able to verify how many attendees completed applications[1]	Accomplishment not provided
Communicated program success stories through published case studies and testimonial from program participants at workshops	MCE provided a .pdf file of a case study project of 70 multifamily units that were upgraded with three boiler replacements, pipe insulation and DI measures. MCE did not provide any distribution lists to indicate who has seen the file.	Additional data for 2015 not provided
Reached 2,304 units with Technical Assistance	Data from MCE[2] show 3,122 units received TA in 2013/14 (1,401 in 2013 and 1,721 in 2013)	Data from MCE[3] show 1,152 units received TA in Q1/Q2 of 2015.
There were 555 units touched by energy efficiency projects	CPUC tracking data shows 1,849 claim IDs and 562 MCE SiteIDs	Not verified
Successful relationship with local water agencies saved more than 882,242 gallons of water	Data from MCE[4] show 1,082,816 gallons of water saved from DI measure installations	Accomplishment not provided
Trained 12 workforce entrants or re-entrants in direct install	Data from MCE[5] show 12 workforce attendees to DI training in 2014 and nine who attended DI training in 2013.	Accomplishment not provided

1 MCE provided a .pdf file entitled, "MCE01_01_Richmond MF workshop sign in.pdf" which included a list of 6 attendees of the Multifamily workshop held in Richmond.

2 MCE provided a dataset called "MCE01_05_MF Pipeline Database 06032015.xlsx" and a revised version called "MCE01_05_MF Pipeline Database Revised 9 14.xlsx". The dataset lists more multifamily units than are included in the totals provided TA in 2013-2015 and the dataset does not clarify why certain units are excluded

from the total. A follow up discussion was held with MCE to clarify why certain properties were excluded from the total.

3 In the dataset, "MCE01_05_MF Pipeline Database Revised 9 14.xlsx", a list of properties that are in the pipeline for 2015 are included as well.

4 MCE provided an Excel file called "MCE Direct Install Tool_Pullman.xlsm" which is a tool that calculates water savings from installed low flow showerheads and faucet aerators. A discussion with MCE clarified that the actual water savings estimate differed from what was presented in the 2014 Annual Report.

5 MCE provided a list of individuals who attended DI training and weatherization training in 2013 and 2014. The data file is called "MCE01_04_8-17-15 - Updated MCE DI TrainingList (MCCDC).xlsx"

Additional non-resource accomplishments were provided by MCE for its Multifamily program and these are listed in Table 7-26 and Table 7-27. Attempts to verify these accomplishments were made when supporting data were provided or made available by MCE in response to the data request submitted by the contractor team. Again, in most cases MCE's documentation did verify its additional non-resource accomplishments or show that they exceeded their stated accomplishments. As Table 7-26 shows, MCE verified the installation of DI measures in 726 units (row 1), the provision of technical assistance to 1,721 units (row 2), and the installation of energy efficiency upgrades at seven properties which affected 506 units in 2013 (row 3).

Table 7-26: MCE Multifamily Non-Resource Accomplishments Provided by MCE for 2013

MCE Multifamily Non-Resource Accomplishments Provided by MCE	Verification of Accomplishments
Installed CFLs, low-flow showerheads and faucet aerators, and pipe wrapping (in 220 units) in 726 units at no additional cost to tenants	Data from MCE[1] show 220 units received pipe wrapping and 726 units received low-flow showerheads and faucet aerators.
Provided TA to 1,401 units in 2013	Verified 1,721 units (also presented above in Table 7-25)
There were 506 units across five affordable properties impacted by energy upgrades	Data from MCE[2] verifies that 506 units across seven affordable properties were impacted by energy upgrades
Trained 15 workforce entrants or re-entrants	A list of 15 workforce entrants or re-entrants were trained in either weatherization or direct install[3]

1 MCE provided a dataset called "MCE01_05_MF Pipeline Database Revised 9 14.xlsx". The dataset states that 220 units received pipe wrapping and 726 received free low-flow showerheads and faucet aerators, but the dataset does not list the individual units that received these measures. Only the name of the buildings in which the units reside are listed.

2 MCE's "MCE01_05_MF Pipeline Database Revised 9 14.xlsx" dataset lists 7 properties that contain 506 units receiving energy upgrades through the Multfamily program, however a clear definition of "affordable" properties was not provided by MCE. This definition was requested, but not provided. The data only lists the property names, the number of buildings, and the number of units each contains.

3 MCE provided a list of trainees from 2013 – 2014 called "MCE01_04_8-17-15 - Updated MCE DI TrainingList (MCCDC).xlsx".

As Table 7-27 shows, MCE has provided technical assistance to 1,152 multifamily units (row 2), provided rebates for upgrades for 288 units (row 5), built a pipeline of 456 units that have reserved rebates (row 4), and has saved 3.3 million gallons of water at one multifamily property (row 7) in the 2015 program year through Q2.

Table 7-27: MCE Multifamily Non-Resource Accomplishments Provided by MCE for 2014 – Q2 2015

MCE Multifamily Non-Resource Accomplishments Provided by MCE	Verification of Accomplishments
Presented program offering to 106 attendees at the Multi-Family Affordable Solar Housing (MASH) workshop, which resulted in one project that is 9% of the kwh savings target and 17% of therm savings	MCE provided a list[1] of 112 e-mail addresses of training that attended the MASH workshop. There are names associated with 55 of the 112 e-mail addresses.
Provided TA to 1,152 units	Data from MCE[2] verified that TA was provided to 1,152 multifamily units.
Scheduled 8/26/15 Direct Install training for 10 workers from disadvantaged communities	No supporting data provided.
Built a pipeline of 456 units for which rebate reservation forms were received in 2015 and anticipate receiving reservation forms for another 237 units by the end of 2015	Data from MCE[3] shows that 456 units either have reserved rebates or have to close their rebate reservation. An additional 160 units are likely to complete a project by the end of 2015.
Completed upgrade projects impacting 288 units	Data from MCE[3] verifies that 288 units have received rebates for energy upgrades.
Launched LED Direct Install offering	MCE provided a .pdf[4] that presents a description of the addition of changing out LEDs for incandescent bulbs to its Direct Install offering. No data have been provided to show that LEDs have been installed since the offering was launched.
Saved 1 property (199 units) 3,361,235 gallons of water	MCE provided a one-page .pdf[5] that describes the project that saved 199 units 3,361,235 gallons of water. A full description of how the water savings were estimated for this property was not provided.

1 MCE provided a list of MASH attendees in an Excel file called "MCE01_06_MASH - energy efficiency participants-April30-2015.xlsx". The list contains 112 e-mail addresses and names for some of the attendees.

2 MCE's "MCE01_05_MF Pipeline Database Revised 9 14.xlsx" dataset lists 1,152 units as receiving technical assistance in 2015. More properties and units are listed than are included in this total. The data do not make clear why certain units are excluded from the total.

3 MCE provided a dataset entitled, "MCE01_07_2015 MF Goals.xlsx" that shows MCE's progress towards meeting its Multifamily program goals. It shows the number of units on which rebates have been paid for participation the program and rebate reservations. It also shows the number of units that have had energy efficiency upgrades and rebates paid out.

4 MCE provided this information in a .pdf called "MCE01_08_Direct Install slide.pdf"

5 MCE provided this information in a .pdf called "MCE01_09_Pullman 8.10.pdf"

It is important to note that the quality of the databases provided to support many of the above listed non-resource accomplishments was poor and improvements to MCE's system of tracking

multifamily technical assistance and installation of DI measures could be made. This will be discussed further in the evaluability of databases section.

Small Commercial Program

Table 7-28 lists the small commercial non-resource accomplishments of MCE as presented in its 2014 Annual Report. Also presented is the verification of the accomplishments using data provided by MCE or by using CPUC tracking data. Based on this analysis, some of the accomplishments could be verified. For example, MCE noted that during 2013-14 it completed 56 energy efficiency upgrades through the program. CPUC tracking data was examined and the evaluation team was able to verify a larger number - 143 claim IDs that represent 87 unique Service Account IDs (row 6). MCE noted that its outreach campaign to the San Rafael Chamber of Commercial resulted in 55 energy assessments (row 4). Data provided by MCE allowed a verification of 49 assessments that resulted from the campaign, which comes close to the claimed number of assessments. The other small commercial non-resource accomplishments listed by MCE were supported through databases sent or documentation provided to the evaluation team, but most of these were not quantity based (see rows 3 and 5).

There were some accomplishments that could not be verified. For example, MCE had provided a one-page progress report that indicated that the small commercial program had completed 2,452 free energy audits from 2013 through Q2 of 2015. Upon examination of a supporting dataset, the evaluation team could verify the completion of 1,779 records for 668 unique electric service accounts that received audits and assessments (row 1). A follow up conversation took place with MCE in which they clarified that it erroneously included both audits and site visits in their count of 2,452 energy assessments and that the dataset they provided was an accurate count.

In addition, MCE noted that it provides customers with pre-negotiated contractor discounts on certain measures (row 2). To support this claim, MCE provided a portion of a dataset that tracks participation in its SmartLights small commercial program with an explanation that it has negotiated a lower negotiated price for measure code CLA10 that appears in its tracking data as custom projects with the measure description "LIGHTING RETROFIT/NEW-INT-LINEAR FLUORESCENT-OTHER". However, the evaluation team was unable to verify discounted price. A comparison of measure costs across MCE's data and PG&E's data in the CPUC tracking data was made but no evidence of a lower measure cost could be found. This is not to say that a lower price has not been negotiated, but that MCE did not provide information to allow the evaluation team to verify this accomplishment.

Last, MCE stated that it paid $111,125 in rebates through the Small Commercial program (row 7). This could not be verified using the CPUC tracking data because there are a number of errors in the data submitted by MCE regarding incentives paid out. MCE has been made aware of these errors by the contracted Data team working on behalf of the CPUC.

Table 7-28: Selected MCE Small Commercial Non-Resource Accomplishments from 2014 Annual Report

MCE Small Commercial Non-Resource Accomplishments for 2013-14 from Annual Report	Verified Accomplishments for 2013-14	Verified Accomplishments for Q1 and Q2 2015
MCE provided a monthly one-page progress document that shows 2,452 free energy audits[1] were provided from 2013 – May 2015 through the small commercial program.	Data from MCE[2] shows 1,779 records for 668 unique electric SAIDs that received audits and assessments (i.e., site visits) through MCE's Small Commercial program.	Energy assessments have occurred in 2015 through the small commercial program but were not separated out from those that occurred in 2013-14 in the one-page progress document.
Program offers customers pre-negotiated contractor discounts on certain measures, project management assistance and post-project quality assurance.	In its response to the evaluation team's data request, MCE stated that it has a negotiated price for measure code CLA10 that appears in its tracking data as custom projects with the measure description "LIGHTING RETROFIT/NEW-INT-LINEAR FLUORESCENT-OTHER". However, evaluation team was unable to verify discounted price.	No additional accomplishment provided.
Customers that participate in the program are also eligible for financing through MCE's on bill repayment program and the relevant information is presented to them in the assessment report	MCE provided a mock up assessment report[3] as an example of what is provided to customers who participate in the program. MCE also provided a database[4] of customers who were considered eligible for financing and 10 are listed in 2014; all were either rejected or cancelled.	MCE's database of customers considered eligible for financing includes six customers in 2015. Of these, four were rejected and two were listed "in progress" as of July 2015.
Outreach Campaign though the San Rafael Chamber of Commerce that resulted in 55 assessments and 20 completed projects	Data provided by MCE[5] verifies 49 assessments that resulted from the San Rafael Chamber of Commerce Outreach Campaign. Of these assessments, there are 11 completed projects. MCE provided a record of the 189 calls made during the outreach campaign and in-person visits.	No additional accomplishment provided
Communicated program success stories through case studies of projects to promote program offerings	In its response to the data request sent to MCE, it stated that case studies have been disseminated using MCE's website, at presentations at the San Rafael Chamber of Commerce Green Committee, via social media and outreach campaigns with the San Rafael Chamber of Commerce, and via information on the SmartLights website: (http://ebenergy.org/commercial-services/smart-lights-program/)	No additional accomplishment provided.

Table 7-28 (Cont'd): Selected MCE Small Commercial Non-Resource Accomplishments from 2014 Annual Report

MCE Small Commercial Non-Resource Accomplishments for 2013-14 from Annual Report	Verified Accomplishments for 2013-14	Verified Accomplishments for Q1 and Q2 2015
Completed upgrades at 56 small businesses	CPUC tracking data shows 143 claim IDs that represent 87 unique Service Account IDs claimed for MCE's small commercial program.	Not verified
Paid $111,125 in rebates	MCE's data in the CPUC tracking data contains errors therefore the amount paid in rebates in 2013-14 is not verifiable.	Not verified

1 MCE provided a progress to date document called "Monthly Update One-Pager - June.pdf" which MCE states erroneously counted site visits in the total of assessments provided. The Excel file provided by MCE to verify the 2013-14 accomplishments related to audits (listed in footnote 2 of this table) is correct.

2 MCE provided an Excel file called "MCE02_01_EF_Combined marinCleanEnergy_auditConducted_greaterThanJan1-2013.xlsx" that includes data for the energy assessments, audits, and upgrades that occurred through MCE's Small Commercial program beginning in 2013.

3 MCE provided the evaluation team with an example report in a .pdf file entitled, "MCE02_03_sample final report.pdf"

4 MCE provided an Excel file entitled, "MCE02_04_EF_MCE OBR Candidates Audit Summary.xlsx" that contains 16 businesses that were initially considered eligible for financing, however all but 3 customers were rejected. One of the projects was cancelled and the other two have "in progress" as their status.

5 MCE provided an Excel file entitled, "MCE02_05_San Rafael Chamber of Commerce_AUDITS (IN FM).xlsx" that lists 49 audits that occurred from 2014 through Q2 of 2015.

Single Family Program

Table 7-29 presents the Single Family program non-resource accomplishments of MCE as presented in its 2014 Annual Report. This program uses three strategies to provide information to homeowners about ways to save energy: My Energy Tool, Home Utility Reports, and the Schools Program. Using databases supplied by MCE, the exact counts of the number of My Energy Action Tool action plans, registered tool users, recipients of Home Energy Reports, and engagement with students through the Schools program could not be replicated. However, in most cases, larger quantities were found thereby surpassing accomplishments listed in the Annual Report. Differences in the quantities for the various non-resource accomplishments may exist because entries in the databases may have changed contents from when the accomplishments were reported in the Annual Report to when they were provided to the evaluation team.

Table 7-29: Selected MCE Single Family Non-Resource Accomplishments from 2014 Annual Report

MCE SF Non-Resource Accomplishments for 2013-14 from Annual Report	Verified Accomplishments for 2013-2014	Verified Accomplishments for Q1 and Q2 2015
My Energy Tool		
Generated 799 new Action Plans which brought the number to 1,479	MCE provided data[1] to show that 1,849 Action Plans were created in 2013-14. Multiple plans could be created by a single customer.	A total of 424 Action Plans were created in 2015 through the month of August.
Added 758 new registered users to the My Energy Tool website bringing the total number of users to 2,146	Total number of registrants based on the data provided by MCE[1] is 763. Total number of users was not verified.	Data for new registrants in 2015 were not provided.
Home Utility Reports		
Expanded the number of customers receiving the reports to over 18,000	Based on the MCE data provided,[2] HUR reports are sent out to over 21,000 customers.	No accomplishment provided.
Schools Program		
Engaged with 4,385 students, which led to the creation of 556 Action Plans	MCE's data[1] shows 609 Action Plans created by accounts denoted as type "SCHOOL". Unable to verify how many students MCE engaged with. These are a subset of the total Action Plans created in My Energy Tool	No "SCHOOL" type accounts were created in 2015 based on the data provided by MCE[1]

1 My Energy Tool data was provided by MCE in an Excel file called "MCE03_01_MCE - My Energy Tool - Registration Tracking.xlsx". Number of Action Plans created was based on the field "Run Date" and unique customer IDs were used to determine number of My Energy Tool users.

2 A number of Excel files were provided by MCE and used to verify customers who receive Home Utility Reports. Counts of customers was based on the total number of unique customer IDs in the following Excel files: HUR1_treatment_demographics.csv, HUR2m_treatment_demographics.csv, HUR2q_treatment_demographics.csv, and HUR3_treatment_demographics.csv. Together, these databases show 21,122 unique customer IDs that have been included in the treatment groups and thus have received Home Utility Reports on either a monthly, bimonthly, or quarterly basis during the 2013-14 period.

MCE supplied additional, and in some cases incremental, non-resource accomplishments and supporting databases about its Single Family program in its response to the data request submitted by the evaluation team. As Table 7-30 shows, the data provided by MCE verified larger quantities of action plans created by individuals or those affiliated with the Schools program. In 2013, MCE stated that users of My Energy Tool created 680 new action plans (as a subset of the 799 that they stated were developed over the 2013-14 program years). Based on the data provided, the evaluation team found that 735 action plans were created in 2013 (see row 2). MCE stated that 281 action plans were created in 2013 as a result of school outreach while the database was used to verify the creation of a total of 338 plans (row 5).

Some of the accomplishments related to mailing of Home Utility Reports and number of new registered users of My Energy Tool were not replicable and came in below the accomplishment provided by MCE. For example, the number of new registered users of My Energy Tool in 2013 was noted to be 1,388 but the database shows 958 unique customer IDs who signed up with the tool in 2013 (row 3).

Table 7-30: Selected MCE Single Family Program Accomplishments Provided by MCE

MCE Single Family Non-Resource Accomplishments from MCE	Verification of Accomplishments
2013	
Generated 680 new Action Plans	Based on the data provided by MCE,[1] 735 Action Plans were created in 2013.
Added 1,388 new registered users to the My Energy Tool website	Based on MCE's data,[1] 958 unique customer IDs were found to have signed up with My Energy Tool in 2013.
Launched the HUR program sending the first mailers in December to 4,424 customers	Data provided by MCE[2] show 3,732 recipients of the first HUR mailers in 2013.
School program reached 1,037 students through classroom curriculum and received 281 Action Plans as a result of the school outreach	Data from MCE[1] show the creation of 338 Action Plans from customer accounts noted as type "SCHOOL".
2015	
Launched a financing market place on My Energy Tool	No data provided to support this accomplishment
Updated housing characteristics data in My Energy Tool to include new MCE Communities of Unincorporated Napa, Benicia, San Pablo and El Cerrito	No data provided to support this accomplishment.
Generated 173 new Action Plans	Based on MCE's data,[1] 424 Action Plans were created in 2015 through August.
Added 187 new registered users to the My Energy Tool website	Data for new registrants in 2015 were not provided.

1 My Energy Tool data was provided by MCE in an Excel file called "MCE03_01_MCE - My Energy Tool - Registration Tracking.xlsx". Number of Action Plans created was based on the field "Run Date", the field "Type" was used to determine which accounts are affiliated with schools, and unique customer IDs were used to determine number of My Energy Tool users.

2 Customers who were included in the first set of HUR mailers were included in MCE's response to the evaluation team's data request. The file in which these customers are listed is "HUR1_treatment_demographics.csv" and the number of customers was based on unique Customer IDs listed.

Financing Program

No verification of non-resource accomplishments, merging of datasets to CPUC tracking data, or evaluability of non-resource program data is being conducted for MCE's Financing program. Appendix B provides selected non-resource accomplishments of MCE's financing program as presented in its Annual Report and provided directly to the evaluation team in response to the data request that was submitted in support of this impact assessment.

7.3.2 Evaluability of Databases

MCE provided 35 Excel files that contained the data used to verify the non-resource accomplishments presented in the above subsection. Of these files, seven were assessed for quality, completeness, and consistency of:

- Contact information (names, addresses, and phone numbers),
- Merging variables (account numbers and customer IDs), and
- Details about recommendations, referrals, and/or attendance at workshops or events.

A subset of the total number of databases provided was selected because not all of the files would be useful in a more detailed evaluation of impacts that stem from non-resource activities. The seven files that were evaluated are as follows with descriptions of their contents:

- *MCE01_05_MF Pipeline Database Revised 9 14.xlsx, Tab names: 2013-2014 and 2015 Dashboard*; the 2013-2014 tab provides records of 28 multifamily properties that have received technical assistance, direct install measures, and pipe wrapping in 2013-2014; the 2015 Dashboard tab contains 54 multifamily properties which received technical assistance in 2014-2015. Fifteen of the 2014 properties are listed on both tabs.
  - *Tab 2013-2014*:
    - Fields provided on this tab include: project number, property name, county/city location, number of buildings, number of units, year in which the property was assessed, number of units in which direct install measures were installed, and number of units in which pipe wrapping was installed.
    - A total number of units that received technical assistance is presented as a subtotal of the number of units presented in the table. No explanation is provided as to why all of the units are not included.
    - No contact information is listed for the properties that were provided with technical assistance in 2013 (and it is only available for 15 properties that received technical assistance in 2014 on the second tab in this workbook). Property names are not provided in a consistent format (names of properties are sometimes listed, and other times descriptions of the property location are included). For most of the properties, dates of assessment (year of assessment) have been provided. Minimal data are available for the properties that received technical assistance in 2013-14.
    - The database contains no electric and gas service account IDs, therefore merges of data to CIS, billing, and CPUC tracking data cannot be carried out.

- *Tab name: 2015 Dashboard*
  - Though the tab name is 2015 Dashboard, the tab includes properties assessed in 2014 and 2015. Data fields for the 17 properties assisted in 2014 include name of property, owner/manager of property, property manager, address, e-mail, phone, number of units, number of buildings, year built, and whether the property is classified as "affordable" or "market". All fields are completed with no missing data.
  - The same data fields are available for the 36 2015 properties as are available for the 2014 properties with the addition of time and date of initial call, date on which a "good faith deposit" was made, date deposited, amount of deposit, check number, site assessment date, date added to dashboard, date assessment report sent, kWh savings potential, therm savings potential, and rebate potential. While data for properties that were provided technical assistance in 2015 is available, it is unclear how many units actually received this assistance. The total provided in this file removes certain units and it is not clear why these were removed.
  - The database contains no electric and gas service account IDs, therefore merges of data to CIS, billing, and CPUC tracking data cannot be easily be carried out.
- Overall, the key variables necessary for contacting property managers in the future are being collected and are moderately populated, but only for 2014 and 2015 records. Service account numbers are not being collected that would allow for a direct merge to CIS and IOU tracking data. Information on recommendations that may be developed as part of the assessments are not being tracked. There are also calculations being made within the spreadsheet used for tracking technical assistance accomplishments that are not well documented.

- *MCE02_01_EF_CombinedmarinCleanEnergy_auditConducted_greaterThanJan1-2013.xlsx,* a database that contains 1,779 records for 668 unique electric SAIDs for small commercial customers that have received audits and/or site assessments.
  - Some of the key variables in the database are: vendor transaction ID, master SAID, electric SAID, business/customer name, site contact name, site address, site phone number, flag for whether the customer is participating in on-bill financing, various dates related to site assessment dates, project commitment dates, vendor inspection dates, measure recommendations descriptions, quantities, potential energy savings, and measure costs.
  - There are approximately 50 different measures installed in commercial buildings (some of which were free through the site assessments).
  - Each record denotes an assessment (i.e., site visit) or audit that has occurred and some properties are listed more than once as they have had multiple audits. As noted

by MCE, multiple "audit" reports may be generated for a single site. For example, if the customer has lighting and refrigeration and HVAC opportunities, those would each constitute a unique "audit".

- The fields are moderately well populated. Of the 1,779 records, there are no blank business names, 28 blank phone numbers (which only represent 13 customers), no blank addresses, and 10 blank measure names. There are a significant number of master SAIDs missing (355) and electric SAIDs missing (403).
- The availability of SAIDs does allow for merging with other data sources that would assist in impact evaluation work, however, there are a number of records which are missing this information, as stated above.
- Overall, the key variables necessary for contacting customers in the future are being collected and are moderately well populated. Service account numbers are being collected for the majority of records that would allow for a direct merge to CIS and IOU tracking data. Detailed information on recommendations are being tracked, although it is not clear if the recommendation was a result of an audit or site assessment.

- *MCE03_01_MCE - My Energy Tool - Registration Tracking.xlsx*, a database that contains 6,650 records of customers who signed up to use My Energy Tool and those who have created Energy Plans using the tool.
  - Salient fields included in the database are: e-mail address, a 0/1 flag to show whether the customer has linked his/her login to his/her PG&E account, square footage, year home constructed, city, zip, date on which customer signed up for My Energy Tool, last login, Schools program group name (if applicable), program type (value may be either "SCHOOL", "COMPANY", “Demand Response”, or blank), 0/1 flag to denote whether customer is part of the Smart Device (thermostat) program, segment (which type of action plan was selected – options are “carbon-net-zero”, “health-comfort”, or “max-roi”), calculation ID (of energy plan run), run time (time/date of energy plan run), number of actions recommended, recommendations, savings ($) estimated for the lifetime of the equipment, and a variety of indicators to show whether customers noted that they are or are not interested in the recommendations made.
  - Note that there are 1,684 unique customer IDs which means that some customers have run the tool multiple times to generate energy action plans. Each record in the database represents the creation of an energy action plan.
  - Based on the data, 5,137 action plans (by 494 unique customers IDs) have been linked to a PG&E account which would help facilitate the merging of these data to CIS, billing, and CPUC tracking data. This represents approximately 30% of customers who used the tool to create Action Plans. Identifying the PG&E accounts numbers and merging this database to other databases, such as CPUC tracking data,

would allow an examination of equipment recommendations made in Action Plans and determine whether customers have purchased the recommended equipment through a PG&E energy efficiency rebate program.

  - Overall, the only variables being collected that can be used to contact customers is the e-mail address. It would be useful to try to gather phone numbers and addresses, although some of these can be obtained by merging onto IOU data. Service account numbers are being collected for the 30% of records that would allow for a direct merge to CIS and IOU tracking data. Detailed information on recommendations are also being tracked. The database is also tracking the customer's reported interest in a recommendation, and if a recommendation was completed. However, it is not clear if the completed recommendation was already done prior to the recommendation being made, or done as a result of the recommendation. This delineation would be very useful to gather.

- *HUR1_treatment_demographics.csv (3,732 records), HUR2m_treatment_demographics.csv (6,559 records), HUR2q_treatment_demographics.csv (6,607 records), HUR3_treatment_demographics.csv (4,234 records)*, a set of databases that includes recipients of Home Utility Reports
  - Each of these tables include the following fields: customer ID, latitude, longitude, square footage, number of occupants, rate schedule, number of bedrooms, number of bathrooms, city, zip, year constructed, whether home is owned or rented, dwelling type, number of children, number of adults, whether the home has a pool, and variables to indicate whether the property has heating and/or cooling.
  - The data are presented in a consistent format and all variables are very well populated.
  - There is a customer ID, but the evaluation team is unsure if it can be used to link back to any CIS, billing, or CPUC tracking data.
  - Overall, the key variables necessary for contacting customers were not provided, however the Customer ID field would allow the records to be merged to gather whatever contact information MCE has on their customer. The report refers the customer to their action plan which is part of My Energy Tool discussed above.

In summary, contact information is being collected moderately well, but there is improvement that can be made, as suggested by the evaluation team. For activities that result in recommendations, the databases provide a wealth of information that would be useful for evaluators. However, the structure and format for some of the databases could be modified to improve their usability.

For example, a review of the multifamily technical assistance database showed that the data fields were poorly labeled, data within fields were not consistent, and information about why certain properties were not included in the totals that were given technical assistance was not provided. This dataset could be improved by entering data in a consistent manner, tracking dates on which assistance was provided, and ideally linking the few records to electric and gas SAIDs. Other recommendations to improve the usability of the datasets include either clearer variable names or a data dictionary documenting key variables, documenting calculations done within the workbooks, and performing calculations that can be done more globally that would not require formulas to be updated every time new records are added (e.g., instead of having a formula that sums three specific cells in a column, have the entire column summed up that interacts with an indicator variable that identifies if the record should be included in the sum).

The databases that track usage of My Energy Tool and the recipients of Home Utility Reports are both well populated and data are tracked consistently for the variables included. It would be particularly useful if these databases also included names, addresses, and phone numbers to support impact evaluation work through surveys. These surveys could be implemented to determine if customers are using the recommendations made in the Energy Plans generated from the tool or in the Home Utility Reports that have been sent out. Finally, if customers identify that they have completed a recommendation from their action plan, it would be helpful to have them report if the action was done as a result of the recommendation.

7.3.3 Results of CPUC Tracking Data Merges

Two databases were used to merge to CPUC tracking data to see if customers who interacted with MCE went on to participate in any California PA energy efficiency resource programs. The first dataset lists customers who received audits and participated in MCE's Small Commercial program and the second contains a list of multifamily properties that received direct install measures through its offering of Technical Assistance.

Merging MCE Small Commercial EF Records

The customer information for MCE Small Commercial Assessment program component came from Excel workbook "MCE02_01_EF_CombinedmarinCleanEnergy_auditConducted_greater ThanJan1-2013.xlsx". The file lists Vendor Transaction ID, Account ID, Electricity and Gas SAID, Customer Name, Contact First and Last Name, Customer Phone Number, Contact Phone Number, Service Address, City and ZIP Code, Site Address, City and ZIP Code, along with a data on recommended energy efficiency measures.

There are 1,779 observations and 1,163 unique transaction IDs in the dataset. Many transaction IDs had more than one record with different measure information associated with them. Since this task was to match all possible projects from the tracking data for each MCE Small

Commercial site, the merging was completed at the project ID level, ignoring the differences in measure information.

The MCE data was merged to the tracking data by (1) Account ID and service account ID, (2) addresses, (3) names, and (4) phone numbers. The number of unique transaction IDs left after each step of merging are listed in Table 7-31 below. After each merging step, the merged records were manually checked to make sure that the site listed in MCE's records is the same site as the one merged from the tracking data.

Table 7-31: Merging Steps of MCE Small Commercial Assessment/Audit Program Database to Tracking Data

Merge Steps	# Transaction IDs Left	% Left
RawData	1,163	100%
After Account Merge	708	61%
After Address Merge	679	58%
After Name Merge	666	57%
After Phone Merge	666	57%

1. Merge by Service Account ID: MCE Small Commercial Assessment (MCE Small Com) program data records were merged to the tracking data by service account ID. The MCE Small Com dataset provided account ID, electric service account IDs (SAIDs) and gas SAIDs, but the electric and gas SAID variables were sometimes confused with the account ID, which is a completely different identifier. Fortunately, PG&E's service account IDs and their account IDs have the same first several digits. Therefore, MCE Small Com records were merged to the tracking data by the first several digits of the account ID, and then the merged records were checked manually to verify if the two parts had the same addresses. Overall, 455 records were merged in this step.
2. Merge by Address: MCE Small Com data were merged to the tracking data by address. The merge was considered valid if the two fields had the same city/zip and name information. The names from MCE Small Com records and the tracking data were manually checked to match the names that were differently spelled. Overall, 29 observations were merged in this step.
3. Merge by Name: MCE Small Com records were merged to the tracking data by names. MCE Small Com data provided three sets of name variables: customer name, site contact first name and last name, and property owner first name and last name. All three sets of the name variables were used in attempts to merge the tracking data, and both first name + last name and last name + comma + first name formats were tried too. Then the merges were checked manually to determine if the addresses were matched. If so, the merge was considered valid. Overall, 13 observations were merged in this step.

4. Merge by Phone Number: MCE Small Com records were merged to the tracking data by phone numbers. Again the merge were checked manually to determine if the addresses were matched. No extra observations were merged in this step; all were covered in the earlier steps.

MCE Small Com program data provided a substantial number of service account IDs, which simplified the merging process. Although there was no e-mail information available, the data provided addresses, names and phone numbers. One issue that was noted is that when the two datasets could be merged by service account ID, there were some cases where the addresses of the two datasets did not match. It is not certain that these were completely valid merges. Based on all sequential merge steps taken, 497 IDs could merge to the CPUC tracking data.

A summary of the number of MCE Small Commercial Assessment/Audit transaction IDs and unique sites that merged with resource program claims in CPUC tracking data can be seen in Table 7-32. This table breaks down the number of transaction IDs and unique sites that merged back up to MCE claims and the number that merged up to PG&E resource claims as a way to determine how much of an effect the assessments and audits provided to MCE customers has had in leading them towards resource activities offered by the PAs. Based on the findings below, 363 of the 588 transaction IDs and 318 of the 451 sites were successfully merged to PG&E claims in the tracking data. This shows very positive support for the effect of this non-resource activity on generating energy savings through CA PA energy efficiency programs.

Again, it is important to remember that the number of merged IDs in Table 7-32 exceeds the number described above (497 IDs) because a single customer may be involved in multiple MCE and/or PG&E claims.

Table 7-32: Number of MCE Small Commercial Assessment/Audit Program Observations and Sites Merged to Tracking Data

PA	# of IDs	# of Sites
MCE	225	133
PG&E	363	318
Total	**588**	**451**

Merging MCE MF Pipeline Records

The customer information for MCE MF Pipeline program came from an Excel workbook provided by MCE called "MCE01_05_MF Pipeline Database Revised 9 14.xlsx". The workbook listed project name, manager name, building owner's name, phone number, service address, city and zip code, and contact e-mail address. There are 70 observations in the dataset, and 68 unique ID numbers. Two IDs had two observations each, with project names being phase

1 and phase 2, and the site information the same. Therefore, the merge was done at the site level, ignoring the project phase.

The dataset was merged to the tracking dataset by (1) addresses, (2) names, (3) phone numbers and (4) e-mail addresses. The number of unique IDs left after each merging step are listed in Table 7-33 below. After each step, the merged records were manually checked to make sure that the site listed in MCE's records is the same site as the one merged from the tracking data.

Table 7-33: Merging Steps of MCE Multifamily Pipeline Program Database to Tracking Data

Merge Steps	# Obs Left	# IDs Left	% Left
RawData	68	68	100%
After Address Merge	62	62	91%
After Name Merge	61	61	90%
After Phone Merge	61	61	90%
After E-Mail Merge	61	61	90%

1. Merge by Address: MCE MF Pipeline program data records were merged to the tracking data by address. The names from MCE MF Pipeline records and the tracking data were manually checked to match the names that were differently spelled. Overall, six observations were merged in this step.
2. Merge by Name: MCE MF Pipeline program data records were merged to the tracking data by names. MCE MF Pipeline data provided three name variables: owner name, manager name, and project manager name. A record was merged to the tracking data if either of the variables matched the name variables in the tracking data. Then the merges were checked manually to determine if the addresses matched. If so, the merge was considered valid. Overall, only 1 observation was merged in this step.
3. Merge by Phone Number: MCE MF Pipeline program data records were merged to the tracking data by phone numbers. Again the merge were checked manually to determine if the addresses were matched. No observations were merged in this step.
4. Merge by Email Address: MCE MF Pipeline program data records were merged to the tracking data by e-mail address. Again the merges were checked manually to determine if the addresses were matched. No new observations were merged in this step, but some observations that got merged in earlier steps found new matched records in the tracking data.

The success of merging this dataset to the CPUC tracking data was hampered by the fact that the MCE MF Com data did not provide the service account ID, and 15 out of 68 of the IDs listed in the MF dataset did not have any customer and/or site information. The addresses in the dataset

had street addresses, cities, and zip codes all together, if available, and there were many cities and zip codes missing. It took some time and effort to clean up the addresses. The name variables included owner name, manager name and project manager name, but no property names. The data sometimes used the property names as the project name, but not consistently. The CPUC tracking data always included the company name, which in the case of multifamily customers are the property name. While there was incomplete data, MCE's dataset provided good information on phone number and the e-mail addresses.

A summary of the number of MCE Multifamily Pipeline customer IDs and unique sites that merged with resource program claims in CPUC tracking data can be seen in Table 7-34. This table breaks down the number of IDs and unique sites that merged back up to MCE claims and the number that merged up to PG&E resource claims as a way to determine how much of an effect the multifamily program activities carried out by MCE customers has had in leading them towards resource activities offered by the PAs. Based on the findings below, four of the seven IDs and three of the 12 sites were successfully merged to PG&E claims in the tracking data. This shows some support for the effect of this MCE program on generating energy savings through CA PA energy efficiency programs.

Table 7-34: Number of MCE Multifamily Pipeline IDs and Sites Merged to Tracking Data

PA	# of IDs	# of Sites
MCE	3	3
PG&E	4	9
Total	**7**	**12**

7.4 Conclusions and Recommendations

Conclusion Non-Resource-1 [MCE, BayREN, SoCalREN]: The accomplishments documented in each PA's annual report are reasonably reliable and do not tend to overstate what they have achieved. Generally speaking, BayREN's Single Family Home Upgrade and Multifamily Upgrade non-resource accomplishments for 2013-14 could be verified. Using the supporting databases and information provided by BayREN, a verification of most of its Single Family Home Upgrade program and Multifamily Upgrade non-resource accomplishments could be conducted using the supporting databases and information provided. There was mixed success in verifying SoCalREN's and MCE's non-resource accomplishments for their programs and services. In some cases, the databases supported the non-resource accomplishments by showing the same or a larger quantity of activities than were stated in the accomplishments. In other cases, there were fewer activities found in the datasets provided than what was claimed in the non-resource accomplishment.

Recommendation Non-Resource-1 [MCE, BayREN, SoCalREN]: The RENs and MCE should archive copies of the databases from which the accomplishments are taken when non-resource accomplishments are reported so that all accomplishments can be verified in the future.

Conclusion Non-Resource-2 [MCE, BayREN, SoCalREN]: The databases provided by the RENs and MCE are generally collecting the necessary data to support future evaluations, although more complete information would improve the evaluability of their non-resource efforts. More complete contact information, such as names, phone numbers, addresses and e-mails allow customers to be contacted in the future, and increase the chances of data records being able to be merged to CPUC tracking data, and utility CIS and billing data. Databases where SAIDs are available make it easier to merge records to other data sources, such as CPUC tracking and CIS data. It is also important to attempt to track when customers go on to participate in IOU programs as a result of the various non-resource efforts, as well as document the recommendations that are provided as a result of audits and assessments. This would help support an attribution analysis of the influence of the PA's efforts on other energy efficiency adoptions that are not made through their programs.

Recommendation Non-Resource-2 [MCE, BayREN, SoCalREN]: The RENs and MCE should attempt to gather key contact information, electric and gas SAIDs, and document audit/assessment recommendations and participation in other programs whenever possible and relevant. For MCE's My Energy Tool, if customers identify that they have completed a recommendation from their action plan, we suggest the tool ask the customer to report if the action was done as a result of the recommendation.

Conclusion Non-Resource-3 [MCE, BayREN, SoCalREN]: MCE and BayREN have a unique customer identifier, but it is not used in all of their customer databases, and SoCalREN does not have a unique customer identifier. A unique customer identifier that is tracked in all customer related databases would allow for datasets to be easily merged and would allow for the development of a centralized database by customer ID containing key information.

Recommendation Non-Resource-3 [MCE, BayREN, SoCalREN]: MCE and BayREN should track their unique customer identifier on all customer related databases, and SoCalRENshould develop a unique customer identifier that is assigned to every customer as they come into contact with someone. Furthermore, a database should be developed that is a centralized repository for all customers and contains key information such as contact information, SAIDs, participation information, and information on other activities that the customer has been involved with.

Conclusion Non-Resource-4 [MCE, BayREN, SoCalREN]: The quality of the RENs' and MCE's non-resource databases reviewed was inconsistent. While some databases were very

easy to use, understand and navigate, others required more effort to analyze and understand. For example, in some instances data fields were poorly labeled, data within fields were not consistent, and information on how some accomplishments were calculated were not documented.

Recommendation Non-Resource-4 [MCE, BayREN, SoCalREN]: The RENs and MCE should consider reviewing the structure, format, and contents of their databases to improve consistency and usability; developing a data dictionary documenting variable names (with the exception of SoCalREN, who provided data dictionaries with all provided datasets); and documenting calculations. Some datasets could be improved by entering data in a consistent manner, tracking dates on which various activities occurred, and attempting to link records to electric and gas SAIDs. Other recommendations to improve the usability of the datasets include creating clearer variable names, developing a data dictionary documenting key variables, documenting calculations done within the workbooks, and performing calculations that can be done more globally that would not require formulas to be updated every time new records are added (e.g., instead of having a formula that sums three specific cells in a column, have the entire column summed up that interacts with an indicator variable that identifies if the record should be included in the sum).

Conclusion Non-Resource-5 [MCE, BayREN, SoCalREN]: The ability to merge the REN's and MCE's databases that track non-resource accomplishments related to energy audits, referrals, site visits, and advisor hotlines to CPUC tracking data is based on the collection of variables that can be used to link the records across sources, such as electric and/or gas service account IDs. Though the databases often include customer name, and sometimes address, phone number, and/or e-mail, they do not always include electric and/or gas service code account IDs because these variables are not always easy to gather when conducting non-resource activities such as marketing, outreach, advisement, and training.

Recommendation Non-Resource-5 [MCE, BayREN, SoCalREN]: The RENs and MCE should record names, addresses, phone numbers, and e-mail addresses in a consistent format, and collect IOU customer account IDs and service account IDs whenever possible, as part of their non-resource tracking systems in order to increase the ability to merge non-resource tracking records to CPUC tracking data. Collecting names, addresses, phone numbers, and e-mail addresses in a consistent format helps to simplify data cleaning steps that are taken before attempting merges, and IOU customer and service account numbers significantly increase the likelihood of merges.

Conclusion Non-Resource-6 [MCE, BayREN, SoCalREN]: The results of the merge for a sample of non-resource databases provide some evidence that the RENs and MCE are influencing customers to participate in IOU energy efficiency programs. The number of records that merged to IOU program tracking data was on the order of the number of participants

participating in the REN/MCE programs.[72] Therefore, there is evidence that REN and MCE non-resource activities have the potential to influence IOU participants. The magnitude of this effect could be significant relative to amount of participation occurring in each of the REN and MCE resource programs. However, these activities likely have a negligible effect relative to the amount of participation occurring in the IOU programs that they may be influencing. It is also important to note that a complete assessment of all non-resource efforts was not made. Also, no effort was made to identify what influence these programs have had on adoptions made outside of IOU programs (or intentions to adopt measures), which was outside the scope of this project, but could be another topic for a future evaluation.

Recommendation Non-Resource-6 [MCE, BayREN, SoCalREN]: Future evaluations of the RENs and MCE could replicate this analysis with additional program years and non-resource databases and attempt an attribution analysis in order to quantify the benefits of the non-resource activities. Furthermore, if the PAs collected more data to support this analysis as discussed in previous recommendations, it would improve the results for this activity**.** Future evaluations could also attempt to identify what influence these programs have had on intentions and/or on adoptions made outside of IOU programs.

[72] For example, 734 single family site IDs in BayREN's Home Upgrade Advisor tracking data merged to PG&E's resource program tracking data. This compares to BayREN's 684 participants in their single family program.

8

Appendices

A. MF and Commercial Survey instruments

B. Non-Resource Accomplishments of Codes and Standards and Financing Programs of RENs and CCA

C. Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers

Appendix A

Nonresidential Downstream Impact Evaluation Phone Survey and Multifamily Whole Building Program(s) Phone Survey

Participant Survey for CPUC
2013-2014 Commercial Evaluation

INTRODUCTION AND FINDING CORRECT RESPONDENT

OUTCOME1

This is _____ calling on behalf of the CPUC, from ITRON CONSULTING. THIS IS NOT A SALES CALL NOR A SERVICE CALL. May I please speak with ...<%CONTACT> ...<%OLDCONTACT> ... <%BUSINESS> ... the person at your organization that is most knowledgeable about your participation in <%UTILITY>'s <%PROGRAM> program.
!___[IF NEEDED]...This is a fact-finding survey only, authorized by the California Public Utilities Commission.

1	Yes (go to next screen)	Continue
2	Make appointment	Make appt and record time
3	Busy/engaged	Record Response and T&T
4	No Answer	Record Response and T&T
5	Refused	Record Response and T&T
6	Disconnected	Record Response and T&T
7	Answering Machine - no message	Record Response and T&T
8	Duplicate	Record Response and T&T
9	DRNA	Record Response and T&T

10	Disability	Record Response and T&T
11-12	Language Barriers	Record Response and T&T
13	Answering Machine - left message	Record Response and T&T
14	NO SCREEN - Participant	Record Response and T&T
15	Hang up	Record Response and T&T
16	Residence	Record Response and T&T
17	Fax	Record Response and T&T
18	Quota full	Record Response and T&T
19	Wrong Address	Record Response and T&T
20	Home office	Record Response and T&T
21	Max attempts	Record Response and T&T
24	General callback	Record Response and T&T
25	Name/Number changed	Record Response and T&T

Thank & Terminate PBLOCK NO_ONE	Thank you for your time. For this study, we need to speak to someone about your organization's installation of energy efficient equipment that your organization installed through <%UTILITY>'s <%PROGRAM> program.	END

Q1B	[IF YOU ARE TRANSFERRED TO ANOTHER PERSON OTHER THAN THE BEST CONTACT]Who would be the person most familiar about your organization's participation in <%UTILITY>'S <%PROGRAM> program? [ENTER NEW CONTACT NAME AND MOVE ON] [IF NEEDED] This is not a sales call. [IF NEEDED] This is a fact-finding survey only, and responses will not be connected with your firm in any way. The California Public Utilities Commission wants to better understand how businesses think about and manage their energy consumption.	
77	There is no one here who can help you	T&T
1	Continue Q1B until you find appropriate contact person, record as &NEW CONTACT NAME	Intro3:s

Intro3:S	[IF BEST CONTACT IS AVAILABLE] Hello, my name is _____%n_____ and I am calling on behalf of the California Public Utilities Commission from Itron Consulting. THIS IS NOT A SALES CALL. We are interested in speaking with the person most knowledgeable about your organization's participation in ... <%UTILITY>'s <%PROGRAM> program...I was told that would be you. ...Your organization participated in <%UTILITY>'s <%PROGRAM>

by installing lighting equipment around 2013 or 2014.

Through this program, your oganization installed....
<%CUSTOM_MEASURE>
<%QTY_1> ... <%UNITS_1> ... <%MEASURE_1>
<%QTY_2> ... <%UNITS_2> ... <%MEASURE_2>
<%QTY_3> ... <%UNITS_3> ... <%MEASURE_3>
Are you the best person to speak to about your organization's participation in this program?

1	Yes	Person:s
2	No, there is someone else	Intro3:s
3	No and I don't know who to refer you to	Appoint
5	Property management company handles this	PMNAME
99	Don't know/refused	T&T

Ext Is there a phone extension or phone number you recommend we use when we call back?

77	Record Extension or Phone Number, &PHONE	Thank&Terminate
88	Refused	Thank&Terminate
99	Don't know	Thank&Terminate

PMNAME May I have the name and contact information of your property management company?

1	Yes - RECORD	Record Response and T&T
2	No	Thank&Terminate
88	Refused	Thank&Terminate
99	Don't Know	Thank&Terminate

Appoint [IF RECOMMENDED CONTACT IS NOT CURRENTLY AVAILABLE]
When would be a good day and time for us to call back?

77	Record day of the week, time of day and date to call back, as &APPOINT	Record Response and T&T
88	Refused	Intro3(99)
99	Don't know	Intro3(99)

If Person(3)

Intro3(99)	Thank you for your time. We need to speak with the person at your organization that is most familiar with this facility's energy using equipment. Those are all of the questions I have for you today.	Abandoned User30

PBLOCK Hi Who would be the person at this location who is most knowledgeable about this facility's energy using equipment? [Enter New Contact Name and move on.]

77	Record Name, as &CONTACT	May_I

88	Refused	Thank&Terminate
99	Don't know	Intro3(99)

May_I May I speak with him/her?

77	Yes	Intro3:s
88	No (not available right now@, set cb)	Abandoned Appointment

PERSON:s

According to our records, your organization participated in <%UTILITY>'s <%PROGRAM> program by installing energy saving equipment around ... <%DEEM_PAID_DATE1> <%CUST_PAID_DATE>
Through this program, your organization installed....
<%CUSTOM_MEASURE>
<%QTY_1> ... <%UNITS_1> ... <%MEASURE_1>
<%QTY_2> ... <%UNITS_2> ... <%MEASURE_2>
<%QTY_3> ... <%UNITS_3> ... <%MEASURE_3>
Are you the person most knowledgeable about your organization's participation in ...<%UTILITY>'s <%PROGRAM> Program?

1	Yes	Continue
2	Yes, need to make appointment	Appoint
4	No, but I will give you a name	Thank&Terminate
99	No one knows about the energy using equipment	Thank&Terminate

DISPLAY

If you need to provide validation for this survey, provide the following contact name and number: Mona Dzvova (LAST NAME PRONOUNCED 'ZOVA'), (415) 703-1231, and the following website: **www.cpuc.ca.gov/eevalidation**

Before we start, I would like to inform you that for quality control purposes, this call may be monitored by my supervisor.Today we're conducting a very important study on the energy needs and perceptions of organizations like yours. We are interested in how organizations like yours think about and manage their energy consumption.Your input will allow the California Public Utilities Commission to build and maintain better energy savings programs for customers like you. And we would like to remind you, your responses will not be connected with your organization in any way.

SCREENER

VERIFY For verification purposes only, may I please have your name?

77	Get name	Scrn_Addr
88	Refused	Scrn_Addr
99	Don't know	Scrn_Addr

DISPLAY For the sake of expediency, I will refer to ....<%UTILITY>'s <%PROGRAM> ...program as the PROGRAM.

Scrn_Addr

First, I'd like to ask you a few questions about your organization and facility. Our records show your organization is located at %ADDRESS in %CITY. Is that correct?
[CONTINUE IF ADDRESS REPORTED BY RESPONDENT IS SIMILAR ENOUGH]

1	Yes	Bus_Name
2	No	CORRECT
88	Refused	COMMENT
99	Don't Know	COMMENT

COMMENT

We were attempting to reach <%UTILITY>'s customer at <%ADDRESS> and since you cannot confirm this address, those are all the questions that we have for you today, on behalf of the California Public Utilities Commission, thank you for your time.

CORRECT

May I have your correct address?

%CORRECT	Corrected Address	COMPARE

COMPARE

Are these addresses similar or totally different?
Computer Address - %ADDRESS
Corrected Address - &CORRECT

1	Similar	Bus_Name
2	Totally Different	COMMENT2

COMMENT2	We were attempting to reach the <%UTILITY> customer at <%ADDRESS> in <%CITY> and since that does not match your address, then we must have mis-dialed the telephone number. Those are all the questions that we have for you today, on behalf of the California Public Utilities Commission. Thank you for your time and cooperation.	Thank and Terminate

BUS_NAME

Our records show your organization's name as: <%BUSINESS> <%CONTACT> <%OLDCONTACT>. Is that correct?

1	Yes	INCENT
2	No	Bus_Correct
88	Refused	COMMENT
99	Don't Know	COMMENT

BUS_CORRECT

What is the correct name for your organization?

&BUS_CORRECT	Corrected Business	INCENT

INCENT

What percentage of the cost of your rebated equipment was covered by the program?

77	RECORD RESPONSE	A1gg
88	REFUSED	FM050
99	DON'T KNOW	FM050

IF INCENT <> 100 then ask; Else skip to FM050

A1gg	What incentive amount did your organization receive from the program towards your energy efficient equipment installation?	
77	RECORD VERBATIM	FM050
88	Refused	FM050
99	Don't know	FM050

FM050	What is the main business ACTIVITY at this facility? [DO NOT READ]	
1	Offices (non-medical)	FM050a
2	Restaurant/Food Service	FM050b
3	Food Store (grocery/liquor/convenience)	FM050c
4	Agricultural (farms, greenhouses)	FM050d
5	Retail Stores	FM050e
6	Warehouse	FM050f
7	Health Care	FM050g
8	Education	FM050h
9	Lodging (hotel/rooms)	FM050i
10	Public Assembly (church, fitness, theatre, library, museum, convention)	FM050j
11	Services (hair, nail, massage, spa, gas, repair)	FM050k
12	Industrial (food processing plant, manufacturing)	FM050l
13	Laundry (Coin Operated, Commercial Laundry Facility, Dry Cleaner)	FM050m
14	Condo Assoc./Apartment Mgr (Garden Style, Mobile Home Park, High-rise, Townhouse)	FM050n
15	Public Service (fire/police/postal/military)	FM050o
77	OPEN\Record Other Service Shop	LANG
88	Refused	LANG
99	Don’t know	LANG

FM050a	Which of the following types of offices best describes this facility? Would you say...[READ]	
1	Administration and management	LANG
2	Financial/Legal	LANG
3	Insurance/Real Estate	LANG
4	Data Processing/Computer Center	LANG
5	Mixed-Use/Multi-tenant	LANG
6	Lab/R&D Facility	LANG
7	Software Development	LANG
8	Government Services	LANG
9	Office with Warehouse	LANG
10	Contractor's Offices	LANG
11	Telecommunications Center (call center)	LANG
12	Travel Services (Travel Agent)	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don’t know	LANG

FM050b Which of the following types of restaurants or food service best describes this facility? Would you say… [READ]

1	Fast Food or Self Service	LANG
2	Specialty/Novelty Food Service	LANG
3	Table Service	LANG
4	Bar/Tavern/Nightclub/Brew Pub or Microbrewery/Other entertainment	LANG
5	Caterer	LANG
6	Other Food Service	LANG
88	Refused	LANG
99	Don't know	LANG

FM050c Which of the following types of food stores best describes this facility? Would you say...[READ]

1	Supermarkets	LANG
2	Small General Grocery	LANG
3	Specialty/Ethnic Grocery/Deli	LANG
4	Convenience Store	LANG
5	Liquor Store	LANG
6	Retail Bakery	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050d What type of agricultural facility is this? [READ]

1	Commercial Greenhouse	LANG
2	Commercial Farm	LANG
3	Dairy/Ranch	LANG
4	Vineyard/Orchard	LANG
5	Agricultural Storage (Grain Elevators, etc.)	LANG
6	Equine Facility (Horse Boarding/Grooming/Racing/Breeding)	LANG
77	OPEN\Describe type of agricultural facility	LANG
88	Refused	LANG
99	Don't know	LANG

FM050e Which of the following types of retail stores best describes this facility? Would you say… [READ]

1	Department/Variety Store	LANG
2	Retail Warehouse/Club	LANG
3	Shop in Enclosed Mall	LANG
4	Shop in Strip Mall	LANG
5	Auto/Truck/Motorcycle Sales	LANG
6	Art Gallery	LANG
7	Auction House	LANG
8	Heavy Equipment Sales	LANG
9	Facility is a Mall/Strip Mall	LANG

77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050f Which of the following types of warehouses best describes this facility? Would you say… [READ]

1	Refrigerated Warehouse	LANG
2	Unconditioned Warehouse, High Bay (lighting higher than 13 ft.)	LANG
3	Unconditioned Warehouse, Low Bay	LANG
4	Conditioned Warehouse, High Bay (lighting higher than 13 ft.)	LANG
5	Conditioned Warehouse, Low Bay	LANG
6	Shipping/Distribution Center	LANG
7	Garage/Parking/Storage for Commercial Fleet	LANG
8	Public Self Storage Facility	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050g Which of the following types of health care centers best describes this facility? Would you say… [READ]

1	Hospital	LANG
2	Nursing Home	LANG
3	Medical/Dental Office	LANG
4	Clinic/Outpatient Care	LANG
5	Medical/Dental Lab	LANG
6	Alcohol/Drug Treatment/Rehabilitation	LANG
7	Doctor's Office	LANG
8	Dentist's Office	LANG
9	Veterinary Hospital/Clinic	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050h Which of the following types of educational centers best describes this facility? Would you say… [READ]

1	Daycare or Preschool	LANG
2	Elementary School	LANG
3	Middle/Secondary School	LANG
4	College or University	LANG
5	Vocational or Trade School	LANG
6	Instructional Studio (Dance/Music/Martial Arts)	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050i Which of the following types of lodging best describes this facility? Would you say… [READ]

1	Hotel	LANG
2	Motel	LANG
3	Resort	LANG
4	Bed and Breakfast	LANG
5	Campground/Trailer Camping/KOA	LANG
6	Residential Hotel/Motel	LANG
7	Dormitory/Sorority/Fraternity	LANG
8	Activity Camp/Summer Camp	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050j Which of the following types of public assembly buildings best describes this facility? Would you say… [READ]

1	Religious Assembly (worship only)	LANG
2	Religious Assembly (mixed use)	LANG
3	Health/Fitness Center/Athletic Center/Gym	LANG
4	Movie Theaters	LANG
5	Theater/Performing Arts Venue	LANG
6	Library/Museum	LANG
7	Conference/Convention Center	LANG
8	Community Center/Activity Center	LANG
9	Country Club	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050k Which of the following types of service buildings best describes this facility? Would you say...[READ]

1	Hair Salon	LANG
2	Nail Salon	LANG
3	Massage Spa	LANG
4	Day Spa	LANG
5	Gas Station/Auto Repair	LANG
6	Gas Station w/Convenience Store	LANG
7	Repair (Non-Auto)	LANG
8	Copy Center/Printing	LANG
9	Package Delivery (Fed Ex/UPS/DHL)	LANG
10	HVAC Repair Installation	LANG
11	Aircraft Maintenance/Repair	LANG
12	Airport	LANG
13	Parking Lot/Commuter Service	LANG
14	Marina	LANG

15	Amusement (mini-golf/go-carts/skating/bowling)	LANG
16	Pet Care/Grooming	LANG
17	Car Rental	LANG
18	Car Wash	LANG
19	Cemetery/Mortuary/Crematorium	LANG
20	Equipment Rental	LANG
21	Fleet Fueling Services	LANG
22	Pest Control	LANG
23	Photographer	LANG
24	Vehicle Inspections	LANG
25	Transportation	LANG
26	Upholstery	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050l Which of the following types of buildings best describes this facility? Would you say...[READ]

1	Assembly/Light Manufacturing	LANG
2	Food Processing Plant	LANG
3	Recycling Center	LANG
4	Commercial/Industrial Bakery	LANG
5	Commercial Brewery/Winery	LANG
6	Chemical/Petrochemical Production	LANG
7	Industrial Process	LANG
8	Radio/Television/Film/Music Production	LANG
9	Energy Generation/Distribution	LANG
10	Machine Shop	LANG
11	Pharmaceutical Production/Manufacturing	LANG
12	Mail Sorting	LANG
13	Mining	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050m What type of laundry facility is this? [READ]

1	Coin Operated	LANG
2	Commercial Laundry Facility	LANG
3	Dry Cleaners	LANG
77	OPEN\Record other building type	LANG
88	Refused	LANG
99	Don't know	LANG

FM050n Which of the following types of buildings best describes this facility? Would you say...[READ]

1	Garden Style	LANG
2	Mobile Home	LANG
3	High-rise	LANG
4	Townhouse	LANG
5	Condominium	LANG
6	Apartment	LANG
7	Artists' Studio/Live Work/Loft	LANG
8	Assisted Living	LANG
77	OPEN\Record other building type	LANG
88	Refused	LANG
99	Don't know	LANG

FM050o Which of the following types of buildings best describes this facility? Would you say...[READ]

1	Police station	LANG
2	Fire station	LANG
3	Post office	LANG
4	Military	LANG
5	Ambulance Service	LANG
6	Jail/Correctional facility	LANG
7	Courthouse	LANG
8	Library	LANG
9	Water/Waste Water Treatment	LANG
10	General Government (Municipal/State/Federal Agency Buildings)	LANG
11	Public Park	LANG
77	OPEN\Record other building type	LANG
88	Refused	LANG
99	Don't know	LANG

LANG Is another language besides English used to conduct business at this facility?

1	Yes	OTH_LANG
2	No	CC2a
88	Refused	CC2a
99	Don't Know	CC2a

OTH_LANG Which languages are used to conduct business at this facility?

1	Spanish	CC2a
2	Chinese	CC2a
3	Korean	CC2a
4	Vietnamese	CC2a
5	Japanese	CC2a
6	Hindi	CC2a
77	OPEN	CC2a

88	Refused	CC2a
99	Don't know	CC2a

CUSTOMER CHARACTERISTICS

Now, I'd like to ask you questions regarding your facility.

CC2a What is the total square footage at this facility?

77	RECORD Square feet	CC2c
888888	Refused	CC3
999999	Don't know	CC3

IF CC2a IN (88, 99)

CC3 Would you say that the floor area is ...?

1	less than 1,500 sq. ft.	CC2c
2	1,500 - 5,000 sq. ft.	CC2c
3	5,000 - 10,000 sq. ft.	CC2c
4	10,000 – 25,000 sq. ft.	CC2c
5	25,000 – 50,000 sq. ft.	CC2c
6	50,000 – 75,000 sq. ft.	CC2c
7	75,000 – 100,000 sq. ft.	CC2c
8	over 100,000 sq. ft. (ag area)	CC2c
88	Refused	CC2c
99	Don't know	CC2c

CC2c Is the entire floor area of this facility heated or cooled?

1	Yes	CC3a
2	No	CC2d
88	Refused	C0
99	Don't know	C0

CC2d What percentage of the floor area is heated or cooled?

77	Percent	CC3a
101	Refused	C0
102	Don't know	C0

If CC2d > 0 or CC2c = 1; else skip to C0

CC3a Is your space heated using electricity or gas or something else?

1	Electricity	C0
2	Gas	C0
3	Both electricity and gas	C0
4	Propane	C0
77	OPEN\Other-record	C0
88	Refused	C0

99	Don't know	C0

C0 About what percentage of your operating costs does energy account for?

1	Less than 1 percent	CC4
2	1-2 percent	CC4
3	3-5 percent	CC4
4	6-10 percent	CC4
5	11-15 percent	CC4
6	16-20 percent	CC4
7	21-50 percent	CC4
8	Over 51 percent	CC4
88	Refused	CC4
99	Don't Know	CC4

CC4 Does your organization own, lease, or manage the facility?

1	Own	C5
2	Lease/Rent	C5
3	Manage	C5
88	Refused	C5
99	Don't know	C5

C5 How many locations does your organization have. Is it....

1	This facility only	CC6
2	2 to 4 locations	CC6
3	5 to 10 locations	CC6
4	11 to 25 locations	CC6
5	more than 25 locations	CC6
88	Don't know	CC6
99	Refused	CC6

CC6 How active a role does your organization take in making purchase decisions related to energy using equipment at this facility? Would you say you are…

1	Very active – involved in all phases and have veto power	CC8
2	Somewhat active – we approve decisions and provide some input and review	CC8
3	Slightly active – we have a voice but it's not the dominant voice	CC8
4	Not active at all – we're part of a larger firm	CC8
5	Not active at all – our firm doesn't get involved in these issues	CC8
88	Refused	CC8
99	Don't know	CC8

CC8 In what year was the facility built?

7777	Year	CC11
8888	Refused	CC10

9999	Don't know	CC10

If CC8 in (88, 99) then ask; else skip to CC11

CC10 If don't know, would you say it was…

1	After 2010	CC11
2	2000s	CC11
3	1990s	CC11
4	1980s	CC11
5	1970s	CC11
6	1960s	CC11
7	1950	CC11
8	Before 1950	CC11
88	Refused	CC11
99	Don't know	CC11

CC11 In what year was this facility last remodeled? [PROBE FOR BEST GUESS]

7777	Year	CC12a
6666	Never Remodeled	CC12a
8888	Refused	CC11a
9999	Don't know	CC11a

Ask if CC11 in (88, 99); else skip to CC12a

CC11a Would you say the last remodeling was done …. [READ RESPONSES.]

1	Between 2010 and present	CC12a
2	Between 2006 and end of 2009	CC12a
3	Between 2000 and the end of 2005	CC12a
4	During the 1990s	CC12a
5	Before the 1990s	CC12a
88	Refused	CC12a
99	Don't know	CC12a

CC12a In what year was this organization established at this location?

7777	Year	BC090
8888	Refused	CC12b
9999	Don't know	CC12b

If CC12a in (88, 99) then ask; else skip to BC090

CC12b Would you say it was…

1	After 2010	BC090
2	Between 2006 and 2010	BC090
3	Between 2000 and 2005	BC090
4	In the 1990s	BC090
5	In the 1980s	BC090
6	In the 1970s	BC090

7	In the 1960s or	BC090
8	Before 1960	BC090
88	Don't know	BC090
99	Refused	BC090

ADDITIONAL FACILITY CHARACTERISTICS

BC090 Has the square footage of the facility increased, decreased or remained the same since January 2012?

1	Increase in square footage	BC100
2	Decrease in square footage	BC110
3	Stayed the same	CA15
88	Refused	CA15
99	Don't know	CA15

If BC090 = 1 then ask; else skip to BC110

BC100 How many square feet were added?

77	Square feet	BC120
88	Refused	BC120
99	Don't know	BC120

If BC090 = 2 then ask; else skip to BC120

BC110 By how many square feet was the facility reduced?

77	Square feet	BC120
88	Refused	BC120
99	Don't know	BC120

If BC090 in (1, 2) then ask; else skip to CA15

BC120 In what year did this <%BC090> occur?

1	2012	V1
2	2013	V1
3	2014	V1
88	Refused	V1
99	Don't know	V1

ROLE OF CONTRACTORS

V1 Did you use a contractor/vendor to install any of the the energy efficient measures that were purchased through the program?

1	Yes	V2
2	No	AP9
88	Refused	AP9
99	Don't Know	AP9

If V1 = 1 then ask; else skip to AP9

V2 How did you come into contact with the contractor/vendor?

1	They contacted you	V2b
2	You contacted them	V3
3	You had worked with them before	V2a
77	OTHER - Record	V3
88	Refused	V3
99	Don't Know	V3

Ask if V2 = 3; else skip to V2b

V2a In relation to this project, did the vendor/contractor approach you about your energy efficient equipment retrofit/installation?

1	Yes	V2b
2	No	V3
88	Refused	V3
99	Don't Know	V3

Ask if V2 = 1 or V2a = 1; else skip to V3

V2b On a scale of 0 - 10, with 0 being NOT AT ALL LIKELY and 10 is VERY LIKELY, how likely is it that your organization would have installed this new equipment had the contractor/vendor not contacted you?

1	0-10 response	V3
88	Refused	V3
99	Don't Know	V3

V3 Did the contractor/vendor tell you about or recommend the program?

1	Yes	V4
2	No	AP9
88	Refused	AP9
99	Don't Know	AP9

Ask if V3 = 1; else skip to AP9

V4 Prior to coming into contact with the contractor/vendor, did your organization have plans to replace/install this equipment?

1	Yes	V4a
2	No	V4a
88	Refused	V4a
99	Don't Know	V4a

V4a Using the same scale of 0 - 10 as before, how likely is it that your organization would have installed the new energy efficient equipment had the contractor/vendor not recommended it?

1	0-10 response	V4b

88	Refused	V4b
99	Don't Know	V4b

V4b Using the same scale, how likely is it that your organization would have installed the energy efficient equipment with the same level of efficiency if the contractor/vendor had not recommended to do so?

1	0-10 response	V40
88	Refused	V40
99	Don't Know	V40

V40 On a scale of 0 - 10, with 0 being not at all important and 10 being very important, how important was the input from the contractor you worked with in deciding which specific equipment to install?

1	0-10 response	AP9
88	Refused	AP9
99	Don't Know	AP9

PROGRAM AWARENESS

Next, I'd like to ask you about various energy efficiency programs and what influenced your program participation.

AP9 How did you FIRST learn about <%UTILITY>'s program? [DO NOT READ ANSWERS]

1	Bill insert	AP9a
2	Program literature	AP9a
3	Account representative	AP9a
4	Program approved vendor	AP9a
5	Program representative	AP9a
6	Utility or program website	AP9a
7	Trade publication	AP9a
8	Conference	AP9a
9	Newspaper article	AP9a
10	Word of mouth	AP9a
11	Previous experience with it	AP9a
12	Company used it at other locations	AP9a
13	Contractor	AP9a
14	Result of an audit	AP9a
15	Part of a larger expansion or remodeling effort	AP9a
77	Other (RECORD VERBATIM)	AP9a
88	Refused	A1b
99	Don’t know	A1b

If AP9 in (1-77) then ask; else skip to A1b

AP9a How ELSE did you learn about <%UTILITY>'s program? [DO NOT READ LIST, ACCEPT MULTIPLES]

1	Bill insert	N33
2	Program literature	N33
3	Account representative	N33
4	Program approved vendor	N33
5	Program representative	N33
6	Utility or program website	N33
7	Trade publication	N33
8	Conference	N33
9	Newspaper article	N33
10	Word of mouth	N33
11	Previous experience with it	N33
12	Company used it at other locations	N33
13	Contractor	N33
14	Result of an audit	N33
15	Part of a larger expansion or remodeling effort	N33
77	Other (RECORD VERBATIM)	N33
88	Refused	N33
99	Don't know	N33

If AP9 = 3 or AP9A = 3 then ask; else skip to A1b
You mentioned that you have a Utility or Program Administrator Account Rep.
Can you give me his or her name?
!!___Do you have his/her email address?
!___Do you have a phone number for him/her?
N33 !___Do you have a cell phone number for him/her?\,

77	RECORD NAME, Phone, Email, etc.	A1b
88	Refused	A1b
99	Don't know	A1b

INTEGRATED DEMAND SIDE MANAGEMENT

If AUDIT = 1 then ask; else skip to ID0
A1b According to our records, your organization also received an AUDIT from <%UTILITY>. Is this correct?

1	Yes	ID0
2	No	ID0
88	Refused	ID0
99	Don't know	ID0

If AUDIT <> 1

ID0 To the best of your knowledge, has the facility located at this address received a <%UTILITY>-sponsored energy audit within the past 3 years?

1	Yes	ID1
2	No	ID1
88	Refused	ID1
99	Don't Know	ID1

ID1 Are you aware of other programs, other than the one we mentioned earlier, or resources that are designed to help organizations like yours reduce its energy bills?

1	Yes	ID2
2	No	ID3
88	Refused	ID3
99	Don't Know	ID3

If ID1 = 1 then ask; else skip to ID3

ID2 What types of programs can you recall? **[RECORD ALL MENTIONS]** [After each response prompt with "Can you recall any others?"]

1	Rebates/incentives (include mentions of SPC and Express)	ID3
2	Building Commissioning (Retrocommissioning, Monitoring based commissioning)	ID3
3	Business energy audits and feasibility studies	ID3
4	Energy Centers (Pacific Energy Center, SCE CTAC)	ID3
5	Seminars, classes, and workshops	ID3
6	Solar or other Distributed Generation Programs (CSI, SGIP)	ID3
7	Demand Response Programs (Flex Your Power, Peak Choice, BIP, DBP, Aggregator, PDP) ID3	ID3
8	Upstream HVAC and Motors Program	ID3
77	Other programs [SPECIFY:]_____	ID3
88	Refused	ID3
99	Don't Know	ID3

ID3 Has your Account Representative, or any Program Staff or Program Vendors discussed solar, wind or other self-generation equipment opportunities with you?

1	Yes, Account Representative	ID3a
2	Yes, Program Staff	ID3a
3	Yes, Program Vendor	ID3a
4	No	ID3a
88	Refused	ID3a
99	Don't Know	ID3a

ID3a Has your Account Representative, Program Staff, or Program Vendors discussed Demand Reduction programs, technologies, or opportunities with you? (Select all that apply)

1	Yes, Account Representative	Program_Lighting
2	Yes, Program Staff	Program_Lighting
3	Yes, Program Vendor	Program_Lighting
4	No	Program_Lighting
88	Don't Know	Program_Lighting
99	Refused	Program_Lighting

PROGRAM LIGHTING EQUIPMENT

Ask if LIGHTING = 1; else skip to NEXT BATTERY

Comment	One way that organizations like yours can reduce their energy use is to install more energy efficient lighting equipment. I would like to ask you about the lighting changes you made as part of your participation in <%UTILITY>'s program.	LI99

CONTINUE IF CUSTOM = 1; ELSE SKIP TO A3A IF DEEMED = 1

LI99 Our records indicate that your organization installed CUSTOM LIGHTING EQUIPMENT through the program. It is described as <%CUSTOM_MEASURE>. Is this correct?

1	Yes	LI100
2	No	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

Ask if LI99 in (2-99); else skip to LI100.

DISPLAY	We can not continue this study unless we can speak to someone at your organization that is familiar with the lighting equipment that was installed through the program.	A3A

Ask if LI99 = 1; else skip to A3A.

LI100 What types of fixtures, ballasts, or light controls were installed as part of this lighting installation? <$2>

1	High performance T8 (1" diameter bulbs)	LI101A <$1>
2	T8 fluorescent fixtures (1" diameter bulbs)	LI101A <$1>
3	T10 fluorescent fixtures	LI101A <$1>
4	Compact HID (High Density Discharge) Fixtures	LI101A <$1>
5	Screw-in modular CFLs	LI101A <$1>
6	Hardwire CFL fixtures	LI101A <$1>
7	CFL Exit Signs	LI101A <$1>

8	Led Exit Signs	LI101A <$1>
9	Halogen bulbs	LI101A <$1>
10	Reflectors	LI101A <$1>
11	Electronic Ballasts	LI101A <$1>
12	Lighting Controls, Time Clock	LI101A <$1>
13	Lighting Controls, Occupancy Sensor	LI101A <$1>
14	Lighting Controls, Bypass/Delay Timers	LI101A <$1>
15	Lighting Controls, Photocell	LI101A <$1>
16	Other Fluorescent	LI101A <$1>
17	Skinny/Thin Tubes	LI101A <$1>
18	T5 Fixtures (5/8" diameter)	LI101A <$1>
19	Screw-in LEDs	LI101A <$1>
20	Screw-in LEDs Reflector Lamps	LI101A <$1>
21	LED Fixtures or Panels (e.g., replacement for linear fixtures)	LI101A <$1>
77	Other (PLEASE SPECIFY)	LI101A <$1>

IF CUSTOM = 1 START MACRO <LI99> FOR CUSTOM MEASURES (LI101A THROUGH LI101H)

LI101A ($1) Approximately how many <$2> were installed through the program?

77	Record #	LI101C <$4>
8888	Refused	LI101B <$3>
9999	Don't know	LI101B <$3>

If LI101A <$1> in (88, 99) the ask; else skip to LI101C <$4>

LI101B ($3) Would you say that the number of <$2> installed under the program are…

1	less than 10 units	LI101C <$4>
2	11 - 50 units	LI101C <$4>
3	50 - 100 units	LI101C <$4>
4	More than 100 units	LI101C <$4>
88	Refused	LI101C <$4>
99	Don't know	LI101C <$4>

LI101C ($4) Were any of the program provided <$2> placed/installed at another facility? If so, what percentage would you estimate?

1	Yes, #record percentage	LI101D <$5>
2	No	LI101D <$5>
101	Refused	LI101D <$5>
102	Don't know	LI101D <$5>

LI101D ($5) What type of lighting equipment was removed and replaced when you installed <$2> through the program?

1	High performance T8 (1" diameter bulbs)	LI101F <$7>
2	T8 fluorescent fixtures (1” diameter bulbs)	LI101F <$7>
3	T10 fluorescent fixtures	LI101F <$7>
4	T12 Fixtures (1.5” diameter bulbs)	LI101F <$7>
5	Compact HID (High Density Discharge) Fixtures	LI101E <$6>
6	Screw-in Modular CFLs	LI101F <$7>
7	Hardwire CFL Fixtures	LI101F <$7>
8	Incandescent bulbs	LI101F <$7>
9	CFL Exit Signs	LI101F <$7>
10	LED Exit Signs	LI101F <$7>
11	Halogen bulbs	LI101F <$7>
12	Reflectors	LI101F <$7>
13	Electronic Ballast	LI101F <$7>
14	Magnetic Ballast	LI101F <$7>
15	Manual Switches	LI101F <$7>
16	Lighting Controls, Time Clock	LI101F <$7>
17	Lighting Controls, Occupancy Sensor	LI101F <$7>
18	Lighting Controls, Bypass/Delay Timers	LI101F <$7>
19	Lighting Controls, Photocell	LI101F <$7>
20	Other Fluorescent	LI101F <$7>
21	Fat/Thick Tubes	LI101F <$7>
22	Skinny/Thin Tubes	LI101F <$7>
23	T5 Fixtures (5/8” diameter)	LI101F <$7>
24	Screw-in LEDs	LI101F <$7>
25	Screw-in LEDs Reflector Lamps	LI101F <$7>
26	LED Fixtures or Panels (e.g., replacement for linear fixtures)	LI101F <$7>
66	Did not replace anything - new equipment	LI90
77	Other (PLEASE SPECIFY)	LI101F <$7>

Ask if LI101D <$5> = 5; else skip to LI101F

LI101E ($6) Were the HID lamps you removed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?

1	High pressure sodium	LI101F <$7>
2	Metal Halide	LI101F <$7>
3	Mercury Vapor	LI101F <$7>
4	Incandescent	LI101F <$7>
88	Refused	LI101F <$7>
99	Don't know	LI101F <$7>

Ask if LI101D <$5> <> 66; else skip to LI90

LI101F ($7) Approximately how old was the lighting that was removed and replaced with <$2>? Would you say...

1	Less than 5 years old	LI101G <$8>

2	Between 5 and 10 years old	LI101G <$8>
3	Between 10 and 15 years old	LI101G <$8>
4	More than 15 years old	LI101G <$8>
88	Refused	LI101G <$8>
99	Don't know	LI101G <$8>

LI101G ($8) How would you describe the removed equipment's condition? Would you say they were in…

1	Poor condition	LI101H <$9>
2	Fair condition	LI101H <$9>
3	Good condition	LI101H <$9>
88	Refused	LI101H <$9>
99	Don't know	LI101H <$9>

LI101H ($9) Approximately what percentage of the lighting equipment that was removed and replaced was broken or not working prior to installing <$2>?

%	Percent	LI90
101	Refused	LI90
102	Don't know	LI90

END MACRO FOR CUSTOM MEASURES; RESTART LOOP IF NEEDED FOR ADDITIONAL MEASURES SELECTED IN LI100; ELSE GO TO LI90

Ask if LI100 = 5

LI90 Of the CFLs you received through the program,what percentage do you estimate were placed into storage for later use?

77	Open Record	LI901
101	Refused	LI901
102	Don't know	LI901

Ask if LI100 = 19

LI901 Of the LEDs you received through the program,what percentage do you estimate were placed into storage for later use?

77	Open Record	LI902
101	Refused	LI902
102	Don't know	LI902

Ask only if LI100 = 20

LI902 Of the LED Reflector Lamps you received through the program,what percentage do you estimate were placed into storage for later use?

77	Open Record	CUST_INSTALL_DATE_NU

101	Refused	CUST_INSTALL_DATE_NU
102	Don't know	CUST_INSTALL_DATE_NU

CUST_INSTALL_DATE_NU

IF UNRECORDED <> CUST_INSTALL_DATE;
Our records indicate that your company installed this CUSTOM LIGHTING EQUIPMENT on <%CUST_INSTALL_DATE>. Is this correct?

1	Yes	NTGCHECK
2	No	CUST_INSTALL_YEAR
88	Refused	CUST_INSTALL_YEAR
99	Don't know	CUST_INSTALL_YEAR

DISPLAY

IF UNRECORDED(CUST_INSTALL_DATE) & ^UNRECORDED(CUST_PAID_DATE);
According to our records, your organization received a rebate for the installation of your CUSTOM LIGHTING EQUIPMENT on ... <%CUST_PAID_DATE>.
IF CUST_INSTALL_DATE_NU = 2 OR (UNRECORDED = CUST_INSTALL_DATE AND UNRECORDED <> CUST_PAID_DATE);

CUST_INSTALL_ YEAR

In what year did you install this CUSTOM LIGHTING EQUIPMENT (PROBE FOR BEST GUESS)

1	2013	CUST_INSTALL_MONTH
2	2014	CUST_INSTALL_MONTH
88	Refused	NTGCHECK
99	Don't know	NTGCHECK

CUST_INSTALL_ MONTH

If CUST_INSTALL_YEAR in (1-3) then ask; else skip to A3a
And in which Month. If you don't know the MONTH, could you remember the SEASON?

1	January	NTGCHECK
2	February	NTGCHECK
3	March	NTGCHECK
4	April	NTGCHECK
5	May	NTGCHECK
6	June	NTGCHECK
7	July	NTGCHECK
8	August	NTGCHECK
9	September	NTGCHECK
10	October	NTGCHECK
11	November	NTGCHECK
12	December	NTGCHECK

13	Fall	NTGCHECK
14	Winter	NTGCHECK
15	Spring	NTGCHECK
16	Summer	NTGCHECK
88	Refused	NTGCHECK
99	Don't know	NTGCHECK

NTGCHECK

GO TO NTG BATTERY IF NTGCUSTOM = 1; ELSE CONTINUE

IF DEEMED = 1 START LOOP FOR DEEMED MEASURES (<%LT_MEAS_x>, WHERE x = 1, 2, or 3); ELSE SKIP TO LI30

A3[A-C]

According to our records, your organization (MxDELAMP = 0) installed/delamped <%LT_QTY_x> <%LT_MEAS_x> through <%UTILITY>'s program, is this correct? [IF MxDELAMP == 1, READ: delamping occurs when you retrofit your T12s to T8s and reduce the number of lamps in a fixutre or simply reduce the number of fixtures]

1	Yes - Quantity is Correct	DEEMED_INSTALL_DATE_NU
2	Yes - Installed Different Quanity	A3_QTY
3	No, did not install	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

DISPLAY

IF A3[A-C](3 - 99), READ: "We must conduct this study with someone that knows about the installation of this measure." and ABANDON USER. Else continue with A3[A-C]_QTY

A3[A-C]_QTY

Ask if A3[A-C] = 2 or LT_QTY_x = 0
Approximately how many units of <%LT_MEAS_x> were (MxDELAMP = 0) installed/delamped under the %PROGRAM program?

77	Record #	DEEMED_INSTALL_DATE_NU
8888	Refused	A3_OTH
9999	Don't know	A3_OTH

A3[A-C]_OTH

IF A3_QTY IN (88, 99)
Would you say that the number of <%LT_MEAS_x> (MxDELAMP = 0) installed/delamped are…

1	less than 10 units	DEEMED_INSTALL_DATE_NU
2	11 - 50 units	DEEMED_INSTALL_DATE_NU
3	50 - 100 units	DEEMED_INSTALL_DATE_NU
4	More than 100 units	DEEMED_INSTALL_DATE_NU

88	Refused	DEEMED_INSTALL_DATE_NU
99	Don't know	DEEMED_INSTALL_DATE_NU

DEEM_INSTALL_DATEx_NU	**IF ^UNRECORDED(DEEM_INSTALL_DATEx)** Our records indicate that your organization <(MxDELAMP = 0)/installed/delamped> ...<%LT_MEAS_x> on <%DEEM_INSTALL_DATEx>. _____Is this correct?	
1	Yes	LI18
2	No	DEEM_INSTALL_YEAR
88	Refused	DEEM_INSTALL_YEAR
99	Don't know	DEEM_INSTALL_YEAR

DISPLAY	**IF UNRECORDED(DEEM_INSTALL_DATEx) & ^UNRECORDED(DEEM_PAID_DATEx)** According to our records, your organization received a rebate for the (MxDELAMP = 0) installation/delamping> of ...<%LT_MEAS_x>... on <%DEEM_PAID_DATEx>.	
DEEM_INSTALL_YEARx	**IF DEEM_INSTALL_DATEx_NU in (2,88,99) | (UNRECORDED(DEEM_INSTALL_DATEx) & ^UNRECORDED(DEEM_PAID_DATEx))** In what year did you (MxDELAMP = 0) install/delamp <%LT_MEAS_x>? (PROBE FOR BEST GUESS)	
1	2013	DEEM_INSTALL_MONTHx
2	2014	DEEM_INSTALL_MONTHx
88	Refused	LI18
99	Don't know	LI18

DEEM_INSTALL_MONTHx	**IF DEEM_INSTALL_YEARx in (1-3)** And what month? {If they can not recall month, try to get the season.}	
1	January	LI18
2	February	LI18
3	March	LI18
4	April	LI18
5	May	LI18
6	June	LI18
7	July	LI18
8	August	LI18
9	September	LI18
10	October	LI18

11	November	LI18
12	December	LI18
13	Fall	LI18
14	Winter	LI18
15	Spring	LI18
16	Summer	LI18
88	Refused	LI18
99	Don't know	LI18

LI18[A-C]

If A3[A-C] is 1 or 2;
Ask only if CFLx = 1; else skip to LI181[A-C]
Of the CFLs you received through the program, what percentage do you estimate were placed into storage for later use?

77	Open Record	LI181
101	Refused	LI181
102	Don't know	LI181

LI181[A-C]

Ask only if LEDx = 1; else skip to LI182[A-C]
Of the LEDs you received through the program,what percentage do you estimate were placed into storage for later use?

77	Open Record	LI182
101	Refused	LI182
102	Don't know	LI182

LI182[A-C]

ASK ONLY IF LEDRLx = 1
Of the LED Reflector Lamps you received through the program,what percentage do you estimate were placed into storage for later use?

77	Open Record	LI19
101	Refused	LI19
102	Don't know	LI19

LI19[A-C]

Were any of the program provided <%LT_MEAS_x> (MxDELAMP = 0) installed/delamped at another facility? If so, what percentage would you estimate?

77	Yes, #record percentage	LI20
101	Refused	LI20
102	Don't know	LI20

LI20[A-C]

IF MxDELAMP = 0; else skip to end of DEEMED MEASURE LOOP
What type of lighting was removed and replaced when you installed <%LT_MEAS_x> through the program?

1	High performance T8 (1" diameter bulbs)	LI22
2	T8 fluorescent fixtures (1” diameter bulbs)	LI22

3	T10 fluorescent fixtures	LI22
4	T12 Fixtures (1.5" diameter bulbs)	LI22
5	Compact HID (High Density Discharge) Fixtures	LI21
6	Screw-in Modular CFLs	LI22
7	Hardwire CFL Fixtures	LI22
8	Incandescent	LI22
9	CFL Exit Signs	LI22
10	LED Exit Signs	LI22
11	Halogen bulbs	LI22
12	Reflectors	LI22
13	Electronic Ballast	LI22
14	Magnetic Ballast	LI22
15	Manual Switches	LI22
16	Lighting Controls, Time Clock	LI22
17	Lighting Controls, Occupancy Sensor	LI22
18	Lighting Controls, Bypass/Delay Timers	LI22
19	Lighting Controls, Photocell	LI22
20	Other Fluorescent	LI22
21	Fat/Thick Tubes	LI22
22	Skinny/Thin Tubes	LI22
23	T5 Fixtures (5/8" diameter)	LI22
24	Screw-in LEDs	LI22
25	Screw-in LEDs Reflector Lamps	LI22
26	LED Fixtures or Panels (e.g., replacement for linear fixtures)	LI22
66	DID NOT REMOVE ANYTHING-ADDITIONAL EQUIP ONLY	NTGCHECK1
77	Other (PLEASE SPECIFY)	LI22

IF MxDELAMP = 0;
ASK IF LI20[A-C] = 5; else skip to LI22[A-C]

LI21[A-C]	Were the HID lamps you removed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?	
1	High pressure sodium	LI22
2	Metal Halide	LI22
3	Mercury Vapor	LI22
4	Incandescent	LI22
88	Refused	LI22
99	Don't know	LI22

If LI20[A-C]^= 66 then ask; else skip to end of DEEMED Loop

LI22[A-C]	Approximately how old was the equipment that were removed and replaced? Would you say…	
1	Less than 5 years old	LI23
2	Between 5 and 10 years old	LI23

3	Between 10 and 15 years old	LI23
4	More than 15 years old	LI23
88	Refused	LI23
99	Don't know	LI23

LI23[A-C] How would you describe the removed equipment's condition? Would you say they were in…

1	Poor condition	LI24
2	Fair condition	LI24
3	Good condition	LI24
88	Refused	LI24
99	Don't know	LI24

LI24[A-C] Approximately what percentage of the lighting equipment that was removed and replaced was broken or not working prior to installing <%LT_MEAS_x>?

%	Percent	NTGCHECK1
101	Refused	NTGCHECK1
102	Don't know	NTGCHECK1

NTGCHECK1

GO TO NTGBATTERY IF NTGDEEMED =1; ELSE RESTART LOOP IF NEEDED FOR <%LT_MEAS_x> WHERE x = 2, 3

AFTER ALL DEEMED MEASURES HAVE GONE THROUGH LOOP AND THE NTGBATTERY HAS BEEN COMPLETED FOR A LIGHTING MEASURE, ASK LI30

ASK IF LIGHTING=1

LI30 Considering all of the lighting changes we just discussed, approximately what percentage of the facility's lighting was affected by those changes?

%	Percent	HB1
101	Refused	HB1
102	Don't know	HB1

HIGH BAY AND DELAMPING

If LINEAR = 1 or LI100 in (1, 2, 3, 16, 17, 18, 77); else skip to HB1a

HB1 Thinking about all of the types of linear fluorescent bulbs that were installed through the program, what is the highest height, in feet, above the area they light? [IN FEET]

1	Record number of feet	HB2
66	Did not install linear fluorescent lamps	HB1a
88	Refused	HB2
99	Don't know	HB2

IF HB1 < 13 then ask; else skip to HB3
Just to double check, was any of the linear fluorescent lighting installed through the program at a height of 13 or more feet above the area it is meant to light? This would qualify as HIGH BAY lighting.

HB2		
1	Yes	HB3
2	No	HB1a
88	Refused	HB1a
99	Don't know	HB1a

ASKI IF IF (HB1 >> 12 & HB1 <> 66 & HB1 <> 88 & HB1 <> 99) | HB2(1); else skip to HB1a
What is the main kind of linear fluorescent bulbs located at this height?

HB3		
1	T8s	HB1a
2	T5s	HB1a
77	OPEN\RECORD OTHER	HB1a
88	Refused	HB1a
99	Don't know	HB1a

Ask if NON_LINEAR = 1 or LI100 in (4, 5, 6, 9, 77); else skip to DEL1
Is any of the lighting installed through the program considered to be High Bay? (If needed, lighting higher than 13 ft)

HB1a		
1	Yes	HB2a
2	No	DEL1
88	Refused	DEL1
99	Don't know	DEL1

Ask if HB1a = 1 else skip to DEL1
What kind of High Bay Lighting is it?

HB2a		
1	HID (High-intensity discharge) High pressure sodium	DEL1
2	HID Metal halide	DEL1
3	HID Mercury Vapor	DEL1
4	HID - I don't know what type	DEL1
5	CFLs	DEL1
77	OPEN\RECORD OTHER	DEL1
88	Refused	DEL1
99	Don't know	DEL1

Ask if DELAMP = 1; else skip to DEL1a
We also show that you delamped linear fluorescent fixtures. Is this correct? (If needed: delamping occurs when you retrofit your T12s to T8s and reduce the number of lamps in a fixture or simply reduce the number of fixtures.)

DEL1		
1	Yes	DEL2

2	No	Gas
88	Refused	Gas
99	Don't know	Gas

Ask if DELAMP ^= 1 and LINEAR = 1 and M1DELAMP ^= 1 and M2DELAMP ^= 1 and M3DELAMP ^= 1 OR LI100(1-3, 16-18, 77);

DEL1a As part of the lighting installation you had completed during your participation in program did you have any delamping done? (If needed: delamping occurs when you retrofit your T12s to T8s and reduce the number of lamps in a fixture or simply reduce the number of fixtures.)

1	Yes	DEL2
2	No	Gas
88	Refused	Gas
99	Don't know	Gas

Ask if DEL1 = 1 or DEL1a = 1 or (M1DELAMP = 1 and A3A in (1, 2)) or (M2DELAMP = 1 and A3B in (1, 2)) or (M3DELAMP = 1 and A3C in (1, 2))

DEL2 There are a few different types of delamping that can take place. Today we will be asking about 3 types in partciular. One type of delamping occurs when fixtures are simply removed (removal only). Another type of delamping occurs when the fixtures themselves are removed and replaced with new fixtures containing less bulbs (remove and replace fixtures). The final type is where the current fixtures are retrofitted, not replaced, to accomodate less bulbs (reduce # of bulbs).
Have you had Removal only Delamping done within your facility since January 2012?

1	Yes	DEL2a
2	No	DEL3
88	Refused	DEL3
99	Don't know	DEL3

If DEL2 = 1 then ask; else skip to DEL3

DEL2a What percent of the original fixtures within the delamped area were removed?

77	Record percentage	DEL3
101	Refused	DEL3
102	Don't know	DEL3

DEL3 Have you had Remove and Replace delamping done within your facility since 2012? Remove and replace occurs when the fixutres themselves are removed and replaced with new fixtures containing less bulbs.

1	Yes	DEL3a
2	No	DEL4

88	Refused	DEL4
99	Don't know	DEL4

If DEL3 = 1 then ask; else skip to DEL4

DEL3a What type of fixtures were removed?

77	Open Record	DEL3b
88	Refused	DEL3b
99	Don't know	DEL3b

DEL3b What type of fixtures were installed?

77	Open Record	DEL3c
88	Refused	DEL3c
99	Don't know	DEL3c

DEL3c How many lamps per fixture were present prior to the delamping retrofit?[PROBE FOR BEST GUESS IF DON'T KNOW]

1	1	DEL3d
2	2	DEL3d
3	3	DEL3d
4	4	DEL3d
5	5	DEL3d
6	6	DEL3d
7	7	DEL3d
8	8	DEL3d
88	Refused	DEL3d
99	Don't know	DEL3d

DEL3d How many lamps per fixture are present now, after the delamping retrofit? [PROBE FOR BEST GUESS IF DON'T KNOW]

1	1	DEL3E
2	2	DEL3E
3	3	DEL3E
4	4	DEL3E
5	5	DEL3E
6	6	DEL3E
7	7	DEL3E
8	8	DEL3E
88	Refused	DEL4
99	Don't know	DEL4

DEL3E Approximately how old were the fixtures that were removed and replaced as a result of this Remove and Replace delamping? Would you say…

1	Less than 5 years old	LI23
2	Between 5 and 10 years old	LI23

3	Between 10 and 15 years old	LI23
4	More than 15 years old	LI23
88	Refused	LI23
99	Don't know	LI23

DEL3F How would you describe the condition of the fixtures that were Removed and Replaced as a result of the remove and replace delamping? Would you say they were in…

1	Poor condition	LI24
2	Fair condition, or	LI24
3	Good condition	LI24
88	Refused	LI24
99	Don't know	LI24

DEL3G Approximately what percentage of the fixtures that were removed and replaced were broken or not working prior to the Remove and Replace delamping?

%	Percent	LI30
101	Refused	LI30
102	Don't know	LI30

DEL4 Have you had a delamping retrofit to reduce the number of lamps per fixture within your facility since 2012? This is where the current fixtures are retrofitted, not replaced, to accomodate less bulbs (reduce # of lamps).

1	Yes	DEL4a
2	No	DEL5
88	Refused	DEL5
99	Don't know	DEL5

If DEL4 = 1 then ask; else skip to DEL5

DEL4a How many lamps per fixture were present prior to the delamping retrofit?[PROBE FOR BEST GUESS IF DON'T KNOW]

77	Open Record	DEL4b
88	Refused	DEL4b
99	Don't know	DEL4b

DEL4b How many lamps per fixture are present now, after the delamping retrofit? [PROBE FOR BEST GUESS IF DON'T KNOW]

77	Open Record	DEL5
88	Refused	DEL5
99	Don't know	DEL5

DEL5 Is the amount of lighting better, worse, or the same than before your delamping job?

1	Better	Gas
2	Worse	DEL11
3	Same	Gas
88	Refused	DEL11
99	Don't know	DEL11

If DEL5 in (2, 88, 99) then ask; else skip to G1

DEL11 Did you install additional lighting equipment to increase the amount of lighting in the delamped area(s)?

1	Yes	Gas
2	No	Gas
88	Refused	Gas
99	Don't know	Gas

GAS EQUIPMENT

Ask if CC3a(2|3) (respondent said organization has gas heating) or GAS=1; else skip to NEXT BATTERY

DISPLAY In this next section we will be discussing the GAS EQUIPMENT present at your facility.

G1 Which of the following natural gas equipment is present at your facility?...

1	Water Heater	G25
2	Gas Furnace	G25
3	Gas Boiler	G25
4	Gas Stove	G25
5	Gas Clothes Dryer	G25
66	No natural gas	Refrigeration
77	Other (specify)	G25
88	Refused	G25
99	Don't know	G25

G25 Does your organization have any plans to install any high efficiency gas equipment within the next 12 months?

1	Yes	Refrigeration
2	No	Refrigeration
88	Refused	Refrigeration
99	Don't Know	Refrigeration

REFRIGERATION EQUIPMENT

Ask R9 through CD4 if REFRIGERATION = 1; else skip to NEXT BATTERY

READ IF ^UNRECORDED(RF_MEAS_x) where x = 1, 2, 3….

DISPLAY In this section of the survey we would like to ask you about the refrigeration equipment changes you made as part of your participation in <%UTILITY>'s program.

R9_x According to our records, your organization installed <%RF_QTY_x> ... <%RF_UNITS_x>...<%RF_MEAS_x> through the <%UTILITY> program, is this correct?

1	Correct as stated	R5b_x
2	Refrigeration equipment installed but not as described	R9X_x
3	No refrigeration equipment installed through the program	Next Measure/Greenhouse
88	Refused	Greenhouse
99	Don't know	Greenhouse

ASK IF IF R9_x(2)

R9X_x Approximately how many units of ...<%RF_MEAS_x>... were installed under the Program?

77	Record #	Calc
88	Refused	R5b_x
99	Don't know	R5b_x

Calc If <%ClaimInstal_RF_x>/<%RFx_QTY_x> <75% then ask RF9Y_x; else if <%ClaimInstal_RF_x>/<%RFx_QTY_x> > 125% ask RF9Z_x; else skip to R5b_x

ASK R9Y IF R9X_x <> 88888 & R9X_x <> 99999; R9X_x << RFxUNDER

R9Y_x Perhaps you could help us to understand the difference between our records and what has been installed…Do you have any suggestions as to why our numbers differ? Were any of these <%RF_MEAS_x> put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	R5b_x
2	Did not install all of the refrigeration equipment, Put some in storage	R5b_x
3	Installed at another facility	R5b_x
4	Did not receive all of the <%RF_MEAS_x>	R5b_x
77	Other	R5b_x
88	Refused	R5b_x
99	Don't know	R5b_x

ASK R9Z_x IF R9X_x >> RFxOVER

R9Z_x Perhaps you can help us to understand the difference between our records and what has been installed....Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2013 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would really help us to evaluate the program's record keeping?

1	Have no idea why numbers differ	R5b_x
2	Multiple participation	R5b_x
3	Installed equipment outside of the program	R5b_x
77	Other	R5b_x
88	Refused	R5b_x
99	Don't know	R5b_x

R5b_x **ASK IF R9_x(1|2);**
What type of refrigeration equipment was removed and replaced when you installed <%RF_MEAS_x>?

1	Old Strip curtains	R5c_x
2	Older Main door cooler/freezer door gaskets	R5c_x
3	Older Anti-sweat heat controllers	R5c_x
4	Same Equipment, just newer	R5c_x
5	Older Display cases without doors	R5c_x
66	NONE - Not a replacement	R5c_x
77	Other (Specify)	R5c_x
88	Refused	R5c_x
99	Don't know	R5c_x

R5c_x **ASK IF IF R5b_x(1||65|77)**
How would you describe the condition of refrigeration equipment that was removed and replaced? Was it…

1	Inoperable (broken)	R5d_x
2	Poor condition	R5d_x
3	Fair condition	R5d_x
4	Good condition	R5d_x
88	Refused	R5d_x
99	Don’t know	R5d_x

R5d_x Approximately how old was the refrigeration equipment that was removed and replaced by the refrigeration equipment we just discussed? Would you say…

1	Less than 5 years old	R9d1_x
2	Between 5 and 10 years old	R9d1_x
3	10 to 20 years old	R9d1_x
4	more than 20 years old	R9d1_x
88	Refused	R9d1_x
99	Don't know	R9d1_x

R9d1_x

ASK IF ^UNRECORDED(RF_INSTDTx); ELSE GO TO DISPLAY
Our records indicate that your company installed the refrigeration equipment in <%RF_INSTDTx> through the <%PROGRAM> program, is this correct?

1	Yes	NTGCHECK3
2	No	DISPLAY; RF9f1_x
88	Refused	DISPLAY; RF9f1_x
99	Don't know	DISPLAY; RF9f1_x

DISPLAY

ASK IF ^UNRECORDED(RF_CHKDTx) & UNRECORDED(RF_INSTDTx)
Our records indicate that your company received a rebate for the refrigeration equipment installed through the program in <%RF_CHKDTx>.

RF9f1_x

ASK IF (^UNRECORDED(RF_CHKDTx) & UNRECORDED(RF_INSTDTx)) | R9D1_x(2)
In what year did you install <%RF_MEAS_x>? (PROBE FOR BEST GUESS) Was it in….

1	2013	R9f2
2	2014	R9f2
88	Refused	NTGCHECK3
99	Don't know	NTGCHECK3

RF9f2_x

ASK IF RF9F1_x(1||2)
And what month? {If they can not recall month, try to get the season.}

1	January	NTGCHECK3
2	February	NTGCHECK3
3	March	NTGCHECK3
4	April	NTGCHECK3
5	May	NTGCHECK3
6	June	NTGCHECK3
7	July	NTGCHECK3
8	August	NTGCHECK3
9	September	NTGCHECK3
10	October	NTGCHECK3
11	November	NTGCHECK3
12	December	NTGCHECK3
13	Fall	NTGCHECK3
14	Winter	NTGCHECK3
15	Spring	NTGCHECK3
16	Summer	NTGCHECK3
88	Refused	NTGCHECK3
99	Don't know	NTGCHECK3

NTGCHECK3 **IF NTGREFRIG == 1 PERFORM NTG BATTERY; ELSE CONTINUE….**

END REFRIGERATION MEASURE LOOP; GO TO R9_x if ^UNRECORDED(RF_MEAS_x) WHERE x = 2, 3; ELSE CONTINUE WITH SURVEY

IF CASES = 1 ASK CD2 THROUGH CD4 ; ELSE SKIP TO NEXT BATTERY

CD2 What is the length across the front (linear feet) of your display case? An approximation would be fine.

77	Record length of case and number of cases	CD3
88	Refused	CD3
99	Don't know	CD3

CD3 Does your new display case have efficient lighting (T-8 or LED lighting) installed?

1	Yes	CD4
2	No	CD4
88	Refused	CD4
99	Don't know	CD4

CD4 Does your new display case have a variable speed fan motor installed?

1	Yes	Greenhouse
2	No	Greenhouse
88	Refused	Greenhouse
99	Don't know	Greenhouse

GREENHOUSE HEAT CURTAINS

Ask if CONTROLS = 1 and FM050 in 4 (Agricultural - farms/greenhouses), 8 (Education), or 12 (Industrial); else skip to NEXT BATTERY

GG1 Does your facility have any greenhouses?

1	Yes	GG1a
2	No	Cooling
88	Refused	Cooling
99	Don't know	Cooling

Ask if GG1=1; else skip to NEXT BATTERY

GG1a How many square feet of greenhouses do you have at your facility?

66	We do not have any greenhouses	Cooling
77	Square feet	GG1b
88	Refused	GG1a1
99	Don’t know	GG1a1

Ask if GG1a IN (88, 99)

GG1a1 Can you identify the appropriate size range from the following list?

1	< 1,500 sq ft	Cooling
2	1,500 - 5,000 sq ft	Cooling
3	5,000 - 10,000 sq ft	Cooling
4	10,000 – 25,000 sq ft	Cooling
5	25,000 – 50,000 sq ft	Cooling
6	50,000 – 75,000 sq ft	Cooling
7	75,000 – 100,000 sq ft	Cooling
8	> 100,000 sq ft	Cooling
88	Refused	Cooling
99	Don't know	Cooling

COOLING EQUIPMENT

Now we would like to discuss your cooling equipment.

CL1 What type of equipment is used to cool this facility? (allow multiples)

1	No A/C	PipeInsulation
2	Split system (two components; compressor is separate from the supply air fan, air conditioner, or heat pump)	CL2
3	Packaged systems (one component; rooftop units)	CL2
4	Package Terminal A/C or Heat Pump (e.g., Hotel/Motel units)	CL2
5	Evaporative coolers (swamp coolers)	CL2
6	Water Chiller (Central plant)	CL2
7	Individual A/C or Heat Pump Units (e.g., Unitary Equipment, Central A/C with multiple units, single unit for small business) NOTE: ASK IF SPLIT OR PACKAGED SYSTEM	CL2
8	Window/Wall Units	CL2
77	Other (Specify)	CL2
88	Refused	CL2
99	Don't Know	CL2

Ask if CL1<>1; else skip to NEXT BATTERY

CL2 How would you describe the condition of the primary cooling equipment currently in use at your facility? Would you say the cooling equipment is in ...

1	In poor condition	CL3
2	In fair condition	CL3
3	Good condition	CL3
88	Refused	CL3
99	Don't know	CL3

CL3 How old is this cooling equipment currently in use at your facility? Would you say…

1	Less than 5 years old	CL4
2	Between 5 and 10 years old	CL4
3	10 to 20 years old	CL4
4	more than 20 years old	CL4
88	Refused	CL4
99	Don't know	CL4

CL4 What is the primary fuel used by this cooling equipment?

1	Electricity	CL35
2	Natural Gas	CL35
3	Both Electricity and Gas	CL35
77	Other (PLEASE SPECIFY)	CL35
88	Refused	CL35
99	Don't Know	CL35

CL35 Does your company have any plans to install high efficiency cooling equipment within the next 12 months?

1	Yes	PipeInsulation
2	No	PipeInsulation
88	Refused	PipeInsulation
99	Don't Know	PipeInsulation

PIPE INSULATION

DISPLAY

ASK IF PIPE = 1; else skip to NEXT BATTERY

In the next section we'll be discussing the pipe insulation present at your facility.

ASK IF ^UNRECORDED(PI_INSTDT); ELSE GO TO DISPLAY/PI1a

PI1 We'd like to confirm that new pipe insulation was installed at your facility on approximately <%PI_INSTDT>. Is this correct?

1	Yes	PI3
2	No	DISPLAY; PI1a
88	Refused	DISPLAY; PI1a
99	Don't know	DISPLAY; PI1a

DISPLAY

ASK IF ^UNRECORDED(PI_CHKDT) & UNRECORDED(PI_INSTDT)

Our records indicate that your company received a rebate for the pipe insulation installed through the program in <%PI_CHKDT>.

ASK IF (^UNRECORDED(PI_CHKDT) & UNRECORDED(PI_INSTDT)) | PI1(2)

PI1a In what year did you install the pipe insulation?

1	2013	PI1b
2	2014	PI1b
88	Refused	PI3
99	Don't know	PI3

ASK IF PI1A(1||2)

PI1b And what month? {If they can not recall month, try to get the season.}

1	January	PI3
2	February	PI3
3	March	PI3
4	April	PI3
5	May	PI3
6	June	PI3
7	July	PI3
8	August	PI3
9	September	PI3
10	October	PI3
11	November	PI3
12	December	PI3
13	Fall	PI3
14	Winter	PI3
15	Spring	PI3
16	Summer	PI3
88	Refused	PI3
99	Don't know	PI3

PI3 Our records indicate that <%PI_QTY> feet of pipe insulation was installed at your facility. Is this about right?

1	Yes	PI7
2	No	PI3a
88	Refused	PI3a
99	Don’t know	PI3a

ASK IF PI3(2||99)

PI13a How many total linear feet of pipe insulation is present at your facility? Your best estimate is okay.

66	No pipe insulation	Sprinklers_Ag
77	Total linear feet of pipe insulation	PI7
88	Refused	P13aa
99	Don't know	P13aa

ASK IF PI3a = 88,99

P13aa Can you estimate what percent of the pipes present at your facility were insulated through the program?

1	Total linear feet of pipe insulation:	PI7
2	Percentage of pipe insulation replaced:	PI7
101	Refused	PI7
102	Don't know	PI7

ASK IF PI3a <> 66;

PI7 Was the pipe insulation installed on new pipes or was it a retrofit of older pipes or both?

1	ONLY NEW	PI7b
2	ONLY OLDER	PI7b
3	BOTH NEW AND OLDER	P17a
88	Refused	PI8
99	Don't know	PI8

ASK IF PI7 = 3; else skip

PI7a What percentage of the pipe insulation was installed on new pipes?

Record	(record percentage)	PI7b
77	Other	PI7b
101	Refused	PI7b
102	Don't know	PI7b

ASK IF PI7(2|3);

PI7b How many years old were the pipes receiving the pipe insulation?

Record	(record in # of years)	PI8
77	Other	PI8
88	Refused	PI8
99	Don't know	PI8

PI8 Was insulation already present on the pipes before the insulation was installed through the program?

1	Yes	P21
2	No	P25
77	Other	P25
88	Refused	P25
99	Don’t know	P25

ASK IF PI8(1);

P21 Was the existing insulation removed and replaced, or was additional insulation added to existing insulation?

1	old insulation removed and replaced	P23
2	Additional insulation added over old insulation	P23
3	Both	P23
88	Refused	P23

99	Don’t know	P23

P23 What condition was your old pipe insulation in at the time of the replacement?

1	Good	P25
2	Fair	P25
3	Poor	P25
4	Not a replacement	P25
88	Refused	P25
99	Don't know	P25

ASK ALL

P25 Are boilers present at your facility?

1	Yes	P27
2	No	P33
77	Other [Record Verbatim]	P33
88	Refused	P33
99	Don’t know	P33

ASK IF PI25(1)

P27 Have the boilers been repaired or replaced since you installed the pipe insulation through the program?

1	Yes	P29
2	No	P33
77	Other [Record Verbatim]	P33
88	Refused	P33
99	Don’t know	P33

ASK IF PI27(1)

P29 How long ago in months was the most recent boiler repair or replacement?

#	Record DATE or # of months ago	P33
77	Other [Record Verbatim]	P33
88	Refused	P33
99	Don’t know	P33

ASK IF PI3A<>66666

P33 Whose idea was it to install new pipe insulation?

1	Me or someone at my facility	P35
2	Contractor	P35
3	Utility company contact	P35
4	Manufacturer	P35
77	Other (specify)	P35
88	Refused	P35
99	Don’t know	P35

P35 What percentage of the pipe insulation cost would you estimate the program rebate covered?

1	Rebate covered all of the cost	P37
2	Rebate covered most of the cost	P37
3	Rebate covered less than half of the cost	P37
4	Other	P37
88	Refused	P37
99	Don't know	P37

P37 How effective was the new pipe insulation in reducing your natural gas bill? Would you say there were…

1	Considerable gas savings	P39
2	Some gas savings	P39
3	No noticeable savings	P39
88	Refused	P39
99	Don't know	P39

P39 Have you noticed any problems with the pipe insulation since the installation?

1	Yes	P40
2	No	NTGCHECK4
88	Refused	NTGCHECK4
99	Don't know	NTGCHECK4

ASK IF P39(1)

P40 What problems have you noticed since the pipe insulation was installed?

77	RECORD RESPONSE	NTGCHECK4
88	Refused	NTGCHECK4
99	Don't know	NTGCHECK4

NTGCHECK4 **GO TO NTG BATTERY IF NTGPIPES = 1; ELSE CONTINUE**

AGRICULTURAL SPRINKLERS

ASK IF SPRINKLERS = 1; ELSE SKIP TO NEXT BATTERY

DISPLAY Now, I would like to ask you about the low-pressure sprinkler nozzles you installed on your irrigation system as part of your participation in <%UTILITY>'s program.

ASK IF AG_QTY > 0

AG1 Our records indicate that <%AG_QTY> low-pressure sprinkler nozzles were installed on either portable or permanent irrigation systems. Is this correct?

1	Yes, correct	AG40
2	Yes, but a different quantity	AG200

3	Did not install	Computer_Power_Mgmt
88	Refused	Computer_Power_Mgmt
99	Don't know	AG40

AG200

ASK IF AG1(2) | AG_QTY = 0
How many low-pressure sprinkler nozzles were installed through the program?

77	Record	AG40
88	Refused	AG40
99	Don't know	AG40

AG40

ASK IF ^AG1(3);
ASK IF ^UNRECORDED(AG_INSTDT); ELSE GO TO DISPLAY/AG41
Our records indicate that you installed the low-pressure sprinkler nozzles around <%AG_INSTDTx> through the <%PROGRAM> program, is this correct?

1	Yes	AG5
2	No	DISPLAY; AG41
88	Refused	DISPLAY; AG41
99	Don't know	DISPLAY; AG41

DISPLAY

ASK IF ^UNRECORDED(AG_CHKDT) & UNRECORDED(AG_INSTDT)
Our records indicate that your company received a rebate for the low-flow sprinkler nozzles installed through the program in <%AG_CHKDT>.

AG41

ASK IF (^UNRECORDED(AG_CHKDT) & UNRECORDED(AG_INSTDT)) | AG40(2);
In what year did you install low-flow sprinkler nozzles? (PROBE FOR BEST GUESS) Was it in….

1	2013	AG42
2	2014	AG42
88	Refused	AG42
99	Don't know	AG42

AG42

ASK IF AG41(1||2)
And what month? {If they can not recall month, try to get the season.}

1	January	AG5
2	February	AG5
3	March	AG5
4	April	AG5
5	May	AG5
6	June	AG5
7	July	AG5

8	August	AG5
9	September	AG5
10	October	AG5
11	November	AG5
12	December	AG5
13	Fall	AG5
14	Winter	AG5
15	Spring	AG5
16	Summer	AG5
88	Refused	AG5
99	Don't know	AG5

AG2 **ASK IF AG1(1 | 99);**
On what type of irrigation systems are the low-pressure sprinkler nozzles installed? Portable, permanent, or some combination of the two?

1	Portable irrigation system	AG5
2	Permanent irrigation system	AG5
3	Both portable and permanent irrigation systems	AG3
66	Neither	Computer_Power_Mgmt
88	Refused	Computer_Power_Mgmt
99	Don't know	Computer_Power_Mgmt

AG3 **READ IF AG2 = 3; ELSE SKIP TO AG5**
Since you have low-pressure sprinkler nozzles installed on both portable and permanent irrigation systems, I'd like for you to tell me what share is installed on each type of irrigation system. Adding up to 100 percent, what share is installed on each type of irrigation system? What percent is installed on PORTABLE irrigation systems?

77	Record percentage	AG4
101	Refused	AG4
102	Don't know	AG4

AG4 **ASK IF AG3 < 100;**
Of all the low-pressure sprinkler nozzles you have installed, what percent is installed on permanent irrigation systems?

77	Record percentage	CHECKSUM
101	Refused	CHECKSUM
102	Don't know	CHECKSUM

CHECKSUM **IF AG3 < 101 AND (AG3 + AG4 ^ = 100) REDO AG3 AND AG4; ELSE AG3a**

IF AG3 = 102 ASK AG3a;

AG3a Can you estimate the percentage installed on portable irrigation systems. Is it….

1	1 to 10 percent	AG4a
2	11 to 20 percent	AG4a
3	21 to 30 percent	AG4a
4	31 to 40 percent	AG4a
5	41 to 50 percent	AG4a
6	51 to 60 percent	AG4a
7	61 to 70 percent	AG4a
8	71 to 80 percent	AG4a
9	81 to 90 percent	AG4a
10	91 to 100 percent	AG4a
101	Refused	AG4a
102	Don't know	AG4a

AG4a If you are not sure, can you estimate the percentage installed on permanent irrigation systems. Is it…

1	1 to 10 percent	CHECK_EST_SUM
2	11 to 20 percent	CHECK_EST_SUM
3	21 to 30 percent	CHECK_EST_SUM
4	31 to 40 percent	CHECK_EST_SUM
5	41 to 50 percent	CHECK_EST_SUM
6	51 to 60 percent	CHECK_EST_SUM
7	61 to 70 percent	CHECK_EST_SUM
8	71 to 80 percent	CHECK_EST_SUM
9	81 to 90 percent	CHECK_EST_SUM
10	91 to 100 percent	CHECK_EST_SUM
88	Refused	CHECK_EST_SUM
99	Don't know	CHECK_EST_SUM

CHECK_EST_SUM **PERFORM A CHECK SO THAT AG3+AG4 = 100% OR AG3a+AG4a=100%**

AG5 What type(s) of crops are grown in the areas irrigated with the installed low-pressure sprinkler nozzles? [ACCEPT MULTIPLES…]

1	Asparagus	AG5a
2	Tomatoes	AG5a
3	Almonds	AG5a
4	Grapes	AG5a
5	Apricots	AG5a
77	Other [RECORD] - list only one other crop	AG5a
88	Refused	AG5a
99	Don't know	AG5a

ASK IF AG5(77); ELSE SKIP TO AG5b

AG5a Is there another crop grown in theses irrigated areas?

66	No other crop	AG5_1
77	Other - list only one crop	AG5b
88	Refused	AG5_1
99	Don't know	AG5_1

ASK IF AG5a(77); ELSE SKIP TO AG5_1

AG5b Is there another crop grown in theses irrigated areas?

66	No other crop	AG5_1
77	Other - list only one crop	AG5_1
88	Refused	AG5_1
99	Don't know	AG5_1

ASK IF AG5(1); ELSE SKIP TO AG5_2

AG5_1 What is the growing season, in months, for ASPARAGUS? If you cannot, the season will do.

1	January	AG5_2
2	February	AG5_2
3	March	AG5_2
4	April	AG5_2
5	May	AG5_2
6	June	AG5_2
7	July	AG5_2
8	August	AG5_2
9	September	AG5_2
10	October	AG5_2
11	November	AG5_2
12	December	AG5_2
13	Fall	AG5_2
14	Winter	AG5_2
15	Spring	AG5_2
16	Summer	AG5_2
88	Refused	AG5_2
99	Don't know	AG5_2

ASK IF AG5(2); ELSE SKIP TO AG5_3

AG5_2 What is the growing season, in months, for TOMATOES? If you cannot, the season will do.

1	January	AG5_3
2	February	AG5_3
3	March	AG5_3
4	April	AG5_3
5	May	AG5_3
6	June	AG5_3
7	July	AG5_3

8	August	AG5_3
9	September	AG5_3
10	October	AG5_3
11	November	AG5_3
12	December	AG5_3
13	Fall	AG5_3
14	Winter	AG5_3
15	Spring	AG5_3
16	Summer	AG5_3
88	Refused	AG5_3
99	Don't know	AG5_3

ASK IF AG5(3); ELSE SKIP TO AG5_4

AG5_3 What is the growing season, in months, for ALMONDS? If you cannot, the season will do.

1	January	AG5_4
2	February	AG5_4
3	March	AG5_4
4	April	AG5_4
5	May	AG5_4
6	June	AG5_4
7	July	AG5_4
8	August	AG5_4
9	September	AG5_4
10	October	AG5_4
11	November	AG5_4
12	December	AG5_4
13	Fall	AG5_4
14	Winter	AG5_4
15	Spring	AG5_4
16	Summer	AG5_4
88	Refused	AG5_4
99	Don't know	AG5_4

ASK IF AG5(4); ELSE SKIP AG5_5

AG5_4 What is the growing season, in months, for GRAPES? If you cannot, the season will do.

1	January	AG5_5
2	February	AG5_5
3	March	AG5_5
4	April	AG5_5
5	May	AG5_5
6	June	AG5_5
7	July	AG5_5
8	August	AG5_5

9	September	AG5_5
10	October	AG5_5
11	November	AG5_5
12	December	AG5_5
13	Fall	AG5_5
14	Winter	AG5_5
15	Spring	AG5_5
16	Summer	AG5_5
88	Refused	AG5_5
99	Don't know	AG5_5

ASK IF AG5(5); ELSE SKIP AG5_77

AG5_5 What is the growing season, in months, for APRICOTS? If you cannot, the season will do.

1	January	AG5_77
2	February	AG5_77
3	March	AG5_77
4	April	AG5_77
5	May	AG5_77
6	June	AG5_77
7	July	AG5_77
8	August	AG5_77
9	September	AG5_77
10	October	AG5_77
11	November	AG5_77
12	December	AG5_77
13	Fall	AG5_77
14	Winter	AG5_77
15	Spring	AG5_77
16	Summer	AG5_77
88	Refused	AG5_77
99	Don't know	AG5_77

ASK IF AG5(77); ELSE SKIP TO AG5a_77

AG5_77 What is the growing season, in months, for <%AG5>? If you cannot, the season will do.

1	January	AG5a_77
2	February	AG5a_77
3	March	AG5a_77
4	April	AG5a_77
5	May	AG5a_77
6	June	AG5a_77
7	July	AG5a_77
8	August	AG5a_77
9	September	AG5a_77

10	October	AG5a_77
11	November	AG5a_77
12	December	AG5a_77
13	Fall	AG5a_77
14	Winter	AG5a_77
15	Spring	AG5a_77
16	Summer	AG5a_77
88	Refused	AG5a_77
99	Don't know	AG5a_77

ASK IF AG5a(77); ELSE SKIP TO AG5b_77

AG5a_77 What is the growing season, in months, for <%AG5a>? If you cannot, the season will do.

1	January	AG5b_77
2	February	AG5b_77
3	March	AG5b_77
4	April	AG5b_77
5	May	AG5b_77
6	June	AG5b_77
7	July	AG5b_77
8	August	AG5b_77
9	September	AG5b_77
10	October	AG5b_77
11	November	AG5b_77
12	December	AG5b_77
13	Fall	AG5b_77
14	Winter	AG5b_77
15	Spring	AG5b_77
16	Summer	AG5b_77
88	Refused	AG5b_77
99	Don't know	AG5b_77

ASK IF AG5b(77); ELSE SKIP TO AG6

AG5b_77 What is the growing season, in months, for <%AG5b>? If you cannot, the season will do.

1	January	AG6
2	February	AG6
3	March	AG6
4	April	AG6
5	May	AG6
6	June	AG6
7	July	AG6
8	August	AG6
9	September	AG6
10	October	AG6

11	November	AG6
12	December	AG6
13	Fall	AG6
14	Winter	AG6
15	Spring	AG6
16	Summer	AG6
88	Refused	AG6
99	Don't know	AG6

AG6 Are the fields with low-pressure sprinkler nozzles irrigated during non-growing seasons?

1	Yes	AG6a
2	No	AG7
88	Refused	AG7
99	Don't know	AG7

ASK IF AG6(1)

AG6a Can you provide the months during which those fields are irrigated?

1	January	AG7
2	February	AG7
3	March	AG7
4	April	AG7
5	May	AG7
6	June	AG7
7	July	AG7
8	August	AG7
9	September	AG7
10	October	AG7
11	November	AG7
12	December	AG7
13	Fall	AG7
14	Winter	AG7
15	Spring	AG7
16	Summer	AG7
88	Refused	AG7
99	Don't know	AG7

AG7 Can you estimate the size of the fields, in acres, irrigated with the low-pressure sprinkler nozzles?

77	Record number of acres	AG8
88	Refused	AG8
99	Don't know	AG7a

ASK IF AG7=99

AG7a If you are unable to give an exact number of acres, can you estimate a range of the size of the fields irrigated with low-pressure sprinkler nozzles. Is it…

1	1-25 acres	AG8
2	26-50 acres	AG8
3	51-100 acres	AG8
4	101-200 acres	AG8
5	201+ acres	AG8
88	Refused	AG8
99	Don't know	AG8

AG8 How many irrigation pumps were affected by the installation of low-pressure sprinkler nozzles?

1	1	AG9_1
2	2	AG9_1
3	3	AG9_1
4	4	AG9_1
5	5	AG9_1
6	More than 5 pumps	AG9_1
88	Refused	AG9_1
99	Don't know	AG9_1

ASK IF AG8(1||6); ELSE SKIP TO AG9_2

AG9_1 What is the rated horsepower of the 1st pump? Would you say it is....

1	Less than 15 hp	AG9_2
2	15-30 hp	AG9_2
3	35-55 hp	AG9_2
4	60 hp or greater	AG9_2
88	Refused	AG9_2
99	Don't know	AG9_2

ASK IF AG8(2||6); ELSE SKIP TO AG9_3

AG9_2 What is the rated horsepower of the 2nd pump? Would you say it is....

1	Less than 15 hp	AG9_3
2	15-30 hp	AG9_3
3	35-55 hp	AG9_3
4	60 hp or greater	AG9_3
88	Refused	AG9_3
99	Don't know	AG9_3

ASK IF AG8(3||6); ELSE SKIP TO AG9_4

AG9_3 What is the rated horsepower of the 3rd pump? Would you say it is....

1	Less than 15 hp	AG9_4
2	15-30 hp	AG9_4

3	35-55 hp	AG9_4
4	60 hp or greater	AG9_4
88	Refused	AG9_4
99	Don't know	AG9_4

ASK IF AG8(4||6); ELSE SKIP TO AG9_5

AG9_4 What is the rated horsepower of the 4th pump? Would you say it is....

1	Less than 15 hp	AG9_5
2	15-30 hp	AG9_5
3	35-55 hp	AG9_5
4	60 hp or greater	AG9_5
88	Refused	AG9_5
99	Don't know	AG9_5

ASK IF AG8(5||6); ELSE SKIP TO AG10

AG9_5 What is the rated horsepower of the 5th pump? Would you say it is....

1	Less than 15 hp	AG10
2	15-30 hp	AG10
3	35-55 hp	AG10
4	60 hp or greater	AG10
88	Refused	AG10
99	Don't know	AG10

AG10 Whose idea was it to install new the low-pressure sprinkler nozzles?

1	Me or someone at my facility	AG11
2	Contractor	P35
3	Utility company contact	P35
4	Manufacturer	P35
77	Other (specify)	P35
88	Refused	P35
99	Don’t know	P35

AG11 Have you noticed any problems with the low-pressure sprinkler nozzles since the installation?

1	Yes	AG12
2	No	NTGCHECK5
88	Refused	NTGCHECK5
99	Don't know	NTGCHECK5

ASK AG12 if AG11(1)

AG12 What problems have you noticed since the sprinkler nozzles were installed?

77	RECORD RESPONSE	NTGCHECK5
88	Refused	NTGCHECK5

99	Don't know	NTGCHECK5

NTGCHECK5 **GO TO NTG BATTERY IF NTGSPRINKLERS = 1; ELSE CONTINUE**

PC POWER MANAGEMENT SOFTWARE

DISPLAY

ASK IF PCPOWER = 1; ELSE SKIP TO NEXT BATTERY
In the next section we'll be discussing the PC power management software present at your facility.

IF PC_QTY > 0; ELSE SKIP TO PC200

PC100 According to our records, your organization purchased <%PC_QTY> power management software licenses through the program, is this correct?

1	Yes, correct	PC1a
2	Yes, but different amount	PC200
3	Did not purchase any	NEXT BATTERY
88	Refused	PC200
99	Don't know	PC200

IF PC_QTY = 0 | PC100(2)

PC200 Approximately how many power management software licenses were purchased through the program?

77	Record amt	PC1a
88	Refused	PC1a
99	Don't know	PC1a

IF PC100 ^=3
ASK IF ^UNRECORDED(PC_CHKDT); ELSE SKIP TO PC1b

PC1a Our records indicate that your company received a rebate for the software licenses purchased through the program in <%PC_CHKDT>. Is this correct?

1	Yes	PI3
2	No	PC1b
88	Refused	PC1b
99	Don't know	PC1b

ASK IF PC1a(2||99) OR UNRECORDED(PC_CHKDT);

PC1b In what year did you purchase the software licenses through the program? Was it in…

1	2013	PC1c
2	2014	PC1c
88	Refused	PC1
99	Don't know	PC1

ASK IF PC1b(1||2);

PC1c And what month? {If they can not recall month, try to get the season.}

1	January	PI3
2	February	PI3
3	March	PI3
4	April	PI3
5	May	PI3
6	June	PI3
7	July	PI3
8	August	PI3
9	September	PI3
10	October	PI3
11	November	PI3
12	December	PI3
13	Fall	PI3
14	Winter	PI3
15	Spring	PI3
16	Summer	PI3
88	Refused	PI3
99	Don't know	PI3

PC1 How many desktop computers are present at this location? We are not counting LAPTOPS.....Your best estimate is fine. DO NOT READ....if they say don't know, then ask them if it is more or less than 50, then find another number within a range and try to get the estimate from that.

Record	Total number of computers	PC2
88	Refused	PC1A
99	Don't know	PC1A

PC2 How many desktop computers are controlled by the power management software at this location?

Record	Total number of computers	PC3
88	Refused	PC2A
99	Don't know	PC2A

PC2A **ASK IF PC2 = 88,99**
What percent of the desktop computers at this location are controlled by the software?

Record	Percentage of desktop computers controlled	PC3
88	Refused	PC3
99	Don't know	PC3

PC3 What is the predominant type of computer processor installed within your desktop computers? Is it….(READ LIST)

1	AMD Athlon	PC3a
2	Intel Pentium 3	PC3a
3	Intel Pentium 4	PC3a

77	Other [Record Verbatim]	PC3a
88	Refused	PC3a
99	Don't know	PC3a

PC3a What is the predominant type of monitor that is controlled by the software at this location? Is it... (READ LIST)

1	CRT	PC3b
2	LCD	PC3b
3	LED	PC3b
77	Other [Record Verbatim]	PC3b
88	Refused	PC3b
99	Don't know	PC3b

PC3b What is the predominant size (in inches) of the monitors that are controlled by the software at this location?

1	(record in # of inches)	PC4
77	Other [Record Verbatim]	PC4
88	Refused	PC4
99	Don't know	PC4

PC4 How often do you upgrade/replace your desktop computers/monitors at this location?

1	Number of years	PC5
77	Other [Record Verbatim]	PC5
88	Refused	PC5
99	Don't know	PC5

PC5 Is the central server that controls the installed network software located at this facility?

1	Yes	PC6
2	No	PC8
77	Other	PC8
88	Refused	PC8
99	Don't know	PC8

ASK IF PC5=1

PC6 Does this server control desktop computers aside from those located at this facility?

1	Yes	PC7
2	No	PC8
77	Other	PC8
88	Refused	PC8
99	Don't know	PC8

ASK IF PC6=1

PC7 How many desktop computers are controlled by the power management software at this other location(s)?

Record	Total number of computers	PC8
88	Refused	PC8
99	Don't know	PC8

PC8 Does the software monitor and provide reports on the usage of individual or groups of network computers?

1	Yes	PC9
2	No	PC9
77	Other [Record Verbatim]	PC9
88	Refused	PC9
99	Don't know	PC9

PC9 How effective was the desktop computer power management software at reducing your energy bill? Would you say you have achieved…

1	Considerable energy savings	PC10
2	Some energy savings	PC10
3	No noticeable savings	PC10
88	Refused	PC10
99	Don't know	PC10

PC10 Have you noticed any problems with the software performance since the installation?

1	Yes	PC10a
2	No	PC11
77	Other [Record Verbatim]	PC11
88	Refused	PC11
99	Don't know	PC11

ASK PC10a if PC10(1)

PC10a What problems have you noticed since the software was installed?

77	RECORD RESPONSE	PC11
88	Refused	PC11
99	Don't know	PC11

PC11 Whose idea was it to install the power management software?

1	Me or someone at my facility.	PC12
2	Contractor.	PC12
3	Utility company contact.	PC12
4	Manufacturer.	PC12
77	Other (specify)	PC12
88	Refused	PC12
99	Don't know	PC12

PC12 Did your facility have any guidelines or protocols in place for turning off equipment or putting equipment in sleep mode while not in use before the power management software was installed?

1	Yes	PC13
2	No	NTGCHECK6
77	Other [Record Verbatim]	PC13
88	Refused	NTGCHECK6
99	Don't know	NTGCHECK6

PC13 **ASK IF PC12=1**
What specific guidelines or protocols were in place before the software was installed?

1	[Record Verbatim]	NTGCHECK6
88	Refused	NTGCHECK6
99	Don't know	NTGCHECK6

NTGCHECK6 **Go to NTG BATTERY IF NTGPC = 1; ELSE CONTINUE WITH SPILLOVER BATTERY**

FINANCE QUESTIONS

DISPLAY I would like to ask you about funding this project. Funding could include external financing such as a company credit card, getting financing through a contractor or retailer, getting a bank loan or internal financing such as using retained earnings.

FIN1 Did you use internal or external funding for this project?

1	Internal funding	SURVEY_OP_HOURS
2	External funding	FIN2
3	Combination of internal and external funding	FIN2
88	Refused	SURVEY_OP_HOURS
99	Don't know	SURVEY_OP_HOURS

FIN2 **[ASK IF FIN1 = 2, 3]**
We are interested in known what type of external financing you used? Did you use….[READ THROUGH FULL LIST, RECORD 1=Yes, 2=No, 88=Refused, 99=Don't Know]

FIN2A	Contractor financing	Y, N, Ref, DK
FIN2B	Vendor financing [FOR INTERVIEWER: for example, taking a store loan from SEARS to buy an appliance]	Y, N, Ref, DK
FIN2C	Secured loan from bank [FOR INTERVIEWER: a loan using property or assets as collateral or lien on the business]	Y, N, Ref, DK
FIN2D	Unsecured loan from bank [FOR INTERVIEWER: a loan which does not require a collateral]	Y, N, Ref, DK
FIN2E	Line of credit	Y, N, Ref, DK

FIN2F	Equipment financing or leasing	Y, N, Ref, DK
FIN2G	Company credit card	Y, N, Ref, DK
FIN2H	Energy efficiency financing program (please specify)	Y, N, Ref, DK
FIN2HA	Please specify which EE financing program. [ASK IF FIN2H=1]	
FIN2I	&UTILITY sponsored on-bill financing	Y, N, Ref, DK
FIN2J	Property Assessed Clean Energy (PACE) Financing	Y, N, Ref, DK
FIN2K	Any other type of financing (please specify)	NONE, OPENEND

SPILLOVER BATTERY - LIGHTING

Comment

Thanks for discussing the new equipment that you installed through the program. Next I would like to discuss any equipment you might have installed OUTSIDE of the <%UTILITY> <%PROGRAM> program.

SP1

ASK ALL

SP1

Since receiving the PROGRAM INCENTIVE we just discussed, did you implement any additional energy efficiency equipment without any assistance from the ...<%UTILITY> program... either at this facility or at other locations?

1	Yes, only at this facility	SP2
2	Yes, only at other locations	SP2
3	Yes, at this facility and other locations	SP2
4	No	End
88	Refused	End
99	Don't know	End

If SP1(1||3); else skip out of spillover battery

SP2

What type of equipment did you install? Was the equipment related to lighting, air conditioning, heating, refrigeration, motors or something else? (SELECT ALL THAT APPLY AND RECORD ADDITIONAL INFO)

1	Lighting	SP2L
2	HVAC or Cooling equipment	OT5
3	Water Heating Equipment	OT5
4	Compressed Air Equipment	OT5
5	Food Service Equipment	OT5
6	Refrigeration Equipment	OT5
7	Gas Equipment	OT5
77	Other (SPECIFY)	OT5
88	Refused	OT5
99	Don't Know	OT5

Ask if SP2 = 1; else OT5

SP2L	What type of fixtures, ballasts, or lighting controls were installed as part of this lighting retrofit without any assistance from the utility program? [SELECT ALL THAT APPLY, AFTER EACH RESPONSE, PROMPT WITH,]	<$2>
1	High performance T8 fluorescent fixtures (1" diameter bulbs)	High
2	T8 fluorescent fixtures (1" diameter bulbs)	High
3	T10 fluorescent fixtures	Low
4	T12 Fixtures (1.5" diameter bulbs)	Low
5	HID (High Density Discharge) Fixtures, Compact	High
6	Screw-in Modular CFLs	High
7	Hardwire CFLs	High
8	Incandescent bulbs	None
9	Compact Fluorescent Exit Signs	High
10	LED Exit Signs	High
11	Halogen	Low
12	Installed Reflectors	High
13	Electronic Ballast	Low
14	Magnetic Ballast	Low
15	Time Clock Lighting Controls	High
16	Occupancy Sensors Lighting Controls	High
17	Bypass/Delay Timers Lighting Controls	High
18	Photocell Lighting Controls	High
19	Other Fluorescent	Low
20	Fat/Thick Tubes	Low
21	Skinny/Thin Tubes	High
22	T5 Fixtures (5/8" diameter)	High
23	Generic Screw-Based LEDs	High
77	Other (PLEASE SPECIFY)	Low
88	Refused	None
99	Don't Know	None

ASK IF SP2L = 5; ELSE SKIP TO MSP2a

LI17	Were the HID lamps you installed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?	
1	High pressure sodium	MSP2a
2	Metal Halide	MSP2a
3	Mercury Vapor	MSP2a
4	Incandescent	MSP2a
88	Refused	MSP2a
99	Don't know	MSP2a

BEGIN MACRO HIGH
PERFORM MACRO HIGH OR LOW FOR FIRST THREE MEASURES MENTIONED IN SP2L

Ask if SP1 in (1|3); else skip to MSP2b <$3>

MSP2a <$1> How many <$2> products did you buy on your own for this facility?

1	{Record Number} for this facility	MSP2b <$3>
88	Refused	MSP2b <$3>
99	Don't know	MSP2b <$3>

Ask if SP1 in (2|3); else skip to SP2bL <$4>

MSP2b <$3> How many <$2> products did you buy on your own for other locations?

1	{Record Number} for other locations	SP2bL <$4>
88	Refused	SP2bL <$4>
99	Don't know	SP2bL <$4>

SP2bL <$4> Did you receive an incentive or rebate, or do you expect to receive an incentive or rebate for &LIGHT_TECH1B from elsewhere, such as another utility or from another organization such as the government?

1	Yes, Received/expect to receive an incentive from ANOTHER utility program	SP2cU <$5>
2	Yes, Received/expect to receive an incentive from a program offered by an organization other than a utility (e.g. a government program	SP2c <$6>
3	Yes, Received/expect to receive an incentive from the manufacturer	SP5L <$7>
4	No, did not receive/expect to receive an incentive	SP5L <$7>

ASK IF SP2bL <$4> = 1

SP2cU <$5> From what utility program did you receive/expect to receive an incentive or rebate?

77	Record	RESTART MACRO

ASK IF SP2bL <$4> = 2

SP2c <$6> From what organization or program did you receive/do you expect to receive an incentive or rebate?

77	Record	SP5L <$7>

Ask if SP2bL <$4> ^ = 1

SP5L <$7> Why did you install this energy efficiency equipment without receiving a rebate or incentive from the &UTILITY program? {DO NOT READ; INDICATE ALL THAT APPLY}

1	Too much paperwork	SP5c <$9>
2	Takes too long to get approval	SP5c <$9>
3	No time to participate, needed equipment immediately	SP5c <$9>
4	The program had ended	SP5c <$9>
5	The equipment would not qualify {PROBE: Why not?}	<$8>

6	The amount of the rebate wasn't important enough	SP5c <$9>
7	Did not know the program was available	SP5c <$9>
8	There was no program available	SP5c <$9>
9	Received rebate from an organization other than a utility	SP5c <$9>
10	Received a larger incentive from another organization	SP5c <$9>
11	Took the first incentive offered	SP5c <$9>
77	Other {SPECIFY}	SP5c <$9>
88	Refused	SP5c <$9>
99	Don't know	SP5c <$9>

ASK IF SP5L <$7> = 5; ELSE SKIP TO SP5c

<$8>	Why would this equipment not qualify?	
77	Record reason…	SP5c <$9>
88	Refused	SP5c <$9>
99	Don't know	SP5c <$9>

SP5c <$9>	Was this equipment specifically recommended by a PROGRAM or UTILITY sponsored audit?	
1	Yes	SP5d <$10>
2	No	SP5d <$10>
88	Refused	SP5d <$10>
99	Don't know	SP5d <$10>

SP5d <$10>	Can you briefly explain why you decided to implement this equipment? (Note to interviewer, if the respondent mentions the utility programs as a factor in deciding to install the measure, record the open ended response in the appropriate response below)	
77	Response not related to utility program (record verbatim)	SP5eL <$11>
78	Response related to utility program (record verbatim)	SP5f <$12>

If $10 is not 78

SP5eL <$11>	Did your experience participating in the <%UTILITY> in 2013-2014 encourage you in any way to implement <$2>?	
1	Yes	SP5f <$12>
2	No	SP5h <$15>
88	Refused	SP5f <$12>
99	Don't Know	SP5f <$12>

SP5f <$12>	How influential was your experience in the <PROGRAM> in your decision to implement this equipment, using a scale of 0 to 10, where 0 is not at all influential and 10 is extremely influential?	
	{Record Response (0-10)} _____	SP5f_CONCHECK <$13>
88	Refused	SP5f_CONCHECK <$13>
99	Don't Know	SP5f_CONCHECK <$13>

IF ($10(78) | $11(1)) & $12(11|1|2|3|4); else skip to SP5gL

SP5f_CONCHECK <$13>	Earlier you indicated that the program encouraged you to implement this equipment, but now you've scored the program fairly low. Why is that?	
77	Record VERBATIM [REVISE SP5f IF NECESSARY]	SP5h <$15>

If they would like to give a new rating, type it in the open end below and the reason\,

IF $12(5||10); else skip to SP5h

SP5gL <$14>	Can you explain specifically how your experience with the PROGRAM influenced your decision to install this additional energy efficient equipment?	
77	Record VERBATIM	MEAS2_1 <$17>
88	Don't know	MEAS2_1 <$17>
99	Refused	MEAS2_1 <$17>

IF $12(11|1|2|3|4);

SP5h <$15>	Using a 0 to 10 scale where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install this equipment...<$2>...if you had not participated in the program?	
#	Record 0 to 10 likelihood rating (_____)	SP5h_CONCHECK <$16>
88	Refused	SP5h_CONCHECK <$16>
99	Don't know	SP5h_CONCHECK <$16>

IF $15 (11 or 1 - 4) & ($10(77) | $11(2)); else skip to MEAS2_1 <$17>

SP5h_CONCHECK <$16>	Earlier you indicated that the program did not encourage you to implement this equipment, but now say that you would have been less likely to install the measure without the program. Why is that?	
77	Record VERBATIM [REVISE SP5h IF NECESSARY]	MEAS2_1 <$17>

MEAS2_1 <$17>	In what year did you install <$2>? (PROBE FOR BEST GUESS)	
1	2013	MSP20 <$18>
2	2014	MSP20 <$18>
88	Refused	MSP20 <$18>
99	Don't know	MSP20 <$18>

MSP20 <$18>	What type of lighting was removed and replaced when you installed <$2>?	
1	High performance T8 (1" diameter bulbs)	MSP25 <$19>
2	T8 fluorescent fixtures (1" diameter bulbs)	MSP25 <$19>
3	T10 fluorescent fixtures	MSP25 <$19>
4	T12 Fixtures (1.5" diameter bulbs)	MSP25 <$19>

5	HID (High Density Discharge) Fixtures, Compact	MSP25 <$19>
6	Compact Fluorescent, Screw-in Modular	MSP25 <$19>
7	Compact Fluorescent, Hardwire	MSP25 <$19>
8	Incandescent	MSP25 <$19>
9	Exit Signs, Compact Fluorescent	MSP25 <$19>
10	Exit Signs, LED	MSP25 <$19>
11	Halogen	MSP25 <$19>
12	Install Reflectors	MSP25 <$19>
13	Electronic Ballast	MSP25 <$19>
14	Magnetic Ballast	MSP25 <$19>
15	Lighting Controls, Time Clock	MSP25 <$19>
16	Lighting Controls, Occupancy Sensor	MSP25 <$19>
17	Lighting Controls, Bypass/Delay Timers	MSP25 <$19>
18	Lighting Controls, Photocell	MSP25 <$19>
19	Other Fluorescent	MSP25 <$19>
20	Fat/Thick Tubes	MSP25 <$19>
21	Skinny/Thin Tubes	MSP25 <$19>
22	T5 Fixtures (5/8" diameter)	MSP25 <$19>
66	NOTHING, EQUIPMENT WAS ONLY ADDED, NOT REPLACED	
77	Other (PLEASE SPECIFY)	MSP25 <$19>
88	Refused	MSP25 <$19>
99	Don't know	MSP25 <$19>

ASK IF ^$18(66)

MSP25 <$19>	Approximately how old was this light equipment that you removed/replaced? Would you say…	
1	Less than 5 years old	MSP26 <$20>
2	Between 5 and 10 years old	MSP26 <$20>
3	Between 10 and 15 years old	MSP26 <$20>
4	More than 15 years old	MSP26 <$20>
88	Refused	MSP26 <$20>
99	Don't know	MSP26 <$20>

MSP26 <$20>	How would you describe the condition of this removed equipment? Would you say they were…	
1	In poor condition	MSP27 <$21>
2	Fair condition, or	MSP27 <$21>
3	Good condition	MSP27 <$21>
88	Refused	MSP27 <$21>
99	Don't know	MSP27 <$21>

MSP27 <$21>	Approximately what percentage of this removed lighting equipment was broken or not working prior to installing…	
%	Percent	MACRO LOW
101	Refused	MACRO LOW

102	Don't know	MACRO LOW

BEGIN MACRO LOW

<$1> In what year did you install <$2>? (PROBE FOR BEST GUESS)

1	2013	<$3>
2	2014	<$3>
88	Refused	<$3>
99	Don't know	<$3>

<$3> What type of lighting was removed and replaced when you installed <$2>?

1	High performance T8 (1" diameter bulbs)	<$4>
2	T8 fluorescent fixtures (1” diameter bulbs)	<$4>
3	T10 fluorescent fixtures	<$4>
4	T12 Fixtures (1.5” diameter bulbs)	<$4>
5	HID (High Density Discharge) Fixtures, Compact	<$4>
6	Compact Fluorescent, Screw-in Modular	<$4>
7	Compact Fluorescent, Hardwire	<$4>
8	Incandescent	<$4>
9	Exit Signs, Compact Fluorescent	<$4>
10	Exit Signs, LED	<$4>
11	Halogen	<$4>
12	Install Reflectors	<$4>
13	Electronic Ballast	<$4>
14	Magnetic Ballast	<$4>
15	Lighting Controls, Time Clock	<$4>
16	Lighting Controls, Occupancy Sensor	<$4>
17	Lighting Controls, Bypass/Delay Timers	<$4>
18	Lighting Controls, Photocell	<$4>
19	Other Fluorescent	<$4>
20	Fat/Thick Tubes	<$4>
21	Skinny/Thin Tubes	<$4>
22	T5 Fixtures (5/8” diameter)	<$4>
66	NOTHING, EQUIPMENT WAS ONLY ADDED, NOT REPLACED	<$4>
77	Other (PLEASE SPECIFY)	<$4>
88	Refused	<$4>
99	Don't know	<$4>

ASK IF ^$3(66)

<$4> Approximately how old was this light equipment that you removed/replaced? Would you say…

1	Less than 5 years old	<$5>
2	Between 5 and 10 years old	<$5>
3	Between 10 and 15 years old	<$5>
4	More than 15 years old	<$5>

88	Refused	<$5>
99	Don't know	<$5>

<$5>	How would you describe the condition of this removed equipment? Would you say they were…	
1	In poor condition	<$6>
2	Fair condition, or	<$6>
3	Good condition	<$6>
88	Refused	<$6>
99	Don't know	<$6>

<$6>	Approximately what percentage of this removed lighting equipment was broken or not working prior to installing…	
%	Percent	CFL1A
88	Refused	CFL1A
99	Don't know	CFL1A

CFL1A	**IF SP2L = 6; else skip to VEND1** Where did you purchase the CFLs that were installed OUTSIDE the program? [ACCEPT MULTIPLES]	
1	Home Depot	CFL3A
2	Costco	CFL3A
3	Orchard Supply Hardware	CFL3A
4	ACE Hardware	CFL3A
5	Lowe's	CFL3A
6	SaveMart	CFL3A
7	K-Mart	CFL3A
8	Sam's Club	CFL3A
9	Smart & Final	CFL3A
10	Yardbirds Home Center	CFL3A
11	Fry's Electronics	CFL3A
12	True Value	CFL3A
65	CONTRACTOR INSTALLED	CFL3A
66	Did not install CFLs	VEND1
77	OTHER [Specify:]	CFL3A
88	Refused	CFL3A
99	Don't know	CFL3A

CFL3A	**ASK IF ^CFL1A(66)** Were all these CFLs installed or were some put in storage for later use?	
1	All installed	VEND1
2	All in storage	VEND1
3	Some in storage, Some installed	CFL4
88	Refused	VEND1

99	Don't Know	VEND1

IF CFL3A = 3

CFL4 What percentage were installed?

77	Open Record	CFL5
88	Refused	CFL5
99	Don't know	CFL5

IF CFL3A = in (2, 3)

CFL5 Why were they put in storage?

77	Open Record	VEND1
88	Refused	VEND1
99	Don't know	VEND1

ROLE OF CONTRACTORS

ASK IF SP2L(1|2|5|6|7|9|10|12|15|16|17|18|21|22|23)

VEND1 Now I would like to find out, did you use a contractor/vendor to install the non-rebated energy efficient lighting?

1	Yes	VEND2
2	No	ENDLOOP
3	Received a rebate	ENDLOOP
88	Refused	ENDLOOP
99	[DO NOT READ] Don't know/No Answer	ENDLOOP

IF VEND1 = 1

VEND2 On a scale of 0 - 10, with 0 being very unimportant and 10 being very important. How important was the input from the contractor you worked with in deciding which specific equipment to install? Was it …

1	0-10 response	VEND3
88	Refused	VEND3
99	Don't know	VEND3

Ask if VEND2(7||10); Else LI30_A;

VEND3 Can you give me your contractor's name?
Do you have his/her email address?
Do you have a phone number for him/her?

77	RECORD NAME, Phone, Email ETC	LI30_A
88	Refused	LI30_A
99	Don't know	LI30_A

ASK IF SP2L(1||77)

LI30_1 Considering all of the lighting changes we just discussed (purchases outside the programs), approximately what percentage of the facility's lighting was affected by those changes?

%	Percent	OT5

101	Refused	OT5
102	Don't know	OT5

SPILLOVER BATTERY - OTHER

IF SP2(2||77)

Comment Next I would like to discuss any equipment you might have installed OUTSIDE of the &UTILITY program.

DISPLAY Earlier you mentioned that your organization installed...<(SP2(2))/HVAC or COOLING EQUIPMENT/> <(SP2(3))/WATER HEATING EQUIPMENT/> <(SP2(4))/COMPRESSED AIR EQUIPMENT/> <(SP2(5))/FOOD SERVICE EQUIPMENT/> <(SP2(6))/GAS EQUIPEMNENT/> %O<%SP2> outside of the program without any benefit of incentive or rebate. I would like to ask you a few questions about this equipment.

Response names in the following questions will have endings "_#" where # signifies the response number to SP2 (# = 1, 2, or 3)

MACRO OTHER

<$1> Was this equipment ...<$2> ...installed at this facility or another facitility or was it installed in both?

1	This facility	<$3>
2	Another facility	<$2>
3	Both this and another facility	<$3>
66	Was not installed	NEXT MEASURE
88	Refused	NEXT MEASURE
99	Don't know	NEXT MEASURE

Ask if <$1> in (1,3)

<$3> Please describe the type of <$2> that you installed at this facility.

77	Record verbatim	<$4>
88	Refused	<$4>
99	Don't know	<$4>

<$4> Please describe the quantity of <$2> that was installed at this facility.

77	Record verbatim	<$5>
88	Refused	<$5>
99	Don't know	<$5>

<$5> Please describe the efficiency level of <$2> that was installed at this facility.

1	Standard Efficiency	<$6>
2	High Efficiency	<$6>
3	Energy Star	<$6>
88	Refused	<$6>
99	Don't know	<$6>

Ask if <$1> in (2-3)

<$6> Please describe the type of <$2> that you purchased and installed at your other facility

77	Record verbatim	<$7>
88	Refused	<$7>
99	Don't know	<$7>

<$7> Please describe the quantity of <$2> that was installed at your other facility

77	Record verbatim	<$8>
88	Refused	<$8>
99	Don't know	<$8>

<$8> Please describe the efficiency level of <$2> that was installed at your other facility

1	Standard Efficiency	<$9>
2	High Efficiency	<$9>
3	Energy Star	<$9>
88	Refused	<$9>
99	Don't know	<$9>

<$9> Did you receive an incentive or rebate, or do you expect to receive an incentive or rebate for &OT_TECH1B from elsewhere, such as another utility or from another organzation such as the government?

1	Yes, Received/expect to receive an incentive from ANOTHER utility program	<$10>
2	Yes, Received/expect to receive an incentive from a program offered by an organization other than a utility (e.g. a government program	<$11>
3	Yes, Received/expect to receive an incentive from the manufacturer	<$12>
4	No, did not receive/expect to receive an incentive	<$12>

ASK IF $9 = 1

<$10> From what utility program did you receive/expect to receive an incentive or rebate?

77	Record	end for this measure

ASK IF $9 = 2

<$11> From what organization or program did you receive/expect to receive an incentive or rebate?

77	Record	SP5O

ASK IF ^$9(1)
Why did you purchase this equipment without the financial assistance available through &UTILITY program? {DO NOT READ; INDICATE ALL THAT APPLY}
<$12>

1	Too much paperwork	<$14>
2	Takes too long to get approval	<$14>
3	No time to participate, needed equipment immediately	<$14>
4	The program had ended	<$14>
5	The equipment would not qualify {PROBE: Why not?}	<$13>
6	The amount of the rebate wasn't important enough	<$14>
7	Did not know the program was available	<$14>
8	There was no program available	<$14>
10	Received a larger incentive from another organization	<$14>
11	Took the first incentive offered	<$14>
77	Other {SPECIFY}	<$14>
88	Refused	<$14>
99	Don't know	<$14>

ASK IF <$12> = 5
<$13> Why would this equipment not qualify?

77	Record answer	<$14>
88	Refused	<$14>
99	Don't know	<$14>

Was this equipment... <$2>... specifically recommended by a PROGRAM/UTILITY sponsored audit?
<$14>

1	Yes	<$15>
2	No	<$15>
88	Refused	<$15>
99	Don't know	<$15>

Can you briefly explain why you decided to implement this equipment? (Note to interviewer, if the respondent mentions the utility programs as a factor in deciding to install the measure, record the open ended response in the appropriate response below
<$15>

77	Response not related to utility program (record verbatim)	<$17>
78	Response related to utility program (record verbatim)	<$16>
88	Refused	<$17>
99	Don't know	<$17>

ASK IF <$15> ^= 78

Did your experience participating in the <%UTILITY> <%PROGRAM> program in 2013-2014 encourage you in any way to implement

<$16> &OT_TECH1B?

1	Yes	<$17>
2	No	<$17>
88	Refused	<$17>
99	Don't Know	<$17>

<$17> How influential was your experience in the PROGRAM in your decision to implement this equipment, using a scale of 0 to 10, where 0 is not at all influential and 10 is extremely influential?

	{Record Response (0-10)} _____	<$18>
88	Refused	<$18>
99	Don't Know	<$18>

ASK IF ($15(78) \| $16(1)) & $17(11\|1\|2\|3\|4)

<$18> Earlier you indicated that the program encouraged you to implement this equipment, but now you've scored the program fairly low. Why is that?

77	Record VERBATIM [REVISE <$17> IF NECESSARY]	

ASK IF IF $17(5\|\|10)

<$19> Can you explain specifically how your experience with the <%PROGRAM> program influenced your decision to install this additional energy efficient equipment?

77	Record VERBATIM	
88	Don't know	
99	Refused	

ASK IF $17(11\|1\|2\|3\|4)

<$20> Using a 0 to 10 scale where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install this equipment...<$2>...if you had not participated in the program?

#	Record 0 to 10 likelihood rating (_____)	
88	Refused	
99	Don't know	

ASK IF $20(11\|1\|2\|3\|4) & ($15(77) \| $16(2))

<$21> Earlier you indicated that the program did not encourage you to implement this equipment ...<$2> >.., but now say that you would have been less likely to install the equipment without the program. Why is that?

77	Record VERBATIM [REVISE xxx IF NECESSARY]	

<$22> In what year did you install <$2>

1	2013	VEND1
2	2014	VEND1
88	Refused	VEND1
99	Don't know	VEND1

ROLE OF CONTRACTORS

ASK IF SP2(2||77)

OTVEND1 Now I would like to find out, did you use a contractor/vendor to install the non-rebated energy efficient equipment?

1	Yes	OTVEND2
2	No	ENDOTHERLOOP
88	Refused	ENDOTHERLOOP
99	[DO NOT READ] Don't know/No Answer	ENDOTHERLOOP

ASK IF OTVEND1(1)

OTVEND2 On a scale of 0 - 10, with 0 being very unimportant and 10 being very important. How important was the input from the contractor you worked with in deciding which specific equipment to install? Was it …

1	0-10 response	VEND3
88	Refused	VEND3
99	Don't know	VEND3

IF OTVEND2(7||10)

OTVEND3_(1-3) Can you give me your contractor's name?
Do you have his/her email address?
Do you have a phone number for him/her?

77	RECORD NAME, Phone, Email ETC	ENDOTHERLOOP
88	Refused	ENDOTHERLOOP
99	Don't know	ENDOTHERLOOP

ENDOTHER LOOP **END OTHER MEASURE LOOP; IF FINISHED OTHER MEASURES OR NO MORE OTHER MEASURES, GO ON TO NEXT BATTERY**

OPERATING HOURS

DISPLAY We are almost finished. The next few questions are to help us get a full understanding of your organization's operational hours.

ALWAYS Is your organization operation 24 hours a day, 7 days a week?

1	Yes	HOLIDAYS
2	No	HOLIDAYS
88	Refused	HOLIDAYS

HOLIDAYS	Dose your facility closed for any holidays during the year? If so, which one(s)?	
1	New Year's Day - January 1	DAYS
2	Martin Luther King Jr. Day - January 18, 2010 (3rd Monday in January)	DAYS
3	President's Day - February 15, 2010 (3rd Monday in February)	DAYS
4	Memorial Day - May 31, 2010 (Last Monday in May)	DAYS
5	Independence Day - July 4th (Or Surrounding Monday/Friday if July 4 is a weekend)	DAYS
6	Labor Day - September 6, 2010 (First Monday in September)	DAYS
7	Thanksgiving - November 26, 2010 (4th Thursday in November)	DAYS
8	Day after Thanksgiving	DAYS
9	Christmas Eve - December 24	DAYS
10	Christmas Day - December 25	DAYS
66	NO HOLIDAY CLOSURES	DAYS
77	Other - Specify	DAYS
88	Refused	DAYS
99	Don't Know	DAYS

DAYS	**Ask if ALWAYS = 2; else skip to OS_REC;** Is your facility closed any of the 7 days of the week? If so, which days are you CLOSED?	
1	Monday	MONDAY_OPEN
2	Tuesday	MONDAY_OPEN
3	Wednesday	MONDAY_OPEN
4	Thursday	MONDAY_OPEN
5	Friday	MONDAY_OPEN
6	Saturday	MONDAY_OPEN
7	Sunday	MONDAY_OPEN
66	Open EVERYDAY	MONDAY_OPEN
88	REFUSED	MONDAY_OPEN
99	DON'T KNOW	MONDAY_OPEN

MONDAY_OPEN	**Ask if ALWAYS(2)&^DAYS(1); else skip to TUESDAY_OPEN;** What time do you open your facility on MONDAY?	
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	MONDAY_CLOSE
88	REFUSED	MONDAY_CLOSE
99	DON'T KNOW	MONDAY_CLOSE

IF MONDAY_OPEN(1||64)
What time do you close your facility on MONDAY?

MONDAY_CLOSE		
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	TUESDAY_OPEN
88	REFUSED	TUESDAY_OPEN
99	DON'T KNOW	TUESDAY_OPEN

Ask if ALWAYS(2)&^DAYS(2); else skip to WEDNESDAY_OPEN;
What time do you open your facility on TUESDAY?

TUESDAY_OPEN		
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	TUESDAY_CLOSE
88	REFUSED	TUESDAY_CLOSE
99	DON'T KNOW	TUESDAY_CLOSE

IF TUESDAY_OPEN(1||65)
What time do you close your facility on TUESDAY?

TUESDAY_CLOSE		
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	WEDNESDAY_OPEN
88	REFUSED	WEDNESDAY_OPEN
99	DON'T KNOW	WEDNESDAY_OPEN

Ask if ALWAYS(2)&^DAYS(3); else skip to THURSDAY_OPEN;
What time do you open your facility on WEDNESDAY?

WEDNESDAY_OPEN		
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	WEDNESDAY_CLOSE
88	REFUSED	WEDNESDAY_CLOSE
99	DON'T KNOW	WEDNESDAY_CLOSE

IF WEDNESDAY_OPEN(1||65)
What time do you close your facility on WEDNESDAY?

WEDNESDAY_CLOSE		
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	THURSDAY_OPEN
88	REFUSED	THURSDAY_OPEN
99	DON'T KNOW	THURSDAY_OPEN

Ask if ALWAYS(2)&^DAYS(4); else skip to FRIDAY_OPEN;
What time do you open your facility on THURSDAY?

THURSDAY_OPEN		
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	THURSDAY_CLOSE
88	REFUSED	THURSDAY_CLOSE
99	DON'T KNOW	THURSDAY_CLOSE

IF THURSDAY_OPEN(1||65)

THURSDAY_CLOSE What time do you close your facility on THURSDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	FRIDAY_OPEN
88	REFUSED	FRIDAY_OPEN
99	DON'T KNOW	FRIDAY_OPEN

Ask if ALWAYS(2)&^DAYS(5); else skip to SATURDAY_OPEN;

FRIDAY_OPEN What time do you open your facility on FRIDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	FRIDAY_CLOSE
88	REFUSED	FRIDAY_CLOSE
99	DON'T KNOW	FRIDAY_CLOSE

IF FRIDAY_OPEN(1||65)

FRIDAY_CLOSE What time do you close your facility on FRIDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SATURDAY_OPEN
88	REFUSED	SATURDAY_OPEN
99	DON'T KNOW	SATURDAY_OPEN

Ask if ALWAYS(2)&^DAYS(6); else skip to SUNDAY_OPEN;

SATURDAY_OPEN What time do you open your facility on SATURDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SATURDAY_CLOSE
88	REFUSED	SATURDAY_CLOSE
99	DON'T KNOW	SATURDAY_CLOSE

IF SATURDAY_OPEN(1||65)

SATURDAY_CLOSE What time do you close your facility on SATURDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SUNDAY_OPEN
88	REFUSED	SUNDAY_OPEN
99	DON'T KNOW	SUNDAY_OPEN

Ask if ALWAYS(2)&^DAYS(7); else skip to DIFF_SCHEDULE;

SUNDAY_OPEN What time do you open your facility on SUNDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SUNDAY_CLOSE
88	REFUSED	SUNDAY_CLOSE

99	DON'T KNOW	SUNDAY_CLOSE

SUNDAY_CLOSE

IF SUNDAY_OPEN(1||65)
What time do you close your facility on SUNDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	DIFF_SCHEDULE
88	REFUSED	DIFF_SCHEDULE
99	DON'T KNOW	DIFF_SCHEDULE

DIFF_SCHEDULE

Some organizations have different schedules for certain times of the year. Does your organization maintain a different schedule for certain months of the year?

1	Yes	MONTHS
2	No	OS_REC
88	REFUSED	OS_REC
99	DON'T KNOW	OS_REC

MONTHS

Ask if DIFF_SCHEDULE = 1; Else skip to OS_REC;
Which months of the year does the schedule vary from the times I just recorded?

1	January	ALT_DAYS
2	February	ALT_DAYS
3	March	ALT_DAYS
4	April	ALT_DAYS
5	May	ALT_DAYS
6	June	ALT_DAYS
7	July	ALT_DAYS
8	August	ALT_DAYS
9	September	ALT_DAYS
10	October	ALT_DAYS
11	November	ALT_DAYS
12	December	ALT_DAYS
88	REFUSED	ALT_DAYS
99	DON'T KNOW	ALT_DAYS

ALT_ALWAYS

Is your organization operation 24 hours a day, 7 days a week?

1	Yes	HOLIDAYS
2	No	HOLIDAYS
88	Refused	HOLIDAYS

If ^ALT_ALWAYS(1) then ask; Else skip to OS_REC;

ALT_DAYS	During this alternate schedule, is your facility closed any of the 7 days of the week? If so, which days are you CLOSED?	
1	Monday	ALT_MONDAY_OPEN
2	Tuesday	ALT_MONDAY_OPEN
3	Wednesday	ALT_MONDAY_OPEN
4	Thursday	ALT_MONDAY_OPEN
5	Friday	ALT_MONDAY_OPEN
6	Saturday	ALT_MONDAY_OPEN
7	Sunday	ALT_MONDAY_OPEN
66	Open EVERYDAY	ALT_MONDAY_OPEN
88	REFUSED	ALT_MONDAY_OPEN
99	DON'T KNOW	ALT_MONDAY_OPEN

Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(1); else skip to ALT_TUESDAY_OPEN;

ALT_MONDAY_OPEN	For the alternate schedule, what time do you open your facility on MONDAY?	
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_MONDAY_CLOSE
88	REFUSED	ALT_MONDAY_CLOSE
99	DON'T KNOW	ALT_MONDAY_CLOSE

IF ALT_MONDAY_OPEN(1||64)

ALT_MONDAY_CLOSE	What time do you close your facility on MONDAY?	
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_TUESDAY_OPEN
88	REFUSED	ALT_TUESDAY_OPEN
99	DON'T KNOW	ALT_TUESDAY_OPEN

Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(2); else skip to ALT_WEDNESDAY_OPEN;

ALT_TUESDAY_OPEN	What time do you open your facility on TUESDAY during your alternate schedule?	
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_TUESDAY_CLOSE
88	REFUSED	ALT_TUESDAY_CLOSE
99	DON'T KNOW	ALT_TUESDAY_CLOSE

IF ALT_TUESDAY_OPEN(1||65)

ALT_TUESDAY_CLOSE	What time do you close your facility on TUESDAY?	
	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_WEDNESDAY_OPEN
88	REFUSED	ALT_WEDNESDAY_OPEN
99	DON'T KNOW	ALT_WEDNESDAY_OPEN

Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(3); else skip to ALT_THURSDAY_OPEN;

ALT_WEDNESDAY_OPEN What time do you open your facility on WEDNESDAY during your alternate schedule?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_WEDNESDAY_CLOSE
88	REFUSED	ALT_WEDNESDAY_CLOSE
99	DON'T KNOW	ALT_WEDNESDAY_CLOSE

IF ALT_WEDNESDAY_OPEN(1||65)

ALT_WEDNESDAY_CLOSE What time do you close your facility on WEDNESDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_THURSDAY_OPEN
88	REFUSED	ALT_THURSDAY_OPEN
99	DON'T KNOW	ALT_THURSDAY_OPEN

Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(4); else skip to ALT_FRIDAY_OPEN;

ALT_THURSDAY_OPEN What time do you open your facility on THURSDAY during your alternate schedule?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_THURSDAY_CLOSE
88	REFUSED	ALT_THURSDAY_CLOSE
99	DON'T KNOW	ALT_THURSDAY_CLOSE

ALT_THURSDAY_OPEN(1||65)

ALT_THURSDAY_CLOSE What time do you close your facility on THURSDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_FRIDAY_OPEN
88	REFUSED	ALT_FRIDAY_OPEN
99	DON'T KNOW	ALT_FRIDAY_OPEN

Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(5); else skip to ALT_SATURDAY_OPEN;

ALT_FRIDAY_OPEN What time do you open your facility on FRIDAY during this alternate schedule?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_FRIDAY_CLOSE
88	REFUSED	ALT_FRIDAY_CLOSE
99	DON'T KNOW	ALT_FRIDAY_CLOSE

IF ALT_FRIDAY_OPEN(1||65)

ALT_FRIDAY_CLOSE What time do you close your facility on FRIDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SATURDAY_OPEN
88	REFUSED	ALT_SATURDAY_OPEN
99	DON'T KNOW	ALT_SATURDAY_OPEN

ALT_SATURDAY_OPEN **Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(6); else skip to ALT_SUNDAY_OPEN;** I recorded that during your alternate schedule you are also open on Saturday. What time do you open your facility on SATURDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SATURDAY_CLOSE
88	REFUSED	ALT_SATURDAY_CLOSE
99	DON'T KNOW	ALT_SATURDAY_CLOSE

ALT_SATURDAY_CLOSE **IF ALT_SATURDAY_OPEN(1||65)** What time do you close your facility on SATURDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SUNDAY_OPEN
88	REFUSED	ALT_SUNDAY_OPEN
99	DON'T KNOW	ALT_SUNDAY_OPEN

ALT_SUNDAY_OPEN **Ask if DIFF_SCHEDULE(1)&^ALT_DAYS(7); else skip to OS_REC;** I recorded that during your alternate schedule you are also open on Sunday. What time do you open your facility on SUNDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SUNDAY_CLOSE
88	REFUSED	ALT_SUNDAY_CLOSE
99	DON'T KNOW	ALT_SUNDAY_CLOSE

ALT_SUNDAY_CLOSE **IF ALT_SUNDAY_OPEN(1||65)** What time do you close your facility on SUNDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	OS_REC
88	REFUSED	OS_REC
99	DON'T KNOW	OS_REC

NET TO GROSS

DISPLAY For the sake of expediency, during this next battery we will be referring to the ..... program as THE PROGRAM and we will be referring to the installation of ...<%NTGMEASURE>... as THE MEASURE.

A3 There are usually a number of reasons why an organization like yours decides to participate in energy efficiency programs like this one. In your own words, can you tell me why you decided to participate in this program?

1	To replace old or outdated equipment	N2
2	As part of a planned remodeling, build-out, or expansion	N2
3	To gain more control over how the equipment was used	N2
4	Maintenance downtime/associated expenses for old equip were too high	N2
5	Had process problems and were seeking a solution	N2
6	To improve equipment performance	N2
7	To improve production as a result of the change in equipment	N2
8	To comply with codes set by regulatory agencies	N2
9	To improve visibility/plant safety	N2
10	To comply with company policies regarding regular equipment retrofits or remodeling	N2
11	To get a rebate from the program	N2
12	To protect the environment	N2
13	To reduce energy costs	N2
14	To reduce energy use/power outages	N2
15	To update to the latest technology	N2
16	To improve the comfort level of the facility	N2
77	RECORD VERBATIM	N2
88	Don't know	N2
99	Refused	N2

N2 Did your organization make the decision to install this new equipment before or after you became aware of rebates/cost reduction available through the PROGRAM?

1	Before	N3a
2	After	N3a
88	Refused	N3a
99	Don't know	N3a

DISPLAY Next, I'm going to ask you to rate the importance of the program as well as other factors that might have influenced your decision to install this equipment through the program. Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of...

N3a The age or condition of the old equipment

#	Record 0 to 10 score (_____)	N3aa
88	Refused	N3b

99	Don't know	N3b

IF N3a > 5 and NTG_TYPE >= 2 THEN ASK

N3aa How, specifically, did this enter into your decision to install/delamp this equipment?

77	RECORD VERBATIM	N3b
88	Don't know	N3b
99	Refused	N3b

N3b Availability of the PROGRAM rebate/cost reduction

#	Record 0 to 10 score (_____)	N3bb
88	Refused	N3c
99	Don't know	N3c

IF N3b > 7 AND NTG_TYPE >= 2, THEN ASK

N3bb Why do you give it this rating?

77	Record VERBATIM	N3c
88	Refused	N3c
99	Don't know	N3c

IF A1B(1)|ID0(1) THEN ASK; ELSE SKIP TO N3d

N3c Please rate the degree of importance of information provided through...A1B(1)|<ID0(1)/The Facility or System AUDIT/>

#	Record 0 to 10 score (_____)	N3cc
88	Refused	N3d
99	Don't know	N3d

IF N3c > 7 and NTG_TYPE >= 2, THEN ASK

N3cc Why do you give it this rating?

77	Record VERBATIM	N3d
88	Refused	N3d
99	Don't know	N3d

If V1 = 1 THEN ASK; ELSE SKIP TO N3e

N3d Recommendation from an equipment vendor that sold you the equipment and/or installed it for you **[VENDOR_1]**

#	Record 0 to 10 score (_____)	N3e
88	Refused	N3e
99	Don't know	N3e

N3e Your previous experience with energy efficient projects?

#	Record 0 to 10 score (_____)	N3f
88	Refused	N3f
99	Don't know	N3f

N3f	Your previous experience with <%UTILITY>'s program or a similar utility program?	
#	Record 0 to 10 score (_____)	N3g
88	Don't know	N3g
99	Refused	N3g

NTG_TYPE >= 3 THEN ASK, ELSE N3h

N3g	Information from the Program, Utility, or Program Administrator training course?	
#	Record 0 to 10 score (_____)	N3gg
88	Refused	N3h
99	Don't know	N3h

IF N3g > 5, THEN ASK

N3gg	What type of information was provided during the training?	
77	Record VERBATIM	N3ggg
88	Refused	N3h
99	Don't know	N3h

N3ggg	How, specifically, did this enter into your decision to install/delamp this equipment?	
77	RECORD VERBATIM	N3h
88	Don't know	N3h
99	Refused	N3h

N3h	Information from the Program, Utility, or Program Administrator Marketing materials?	
#	Record 0 to 10 score (_____)	N3hh
88	Refused	N3j
99	Don't know	N3j

IF N3h > 5 and NTG_TYPE >= 2, THEN ASK

N3hh	What type of information was provided that pertained to the PROJECT?	
77	Record VERBATIM	N3hhh
88	Refused	N3j
99	Don't know	N3j

IF N3hh = 77, THEN ASK

N3hhh	How, specifically, did this enter into your decision to install/delamp this energy efficient equipment?	
77	RECORD VERBATIM	N3j
88	Don't know	N3j
99	Refused	N3j

IF NTG_TYPE >= 2

N3j	Standard practice in your business/industry	
#	Record 0 to 10 score (_____)	N3k

88	Refused	N3k
99	Don't know	N3k

If AP9 = 3 or AP9a = 3 THEN ASK; ELSE SKIP TO N3m

N3l Endorsement or recommendation by your account rep?

#	Record 0 to 10 score (_____)	N3ll
88	Refused	N3m
99	Don't know	N3m

IF N3l > 5 & NTG_TYPE >= 2 THEN ASK

N3ll What did they recommend?

77	Record VERBATIM	N3lll
88	Refused	N3m
99	Don't know	N3m

IF N3LL(77)

N3lll How specifically did this enter into your decision to install this project using energy efficient equipment?

77	RECORD VERBATIM	N3m
88	Don't know	N3m
99	Refused	N3m

IF NTG_TYPE >= 2, ASK

N3m Corporate policy or guidelines

#	Record 0 to 10 score (_____)	N3mm
88	Refused	N3n
99	Don't know	N3n

IF N3m > 5, THEN ASK

N3mm How, specifically, did this enter into your decision to install/delamp this equipment?

77	RECORD VERBATIM	N3n
88	Don't know	N3n
99	Refused	N3n

N3n Payback or return on investment of installing this equipment

#	Record 0 to 10 score (_____)	N3o
88	Refused	N3o
99	Don't know	N3o

N3o Improved product quality

#	Record 0 to 10 score (_____)	N3oo
88	Refused	N3p
99	Don't know	N3p

IF N3o > 5, THEN ASK

N3oo	How, specifically, did this enter into your decision to install/delamp this equipment?	
77	RECORD VERBATIM	N3p
88	Don't know	N3p
99	Refused	N3p

IF FM050 = 12 AND NTG_TYPE = 4, THEN ASK, ELSE SKIP TO N3r

N3p	Compliance with state or federal regulations such as Title 24, air quality, OSHA, or FDA regulations	
#	Record 0 to 10 score (_____)	N3pp
88	Refused	N3r
99	Don't know	N3r

IF N3p > 5, THEN ASK

N3pp	How, specifically, did this enter into your decision to upgrade to energy efficient equipment?	
77	RECORD VERBATIM	N3r
88	Don't know	N3r
99	Refused	N3r

ASK IF NTG_TYPE >= 3

N3r	Compliance with your organization's normal remodeling or equipment replacement practices?	
#	Record 0 to 10 score (_____)	N3rrr
88	Refused	N3s
99	Don't know	N3s

IF A3(2|10)&N3R(6||10);

N3RRR	What is your normal cycle in number of years for which you typically retrofit your equipment to comply with your organization@'s normal remodeling or equipment replacement practices?	
# yrs	Record Number of Years	N3rr
88	Refused	N3rr
99	Don't know	N3rr

IF N3r > 5, THEN ASK

N3rr	How, specifically, did this enter into your decision to install/delamp this equipment?	
77	RECORD VERBATIM	N3s.
88	Don't know	N3s.
99	Refused	N3s.

N3s	Were there any other factors we haven't discussed that were influential in your decision to install/delamp this MEASURE?	
1	Nothing else influential	CC1
77	Record verbatim	N3ss
88	Refused	CC1
99	Don't know	CC1

ASK IF N3s = 77

N3ss Using the same zero to 10 scale, how would you rate the influence of this factor?

#	Record 0 to 10 score (_____)	CC1
88	Refused	CC1
99	Don't know	CC1

CONSISTENCY CHECKS ON N3p, N3q and N3r
If NTG_TYPE = 4
IF A3 = 8, AND N3p < 4, THEN ASK

CC1 You indicated earlier that compliance with codes or regulatory policies was one of the reasons you did the project. However, just now you scored the importance of compliance with state or federal regulations or standards such as Title 24, air quality, OSHA, or FDA regulations in your decision making fairly low, why is that?

77	RECORD VERBATIM	CC1a
88	Don't know	CC1a
99	Refused	CC1a

IF A3 ^= 8, and N3p > 7, THEN ASK

CC1a You indicated earlier that compliance with codes or regulatory policies was not one of the primary reasons you did the project. However, just now you scored the importance of compliance with state or federal regulations or standards such as Title 24,air quality, OSHA, or FDA regulations in your decision making fairly high, why is that?

77	RECORD VERBATIM	CC3
88	Don't know	CC3
99	Refused	CC3

IF A3 = 2 or 10, AND N3r < 4, THEN ASK

NCC3 You indicated earlier that a regularly scheduled retrofit was one of the reasons you did the project. However, just now you scored the importance of compliance with your company's regularly scheduled retrofit or equipment replacement in your decision making fairly low, why is that?

77	RECORD VERBATIM	CC3a
88	Don't know	CC3a
99	Refused	CC3a

IF A3 ^= 2 and A3 ^= 9 and A3^=10 AND N3r > 7 THEN ASK

NCC3a You indicated earlier that a regularly scheduled retrofit was NOT one of the reasons you did the project. However, just now you scored the importance of compliance with your company's regularly scheduled retrofit or equipment replacement in your decision making fairly high, why is that?

77	RECORD VERBATIM	N33
88	Don't know	N33
99	Refused	N33

PAYBACK BATTERY
If INCENT <> 100 AND NTG_TYPE >= 2, THEN ASK; ELSE SKIP TO N33

P1 What financial calculations does your company typically make before proceeding with the installation of energy efficient equipment like you installed through the program?

1	Payback	P2A
2	Return on investment	P2B
77	Record VERBATIM	P3
88	Don't know	P3
99	Refused	P3

If P1 = 1 THEN ASK; ELSE SKIP TO P2B

P2A What is your threshold in terms of the payback or return on investment your company uses before deciding to proceed with installing energy efficient equipment like you installed through the program? Is it…

1	0 to 6 months	P3
2	6 months to 1 year	P3
3	1 to 2 years	P3
4	2 to 3 years	P3
5	3 to 5 years	P3
6	Over 5 years	P3
88	Don't know	P3
99	Refused	P3

IF P1 = 2 THEN ASK

P2B What is your ROI?

1	Record ROI____;	P3

P3 Did the rebate move your energy efficient equipment project within this acceptable range?

1	Yes	P4
2	No	P3a
88	Don't know	P3a
99	Refused	P3a

If P3 = 1 THEN ASK; ELSE SKIP TO P3A

P4 On a scale of 0 to 10, with a 0 meaning Not At All Important and a 10 meaning a Very Important, how important in your decision was it that the project was now in the acceptable range?

#	Record 0 to 10 score (_____)	P3a
88	Refused	P3a
99	Don't know	P3a

CONSISTENCY CHECKS ON N3b and P3
IF P3 = 1, AND N3b < 5, THEN ASK

P3a The rebate seemed to make the difference between meeting your financial criteria and not meeting them, but you are saying that the rebate didn't have much effect on your decision, why is that?

77	Record VERBATIM	P3e
88	Don't know	P3e
99	Refused	P3e

IF P3 = 2, AND N3b > 5, THEN ASK

P3e The rebate didn't cause the installation of energy efficient equipment to meet your company's financial criteria, but you said that the rebate had an impact on the decision to install this energy efficient equipment. Why did it have an impact?

77	Record VERBATIM	N33
88	Don't know	N33
99	Refused	N33

IF N3A(8||10) | N3D(8||10) | N3E(8||10) | N3F(8||10) | N3J(8||10) | N3M(8||10) | N3N(8||10) | N3O(8||10) | N3P(8||10) | N3R(8||10);

DISPLAY Next, I would like you to rate the importance of the PROGRAM in your decision to implement this MEASURE as opposed to other factors that may have influenced your decision such as...(SCAN BELOW AND READ TO THEM THOSE ITEMS WHERE THEY GAVE A RATING OF 8 or higher)

<%N3A> Age or condition of old equipment,	...@[%N3A>@
<%N3D> Equipment Vendor recommendation	...@[%N3D>@
<%N3E> Previous experience with this measure	...@[%N3E>@
<%N3F> Previous experience with this program	...@[%N3F>@
<%N3J> Standard practice in your business/industry	...@[%N3J>@
<%N3M> Corporate policy or guidelines	...@[%N3M>@
<%N3N> Payback on investment.	...@[%N3N>@
<%N3O> To improve production as a result of lighting,	...@[%N3O>@
<%N3P> Compliance with state or federal regulations or standards such as Title 24, air quality, OSHA, or FDA regulations	...@[%N3P>@
<%N3R> Compliance with normal maintenance or retrocommissioning policies or your companies regularly scheduled retrofit or lighting replacement	...@[%N3R>@

DISPLAY If you were given 10 points to award in total, how many points would give to the importance of the program and how many points would you give to these other factors?\

N41 How many of the ten points would you give to the importance of the PROGRAM in your decision?

#	Record 0 to 10 score (_____)	N42
88	Refused	N42
99	Don't know	N42

N42 and how many points would you give to all of these other factors?\

#	Record 0 to 10 score (_____)	N41a
88	Refused	N41a

99	Don't know	N41a

If N41 <> 88 and N41 <> 99 and N42 <> 88 and N42 <> 99, computer N41 + N42. While N41+N42 <> 10, display:
__We want these two sets of numbers to equal 10.
<%N41> for Program influence and
<%N42> for Non Program factors

IF DELAMP <> 1;

REPLACE Was the installion of this measure....<%NTGMEASURE> ...a replacement of existing equipment or was it additional equipment you installed in your facility?

1	Replace	DISPLAY
2	Add-on	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

DISPLAY Now I would like you to think about the action you would have taken with regard to the installation of this equipment if the program had not been available.

IF REPLACE(1) | DELAMP == 1

N5 Using a likelihood scale from 0 to 10, where 0 is Not at all likely and 10 is Extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program qualifying energy efficient equipment that you did in this project?

#	Record 0 to 10 score (_____)	N5a
88	Refused	N5B
99	Don't know	N5B

IF REPLACE(2) THEN ASK; ELSE SKIP TO N6

N5aa Using a likelihood scale from 0 to 10, where 0 is Not at all likely and 10 is Extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same energy efficient equipment at the same time as you did?

#	Record 0 to 10 score (_____)	N6
88	Don't know	N6
99	Refused	N6

CONSISTENCY CHECKS
IF N3b > 7 and N5 > 7, THEN ASK

N5a When you answered ...<%N3B> ... for the question about the influence of the rebate, I would interpret that to mean that the rebate was quite important to your decision to install. Then, when you answered ..<%N5>... for how likely you would be to install the same equipment **without** the rebate, it sounds like the rebate was not very important in your installation decision.
I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain in your own words, the role the rebate played in your decision to install this efficient equipment?

77	Record VERBATIM	NN5aa
88	Don't know	NN5aa
99	Refused	NN5aa

NN5aa Would you like for me to change your score on the importance of the rebate that you gave a rating of <%N3B> and/or change your rating on the likelihood you would install the same equipment without the rebate which you gave a rating of <%N5> and/or we can change both if you wish?

1	No change	N5b
77	Record how they would rate rebate influence and how they would rate likelihood to install without the rebate	N5b
88	Don't know	N5b
99	Refused	N5b

ASK IF REPLACE(1)

N5b Using the same scale as before, if the program had not been available, what is the likelihood that you would have done this project at the same time as you did?

#	Record 0 to 10 score (_____)	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

DEFERRED FREE RIDERSHIP FOLLOW-UP

DISPLAY If N5b < 9; ELSE SKIP TO N6

DISPLAY Next, I'd like to ask a couple of questions to help us estimate at what point in the future you would definitely have replaced your existing equipment. We understand that you can't know exactly when you would have done this, especially so far into the future. We're just trying to get a sense of how long you think the current equipment or process would have kept serving your company's needs before you had to or chose to replace it. TD1

TD1 If the program had not been available, how likely is it that you would have replaced your existing equipment within one year of when you did?

1	Definitely would have (1.0 probability)	N9bb
2	Probably would have (0.75 probability)	TD2
3	50-50 chance (0.50 probability)	TD2
4	Probably not (0.25 probability)	TD2
5	Definitely not (0.0 probability)	TD2

IF TD1 = 2, 3, 4, 5 ASK TD2, ELSE GO TO N9bb

TD2 If the program had not been available, how likely is it that you would have replaced your existing equipment within three years of when you did?

1	Definitely would have (1.0 probability)	N9bb
2	Probably would have (0.75 probability)	TD3
3	50-50 chance (0.50 probability)	TD3
4	Probably not (0.25 probability)	TD3
5	Definitely not (0.0 probability)	TD3

IF TD2 = 2, 3, 4, 5 ASK TD3; ELSE GO TO N6

TD3 If the program had not been available, how likely is it that you would have replaced your existing equipment within five years of when you did?

1	Definitely would have (1.0 probability)	N9bb
2	Probably would have (0.75 probability)	N9bb
3	50-50 chance (0.50 probability)	N9bb
4	Probably not (0.25 probability)	N9bb
5	Definitely not (0.0 probability)	N9bb

CONSISTENCY CHECK ON AGE

IF (N3a > 6 AND TD3 = 3, 4 or 5) THEN ASK; ELSE SKIP TO N6

N9bb Earlier when I asked about the influence of the age/condition of the old equipment on your decision to install this new equipment, you gave me a rating of <%N3A> out of ten. I would interpret this to mean that the age/condition was quite influential in your decision to install this new equipment when you did. Perhaps I have either recorded something incorrectly or maybe you could explain in your own words the role the age/condition of the existing equipment played in your decision to install this new energy efficient equipment.

77	Record VERBATIM	N6
88	Don't know	N6
99	Refused	N6

ADDITIONAL BASELINE INPUT

N6 Now I would like you to think one last time about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do?

1	Install/Delamped fewer units	N7
2	Install standard efficiency equipment or whatever required by code	N7
3	Installed equipment more efficient than code but less efficient than what you installed through the program	N7
4	Done nothing (keep existing equipment as is)	N7
5	Done the same thing I would have done as I did through the program	N7
6	Repair/rewind or overhaul the existing equipment	N7
77	Something else (specify what _____)	N7
88	Don't know	N7
99	Refused	N7

Ask if N6 = (1, 2, 3, 4) and (N5 > 8 and N5b > 8 OR N5aa > 8)

N7 In an earlier response, you said that if the program had not been available, there was a very high likelihood that you would have installed exactly the same equipment as you did through the program. However, just now you have indicated that you would not have installed the same equipment as you did without the benefit of the program. Can you explain to me why there is this difference?

77	Record VERBATIM	N6a
88	Don't know	N6a
99	Refused	N6a

Ask if N6(1);

N6a How many fewer units would you have installed/Delamped? (It is okay to take an answer such as ...HALF...or 10 percent fewer ... etc.)

77	RECORD VERBATIM	ER2
88	Refused	ER2
99	Refused	ER2

Ask if N6(3);

N6b Can you tell me what model or efficiency level you were considering as an alternative? (It is okay to take an answer such as … 10 percent more efficient than code or 10 percent less efficient than the program equipment)

77	RECORD VERBATIM	ER2
88	Don't know	ER2
99	Refused	ER2

Ask if N6(6);

N6c How long do you think the repaired equipment would have lasted before requiring replacement?

77	RECORD VERBATIM	ER2
88	Don't know	ER2
99	Refused	ER2

EARLY REPLACEMENT BATTERY

[IF N5b < 8 and A3 = 1, 4, 8, or 10 THEN ASK. ELSE SKIP TO SP1]

DISPLAY Earlier, when I asked you a question about why you decided to implement the project using high efficiency equipment, you gave reasons related to <A3> Now I would like to ask you some follow up questions regarding these responses you gave me. ER2

IF REPLACE(1);

ER2 How many more years do you think your equipment would have gone before failing and required replacement?

77	___ Estimated Remaining Useful Life (in years)	ER6
88	Don't know	ER6
99	Refused	ER6

IF A3 = 4, THEN ASK

ER6 How much downtime did you experience in the past year?

77	_____Downtime Estimate (in weeks)	ER9
88	Don't know	ER9
99	Refused	ER9

ER9 In your opinion, based on the economics of operating this equipment, for how many more years could you have kept this equipment functioning?

Yrs	___ Estimated Remaining Useful Life	ER11
88	Don't know	ER11
99	Refused	ER11

IF A3 = 8, THEN ASK

ER15 Can you briefly describe the specific code/regulatory requirements that this project addressed?

77	RECORD VERBATIM	ER19
88	Don't know	ER19
99	Refused	ER19

IF A3 = 10, THEN ASK

ER19 Can you briefly describe the specific company policies regarding regular/normal maintenance/replacement policy(ies) that were relevant to this project? Or briefly describe the specific company policies regarding regular equipment retrofits and remodeling?

77	RECORD VERBATIM	PP1
88	Don't know	PP1
99	Refused	PP1

PROCESS QUESTIONS - ASK ALL

PP1 What do you believe the PROGRAM'S primary strengths are?

77	Record VERBATIM	PP2
88	Don't know	PP2
99	Refused	PP2

PP2 What concerns do you have about the PROGRAM, if any? (IF NEEDED: What do you view as the primary features that need to be improved?)

77	Record VERBATIM	PP4
88	Don't know	PP4
99	Refused	PP4

PP4 On a scale of 0 - 10, where 0 is completely dissatisfied and 10 is completely satisfied, how would you rate your OVERALL satisfaction with the <%PROGRAM>?

#	Record 0 to 10 score (_____)	PP5
88	Refused	PP5
99	Don't know	PP5

IF PP4 < 4 THEN ASK; ELSE SKIP TO PP5A

PP5 Why do you say that?

77	Record VERBATIM	PP5A
88	Don't know	PP5A
99	Refused	PP5A

PP5A Using the same 0 - 10 scale, how would you rate your OVERALL satisfaction with the performance of the energy efficient measures you had installed?

#	Record 0 to 10 score (_____)	PP5B
88	Refused	PP6
99	Don't know	PP6

IF PP5A < 6 THEN ASK; ELSE SKIP TO PP6

PP5B Why do you say that?

77	Record VERBATIM	PP6
88	Don't know	PP6
99	Refused	PP6

PP5C Using the same 0 - 10 scale, how would you rate your OVERALL satisfaction with the quality of the installers' work?

#	Record 0 to 10 score (_____)	PP5D
88	Refused	PP5E
99	Don't know	PP5E

PP5D Why do you say that?

77	Record VERBATIM	PP5E
88	Don't know	PP5E
99	Refused	PP5E

PP5E From your perspective, what if anything could be done to improve the quality of the installers' work?

77	Record VERBATIM	PP6
88	Don't know	PP6
99	Refused	PP6

In qsl: IF ^UNRECORDED(IMPLEMENTER);

ASK IF %IMPLEMENTER = "a local government", "state government", or "an independent firm"; ELSE PP10

PP6 The program you participated in was run by %IMPLEMENTER. Has your organization participated in energy efficiency programs run by <%UTILITY> in the past three years?

1	Yes	PP8
2	No	PP10
88	Refused	PP10
99	Don't know	PP10

ASK IF PP6=1

PP8 Please consider your recent experience with the PROGRAM run by %IMPLEMENTER versus your past experience with the program run by <%UTILITY>. Are there any differences between the two that stand out? Any there attributes or services that seemed better in one or the other?

1	No differences	PP10
77	Yes, Record DIFFERENCES	PP10
88	Don't know	PP10
99	Refused	PP10

ASK IF IOU_PROG = 1 (utility administered program); ELSE PP12

PP10 The program you participated in was run by <%UTILITY>. Have you participated in programs run by governments, institutions, or other independent firms in the past three years? (select all that apply)

1	Local Government	PP14
2	State Government or Institution	PP14
3	Independent Firm	PP12
88	Refused	PP16
99	Don't know	PP16

ASK IF PP10 = 3;

PP12 Please consider your experiences with the program run by an independent firm versus your recent experience with the program run by an independent firm versus your recent experience with <%UTILITY>'s program. Are there any differences between the two that stand out? Are there attributes or services that seemed better in one or the other? (NOTE: SPECIFY WHICH ENTITY IS REFERRED TO IN EACH COMMENT)

1	No differences	PP16
77	Yes, RECORD DIFFERENCES	PP16
88	Refused	PP16
99	Don't know	PP16

ASK if PP10 in (1, 2)

PP14 Please consider your experiences with the program run by a government or institution versus your recent experience with <%UTILITY>'s PROGRAM. Are there any differences between the two that stand out? Are there attributes that seemed better in one or the other? (NOTE: SPECIFY WHICH ENTITY IS REFERRED TO IN EACH COMMENT)

77	Yes, Record VERBATIM	PP16
78	No differences	PP16
88	Refused	PP16
99	Don't know	PP16

ASK if PP6 = 1 AND PP10 = 1, 2 or 3. ELSE PP3

PP16 Which entity, the <%UTILITY> program or the <%IMPLEMENTER> <%PP10> program was more effective in supporting your organization's decision making process?

1	%IMPLEMENTER	PP18
2	%UTILITY	PP18

3	Very little difference	PP18
88	Refused	PP18
99	Don't know	PP18

If PP16 in (1, 2) then ask; else skip to PP20

PP18 How significant was this difference, would you say…

1	Very Significant	PP20
2	Somewhat Significant	PP20
3	Not very significant	PP20
88	Refused	PP20
99	Don't know	PP20

PP20 Which entity had a better technical understanding of the energy use at your facility and provided the best technical assistance in specifying the project?

1	%IMPLEMENTER	PP22
2	%UTILITY	PP22
3	Very little difference	PP22
88	Refused	PP22
99	Don't know	PP22

If PP20 in (1, 2) then ask; else skip to PP24

PP22 How significant was this difference, would you say…

1	Very Significant	PP24
2	Somewhat Significant	PP24
3	Not Very Significant	PP24
88	Refused	PP24
99	Don't know	PP24

PP24 Which entity was more effective in supporting you through the application process

1	%IMPLEMENTER	PP26
2	%UTILITY	PP26
3	Very little difference	PP26
88	Refused	PP26
99	Don't know	PP26

If PP24 in (1, 2) then ask; else skip to PP3;

PP26 How significant was this difference, would you say…

1	Very Significant	PP3
2	Somewhat Significant	PP3
3	Not very significant	PP3
88	Refused	PP3
99	Don't know	PP3

PP3	Do you have any comments on the current incentive structure of the PROGRAM?	
1	No	ID1
77	Yes - RECORD COMMENTS_____	ID1
88	Don't know	ID1
99	Refused	ID1

DISPLAY	**LONG TERM INFLUENCE** **If NTG_TYPE >= 2** **IF N3f > 4, THEN ASK, ELSE CCC12A** Now I'd like you to think about your organization's experiences with %UTILITY's energy efficiency programs and efforts over the longer term, for example, over the past 5, 10, or even 20 years. In an earlier question, you indicated that your previous experience with utility energy efficiency programs was a factor that influenced your decision to implement this PROJECT. I would like to ask you a few questions about this experience.	LT2

LT2	For how many years have you been participating in %UTILITY's energy efficiency programs?	
# yrs	Record Number of Years	LT3
88	Refused	LT3
99	Don't know	LT3

LT3	During this time, how many times has your organization participated in these PROGRAM(s)?	
1	7 to 10 times, or more	CA6
2	4 to 7 times	CA6
3	2 to 4 times	CA6
4	less than 2 times	CA6
88	Refused	LT6
99	Don't know	LT6

CA6	**IF LT3(1||4);** What type of equipment did you install through this (these) program(s)? [READ RESPONSE CATEGORIES]	
1	Indoor lighting	LT6
2	Cooling equipment	LT6
3	Natural gas equipment, such as water heater, furnace or appliances	LT6
4	Insulation or windows	LT6
5	Refrigeration	LT6
6	Industrial process equipment	LT6
7	Greenhouse heat curtains	LT6
8	Food service equipment	LT6
77	OPEN \SOMETHING OTHER (specify)	LT6
88	Refused	LT6
99	Don't Know	LT6

LT6 What factors led you to participate in these program(s)?

77	Record VERBATIM	LT7
88	Refused	LT7
99	Don't know	LT7

LT7 And exactly how did that experience help to convince you to install this energy efficient equipment?

77	Record VERBATIM	LT8
88	Refused	LT8
99	Don't know	LT8

LT8 **IF LT3 = 1 or 2, THEN ASK. ELSE CCC12A.**
Have these programs had any long-term influence on your organization's energy efficiency related practices and policies that go beyond the immediate effect of incentives on individual projects? [DO NOT READ: Examples are causing them to add energy efficiency procurement policies, internal incentive or reward structures for improving energy efficiency, or adoption of energy management best practices.]

1	Yes	LT9
2	No	CC12A
88	Refused	CC12A
99	Don't know	CC12A

LT9 **If LT8 = 1 then ask; else skip to CA2;**
Has your organization developed a specification policy for the selection of energy efficient equipment? [EXAMPLES... REQUIREMENTS THAT ALL NEW FLUORESCENT LIGHTING SYSTEMS USE ELECTRONIC BALLAST, OR THAT ALL NEW MOTORS BE PREMIUM EFFICIENCY]

1	Yes	LT10
2	No	LT10
88	Refused	LT10
99	Don't know	LT10

LT10 Has your organization assigned responsibility for controlling energy usage and costs to any of the following?

1	An in-house staff person	LT11
2	A group of staff	LT11
3	An outside contractor	LT11
4	NONE OF THESE	LT11
88	Refused	LT11
99	Don't know	LT11

LT11 Does your organization have any internal incentive or reward policies for business units or staff responsible for managing energy costs?

1	Yes	LC7
2	No	CA2
88	Refused	CA2
99	Don't know	CA2

Ask if LT11(1)

LC7 How do these incentive/reward structures work?

77	OPEN/Record	CA2
88	Refused	CA2
99	Don't know	CA2

CA2 In marketing materials or in communications with customers, does your company highlight the ways in which your business is environmentally conscious?

1	Yes	RETURN TO REMAINDER OF SURVEY
2	No	RETURN TO REMAINDER OF SURVEY
77	OPEN\RECORD OTHER	RETURN TO REMAINDER OF SURVEY
88	Refused	RETURN TO REMAINDER OF SURVEY
99	Don't know	RETURN TO REMAINDER OF SURVEY

ONSITE RECRUITING

TO SCHEDULE INSTALLATION OF MONITORING EQUIPMENT

If LOGGER= 1; Else Skip to Comment1

DISPLAY In order to improve this program's performance, <%UTILITY> would also like to make an accurate measurement of the energy savings associated with the energy efficient equipment installed by collecting and analyzing information from selected customers. If you agree to participate, Itron, on behalf of <%UTILITY>, will come to your business to install monitoring devices on your equipment to record when the equipment is in use. The monitoring devices will be installed in an unobtrusive place and would be removed by us at the end of the research project. We expect the site visit to take about two hours. We'll come back and remove the monitoring devices within 3-6 months. Note, the electric use data will be used strictly for the study of the <%PROGRAM> and will not affect your electric service at all. You will need to sign a brief participation agreement. LOG_REC

LOG_REC Are you interested in participating in this project?

1	Yes	LOG_NAME
2	No	Comment1
88	Refused	Comment1

99	Don't know	Comment1

	ASK IF LOG_REC(1)	
LOG_NAME	May I have the name of the person that our technician should contact to make an appointment?	LOG_PHONE
LOG_PHONE	What would be the most convenient phone number for our technecian to contact ....<%LOG_NAME>?	LOG_ALT
LOG_ALT	In the even that ....<%LOG_NAME> ... is unavailable, would there be an alternate contact that we could schedule an appointment with?	LOG_PH_ALT
LOG_PH_ALT	What would be the most convenient phone number to reach this person?	LOG_NOTE
LOG_NOTE	Are there any notes that would facilitate our technician@'s ability to make an appointment? For example, are some days of the week better for making contacts, are early mornings better or are afternoons better?	
66	No Notes	OS_NAME1
77	Record Notes	OS_NAME1

	IF ONSITE = 1	
COMMENT1	**TO SCHEDULE ONSITE VERIFICATION** As we've discussed, the <%PROGRAM> is an important component of the California Public Utilities Commission's ongoing efforts to save energy and reduce emissions affecting climate change. In order to improve this program's performance, the CPUC would like to make an accurate measurement of the energy savings associated with energy efficiency equipment installed by collecting and analyzing information from selected customers. Your input to this research is extremely important. By receiving a rebate through the <%PROGRAM>, your firm has agreed to allow verification of the installation of the equipment rebated through the program.	
OS_NAME1	Our verification technician will need to meet a facilities representative of your company. This should be either the manager of the facility or part of the facilities staff. May I please have the name of the person who our technician can call you to set up an appointment time?	
1	Same as for logger	HB_Lift
77	Record Name	OS_PHONE1
99	Don't know	T&T

	IF OS_NAME1(77)	
OS_PHONE1	May I also have the best phone number for the technician to reach this person?	
&OS_PHONE1	PHONE FOR PRIMARY CONTACT	OTHER
88	Refused	T&T
99	Don't know	T&T

OTHER	Is there another person that the engineer might speak with at your company, if this primary person is not available?	
&OTHER	Get name	OS_NAME2

88	Refused	T&T
99	Don't know	T&T

OS_NAME2 May I please have their name so our technician can call them at another time?

&OS_NAME2	Get name	OS_PHONE2
88	Refused	T&T
99	Don't know	T&T

OS_PHONE2 May I also have the best phone number for the technician to reach them?

&OS_PHONE2	Get phone number	HB_Lift
88	Refused	T&T
99	Don't know	T&T

Ask if HIGHBAY = 1 or (HB1 > 12 and HB1<>66 and HB1<>88 and HB1<>99) or HB2 = 1 or HB1a = 1; Else skip to OS_Business

HB_Lift Do you have some form or a lift or ladder available to reach the lighting at your facility that is located 13ft or more above ground?

1	Yes	OS_Business
2	No	OS_Business
88	Refused	T&T
99	Don't know	T&T

OS_Business Do you have a sign or business name other than <%BUSINESS> that our technicians should look for when they visit your site?

1	Yes	OS_Bus_Name
2	No	Vendor_Name
88	Refused	T&T
99	Don't know	T&T

Ask if OS_BUSINESS(1)

OS_Bus_Name What is the sign or business name they should be looking for?

1	Get name	Vendor_Name

VISIT_NOTES DO NOT READ.....If you have any special notes about the on@-site visit or the installation of loggers, add these notes here.

1	No additional notes	Vendor_Name
77	Record Notes	Vendor_Name

Ask if V1(1)

Vendor_Name	Earlier you stated that you had a vendor/contractor that helped you with the installation of the lighting equipment that was installed through the 2010-2012 <%UTILITY> Program. Could you provide me with their name and phone number?	
1	Cannot provide	END
77	Record Name, Phone Number, Email Address or any other information they can provide. More is better.	END
88	Refused	END
99	Don't know	END

END	Those are all the questions I have for you today. On behalf of the CPUC, I would like to thank you very much for your kind cooperation. Have a good day.	

Multifamily Whole Building Program(s) Impact Evaluation
2013-2014 PARTICIPATING DECISION MAKER FINAL SURVEY INSTRUMENT
July, 2015

Purpose of this Survey Guide (not to be read to Participants)

The purpose of this survey guide is to collect information from participating customers in the Regional Area Network (REN) EUC-MF programs. Questions in this survey guide are to ask participating multi-family property managers or other decision-makers about their motivations for participation and possible actions in absence of the program. The table below outlines the sections, topics and questions of the interview guide.

Survey Guide: Topics and Corresponding Questions

Section	Topics	Questions
Introductory Questions	Ensuring we are talking to the primary decision maker/ actor for participation. Discussing reasons for project.	INT1 - INT5
Verification Questions	Verification of measure installation and removals.	V1 - V3
Early Replacement/baseline Questions	Determine working status, expected life, and scheduled upgrade of replaced unit to determine if measure qualifies for early replacement.	ER1 - ER15
Free-Ridership Questions	Determine importance of program in decision to upgrade measures	PAI1 - PAI7
Firmographics	Do residents own or rent? How many other properties do they manage?	F1 – F8

INTRODUCTION AND SCREEN

[NOTE TO INTERVIEWER: Cross-reference names from program tracking database to ensure you indicate the property utilities. Multiple decision makers will be involved in many properties – please be sensitive to respondent's need to get input from associates. For EUC-MF participants, please review the participant information prior to the interview and probe for inconsistent responses.]

Hello, this is **[INTERVIEWER'S NAME]** calling from Pacific Market Research on behalf of [**REN]**. ***This is not a sales call.*** May I please speak with the [contact], person who is most knowledgeable about your firm's involvement in the **[Energy Upgrade California /Bay Area Regional Energy Network's Multifamily Building Enhancements program, or "BAMBE"]** Program for <project> located at <insert address>. As part of this program, you received a rebate for the installation of energy efficient products at this property.

INTa. First, do you own or manage this building?

1. Yes, own /manage - Go to INT1
2. No, not familiar with listed address Thank and Terminate
3. No, live here, someone else owns the building – Ask for the contact information for the owner or property manager

INT1. Are you the person who is most knowledgeable about your company's participation in the **[Energy Upgrade California / Bay Area REN Multifamily, or "BAMBE"]** Program in [COMPLETION DATE]?

1. YES [GO TO INT4]
2. NO [GO TO INT2]
3. REQUESTS MORE INFORMATION [GO TO INT3]

-98. DON'T KNOW [GO TO INT3]

-99. REFUSED [GO TO INT3]

INT2. Is there someone who may be more knowledgeable about the upgrades that I could speak with?

1. YES AND AVAILABLE [GO BACK TO INT1]
2. YES AND BUSY [SCHEDULE CALLBACK]
3. NO [TERMINATE – REFUSAL]
4. DON'T KNOW/REFUSED [TERMINATE]

INT3. Your local gas and electric utilities sponsor the [Multi-Family Home Energy Savings Program/Energy Upgrade California program]. The California Public Utilities Commission (CPUC) authorizes the rebates for the REN programs and requires them to submit such a report each year. The CPUC hired our firm to prepare an independent evaluation of their energy efficiency programs. The information that we gather will help the CPUC determine the savings achieved through these programs and assist in the design of future programs.

1. SATISFIED WITH INFORMATION – CONTINUE [GO TO INT4]
2. WANTS TO VERIFY STUDY [SCHEDULE CALLBACK]
3. REFUSED [TERMINATE]

(**IF NEEDED:** It will take about 15 minutes.)

We are interviewing firms that participated in **[SoCalREN Energy Upgrade California / Bay Area REN Multifamily program ("BAMBE")]** during 2013 and 2014 to discuss the factors that may have influenced their decision to participate in the program

In this survey, I will refer to the [PNAME] property at [LOCAT] that participated in the program as "the property."

IF NEEDED: . Your answers will be consolidated with answers from other program participants and used to help evaluate the effectiveness of the program and to design future programs. *We would be grateful for your participation in our research.*

INT4. How did the idea for this project originate? [DO NOT READ, ACCEPT MULTIPLE] (Probe: Did your company develop the idea, was it suggested by a vendor or consultant, was it the result of an audit, was it part of a larger expansion or remodeling effort?)

a. Utility Bill Insert
b. Program Literature
c. Utility Account Representative
d. Program Vendor
e. Utility or Program Website
f. Trade Publication
g. Conference
h. Newspaper Article
i. Word of Mouth
j. Previous experience with [IOU] Program
k. City/Government Recommendation
l. Contractor
m. Result of an Audit
n. Part of a larger expansion or remodeling effort
o. Company policy
p. Other [RECORD]
-98. [DON'T KNOW]
-99. [REFUSED]

INT5. There are usually a number of reasons to do a project of this type. In your own words, can you tell me why you decided to carry out this upgrade at [PNAME]? Were there any other reasons? [DO NOT READ; ACCEPT MULTIPLE]

a. To replace old or outdated equipment
b. As part of a planned remodeling, build-out, or expansion
c. To gain more control over energy use in the building(s)
d. The maintenance of old equipment was high/equipment kept breaking
e. To improve quality/value of property to renters
f. To comply with codes and/or regulatory requirements
g. To Improve tenant comfort/satisfaction
h. To reduce gas/electric bills
i. To get a rebate from the program
j. To reduce energy use / power outages
k. To update to the latest technology
l. To adhere to company policy
m. OTHER [RECORD]
-98. [DON'T KNOW]
-99. [REFUSED]

VERIFICATION QUESTIONS

V1. The program records show that the following products were installed at **[PNAME]** as part of the **[SoCal REN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")]** Program. Please confirm that this is correct. Did you install approximately [**QTY] [MEASURE]? (READ MEASURES FROM INSTALLATION LIST ON CUSTOMER RECORD; ONLY READ MEASURES WITH QTY >0; DO NOT READ RESPONSES)**
[IF NEEDED: I understand if you cannot confirm the exact quantity, however, please let me know if these products or quantities seem correct.]

1. Yes, installed that measure and quantity
2. Yes, installed that measure, not sure of quantity
3. Yes, installed that measure, but that quantity is incorrect
4. No, I did not install that measure

-98. [DON'T KNOW]

-99. [REFUSED]

a. [FOR ANY MEASURES WHERE V1=3] What is the correct quantity installed?

	Measure	Qty	V1. [**Record 1-4; 98, 99**]	a. If V1 = 3: What is the correct quantity?
A	Air Conditioner			
B	Attic Insulation	*SqFt*		
D	Clothes Washer			
F	Faucet Aerator			
G	Low-Flow Showerhead			
H	Pool Pump			
I	Pool Heater			
J	Refrigerator			
K	Space Heating Boiler			
L	Storage Water Heater			
M	Tankless Water Heater			
N	Wall Insulation	*SqFt*		
O	Water Heater Boiler Controls			
P	Water Heating Boiler			
Q	Ventilation Fan			
R	Windows	*SqFt*		
S	Dishwasher			
T	Freezer			
U	Insulation	*SqFt*		
V	recirculation pump			
W	space heater			
X	space heating furnace			
	Vending Machine			
	Ceiling fans			
	Floor Insulation		*Sqft*	
	Crawlspace Insulation		*Sqft*	
	Water Heater Pump			
	Hot Water Demand Control			

	Ductless Heat Pump			
	Hot Water Pipe Insulation		*Sqft*	
	Pool Cover			
	Space Heating Boiler Controls			
	Thermostatic Radiator Valve			
	Thermostatic Shower Valve			
	Thermostat Setback			

V2. We also show that the following lighting products were installed at **[PNAME]** as part of the **[SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")]** Program. Please confirm that this is correct. Did you install approximately [**QTY] [MEASURE]?**
(READ ANSWERS FROM INSTALLATION LIST ON CUSTOMER RECORD; ONLY READ MEASURES WITH QTY >0)
[IF NEEDED: I understand if you cannot confirm the exact quantity, however, please let me know if these products or quantities seem correct.]

1. Yes, installed that measure and quantity
2. Yes, installed that measure, not sure of quantity
3. Yes, installed that measure, but that quantity is incorrect
4. No, I did not install that measure

-98. [DON'T KNOW]

-99. [REFUSED]

a. [FOR ANY MEASURES WHERE V2=3] What is the correct quantity of <measure> installed?

	Measure	[Original Qty from Database]	V2. [**Record 1-4; 98, 99**]	a. [If V2=3]: What is the correct quantity?
A	Indoor CFL Bulbs			
B	Indoor CFL Lighting Fixture with bulbs			
C	Indoor LED Bulbs			
D	Indoor LED Exit Sign			
E	Indoor LED Lighting Fixture with bulbs			
F	Indoor Lighting Controls or Occupancy Sensors			
G	Indoor Linear Fluorescent Fixture or Bulbs			
H	Indoor Reflector CFLs			
I	Indoor Reflector LEDs			
J	LED Pool Light			
K	Outdoor Lighting Controls or Occupancy Sensors			
L	Outdoor CFL Bulbs			
M	Outdoor CFL Lighting Fixture with bulbs			
N	Outdoor Linear Fluorescent Fixture or Bulbs			
O	Outdoor Reflector CFLs			
	Outdoor LED Bulbs			
	Remove Heat Lamps			
	Induction Lighting			

V3. Did you receive any of the following services as part of the **[SoCal REN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")]** Program? **[READ LIST]**

	Measure	[**1=YES, 2=NO, -98 = DON'T KNOW, -99 = REFUSED**]
A	Energy Audit	
B	Technical Assistance	
C	Feasibility Study	
D	Program Training	
E	Program Incentives	
F	Assistance with Filling out Rebate Applications and/or Incentive Options	

STATUS OF PRE-EXISTING EQUIPMENT AND RETROFIT SCHEDULE

Now I want to ask about the equipment you replaced.

[ASK ER1- ER14 FOR STORAGE WATER HEATERS, TANKLESS WATER HEATERS, DISHWASHERS, RECIRCULATION PUMPS, REFRIGERATORS, SPACE HEATING FURNACE, SPACE HEATING BOILER, WATER HEATER CONTROLS, CLOTHES WASHERS, POOL PUMPS, POOL HEATERS, VENTILATION FAN, AND WATER HEATER BOILERS, AIR CONDITIONER, CENTRAL SPACE AND WATER HEATER, VENDING MACHINE, CEILING FAN, WATER HEATER PUMP, HOT WATER DEMAND CONTROL, DUCTLESS HEAT PUMP, POOL COVER, SPACE HEATING BOILER CONTROL, THERMOSTATIC RADIATOR VALVE, THERMOSTATIC SHOWER VALVE, FREEZER, SPACE HEATER]

[RANDOMIZE ORDER OF MEASURES ASKED]

[ASK ER1- ER8 where QTY >1; IF QTY = 1 SKIP TO ER9]

ER1.You installed [QTY1] [MEASURE1] as part of the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program. What percent of the [QTY1] [MEASURE1] were replacing existing equipment? [**IF NEEDED:** An example of this would be where there was/were [MEASURE1] in the apartment prior to the new [MEASURE1] being installed.]

1. [**RECORD PERCENT]**

-98. [DON'T KNOW]

-99. [REFUSED]

[IF ER1 = 0%, SKIP TO NEXT MEASURE]
[IF ER1 > 0%, CALCULATE "REPLACED_QTY_MEASURE1". REPLACED_QTY_MEASURE1 = QTY1*ER1%]

ER2.Of the [REPLACED_QTY_MEASURE1] [MEASURE1] that replaced existing equipment, what percent were… [**RESPONSES NEED TO SUM TO 100%]**

a. Fully functional and not in need of repair?

[**RECORD PERCENT]**

b. Functional, but needed minor repairs?

[**RECORD PERCENT]**

c. Functional, but needed major repairs?

[**RECORD PERCENT]**

d. Not functional?

[**RECORD PERCENT]**

-98. [DON'T KNOW]

-99. [REFUSED]

[IF ER2c + ER2d = 100%, SKIP TO [NEXT MEASURE]]

ER3.On average, how old were the [MEASURE1], prior to replacement? Your best guess is fine

[**RECORD AGE]**

-98. [DON'T KNOW]

-99. [REFUSED]

ER4.On average, how much longer do you think your old [MEASURE1] would have lasted if you had not replaced it?

[**RECORD YEARS]**

-98. [DON'T KNOW]

-99. [REFUSED]

ER5. Were these [MEASURE1] part of a scheduled, planned, or government mandated upgrade/refurbishment of **[PNAME]**? [IF NEEDED: a scheduled or planned upgrade is when a company has a regularly scheduled renovation; a government mandated upgrade are those required to keep up with city, state, or federal building codes or to qualify for city, state, or federal housing subsidies.]

a. Yes, these were part of our scheduled, planned, or government mandated refurbishment/upgrade of the property
b. No, these were not part of our scheduled, planned, or government mandated refurbishment/upgrade of the property
c. [Some were part of a scheduled/mandated refurbishment upgrade, and some were not]

-98. [DON'T KNOW]
-99. [REFUSED]

[IF ER5= B, SKIP TO [NEXT MEASURE]]

ER6. [IF ER5 = c] What percent of replaced [REPLACED_QTY_MEASURE1] [MEASURE1] was part of a scheduled, planned, or government mandated upgrade, and what percent was not? [REPONSES NEED TO SUM TO 100%]

		Record Percent
A	Percent of replaced[MEASURE1]part of regularly scheduled or government mandated refurbishment/upgrade	
B	Percent of replaced[MEASURE1] not part of regularly scheduled or government mandated refurbishment/upgrade	
-98	(DON'T KNOW)	
-99	(REFUSED)	

ER7. [IF ER5=a, OR IF ER5=c] As part of your regularly scheduled or government mandated upgrade process at **[PNAME]**, do you generally *replace* the [MEASURE1], or r*epair* the existing [MEASURE1]?

1. I generally replace the existing [MEASURE1]
2. I generally repair the existing [MEASURE1]
3. Depends on the [MEASURE1]; Sometimes replace the [MEASURE1] and sometimes repair them.

-98. [DON'T KNOW]
-99. [REFUSED]

ER8. [IF ER7= 3] What percent of replaced [REPLACED_QTY_MEASURE1] [MEASURE1] would you expect to replace during your scheduled upgrade, and what percent would you expect to repair? [REPONSES NEED TO SUM TO 100%]

		Record Percent
A	Percent of replaced[MEASURE1]expect to replace	
B	Percent of replaced[MEASURE1]expect to repair	
-98	(DON'T KNOW)	
-99	(REFUSED)	

[ASK ER9 - ER14 where QTY =1]

ER9. As we just discussed, you installed ONE [MEASURE1] as part of the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program. Was that [MEASURE1] replacing existing equipment? [**IF NEEDED:** An example of this would be where there was/were [MEASURE1] in the apartment prior to the new [MEASURE] being installed.]

1. Yes
2. No

-98. [DON'T KNOW]

-99. [REFUSED]

[IF ER9= No, SKIP TO NEXT MEASURE]

ER10. Was the replaced [MEASURE1] ….

a. Fully functional and not in need of repair?

b. Functional, but needed minor repairs?

c. Functional, but needed major repairs?

d. Not functional?

-98. [DON'T KNOW]

-99. [REFUSED]

[IF ER10 = C or D, SKIP TO [NEXT MEASURE]]

ER11. How old was the [MEASURE1], prior to replacement? Your best guess is fine

[**RECORD AGE]**

-98. [DON'T KNOW]

-99. [REFUSED]

ER12. How much longer do you think your old [MEASURE1] would have lasted if you had not replaced it?

[**RECORD YEARS]**

-98. [DON'T KNOW]

-99. [REFUSED]

ER13. Was this replaced [MEASURE1] part of a scheduled, planned, or government mandated upgrade/refurbishment of **[PNAME]**?

a. Yes, this was part of our scheduled, planned, or government mandated refurbishment/upgrade of the property

b. No, this was not part of our scheduled, planned, or government mandated refurbishment/upgrade of the property

-98. [DON'T KNOW]

-99. [REFUSED]

[IF ER13= B, SKIP TO [NEXT MEASURE]]

ER14. [IF ER13 = a] As part of your regularly scheduled or government mandated upgrade process at **[PNAME]**, do you generally *replace* the [MEASURE1], or r*epair* the existing [MEASURE1]?

1. I generally replace the existing [MEASURE1]
2. I generally repair the existing [MEASURE1]
3. Depends on the [MEASURE1]; Sometimes replace the [MEASURE1] and sometimes repair them.

-98. [DON'T KNOW]

-99. [REFUSED]

[ASK ER15 FOR WINDOWS, COOL ROOF, ATTIC/ROOF INSULATION, WALL INSULATION, FLOOR INSULATION, FLOOR INSULATION, CROWLSPACE INSULATION, PIPE INSULATION, FAUCET AERATORS, AND LOW-FLOW SHOWERHEADS]

ER15. As we just discussed, you also installed [MEASURE1] as part of the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program. Was this replaced [MEASURE1] part of a scheduled, planned, or government mandated upgrade/refurbishment of **[PNAME]**?

a. Yes, this was part of our scheduled, planned, or government mandated refurbishment/upgrade of the property

b. No, this was not part of our scheduled, planned, or government mandated refurbishment/upgrade of the property

-98. [DON'T KNOW]

-99. [REFUSED]

[REPEAT ER1- ER15 FOR UP TO 3 MEASURES]

PROGRAM ATTRIBUTION INDEXES

I'm going to ask you to rate the importance of the program as well as other factors that might influence your decision to install [MEASURE1 V1 & V2], where 0 means not at all important and 10 means very important. An importance rating of 8 shows twice as much influence as a rating of 4.

PAI1. Now, using this 0 to 10 rating scale, where 0 means "Not at all important" and 10 means "Very important," please rate the importance of each of the following in your decision to install the [MEASURE1] at this time. [IF A PARTICULAR FACTOR IS NOT APPLICABLE, RECORD THE IMPORTANCE VALUE AS 0]

a. The age or condition of the old equipment

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

b. Availability of the [REN] rebate

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

c. [ASK IF V3a=1, V3b=1, OR V3c = 1]Information provided through a the feasibility study, energy audit or other types of technical assistance provided through the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

d. Recommendation from an equipment vendor that sold you the [MEASURE] and/or installed it

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

e. Your previous experience with this type of project?

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

f. Your previous experience with the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] program or a similar utility program?

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

g. [IF ASK IF V3D=1] Information from Program or utility training course?

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

h. Information from other [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program marketing materials

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

i. Suggestion from your utility account representative

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

j. Payback or return on the Project

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

k. Increased value of the Property

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

l. Compliance with city, state, or federal government regulations

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

m. Compliance with your company's normal maintenance or retrocommissioning policies

[**RECORD 0-10]**

-98. [DON'T KNOW]

-99. [REFUSED]

n. How does your company policy influence your decision to install [MEASURE]?

[**OPEN END]**

96 Not applicable not a company

-98. [DON'T KNOW]

-99. [REFUSED]

Consistency Checks

CC1. [IF INT5=f AND PAI1-l <4 ASK] You indicated earlier that compliance with codes or regulatory policies was one of the reasons you did the project. However, just now you scored the importance of compliance with city, state, or federal government regulations in your decision making fairly low, why is that?

[**OPEN END]**

-98. [DON'T KNOW]

-99. [REFUSED]

CC2. [IF INT5≠f AND PAI1-l >7 ASK] You indicated earlier that compliance with codes or regulatory policies was one of the reasons you did the project. However, just now you scored the importance of compliance with city, state, or federal government regulations in your decision making fairly HIGH, why is that?

[**OPEN END]**

-98. [DON'T KNOW]

-99. [REFUSED]

CC3. [IF INT5=l AND PAI1-m <4 ASK] You indicated earlier that adhering to company policies was one of the reasons you did the project. However, just now you scored the importance of compliance with normal maintenance or retrocommissioning practices in your decision making fairly low, why is that?

[**OPEN END]**

-98. [DON'T KNOW]

-99. [REFUSED]

CC4. [IF INT5=l AND PAI1-m >7 ASK] You indicated earlier that adhering to company policies was one of the reasons you did the project. However, just now you scored the importance of compliance with normal maintenance or retrocommissioning practices in your decision making fairly high, why is that?

[**OPEN END]**

-98. [DON'T KNOW]

-99. [REFUSED]

PAI2. Did you learn about the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program BEFORE or AFTER you decided to install the [MEASURE1] at **[PNAME]**?

1. I learned about the Program BEFORE I decided to install the [MEASURE]
2. I learned about the Program AFTER I decided to install the [MEASURE]

-98. [DON'T KNOW]

-99. [REFUSED]

Now I'd like to ask you a question about the importance of the program to your decision as opposed to other factors that you mentioned above. [READ THE FACTORS A-M WHERE THEY GAVE AN IMPORTANCE RATING OF ≥8 IN PAI1]

a. The age or condition of the old equipment
b. Recommendation from an equipment vendor that sold you the [MEASURE] and/or installed it
c. Your previous experience with this type of PROJECT?
d. Payback or return on the Project
e. Improved Quality of the Property
f. Compliance with city, state, or federal government regulations
g. Compliance with the company's normal maintenance or retrocommissioning practices

PAI3. If you were given 10 points to award in total, how many points would give to the importance of the program and how many points would you give to these other factors?

a. How many of the ten points would you give to the importance of the program?

[**RECORD 0-10 SCORE]**
-98. [DON'T KNOW]
-99. [REFUSED]

b. … And how many of the ten points would you give to all these other factors?

-98. [DON'T KNOW]
-99. [REFUSED]

We want these two sets of numbers to equal 10. We have [RESPONSE FROM PAI3a] for program importance and [RESPONSE FROM PAI3b] for non-program factors. Does that sound about right? [IF NO, GO BACK TO PAI3]

PAI4. Now I would like you to think about the action you would have taken with regard to the installation of this [MEASURE] if the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program had not been available. Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if the program had not been available, what is the likelihood that you would have installed exactly the same efficiency equipment that you did in this project?

[**RECORD 0-10 SCORE]**
-98. [DON'T KNOW]
-99. [REFUSED]

Consistency Checks

CC5. [IF PAI1b>7 AND PAI4>7 ASK] When you answered < PAI1b> for the question about the influence of the rebate, I would interpret that to mean that the rebate was quite important to your decision to install. Then, when you answered < PAI4> for how likely you would be to install the same equipment without the rebate, it sounds like the rebate was not very important in your installation decision. I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain in your own words, the role the rebate played in your decision to install this efficient equipment?

[**OPEN END]**
-98. [DON'T KNOW]
-99. [REFUSED]

CC6. [IF PAI1b>7 AND PAI4>7 ASK] Would you like for me to change your score on the importance of the rebate that you gave a rating of <PAI1b> and/or change your rating on the likelihood you would install the same equipment without the rebate which you gave a rating of <PAI4> and/or we can change both if you wish?

[**OPEN END]**

-98. [DON'T KNOW]

-99. [REFUSED]

PAI5. Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not installed the program qualifying [MEASURE], which of the following alternatives would you have been MOST likely to do (READ LIST)?

1. Install fewer [MEASURE]s
2. Install standard efficiency equipment or whatever required by code [SKIP TO PAI8]
3. Install equipment more efficient than code but less efficient than what you installed through the program [SKIP TO PAI7]
4. Repair the existing equipment [SKIP TO PAI8]
5. Do nothing (keep the existing equipment as is) [SKIP TO PAI8]
6. (OTHER, SPECIFY)

-98. [DON'T KNOW]

-99. [REFUSED]

PAI6. [IF PAI5 = 1] How many fewer units would you have installed?

[**RECORD]**

-98. [DON'T KNOW]

-99. [REFUSED]

PAI7. [IF PAI5 = 3] Can you tell me what model or efficiency level you were considering as an alternative?

[**RECORD OPEN END]**

-98. [DON'T KNOW]

-99. [REFUSED]

[IF MORE THAN ONE MEASURE INSTALLED AT PNAME]

PAI8. I understand you installed several other measures at [PNAME], [LIST ALL other MEASURES INSTALLED FROM V1 AND V2]. Did the program have the same influence on your decision to install the [LIST OTHER MEASURES] as we just discussed?

1 Program had the same influence on installation of all the measures at [PNAME]

2 Program had a different influence on installation of different measures at [PNAME] [REPEAT PAI1 - PAI7 FOR UP TO 3 MEASURES]

-98. [DON'T KNOW] [REPEAT PAI1 - PAI7 FOR UP TO 3 MEASURES]

-99. [REFUSED] [REPEAT PAI1 - PAI7 FOR UP TO 3 MEASURES]

FIRMOGRAPHICS

I have just a few questions left for background purposes.

F1. Is the property that we discussed master-metered (e.g. one meter for the entire property) or individually metered (e.g. a meter for each building and the property)?
1. MASTER-METERED
2. INDIVIDUALLY METERED
3. OTHER (SPECIFY)
-98. [DON'T KNOW]
-99. [REFUSED]

F2. Do residents at your property own or rent their homes?
1. OWN
2. RENT
3. OTHER (SPECIFY)
-98. [DON'T KNOW]
-99. [REFUSED]

F3. Are units at this property offered at market rental rates or government subsidized housing?
1. Market Rate
2. Government Subsidized
3. Both market rate and government subsidized
-98. [DON'T KNOW]
-99. [REFUSED]

F4. How many apartments are at [PNAME]?
1. [RECORD #]
-98. [DON'T KNOW]
-99. [REFUSED]

F5. How many multifamily complexes, including [PNAME], does your company own or manage?
1. [RECORD #]
-98. [DON'T KNOW]
-99. [REFUSED]

F6. [IF F5>1] And approximately how many individual apartments or dwellings does that represent?
1. [RECORD #]
-98. [DON'T KNOW]
-99. [REFUSED]

F7. [IF F5>1] Have some of your other properties participated in [REN] energy efficiency programs?
1. Yes
2. No
-98. [DON'T KNOW]
-99. [REFUSED]

F8. [IF F7=1] What other programs have these properties participated in? [OPEN END]
1. [RECORD RESPONSE]
-98. [DON'T KNOW]
-99. [REFUSED]

F9. [IF F7=2] Why have your other properties not participated in [REN] energy efficiency programs?
1. [RECORD RESPONSE]
-98. [DON'T KNOW]
-99. [REFUSED]
]

F10. And approximately how many years have you worked at [PNAME]?
1. [RECORD #]
-98. [DON'T KNOW]
-99. [REFUSED]

OUTRO. Those are all the questions I have. On behalf of the [SoCalREN Energy Upgrade California / Bay Area REN Multifamily ("BAMBE")] Program, thank you very much for your time.

Appendix B

Non-Resource Accomplishments of Codes and Standards and Financing Programs of RENs and CCA

Because two statewide studies are being conducted on the codes and standards, and financing programs, they were not evaluated in the non-resource assessment included in this study report. The non-resource accomplishments presented in the annual reports of each of the PAs, as well as additional non-resource accomplishments that were shared through responses for data requests, are presented here. No verification of these accomplishments or evaluability of the supporting datasets provided by the PAs was conducted for the Financing and Codes and Standards service areas.

B.1 BayREN Codes & Standards and Financing Services

This section presents the non-resource accomplishments of the Codes and Standards and the Financing service areas as presented in BayREN's 2014 Annual Report (*text in italics was taken from the annual reports*). BayREN also provided additional non-resource accomplishments for both service areas and these are presented as well, which include accomplishments through Q2 of 2015.

Codes and Standards Services

Baseline Evaluation

- *Fifteen city and county building departments volunteered to participate in the BayREN Codes & Standards Permit Resource Opportunity Program (PROP), which involves the BayREN Codes & Standards team spending (usually) two working days with individual building departments to engage and interview key staff, observe their permitting processes, and conduct plan reviews and field inspections of several permitted projects that are complete enough for installed energy measures to be inspected and compared with permitted conditions. Following each visit, the CBO receives a report summarizing any discrepancies found between permitted and installed energy features, and specific suggestions for improving compliance.*

Training

- *BayREN trainings are designed to educate both local officials and the private sector building community in key aspects of code compliance and enforcement. Training topics are offered as a series and each training series addresses specific energy code compliance strategies and best practices. BayREN offers 6 different Title 24 training series. The Program developed a training plan that outlined a strategic approach to educating the program's target audience in key aspects of energy code compliance. The Program developed a menu of trainings to be offered based on feedback from the program's Compliance Survey results. No tests were administered at any of the trainings.*
- *Workshops modules were also listed as a strategy implemented for the Codes and Standards program. These could be delivered separately or as a combined 4 hour workshop depending upon need. BayREN county representatives worked with local building departments within their counties to schedule the trainings.*

Regional Forums

- *Regional Forums occurred every two months from January 2014 through December 2014. BayREN held 7*[1] *Regional Forums over the course of 2014 that focused on high-level policy and program design issues on energy efficiency and energy code compliance. Forum topics were developed by the Codes and Standards Committee and informed by participant feedback received at the previous forum.*

Tools

- *Permit guides were developed early on in 2014 based on feedback received during PROP visits to building departments. These permit guides are housed on the BayREN website for public use. The program did not actively distribute the permit guides to building departments, but program staff, including consultants, trainers and committee members did periodically email training participants and local building department contacts links to the guides on the BayREN website (https://www.bayren.org/codes/resources)*[2]*.*

Additionally, BayREN provided the following non-resource accomplishments related to its Codes and Standards service area in response to a data request sent by the Consultant Team in support of this impact assessment:

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[1] In BayREN's response to the consultant team's data request, it was noted that the 2014 Annual Report erroneously listed 6 Regional Forums.

[2] Italicized text was taken from the following document: Bay Area Regional Energy Network 2014 Energy Efficiency Annual Report. Prepared by Bay Area Governments, April 15, 2015. Pages 6-7.

- In 2013-2014, 72 trainings were organized by 16 BayREN jurisdictions with 469 people in attendance. In Q1-Q2 2015, there have been 18 trainings organized by 10 jurisdictions with 233 people in attendance.
- A total of 411 attendees that are representative of 44 jurisdictions participated in the 7 Regional Forums that were held in 2013-2014. A total of 131 attendees representative of 27 jurisdictions participated in 3 Regional Forums held during Q1-Q2 2015.

Financing Programs

Multifamily Capital Advance Program

- *The program was authorized to proceed in September 2013 through the CPUC Financing Proceeding.*
- *Program development began after the authorization. In 2013, BayREN recruited a consultant for lend outreach, and a loan servicer for the BayREN portion of loan repayments from lenders.*
- *Two financial institutions have signed Participation Agreements.*

Commercial PACE

- *In 2014, development commenced for the creation of county-customized commercial building profile inventories (the Commercial Building Inventory & Profiling Tool(s)), comprised of two interfacing resources and support:*
  - *Individual county-by-county reports which analyze commercial building patterns, identify and define market segmentation profiling indicators, and describe the methodology behind the indicators and the profiling capacity of the Commercial Building Inventory & Profiling Tool.*
  - *Individual county-by-county Commercial Building Inventory & Profiling Tool, which use a baseline of more than 25 construction, ownership, performance and financial indicators and a mechanism that allows each county to game single or bundled indicator combinations. This functions as a commercial market segmentation tool, to identify key building candidates among commercial, retail, and hospitality sectors for energy and water improvements.*
- *Option to further customize the tool through additional indicator.*
- *Completed judicial validation of two counties in the California FIRST PACE Program.*

Pay As You Save® (PAYS) Program

- *Outreach to sixteen local water agencies to promote engagement in a BayREN PAYS partnership.*

- *Selection of four Partner Utilities (City of Hayward, Town of Windsor, East Bay Municipal Utility District, and San Francisco Public Utilities Commission) based upon utilities' ability and commitment to implement an on-bill pilot within the 2013-14 period. These Partner Utilities have expressed interest to include measures that would generate sufficient water, gas, and electricity savings so that the on-bill surcharges for installed measures would still result in immediate net savings for participants.*
- *Green Hayward PAYS with the City of Hayward:*
  - *Supported the development of multifamily residential indoor and multifamily/commercial landscaping services approved by City Council February 2014. Field-ready pending final City approval of funding. Services include indoor plumbing fixtures, common area energy measures that deliver savings to the property owner (lighting, hot water distribution, etc.), and weather-based irrigation controller installation. Current pipeline for interested properties in receipt of a pre-screening visit includes 6 properties representing over 1,200 units.*
  - *Forthcoming program opportunities: Hayward is committed to serving 2,000 multifamily units in 2015, and is interested to expand a successful pilot to serve more multifamily units and provide additional customer classes.*
  - *Hayward program will focus on multifamily residential: indoor plumbing fixtures, common area energy measures that deliver savings to the property owner (lighting, hot water distribution, etc.), and weather-based irrigation controller installation.*
- *Windsor Efficiency PAYS® with the Town of Windsor:*
  - *Supported the implementation of on-going Residential field services for single and multifamily. Services include indoor plumbing fixtures and outdoor turf conversion to drought tolerant landscapes.*
  - *Supported the development of commercial landscaping services, approved by Town Council May, 2014, and contractor training in December 2014. Services to include installation of weather based irrigation controllers and irrigation system repairs.*
  - *Forthcoming program opportunities:*
    - *With access to Windsor project records dating November 2012, BayREN to assist with evaluating key on-bill issues such as actual (vs. estimated/ projected) water savings, surcharge transferability, and customer repayment histories.*
    - *Residential single family program design revisions can be easily implemented and will facilitate additional water savings for a Partner Utility that will most likely face strict water reductions in 2015 due to the drought.*
  - *Windsor program will include a new Commercial Landscaping Component that promotes installation of weather-based irrigation controllers and turf conversion.*

  - *Windsor has committed to retrofitting 75 commercial customers' landscapes, and offers BayREN a record of on-bill projects (through the DOE pilot) dating to November 2012 to assist with evaluating on-bill performance.*
- *EBMUD WaterSmart PAYS®*
  - *Supported the development of multifamily residential indoor and single family/multifamily/commercial landscaping components approved for test projects. Program contracts and agreements in review by EBMUD staff. Field-services expected to be available in 2015.*
  - *Additional 2015 program opportunities: EBMUD test projects will inform EBMUD roll out of a Phase 1 PAYS pilot to a market that includes approximately 1.3 million water customers.*
- *Research for SFPUC PAYS Potential*
  - *SFPUC seeks to focus on multifamily residential indoor plumbing fixtures.*
  - *After preliminary research in 2013, SFPUC requested BayREN initiate program development in May 2014 to align with new water/waste water rates to be adopted in April 2014; program development efforts with SFPUC are currently on hold*[3].

BayREN also provided the following non-resource accomplishments that occurred in Q1-Q2 of 2015 and relate to its Commercial PACE program. These accomplishments were provided in response to a data request sent by the consultant team in support of this impact assessment.

- BayREN wrote, issued, and reviewed a Request for Qualifications for a commercial PACE contractor training and ongoing project development support services in support of Bay Area commercial PACE programs. The RFQ was provided in response to the data request. The services are to be provided in 2015.
- Worked with consultant (Sustainable Real Estate Solutions) to plan and deliver 8 contractor training sessions in BayREN counties as follows (response to data request provided the contractor firm names in attendance):
  - May 5, 2015: Oakland (Alameda) – 14 attendees
  - May 6, 2015: San Francisco – 14 attendees
  - May 7, 2015: Santa Clara – 8 attendees
  - May 8, 2015: Sonoma County – 10 attendees
  - June 2, 2015: Sonoma County – 7 attendees

[3] Italicized text was taken from the following document: Bay Area Regional Energy Network 2014 Energy Efficiency Annual Report. Prepared by Bay Area Governments, April 15, 2015. Pages 7-10.

  - June 3, 2015: Santa Clara – 4 attendees
  - June 4, 2015: Oakland (Alameda) – 11 attendees
  - June 5, 2015: San Francisco – 7 attendees
- BayREN provided the consultant team a project tracking and pipeline file that provides a Phase I project status report and describes the outcomes of the contractor trainings that were held. The file includes an analysis of weekly workshop invitations (outcomes) and attendance analysis. It also describes the plans for Phase II which is designed to build a pool of early adopters to the program. According to the report:
  - 1,188 Contracting firms identified as prospects
  - 1,751 Number of outbound calls/emails
  - 857 Number of individuals contacted via phone or email
  - 123 firms accepted invitations to attend and a total of 72 actually attended a workshop
  - The report also provides a pipeline of 20 contractors to show the stage in which this pool of early adopters are in the program.
- PACE Web Portal for Local Governments: The Bay Area Regional Energy Network (BayREN), in partnership with the U.S. Department of Housing and Urban Development (HUD), has developed the Local Government PACE Portal, a "one-stop shop" for local governments interested in allowing property owners to take advantage of PACE financing. This site includes introductory information about PACE (including a list of PACE providers in the nine Bay Area counties), outlines the steps necessary for making PACE available in your jurisdiction, and provides document templates to help staff prepare packets for presentation to local elected leaders. The website is: http://abag.ca.gov/bayren/pace/index.html

Additionally, BayREN provided the following accomplishment that occurred in Q1-Q2 2015 related to its PAYS program. This information was provided in BayREN's response to the consultant team's data request submitted to acquire data in support of this impact assessment:

- Town of Windsor Commercial Landscaping on-bill contractor services were launched in December 2014, with 3 property contacts and 2 site visits conducted in Q1-Q2 2015. City of Hayward Multifamily on-bill contractor services were approved for funding in June, 2015, with 60 property contacts and 7 site visits conducted through the end of Q2, 2015.

B.2 MCE Financing Program

This section of the appendix presents the non-resource accomplishments of MCE's financing program as presented in its 2014 Annual Report (*text in italics was taken directly from MCE's annual report*). In addition, MCE provided additional non-resource accomplishments related to its financing activities through Q2 of 2015 and these are also included below.

- *MCE's Financing Program is a public/private partnership between commercial banks and MCE to provide a source of funding to residential and commercial property owners to complete energy efficiency projects on their properties. Loans are available to fund energy efficiency projects that are completed either through the MCE commercial and multifamily rebate programs or through the single family Home Upgrade program offered through PG&E.*
- *MCE implemented a $40,000 marketing campaign to drive participation into single family loan program. Campaign activities included:*
  - *Print and online marketing*
  - *Tabling at community events*
  - *Earned media with local home publications*
  - *Partnership with Marin Builders Association to help raise visibility with contractors*
  - *Promotional information on Home Utility Reports which are mailed to approximately 18,000 single family customers in MCE service territory*
- *MCE partnered with other regional programs*
  - *Coordinated referrals with the Home Upgrade Advisor program in BayREN portfolio:*
    - *51 referrals from Home Upgrade Advisors to the loan program*
    - Based on a response from MCE to the consultant team's data request, MCE provided documentation to show that its online Financing Marketplace tool has received 45 page views according to Google Analytics since MCE started tracking visitors in April 2015.
    - Additionally, CLEAResult, the administrator of the Home Upgrade Advisor program, maintains data on referrals from the Home Upgrade Advisor. Results of database queries of referrals to the MCE Green Home Loan program were provided in a .pdf file in response to the data request sent by the consultant team and showed the following:
      - April 16th 2014: 37 referrals, 3 callers already aware of program
      - March 23, 2015: 51 Referrals, 15 Callers already aware of program
      - August 14th, 2015: 55 Referrals, 15 Callers already aware of program

- The pdf file also includes the results of a database query showing number of referrals by lead source to the Home Upgrade Advisor program. There are a total of 182 records of customers including name, address, more specific details of lead source, phase of account (on hold, closed, etc.), and account origin (phone, web, marketing event list, or email).

- *Provided collateral to organizations doing outreach and home visits (Marin County Energy Watch program, Rising Sun Youth Energy Services).*
- *Major achievements include getting first loan on the books.*[4]

MCE also provided the following non-resource accomplishments that occurred in 2013, 2014, and the early part of 2015 related to its Financing program. These accomplishments were provided in response to a data request sent by the consultant team in support of this impact assessment.

In 2013:

- Launched Financing program
  - secured partner institutions,
  - negotiated financing terms, and
  - executed operating agreements
- Marketing: Earned media included one article in the Marin Independent Journal print and online version.

In 2014:

- MCE worked with Energy Division to confirm that the CCA Info Tariff, which provides the policy framework for MCE's access to customer bills, does provide the opportunity for MCE to place charges that are related to "energy services," including on-bill repayment for solar and for battery storage systems.

In 2015:

- **Outreach:** MCE representatives provided collateral at the Marin Home & Garden and Marin County Fair attendees asked MCE staff questions specific to financing offerings.

[4] Italicized text was taken from the following document: 2014 MCE Energy Efficiency Annual Report. Prepared by Marin Clean Energy, posted to EEStats on April 15, 2015. Pages 7-8.

MCE also marketed Green Loan offerings through the County of Marin's green building display.

- **Partnerships with other regional programs:** Continued to coordinate referrals with the Home Upgrade Advisor program in the BayREN portfolio, provided collateral to organizations doing outreach and home visits (Marin County Energy Watch program, Rising Sun Youth Energy Services). MCE also collaborated with the County and BayREN as mentioned above for Home Upgrade Advisor referrals and for participation in Homeowner Workshops.
- **Coordination with other programs:** MCE has been working with the County and cities of Marin to implement PACE programs locally. In 2012, MCE worked with local jurisdictions to authorize California FIRST, agreeing to serve as the local liaison for the program (facilitating adoption by local jurisdictions and helping connect customers with the program.) Since its authorization in Marin, the California FIRST program has received 183 applications for residential projects and has funded 58 projects.
- Beginning in 2015, MCE has worked with Marin County to implement open market PACE program, allowing any PACE provider who will agree to a minimum set of best practices to offer their services in the County. MCE and the County finalized the Agreement in June of 2015 and have been working with PACE providers and local jurisdictions to implement this program across the County of Marin.

B.3 SoCalREN Financing Services

This section of the appendix presents the non-resource accomplishments of financing service areas as presented in SoCalREN's 2015 Annual Report (*text in italics was taken directly from SoCalREN's annual report*). SoCalREN also provided additional non-resource accomplishments through Q2 of 2015 and these are also included below.

The SoCalREN offers energy efficiency financing options to both private and public sector customers. Financing products include Public Building Financing Programs Information and Outreach; EUC Single Family Loan Loss Reserve; Cool Comfort Financing (HVAC), Non-Residential Property Assessed Clean Energy (PACE) loans; and Public Building Revolving Loan Fund Information and Outreach.

EUC Residential Loan Loss Reserve

- *As of December 2014, the program has funded 414 projects, with a total loan value of $6,811,411. These loans are available for EUC Advanced Home Upgrade and Home Upgrade projects (This covers pre-2013 Home Energy Loans).*

- In the "*CPUC PY2013-2014 Regional Energy Networks Value and Effectiveness Study*" by ODC[5], it stated that a total of 535 loan applications had been received and 272 loans funded either through Home Energy Loans or Cool Comfort Financing Loans in 2013-2014. A dataset provided by SoCalREN (SoCalREN Financing.xlsx) in response to the consultant team's data request shows that a total of 272 loans had been funded up through March 2015 from the 535 applications that had been submitted.

Non-Residential Property Assessed Clean Energy (PACE) Financing

- *Non-residential PACE financing allows L.A. County to issue bonds to secure funding for energy efficiency upgrades. Participants spread the costs of energy improvements over the expected life of installed measures by selecting payment terms up to 20 years.*
- *Funded 3 projects in 2014, totaling over $14 million.*
- *Received applications for 36 projects with a projected loan value of more than $55 million.*
- A dataset provided by SoCalREN[6] showed that in 2013-14, 144 PACE applications that were received and a total of 5 were funded.

Public Agency Financing

- *When the SoCalREN 2013-2014 PIP scope of work was originally proposed to the CPUC in 2012, the public agency financing offering for the SoCalREN consisted of 1) funding for a Loan Loss Reserve (LLR) supporting the Energy Lease Financing product created by Los Angeles County under ARRA and 2) the creation of a Revolving Loan Fund (RLF) for public agencies wishing to implement energy efficient projects in their buildings. Neither the LLR nor the RLF projects were fully funded by the CPUC as the Final Decision only funded assistance related to marketing, outreach and administration tasks associated with public agency finance activities. In the Final Decision, however, the original titles for the two programs were retained. Since the program task descriptions for Public Agency LLR and Public Agency RLF were very similar in nature, SoCalREN tracked and reported on the Tasks as one single program.*
- *Completed 68 Financing Applications for enrolled agencies (includes SCE On Bill Financing, SCG On-Bill Financing, and Energy Lease Financing).*
- *Submitted over $9 million dollars in financing applications.*
- *Closed on $1 million in financing loans.*

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5 Prepared by Opinion Dynamics Corporation on behalf of the CPUC. Draft date September 9, 2015.

6 In response to the consultant team's data request in support of this assessment, SoCalREN provided an Excel file entitled, "SoCalREN Financing.xlsx" which served as the source of this non-resource accomplishment.

- *Prepared and delivered 16 Project Proposals to present financial metrics and financing options available to agencies.*
- *Participated in over 37 outreach events and presentations with key stakeholders.*
- *Reached 1,165 inboxes through marketing eblasts.*
- *Created tools, collateral and educational materials to overcome barriers and typical financing misconceptions by public agencies and provide best practices solutions.*
- *Updated existing collateral material with new information. Created and maintained financing pages for The Energy Network website www.theenergynetwork.com.*
- *Expanded contact database to track outreach to public agencies.*
- *Marketed The Energy Network Public Agency Financing Assistance Program services to eligible public agencies, including those that are not currently enrolled in the REN's turnkey project delivery services program*[7].
- In 2014, a total of 37 marketing and outreach events (i.e., webinars, conference calls, and in-person events) were held in support of Public Agency financing.

[7] Italicized text was taken from the following document: 2015 SoCalREN Energy Efficiency Annual Report. Prepared by SoCalREN, April 15, 2015. Pages 14-16.

Appendix C

NTGR Working Group Framework for NTG Analysis

Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers

Prepared for the Energy Division, California Public Utilities Commission

By

The Nonresidential Net-To-Gross Ratio Working Group

October 16, 2012

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Appendix A: References

Acknowledgments

As part of the evaluation of the 2010-12 energy efficiency programs designed and implemented by the four investor-owned utilities (Pacific Gas & Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas and Electric Company) and third parties, the Energy Division of the California Public Utilities Commission (CPUC) re-formed the nonresidential net-to-gross ratio working group that was originally formed during the PY2006-2008 evaluation. The main purpose of this group was to furtherrefine and improve the standard net-to-gross methodological framework that was developed during the PY2006-2008 evaluation cycle. This framework includes decision rules, for integrating in a systematic and consistent manner the findings from both quantitative and qualitative information in estimating net-to-gross ratios. The working group, listed alphabetically, is composed of the following evaluation professionals:

- Jennifer Fagan, Itron, Inc.
- Nikhil Gandhi, Strategic Energy Technologies, Inc.
- Kay Hardy, Energy Division, CPUC
- Jeff Hirsch, James J. Hirsch & Associates
- Richard Ridge, Ridge & Associates
- Mike Rufo, Itron, Inc.
- Claire Palmgren, KEMA
- Valerie Richardson, KEMA
- Philippus Willems, PWP, Inc.

A public webinar was conducted to obtain feedback from the four investor-owned utilities and other interested stakeholders. The questionnaire was then pre-tested and, based on the pre-test results, finalized in December 2011.

1. Overview of the Large Nonresidential Free Ridership Approach

The methodology described in this section was developed to address the unique needs of Large Nonresidential customer projects developed through energy efficiency programs offered by the four California investor-owned utilities and third-parties. This method relies exclusively on the Self-Report Approach (SRA) to estimate project and program-level Net-to-Gross Ratios (NTGRs), since other available methods and research designs are generally not feasible for large nonresidential customer programs. This methodology provides a standard framework, including decision rules, for integrating findings from both quantitative and qualitative information in the calculation of the net-to-gross ratio in a systematic and consistent manner. This approach is designed to fully comply with the *California Energy Efficiency Evaluation: Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals* (Protocols) and the *Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approaches* (Guidelines).

This approach preserves the most important elements of the approaches previously used to estimate the NTGRs in large nonresidential customer programs. However, it also incorporates several enhancements that are designed to improve upon that approach, for example:

- The method incorporates a 0 to 10 scoring system for key questions used to estimate the NTGR, rather than using fixed categories that are assigned weights.
- The method asks respondents to jointly consider and rate the importance of the many likely events or factors that may have influenced their energy efficiency decision making, rather than focusing narrowly on only their rating of the program's importance. This question structure more accurately reflects the complex nature of the real-world decision making and should help to ensure that all non-program influences are reflected in the NTGR assessment in addition to program influences.

It is important to note that the NTGR approach described in this document is a general framework, designed to address all large nonresidential programs. In order to implement this approach on a program-specific basis, it also needs to be customized to reflect the unique nature of the individual programs.

2. Basis for SRA in Social Science Literature

The social sciences literature provides strong support for use of the methods used in the SRA to assess program influence. As the *Guidelines* notes,

> More specifically, the SRA is a mixed method approach that involves asking one or more key participant decision-makers a series of structured and open-ended questions about whether they would have installed the same EE equipment in the

> absence of the program as well as questions that attempt to rule out rival explanations for the installation (Weiss, 1972; Scriven, 1976; Shadish, 1991; Wholey et al., 1994; Yin, 1994; Mohr, 1995). In the simplest case (e.g., residential customers), the SRA is based primarily on quantitative data while in more complex cases the SRA is strengthened by the inclusion of additional quantitative and qualitative data which can include, among others, in-depth, open-ended interviews, direct observation, and review of program records. Many evaluators believe that additional qualitative data regarding the economics of the customer's decision and the decision process itself can be very useful in supporting or modifying quantitatively-based results (Britan, 1978; Weiss and Rein, 1972; Patton, 1987; Tashakkori and Teddlie, 1998).[1]

More details regarding the philosophical and methodological underpinnings of this approach are in Ridge, Willems and Fagan (2009), Ridge, Willems, Fagan and Randazzo (2009) and Megdal, Patil, Gregoire, Meissner, and Parlin (2009). In addition to these two articles, Appendix A provides an extensive listing of references in the social sciences literature regarding the methods employed in the SRA.

3. Free Ridership Analysis by Project Type

There are three levels of free-ridership analysis. The most detailed level of analysis, the **Standard – Very Large Project** NTGR, is applied to the largest and most complex projects (representing 10 to 20% of the total) with the greatest expected levels of gross savings[2] The **Standard** NTGR, involving a somewhat less detailed level of analysis, is applied to projects with moderately high levels of gross savings. The least detailed analysis, the **Basic** NTGR, is applied to all remaining projects. Evaluators must exercise their own discretion as to what the appropriate thresholds should be for each of these three levels.

4. Sources of Information on Free Ridership

There are five sources of free-ridership information in this study. Each level of analysis relies on information from one or more of these sources. These sources are described below.

1. **Program Files**. As described in previous sections of this report, programs often maintain a paper file for each paid application. These can contain various pieces of information which are relevant to the analysis of free-ridership, such as letters written by the utility's customer representatives that document what the customer had planned to do in the absence of the rebate and explain the customer's motivation for implementing the efficiency measure. Information on the measure payback with and without the rebate may also be available.

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[1] *Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approaches*, October 15, 2007, pg. 3.

[2] Note that we do not refer to an Enhanced level of analysis, since this is defined by the Protocols to involve the application of two separate analysis approaches, such as billing analysis or discrete choice modeling.

2. **Decision-Maker Surveys**. When a site is recruited, one must also determine who was involved in the decision-making process which led to the implementation of measures under the program. They are asked to complete a Decision Maker survey. This survey obtains highly structured responses concerning the probability that the customer would have implemented the same measure in the absence of the program. First, participants are asked about the timing of their program awareness relative to their decision to purchase or implement the energy efficiency measure. Next, they are asked to rate the importance of the program versus non-program influences in their decision making. Third, they are asked to rate the significance of various factors and events that may have led to their decision to implement the energy efficiency measure at the time that they did. These include:

    - the age or condition of the equipment,
    - information from a feasibility study or facility audit
    - the availability of an incentive or endorsement through the program
    - a recommendation from an equipment supplier, auditor or consulting engineer
    - their previous experience with the program or measure,
    - information from a program-sponsored training course or marketing materials provided by the program
    - the measure being included as part of a major remodeling project
    - a suggestion from program staff, a program vendor, or a utility representative
    - a standard business practice
    - an internal business procedure or policy
    - stated concerns about global warming or the environment
    - a stated desire to achieve energy independence.

    In addition, the survey obtains a description of what the customer would have done in the absence of the program, beginning with whether the implementation was an early replacement action. If it was not, the decision maker is asked to provide a description of what equipment would have been implemented in the absence of the program, including both the efficiency level and quantities of these alternative measures. This is used to adjust the gross engineering savings estimate for partial free ridership, as discussed in Section 5.2.

    This survey contains a core set of questions for **Basic** NTGR sites, and several supplemental questions for both **Standard and Standard – Very Large** NTGR sites For example, if a Standard or Standard-Very Large respondent indicates that a financial calculation entered highly into their decision, they are asked additional questions about their *financial criteria* for investments and their rationale for the current project in light of them. Similarly, if they respond that a *corporate policy* was a primary consideration in their decision, they are asked a series of questions about the specific policy that led to their adoption of the installed measure. If they indicate the installation was a *standard practice*, there are supplemental questions to understand the origin and evolution of that standard practice within their

organization. These questions are intended to provide a deeper understanding of the decision making process and the likely level of program influence versus these internal policies and procedures. Responses to these questions also serve as a basis for consistency checks to investigate conflicting answers regarding the relative importance of the program and other elements in influencing the decision. In addition, **Standard – Very Large** sites may receive additional detailed probing on various aspects of their installation decision based on industry- or technology-specific issues, as determined by review of other information sources. For Standard-Very Large sites all these data are used to construct an internally consistent "story" that supports the NTGR calculated based on the overall information given.

3. **Vendor Surveys**. A Vendor Survey is completed for all **Standard** and **Standard-Very Large** NTGR sites that utilized vendors, and for **Basic** NTGR sites that indicate a high level of vendor influence in the decision to implement the energy efficient measure. For those sites that indicate the vendor was very influential in decision making, the vendor survey results enter directly into the NTGR scoring. The vendor survey findings are also be used to corroborate Decision Maker findings, particularly with respect to the vendor's specific role and degree of influence on the decision to implement the energy efficient measure. Vendors are queried on the program's significance in their decision to recommend the energy efficient measures, and on their likelihood to have recommended the same measure in the absence of the program. Generally, the vendors contacted as part of this study are contractors, design engineers, distributors, and installers.

4. **Utility and Program Staff Interviews**. For the Standard and Standard-Very Large NTGR analyses, interviews with utility staff and program staff are also conducted. These interviews are designed to gather information on the historical background of the customer's decision to install the efficient equipment, the role of the utility and program staff in this decision, and the name and contact information of vendors who were involved in the specification and installation of the equipment.

5. **Other information**. For **Standard – Very Large Project** NTGR sites, secondary research of other pertinent data sources is performed. For example, this could include a review of standard and best practices through industry associations, industry experts, and information from secondary sources (such as the U.S. Department of Energy's Industrial Technologies Program, Best Practices website URL, http://www1.eere.energy.gov/industry/bestpractices/). In addition, the Standard- Very Large NTGR analysis calls for interviews with other employees at the participant's firm, sometimes in other states, and equipment vendor experts from other states where the rebated equipment is being installed (some without rebates), to provide further input on standard practice within each company.

Table 1 below shows the data sources used in each of the three levels of free-ridership analysis. Although more than one level of analysis may share the same source, the amount of information that is utilized in the analysis may vary. For example, all three levels of analysis obtain core question data from the Decision Maker survey.

Table 1: Information Sources for Three Levels of NTGR Analysis

	Program File	Decision Maker Survey Core Question	Vendor Surveys	Decision Maker Survey Supplemental Questions	Utility & Program Staff Interviews	Other Research Findings
Basic NTGR	√	√	√[1]		√[2]	
Standard NTGR	√	√	√[1]	√	√	
Standard NTGR - Very Large Projects	√	√	√[3]	√	√	√

[1]Only performed for sites that indicate a vendor influence score (N3d) greater than maximum of the other program element scores (N3b, N3c, N3g, N3h, N3l).

[2]Only performed for sites that have a utility account representative

[3]Only performed if significant vendor influence reported or if secondary research indicates the installed measure may be becoming standard practice.

A copy of the complete survey forms (with lead-in text and skip patterns) are available upon request.

5. NTGR FRAMEWORK

The Self-Report-based Net-to-Gross analysis relies on responses to a series of survey questions that are designed to measure the influence of the program on the participant's decision to implement program-eligible energy efficiency measure(s). Based on these responses, a NTGR is derived based on responses to a set of "core" NTGR questions.

5.1. NTGR Questions and Scoring Algorithm

A self-report NTGR is computed for all NTGR levels using the following approach. Adjustments may be made for **Standard – Very Large** NTGR sites, if the additional information that is collected is inconsistent with information provided through the Decision Maker survey.

The NTGR is calculated as an average of three scores. Each of these scores represents the highest response or the average of several responses given to one or more questions about the decision to install a program measure.

- **Program attribution index 1 (PAI–1) score** that reflects the influence of the **most important** of various program and program-related elements in the

customer's decision to select the specific program measure at this time. Program influence through vendor recommendations is also incorporated in this score.

- **Program attribution index 2 (PAI–2) score** that captures the perceived importance of the program (whether rebate, recommendation, training, or other program intervention) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score is determined by asking respondents to assign importance values to both the program and most important non-program influences so that the two total 10. The program influence score is adjusted (i.e., divided by 2) if respondents say they had already made their decision to install the specific program qualifying measure before they learned about the program.

- **Program attribution index 2 (PAI–3) score** that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available (the counterfactual).

When there are multiple questions that feed into the scoring algorithm, as is the case for both the **PAI-1** and **PAI-3** scores, the maximum score is always used. The rationale for using the maximum value is to capture the most important element in the participant's decision making. Thus, each score is always based on the strongest influence indicated by the respondent. However, high scores that are inconsistent with other previous responses trigger consistency checks and can lead to follow-up questions to clarify and resolve the discrepancy.

The calculation of each of the above scores is discussed below. For each score, the associated questions are presented and the computation of each score is described.

5.1.1. PAI–1 score

For the Decision Maker, the questions asked are:
I'm going to ask you to rate the importance of the program as well as other factors that might influence your decision to implement [MEASURE.] Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means not at all important and 10 means very important, so that an importance rating of 8 shows twice as much influence as a rating of 4.

Now, using this 0 to 10 rating scale, where 0 means "Not at all important" and 10 means "Very important," please rate the importance of each of the following in your decision to implement this specific [MEASURE] at this time.

- Availability of the PROGRAM rebate

- Information provided through a recent feasibility study, energy audit or other types of technical assistance provided through PROGRAM

- Information from PROGRAM training course

- Information from other PROGRAM marketing materials
- Suggestion from program staff
- Suggestion from your account rep
- Recommendation from a vendor/supplier (If a score of greater than 5 is given, a vendor interview is triggered)

For the Vendor, the questions asked (if the interview is triggered) are:
I'm going to ask you to rate the importance of the [PROGRAM] in influencing your decision to recommend [MEASURE] to [CUSTOMER] and other customers. Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means not at all important and 10 means very important, so that an importance rating of 8 shows twice as much influence as a rating of 4.

1. Using this 0 to 10 scale where 0 is 'Not at all important" and 10 is "Very Important," how important was the PROGRAM, including incentives as well as program services and information, in influencing your decision to recommend that CUSTOMER install the energy efficiency MEASURE at this time?

2. And using a 0 to 10 likelihood scale, where 0 denotes "not at all likely" and 10 denotes "very likely," if the PROGRAM, including incentives as well as program services and information, had not been available, what is the likelihood that you would have recommended this specific energy efficiency MEASURE to CUSTOMER?
3. Now, using a 0 to 100 percent scale, in what percent of sales situations did you recommend MEASURE before you learned about the [PROGRAM]?
4. And using the same 0 to 100 percent scale, in what percent of sales situations do you recommend MEASURE now that you have worked with the [PROGRAM]?
5. And, using the same 0 to 10 scale where 0 is "Not at all important" and 10 is "Very important", how important in your recommendation were:
   a. Training seminars provided by UTILITY?
   b. Information provided by the UTILITY website?
   c. Your firm's past participation in a rebate or audit program sponsored by UTILITY?

If the Vendor interview is triggered, a score is calculated that captures the highest degree of program influence on the vendor's recommendation. This score (VMAX) is calculated as the MAXIMUM value of the following:

1. The response to question 1
2. 10 minus the response to question 2
3. The response to question 4 minus the response to question 3, divided by 10
4. The response to question 5a.
5. The response to question 5b.
6. The response to question 5c.

Note that vendors are asked an additional question regarding other ways that their recommendations regarding the measure might have been influenced. Their responses are not used in the direct calculation of the NTGR but are potentially useful in making adjustments to the core NTGR.

The PAI–1 score is calculated as:
The highest program influence score divided by the sum of the highest program influences (i.e., the responses to the first six decision maker questions) plus the highest non-program influence score, multiplied by 10. and, if the vendor interview has been triggered, the VMAX score multiplied by the score the decision makers assigned to the vendor recommendation.

5.1.2. PAI–2 score

The questions asked are:

1. Did you learn about PROGRAM BEFORE or AFTER you decided to implement the specific MEASURE that was eventually adopted or installed?

2. Now I'd like to ask you a last question about the importance of the program to your decision as opposed to other factors that may have influenced your decision. Again using the 0 to 10 rating scale we used earlier, where 0 means "Not at all important" and 10 means "Very important," please rate the overall importance of PROGRAM versus the most important of the other factors we just discussed in your decision to implement the specific MEASURE that was adopted or installed. This time I would like to ask you to have the two importance ratings -- the program importance and the non-program importance -- total 10.

The PAI–2 score is calculated as:
The importance of the program, on the 0 to 10 scale, to question 2. This score is reduced by half if the respondent learned about the program after the decision had been made.

5.1.3. PAI–3 Score

The questions asked are:

1. Now I would like you to think about the action you would have taken with regard to the installation of this equipment if the &PROGRAM had not been available.

Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if PROGRAM had not been available, what is the likelihood that you would have installed exactly the same program-qualifying efficiency equipment that you did in this project?

The PAI-3 score is calculated as:

10 minus the likelihood of installing the same equipment

5.1.4. The Core NTGR

The self-reported core NTGR in most cases is simply the average of the PAI-1, PAI-2, and PAI-3 scores, divided by 10. The one exception to this is when the respondent indicates a 10 in 10 probability of installing the same equipment at the same time in the absence of the program, in which case the NTGR is based on the average of the PAI-2 and PAI-3 scores only.

5.2. Data Analysis and Integration

The calculation of the Core NTGR is fairly mechanical and is based on the answers to the closed-ended questions. However, the reliance of the Standard NTGR – Very Large on more information from so many different sources requires more of a case study level of effort. The SRA Guidelines point out that a case study is one method of assessing both quantitative and qualitative data in estimating a NTGR. A case study is an organized presentation of all these data available about a particular customer site with respect to all relevant aspects of the decision to install the efficient equipment. In such cases where multiple interviews are conducted eliciting both quantitative and qualitative data and a variety of program documentation has been collected, one will need to integrate all of this information into an internally consistent and coherent story that supports a specific NTGR.

The following data sources should be investigated and reviewed as appropriate to supplement the information collected through the decision maker interviews.

- Account Representative Interview
- Utility Program Manager/Staff Interview
- Utility Technical Contractor Interview
- Third party Program Manager Interview
- Evaluation Engineer Interview
- Gross Impact Site Plan/Analysis Review
- Corporate Green/Environmental Policy Review (if mentioned as important)
- Corporate Standard Practice Review (if mentioned as important)
- Industry Standard Practice Review (if mentioned as important)
- Corporate payback review (if mentioned as important)
- Review relevant codes and standards, including regulatory requirements
- Review industry publications, websites, reports such as the Commercial Energy Use Survey, historical purchase data of specific measures etc.

As detailed in the Self-Report NTGR Guidelines, when complementing the quantitative analysis of free-ridership with additional quantitative and qualitative data from multiple respondents and other sources, there are some basic concerns that one must keep in mind. Some of the other data – including interviews with third parties who were involved in the decision to install the energy efficient equipment – may reveal important influences on the customer's decision to install the qualifying program measure. When one chooses to

incorporate other data, one should keep the following principles in mind: 1) the method chosen should be balanced. That is, the method should allow for the possibility that the other influence can either increase or decrease the NTGR calculated from the decision maker survey responses, 2) the rules for deciding which customers will be examined for potential other influences should be balanced. In the case of Standard –Very Large interviews, all customers are subject to such a review, so that the pool of customers selected for such examination will not be biased towards ones for whom the evaluator believes the external influence will have the effect of influencing the NTGR in only one direction, 3) the plan for capturing other influences should be based on a well-conceived causal framework. The onus is on the evaluator to build a compelling case using a variety of quantitative and/or qualitative data for estimating a customer's NTGR.

Establishing Rules for Data Integration

Before the analysis begins, the evaluation team should establish, to the extent feasible, rules for the integration of the quantitative and qualitative data. These rules should be as specific as possible and be strictly adhered to throughout the analysis. Such rules might include instructions regarding when the NTGR based on the quantitative data should be overridden based on qualitative data, how much qualitative data are needed to override the NTGR based on quantitative data, how to handle contradictory information provided by more than one person at a given site, how to handle situations when there is no decision-maker interview, when there is no appropriate decision-maker interview, or when there is critical missing data on the questionnaire, and how to incorporate qualitative information on deferred free-ridership.

One must recognize that it is difficult to anticipate all the situations that one may encounter during the analysis. As a result, one may refine existing rules or even develop new ones during the initial phase of the analysis. One must also recognize that it is difficult to develop algorithms that effectively integrate the quantitative and qualitative data. It is therefore necessary to use judgment in deciding how much weight to give to the quantitative versus qualitative data and how to integrate the two. The methodology and estimates, however, must contain methods to support the validity of the integration methods through preponderance of evidence or other rules/procedures as discussed above.

For the **Standard-Very Large** cases in the large Nonresidential programs, the quantitative data used in the NTGR Calculator (which calculates the "core" NTGR), together with other information collected from the decision maker regarding the installation decision, form the initial basis for the NTG "story" for each site. Note that in most cases, supplemental data such as tracking data, program application files and results of interviews with program/IOU staff and vendors, will have been completed before the decision maker is contacted and will help guide the non-quantitative questioning in the interview. In practice, this means that most potential inconsistencies between decision maker responses and other sources of information should have been resolved before the interview is complete and data are entered into the NTGR Calculator. For example, if a company has an aggressive "green" policy widely promoted on its website that is not mentioned by the decision makers, the interviewer will ask the respondent to clarify the role of that policy in the decision. Conversely, if the decision maker attributes the

decision to install the equipment to a new company wide initiative rather than the program, yet there is no evidence of such an initiative reported by program staff, vendors, or the company's website, the decision maker will be asked to explain the discrepancy so that his or her responses can be changed if needed.

In some cases, however, it may be necessary to modify or override one of the scores contributing to the overall NTGR or the NTGR itself. Before this is done all quantitative and qualitative data will be systematically (and independently) analyzed by two experienced researchers who are familiar with the program, the individual site and the social science theory that underlies the decision maker survey instrument. Each will determine whether the additional information justifies modifying the previously calculated NTGR score, and will present any recommended modifications and their rationale in a well-organized manner, along with specific references to the supporting data. Again, it is important to note that the other influences can have the effect of either increasing or decreasing the NTGR calculated from the decision maker survey responses, and one should be skeptical about a consistent pattern of "corrections" in one direction or another.

Sometimes, *all* the quantitative and qualitative data will clearly point in the same direction while, in others, the *preponderance* of the data will point in the same direction. Other cases will be more ambiguous. In all cases, in order to maximize reliability, it is essential that more than one person be involved in analyzing the data. Each person must analyze the data separately and then compare and discuss the results. Important insights can emerge from the different ways in which two analysts look at the same set of data. Ultimately, differences must be resolved and a case made for a particular NTGR. Careful training of analysts in the systematic use of rules is essential to insure inter-rater reliability[3].

Once the individual analysts have completed their review, they meet to discuss their respective findings and present to the other the rationale for their recommended changes to the Calculator-derived NTGR. Key points of these arguments will be written down in summary form (e.g., Analyst 1 reviewed recent AQMD ruling and concluded that customer would have had to install the same measure within 2 years, not 3, thereby reducing NP score from 7.8 to 5.5) and also presented in greater detail in a workpaper so that an independent reviewer can understand and judge the data and the logic underlying each NTGR estimate. Equally important, the CPUC will have all the essential data to enable them to replicate the results, and if necessary, to derive their own estimates.

The outcome of the reconciliation by two analysts determines the final NTGR for a specific project. Again, the reasoning behind the "negotiated" final value must be thoroughly documented in a workpaper, while a more concise summary description of the rationale can be included in the NTGR Calculator workbook (e.g., Analyst 1 and Analyst 2 agreed that the NTGR score should have been higher than the calculated value of 0.45

[3] Inter-rater reliability is the extent to which two or more individuals (coders or raters) agree. Inter-rater reliability addresses the consistency of the implementation of a rating system.

because of extensive interaction between program technical staff and the customer, but they disagreed on whether this meant the NTGR should be .6 or .7. After discussion, they agreed on a NTGR of .65 as reflecting the extent of program influence on the decision).

In summary, it has been decided that supplemental data from non-core NTG questions collected through these surveys should be used in the following ways in the California Large Nonresidential evaluations:

- Vendor interview data will be used at times in the direct calculation of the NTGR. It will also be used to provide context and confirming/contradictory information for Standard-Very Large decision maker interviews.

- Qualitative and quantitative information from other sources (e.g., industry data, vendor estimates of sales in no-program areas, and other data as described above) may be used to alter core inputs only if contradictions are found with the core survey responses. Since judgments will have to be made in deciding which information is more compelling when there are contradictions, supplemental data are reviewed independently by two senior analysts, who then summarize their findings and recommendations and together reach a final NTGR value.

- Responses will also be used to construct a NTGR "story" around the project; that is they will help to provide the context and rationale for the project. This is particularly valuable in helping to provide guidance to program design for future years. It may be, for example, that responses to the core questions yield a high NTGR for a project, but additional information sources strongly suggest that the program qualifying technology has since become standard practice for the firm or industry, so that free ridership rates in future years are likely to be higher if program rules are not changed.

- Findings from other non-core NTGR questions (e.g., Payback Battery, Corporate Policy Battery) are also be used to **cross-check the consistency** of responses to core NTGR questions. When an inconsistency is found, it is presented to the Decision Maker respondent who is then be asked to explain and resolve it if they can. If they are not able to do so, their responses to the core NTGR question with the inconsistency may be overridden by the findings from these supplemental probes. These situations are handled on a case-by-case basis; however consistency checks are programmed into the CATI survey instrument used for the Basic and Standard cases.

Finally, some analysis of additional information beyond the close-ended questions that are used to calculate the Core NTGR could be done for the **Standard NTGR**. For example information regarding the financial criteria used to make capital investments, corporate policy regarding the purchase of energy efficiency equipment or the influence of standard practice in the same industry as the participant could be taken into account and used to make adjustments to the Core NTGR in a manner similar what is done for the Standard – Very Large NTGR.

5.3. Accounting for Partial Free Ridership

Partial free-ridership can occur when, in the absence of the program, the participant would have installed something more efficient than the program-assumed baseline efficiency but not as efficient as the item actually installed as a result of the program.

In situations where there is partial free ridership, the assumed baseline condition is affected. Absent partial free ridership, the assumed baseline would normally be based on existing equipment (in early replacement cases), on code requirements (in normal replace on burnout cases), or on a level above current code (e.g., this could be a market average or value purposefully set above code minimum but below market average; in this case, the definition and requirement would typically be defined by a specific program's baseline rules). In some cases, there may be a "dual" baseline (more specifically, a baseline that changes over the measure's EUL) if the project involves early replacement plus partial free ridership. In such cases, the baseline basis for estimating savings is the existing equipment over the remaining useful life (RUL) of the equipment, and then a baseline of likely intermediate efficiency equipment (e.g., code or above) for the remainder of the analysis period (i.e., the period equal to the EUL-RUL). When there is partial free ridership, the baseline equipment that would have been installed absent the program is of an intermediate efficiency level (resulting in lower energy savings than that assumed by the program if the program took in situ equipment efficiency as the basis for savings over the entire EUL). A related issue with respect to determination of the appropriate baseline is whether the adjustment made, if any, from the in situ or otherwise claimed baseline in the ex ante calculation, is whether the adjustment applies to the gross or net savings calculation.

Assignment of Partial Free Ridership Effects to Gross versus Net. In past evaluations, partial free ridership impacts have principally been incorporated into the net-to-gross ratio. This is because most partial free ridership is induced by market conditions, rather than by non-market factors. Market conditions refer primarily to standard adoption of a technology by a particular market segment or end user as a result of competitive market forces or other end user-specific factors. The key determining principle with respect to application of the adjustment to the net-to-gross ratio is whether there is a level of efficiency, below the efficiency of the measure for which savings are paid and claimed, but above what is required by code or minimum program baseline requirements that the end user would have implemented anyway without the program. Conditions that cause this adjustment to be made to gross savings rather than the net-to-gross ratio may include factors such as

- changing baseline equipment to meet changed business circumstances (such as increased production/throughput, changes in occupancy, etc.);
- compliance with environmental regulations, indoor air quality requirements, safety requirements; or
- the need to address an operational problem.

Each project should be examined separately for partial free ridership and a determination should be made based on the unique circumstances of each installation of whether an adjustment to gross savings or the net-to-gross ratio is warranted.

Data Collection Procedures. Information is gathered on partial free ridership using the following questions asked as part of the decision maker NTGR survey.

1. Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not installed the program qualifying equipment, which of the following alternatives would you have been MOST likely to do?
    a. Install fewer units
    b. Install standard efficiency equipment or whatever required by code
    c. Install equipment more efficient than code but less efficient than what you installed through the program
    d. repair/rewind or overhaul the existing equipment
    e. do nothing (keep the existing equipment as is)
    f. something else (specify what _____)

2. (IF FEWER UNITS) How many fewer units would you have installed? (It is okay to take an answer such as ...HALF...or 10 percent fewer ... etc.)

3. (IF MORE EFFICIENT THAN CODE) Can you tell me what model or efficiency level you were considering as an alternative? (It is okay to take an answer such as … 10 percent more efficient than code or 10 percent less efficient than the program equipment)

4. (IF REPAIR/REWIND/OVERHAUL) How long do you think the repaired/rewound/refurbished equipment would have lasted before requiring replacement?

In addition, these same partial free ridership questions should be asked during the on-site audit for a given project. This latter interview will be conducted by the project engineers. The collected information helps the gross impact and NTG analysis teams gain a more complete understanding of the true project baseline and equipment selection decision. These decision maker questions are included in the Excel version of the CATI-based Standard and Basic decision maker survey instrument as well as in the Standard-Very Large instrument.

Data Analysis and Integration Procedures. In cases where partial free ridership is found and it is determined that the adjustment should be made to the net-to-gross ratio, the following procedure should be used:

On the net side, the adjustment is based on the intermediate baseline indicated by the decision maker for the time period in which the intermediate equipment would have been installed. The calculation of energy saved under this intermediate baseline is done, and then divided by the savings calculated under the in situ baseline. The resulting ratio is then multiplied by the initial NTGR which was previously calculated using only the

'core' scoring inputs. The effect of this adjustment is to reduce the NTGR further to reflect the effects of the revealed partial free ridership.

In all cases, the Gross Impacts and NTG analysis teams will need to carefully coordinate their calculations to ensure that they are not inadvertently adjusting the savings twice for the same partial free ridership, i.e., through adjustments both to the gross savings calculation and to the NTG ratio.

6. NTGR INTERVIEW PROCESS

The NTGR surveys are conducted via telephone interviews. Highly-trained professionals with experience levels that are commensurate with the interview requirements should perform these interviews. Basic and Standard level interviews should be conducted by senior interviewers, who are highly experienced conducting telephone interviews of this type. Standard - Very Large interviews should be completed by professional consulting staff due to the complex nature of these projects and related decision making processes. More than likely, these will involve interviews of several entities involved in the project including the primary decision maker, vendor representatives, utility account executives, program staff and other decision influencers, as well as a review of market data to help establish an appropriate baseline.

All but the Standard -Very Large interviews should be conducted using computer-aided telephone interview (CATI) software. Use of a CATI approach has several advantages: (1) the surveys can be customized to reflect the unique characteristics of each program, and associated program descriptions, response categories, and skip patterns; (2) it drastically reduces inaccuracies associated with the more traditional paper and pencil method; and (3) the process of checking for inconsistent answers can be automated, with follow up prompts triggered when inconsistencies are found.

7. COMPLIANCE WITH SELF-REPORT GUIDELINES

The proposed NTGR framework fully complies with all of the CPUC/ED and the MECT's Guidelines for Estimating Net-to-Gross Ratios Using the Self-Report Approach.

Appendix A

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(END OF ATTACHMENT B)

Regional Energy Networks (RENs) Reconciliation Memo

By Dr. Katherine Johnson, EM&V Advisor- Energy Division, CPUC

January 8, 2016

Executive Summary

The California Public Utilities Commission (CPUC) authorized a new type of energy efficiency program administrator in November 2012, through the formation of two Regional Energy Networks (RENs).[1] With a two-year budget of approximately $67 million, the RENs account for 2.5% of California's 2013–2014 EE portfolio budget of $2.6 billion. However, the RENs are also independently accountable for delivering the results described in their respective program implementation plans (PIPs) and providing monthly and annual updates on their overall progress towards achieving their energy savings goals.[2]

Since the REN are a new program delivery strategy, the CPUC directed that Evaluation, Measurement & Verification (EM&V) studies be conducted to determine the overall effectiveness of the RENs and their savings impacts during the 2013-2014 program period. This memorandum summarizes the results of the two REN studies completed to date:

- *The PY 2013–2014 Regional Energy Networks Value and Effectiveness Study Final Report, (*Value and Effectiveness Study), conducted by Opinion Dynamics Corporation (ODC), January 6, 2016.
- *2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report* (Impact Assessment)**,** prepared by Itron, Apex Analytics and DNV-GL January 8 2016.

Due to data availability and timing constraints, the two studies were reduced in scope to accommodate available data, budget, and completion dates**.** Thus, rather than providing a comprehensive assessment of the program operations and savings impacts, the studies provide a qualitative assessment of some[3] REN programs in the 2013-2014 program years and a verification of savings estimates for a subset of REN programs.

While both EM&V studies addressed the RENs, neither study offered definitive recommendations on steps the CPUC should take going forward. The ODC study suggested that the RENs provide some benefit, but the study was limited to only three of the 17 REN programs. Moreover, many of their conclusions were based on self-reported information from REN program staff that could not be independently verified. The Itron study identified some significant tracking issues that will result in significant reductions in energy savings for some REN programs.

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[1] CPUC Decisions D.12-05-015 and D.12-11-015.

[2] Page 11, D. 12-11-015.

[3] Pages 2 and 9, Draft EM&V Plan, ODC, September 18, 2014 explained that the effectiveness component of the study would assess the RENs' management capabilities with emphasis on both non-resource activities and innovative sub-pilots. The justification to include only non-resource pilots is two-fold. First, resource pilots would be evaluated under the impact evaluation, and second, budgetary constraints for the process evaluation necessitate that the overall scope of the evaluation be narrow. The number of RENs programs evaluated with any rigor was reduced to three via a two-part process. First, Energy Division identified RENs' programs that could be evaluated within planned related program studies under a program lead analyst (e.g., Financing and Codes and Standards). The remainder (e.g., SoCalREC) had evaluability challenges that disqualified them from a more rigorous review (i.e., lack of program track record and corresponding data and being non-resource programs).

Specifically, the findings from the two studies suggest that the BayREN multifamily program has made significant progress to date relative to its forecasted goals for both its kilowatt hour (kWh) and therm projections. However, this preliminary finding should be verified in the upcoming impact evaluations.

In addition, the two studies identified a number of ways to significantly improve the program tracking databases to capture critical energy savings data used to estimate savings. However, the RENs also need to reassess the value of the information reported for non-resource programs, as this information is not directly tied back to specific program goals or objectives. As such, future process evaluations should include recommendations on ways to streamline and improve the quality of the information reported in the program databases to ensure that the full value of these non-resource programs is captured appropriately.

As both ODC and Itron point out, several related studies are currently underway that are expected to provide additional information to guide the CPUC in determining appropriate next steps for the RENs including:

- A process study of the BayREN Codes and Standards Compliance Improvement program, with preliminary results presented at the Quarterly Stakeholder Meeting in December 2015.
- REN Multifamily Program Study, expected to be completed in the first quarter of 2016.
- An energy impact evaluation of the RENs, due in 2016, will cover the 2013–2014 program years and the first two quarters of 2015.
- A second phase of this RENs value and effectiveness study, to be completed in 2016.[4]

Therefore, drawing more meaningful conclusions about the status of the RENs and their future seems premature at this point. Unfortunately, neither study can provide a clear answer to the question now before the CPUC: *What's next for the RENs?* The Commission should continue the programs subject to implementation of the recommended improvements in the reports and continue to review their performance through the planned studies.

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[4] Page 15, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

Introduction

In November 2012, the CPUC authorized the formation of two Regional Energy Networks (RENs) to administer energy efficiency (EE) programs in Northern and Southern California.[5] With a two-year budget of approximately $67 million, the RENs account for 2.5% of California's 2013–2014 EE portfolio budget of $2.6 billion. Independent of the IOUs, but supported by ratepayer funds, the RENs were approved to deliver energy efficiency services according to the criteria requiring these new program administrators to pursue:

- Activities that the four California Investor-Owned Utilities (IOUs) cannot or do not intend to undertake;
- Activities for which there is no current utility program offering and for which there is the potential for scalability to a broader geographic reach, if successful; and
- Activities in hard-to-reach markets, whether or not there is currently a utility program that may overlap.[6]

The RENs are unique in that they were selected, managed, and overseen by the CPUC directly rather than IOU staff. The Commission noted in its Decision (D.12-11-015) that:

> "Had the utilities been proactive over the past several years and reached out to the local governments to create true partnerships that took advantage of the expertise and viewpoints of the local governments, perhaps the Commission would not have felt the need to step in to allow the REN proposals to be submitted directly and the RENs could indeed have been satisfied with being part of the utility portfolios…But for now, RENs are distinguishable from other LGPs by the fact that the Commission instead of the utilities selects them.[7]

The RENs are also independently accountable for delivering the results described in their respective program implementation plans (PIPs), as further directed in this decision.[8]

Although the CPUC approved the two RENs in D.12-11-015, and authorized the RENs to begin service in January 2013, due to various requirements and requests, the RENs received final CPUC approval to begin offering EE services in July 2013.[9] Most programs rolled out by September 2013. The reasons for these delays are provided in detail in the footnote below.[10]

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[5] CPUC Decisions D.12-05-015 and D.12-11-015.

[6] Page 17, D.12-11-015.

[7] Pages 8-9, D. 12-11-015.

[8] Page 11, D. 12-11-015.

[9] Page 8, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[10] Subsequent to the issuance of D.12-11-015, the BayREN, on January 14, 2013, submitted Advice Letter 1, which included a revised PIP. On April 2, 2013, in compliance with Ordering Paragraph 5 of D.12-11-015, the IOUs and RENs filed revised PIPs in a joint Advice Letter for the Energy Upgrade California Enhanced Basic and Modified Flex Path programs (renamed to Home Upgrade and Advance Home Upgrade, respectively), requesting approval for program changes directed in the Decision. On May 31, 2013, the ED partially approved the joint Advice Letter via Disposition Letter, and directed the administrators to file a Tier 2 Advice Letter to address the issues that were deemed non-compliant. An additional Advice Letter was filed on July 14, 2013, and was approved later that summer. On May 8, 2013, BayREN, after receiving feedback from subject matter experts within the ED, filed a Second Amended PIP proposing slight modifications to all program offerings. On June 11, 2013, the CPUC approved the Second Amended PIP. The Multifamily Capital Advance and Single Family Loan Loss Reserve programs were part of a separate Financing decision released after the Energy Efficiency decision.

Overview of RENs Programs

The San Francisco Bay Area Regional Energy Network (BayREN), spans nine member counties entirely within the Pacific Gas & Electric (PG&E) service territory; the Southern California Regional Energy Network (SoCalREN), covers most of the Southern California Edison (SCE) and Southern California Gas Company (SCG) service territories. The counties served by these two RENs are listed in Table 1.

Table 1. Counties Served by the Two RENs[11]

BayREN	SoCalREN
1. Sonoma	1. Los Angeles
2. Napa	2. San Bernardino
3. Marin	3. Riverside
4. Solano	4. Ventura
5. San Francisco	5. Inyo
6. San Mateo	6. Imperial
7. Contra Costa	7. Mono
8. Alameda	8. Orange (partial)
9. Santa Clara	9. Kern (partial)
	10. Tulare (partial)
	11. Santa Barbara (partial)
	12. Kings (partial)

BayREN programs consist of:

- **BayREN Single Family Home Upgrade** is a service available to owners of single family detached homes in the BayREN territory who are PG&E customers. This program pays incentives for whole house retrofits and offers assistance to customers and contractors going through the process through its Home Upgrade Advisor segment.
- **Bay Area Multifamily Whole Building Program** is a service that allows multifamily property owners to receive free technical assistance designed to lower barriers to multiple measure upgrades through technical and financing assistance. Property owners receive customized scopes of work designed to reduce building energy use and receive incentives for whole building retrofits and for indoor LED lighting.
- The **BayREN Codes and Standards Subprogram** consists of three components: enforcement of existing codes, training, and sharing best practices for reach codes.
- The **BayREN Energy Efficiency Financing Portfolio** contains three programs to help make energy efficiency upgrades more affordable. The components are: (1) Pay As You Save, (2) Commercial PACE, and (3) Multifamily Capital Advance.

The SoCalREN pilot consists of the following program activities:

- Single Family Home Upgrade, Multifamily Whole Building retrofits, Local Marketing and Outreach, Contractor Outreach and Training, Green Building Labeling, and Low Income Single

[11] Page 6, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

Family Housing Upgrades. Note that through the Single Family Home Upgrade and Multifamily Whole Building program components, SoCalREN provides incentives for both single family and multifamily whole house/building retrofits.

- Financing programs are made available by SoCalREN to local governments to supplement the on-bill financing offered by the IOUs and, therefore, enable greater investments in deep energy savings.
- SoCalREN's Regional Energy Center offers comprehensive technical support to local governments and other public entities to enable them to implement deeper and more cost-effective energy management practices.[12]

Overview of the Evaluation, Measurement & Verification (EM&V) Studies

The Commission Decision authorizing the REN 2013-2014 budgets, D.12-11-015, provided guidance on how REN activities should be evaluated in order to inform future Commission actions on whether to preserve, expand, or discontinue these pilot Program Administrators:

> "It will be especially important, with the REN activities, to emphasize more evaluation to determine if certain piloted activities were successful and should be scaled up in 2015 and beyond, or discontinued altogether. To the extent possible, Commission staff and RENs should consider early evaluation activities prior to the end of 2014, in order to have more information going into the 2015 portfolio design process."[13]

In response to this directive, CPUC staff commissioned and oversaw two studies designed to assess the RENs' progress to date:

- *The PY 2013–2014 Regional Energy Networks Value and Effectiveness Study* (Value and Effectiveness Study") Final Report, conducted by Opinion Dynamics Corporation (ODC), January 6, 2016.

- *2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report* (Impact Assessment)**,** prepared by Itron, Apex Analytics and DNV-GL January 8, 2016.

The two EM&V studies were intended to determine the overall effectiveness of the RENs and the savings impacts they have contributed during the 2013-2014 program period. However, due to limitations in both available data and timing issues, both studies were reduced in scope based upon the available data, budget, and completion dates. Thus, rather than providing a comprehensive assessment of the program operations and savings impacts, the studies provide a qualitative assessment of some[14]

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[12] Pages ES-2-ES-3, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL January 8, 2016.

[13] Page 127, D.14-10-046 (quoting page 20, D.12-11-015).

[14] Pages 2 and 9, Draft EM&V Plan, ODC, September 18, 2014 explained that the effectiveness component of the study would assess the RENs' management capabilities with emphasis on both non-resource activities and innovative sub-pilots. The justification to include only non-resource pilots is two-fold. First, resource pilots would be evaluated under the impact evaluation, and second, budgetary constraints for the process evaluation necessitate that the overall scope of the evaluation be narrow. The number of RENs programs evaluated with any rigor was reduced to three via a two-part process. First, Energy Division identified RENs' programs that could be evaluated within planned related program studies under a program lead analyst (e.g., Financing and Codes and Standards). The remainder (e.g., SoCalREC) had evaluability challenges that disqualified them from a more rigorous review (i.e., lack of program track record and corresponding data and being non-resource programs).

REN programs in the 2013-2014 program years and a verification of savings estimates for a subset of REN programs.

The ODC study was changed from a process study to a value and effectiveness study to better match the study's goals and objectives. Moreover, ODC recognized that since the RENs programs are new pilot programs, it would be more useful and appropriate to inform the CPUC on topics such scalability and overlap rather than information on how to improve the programs within the RENs.

Therefore, the intent of the value and effectiveness study is not to convey or capture the full value of the RENs and their program activities, but only a sample limited to the following three programs:

- BayREN Pay As You Save Program;
- BayREN Home Upgrade Advisor Program; and
- SoCalREN Public Agency Program. [15]

With this in mind, ODC developed a set of research objectives expected to determine the value and effectiveness of the RENs from both broad and narrow perspectives (described in detail in the full report).[16] The study gathered data from both primary and secondary sources, including in-depth interviews, customer surveys, and a review of program materials.

The scope of the Itron Impact Assessment was to summarize the results from a set of quick turnaround tasks and then calculate cost-effectiveness estimates for the REN activities based on the updated savings assumptions. The study included updating the key impact parameters using primary data collection for net-to-gross (NTG) analysis and using results from recent gross ex post impact evaluations (for key nonresidential lighting measures), to then recalculate program cost effectiveness based on more current savings estimates for specific measures.

The study also included a comparison between RENs and investor owned utility (IOU) savings calculation assumptions (ex ante), to identify if there are any obvious over- or understatements in the savings being claimed prior to conducting any field evaluation.

In addition, Itron independently verified some of the non-resource program accomplishments of the RENs that were reported in the ODC Value and Effectiveness Study.

Lastly, the impact assessment study provides a review of the ability of the current tracking systems for these activities to support future evaluations (an evaluability assessment). However, no specific attribution or adjustments to savings assumptions was made based on this review.[17]

The scope of these EM&V activities conducted across the RENs' program portfolio is summarized in Table 2.

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[15] Page 25, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[16] Pages 16, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[17] Pages ES-1-ES-2, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Table 2. Subprograms Included in the EM&V Studies[18]

REN SubProgram	Areas Addressed in the ODC Report	Areas Addressed in the Itron Report
BayREN Programs		
Single Family Home Energy Advisor	Assess Value and Effectiveness; Summary of Accomplishments	Gross Impact Assessment, Cost Effectiveness Analysis; Evaluability Assessment; Accomplishments Assessment
Multifamily	Assess Value and Effectiveness; Summary of Accomplishments	Gross Impact Assessment, Net-to-Gross Analysis; Cost Effectiveness Analysis, Evaluability Assessment; Accomplishments Assessment
Codes & Standards	Summary of Accomplishments	Not evaluated
Financing Portfolio	Assess Value and Effectiveness of PAYS Water Efficiency Pilot; Summary Accomplishments	Not evaluated
SoCalREN Programs		
Single Family Home Upgrade and Multifamily Whole Building	Summary of Accomplishments	Gross Impact Assessment, Cost Effectiveness Analysis; Evaluability Assessment; Accomplishments Assessment
Financing	Assess Value and Effectiveness of Public Agency Financing Program; Summary of Accomplishments	Not evaluated
SoCalREC	Summary of Accomplishments	Evaluability Assessment; Accomplishments Assessment

The EM&V methods and approaches used in these two studies to arrive at the findings and conclusions summarized in this memorandum are shown in Table 3.

18 Pages 17-23, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016' and Page ES-4, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Table 3. Summary of EM&V Methodologies Used in the Two Studies[19]

EM&V Approach	ODC	Itron
Review of Program Records		
Annual Reports	All Programs	
Review Program Databases		RENs Single- and Multifamily Programs; SoCalREC
Ex Ante Savings Estimates - Review selected measures		RENs Single- and Multifamily Programs
In-Depth Staff Interviews	34	
REN Staff	24	
IOU Staff	10	
Internet Customer Surveys	105	
SoCalREN Public Agency Participants	28	
BayREN: residential customers who participated in Home Upgrade Advisor program	77	
BayREN Multifamily Whole Building Program Participants	43	

The key findings from the two EM&V studies are summarized in this memorandum and compared, where possible, to the planned goals and objectives for these RENs regarding budgets and expenditures, energy savings goals, cost-effectiveness, and non-resource accomplishments.

Assessing the RENs' Performance

The RENs' performance during the study period of PY2013-PY2014 based on their reported progress is summarized in this section. Where possible, it also includes metrics that have been independently verified in the EM&V studies. In this way, we are trying to address a key CPUC question of "*How are the RENs performing relative to their promised goals?"*

Program Expenditures

The REN budgets were revised several times during the 2013-2015 funding cycle. Initially, the budgets were based upon the PIPs that were subsequently reviewed and approved by the CPUC. Additional funding was provided for the PY2015 period as described in D.14-10-046. Some funds were carried over from PY2013 to PY2014 for a number of reasons. The evolution of the RENs budgets during this program funding period is summarized in Table 4.

[19] Pages 17-23, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016 and Page ES-4, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Table 4. Summary of 2013-2015 Program Year Budgets by REN

Total Budgets	Proposed Program Budget 2013-2014[20]	Approved 2013-2014 Budget[21]	Proposed 2015 Budget[22]	Approved 2015 Budget[23]	Total Three Year Approved Budgets
Bay Area Regional Energy Network (BayREN)	$26,567,750	$23,788,721	$11,930,137	$11,371,375	$35,160,096
Southern California Regional Energy Network (SoCalREN)	$43,300,329	$43,303,328	$31,069,012	$31,069,012	$74,372,340
Total	**$69,868,079**	**$67,092,049**	**$42,999,149**	**$42,440,387**	**$109,532,436**

The budgets for each REN by program are summarized in the following two tables.

Table 5. Summary of 2013-2015 BayREN Program Year Budgets by Program

Programs	2013–2014 Budget - Approved[24]	2013-2014 Actual[25]	Proposed 2015 Budget	Approved 2015 Budget[26]	Total Three Year Approved Budget[27]
Energy Upgrade Programs (2)	$16,293,750	$18,393,644	$11,317,486	$8,146,875	$24,440,625
Single Family	$9,000,000	$6,774,779	$4,840,886	$4,500,000	$13,500,000
Multifamily	$7,293,750	$11,618,865	$6,476,600	$3,646,875	$10,940,625
Codes and Standards (C&S)	$3,349,000	$2,761,418	$1,826,373	$1,274,500	$4,623,500
Single Family Loan Loss Reserve	$3,825,000	$2,633,659	$612,651	$1,550,000	$5,375,000
Multifamily Capital Advance	$2,000,000	$1,605,928	$0	$1,000,000	$3,000,000
PAYS® Water Efficiency Pilot	$650,000	$721,612	$361,146	$325,000	$975,000
Commercial PACE Administration and Marketing	$450,000	$306,119	$251,505	$225,000	$675,000
Total	**$22,742,750**	**$23,788,721**	**$13,756,510**	**$10,971,375**	**$33,714,125**

[20] Budget source downloaded from EESTATS. BayREN.Anuual. Excel. 2014.2 file.

[21] Page 9, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[22] Page 8, Advice Letter 3, 2013-2014 Budgets, March 26, 2014.

[23] Page 8, Advice Letter 3, 2013-2014 Budgets, March 26, 2014.

[24] Budget source downloaded from EESTATS. BayREN.Anuual. Excel.2014.2 file.

[25] BayREN 2014 annual report 2015_0414.xlsx as reported which includes the spending plus mid-cycle changes and rollover of funds.

[26] BayREN 2013-2015 funding allocation.xls, BayREN Program Summary Table 2015.

[27] Due to discrepancies in the budget amounts, the total approved budget reflects the total funding approved for the three-year period while the actual funding amounts during the two-year period may have fluctuated due to rollover and reallocation of funding.

Table 6. Summary of the 2013-2015 SoCalREN Budgets by Program

SoCalREN Programs	2013–2014 Budgets		Advice Letter 3 Budgets, March 26, 2014	
	2013–2014 Budget	2013-2014 Budget-Advice Letter 3, p. 8	2015 Budgets by Subprogram-from 2014 Advice Letter	Total Three Year Budgets
Energy Upgrade California -6 Programs	$21,155,103	$21,158,104	$13,727,651	$34,885,755
Multifamily	$9,543,801	$9,543,801	$5,342,790	$14,886,591
Single Family	$4,614,308	$4,616,309	$4,038,238	$8,654,547
Local Marketing and Outreach	$3,272,744	$3,273,744	$2,214,848	$5,488,592
Green Building Labeling	$2,010,000	$2,010,000	$1,005,000	$3,015,000
Contractor Training and Outreach	$1,014,250	$1,014,250	$776,906	$1,791,156
Low Income Single Family	$700,000	$700,000	$349,869	$1,049,869
Regional Energy Center	$16,586,726	$14,759,870	$11,612,400	$26,372,270
Financing – 3 programs	$5,558,500	$5,558,499	$3,902,476	$9,460,975
Single Family Loan Loss Reserve	$3,475,000	$3,475,000	$1,639,476	$5,114,476
Non-Residential Property Assessed Clean Energy (PACE)	$1,411,500	$1,411,500	$1,634,000	$3,045,500
Public Agency Financing Assistance	$672,000	$671,999	$629,000	$1,300,999
Water Energy Nexus	NA	$489,714	$265,735	$755,449
CEEPMS	NA	$1,037,141	$1,410,750	$2,447,891
Workforce Development	NA	$300,000	$150,000	$450,000
Total	**$43,300,329**	**$43,303,328**	**$31,069,012**	**$74,372,340**

The program budgets and expenditures by REN through 2014 based on the information provided in the January 2015 monthly reports are summarized in the following two tables and illustrated in the two accompanying figures.

Table 7. Summary of BayREN Program Budgets and Expenditures through 2014[28]

BayREN Programs	2013-2014 Adopted Program Budget	2015 Adopted Program Budget	2013-2015 Program Budget	2013-2015 Program Revised Budget	Program Expenditures (Inception-To-Date)	Percent of Budget Spent as of 12-31-2014
Single Family	$9,000,000	$4,473,249	$13,473,249	$14,192,951	$5,128,981	36%
Multifamily	$7,293,750	$6,476,600	$13,770,350	$13,770,350	$5,429,268	39%
Codes and Standards (C&S)	$3,349,000	$1,274,500	$4,623,500	$5,096,282	$2,841,568	56%
Financing	$6,925,000	$956,723	$7,881,723	$7,758,791	$1,161,539	15%
Total	**$26,567,750**	**$13,181,072**	**$39,748,822**	**$40,818,374**	**$14,561,356**	**36%**

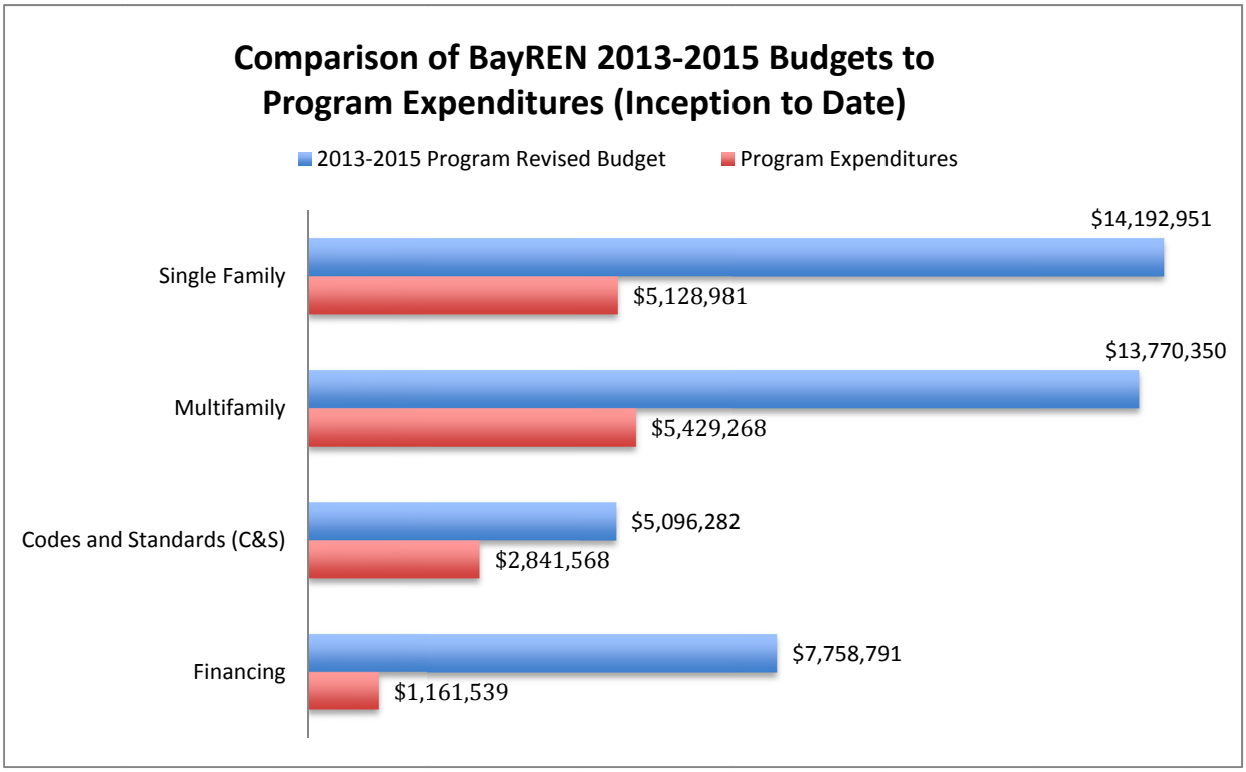

Figure 1: Comparison of BayREN 2013-2015 Budgets to Program Expenditures (Inception to Date)

28 BayREN 2013-2015 Monthly Energy Efficiency Program Report; Report Month: January 2015.

Table 8. Summary of SoCalREN Program Budgets and Expenditures through 2014[29]

SoCalREN Programs	2013-2014 Adopted Program Budget	2013-2015 Program Revised Budget	Program Expenditures (Inception-To-Date)	Percentage of Budget Spent as of 12-31-2014
Energy Upgrade California Programs	$28,943,939	$31,732,656	$12,016,532	38%
Financing	$15,175,000	$8,337,750	$2,864,336	34%
REC	$0.00	$24,347,086	$12,846,325	53%
Total	**$44,118,939.00**	**$64,417,492**	**$27,727,193**	**43%**

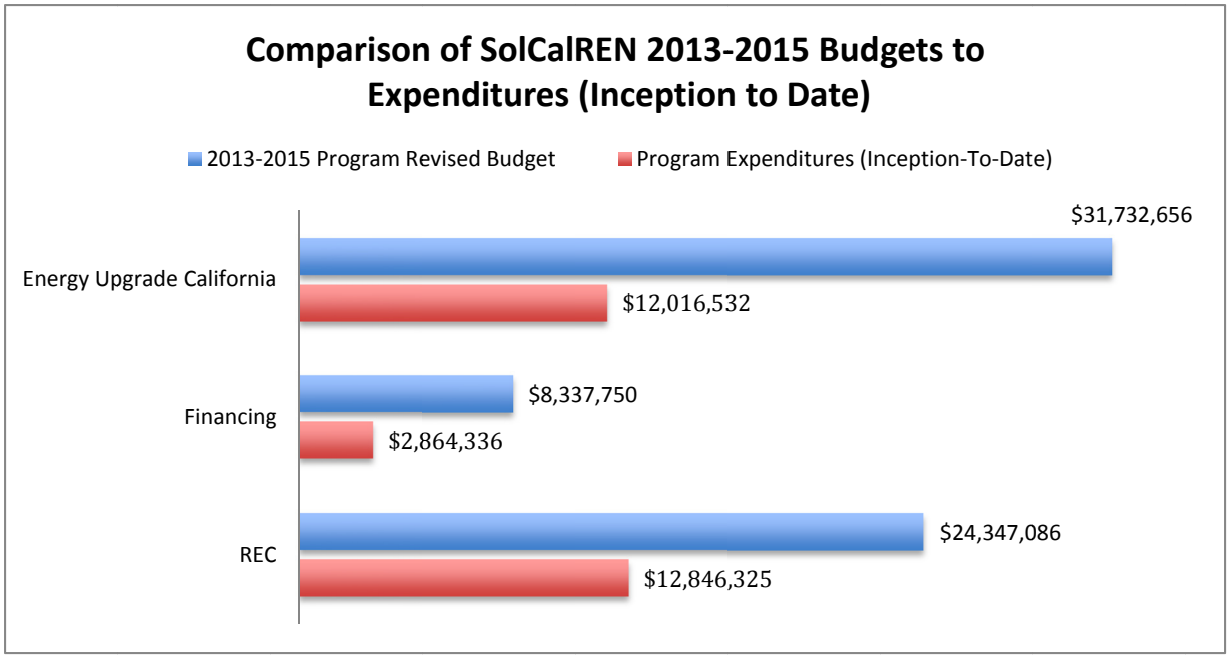

Figure 2: Comparison of SoCalREN 2013-2015 Budgets to Program Expenditures (Inception to Date)

According to the budget numbers provided by the RENs, annual spending amounts for these programs through PY2014 is one-third of the total amount budgeted for BayREN (36%) and less than one-half of the projected spending levels for SoCalREN (43%).

Energy Savings

The RENs were also required to deliver energy savings through their programs as described in their PIPs. The RENs progress to date on delivering on these "promised" energy savings is summarized in the Tables 9 and 10. These results are based on either the findings from the Itron report, or the self-reported estimates listed in the PY2014 annual reports.

[29] SoCalREN 2013-2015 Monthly Energy Efficiency Program Report, January, 2015.

Table 9. RENs Projected Savings Goals[30]

Program Administrator	2013-2014 Program Cycle			2015		
	Projected Energy Savings Goals (MWh)	Projected Demand Savings Goals (MW)	Projected Gas Savings Goals (Mtherms)	Projected Energy Savings Goals (MWh)	Projected Demand Savings Goals (MW)	Projected Gas Savings Goals (Mtherms)
Bay Area Regional Energy Network (BayREN)	13,249	9	931	1,747	4	223
Southern California Regional Energy Network (SoCalREN)	27,206	6	405	9,461	2	201
RENs Total	**40,455**	**15**	**1,336**	**11,208**	**6**	**424**

Table 10. BayREN and SoCalREN Multifamily Savings Goals and Self-Reported Accomplishments in 2013–2014[31]

BayREN Multifamily[32, 33]			
Savings Type (Annual Ex Ante Gross)	**Goal**	**Self-Reported Accomplishments in 2013–2014**	**Percent of Goal**
Gross Energy Savings (kWh)	409,591	1,672,439	408%
Peak Demand Savings (kW)	334	205	61%
Gas Savings (Therms)	44,885	171,940	383%
SoCalREN Home Upgrade			
Energy Savings (kWh)	2,335,784	87,817	4%
Peak Demand Savings (kW)	2,681	145	5%
Gas Savings (Therms)	164,629	12,056	7%

The energy goals reported by the RENs changed dramatically throughout the PY2013-2014 program period as the illustrated in the Tables 11 and 12.[34]

[30] Data taken from the California Energy Efficiency Website, August 2015. http://eestats.cpuc.ca.gov/Views/EEDataPortal.aspx/

[31] Pages 29-30, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[32] Page 31' Note: BayREN states these are gross values PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[33] EESTATS December 2014 Monthly Report, which are annual gross ex ante savings values.

[34] Note, this information was not available for the BayREN Codes and Standards Program and the SoCalREC Program.

Table 11. Evolution of BayREN Savings Goals During the PY2013-PY2014 Program Cycle

BayREN Resource Programs	Forecasted Savings[35]	Self-Reported Savings[36]	First Year Ex Ante Claimed Savings[37]
Single Family Program			
Gross Energy Savings (kWh)	2,128,378	229,438	188,323
Peak Demand Savings (kW)	3,438	402	289
Gas Savings (Therms)	293,803	77,582	49,105
Multifamily Program			
Gross Energy Savings (kWh)	1,365,019	3,402,220	1,590,268
Peak Demand Savings (kW)	1,111	382	198
Gas Savings (Therms)	152,850	259,397	169,808

Table 12. Evolution of SoCalREN Savings Goals During the PY2013-PY2014 Program Cycle

SoCalREN Resource Programs	Forecasted Savings[38]	Self-Reported Savings[39]	First Year Ex Ante Claimed Savings[40]
Energy Upgrade			
Gross Energy Savings (kWh)	8,599,784	749,595	466,269
Peak Demand Savings (kW)	4,038	3,066	215
Gas Savings (Therms)	433,909	21,233	25,931

For both RENs, the original savings goals that the RENs promised to deliver are significantly higher than what has been actually achieved based on the savings reported in the REN annual reports and in their tracking databases. These discrepancies are illustrated in Figure 3 by comparing the percentage of the forecasted energy savings goals to the savings claimed by the RENs as reported by Itron.

[35] Pages 4-5, BayREN PIP, September 18, 2013.

[36] BayREN Monthly Energy Efficiency Program Report, January 2015- Installed to Date.

[37] Page 2-9, Table 1-2, Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016. This table presents the first year gross ex ante savings values 2013-2014 for each program, by sector and measure group. This summary includes all measures for which there was an ex ante savings claim. Note, these are not evaluated savings estimates but are rather based on the information found in the REN database.

[38] Pages 3-5, SoCalREN PIP, August 6, 2013.

[39] SoCalREN Monthly Energy Efficiency Program Report, January 2015- Installed to Date monthly report.

[40] Page 2-9, Table 1-2, Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016. This table presents the first year gross ex ante savings values 2013-2014 for each program, by sector and measure group. This summary includes all measures for which there was an ex ante savings claim. Note, these are not evaluated savings estimates but are rather based on the information found in the REN database.

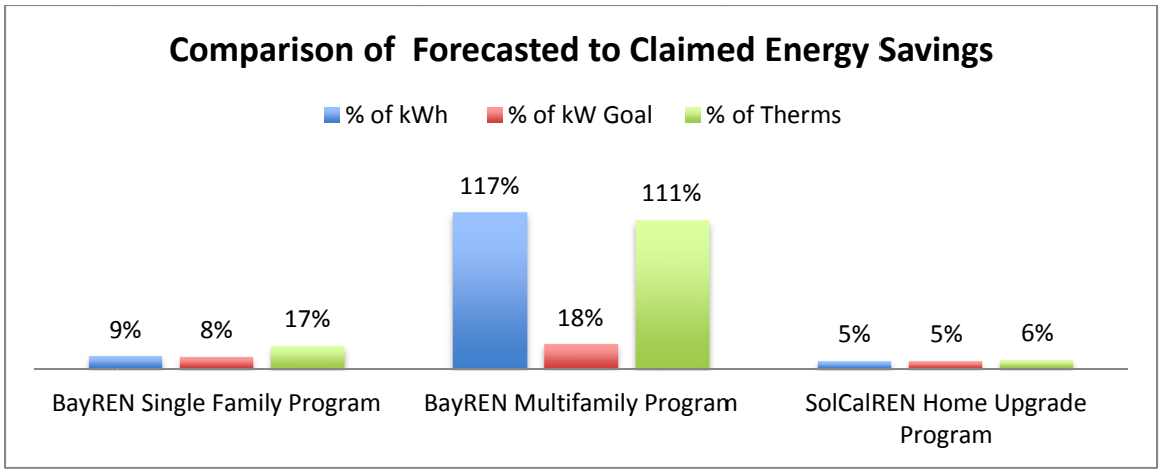

Figure 3. Comparison of Forecasted to First Year Ex Ante Claimed Savings by REN Program

The discrepancy between the original forecasted goals and the savings reported in the REN annual reports is illustrated in Figure 4.

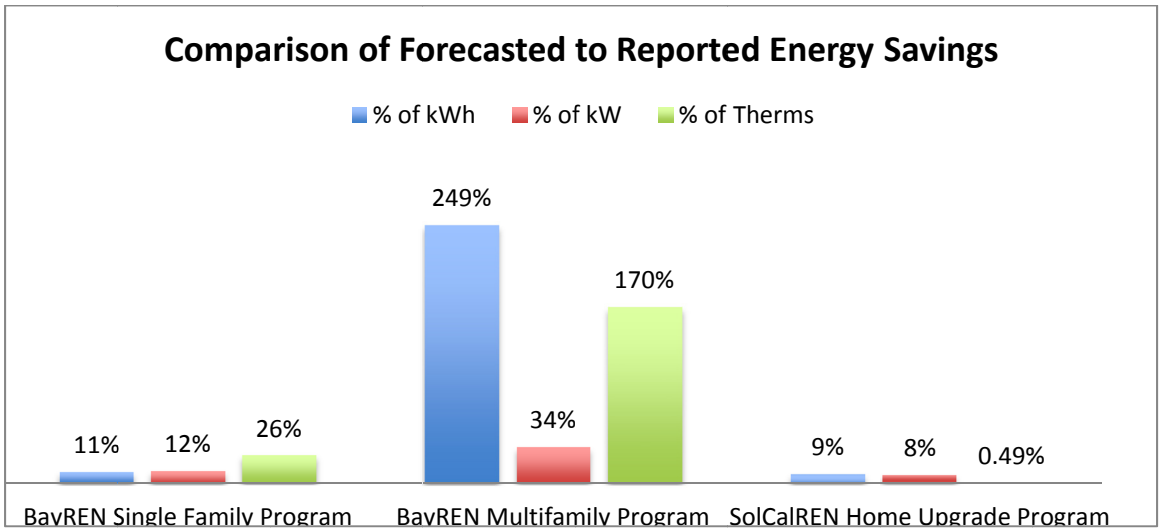

Figure 4. Comparison of Forecasted to Reported Energy Savings by REN Program

The findings illustrated in these two figures show the BayREN multifamily program is the only one that is consistently exceeding its kWh and therm goals. However, none of the REN programs is meeting its kW targets. Lastly, even by the RENs' own internal tracking, the single family programs offered through the RENs fall well short of their original savings forecasts.

Itron also identified some differences between the numbers the RENs self-reported findings and Itron's evaluated savings estimates for the multifamily programs. Itron calculated the net-to-gross values only for BayREN's multifamily measures (see Table 13).[41] This analysis determined that the ex post NTGRs

[41] The SoCalREN multifamily program had only two unique participants. These small populations were not considered large enough to provide a reliable net-to-gross ratio (NTGR). Furthermore, there was no existing NTGR algorithm or survey battery for single family Home Upgrade participants for this study to utilize, so this program was not evaluated either for NTGRs.

were lower than expected with ex ante estimates as follows: BayREN multifamily ex post NTGRs of 0.58 compared to the ex ante NTGR of 0.85.[42]

As explained more fully in the Itron report, the net realization rates are based only on the ratio of ex post to ex ante NTGRs or rather the ratio of what the RENs claimed to the actual savings determined through the impact assessment.

Table 13. Comparison Between Reported Versus Evaluated 2013-2014 Net Lifecycle Savings with Net Realization Rates[43]

Program Name	Self-Reported Net Lifecycle			Evaluated Net Lifecycle			Net Realization Rates		
	MW	GWh	MM-Therms	MW	GWh	MM-Therms	MW	GWh	MM-Therms
BayREN-Single Family	5.7	1.8	0.7	5.7	1.8	0.7	100%	100%	100%
BayREN-Multifamily	3	24.3	2.6	2.1	16.6	1.8	68%	68%	68%
SoCalREN-Single Family	-0.4	-1.9	-0.4	1.4	0.9	0.2	-342%	-49%	-45%
SoCalREN-Multifamily	0.4	2.6	0	0.4	2.6	0	100%	100%	100%

But Itron qualified its savings estimates as follows: *"Although this evaluation did not update gross savings values for the RENs' multifamily measures, there is not a high level of confidence in the reliability of these values either."*[44] The reasons cited by Itron, and described more fully in the report, included finding discrepancies between claimed and expected savings values; determining that more than 25% of the reviewed projects had significant discrepancies regarding the first year savings to annual bill ratio; and the baseline analysis indicated that while the programs claimed 100% early replacement, participant survey responses indicated that this was not the case.

Itron further explains that the negative realization rates for SoCalREN single family measures were because incorrect values were used to calculate energy savings. Itron corrected these errors. However, Itron also noted that the realization rates and free ridership rates are in line with what is typically seen in similar IOU program evaluations.

Cost-Effectiveness

Although the RENs were not required to be cost-effective,[45] the CPUC did require the RENs to calculate and report their cost-effectiveness results for their programs. These results are summarized in Table 14.

[42] Page ES-10. 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

[43] Page ES-10, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

[44] Itron listed the several why there was not a high degree of confidence in the reliability of the values for the multifamily measures which are explained in the report at page ES-9.

[45] Page 125, D.14-10-046.

Table 14. Self-Reported Cost-Effectiveness Results for BayREN and SoCalREN[46]

2014 Annual Results	TRC Ratio	PAC Ratio
BayREN	0.30	0.36
SoCalREN	-0.07	-0.08

Itron also calculated the TRC and PAC ratios for the selected programs it reviewed in the impact assessment. These results are summarized and compared to the estimates provided by the RENs for these programs in Table 15.

Table 15. Comparison of Projected, Reported and Evaluated TRC and PAC Ratios for the 2013-2014 Program Period

Program Name	TRC Ratios			PAC Ratios		
	Projected	Self-Reported	Evaluated	Projected	Reported	Evaluated
BayREN-Single Family	0.56	0.05	0.05	1.29	0.06	0.06
BayREN-Multifamily	0.67	0.39	0.28	0.97	0.44	0.30
SoCalREN-All*	0.74 (elec) 0.51 (gas)	(0.04)	0.02	1.26 (elec) 0.79 (gas)	(0.04)	0.03

*SoCalREN projected separate TRC and PAC Ratios for gas and electric fuels.

In addition, Itron qualified a number of cost-effectiveness estimates for the REN single family measures. The inconsistencies between the RENs and IOUs made it difficult to assess the reliability of the current savings values. SoCalREN also used a previous version of the Energy Upgrade California (EUCA) calculator, which incorrectly resulted in lifecycle savings being highly negative for a number of measures (i.e., the savings claim indicated an increase in usage as a result of the installed measures). This error affected the program level lifecycle saving calculations, which in turn caused TRC and PAC ratios to also be negative.[47]

Itron also pointed out that although the BayREN multifamily program's TRC and PAC are also significantly below 1.0, they are in line with the IOUs' programs. Since the IOUs do not differentiate the costs for their single family Home Upgrade and multifamily Whole Building programs, TRCs cannot be developed separately for single family and multifamily components. Similarly, costs were not broken out by single family and multifamily measures for SoCalREN so only one overall result was developed.[48]

The REN and IOU Home Upgrade and Whole Building programs all have TRCs in the range of 0.02 to 0.21. The SoCalREN program (primarily composed of single family home upgrades), and the BayREN single family program have TRC and PAC values that are near zero and which are significantly lower than the other IOU programs.[49]

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46 Page 14, BayREN2014 Annual Report & Table 4, SoCalREN Annual Excel 2015.

47 Page ES-10, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

48 Page 6-2, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

49 Page ES-13, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Since the BayREN single family savings values are all ex ante pass through, that is values that do not affect the cost-effectiveness calculations, so the evaluated TRC and PAC values are the same as the reported values. Furthermore, the corrected SoCalREN savings values for single family have resulted in positive TRC and PAC values. Since 2013 was a startup year, the TRC and PAC ratios were only calculated for the 2014 program year.[50]

Comparing RENs to IOUs Quantitatively

Itron sought to compare the REN programs' participation levels, savings values, and resulting TRC and PAC ratios with similar IOU programs. However, Itron had difficulty identifying a sufficient number of similar IOU programs that would make for a fair comparison since the REN programs have so many non-resource activities as part of their program delivery. Itron did identify a few IOU programs that offer a similar measure mix to a comparable customer class. Although the IOU programs may not have the same emphasis on marketing, outreach, education and other non-resource activities, the analysis still provided a useful perspective on the performance of the REN programs in terms of both the magnitude of participants and savings and on cost effectiveness as Itron explained in its report.[51] These comparisons are illustrated in Table 16.

Table 16. Comparison of 2013-14 Savings and Cost-Effectiveness among REN and IOU Home Upgrade and Multifamily Whole Building Programs

Program Name	Number of Participants	Net Lifecycle Savings			Cost-Effectiveness	
		MW	GWh	MMTherms	TRC	PAC
BayREN-Single Family	684	5.7	1.8	0.7	0.05	0.06
BayREN-Multifamily	95	2.1	16.6	1.8	0.28	0.3
SoCalREN-Single Family	120	1.4	0.9	0.2	0.02*	0.03*
SoCalREN-Multifamily	2	0.4	2.6	0	0.02*	0.03*
PGE-Home Upgrade and MF Whole Building	4,931	86.7	66.7	15.3	0.23	0.83
SCE-Home Upgrade and MF Whole Building	1,700	29.9	22.8	2	0.21	0.35
SCG-Home Upgrade and MF Whole Building	2,669	0	11.6	4.7	0.24	0.48
SDGE-Home Upgrade and MF Whole Building	642	5.6	4	0.6	0.08	0.14

*The SoCalREN TRC and PAC are for their MFM and SFM claims combined. The program costs are not reported by multifamily versus single family in the tracking data, so calculating an individual TRC and PAC was not possible.

Comparing RENs to IOUs Qualitatively

ODC's Value and Effectiveness Study also made some comparisons regarding the program delivery for the three programs and identified the following key findings based on the feedback from the REN staff interviews:

- REN staff believes that the RENs' organizational structure and governance provide greater credibility, trust, and flexibility compared to the IOUs. For example, the RENs allow for regional

[50] Pages 6-2-6-3, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

[51] Page 6-4, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

resource sharing which allows local governments to save time and money by borrowing approaches or designs that other governments have developed and then customizing those resources to fit their needs.[52]

- REN and IOU program offerings are distinct and well defined despite areas of overlap**.**
    - Although customers for the Home Upgrade Offering fully overlap between the IOUs and the RENs, the RENs offer different services or higher levels of engagement to the same customers.[53] Both RENs help customers find the most appropriate program, as they refer customers to the Advanced Home Upgrade program when necessary.
    - Technical assistance through SoCALREC is another area of overlap between the SCE/SCG and REN services. Both SoCalREN and the IOU staff agree that their offerings are distinct in terms of the level of engagement involved.
    - Similarly, the RENs' and IOUs' Multifamily programs fully overlap in terms of customers, but offer slightly different program designs. Furthermore, SoCalREN and SCG offer services at multifamily sites in the same territory, and IOU account representatives market both programs to customers. But the programs offer different measures and have separate approaches to obtaining the final rating of the building.[54]

- Despite these areas of overlap, the REN staff believes they offer a higher level of customer support compared to the IOUs. For example, the RENs staff refers customers to a suite of complementary programs that may be relevant. Furthermore, ODC documented that the Home Upgrade Advisors program refers hundreds of customers throughout BayREN's territory to a wide variety of programs.[55]

Assessment of the RENs' Operational Characteristics

Based on its assessment of the three pilot programs, the Value and Effectiveness Study also provided some additional insights regarding RENs' operational capabilities.

Capacity Building

- The RENs help improve local government capacity building, but the full extent of this capacity building was not explored in the ODC study. Public Agency Program participants said that the RENs help with building capacity among their staff by increasing their staffs' ability to improve EE within municipal buildings. ODC also made the following additional observations:

    - The nature of the RENs' organizational and governance structure also builds capacity among local governments that administer the REN or implement REN activities.

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52 Pages 42-43, 47, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

53 SoCalREN offers Home Upgrade only to homeowners in LA County, while BayREN offers Home Upgrade to any homeowner in the entire BayREN region.

54 SoCalREN uses an open-rater model, whereas the IOUs assign a rater to the projects. The Consultant Team heard from the RENs that an open-rater model provides greater flexibility in the rater, but the Consultant Team did not verify that statement.

55 Pages 45-46, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

  - The BayREN PAYS also provides local governments with technical services, expertise, and resources, such as contract templates and marketing materials for water agencies.
  - As a new organization, BayREN has tested management structures that have been refined over time and initiated institutional changes within its member county lead agencies that appear to enhance the EE capacities at these local governments. However, the full extent of capacity change is not explored in this study.

- However, it is unclear whether that capacity would continue to exist without REN support. There is some evidence that capacity and internal knowledge would remain in place, in that the REN budget does not support dedicated local government staff positions. But without REN-supported consultants, the ability to perform EE-related actions may be reduced, the study concluded.[56]

Customer Satisfaction Levels

- RENs' program participants report high satisfaction levels across all three programs. The REN staff is effectively assisting participants in overcoming challenges they face in planning, procuring, and completing energy efficiency projects.[57]

  - Staff from the water agencies that BayREN served through the PAYS program reported high satisfaction, with all three rating BayREN's support as "very helpful."
  - Participants in the Home Upgrade Advisor and Public Agency programs provided high ratings for all the program elements examined in this study.[58]

Additional Benefits

Participants in the PAYS, Home Upgrade Advisor, and Public Agency Program programs indicated that they received substantial benefit from the RENs activities as illustrated in the two examples provided below:

- The BayREN Home Upgrade Advisor survey respondents listed several positive benefits of working with a Home Upgrade Advisor including high satisfaction with the home upgrade process (83%) and increased likelihood of performing a home upgrade (77%). Improved comfort and bill savings were the top benefits mentioned by the Home Upgrade program participants.

- Working with the Home Advisor made a difference for nearly two-thirds (64%) of the homeowners in encouraging them to either undertake or complete home upgrades or have increased knowledge and confidence in the decisions made regarding this home upgrade.[59]

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[56] Pages 55-56, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[57] Page 3, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[58] Page 64, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[59] Page 51, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

Scalability

- The Value and Effectiveness Study concluded that existing REN program offerings can be replicated and scaled up but new RENs may face difficulties and significant barriers to entry. Additional study insights include:
    - The management structures of the RENs allow for scaling up of existing small-scale efforts because they use consultants for program implementation. The RENs have demonstrated the management capability to oversee consultants; the RENs and their implementing consultants are performing well in the three studied programs.
    - The SoCalREN model may have a slight advantage over the BayREN model because of its fewer number of applicable decision makers, but both would potentially face challenges with oversight of a new program.
    - Since the existing RENs cover a large part of the IOU service territories, the primary geographic areas remaining within California to potentially establish a new REN would be within those areas defined by the central coast, the northern coast, the Sierra, the Central Valley, and San Diego County.
    - Additionally, the existing RENs indicated that any new REN would incur costs at several levels including start-up and the ongoing costs of program collaboration.[60]

Non-Resource Accomplishments

Since the RENs conduct non-resource programs, which may provide ancillary benefits to their customers, the value of these non-resource activities was evaluated in both studies. As Itron explained, "*The purpose of documenting the accomplishments of the non-resource program components is to identify the value these programs might have provided beyond the ex ante energy savings claims they have made.*" [61]

The Value and Effectiveness Study reviewed the accomplishments reported by the RENs in their annual reports. Next, the Itron Impact Assessment was able to verify a percentage of those accomplishments based on an independent review of program records in its program database.

Itron could independently verify less than one-half (47%) of the PPA program accomplishments and Itron could verify three-quarters (78%) of the additional program activity level metrics reported in the annual reports (see Table 17). Appendix A provides summary tables of these metrics for each REN program. This analysis suggests that the program databases do a better job of tracking specific program activities rather than documenting actual program achievements relative to goals.

[60] Page 76, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[61] Page 2-5, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Table 17. Comparison of Non-Resource Goals to Self-Reported and Verified Accomplishments

Performance Metric	BayREN	SoCalREN	Total
Total number of PPA metrics reported	21	9	30
Number reported and verified	9	5	14
% Verified	43%	56%	47%
Number Additional Metrics Reported in the 2015 Annual Report	12	28	40
Number of Additional Metrics Verified	9	22	31
% Verified	75%	79%	78%

But both ODC and Itron point out that while the non-resource databases provided by the RENs are generally collecting the necessary data to support future evaluations, the quality, consistency and usability of these data sources varied considerably.[62]

Influence of RENs on IOU Participation

For a select number of non-resource activities, Itron merged the related datasets to IOU program tracking data to determine if any non-resource program participants went on to participate in IOU programs. They also merged a sample of key non-resource tracking databases to IOU ex ante claim databases as a test to see if any IOU program participants were potentially influenced by the non-resource efforts. Since the number of records that merged to IOU program tracking data was similar to the number of participants participating in the REN programs, Itron concluded that REN non-resource activities have the potential to influence IOU participants.[63] But Itron also qualified this finding, stating, *"These activities likely have a negligible effect relative to the amount of participation occurring in the IOU programs that they may be influencing."*[64]

Assessment of the EM&V Studies

Areas of Agreement within the EM&V Studies

Although the studies had different objectives, there were several areas in which the two studies provided consistent findings.

- Both studies identified serious deficiencies in the current program databases and provided recommendations on ways in which to improve database tracking to better link program accomplishments to energy savings.[65] Itron provided 24 recommendations intended to improve data collection and tracking to allow for better estimates of energy savings.

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62 Page ES-17, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

63 For example, 734 single family site IDs in BayREN's Home Upgrade Advisor tracking data merged to PG&E's resource program tracking data. This compares to BayREN's 684 participants in their single family program.

64 Pages ES-17, 7-1, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

65 Page ES-4, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016 & Page 80, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

- Both studies found that the non-resource accomplishments have a positive impact on REN operations. The RENs programs provide a number of services that do not result in direct ex ante energy savings claims, but which may influence positive energy efficiency actions within the RENs programs, the IOU programs, or outside of an energy efficiency program. The majority of these activities reported in the REN annual reports were found to be reasonably reliable, and do not tend overstate what they achieved. [66] In addition, Itron was able to validate 47% of non-resource assessment findings reported in ODC's Value and Effectiveness Study.

Areas of Inconsistency

The two studies diverged in their characterization of the savings estimates, primarily because ODC relied on REN self-reported numbers while Itron conducted an independent analysis and verification of the savings estimates for the REN Single- and Multifamily programs.

- For example, ODC concluded that the BayREN Multifamily program performed well and achieved higher than expected savings, which one REN staff member attributed to the positive relationship between the REN and the local government.[67] However, this is based on qualitative findings only, and do not reflect the actual savings estimates.

- In contrast, the Itron study found that BayREN's Multifamily Program had a net realization rate of only 68% of its energy savings goals.[68] This finding is based on the actual review of savings estimates and therefore is considered to be a more reliable result.

Conclusions and Recommendations from the EM&V Studies

Both EM&V studies provided the following recommendations based on their evaluation of these REN programs.

Value

ODC's found several indicators that the RENs are providing value to the California energy efficiency community in the following ways:

- Offering new program designs, such as the PAYS and (SoCalREC) software packages;
- Supporting energy efficiency in hard-to-reach markets, specifically in the multifamily sector; and
- Providing beneficial technical expertise in BayREN Home Upgrade Advisor, SoCalREN Public Agency Program, and PAYS programs.[69]

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[66] Page ES-6, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

[67] Page 78, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[68] Page ES-10, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

[69] Pages 1-2, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

However, the RENs and IOUs disagree about the value of the RENs as the following two examples show. But ODC acknowledges that it has no strong evidence to support either position.

- The RENs believe that their relationships with local governments have a high level of credibility and trust that affords them better access to foster community collaboration than the IOUs that eventually leads to higher savings.
- The IOUs counter that the LGPs programs run by the IOUs have similar abilities.[70]

Effectiveness

ODC cited the following examples as evidence that the RENs are effective:

- Successfully navigated the CPUC regulatory environment and mitigated administrative challenges to bring their nearly $67-million-dollar portfolio of programs to fruition within 18 months;
- Responding well to management challenges; and
- Achieving high satisfaction ratings across the three different programs.[71]

Impact Assessment

Itron's report provided a total of 24 conclusions and recommendations to inform the RENs programs going forward. The major conclusions are:

- The current program databases are overstating savings estimates, which then lead to significant miscalculations of program cost-effectiveness, and free ridership rates. The Itron study found significant problems with the values provided, led to the miscalculation of first year and lifecycle savings values, and TRC and PAC ratios. A comparison between the tracking data and the monthly report (2013-2014 inception-to-date fields) revealed discrepancies in program expenditures, demand reduction, energy savings, and gas savings that varied from 1% to 87,540%.
- The gross savings estimates for the REN programs were significantly overstated.
- The study found significantly different net-to-gross ratio (NTGR) for the BayREN program.
- This impact assessment did not fully capture the influence from the REN programs or actions taken outside of an energy efficiency program.[72]
- The evaluators identified a number of reasons for these errors including using inconsistent calculations from individual program worksheets and a lack of collaboration among key stakeholders and partners.

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[70] Page 78, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[71] Page 3, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[72] Pages E-4, E-6, 5-8, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Recommendations from EM&V Studies

The major recommendations from both studies are summarized next. ODC based its recommendations on its qualitative assessment of REN activities while Itron arrived at its recommendations based on a review of current savings assumptions and values used to calculated cost-effectiveness.

ODC recommended that the RENs should continue because of the value that they demonstrate to their constituencies in several important areas: technical expertise, targeting hard-to-reach markets, and linkages with other utility offerings.
While ODC provided several examples of the value that the RENs offer to the California Energy Efficiency Community, the evaluators did observe, "*However, this study is indeterminate on whether the RENs should continue as program administrators in either a probationary or a permanent status.*"[73]

ODC also recommended that the RENs maintain their new programs and document customer response. These new programs provide value in the form of new technologies and savings via a water-energy nexus, even though both programs have low participation rates.

Itron determined that both the RENs and the IOUs need to improve the data collection and tracking of key pilot methods to improve quality of data needed to document program progress and determine energy savings and cost-effectiveness.[74]
Itron provided specific recommendations to improve the quality of the ex ante data reported to the CPUC by strengthening reporting requirements, requiring additional standardization, gathering more detailed information and working together collaboratively.

Itron recommended that the RENs and IOUs collaborate and agree on consistent methods to estimate savings for similar multifamily measures.

The RENs should consider tracking the costs associated with any non-resource activities that do not directly benefit the resource elements of their programs to support a more accurate calculation of cost effectiveness.

The RENs should consider reviewing the structure, format, and contents of their databases to improve consistency and usability; developing a data dictionary documenting variable names (with the exception of SoCalREN, who provided data dictionaries with all provided datasets); and documenting calculations.

Both evaluations recommended conducting additional studies to more fully understand the effects of issues identified in these two EM&V Reports.[75]
ODC suggested that future studies systematically gather additional data specific to customer and contractor confusion before drawing conclusions about RENs contributing to market confusion.

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[73] Page 80, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016.

[74] Page 80, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016 and Pages E-4, 4-54-4-56, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

[75] Pages 80-81, PY2013-2014 Value and Effectiveness Study Final Report, Opinion Dynamics Corporation, January 6, 2016 and Pages E-8, 2013-14 Regional Energy Networks and Community Choice Aggregator Programs Impact Assessment Final Report, Itron, Apex Analytics & DNV-GL, January 8, 2016.

Itron recommended that future REN evaluations replicate the non-resource assessment verification analysis with additional program years and non-resource databases and attempt an attribution analysis in order to quantify the benefits of the non-resource activities.

ED EM&V Advisor Conclusions and Recommendations

While both EM&V studies addressed the RENs, neither study offered definitive recommendations on steps the CPUC should take with regard to the next chapter of the RENs. The ODC study suggested that the RENs provide some benefit, but the study was limited to only three of the 17 REN programs. Moreover, many of their conclusions were based on self-reported information from REN program staff that could not be independently verified. The Itron study identified some significant tracking issues that will result in significant reductions in energy savings for some REN programs.

Specifically, the findings from these two studies suggest that the BayREN multifamily program has made significant progress to date relative to its forecasted goals for both its kilowatt hour (kWh) and therm projections. However, this preliminary finding should be verified in the upcoming impact evaluations.

In addition, the RENs also need to reassess the value of the information reported for non-resource programs. The value of the metrics currently tracked for non-resource programs is questionable as they are not linked directly back to specific program goals. Therefore, the future process evaluations should include recommendations on ways to streamline and improve the quality of the information reported in the program databases to ensure that the full value of these non-resource programs is reported appropriately.

There are several related studies currently underway may provide additional information to guide the CPUC in determining appropriate next steps for the RENs. Therefore, drawing more meaningful conclusions about the status of the RENs and their future seems premature at this point. Unfortunately, neither study can provide a clear answer to the question now before the CPUC: *What's next for the RENs?* The Commission should continue the programs subject to implementation of the recommended improvements in the reports and continue to review their performance through the planned studies.

(END OF ATTACHMENT C)