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BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Application of Southern California Edison Company (U338E) for Approval of its 2009-2011 Energy Efficiency Program Plans And Associated Public Goods Charge (PGC) And Procurement Funding Requests.	Application 08-07-021 (Filed July 21, 2008)
And related matters.	Application 08-07-022 Application 08-07-023 Application 08-07-031 (Filed July 21, 2008)

AMENDMENT TO COMMENTS OF THE UTILITY REFORM NETWORK ON THE JOINT UTILITIES' REVISED SHOWINGS OF MARCH 2, 2009

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On April 23, 2009, The Utility Reform Network (TURN) received permission from Administrative Law Judge David Gamson to file and serve an amended version of the *Comments of The Utility Reform Network on the Joint Utilities' Revised Showings of March 2, 2009* that had been filed and served on April 17, 2009. The Amended Comments were served on all persons on the service list for these consolidated applications on Tuesday, April 21, 2009, in both an "annotated" version that shows the changes made to the text and tables and a "clean" version (with the changes incorporated without identification). TURN is filing only the "clean" version of the Amended Comments with the changes incorporated without identification. The attachments that had been included with the original filed version have not changed. Due to service problems caused by attaching them to the comments served April 17, 2009, TURN is not including them with the Amended Comments, but is making them available to anyone that requests a copy.

AMENDED COMMENTS OF THE UTILITY REFORM NETWORK ON THE JOINT UTILITIES' REVISED SHOWINGS OF MARCH 2, 2009

I. Introduction

A. Overview

In July 2008, each of the four major energy investor-owned utilities[1] unveiled its application for energy efficiency programs for the 2009-2011 program cycle. As was immediately clear to almost everyone involved in the process,[2] these applications were both not in compliance with numerous directives from various Commission decisions and rulings, and incomplete in important regards. Another eight months passed before the "revised" applications were filed and served; even then, the revised IOU showings were missing key information. To further complicate matters, the IOUs used their applications as vehicles to seek substantial "policy" changes that would severely impact many of the underlying directives and requirements embodied in prior Commission decisions and rulings. If the resolution on these requests creates any substantial change to rules and practices put in place to guide the development and review of the proposed portfolios, it may well be that another iteration of revised applications and testimony lurks in the near future.

It is against this backdrop that The Utility Reform Network (TURN) submits these comments on the re-filed applications. Based on the information that was

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[1] Pacific Gas and Electric Company (PG&E), San Diego Gas & Electric Company (SDG&E), Southern California Edison Company (Edison or SCE) and Southern California Gas Company (SoCalGas) (hereinafter referred to collectively as the "IOUs").

[2] The IOUs continued to assert that their initial applications were adequate (in their reply to the initial comments and protests of the applications). At the second prehearing conference the IOUs accepted the need for their applications to be re-filed. *Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judge Determining the Scope, Schedule, and Need for Hearing in This Proceeding* ("Scoping Memo"), November 25, 2008, p. 3.

accessible in the revised utility testimony and workpapers,[3] and that has been provided in the data request responses received to date, TURN has performed an initial review of the applications and utility proposals therein. The results of this initial review include some fairly detailed criticisms and recommendations with regard to portions of the proposed portfolios, and a number of more general comments in areas that we likely will continue to flesh out as the process continues. In considering these comments, it is important for the Commission to keep in mind that after it took the IOUs more than half a year to make the revisions necessary to permit a meaningful review of the proposals, TURN and the other non-utility parties have had the revised proposals for a matter of weeks.

TURN's comments first discuss concerns about where the process stands today, and the dimming prospects for implementing effective utility portfolios that will contribute to achieving California's ambitious energy efficiency goals. TURN then addresses in some detail specific elements of the IOUs' program proposals, such as the inappropriate continuing reliance on compact fluorescent lamps (CFLs) despite the clear evidence of successful market transformation and clear Commission discouragement of this approach. TURN also discusses some of the problems the IOUs' treatment of administrative and general (A&G) costs present in terms of understanding the full costs of the proposed programs, the true cost-effectiveness of the programs, and the risk that

[3] In a number of instances, TURN's consultants found that spreadsheets and other tables had been prepared in such a way as to limit the use of the tables, primarily with cells that had only a numerical value, but lacked the underlying function (that is, were hard-wired so they provided only a number). It's worth remembering that the IOUs had to take extra steps to transform working tables (with embedded, functioning equations) into tables with numbers and nothing else. And in doing so, the IOUs ensured interested parties would have to either devote time and effort to transform such values-only tables back into functioning versions that permit more meaningful analysis, or ask for the original versions and await their arrival from the utility. The need to re-construct or request working versions of these workpapers and tables from the IOUs has inhibited the review of the revised applications.

the growth in program costs means less for achieving ambitious energy efficiency goals and more for additional utility profits (above and beyond the "earnings" attained under any energy efficiency shareholder incentive mechanism).

B. Perhaps The Most Important Question the Commission Faces At This Juncture Is How It Will Resolve The Growing Tension Between "Getting It Right" and "Getting It Done" For The 2009-2011 Portfolios.

The Commission finds itself in a box that's partly of its own making. Since at least early 2007[4], various rulings and decisions have provided detailed guidance as to what the agency expected and required from the IOUs in their proposals for a 2009-2011 energy efficiency portfolio. The IOUs' first attempt fell far short – before even considering the merits of any of the specific proposals set forth in those applications, the Commission had to deal with substantial questions about the completeness of the showing and its compliance (or lack thereof) with the earlier directives. Seven months later, the "revised" applications address some of the concerns raised in response to the initial applications, but in important regards continue to fall short of what the Commission reasonably expected from the utilities. If one were to graph the progress achieved in the seven months between the initial and revised applications, and then extrapolate to predict the date by which a fully developed and compliant set of applications might reasonably be expected, the Commission would likely be looking at 2012 before it would have complete showings on the 2009-2011 portfolios.

The problem stems at least in part from the fact that the IOUs are well-positioned to get what they want if the clock runs out. After all, they are the only game in town when it comes to program administration for the 2009-2011 portfolios. Therefore, they

[4] "CPUC Staff Proposal for 2009-2011 Energy Efficiency Portfolio Development and Long-Term Efficiency Goals Update Process" (attached to "Notice of Prehearing Conference" issued February 16, 2007 in R.06-04-010).

have to understand at some level that with each passing week the Commission could be moving closer to a choice between letting the utilities do what they want to do or not having energy efficiency programs of the scale that the Commission needs to achieve its goals for California (not to mention to enable the agency to continue having bragging rights about its energy efficiency efforts).

If the Commission wants to short-circuit any such "run out the clock" strategy, it should signal very strongly that the IOUs' demonstrated ability (or lack thereof) to achieve compliance with decisions and directives concerning the 2009-2011 portfolios will be a central element in considering whether to move to an independent, non-utility administrator for whatever rate-funded energy efficiency efforts follow. The Commission has already warned the IOUs that what they do with the 2009-2011 portfolios may lose them their jobs as portfolio administrators. In D.08-07-047, issued in the Energy Efficiency Rulemaking, R.06-04-010, the Commission made clear, "We give notice that continued IOU program administration and funding is contingent upon the IOUs implementing expanded, integrated long-term energy efficiency activities as a key focus of their 2009-2011 program portfolios."[5] This principle should apply with equal force to the IOUs' willingness to comply with the Commission's other requirements for the 2009-2011 portfolios.

As for what to do with the 2009-2011 portfolios, the Commission needs to devote the time and resources necessary to carefully review the IOUs' proposals and the alternatives other interested parties will begin presenting in these initial comments on the revised IOU applications. Despite the track record to date, there seems to be a continuing commitment on the Commission's fifth floor to having a final decision issued by the end

[5] D.08-07-047, p. 31.

of this summer. At this point, meeting this commitment can only come at the price of sacrificing meaningful review of the utilities' applications and proposals. The Commission must recognize this is a trade-off it must avoid making. The stakes are simply too high. Consider the dollar impacts: The IOUs' proposed portfolios come with a price tag exceeding $4 billion over a three-year period. Even if the Commission were to rein in the proposed spending on CFL programs and substantially reduce the A&G costs, the price tag would still be several billion dollars. And it's not just about the dollars in this case – given the central role that the Commission would have utility-administered energy efficiency programs play in achieving California's energy efficiency goals and, by extension, greenhouse reduction goals, getting the programs "right" is far more important than getting the review and approval process "done."[6]

Furthermore, the initial, relatively cursory review of the IOUs' revised applications indicates that there is a lot of work ahead necessary to get the programs "right" such that they would be worthy of ratepayer funding. After all of the effort devoted to developing more ambitious energy efficiency goals and creating a full-blown strategic plan intended to move California toward achieving those goals, it is remarkable how much of the IOUs' approach for 2009-2011 can be summarized as "more of the same." The logic seems to be "if you liked what we did in 2006-2008 with $2.1 billion of ratepayer funds, you'll *love* it when we do more of the same to achieve 10% more savings at twice the cost." But if the Commission's decisions and directives of late have demonstrated anything, it is that the agency is <u>not</u> looking for "more of the same" (or, as

[6] For further discussion on this, TURN refers to an article written by Cynthia Mitchell, our principal consultant on energy efficiency matters, that was recently published in Public Utilities Fortnightly: "Stabilizing California's Demand: The real reasons behind the state's energy savings" (March 2009 Public Utilities Fortnightly) (Attachment 1 to these comments).

the utilities propose, "way more of the same"). Perhaps the utilities have some deep-seated disagreement with the course the Commission has charted for California's energy efficiency efforts. Perhaps this is the natural result of placing energy efficiency and its emphasis on reducing energy consumption in the hands of multi-billion dollar companies that have spent decades learning how to encourage energy sales. Whatever the explanation, the Commission needs to recognize that the utility applications are not what California needs in order to make progress toward the energy future envisioned by the agency.

In sum, if the IOUs' revised applications represent the best the utilities can do, then it's time to find a different entity to administer energy efficiency. It would be incentive-based regulation at its finest: Clearly signal to the IOUs that continuing on their current trajectory for 2009-2011 will result in a new, non-utility approach to program administration in 2012, then see how the companies respond. The Scoping Memo declares such proposals off limits only for the 2009-2011portfolio period.[7] Should things continue along the tortuous path experienced to date, TURN may well urge the Commission to reconsider even this limited restriction, consistent with the warning leveled in D.08-07-047.

II. Regulatory History / Background 2009 -2011 Portfolios

A. Regulatory context underlying the 2009-2011 Portfolio Applications

The Commission's review of the utilities' revised applications for 2009-2011 energy efficiency programs needs to keep in mind the context from which these

[7] Scoping Memorandum of November 25, 2008, pp. 11-12 ["The general question of whether the Utilities should continue to be the administrators of energy efficiency programs from 2009 through 2011 is not within the scope of this proceeding."]

applications emerged. The development of the principles the Commission wished to see reflected in these applications, and the goals it hoped the applications would help California attain, began to be laid out in early 2007, when the "CPUC Staff Proposal for 2009-2011 Energy Efficiency Portfolio Development and Long-Term Efficiency Goals Update Process" was first unveiled. The Staff Proposal reflected a thoughtful and honest reflection of the strengths and weaknesses of the current portfolios and portfolio administrative processes, as well as a realistic assessment of the resources available to staff and parties to devote to the ambitious agenda in that proceeding.

The issuance of the Staff Proposal began a process that continued for many months, through numerous workshops and rounds of comments. The mid-point product of this effort was D.07-10-032, a decision intended to create "a framework for sustainable EE and other demand-reducing programs and a process for accomplishing extensive EE savings through long-term strategic planning."[8] While D.07-10-032 was an ambitious and impressive statement in its own right, it really served more to pave the way for implementation of a "more integrative approach to program development and delivery [that] will permit California to take advantage of ever more cost-effective ways of implementing energy efficiency programs."[9] To that end, it directed the utilities to develop a strategic plan, a "key tool to implement this strategic approach" that would enable California "to move beyond a narrow focus on achieving short-term savings through a broader strategic focus on long-term goals."[10] As a mark of its ambition, D.07-

[8] D.07-10-032, p. 4.
[9] *Id.* at 5.
[10] *Id.*

10-032 included 45 individual ordering paragraphs, far more than is usually the case even in complex PUC proceedings.[11]

After the issuance of D.07-10-032, there ensued another round of workshops and comments intended to assist the IOUs in developing a long-term strategic plan for California. The IOUs attempts to develop and present such a plan culminated in the filing of A.08-06-004, an application presenting their version of the California Energy Efficiency Strategic Plant (CEESP). Rather than move forward with a review of the utility-developed CEESP, the Commission opened a new rulemaking (R.08-07-011) that incorporated the previous efforts into a Commission-approved plan, adopted "on behalf of the state of California."[12]

B. Overview July 21, 2008 Applications

The IOUs filed applications on July 21, 2008 with their proposals for energy efficiency portfolios for the 2009-2011 program cycle, seeking approximately $3.7 billion of funding during the three-year period (an increase of some 80% over the spending for the previous three-year cycle). As is more fully described in the joint protest TURN filed with the Division of Ratepayer Advocates (DRA),[13] there were two foundational issues that rendered these applications so flawed that they could not be meaningfully analyzed without substantial modification and amendment. First, the data and analysis that was presented to support the proposals were of such poor quality that it was often exceedingly difficult to ascertain what the utilities proposed to spend the nearly

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[11] For example, D.09-03-025, the final decision in the recently concluded 2009 test year GRC for SCE, contains 29 individual ordering paragraphs.
[12] D.08-09-040 (in R.08-07-011), p. 6.
[13] "Initial Protest of the Division of Ratepayer Advocates and The Utility Reform Network to the 2009-2011 Energy Efficiency Applications [of the IOUs]" filed August 28, 2008 (hereinafter referred to as "Initial DRA/TURN Protest").

$4 billion on during the three year period, much less whether such proposals were reasonable. This shortcoming was particularly frustrating for the non-program spending such as the overhead and other costs generally described as "administrative and general" (A&G) spending. Reviewing the original applications and supporting materials, it was impossible to assess how much of the requested $3.7 billion covered such activities, much less whether such spending was reasonable under the circumstances. While the IOUs included a specific budget line item of "Overhead and A&G" in their applications totaling over 40% of the total program budgets, DRA and TURN questioned whether the actual figure was even higher, since additional A&G costs seemed embedded in the costs attributed to specific programs.[14]

Second, the IOUs failed to highlight the type and number of new innovative approaches or programs that might have achieved compliance with the Commission's directives in D.07-10-032 and the strategic plan development process. Instead, the utilities devoted more effort to seeking modifications (under the rubric of "policy changes") that would, all things being equal, increase incentives even if the applications offered no increase in incremental energy efficiency savings. For all the time and effort devoted to describing the need for innovation and encouraging big, bold thinking in

[14] This explains why the DRA and TURN Protest called for, at a minimum, requiring that the IOUs identify their projected A&G costs with sufficient specificity to enable the Commission to determine whether they are allowable costs per the ALJ's February 21, 2006 Ruling on Reporting Requirements (R.01-08-028). This Ruling in part requires the program administrators and program implementers to allocate and report expenditures properly to each of the expenditure categories under the Ruling's adopted reporting requirements. Per Attachment A of the Ruling, Section 3 Expenditures are broken down by Administrative Cost, Marketing / Advertising / Outreach Costs, Direct Implementation, and EM&V (see page A-6). Per the Appendix to the Ruling "Allowable Costs" the budget/cost items listed are the only costs that can be claimed for rate recovery. If there are additional A&G costs related to administering the IOU Core Programs, LGPs, or 3Ps, or A&G costs included in the "Incentives / Rebates" budget category, that data and information must also be provided.

program development and design, the proposed portfolios really only offered more of the same. If the Commission were looking for a continuation of programs that during the 2006-2008 cycle started off relying heavily on CFLs, then saw that reliance keep growing during the three-year period, the IOUs' original applications might have fit the bill.

In sum, the DRA and TURN Protest urged the Commission to direct the IOUs to provide the quality of information necessary to permit the meaningful review and evaluation of the proposed energy efficiency spending for the 2009-2011 portfolios. The fact that the spending was labeled "energy efficiency" did not change the fundamental requirements that only reasonable costs are eligible for inclusion in rates, and that the utilities bear the burden of presenting evidence that permits the Commission to assess the reasonableness of the proposed spending.

C. Post-Application Rulings and Directives

In two rulings issued since the IOUs filed their original applications, the assigned Commissioner and ALJ have sought to highlight some of the deficiencies in those versions of the utility proposals.

According to the Assigned Commissioner's and Administrative Law Judge's Ruling Requiring Supplemental Filings, issued October 30, 2008:

> It is imperative that the 2009-2011 portfolios achieve cost-effective energy savings and lay a solid foundation and path for the 2020 goal. This requires a careful weighing of short-term savings versus longer-term benefits and certainty versus innovation. <u>It also requires that this Commission ensure that the utilities achieve their goals cost-effectively by minimizing administrative costs, ensuring rapid turn over of ineffective programs and measures, and increased use of statewide programs to achieve economies of scale</u>.[15]

[15] October 30, 2008 Ruling in A.08-07-021, p. 4 [emphasis added].

The Ruling went on to detail 11 categories of modifications "required to produce applications that adhere to applicable Decisions and Rulings, provide sufficient information to assess the merits of the individual programs and portfolios as a whole, and adequately and accurately reflect policy direction from the Commission."[16] The necessary modifications ranged from something as straightforward as using the most recently updated DEER values,[17] to addressing specific concerns in the E3 Cost-Effectiveness Calculator Output files and presenting accurate and consistent data in the energy savings and budget tables, and providing sufficiently detailed budget information that would allow closer review of administrative, overhead, and other non-program costs, including a "clear explanation of and justification for the unreasonably high administrative costs of these programs."[18]

The December 12, 2008 Assigned Commissioner and Administrative Law Judge's Ruling requiring additional information for the IOUs supplemental applications and testimony further pursued the need for more specific and clear information on the amounts of administrative costs included in those applications. The ruling also directed the utilities to "provide a narrative explanation for the high levels of administrative costs of their programs, after having explored every opportunity to reduce those costs."[19]

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[16] *Id.*, at pp. 4-5.

[17] As the ruling explains, it's not as if this requirement caught the utilities by surprise: "The Commission has clearly and repeatedly directed the IOUs to use the ex-ante values provided in the Database of Energy Efficiency Resources (DEER) for the purposes of filing energy efficiency portfolio plans and forecasting savings and other program impacts." In case anyone might dispute this assertion, the ruling goes on to cite D.05-04-051 as an early directive from the Commission to the utilities on the use of DEER values for energy efficiency portfolio filings, then highlights six subsequent decisions or rulings that reiterated this point. *Id.*, at 5.

[18] *Id.* at 12.

[19] December 12, 2008 Ruling, p. 4 (Ruling §¶

III. Initial Analysis of March 2, 2009 Amended and Revised Applications

A. The IOUs' $4.2 Billion Proposed Budget Remains Unjustified.

TURN TABLE 1
Comparison 2006-2008 Authorized Portfolio Budgets to
IOUs' 2009-2011 Compliance & Utility Preferred Portfolio Budgets

	Authorized 2006-2008 Portfolio Budgets*	IOUs' 2009-2011 Compliance Portfolio Budgets**	% Increase 2006-2008 to 2009-2011	IOUs' 2009-2011 Preferred Portfolio Budgets**
PG&E	$928,191,020	$1,802,923,351	94%	$1,802,923,351
SCE	$722,070,238	$1,343,679,000	86%	$1,343,679,000
SDG&E	$257,540,565	$514,097,214	100%	$321,618,963
SCG	$168,921,633	$541,927,474	221%	$273,264,897
TOTAL	$2,076,723,456	$4,202,627,039	102%	$3,741,486,211

*per D.05-09-043 September 22, 2005, Interim Opinion: EE Portfolio Plans and Program Funding Levels for 2006-2008 – Phase 1 Issues; grossed up by 1.07 to reflect EM&V costs

Source: All March 2009 budgets taken from Table 4.2 of IOUs' Compliance Tables

This proposed doubling of the portfolio budget is not commensurate with the rather modest increase on a net basis in the 2009 -2011 EE goals of 10.3% (06-08 total 6812 GWh to 09-11 total 7516 GWh). And with the shift in defining EE goals for 2009-2011 as gross rather than net for purposes of the MPS (as adopted in D.08-07-047), the IOUs actually face significantly lower goals in 09-11 than they did 06-08.

TURN TABLE 2

COMPARISION OF THE IOUs' JULY 2008 APPLICATION AND MARCH 2009 AMENDED APPLICATION 2009-2011 PROPOSED BUDGETS ($ millions)

	PG&E				SCE				SDG&E				SoCalGas				IOUs TOTAL			
	7/8/2008*		9-Mar		8-Jul		9-Mar		8-Jul		9-Mar		8-Jul		9-Mar		8-Jul		9-Mar	
TOTAL BUDGET	$1,873	% T	$1,803	% T	$1,344	% T	$1,344	% T	$280	% T	$514	% T	$237	% T	$542	% T	$3,733	% T	$4,203	% T
Budget by Spending Category																				
Overhead, General & Administrative Costs	**$778**	**42%**	**$271**	**15%**	**$574**	**43%**	**$151**	**11%**	**$159**	**57%**	**$68**	**13%**	**$134**	**56%**	**$46**	**9%**	**$1,645**	**44%**	**$537**	**13%**
Marketing & Outreach			**$154**	**9%**			**$61**	**5%**			**$44**	**8%**			**$27**	**5%**			**$285**	**7%**
EM&V	$123	7%	$134	7%	$88	7%	$90	7%	$18	6%	$41	8%	$16	7%	$43	8%	$245	7%	$308	7%
Direct Implementation	$625	33%	$1,244	69%	$681	51%	$1,042	78%	$103	37%	$361	70%	$87	37%	$425	78%	$1,497	40%	$3,073	73%
Rebates and incentives	$381	20%	$582	32%	$450	33%	$424	32%	$72	26%	$208	40%	$79	33%	$331	61%	$982	26%	$1,545	37%
Upstream Payments	$181	10%	$2	0%	$101	8%	$144	11%	$16	6%	$32	6%	$0	0%	$0	0%	$299	8%	$178	4%
Subtotal REBATES,INCENTIVES, UPSTREAM	**$562**	**30%**	**$584**	**32%**	**$551**	**41%**	**$568**	**42%**	**$88**	**32%**	**$240**	**47%**	**$79**	**33%**	**$331**	**61%**	**$1,281**	**34%**	**$1,723**	**41%**
Direct Install Labor, Materials, Activity	$63	3%	$609	34%	$130	10%	$464	34%	$15	5%	$116	23%	$8	3%	$87	16%	$216	6%	$1,276	30%
Rebate Processing & Inspection			**$51**	**3%**			**$11**	**1%**			**$6**	**1%**			**$7**	**1%**			**$74**	**2%**
TOTAL	$1,526	82%	$1,803	100%	$1,344	100%	$1,344	100%	$280	100%	$514	100%	$237	100%	$542	100%	$3,387	91%	$4,203	100%

* PG&E did not provide a figure in the E3 export file for its portfolio's EM&V budget. The EM&V budget figure is taken from Table 3-1 of PG&E's testimony. The total budget for PG&E's portfolio (top row "TOTAL BUDGET") is more than the sum of its budgets for Administrative Costs, Direct Implemenation, and EM&V (bottom row "TOTAL"). The 2008 percent breakdown for PG&E does not, therefore, add to 100% (it is the sum of the Administrative Costs, EM&V, and Direct Implementation categories). The IOU total column is derived from the sum of figures for the four utilities, and so the IOU % totals for July 2008 filings do not add to 100% either.

Source : March 2009 data - Table 4.2 of IOUs Compliance Tables: Compliance Scenario; July 2008 data - DRA / TURN August 28, 2008 Protest

TURN Table 2 "Analysis of the IOU's July 2008 Application and March 2009 Compliance Amended Application 2009-2011 Budgets" provides a more detailed breakout, by "Budget by Spending Category" and "Budget by Program Total". In the IOUs' July Applications, the "Budget by Spending Category" was disaggregated into 3 subcategories: Overhead, General & Administrative Costs, EM&V, and Direct Implementation. At the time, the IOUs in aggregate (far right hand column labeled "IOUs Total") indicated that "Overhead, G&A", would absorb fully $1.645 billion, or 44% of the proposed $3.7 billion budget; with only $1.281 billion or 34% (that is, only one ratepayer dollar out of every three) going toward buying down the incremental cost of higher efficiency energy-using measures.

With the March 2009 Amended Applications, the IOUs have added the additional subcategory of "**Marketing & Outreach**" to the "Budget by Spending Category"; and further disaggregated "Direct Implementation" beyond the July 2008 three entries of Rebates and Incentives; Upstream Payments; Direct Install Labor, Materials, Activity; to also include **Rebate Processing & Inspection**. Looking first at PG&E to the far left, specifically the two columns labeled Jul-08 and Mar-09, the figures indicate that the utility's July 2008 $778 million or 42% of total in Overhead, G&A, has per the March 2, 2009 filing, been further broken out into Marketing & Outreach at $154 million or 9% of total, with $573 million re-assigned to Rebate, Processing & Inspection or 32% of total. On March 25, 2009, PG&E modified its March 2nd filing to reduce the allocation to Rebate Processing & Inspection from $573 million or 32% to $51 million or 3%; with the amount allocated to Direct Install Labor, Materials, Activity increased to $609 million or 34% (see TURN TABLE 3). Most surprisingly, PG&E adjusted its March 2nd Upstream

Payments (essentially the Upstream Lighting Program which is over 50% basic screw-in CFLs, see Tables 6 & 7 Section B) from $190 million or 11% down to $2 million or less than 1%.

TURN TABLE 3						
COMPARISION OF PG&E's JULY 2008 APPLICATION, MARCH 2, 2009 AMENDED APPLICATION, and MARCH 25, 2009 REVISED APPLICATION 2009-2011 PROPOSED BUDGETS ($ millions)						
	PG&E					
	7/8/2008*		3/2/2009		3/25/2009	
TOTAL BUDGET	$1,873	% T	$1,803	% T	$1,803	% T
Budget by Spending Category						
Overhead, General & Administrative Costs	**$778**	**42%**	**$273**	**15%**	**$271**	**15%**
Marketing & Outreach			**$154**	**9%**	**$154**	**9%**
EM&V	$123	7%	$134	7%	$134	7%
Direct Implementation	$625	33%	$1,242	69%	$1,244	69%
Rebates and incentives	$381	20%	$394	22%	$582	32%
Upstream Payments	$181	10%	$190	11%	$2	0%
Subtotal REBATES,INCENTIVES, UPSTREAM	**$562**	**30%**	**$584**	**32%**	**$584**	**32%**
Direct Install Labor, Materials, Activity	$63	3%	$86	5%	$609	34%
Rebate Processing & Inspection			**$573**	**32%**	**$51**	**3%**
TOTAL	$1,526	82%	$1,803	100%	$1,803	100%

* PG&E did not provide a figure in the E3 export file for its portfolio's EM&V budget. The EM&V budget figure is taken from Table 3-1 of PG&E's testimony. The total budget for PG&E's portfolio (top row "TOTAL BUDGET") is more than the sum of its budgets for Administrative Costs, Direct Implemenation, and EM&V (bottom row "TOTAL"). The 2008 percent breakdown for PG&E does not, therefore, add to 100% (it is the sum of the Administrative Costs, EM&V, and Direct Implementation categories). The IOU total column is derived from the sum of figures for the four utilities, and so the IOU % totals for July 2008 filings do not add to 100% either.

Source : Table 4.2 of PG&E's Compliance Tables: Compliance Scenario - March 2, 2009 and March 25, 2009; July 2008 data - DRA / TURN August 28, 2008 Protest

The alarming results in PG&E's March 2009 budget allocations are not so evident with **SCE** and **SDG&E/SoCalGas**. Beginning with **SCE**:

- First in July 2008 SCE had a 10% higher allocation to Rebates, Incentives, Upstream than PG&E: $551 million or 41% (as compared to PG&E's 30%). With March 2009, SCE essentially holds to that position at $568 million or 42%.
- Second, SCE reduced its July 2008 allocation of $574 million (or 43%) of budget in "Overhead, G&A" to its March figure of $151 million or 11%, by (1) breaking out $61 million (5%) to Marketing & Outreach (less than PG&E's 9%); (2) breaking out $11 million (1%) to Rebate Processing & Inspections (relative to PG&E's 32%); and (3) tripling the allocation to Direct Install Labor, Materials, Activity, from $130 million (10%) to $464 million (34%).

SDG&E and **SoCalGas** follow an approach similar to SCE's for reducing their allocations to Overhead and G&A. Some of this shift is lost in light of the Sempra Utilities having nearly doubled their proposed budget total: SDG&E went from $280 million in July 2008 to $514 million in March 2009 (an 84% increase), and SoCalGas jumped from $237 million to $542 million (129% increase).

- In their July 2008 applications, SDG&E and SoCalGas had the largest allocations to Overhead and A&G of the four IOUs at $159 million (57%) and $134 million (56%), respectively. In the March 2009 revisions, these figures

droped to $68 million or 13% (for SDG&E) and $46 million or 9% (for SoCalGas). These reported reductions were achieved by:

- Breaking out $44 million or 8% and $27 million or 5% to Marketing & Outreach, respectively (figures relatively comparable to what PG&E and SCE did).
- Like SCE, they allocated a small amount to Rebate Processing & Inspections; $11 million or 1% SDG&E and $6 million or 1% SoCalGas.
- Also like SCE, they significantly increased Direct Install Labor, Materials, Activity, from $15 million (5%) to $116 million (23%) for SDG&E and from $8 million (3%) to $87 million (16%) for SoCalGas.
- Finally, differing from both PG&E and SCE, SDG&E and SoCalGas significantly increased allocations to Rebates, Incentives, Upstream; from $88 million (32%) to $240 million (47%) for SDG&E, and from $79 million (33%) to $331 million (61%) for SoCalGas.

TURN offers the following findings and recommendations concerning TURN Table 2.

- It is very unclear the extent to which the IOUs actually reduced Overhead and G&A costs, as distinct from reallocating costs to create the appearance of lessened overhead and G&A. (October and December Rulings specified detail and transparency).

- Per TURN Table 4 "Energy Efficiency Program Budget Breakdown: Selected States, Years" shown below, even accepting the IOUs' March 2009 Overhead and G&A costs in aggregate as 13% of total (far right hand column, $539 million or 13%), is still 63% higher than the average shown in Table 3 of 8% (far right hand column, first row entry Administrative Costs & Program Management).

TURN TABLE 4

Energy Efficiency Programs Budget Breakdown: Selected States, Years

	Oregon Energy Trust 2007	National Grid (MA) 2009	NSTAR (MA) 2009	Cape Light Compact (MA) 2009	New Jersey Clean Energy 2007	Conn. Utilities 2009	Efficiency Vermont 2007	AVERAGE
Administrative Costs & Program Management	**10%**	**10%**	**10%**	**5%**	**10%**	**8%**	**2%**	**8%**
Marketing Costs (includes development)	5%	3%	7%	3%	5%	2%	18%	6%
Incentives & rebates	**51%**	**72%**	**64%**	**64%**	**75%**	**65%**	**32%**	**60%**
Program Delivery (excluding incentives & rebates)*	27%	11%	15%	24%	**9%**	10%	44%	20%
Measurement / Evaluation / Market Research	3%	4%	4%	4%	0.20%	2%		3%
Other Expenses (including IT)	4%	-	-	-	1%	14%	4%	6%
TOTAL	100%	100%	100%	100%	100%	100%	100%	

* Program delivery includes direct install labor and materials, sales, technical assistance and quality control. In Vermont, it includes the "Services and Initiatives" category. In New Jersey, it includes "rebate processing".

Sources:

Connecticut: http://www.ctsavesenergy.org/files/FINAL%202009%20C&LM%20Electric%2

National Grid: http://www.mass.gov/Eoeea/docs/dpu/electri

NSTAR: http://www.mass.gov/Eoeea/docs/dpu/electric/08-

Cape Light: http://www.mass.gov/Eoeea/docs/dpu/electric/(

Efficiency Vermont: http://www.efficiencyvermont.com/stella/filelib/AR2(

New Jersey: http://www.njcleanenergy.com/files/file/Library/BPURpt4Q07Master9

Oregon Trust: http://www.energytrust.org/library/financial/2008-09_Bud

- Also, the amount of ratepayer dollars going toward buying down the incremental cost of higher efficiency energy-using measures per the IOUs' March 2009 of $1,723 million or 41% of total (far right hand column, row entry of Rebates, Incentives, Upstream) is significantly less than the average shown in Table 3 of 60% (far right hand column, third row entry Incentives & Rebates).
- The Commission should be seeing some economies of scale and scope with the IOUs budget totals and allocations between rebates and incentives and all other non-incentive costs, including overhead and A&G. Instead, the pattern is more money for fewer "more of the same CFL savings" (see discussion next section).
- The Commission should order a full audit of the utilities' A&G costs in order to make sense of the substantial amounts deemed "A&G" in the original applications and the substantial changes in characterization of many of those costs in the revised applications.

B. The Amended Applications continue to be inappropriately entrenched in CFL-dominated portfolios.

Ignoring clear signals from the Commission and the market, the IOUs' proposed energy efficiency (EE) portfolios for 2009-2011 continue to be dominated by compact fluorescent lamps (CFLs). This is not an effective use of ratepayer funds, as discussed in greater detail in TURN's White Paper (Attachment 2 to these comments).[20] The IOUs'

[20] TURN Attachment 2 "Moving Beyond Utility CFL-Dominated Energy Efficiency Portfolios", discusses how the key measures of CFL market transformation – including sales, saturation, remaining cost-effective sockets, and freeridership rates – indicate the CA IOUs are well overdue to move away from CFL-dominated EE portfolios. If managed properly, the CA market for CFLs

Revised Applications would continue the recent trend in CFL-dominated portfolios,[21] and savings from CFLs represent a disproportionate share of the energy savings claimed by the utilities.[22] Rather than "more of the same" with CFLs, the IOUs should leapfrog ahead by focusing on more cost-effective high efficiency lighting and other key end use efficiency opportunities including HVAC, refrigeration, motors, and thermal integrity improvements. The subsidies for standard CFLs should be phased out, the sooner the better.

For the 2006-2008 EE Portfolio, the IOUs in aggregate forecasted 81 million, and reported 98 million CFLs discounted via their Upstream Lighting Programs (ULP). (TURN Table 5 below entitled "**Residential** CFL Units (millions): Forecast & Reported 2006-2008; Forecast 2009-2011") Going forward, the IOUs show little indication of substantially ramping down ratepayer-discounted CFL unit counts. For 2009-2011 PG&E forecasts 34 million CFL units, or 66% of their 06-08 total; SCE 33 million (98% of their 06-08 total); and SDG&E 8 million (or 77% of their 06-08 total). In total, the IOUs forecast subsidizing 76 million CFLs to residential consumers via the ULP. As reflected in the notes to TURN Table 5, the 2009-2011 forecast for CFLs via the ULP is 7 million

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will continue to grow even in the absence of a CFL component of the utilities' Upstream Lighting Program (ULP). The White Paper also details why, even as CFLs continue as a major part of efforts to reduce energy consumption, CA IOU CFL-dominated EE portfolios are increasingly not a good fit from an economic or environmental perspective.

[21] Unless otherwise noted, the CFLs discussed throughout this report are low-wattage screw-ins. Also significant sums of ratepayer funds were spent on CFLs during the 2000-2001 CA energy crisis, post-deregulation 2002-2005, and more recently the 2006-2008 IOU EE portfolios.

[22] For the 2006-08 portfolios, energy savings from CFLs are likely to exceed 70% of the electric claimed savings (although on a verified and measured basis the CFL-produced savings are much lower).

higher or 83 million when the IOUs' forecast of CFLs via ULP to non-residential consumers is factored in.

TURN TABLE 5 **Residential** CFL Units (millions): Forecast & Reported 2006-2008; Forecast 2009-2011								
	Forecast	Reported				% Increase Forecast to Reported	Forecast*	% Total
	2006-2008	2006	2007	2008	2006-2008		2009-2011	to 06-08
PGE	60.0	6.8	18.6	27.4	52.6	-12.3%	34.9	66%
		13%	35%	52%	100%			
SCE	18.0	6.9	16.7	11.7	35.3	96.0%	33.0	93%
		20%	47%	33%	100%			
SDG&E	3.0	1.1	4.7	4.2	9.9	230.0%	8.0	81%
		11%	47%	42%	101%			
TOTAL	81.0	14.8	40.0	43.2	98.0	21.0%	75.9	77%
% Total		15%	41%	44%	100%			

Note: Traditional Upstream Lighting Program (ULP) CFLs only

*The 2009- 2011 forecast for the UPL residential and non-residential is higher:

PG&E	38.4
SCE	36.7
SDG&E	8.0
	83.0

Source: Table 1.4 of Compliance Tables

TURN TABLE 6 "2009-2011 Projected Lighting End Use and CFL Measure Mix: Compliance Portfolio" shows that the IOUs intend to hold relatively steady with lighting-dominated portfolios at 54% of total net GWh energy and 46% total net MW demand, and with CFLs by far the largest component at 34% of total net GWh energy and 29% total net MW demand. (last two rows under "Total", columns 2 and 4).

TURN Table 6 2009 - 2011Projected Lighting End Use and CFL Measure Mix: Compliance Portfolio				
PG&E	Net GWh	% T **Net** Savings	Net MW	% T **Net** Savings
Total Portfolio Savings	2,666		520	
All Lighting*	1,540	58%	245	47%
Res and Non-Res CFLs (Lamps Only)	1,080	41%	176	34%
Res & Non-Res CFLs (Lamps Only) - Upstream**	950	36%	152	29%
SCE				
Total Portfolio Savings	4,154		850	
All Lighting*	2,139	51%	380	45%
Res and Non-Res CFLs (Lamps Only)	1,294	31%	226	27%
Res & Non-Res CFLs (Lamps Only) - Upstream**	1,032	25%	190	22%
SDG&E				
Total Portfolio Savings	635		135	
All Lighting*	323	51%	66	49%
Res and Non-Res CFLs (Lamps Only)	161	25%	27	20%
Res & Non-Res CFLs (Lamps Only) - Upstream**	141	22%	23	17%
TOTAL	7,455		1,505	
All Lighting*	4,001	**54%**	690	**46%**
Res and Non-Res CFLs (Lamps Only)	2,535	**34%**	429	**29%**
Res & Non-Res CFLs (Lamps Only) - Upstream**	2,123	**28%**	366	**24%**

* "All Lighting" is Residential and Non-Residential per IOUs' Tables 1.4

**"Res & Non-Res CFLs" from IOUs' Tables 1.4. Upstream traditional CFLs only

Note: SDGE included 463 kW and 2,787,027 kWh for screw-in CFLs "Turn-in". This category has been excluded from this analysis.

Source: Table 1.4 Compliance Tables

The figures compiled in TURN Table 7 ("Lighting Key Measure Grouping") go into further detail of the forecasted mix of key lighting measures. The IOUs appear to talk up their commitment to next generation lighting without backing up that talk. For example, the IOUs have proposed to create a new statewide lighting program ("Residential – Advanced Consumer Lighting") modeled on the existing Upstream Lighting Program (ULP) manufacturer buy-down market strategy, with the program promoting specialty CFLs, LEDs, cold cathode, and high efficiency incandescent lighting. But the data indicate that the IOUs are far more committed to basic screw-in

CFLs via the ULP, with such CFLs delivering 53% of the lighting GWh of energy saved across the three electrics (first row, far right hand column). By utility, the percentage of forecasted lighting GWh energy savings from CFLs (traditional or standard screw-in) delivered through the ULP is as follows: PG&E 62%; SCE 48%; and SDG&E 44%. By contrast, the second row entry for "Speciality" CFLs (defined as all CFLs that do not fall into the definition of Basic CFLs, that is non-dimmable, bare spiral CFLs up to 30 Watts) shows no activity here for PG&E and SDG&E, with SCE at only 5% of lighting total GWh energy sales. Similarly, there is little if any activity in other lighting measure categories including:

- LEDs: PG&E, SCE, and SDG&E each only 1% of total lighting GWh energy sales.
- Interior Lighting System Retrofits and System Replacements: PG&E and SDG&E 0% each, SCE only 1% of total lighting GWh energy sales.

The only other lighting key measure categories to show any activity are:

- Linear Fluorescent Interior Lamps (changing out standard efficiency 4- , 6– and 8-foot lamps to higher efficiency versions – the IOUs have been promoting this activity for almost as long as basic screw-in CFLs), with PG&E at 5%, SCE at 17%, and SDG&E at 16%, of lighting total GWh energy sales, and:
- More Basic Screw-in CFLs via market channels other than the Upstream Lighting Program (ULP), with PG&E at 4%, SCE at 4%, and SDG&E at 6% of total lighting GWh energy sales.

TURN TABLE 7

Lighting Key Measure Groupings: Compliance Portfolio GWh Energy Savings

	PG&E				SCE				SDGE				All IOUs			
Lighting Category	Net GWh Res	Net GWh Non Res	Total	% T Lighting	Net GWh Res	Net GWh Non Res	Total	% T Lighting	Net GWh Res	Net GWh Non Res	Total	% T Lighting	Net GWh Res	Net GWh Non Res	Total	% T Lighting
Screw-in CFL Interior (Upstream - Traditional)	603	347	950	**62%**	650	381	1,032	**48%**	141	0	141	**44%**	1,395	728	2,123	**53%**
Screw-in CFL Interior (Upstream - Specialty)	-	-	-	**0%**	82	35	117	**5%**	0	0	0	**0%**	82	35	117	**3%**
CFL Fixture Interior (Upstream)	4	-	4	0%	58	0	58	3%	0	0	0	0%	62	0	62	2%
CFL Fixture Exterior (Upstream)	33	-	33	2%	64	0	64	3%	0	0	0	0%	97	0	97	2%
Screw-in CFL Interior - other	20	93	113	7%	27	51	78	4%	13	7	19	6%	43	114	157	4%
CFL Fixture Interior - other	12	10	22	1%	48	4	52	2%	0	15	15	5%	56	24	81	2%
CFL Exterior - other	11	6	17	1%	68	0	68	3%	0	0	0	0%	73	6	80	2%
LED	0	22	22	1%	14	1	15	1%	0	3	3	1%	14	27	41	1%
Interior Controls	43	22	64	4%	3	44	48	2%	0	18	18	6%	46	83	129	3%
Interior Exit Signs	1	4	5	0%	1	9	10	0%	0	0	0	0%	2	12	14	0%
Linear Fluorescents Interior LAMPS	24	51	75	5%	7	349	356	17%	2	51	53	16%	34	451	485	12%
Linear Fluorescents (parking structures) Exterior	1	-	1	0%	3	0	3	0%	0	0	0	0%	7	0	7	0%
Other Interior Lighting	14	113	127	8%	1	10	12	1%	0	16	16	5%	20	192	212	5%
Other Exterior Lighting	10	7	17	1%	3	7	10	0%	0	0	0	0%	13	44	57	1%
Other Lighting	22	-	22	1%	0	0	0	0%	0	0	0	0%	22	0	22	1%
Daylighting	-	0	0	0%	0	8	8	0%	0	0	0	0%	0	8	8	0%
Interior Lighting System Retrofits	-	8	8	1%	0	18	18	1%	0	0	0	0%	0	18	18	0%
Interior Lighting System Replacement	-	-	-	0%	0	106	106	5%	0	0	0	0%	0	106	106	3%
Customized Lighting	-	54	54	3%	0	63	63	3%	0	0	0	0%	0	101	101	3%
Exterior Lighting Controls	-	-	-	0%	0	1	1	0%	0	0	0	0%	0	1	1	0%
SBD - Light Power Density	-	7	7	0%	0	22	22	1%	0	0	0	0%	0	29	29	1%
T-8 Delamp	-	-	-	0%	0	0	0	0%	0	54	54	17%	0	54	54	1%
New Construction	-	-	-	0%	0	0	0	0%	0	3	3	1%	0	3	3	0%
Total	798	742	1,540	100%	1,029	1,110	2,139	100%	156	167	323	100%	1,969	2,036	4,005	100%

Source: Compliance Tables, Compliance Scenario, Table 1.4

TURN Table 7A "Lighting Key Measure Grouping Screw-in CFL Interior Upstream Traditional" shows the two-thirds residential to one-third non-residential split in the CFL Gwh energy savings that the IOUs have assumed. However, this is an incorrect assumption. The IOUs claimed a 90/10% res/non-res in their 2006-2008 reported accomplishments, with Energy Division adjusting it to 95/5%. The recent survey work (KEMA and Itron) surveying business purchasing practices supported the 95/5 split as being an upper limit on non-res purchases. This upper limit is also supported by Commercial Energy User Survey (CEUS) older data on available non-residential sockets and their saturation with CFL (early in this decade) These two surveys support 95/5 given the high volume of total UPL CFLs (~90 million) . The 66% - 34% assumed split serves to overstate the forecasted GWh savings given the much longer run time of nonresidential lighting.

TURN TABLE 7A Lighting Key Measure Grouping Screw-in CFL Interior Upstream Traditional	
PG&E	
Net GWh Residential	603
% Total	**63%**
Net GWh Non- Residential	347
% Total	**37%**
Total	950
SCE	
Net GWh Residential	650
% Total	**63%**
Net GWh Non- Residential	381
% Total	**37%**
Total	1,032
SDG&E	
Net GWh Residential	141
% Total	**100%**
Net GWh Non- Residential	0
% Total	0%
Total	141
ALL IOUS	
Net GWh Residential	1,395
% Total	**66%**
Net GWh Non- Residential	728
% Total	**34%**
Total	2,123

Source: Compliance Tables 1.4

It would seem prudent to treat the IOUs' forecasts of the number of CFLs as a floor, given past experience with the 2006-2008 EE Portfolios. Thus the forecast of per unit CFLs of 77 million in TURN Table 5, and total portfolio GWh energy savings from CFLs (basic screw-in) via the ULP of 53%, should be considered the minimum lower threshold of what the IOUs will in fact implement regarding CFLs if their 2009-2011 Portfolios are approved. After all, the Commission approved 2006-2008 portfolios that included forecasted CFL GWh savings at 30% of total EE portfolio energy savings, while

the actual reported CFL GWh energy savings were approximately double that figureat the end of 2007. (TURN Table 8: "Shifting CFL Portfolio Share: CPUC Approved & IOUs Reported 2006-2008 Portfolios") TURN estimates the year-end 2008 data to reflect 65+%.

TURN TABLE 8
Shifting CFL Portfolio Share:
CPUC Approved & IOUs Reported
2006-2008 Portfolios

	2006-2008 CPUC Approved % Total	2006-2007 IOUs Reported % Total	2006-2008 IOUs Reported % Total
CFLs Gwh Energy	30%	59%	na**

* All CFLs: not just Upstream Lighting Program (UPL).
For 2006-2007, CFLs via ULP were 52%
** ED has not released its 2008 year-end count

Source: 06-08 KEMA Load Shape Initiative Report; 07-08 IOUs' reported accomplishments Energy Division filings

TURN Table 9 summarizes the IOUs' 2009-2011 proposed budgets and savings for the CFL "Standard", CFL "Advanced ULP" (new program), and Lighting Market Transformation (also new program). Again, the budget data show (1) PG&E and SDG&E are still very much embedded in the basic screw-in CFLs via the ULP, and (2) SCE appears to propose a more balanced spending between the two CFL categories. PG&E proposes to devote 98% of its total DIRECT IMPLMENTATION (category includes incentives) CFL ULP budget to "standard" CFLs; for SDG&E, the figure is 92%.

TURN TABLE 9 IOUs Proposed Budgets & Savings Upstream Lighting Program Manufacturer Buy-Down CFL "Standard" and CFL "Advanced"							
		Admin. & General	Marketing/ Outreach	Direct Implementation	% Total	TOTAL	% Total
PG&E	CFL Standard	$7,393,525	$9,079,452	$70,287,508	98%	$86,760,485	94%
	CFL Advanced	$1,260,650	$3,026,484	$1,265,971	2%	$5,553,105	6%
	Stw. Lighting						
	Mkt. Transformation	$308,473				$458,473	0.50%
	TOTAL	$8,962,648	$12,105,936	$71,553,479		$92,772,063	
SCE	CFL Standard	$3,745,246	$219,451	$28,694,303	43%	$32,659,000	43%
	CFL Advanced	$5,071,812	$597,531	$37,440,658	57%	$43,110,000	57%
	Stw. Lighting						
	Mkt. Transformation	$1,054,000				$1,054,000	1.40%
	TOTAL	$8,817,058	$816,982	$66,134,961		$75,769,000	
SDG&E	CFL Standard	$1,222,324	$2,281,468	$26,853,157		$28,075,481	
	CFL Advanced	$1,222,324	$2,281,468	$2,433,763		$3,656,087	
	Stw. Lighting						
	Mkt. Transformation						
	TOTAL	$2,444,648	$4,562,936				

CFL "Standard" refers to medium base screw in CFL

CFL "Advanced" refers to specialty CFLs, LEDs, cold cathode, and high efficiency incandescent.

Source: IOUs' Program Implementation Plans (PIPs)

C. Developing an Exit Strategy for the CFL Component of the IOUs Upstream Lighting Program

For the reasons detailed in TURN's attached White Paper,[23] TURN makes the following recommendations regarding CFLs and their future role in the CA IOU EE portfolios:

- California should "declare victory" in finding the CFL market sufficiently transformed and develop an exit strategy for the medium size screw-in CFL component of the ULP.
- The exit strategy should start with that outlined in the "California Long Term EE Strategic Plan" adopted in September 2008 (Strategy 4-4: Coordinated phase out of Utility incentives for purchase of CFLs, Near-Term 2009-2011).
    - Ensure that big box and home improvement retailers such as Wal-Mart and Home Depot are ready to stock ENERGY STAR price discounted CFLs in CA as IOUs phase CFL programs out.

[23] Attachment 2 "Moving Beyond Utility CFL-Dominated Energy Efficiency Portfolios".

- The utilities should work with manufacturers and retailers to increase the availability and affordability at the retail level of specialty CFLs and other high efficiency lighting products.

- A market strategy should be developed to target CFLs to the remaining population that has not yet adopted CFLs or bought CFLs in any quantity, in order to address the remaining limited market barriers that actually still exist.

- The education, marketing, and outreach in regard to CFLs should be redirected to promote specialty CFLs and other high efficiency lighting technologies that show promise for being commercially viable, but currently not readily available or affordable.

- As part of the 2009-2011 portfolio development, CFL programs should coordinate with the state's mandated safe CFL disposal directives, as well as be accountable for the CFL bulbs put into the market in 2006-2008.

- The Commission as part of its strategic planning efforts should explore prospects for securing in CA a "green" CFL manufacturing facility.

- The IOUs should move from a sockets-focused approach to lighting to a systems-focused one to encourage fixture replacements and lighting system retrofit improvements.

Each of these recommendations is more fully discussed in the sections below.

1. CA should "declare victory" because the CFL market is sufficiently transformed, and develop an exit strategy for the medium-sized screw-in CFL component of the Upstream Lighting Program.

Standard CFLs have achieved a position in the market where continued utility sponsorship is no longer warranted. Therefore, the CA IOUs should follow the model adopted by NEEA and others. This approach is consistent with CA's Long Term Energy Efficiency Strategic Plan, which already directs the IOUs to end their subsidies for CFLs via the Upstream Lighting Program (ULP):

> Utilities will begin to phase traditional mass market CFL bulb promotions and giveaways out of program portfolios and shift focus toward new lighting technologies and other innovative

> programs that focus on lasting energy savings and improved consumer uptake.[24]

The Northwest Energy Efficiency Alliance's (NEEA's) two criteria by which to judge when the market is transformed (availability and affordability) have been met not only in the Pacific Northwest, but arguably much more widely.[25] The California IOUs should make it a high priority to include in their 2009-11 portfolios the development of a timetable for withdrawing their financial incentives, and a plan for notifying retailers of that timetable. As the recent EPA market profile of CFLs suggests,[26] the payback time for a standard compact fluorescent has already shrunk to seven months.[27] Continued subsidies are not only unnecessary, they risk conveying the unhelpful message to the public that a seven-month payback is not 'good enough.' Few if any currently available energy-relevant products command a comparable return on investment. The Energy Trust of Oregon and NEEA managed a successful transition from buydown of standard CFLs to specialty lamps in Oregon. The consequences of withdrawing incentives from big-box retailers in 2007/08 on the average shelf price of CFLs, and on sales were modest indeed. Between Fall 2006 and Winter 2008/09 the average shelf price of a CFL increased roughly six percent, from $4.04 to $4.28, and sales exceeded forecasts, setting a new

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[24] D08-09-040 September 19, 2008 California Long-Term Energy Efficiency Strategic Plan, p. 13.

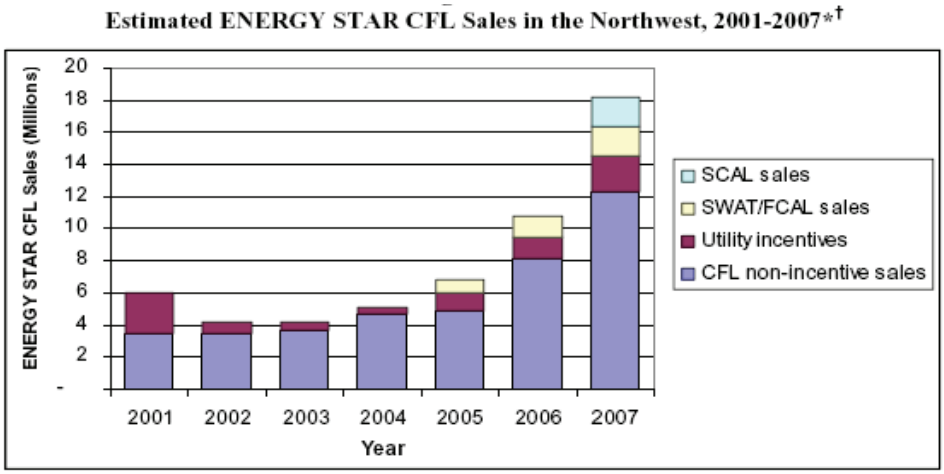
[25] See 08-06-004 TURN Protest comments July 9, 2008, p. 11.

[26] "Big Results, Bigger Potential: ENERGY STAR CFL Market Profile." March, 2009. http://www.energystar.gov/ia/products/downloads/CFL_Market_Profile.pdf

[27] From the chart and accompanying text it appears that this is a national average price, which would suggest that the price is made up of both subsidized and non-subsidized bulbs. If the Northwest is any indication of the relative fractions, however, then the majority of CFLs sold were not utility discounted.

record by topping 25 million for 2008.[28] It is also worth noting that in the Northwest sales over the period 2006-2008 have increased 240% at average CFL shelf prices of over $4.00. Figure 1 below (Figure 3.2 in NEEA's 2008 report)[29] further suggests CFL sales in the Northwest have been predominately "non-incentive sales."

Figure 1



Sources: PECI, 2001–2006; Fluid Market Strategies, 2008a, 2008b, and 2007b.
* The 2007 Widget Report reports total CFL sales of 18,943,754 bulbs in the region, which includes 816,766 non-ENERGY STAR bulbs. Non- ENERGY STAR bulbs were excluded from the 2007 total shown above and from CFL sales totals for prior years.
† 2006 sales include NEEA estimate of 1.5 million WAL-MART CFLs sold region-wide in 2006 (see KEMA, 2007 [MPER3] Appendix A for more detail).

2. The Upstream Lighting Program (ULP) should be reconfigured to increase the availability and affordability at the retail level of specialty CFLs and other high efficiency lighting products.

The IOU's long standing focus on standard CFLs has kept other worthy high efficiency lighting products out of the spotlight. So-called "specialty" CFLs as well as other lighting products that are suitable to niche applications or still be in a developmental phase deserve IOU promotion. Shifting utility ratepayer incentives and the

[28] Personal communication, Fred Gordon (Energy Trust of Oregon), March 5, 2009, and Anu Teja (NEEA) April 2, 2009.

[29] http://www.nwalliance.org/research/reports/E08-195.pdf

public's attention to less well known lamps and lighting products that share CFLs' energy efficiency but differ in that they are not (yet) widely available or affordable and often may not be suited to the majority of sockets is a logical next step. Here too the Northwest experience is instructive. For instance, the Energy Trust of Oregon presided over the successful shift to specialty CFLs including daylight bulbs, heat-treated bulbs, outdoor fixtures, three-way bulbs, etc., while noting the need to maintain a price gradient among the various types to avoid reducing the price of specialty CFLs to levels equal with standard CFLs.

With standard CFLs fast becoming accepted in the market,[30] several organizations are looking to the future for next generation lighting technologies that could impact the lighting market, and energy efficiency, in the same way as standard CFLs have done.[31] A number of new technologies are being developed to further promote energy efficiency gains in lighting. This TURN Attachment 3 "Next Generation Lighting" identifies some of the main new technologies and the extent to which they are available in the market.

A number of problems have been identified with the IOUs' upstream lighting programs, including leakage of discounted bulbs out of the state or service territory, limited consumer understanding of the variety of CFLs available, lack of consumer understanding of mercury hazards and the need to recycle CFLs at end of life. While the IOUs acknowledge these problems, their descriptions of how they propose to rectify the situation are uninspired and unpersuasive ("PG&E continues to encourage manufacturers

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[30] Recent data from NEMA suggest that one in four household lamps is a CFL. See "CFL share of Household Lamps Reaches New High" at: http://www.nema.org/media/pr/20081110a.cfm and http://www.lightsearch.com/lightnow/2008/1108/1108_lampindex.htm

[31] See for example, NEEAs 2005-2009 Strategic Plan, p.6 available at http://www.nwalliance.org/research/documents/NEEA_StratBizPlan_20060918.pdf

to print recycling information," "SDG&E will continue to offer all types of CFLs in its program," or SCE's "New efforts to increase high efficiency products in lighting showrooms").[32] The resources available through these programs are more than sufficient to attack the problems of leakage, ignorance, or availability creatively and with fresh ideas rather than merely continuing to do the same thing (or more of the same thing).

3. A more focused and limited CFL market strategy should be developed to target CFLs to the remaining population that has not yet adopted CFLs or bought CFLs in any quantity in order to address the remaining market barriers that actually still exist.

A mass market approach to CFLs such as embodied by the existing and utility-proposed ULP is no longer appropriate to the task of expanding the market for CFLs. The widespread adoption of CFLs (the March, 2009 Energy Star CFL Market Profile identifies CFL market share in the U.S. as approaching 30%) masks the uneven distribution of CFLs in households. The IOUs should focus their aim on those households that have not adopted CFLs (those the CPUC has deemed "hard to reach" (HTR)). The IOUs should conduct market research studies to understand who lives in these households and what may keep them from trying out CFLs. Targeted programs that build on the information derived from these studies should replace the ULP and its mass-market focus. Mere assurances that these populations are being targeted are not adequate. Instead the IOUs should articulate the targeted efforts they intend to pursue to introduce or persuade those households without CFLs to adopt them entail.

[32] PG&E, SDG&E, and SCE's responses to Question 5 of the DRA Data Request: A.08-07-023 04/03/09 Response EE Programs and Budgets for PYs 2009-2011DRA-3 Data Request Dated March 20, 2009 CFL Basic and CFL Advanced Programs.

The following list of recommendations is taken from Skumatz & Howlett, 2006, "Findings and Gaps in CFL Evaluation Research: Review of the Existing Literature:"[33]

> The best practices identified in the report provide useful tips for the design and operation of programs related to residential CFLs. In addition, the research indicates that there are a number of opportunities for increasing sales of CFLs for residential applications:
>
> - Technology: Continuing technology improvements to provide high quality applications beyond the widely-accepted small 13-23 watt applications. Energy Star® CFLs for recessed fixtures, as well as CFLs that will work well in outdoor applications, and with dimmers and photo cells would likely help expand the market.
> - Labeling: Residents find labeling on the packaging to be confusing. They particularly report problems with the (EPA) match or equivalencies stated between CFL watts and incandescent watts; many report the lights are dimmer than the bulb it replaced. EPA may want to re-work these equivalencies to minimize disappointment. Poor or disappointing performance of a bulb has a long memory in the marketplace, and should be avoided wherever possible. There have been some efforts to cite lumen equivalents instead of wattage equivalents to account for the fact that a CFL watt is not necessarily perceived the same as an incandescent watt.
> - Beyond retrofit: Virtually all the CFLs are sold to homeowners for retrofit in existing fixtures. To continue to expand the adoption of CFLs – and to help prevent backsliding to incandescent bulbs – programs may want to focus on CFL fixtures, and on developing programs to interest builders and contractors in CFLs. In some areas of the US, codes and standards are being used, requiring new homes to have a certain number of CFL / Energy Star® fixtures; however, the market still needs considerable attention.
> - Additional rooms: There are several opportunities to expand use of CFLs. Although CFLs are most commonly installed in kitchens, living rooms, and bedrooms (and outdoors in California), not all fixtures in these areas have CFLs. In addition, expanding capabilities of CFLs so they can withstand cold outdoor temperatures would expand applications of CFLs.

[33] mail.mtprog.com/CD_Layout/Day_2_22.06.06/1115-1300/ID109_Skumatz3_final.pdf (p. 10)

Greatest future potential may lie in family rooms and garages that have high usage and fewer CFLs.

- Marketing using NEBs: Non-energy benefits analysis shows households with CFLs report they particularly value the lifetimes and environmental benefits, but a significant share also state the value high quality lighting from CFL. Given this information comes from CFL owners, using this information in marketing may help appeal to new purchasers. Cooperative marketing efforts, sponsorship from CFL manufacturers, and local / regional / national coordination in promoting CFLs provides an opportunity to leverage program dollars and capitalize on awareness opportunities for CFLs.
- Retailers: Capitalizing on feedback from retailers, an education program assuring retailers that CFLs have the same or fewer complaints as other products may help add allies in increasing CFL market share. Retailers are a key ally in increasing both awareness and sales, through efforts in marketing and point of purchase, good placement in stores, promotions, and other activities. Finally, considering whether it is possible to gain higher penetration (and decent aisle placement) for CFLs in grocery stores may provide another opportunity for increasing market share. This would make parallel access for CFLs and traditional bulbs; however, it may be that the CFLs would sell poorly because of higher price unless knowledgeable staff are readily available, which is more practical in hardware and box stores.

Skumatz et al. also suggest improvements to Program Design and Process:

> The studies emphasize conducting market research sufficient to develop a sound program plan with multi-pronged, inclusive participation strategies. Other positive features include links between design and tactics to program theory and logic, and developing measurable indicators with clear sources of data (and buy-in from regulators where needed). Measurement of progress needs a clear baseline and accurate data collection process, an appropriate, periodic verification process (tracking and computations), and detailed and well documented evaluation process linking to program goals. The evaluation work should provide a feedback loop for integration into program refinement / management. Programs with clear responsibilities (but with flexibility) perform better, and implementation using an RFP process is recommended. Of course, quality CFLs (potentially independently tested) are key to program satisfaction, and the

> "best practices" reports recommend avoiding give-away programs that devalue the product".[34]

4. The education, marketing, and outreach related to CFLs should be redirected to promote specialty CFLs and other high efficiency lighting technologies that are commercially viable, but currently not readily available or affordable.

The low price and ready availability of CFLs have introduced a majority of US (and CA) households to this product. Their ubiquity at the top of green consumer lists and environmental campaigns has succeeded in a ready equation of them with responsible consumption patterns. Consequently market transformation efforts outside of CA have begun transitioning to promoting lighting products besides standard CFLs. This shift is motivated by the fact that ratepayer dollars are better spent on products that align with energy efficiency goals yet have not achieved widespread recognition (or the shelf space) that standard CFLs have. Dimmers, candelabras, outdoor lights and a variety of other applications can be outfitted with so-called specialty CFLs, but for the fact that these product categories have not yet achieved NEEA's availability and affordability criteria. The IOUs are well-positioned to draw attention to these products now that standard CFLs no longer benefit from their attention. Instead of lagging behind efforts in other states and behind the market, which is already expanding in these directions, the IOUs should lead.[35] They should identify whatever steps are necessary to aggressively pursue expansion toward specialty CFLs and then implement them. Education, marketing and

[34] Id. p. 5 (emphasis added).

[35] According to SDG&E and SCE, the 2008 level of incentives offered for so-called advanced CFLs amounted to 11% and 17% of the standard CFL incentives in their respective programs. (DATA REQUEST SET DRA-SCE-002-14)

outreach involve concrete campaigns and targeted messages. Without concrete evidence that they are coordinating this kind of effort, assurances that they are "targeting low-income households through demographic-based allocations to stores in disadvantaged communities"[36] remain unpersuasive.

5. The Commission should encourage the development in CA of the first U.S.-based CFL "green" manufacturing facility.

At present there is no CFL manufacturing infrastructure in CA[37] or the U.S. Given California's embrace of CFLs as a central element in its pursuit both of energy efficiency goals and compliance with AB32's mandates to reduce greenhouse gas emissions, this is unfortunate. However, it also presents an opportunity. Chapter 9 of the CPUC's Long Term Energy Efficiency Strategic Plan encourages workforce education and training (WE&T) in the fields related to energy efficiency. It is therefore worth asking why the IOUs have not explored the possibility of establishing a state-of-the-art "green" CFL manufacturing presence in CA.[38] Not only would such a facility dovetail with the desire to create jobs in the state, it presents an opportunity to produce CFLs that meet or exceed

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[36] PG&E Statewide PIP 2009-11, p. 52.

[37] In 2002, Lights of America opened a CFL factory in CA, which for a few years produced lamps including three twister models: 2415, 2420, and 2425. These bulbs are/were ENERGY STAR certified and continue to be available while supplies last. Aik Kolsy (ESP Lighting) personal communication with Reuben Deumling, Energy Economics Inc. and TURN consultant ,April 10, 2009).

[38] The electric IOUs in their March 2nd Amended Applications, duplicate statewide program implementation plan (PIPs) filings concedes in their Residential Lighting Incentive Program for Basic CFLs and Advanced Consumer Lighting Program that they have not addressed the workforce education and training concern. "Due to the characteristics of this program as upstream and staff driven, there is no provision for WE&T. However, the technologies of energy-efficient lighting have great potential for inclusion in other WE&T programs. They are particularly suited for those aimed at energy education. The program staff will support such efforts with information about the technologies and products."

domestic environmental requirements pertaining to manufacturing, something that cannot be guaranteed in the current import-dominated situation. Furthermore, by producing CFLs at sites closer to the large market which California represents suggests the possibility of reducing lifecycle energy consumption associated with transport.TURN does not discuss in the accompanying White Paper how such a facility should be financed, owned or operated. Rather, the point here is to draw attention to the fact that the present-day CFL manufacturing infrastructure in CA is nonexistent. Given present and future demand for these lighting products, policy makers' interest in job creation as a component of the state's pursuit of its energy efficiency goals, the environmental dividends from domestic production, and the level of ratepayer funds currently devoted to purchasing CFLs from abroad, development of such infrastructure seems timely indeed.[39] Thus TURN believes that there is a tremendous opportunity here with high efficiency lighting via the construction and operation of the first green manufacturing facility for CFLs and possibly other high efficiency lighting products in CA.

6. The IOUs should move from a "socket" to systems approach to lighting that encourages fixture replacements and lighting system retrofit improvements.

The most innovative nonresidential lighting retrofit programs in CA approach the task in a manner that is more comprehensive than are encouraged or rewarded under the existing guidelines (DEER, refund eligibility requirements, and the TRC calculations). For instance, the current DEER, rebate eligibility requirements, and TRC calculations all

[39] In 2008, Policy Matters Ohio published a report: "Good Bulbs Bad Jobs," on the outsourcing of GE's CFL production to China, see: http://www.policymattersohio.org/GoodBulbsBadJobs.htm

encourage or promote the "socket" over the "systems" approach to lighting efficiency.[40] The 'socket' approach, as the term is used here, refers to the manner in which direct install lighting programs commonly specify lamp replacements from a fairly short list of technologies found in DEER. The 'systems' approach, by contrast, starts from the existing suite of lighting products and identifies lamps or entire lighting systems/assemblies from a much longer list that best fit the demand for lighting in that space. It is a customized approach that is not limited by what a lighting contractor would carry in his truck and can therefore yield much higher savings per site. The 'prescriptive/socket approach' is expected to soon preclude the contractor or implementer from specifying a lighting system not listed in the DEER.

Regardless of the socket versus systems limitations of the IOUs' current and proposed lighting efficiency programs, there are a number of CA lighting efficiency contractors going beyond basic one-for-one replacements of CFLs for incandescents or electronic ballast/T-8s for magnetic ballast/T-12 linear systems. According to these lighting contractors, some of the existing commercial lighting is not cost effective to retrofit under the prevailing system of rewards unless it is combined with other standard lighting retrofits at the same site. These lighting categories include T8-700 for T8-800 replacements, 8' T12 replacements, induction lighting, 3rd generation super T-8 systems, 2' and 8' T8 replacements, and tandem wiring of lamps (sharing one ballast among multiple fluorescent lamps). Companies like Ecology Action's Right Lights and East Bay Energy Watch's Smart Lights Program combines into one package the kW and kWh

[40] Personal communication Reuben Deumling, Energy Economics Inc. and TURN consultant with Maria Sanders, Smart Lights Berkeley, April, 2009.

saved[41] of multiple lighting categories, eliminating lost opportunities and cream skimming that can characterize more conventional retrofits. De-lamping combined with reflector exchange (which optimizes light output while precluding the reinsertion of additional tubes) is another example that a comprehensive approach is more likely to include.[42]

Approaching the commercial lighting sector mindful of the manner in which existing policies limit a retrofit, but focusing instead on maximum energy savings, whether or not these will be all equally incentivized, is both aligned with the state's energy policy goals and also of greater benefit to the customer. Rather than discouraging or disallowing these types of 'calculated savings' commercial lighting retrofits, the IOUs should draw on the experiences of those third parties currently retrofitting lighting in this manner. In addition, the Commission should consider revisions to the current cost-effectiveness tests (total resource cost (TRC) and program administrator cost (PAC) to minimize cream-skimming and lost opportunities. The current regulatory emphasis on "net benefits" is keeping the California utility energy efficiency (EE) programs focused on the short-run, when the objective is to maximize the amount of installed cost-effective measures that achieve more comprehensive high quality and long term savings over the life of the host facility. Certainly, EE should produce positive net benefits. Yet higher values are not necessarily reflective of more desirable programs. Programs that cream skim and create lost opportunities may have much higher net benefits than more comprehensive programs, which ultimately will create deeper, broader, and more

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[41] East Bay Energy Watch Smart Lights Program, *Lighting KW Reduction Workpaper*.

[42] Personal communication Reuben Deumling, Energy Economics Inc. and TURN consultant with Gene Thomas, Ecology Action - Right Lights; Maria Sanders and Martin Bond, Smart Lights Berkeley, April, 2009.

enduring energy savings. Moving forward, the utilities should be procuring EE savings that are more akin to supply-side procurement: longer-lived, higher persistence / retention rates, and higher confidence in verified savings. In past proceedings TURN has offered different revisions to the cost-effectiveness methods.[43]

D. The Commission should not authorize ratepayer funding for the IOUs' proposed CFL programs unless all program CFLs meet minimum toxicity requirements, and all participating manufacturers and retailers contribute to California's CFL disposal program.

PG&E, SCE and SDG&E propose two statewide residential CFL programs for inclusion in their 2009-2011 portfolios: 1) the Residential Lighting Incentive Program for Basic CFLs (Basic CFL Program) and 2) the California Super CFL Program (Super CFL Program, a sub-program of the Advanced Consumer Lighting Program.[44] The IOUs explain that "ENERGY STAR® labeled screw-in compact fluorescent bare spiral lamps of up to and including 30 watts" will be discounted via upstream (and / or midstream) incentives in the Basic CFL Program.[45] Through the Super CFL Program, the IOUs intend to provide incentives for ENERGY STAR® qualified bulbs that additionally meet "stringent standards and specifications for dimmability, color, mercury content, dimensions, longevity, efficacy, and an extremely low defect rate."[46]

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[43] R.06-04-010 "Comments of TURN on Staff Proposal and Procedural Strategy" March 16, 2007 (filed subsequent times in this portion of R.06-04-010 pertaining to the 09-11 portfolios); R. 06-04-010 "Reply Comments of TURN in Response to the 3-14-08 ACR and ALJ's Ruling Regarding C/E Metrics and the EE Policy Manual" April 8, 2008; and Application 08-07-021,022, 023 and 031, "TURN Prehearing Conference Statement", October 6, 2008.
[44] *See* PG&E Testimony (amended 3-2-09), Attachment 2; SCE Exhibit 3A (amended 3-2-09); SDG&E Testimony (amended 3-2-09), Chapter 2, Appendix B, Vol. 1.
[45] PG&E Testimony (amended 3-2-09), Attachment 2, p. 38; SCE Exhibit 3A (amended 3-2-09), p. 39; SDG&E Testimony (amended 3-2-09), Chapter 2, Appendix B, Vol. 1, p. 24.
[46] PG&E Testimony (amended 3-2-09), Attachment 2, p. 54-55; SCE Exhibit 3A (amended 3-2-09), p. 57; SDG&E Testimony (amended 3-2-09), Chapter 2, Appendix B, Vol. 1, p. 41.

Fluorescent lamps, including CFLs, have been referred to as an "environmental paradox" because they use a fraction of the energy used by the incandescent lamps they replace, but they depend on the use of a small amount of mercury, a persistent and bio-accumulative neurotoxin.[47] Because mercury contamination is a serious public health and environmental problem, fluorescent lamps must be properly disposed of at the end of their useful life, or when breakage occurs.

In the *California Long-Term Energy Efficiency Strategic Plan*, adopted by the Commission in D.08-09-040, the Commission directed that energy efficiency programs implemented in 2009 and onward should be designed to "ensure environmental safety of CFLs and other emerging lighting solutions."[48] Specifically, the Commission adopted the following three near-term (2009-2011) requirements for achieving this goal:

- Establish minimum mercury content requirements on [sic] the CFL manufacturers participating in utility programs.
- Determine cost-effective convenient methods for collection and recycling of any end-of-life light bulbs.
- Coordinate consumer education and marketing programs to improve disposal habits.[49]

These related goals of limiting the mercury content in CFLs, educating consumers about proper CFL handling and disposal, and supporting CFL recycling are likewise embodied in Assembly Bill No. 1109, Huffman, the California Lighting Efficiency and Toxics Reduction Act (AB 1109), signed by Governor Schwarzenegger on October 12, 2007. Further, AB 1109 makes clear the intent "of the Legislature to have a system established

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[47] *See* id. (quoting the Product Stewardship Institute's reference to CFLs as an "environmental paradox").
[48] D.08-09-040, Attachment A, p. 24. *See also* D.08-09-040, p. 1 (directing that the strategies adopted in the *Strategic Plan* should be "incorporated into energy efficiency program planning and implementation starting in 2009.").
[49] Id.

for the recycling of hazardous lighting products that is free and convenient for end users."[50]

As acknowledged by the Commission in D.08-09-040, entities other than the IOUs have important roles to play in these efforts to reduce and properly manage the toxic waste associated with CFLs.[51] Nonetheless, the IOUs obviously have a central role to play in implementing the minimum mercury content requirement for CFLs distributed through their programs, and should at least play a supportive role in facilitating the development of a CFL recycling program and educating consumers, as discussed below.

1. The Commission should only authorize the IOUs to provide incentives for CFLs that contain no more than 3 mg of mercury per lamp <u>and</u> have been qualified as meeting the ENERGY STAR® version 4.0 requirements, or the most recent version of the ENERGY STAR® requirements.

PG&E and SCE propose limiting the mercury content of CFLs receiving incentives through the Super CFL Program to a maximum of 3 mg per lamp.[52] However, PG&E, SCE and SDG&E propose to provide incentives for CFLs with up to 5 mg of mercury per lamp through the Basic CFL Program.[53] The Commission should deny the IOUs' requests to provide incentives for CFLs with more than 3 mg of mercury per lamp and cap the mercury content of CFLs included in all utility programs to 3 mg per lamp.

Ratepayer-funded utility EE activities should play a leadership role in advancing the market for efficient lighting products, as well as reducing the hazardous waste

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[50] AB 1109, Sec. 2 (i).
[51] D.08-09-040, Attachment A, p. 24.
[52] *See* PG&E Response to TURN DR 2, Q 6; SCE Response to TURN DR 2, Q 6. SDG&E did not provide TURN with any information about the mercury content specification for Super CFLs, explaining instead in response to TURN DR 2, Q 6 that the Super CFL specifications were not yet completed and approved for release.
[53] *See* PG&E Response to TURN DR 2, Q 1; SCE Response to TURN DR 2, Q 1; SDG&E Response to TURN DR 2, Q 1.

associated with those products. The 5 mg per CFL limit proposed by the IOUs for the Basic CFL Program would simply be the same mercury limit required by AB 1109. AB 1109 prohibits the manufacture and sale of fluorescent lamps in California after January 1, 2010, that contain levels of mercury that would result in the prohibition of those general purpose lights being sold in the European Union under the Restriction on Hazardous Substances or RoHS directive. The EU prohibits, for example, mercury in compact fluorescent lamps exceeding 5 mg per lamp.[54] The utilities should be required to do more than implement lighting programs that are consistent with the toxicity requirements of California law.

Adopting a 3 mg limit for CFLs that receive ratepayer subsidies is reasonable in light of the IOUs' own proposal to adopt this limit for the Super CFL Program, as well as market trends. As noted by the State of Maine in its January 2008 *Report Regarding the Recycling of Fluorescent Lamps and Consumer Education Efforts*:

> Many U.S. manufacturers already make CFLs with mercury amounts well below the NEMA cap [5 mg[55]], a circumstance that has led the eco-label organization Green Seal to propose a revised CFL standard that lowers the maximum mercury content to 3 mg. In making this proposal, Green Seal relied on the fact that Philips Lighting, Ecobulb, Sylvania and Lights of America all make CFLs that contain less than 3 mg of mercury and some with as little as 1.23 mg (Green Seal, 2007). Eco-label organizations in Canada and Europe already have promulgated CFL standards that set the maximum mercury content at 3 mg.[56]

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[54] *See* Directive 2002/95/EC, adopted by the European Parliament and the Council of the European Union on January 27, 2003 (referenced in AB 1109), available online at http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32002L0095:EN:HTML.

[55] U.S. lamp manufacturers that belong to the National Electrical Manufacturers Association (NEMA) announced in March 2007 that, for CFLs of less than 25 watts, they would abide by the same 5 mg limit that applies in Europe, and for CFLs that use 25 to 40 watts of electricity, NEMA members agreed on a cap of 6 mg.[55] It is TURN's understanding that not all CFL manufacturers introducing CFLs into the California market have signed on to this pledge.

[56] Id.

Also noteworthy, some major lighting retailers have already placed requirements more stringent than a 5 mg cap on the bulbs they will sell. Wal-Mart's CFL suppliers have "committed to achieving a greater reduction in mercury content than the 5 mg standard set by" NEMA, and "will also adhere to clean production techniques that will minimize mercury pollution from factories manufacturing CFLs."[57] IKEA, the Swedish home furnishings chain, which has promoted and sold CFLs for over 10 years and offered free bulb recycling at all of its stores since 2001, has imposed a 3 mg limit on the level of mercury in the CFLs it sells.[58]

The IOUs should likewise exercise their upstream market power to promote CFLs with 3 mg or less of mercury per lamp in California. This standard would be a reasonable requirement to place on manufacturers seeking ratepayer funding. In fact, PG&E asserts that "[t]he overwhelming majority of PG&E's incented CFLs have no more than 3 mg. of mercury per bulb."[59] The utilities' role in this market is too important for them to endorse what is soon to become the status quo, the AB 1109 mercury limit. Rather, they should be generating market pull for ultra-low mercury CFLs – 3 mg per lamp or less – to become the norm in California. Similarly, CFLs receiving ratepayer subsidies should meet the most recent version of the ENERGY STAR® qualifications, which currently is version 4.0.[60]

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[57] "Wal-Mart to reduce mercury in CFLs – Agreement by suppliers reflects a little-known downside to light bulbs", May 10, 2007, MSNBC, http://www.msnbc.msn.com/id/17831334/.
[58] *Report Regarding the Recycling of Fluorescent Lamps and Consumer Education Efforts*, State of Maine Department of Environmental Protection and Maine Public Utilities Commission, January 2008, p. 6. *www.maine.gov/dep/rwm/homeowner/cfldep_puc/cfl**report**withdep_puc.pdf*
[59] PG&E Response to TURN DR 2, Q 5.
[60] Because ENERGY STAR® version 4.0 adopts a 5 mg per bulb cap for mercury, this specification is not rigorous enough to be relied on for mercury specifications in utility EE programs. While the IOUs state that all bulbs included in the Basic CFL Program and the Super CFL Program will be ENERGY STAR® bulbs, and presumably version 4.0, none specifies that

For all of these reasons, the Commission should find that there is no compelling reason to ask ratepayers to subsidize CFLs that have more than 3 mg of mercury through the Basic CFL Program (or any utility program, for that matter). Using ratepayer funds to support bulbs that exceed the 5 mg mercury standard required by AB 1109 would ensure that utility EE programs truly serve to advance the best available technologies for lighting products, in terms of energy and environmental benefits.

2. The Commission should require the IOUs to condition the receipt of ratepayer funding by CFL manufacturers and retailers participating in utility EE programs on their willingness to contribute to the state's CFL disposal and recycling efforts.

Under the IOUs' proposals, retailers and manufacturers participating in the Basic CFL Program and Super CFL program will not need to meet any requirements regarding CFL disposal.[61] However, when ratepayer funds are used to bring CFLs into California homes at subsidized prices, those funds should be leveraged to help fund end-of-life disposal of CFLs in California. The electric utility EE programs are directly responsible for bringing millions and millions of CFLs into California, and the IOUs have an undeniable role to play in encouraging their proper handling and disposal.

Requiring CFL manufacturers and retailers who are the direct recipients of ratepayer-funded CFL subsidies to actively contribute to California's CFL recycling program is a reasonable way to further this goal and reduce the hazardous waste associated with CFLs. To support the development of the statewide CFL recycling program undergoing development pursuant to AB 1109, the Commission should direct

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bulbs will meet the most recent version of the ENERGY STAR® specifications, should the standards change in time for application during this program cycle.

[61] *See* PG&E Response to TURN DR 2, Q 4 and Q 8; SCE Response to TURN DR 2, Q 4 and Q 8; SDG&E Response to TURN DR 2, Q 4 and Q 8.

the IOUs to require that manufacturers who participate in ratepayer-funded CFL programs make a meaningful contribution to CFL recycling in California.[62] Likewise, the Commission should direct the IOUs to require that retailers who receive direct ratepayer funding as participants in utility CFL programs must agree to provide the public with a convenient in-store collection opportunity for CFL recycling.

E. The Commission should recognize the current energy efficiency goals as statewide gross goals, with the IOUs only responsible for only a portion of the goals.

In Decision 08-07-047, the Commission adopted gross EE savings goals for 2012 through 2020, and similarly redefined the energy savings goals for 2009 through 2011 as gross goals, not net of free riders. The Commission found that its earlier-adopted ten-year goals (2004-2013) were no longer suitable for utility-only programs, and that a gross versus net goal structure would recognize that IOU programs are not the only driver of efficiency gains.[63] The CPUC's Energy Division advised the adoption for each IOU service area of both a total market gross (TMG) goal (to be used for procurement planning and carbon emissions regulation) as well as a utility-specific goal (against which to measure the net effects of utility programs toward meeting the total market gross goal).[64] However, due to perceived limitations in Itron's EE Savings Goals Update Study on how to tease out utility-specific EE program savings from the TMG potential, Energy Division recommended that the Commission adopt the report's TMG goals on an interim

[62] At this time, TURN does not have a specific recommendation for what such a contribution should be, although we note that AB 1173 (Huffman), introduced earlier this year, would similarly require an as-of-yet unspecified manufacturer contribution to the state's CFL recycling program.
[63] Ibid at 2. Pages 19, 23, 28.
[64] Ibid,, page 11.

basis as surrogate utility-specific goals.[65] Importantly, the goals decision recognized that while attributing EE savings to utility program and market effects / market transformation was analytically preferable, using TMG-only goals on an interim basis for 2009-2011 utility-specific goals would be sufficient because it would work to increase portfolio benefits "as utilities find it easier to support more strategic long-term energy efficiency programs."[66]

The Commission's decision to restate the 2009 – 2011 goals on a gross basis instead of net of freeriders had an unintended and extremely negative effect. Rather than move the IOUs to more comprehensive and forward-looking EE portfolios, the IOUs' July 21st Applications and March 2nd Amended Applications are still CFL-dominated, because under the counting change from net to gross, high freeridership CFLs no longer negatively impact savings towards goals, while continuing to act as steroids to the performance earnings basis (PEB) of the RRIM.[67]

To remedy the problems arising from the "gross" goals approach, TURN offers a goals partitioning and savings attribution proposal that draws on the growing trend nationally in allocating EE goals and EE savings between utility and market effects / market transformation. TURN first introduced this concept in our March 24, 2008 comments on the IOUs' March 6, 2008 preliminary EE Strategic Plan.[68] In support of our

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[65] Ibid, page 11

[66] Ibid 2, page 30.

[67] And even this isn't enough for the IOUs as evidenced by their "policy issue" demand for gross savings to count towards PEB.

[68] The comments were not filed with the Commission but submitted to the IOUs via e-mail. TURN also discussed NEEA's approach to goals partitioning and savings attribution in R. 06-4-010 April 8, 2008 TURN Reply Comments to the AC and ALJ Ruling Regarding Cost Effectiveness Metrics and EE Policy Manual; R.08-07-011 August 7, 2008 TURN Reply

suggestion to the IOUs that a market transformation entity share in the responsibility for meeting California's EE goals, TURN explained how this would reduce the savings expected of utility programs alone. We described how the Northwest Energy Efficiency Alliance (NEEA) tracks and attributes the region's energy savings by three categories: Baseline [ongoing naturally occurring EE], Local Incentives [utility EE programs], and Regional Net Market Effects [market transformation activities]. The following chart reproduced from page 7 of the NEEA 2005 Market Activities Report dated October 6, 2006 illustrates how the attribution responsibility works.[69] This shows that in 2005 cumulative total regional energy savings across all sectors were about 250 aMW, with approximately 140 aMW or 56% attributed to regional market effects or market transformation activities, 40 aMW (or 16%) attributable to local incentives or utility EE programs, and 70 aMW (28%) attributable to baseline or ongoing naturally occurring EE. TURN's March 24, 2008 comments to the utilities went on to note that an arrangement similar to the NEEA approach would address the utilities' concern that their focus on attribution of savings to utility programs to meet the EE goals may undermine statewide efforts towards rapid market transformation and integration of programs and strategies.

NEEA's partitioning of EE goals and attribution of EE savings to not just utility programs but also market effects / market transformation is part of a growing trend nationally. The trend recognizes that transforming this country's energy consumption landscape to reduce GHG emission reductions, and more generally the goal of economic

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Comments on the Commission's Draft EE Strategic Plan; and A08-07-021 October 6, 2008 TURN PHC Statement.

[69] www.nwalliance.ogr/research/documents/2005.

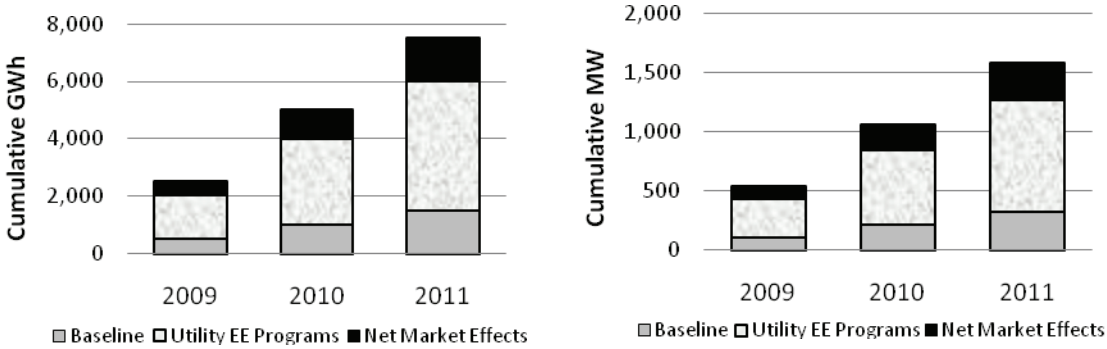
and environmental sustainability, requires aggressive action by all sectors. The American Council for an Energy-Efficiency Economy (ACEEE) April 25, 2008 letter to the AC and ALJ in Rulemaking 06-04-010 Regarding EE Savings Goals through 2012, urged the Commission to raise the goals (representing approximately 1% per year net electricity savings) to be in keeping with other states that are setting higher goals. As shown in Attachment 5, "The National Trend in Sharing the Responsibility and Credit for Energy Efficiency Between Utility and Non-Utility Entities", ACEEE cites nine states with EE goals higher than California's. What ACEEE does not clearly distinguish is that, by and large, the nine states generally represent (1) statewide or state as a whole, not utility-specific goals, (2) as such, the goals are gross not net, and (3) savings are attributed to utility and non-utility entities. For example, Maryland has an overall gross electricity savings goal of 15 per cent by 2015, with the utilities being responsible for 10 per cent and the state for 5 per cent. In Illinois the utilities are responsible for 75 per cent of the state goal and the state for 25 per cent.[70]

The figures below illustrate TURN's recommendation of how the Commission's 2009 – 2011 energy savings goals could be partitioned into the three attribution categories of:

- Baseline / Ongoing Naturally Occurring EE: 20% of the 2009 – 2011 EE goals given the current NTG ratio of 0.80.
- Net Market Effects / Market Transformation Activities: 20% of the 2009- 2011 EE goals given the difference between the current based NTG ratio of 0.80 and the DEER 2008 Update NTG ratio of 0.60.
- Utility EE Activities and Programs: 60% of the 2009 – 2011 EE goals given the difference between the gross goals (100) and the DEER 2008 Update NTG ratio of 0.60.

[70] Personal communication from Steve Nadel, ACEEE, May 28, 2008.

TURN Figures 2 and 3
Cumulative GWh and MW Goals 2009-2011 Partitioned by the Attribution Categories of:
20% Baseline / Ongoing Naturally Occurring EE Net Market Effects,
60% Utility EE Activities and Programs, and 20% Market Transformation Activities



On a going forward basis for 2009-2011, the IOUs' Supplemental Filings would work to achieve goals 40% lower than (or 60% of) their 2009-2011 EE Portfolio Applications. Because the IOUs' goals are being adjusted to essentially net out the free-ridership CFL effect in the 2006-2008 portfolios, the IOUs' would more readily pursue developing an "exit plan" for their current upstream CFL manufacturer buy down program. TURN suggests that 2009 be viewed as the transition year for either the utilities or the Commission ensuring that big box and home improvement retailers such as Wal-Mart and Home Depot are ready to stock Energy Star price discounted CFLs in CA as IOUs phase CFL programs out, and to engage in negotiations with manufacturers and retailers to buy-down prices and stock the next generation of high efficiency lighting.

F. The Amended Applications continue to underemphasize peak and critical peak energy efficiency available through programs such as HVAC efforts.

TURN has long advocated that the IOUs should be much more aggressive in targeting residential space conditioning improvements (cooling and heating) as a means of achieving critical peak and peak energy efficiency savings. Peak EE reduces system

capacity needs, which provides a host of environmental and economic benefits associated with deferring new generation, distribution, and transmission investments. Additionally, peak-shavings EE can be a cost-effective tool for increasing system reliability. Moreover, more extensive deployment of cost-effective peak-shaving EE increases utility system load factors, thereby decreasing the cost-of-service for all utility customers. (See D.05-09-043, pp. 106-07). Accordingly, TURN has been very supportive of the Commission's active promotion of comprehensive, integrated, and aggressive (while still cost-effective) peak and critical peak programs as evidenced in the CEESP.

Unfortunately, in the seven months that lapsed between the IOUs initial and revised Applications the extremely inadequate forecast of net MW savings and allocation of portfolio funds to residential HVAC EE from July 2008 has further eroded. TURN TABLE 10 "Relative Budget Allocations and EE Savings for the Residential End Use Categories HVAC and Lighting: Compliance Scenario; Comparison July 2008 Applications and March 2009 Amended Applications" shows that on an end results basis forecasted net MW residential HVAC savings have dropped from 9% of the total portfolio in July 2008 to 6% in March 2009 (last 2 rows, right hand columns). PG&E registers the largest drop in forecasted net MW residential HVAC savings, dropping from 11% in July 2008 to 5% in March 2009; SCE from 7% to 6%, with SDG&E holding at 3%.

TURN TABLE 10
Relative Budget Allocations and EE Savings for the
Residential End Use Categories HVAC and Lighting: Compliance Scenario
Comparison July 2008 Applications and March 2009 Amended Applications

	8-Jul		9-Mar		8-Jul		9-Mar		8-Jul		9-Mar	
	Budget	%T	Budget	%T	Net	%T	Net	%T	Net	%T	Net	%T
PG&E	$ millions	Portfolio	$ millions	Portfolio	GWh	Portfolio	GWh	Portfolio	MW	Portfolio	MW	Portfolio
Total Portfolio	$1,873		$1,803		3,695		2,666		709		520	
Res HVAC	$58	**3%**	$46	**3%**	55	**1%**	17	**1%**	79	**11%**	29	**6%**
Res Lighting	$146	8%	$76	4%	1,174	32%	798	30%	171	24%	94	18%
SCE*												
Total Portfolio	$1,344		$1,344		2,699		4,154		811		850	
Res HVAC	$20	**1%**	$19	**1%**	72	**3%**	70	**2%**	61	**7%**	56	**7%**
Res Lighting	$210	16%	$303	23%	564	21%	1,049	25%	73	9%	144	17%
SDG&E												
Total Portfolio	$280		$514		533		635		102		135	
Res HVAC	$14	**5%**	$10	**2%**	5	**1%**	6	**1%**	3	**3%**	4	**3%**
Res Lighting	$28	10%	$28	6%	177	33%	158	25%	21	21%	26	20%
TOTAL 3 IOUs												
Total Portfolio	$3,497		$3,661		6,928		7,455		1622		1,506	
Res HVAC	$92	**3%**	$75	**2%**	132	**2%**	93	**1%**	143	**9%**	89	**6%**
Res Lighting	$384	11%	$408	11%	1,915	28%	2,005	27%	265	16%	265	18%

* SCE's lighting budget includes its Advanced Consumer Lighting Program

Source: Table 4.2 (Total Budget), Table 1.2 (HVAC and Lighting Budget), Table 1.4 (Savings)

The IOUs' most recent proposals are moving in the wrong direction with regard to residential HVAC savings.

As for commercial HVAC opportunities, the Commission should require that all new commercial buildings and commercial buildings requiring HVAC retrofits be fitted with variable air volume systems, which change the amount of airflow in response to changes in heating and cooling load, and variable speed drive heating and air conditioning.

Variable air volume systems handle changing load requirements by varying the amount of heated or cooled air circulated to the conditioned space in response to varying heating or cooling loads. This reduces fan power requirements, which saves energy and conditioning costs. [71]

Variable-speed drives are an efficient and economical retrofit option that should be considered for all VAV systems. Variable-speed drives allow the motor speed to vary depending on actual operating conditions, rather than operating continuously at full speed. Varying a fan's speed allows it to match changing load requirements more closely, and because fan power draw is proportional to the cube of its speed, reducing speed can save a lot of energy. For example, reducing a fan's speed by 20 percent can reduce its energy requirements by nearly 50 percent. Installing a VSD on the fan motor allows the fan to automatically match this reduced capacity, slowing down in response to reduced demand, thereby saving energy.[72] Variable speed drives also provide demand

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[71] CEC. 2008. EnergyStar® Building Manual, updated April 2008, Ch. 8, pp. 5. Available: www.energystar.gov/index.cfm?c=business.EPA_BUM_CH8_AirDistSystems#SS_8_4_4
[72] *Ibid*., pp. 16.

response capability without significant impacts on occupant comfort, as a 10-15% reduction in fan speed during critical peak hours can reduce fan energy use by about 25-40%.

G. The Amended Applications do not reflect innovative statewide implementation approaches and program delivery.

The IOUs' Amended Applications do not reflect innovative statewide implementation approaches and program deliveries. As discussed earlier, the IOUs' proposed continuation of CFL-dominated portfolios is perhaps the clearest example of a failure in this regard. The Statewide Appliance Recycling Program (ARP) is another example of a program that has outlived its useful purpose. Refrigerator recycling through the ARP is one of the more visible and long-running energy efficiency programs within the IOU portfolios. The program's central message, that your electric utility will pay you to give up something that may be difficult to dispose of, resonates with many people.

When refrigerator recycling programs—organized for the purpose of saving energy—first started in California in the late 1970s, they were focused on collecting secondary refrigerators, such as those that people kept in their garages or basements and used infrequently or not at all. This intervention was termed '**retirement**,' in contrast to '**replacement**,' which refers to the collection of primary refrigerators—those in people's kitchens. By directing attention to the energy waste associated with older, often little used, second refrigerators and making it easy (and generally remunerative) to get rid of them, the expectation was that people would not only get rid of them through such a program, but would be persuaded to give up having a second fridge altogether: they would not replace it.

Under the assumption that the refrigerators being collected and destroyed are secondary garage / basement refrigerators and will not be replaced, the per-unit energy saved is estimated to roughly correspond to the in-use electricity consumed by the collected fridge. On the other hand, if primary kitchen refrigerators are collected (as has increasingly become common in California) program planners recognize that the collected refrigerator will be replaced with another refrigerator. In those cases[73] the energy savings might be expected to correspond to the difference between the old refrigerator's and the new refrigerator's electricity consumption. The accounting methods used to determine program level energy savings do not adhere to this logic, however. Instead the ARP continues to assume that by and large it is secondary garage / basement refrigerators are being picked up, thus crediting the ARP with the higher 'retirement' EE savings. The need to correct this generous accounting practice is but one of the criticisms of the program discussed below. Ironically, brochures mailed out to ratepayers get the calculation right, as they feature this simple calculation where the new unit's usage is subtracted from the old one's (Figure 4 below).

The federal regulations requiring new refrigerators to meet minimum energy efficiency thresholds adopted in 1990, followed by more stringent requirements in 1993 and in 2001, have resulted in the difference between the energy consumed by the old refrigerator and its higher efficiency replacement to drop from nearly 836 kWh/yr (when

[73] In practice many of the secondary garage / basement refrigerators now collected in this program are also replaced, rendering the distinction between primary and secondary to a large extent anachronistic.

a unit 25 years or older is replaced) to 248 kWh/yr (for replacing a 5 year old unit).[74] (see Figure 4)[75]

Figure 4

2006 PG&E calculation of energy savings from refrigerator replacement

Refrigerators: ENERGY STAR vs. Older Models

Age of existing refrigerator	Average Annual energy use - current model (kWh/year)	Average annual electric bill savings (kWh/year)*	Average annual energy savings ($)**
5 years old	690	248	$32
10 years old	653	211	$27
15 years old	934	492	$63
20 years old	1,139	697	$89
25 years old	1,278	836	$107

** Savings are based on comparison to the average annual use of a new ENERGY STAR qualified refrigerator using 442kWh/year. Actual energy consumption may vary based on size and individual usage patterns.*
*** Rates effective May 2004 ($ 0.128/kWh avg).*

Pacific Gas and Electric Company®

Source: refrigerator_recycle_v12.pdf

The original program requirements on retiring 'unnecessary,' 'wasteful,' or 'energy guzzling' second refrigerators had prevented pick-up crews from collecting the primary fridges. Beginning in 1999, however, the IOUs' and appliance recycling contractors' advocacy in favor of relaxing eligibility criteria succeeded in expanding the program to include the pick-up of primary (kitchen) refrigerators.

As compared to secondary refrigerators that had already served two or more lives as primary (kitchen) and then as a secondary (garage or basement) refrigerator, primary

[74] ENERGY STAR. 2006. "Refrigerators: 2006 Partner Resource Guide." (Retrieved October 12, 2006) (The link is no longer active, but can be retrieved through archive.org). www.energystar.gov/ia/partners/manuf_res/downloads/Refrigerator_Partner_Resource_Guide.pdf
[75] Pacific Gas & Electric, 2004. "Retire, Recycle, Replace." Brochure.

refrigerators are reasonably expected to be younger and, by virtue of the federal appliance energy efficiency standards, increasingly more energy efficient as time passes. Thus relaxing the eligibility criteria permits collection of more refrigerators, but with declining average energy savings per collected unit, the fraction of primary (kitchen) refrigerators increases and declining average age of collected unit. Already in 2002, the Residential Appliance Saturation Survey (RASS) revealed that "Fifty-seven percent of primary refrigerators [we]re seven years or less old. Twenty percent [we]re eight to ten years old and 18 percent [we]re more than 10 years old."[76]

Most of the inefficient refrigerators manufactured between the mid-1960s and the late-1980s (prior to the federal standards) have already been retired, scrapped, or recycled. The sharp increase in sales of new refrigerators beginning in the 1990s and continuing to the present combined with little change in the saturation rates of refrigerators suggests that consumers have internalized the message that keeping older refrigerators in use is obsolete. Refrigerators on average are estimated to be kept around for only 15 or 16 years compared to 19 years twenty years ago. It is time to revisit and reconsider some of the core assumptions about how the program is structured, and whether it is still necessary. Table 11 below outlines the recently concluded ARP for 2006-08 as well as the 2009-11 goals and assumptions for this program. TURN issues and concerns with the assumptions are as follows:

- First and foremost, for the three electric utilities the gross KWh savings are for retirement, not replacement, meaning the total refrigerator energy

[76] 2004-05 RARP EM&V report p. 6-9

usage is credited as savings, rather than the incremental usage between the new higher efficiency and existing unit.

- Next, the variation in assumptions among the IOUs, and between the 'compliance' and 'preferred' portfolios is striking. SCE's NTG of 1.0 is an example of wishful thinking without any basis in the existing literature.

In short, the Statewide Appliance Recycling Program (ARP) should be phased out for the following reasons:

1. Large refrigerator retail outlets such as Lowe's, Home Depot, Best Buy, and Sears now offer free pickup of used refrigerators in conjunction with delivery of a new model.
2. The ARP savings are overstated and will continue to fall:
    - The California refrigerator population has already moved beyond the cohorts (age of unit and efficiency) that corresponded to "the problem" of inefficient refrigerators. The population is now made up to a significant degree of refrigerators manufactured after federal energy efficiency standards went into effect.
    - Homeowners often upgrade to a refrigerator that is not only more energy efficient but is also larger and has more features, further diminishing the realized incremental savings from the program intervention.
    - Because the ARP longstanding program rationale of removing second "garage" refrigerators has changed to largely removing the existing primary kitchen refrigerator that is being replaced, total program savings

are significantly less, rendering the program at best only marginally cost effective.

3. The ARP has had no effect on the number of second refrigerators kept by CA households.

1. Free retail sector refrigerator pickup is available: The private sector (here understood to include large refrigerator retail outlets such as Lowe's, Home Depot, Best Buy, and Sears) now offers free pickup of used refrigerators in conjunction with delivery of a new model.[77] The logistics of this approach to collection are more efficient than the statewide ARP model (and cheaper to ratepayers since utility-administered funds subsidize the effort). In the case of Home Depot, JACO, one of two ARP contractors the IOUs rely on, is also the vendor who collects the refrigerators for (1) shredding/recycling of models the used market will not support, and (2) possible resale of newer, more energy efficient and otherwise more desirable models in the secondary appliance market.[78]

   Given the private sector's ability to collect used refrigerators at no direct cost to

[77] http://www.lowes.com/lowes/lkn?action=pg&p=Promos/ApplianceDelivery07.html&lks=apaa1
http://www.homedepot.com/webapp/wcs/stores/servlet/ContentView?pn=AP_Appliance_Offers&langId=-1&storeId=10051&catalogId=10053#APCredit
http://www.sears.com/shc/s/DZExclusion?collateralId=318598&EXCLID=1&storeId=10153
"Best Buy recently announced offering an appliance recycling program, the success of which may offer additional information on the relative importance of convenience and rebates in particular customer and appliance vintage segments." (SCE 09-11 PIP, p. 100)

[78] 3PD (http://www.3pd.com/) is the company which collects the appliances for Home Depot, and JACO collects them daily from 3PD. JACO already collects and recycles refrigerators for the ARP, but the firm also collect appliances, including refrigerators, separately for other clients which are not recycled; so it is possible that public funds could usefully be injected at this point in the process to subsidize the recycling of some of those refrigerators—if a subsidy is even necessary.

the consumer there is no need for ratepayers to continue subsidizing refrigerator collection. Ensuring that operable inefficient refrigerators stay out of the used market might require a subsidy, though even this may no longer be necessary, since recent appliance recycling evaluation reports indicate that these older refrigerators are no longer admissible in the used market.[79] While the recycling could conceivably pay for some of the program costs through sales of constituent materials, scrap prices are too variable to reliably pay for such a modified version of the ARP. Consequently modest subsidies from ratepayer funds (significantly lower than those currently awarded the ARP) would likely continue to be appropriate.

2. <u>The ARP savings are overstated now and will continue to fall in the future:</u>

   The population of refrigerators that can be expected to be collected in the 2009-11 program cycle were largely manufactured after 1990 or 1993 when successive federal standards governing refrigerator energy efficiency went into effect. Past calculations of refrigerator unit energy consumption (UEC) collected through the ARP and its antecedents suggest but do not capture the extent of this transition. Soon the difference between the UEC of the old and the new refrigerator will on average be too small to justify collection and recycling on a stand-alone ARP basis, never mind the environmental and economic reasons that should discourage more rapid turnover in what used to be called durable goods.

   The most recent EM&V report on the 2004-05 ARP already indicates the nature

[79] "Only used refrigerators less than 10 years were likely to be sold and remain in use; refrigerators over 10 years old were likely to be destroyed." (p.3-8, 2004-05 RARP EM&V report)

of this problem: nearly one-third of the secondary and one-quarter of the primary refrigerators collected by the program were less than ten years old.[80] In nearly all cases, one would expect that **these refrigerators should never have been discarded, collected, or replaced as part of a stand-alone recycling program.** The fact that this happened at all indicates what a poor job the ARP marketing and outreach has done distinguishing between refrigerators which are the problem (older, large) and which are not the problem (younger, small). Energy consumption of US refrigerators correlates with both age and size, and the IOUs have resisted incorporating either into the program eligibility guidelines. Many of these younger refrigerators are, for all intents and purposes, indistinguishable—in terms of UEC—from the ones that can be expected to replace them. The fraction collected in the 2006-08 program that was manufactured after the early 1990s was in any case higher, and will surely rise with the 2009-11 program.

The IOUs' advocacy of collecting both primary (kitchen) and secondary (garage/basement) refrigerators in 1999, which has subsequently morphed into a program where five out of six refrigerators collected are primary refrigerators[81], and where the majority of secondary refrigerators collected are *also* replaced, obscures the earlier program rationale that secondary refrigerators can and should be retired (not replaced). The program focus should be to maximize the *net*

[80] "The analysis of the survey data indicated that about 77.0% of primary refrigerators recycled and about 67.4% of the secondary refrigerators recycled were over 10 years old." (2004-05 RARP EM&V report, p.3-8)

[81] (2004-05 RARP EM&V report, p. 3-20 and Appendix B-2) "Main refrigerators were estimated to represent 83.8% of this category and spare refrigerators 16.2%."

refrigerator kWh removed from the grid, but only where the savings are e.g., >500kWh per household (see above).[82]

3. <u>The program appears to have no effect on the number of secondary refrigerators:</u> While the program has an effect on the used market for refrigerators—restricting the supply as well as shifting public attitudes about the desirability and responsibility of buying a used refrigerator—it has a limited effect in reducing the total *number* of refrigerators in use. According to Glen Sharp at the CEC, the saturation of secondary refrigerators in California remains largely unchanged at roughly 20% of California households.[83]

   Because the accounting methods developed for the ARP do not subtract out the replacement refrigerator's usage (as suggested in Figure 1) but focus on the population of refrigerators that is removed from the grid, the program savings are overstated. The energy savings attributable to the program should reflect the incremental kWh energy savings between the old and the new refrigerator. Crediting the program with removal of the (old) refrigerator without accounting for the (new) model that takes its place is like giving a lighting program credit for removal of the incandescent bulbs without subtracting the energy consumption of the energy consumed by the CFLs that replace them.

   As TURN Table 11 indicates, under SCE's proposal a refrigerator collected by its

[82] Refrigerator programs that target low income households commonly stipulate a minimum UEC replacement threshold. Five hundred kWh/yr is a fairly low differential for such a program. see http://www.waptac.org/si.asp?id=498 (Figure 10)

[83] Glen Sharp, CEC, personal communication March 6, 2007 & April 15, 2009 The Residential Energy Consumption Survey (RECS) also confirms this trend for the US as a whole: http://www.eia.doe.gov/emeu/recs/

ARP would be treated as if it achieved per unit energy savings of 1,448 kWh/yr. This figure no longer reflects the population of used refrigerators, and should be scaled back to a figure closer to the 669 kWh/yr figure PG&E put forward. This is the gross savings figure. The majority of refrigerators collected through the ARP can be expected to be replaced with another unit that consumes a minimum average of 510 kWh/yr.[84] Thus the net savings is much smaller, so small in fact that it is likely to be too small to warrant the program's continuation. The declining yield in terms of energy savings per refrigerator collected cannot justify the nearly $200 price tag for each pickup (see Table 11).

TURN TABLE 11
IOUs Statewide Appliance Recycling Program (ARP)

			kW	EUL	NTG	Gross kWh	Net kWh	# refrig	Budget	cost/unit	TRC
2006-08		PG&E	0.30	10.0	0.35	1,946	681	82,341	*$17,000,000*	$206	
		SCE	0.30	10.0	0.61	1,656	1,010	187,183	$36,215,126	$193	
		SDG&E	0.30	10.0	0.35	1,946	681	30,087	$7,466,096	$248	
		Total						**299,611**	**$60,681,222**		
2009-11	Preferred	PG&E	0.142	5.0	0.62	624	387	350,982	$39,600,676	$173	1.38
		SCE	0.223	10.0	1.00	1,448	1,448	210,000	$40,474,000	$189	3.68
		SDG&E	0.225	5.0	0.61	1,461	891	34,200	$6,734,546	$197	2.58
		Total						**595,182**	**$86,809,222**		
	Compliance	PG&E	0.132	4.9	0.62	669	415	350,982	$39,600,676	$113	1.38
		SCE	0.257	4.9	0.62	1,198	743	210,000	$40,474,000	$193	1.32
		SDG&E	0.20	5.0	0.61	977	596	63,045	$19,080,986	$303	1.15
		Total						**624,027**	**$99,155,662**		1.15

*The compliance budget number for SDG&E's ARP is more than three times their preferred number. This is cause for concern, especially as the number of refrigerators is only twice as large. Also a budget figure for PG&E's 2006-08 ARP was not discovered. The figure of $17M is an estimate.

H. Overall Spending and A&G Trends

Meeting the 2020 energy efficiency goals in a cost-effective way requires that the utilities minimize both total costs with respect to the energy and demand savings

[84] AHAM. 2005 "Refrigerators: Energy Efficiency and Consumption Trends." In practice this is likely to be slightly higher since replacements tend to be larger and more heavily featured models.

implemented. The total combined proposed Utility budget increased from an actual expenditure of $1.91 billion during the 2006-2008 program cycle to a proposed 2009-2011 budget of $3.47 billion (net of EM&V costs), an 82% increase.[85]

The table on the next page shows spending by category from the 2006-08 and 2009-2011 program cycles, as well as utility estimates of energy savings for PG&E, Edison, and SDG&E. [86]

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[85] Includes all applicant utilities. These figures exclude EM&V, which is a contractor cost that is largely controlled by the Commission, not the utility. TURN does have concern with the magnitude of the Utility estimates of EM&V costs, and comment on this issue, below.

[86] Sources:
2006-2008 program cycle:
Expenditures from CPUC Website (as reported by Utilities), SCE, SDG&E, and SoCalGas expenditures from eega2006.cpuc.ca.gov/ReportsDisplay.aspx, PG&E from eega2006.cpuc.ca.gov/DataQueriesDisplay.aspx?QueryName=QuarterlyProgramExpenditures.
Savings from eega2006.cpuc.ca.gov/DataQueriesDisplay.aspx?QueryName=MonthlyProgramImpacts.
2009-2011 program cycle:
Expenditures from PG&E, Appendix A-02, Table 4.2; SCE, Exhibit 2 Attachment A; SDG&E, TURN-SDGE DR 8-1, Table 4.2 (Preferred).
Savings from EE Revised Applications (PG&E, pp. 5; SCE, pp. 8; SDG&E, pp. 9) & Testimony (SDG&E, Besa pp. 5).
Note: The 2006-2008 program cycle figures are self-reported by the Utilities themselves. By using these figures for comparative purposes in assessing levels of utility spending, we are not endorsing the figures as past estimates of utility spending (as remain subject to EM&V and significant reductions have resulted from the EM&V process). The 2009-2011 program cycle figures in the table are "Preferred" scenario figures. TURN does not endorse Utility estimates of future savings as likely to occur given the Utilities' program designs. Rather we are using utility figures for what they claim to have done and what they plan to do to show the increase in cost per unit – even as assumed by the utilities themselves.

Table 12: Comparison of Utilities' (PG&E, Edison, and SDG&E) Actual 2006-2008 Program Cycle Spending and Energy Savings with Proposed 2009-2011 Program Cycle Budget and Savings[87]

	2006-2008 Cycle					2009-2011 Cycle				
Utility	Total Expenditure	A&G Expenditure	A&G + Marketing & Outreach Expenditure	Program Expenditure (net of A&G + Marketing & Outreach)	Adjusted MWh savings*	Requested Total Budget (Net of EM&V Costs)	Requested A&G Budget	Requested A&G + Marketing & Outreach Budget	Program Expenditure	Utility Adjusted MWh targets*
PG&E	$901,602,859	$123,643,099	$221,759,959	$777,959,760	10,564,497	$1,669,373,474	$271,315,144	$425,068,781	$1,398,058,331	6,341,000
Edison	$670,478,452	$58,656,470	$150,285,811	$611,821,982	4,365,773	$1,254,019,000	$150,583,394	$211,907,391	$1,103,435,606	5,553,000
SDG&E	$215,159,482	$32,694,479	$50,424,816	$182,465,003	1,088,140	$295,889,445	$68,120,682	$111,672,402	$227,768,763	770,300
Total	$1,787,240,793	$214,994,048	$422,470,587	$1,572,246,745	16,018,410	$3,219,281,919	$490,019,219	$748,648,574	$2,729,262,700	12,664,300
per kWh										
PG&E	$0.0853	$0.0117	$0.0210	$0.0736		0.2633	0.0428	0.0670	0.2205	
Edison	$0.1536	$0.0134	$0.0344	$0.1401		0.2258	0.0271	0.0382	0.1987	
SDG&E	$0.1977	$0.0300	$0.0463	$0.1677		0.3841	0.0884	0.1450	0.2957	
Total	$0.1116	$0.0134	$0.0264	$0.0982		0.2542	0.0387	0.0591	0.2155	

	2009-11 % increase from 2006-08				
Utility	Requested Total Budget (Net of EM&V Costs)	Requested A&G Budget	Requested A&G + Marketing & Outreach Budget	Requested Program Expenditure (net of A&G + Marketing & Outreach)	Savings, Adjusted MWh *
PG&E	85%	119%	92%	80%	-40%
Edison	87%	157%	41%	80%	27%
SDG&E	38%	108%	121%	25%	-29%
Total	80%	128%	77%	74%	-21%
per kWh					
PG&E	208%	266%	219%	199%	
Edison	47%	102%	11%	42%	
SDG&E	94%	194%	213%	76%	
Total	128%	188%	124%	120%	

* Adjusted MWh are electric savings plus gas savings valued at 8500 Btu/kWh (11.765 kWh per therm).

The table shows that utilities (excluding SoCalGas) propose to spend 80% more in 2009-2011 than they did in 2006-2008, but are projecting an energy savings reduction

[87] Please note that differences between Table 12, here, and Table 2, above, are due to the following:

1) For 2006-2008 program cycle, Table 12 here reflects actual expenditures, whereas, Table 2 above reflects 2006-2008 authorized budgets.
2) For 2009-2011 program cycle, Utility budgets are reported in Table 12 here as budgets net of EM&V expenses, whereas, Table 2 above included EM&V.
3) Table 12 here uses "Preferred" Scenario budgets for the 2009-2011 program cycle, whereas, Table 12 above uses Compliance budgets.
4) Table 12 here includes numbers for three of the four IOUs (PG&E, Edison, and SDG&E), whereas, Table 2 above sums across all four IOUs.

of only 21%.[88] Essentially, the unit cost of energy savings would increase by 128% state-wide if the utilities are allowed to have their way.

We have started to analyze administrative costs in detail because one would expect that as actual program costs increase, the cost of administration should be reduced on a percentage basis as a result of the effect of increasing returns to scale. But this kind of economy of scale does not seem to exist in the utility filings. TURN's review to date of the Utilities' proposed budgets indicates that A&G costs[89] have increased at substantially higher rates in 2009-2011 than even the overall program budgets. The total of the Utility-designated administration budgets has increased from an actual expenditure of $234 million for the 2006-2008 program cycle to a request of $649 million for the 2009-2011 program cycle, a 177% increase. The utility with the most remarkable change is SoCal Gas, which proposes to spend almost 63% of its $251.4 million budget ("Preferred", excluding EM&V) on administration and increase its administration budget by 740% while *decreasing* non-administrative spending by 9.5%. Its 2009-2011 request **for program administration** ($159 million) is 31% more money than it spent on its entire program in 2006-08 ($121 million). The other Sempra utility, SDG&E proposes to increase spending on administration by 108% and marketing and outreach by 121%, while increasing total spending by only 38%. In other words, rebates and other direct services to customers will increase by about 12%, and the rest will be gobbled up in

[88] In making this calculation, we count each kWh of electricity saved as equal to 8500 Btu of natural gas to reflect natural gas used in a power plant to generate electricity, based generally on recent trends in electric market prices.

[89] When using the term "administration" or "A&G", we use utility definitions of those costs. However, TURN believes that other administrative cost components not related to directly providing service, including marketing and outreach costs and rebate processing and inspection costs (defined clearly for some utilities but not others) require careful evaluation and analysis because they do not provide direct services and, therefore, warrant similar consideration as "A&G."

bureaucracy and marketing. No wonder SDG&E's preferred goal is to achieve 29% less savings than it claimed that it achieved in 2006-08! Both PG&E and Edison have higher administrative spending increases than total increases. PG&E's administrative spending increases 119% with an 80% increase in all other spending. For Edison, the figures are 157% administrative increase and an 80% increase in other spending.

As noted above, the overall combined budgets of the Utilities have increased 82%. In other words, the Commission is not seeing <u>any</u> returns to scale with respect to the administration of its programs. In fact, it seems that the Utilities actually are forecasting decreasing returns to scale not only in program spending (dollars spent per unit of energy saved) but in administration. Utility-identified A&G has increased from 12.4% to 15.2% of the total program cost and A&G plus marketing and outreach has stayed static at about 23% of total spending as shown above.

In addition, TURN is concerned about costs of inspections and rebate processing – which are essentially back-end administration, even though technically included in program delivery costs in the utility templates. While all of the utilities have not reported these figures in the same way so that we cannot include them in the comparative discussion of 2006-2008 and 2009-2011 above.

Finally, these rising administrative costs do not tell the entire story. As noted below, the utilities deliberately choose not to include significant portions of both their administrative costs and their program costs in their EE budgets by leaving out labor overheads such as pensions, benefits, workers' compensation, payroll taxes, and administrative costs directly related to labor such as human resources departments and costs of office space.

1. Lack of specific plan to administer EE programs

PG&E and Edison—although this could apply to the Sempra Utilities, as well[90]—have demonstrated through their responses to DRs that they do not have a well-thought-out plan for implementing their proposed EE programs. Neither PG&E nor Edison has developed organizational charts for the 2009-2011 program years (TURN DR 1-3 for both PG&E and Edison). Edison cannot even say how many FTE employees per year it will have in the event the Commission approves its application (TURN-SCE DR 1-5). This represents a profound lack of planning, which begs the question of how the Utilities even derived their budgets in the first place. It certainly throws into doubt the cost-effectiveness values of individual programs, thereby preventing a comprehensive ranking of program effectiveness. Moreover, the absence of organizational charts or estimations of the number of FTE employees that would be required if the Commission were to adopt the Utilities' applications, introduces the prospect of double counting of costs across various proceedings. For example, without knowing what, if any, employees the Utilities are employing for HR for their EE programs, it is not possible to ascertain whether they are asking for HR recovery here in the EE proceeding that have already asked for and been approved for in the GRC proceedings.

Recommendation:

The Commission should require all of the Utilities to provide a proposed organizational chart and estimate of the FTE employees they intend to employ during the 2009-2011 program cycle, and to fully account for and justify—in a level of detail

[90] PG&E and Edison; TURN has not received the Sempra Utilities' DR responses on this issue because of issues surrounding the Sempra Utilities claim of confidentiality regarding organizational charts. TURN needs to follow-up with the Sempra Utilities to work out a reasonable non-disclosure agreement.

consistent with the showing required in a GRC-type review of Test Year spending proposals—each of the positions that they propose to include.

2. Proper Review of Other Support Costs that are Administrative in Nature

a. Rebate Processing, Inspection, Marketing, and Outreach Costs--Like Administration--Do Not Provide Direct Services.

Certain program costs identified in the Utilities' Portfolio Budgets that, while not assigned to EE program A&G by the Utilities, are administrative in nature, nonetheless. When programs are reviewed, these costs – that do not provide direct services – should be identified, called out, and scrutinized in order to correctly assess the administrative burden contained in the individual programs and to better understand the "on the ground" portion of the Direct Implementation budget component. The table below (taken from Table 4-2 of PG&E's Appendix A-02) shows how programs are identified in the Commission's common format.

Table 13:

Originally Table 4.2 from PGE Appendix A-02 – Portfolio Tables, Mandated Preferred Scenario (revised March 25, 2009)

Table 4.2	PG&E Portfolio Budget by E3 Formats (Revised 3/25/09)								
	PROGRAM Category	Core Portfolio - Base Scenario	Percent	Third Party Portfolio	Percent	Govt Partnership Portfolio	Percent	Total EE Portfolio	Percent
	BUDGET (IOU+Subcontractor)								
A.	**Administrative Costs**	**$ 157,969,343**	**12.6%**	**$ 69,444,317**	**20.8%**	**$ 43,901,484**	**20.2%**	**$ 271,315,144**	**15.0%**
A.1	Overhead (G&A Labor/Materials)	**$ 67,870,315**		**$ 14,734,000**		**$ 10,999,744**		**$ 93,604,060**	
A.1.1	IOU	$ 67,870,315		$ 14,734,000		$ 10,999,744		$ 93,604,060	
A.1.2.	Subcontractor	$ -		$ -		$ -		$ -	
A.2	Administrative Costs - Labor (Managerial & Clerical)	**$ 66,326,342**		**$ 53,160,077**		**$ 30,435,900**		**$ 149,922,318**	
	IOU	$ 22,447,167		$ 6,617,820		$ 8,484,457		$ 37,549,445	
	Subcontractor (1)	$ 43,879,174		$ 46,542,257		$ 21,951,442		$ 112,372,873	
A.3	HR Support/Development	**$ 13,868,359**		**$ 904,369**		**$ 1,438,506**		**$ 16,211,234**	
	IOU	$ 13,868,359		$ 904,369		$ 1,438,506		$ 16,211,234	
	Subcontractor	$ -		$ -		$ -		$ -	
A.4	Travel, Conference Fees	**$ 9,904,327**		**$ 645,871**		**$ 1,027,334**		**$ 11,577,532**	
	IOU	$ 9,904,327		$ 645,871		$ 1,027,334		$ 11,577,532	
	Subcontractor	$ -		$ -		$ -		$ -	
B.	**Marketing and Outreach**	**$ 125,148,369**	**10.0%**	**$ 16,817,761**	**5.0%**	**$ 11,787,507**	**5.4%**	**$ 153,753,637**	**8.5%**
B.1	Labor	**$ 125,148,369**		**$ 16,817,761**		**$ 11,787,507**		**$ 153,753,637**	
	IOU	$ 10,147,609		$ -		$ 568,920		$ 10,716,529	
	Subcontractor (list)	$ 115,000,760		$ 16,817,761		$ 11,218,587		$ 143,037,108	
B.2	Materials	**$ -**		**$ -**		**$ -**		**$ -**	
	IOU	$ -		$ -		$ -		$ -	
	Subcontractor (list)	$ -		$ -		$ -		$ -	
C.	**Direct Implementation (Incentives and Rebates)**	**$ 443,111,720**	**35.4%**	**$ 151,211,079**	**45.2%**	**$ 75,490,242**	**34.7%**	**$ 669,813,041**	**37.2%**
	User Input Incentive	**$ -**		**$ 27,412,303**		**$ -**		**$ 27,412,303**	
	End User Rebate	**$ 443,111,720**		**$ 78,278,093**		**$ 33,281,549**		**$ 554,671,362**	
	Direct Install Labor Activity	**$ -**		**$ 26,244,150**		**$ 39,988,133**		**$ 66,232,283**	
	IOU	$ -		$ -		$ -		$ -	
	Subcontractor	$ -		$ 26,244,150		$ 39,988,133		$ 66,232,283	
	Direct Install Materials & Service	**$ -**		**$ 17,738,364**		**$ 1,852,628**		**$ 19,590,992**	
	IOU	$ -		$ -		$ -		$ -	
	Subcontractor	$ -		$ 17,738,364		$ 1,852,628		$ 19,590,992	
	Upstream/Midstream rebates	**$ -**		**$ 1,538,170**		**$ 367,931**		**$ 1,906,102**	
								$ -	
D.	**Direct Implementation (Non Incentives and Rebates)**	**$ 391,527,604**	**31.3%**	**$ 96,788,435**	**29.0%**	**$ 86,175,614**	**39.6%**	**$ 574,491,653**	**31.9%**
	Activity	**$ 372,136,230**		**$ 90,953,669**		**$ 60,178,092**		**$ 523,267,991**	
	IOU	$ 112,802,877		$ 1,720,994		$ 6,463,694		$ 120,987,565	
	Subcontractor	$ 259,333,353		$ 89,232,675		$ 53,714,398		$ 402,280,426	
	Installation	$ -		**$ -**		**$ -**		**$ -**	
	Hardware & Materials	$ -		**$ -**		**$ -**		**$ -**	
	Rebate Processing & Inspection	**$ 19,391,374**		**$ 5,834,766**		**$ 25,997,522**		**$ 51,223,662**	
	Labor	**$ 19,391,374**		**$ 5,834,766**		**$ 25,997,522**		**$ 51,223,662**	
	IOU	$ 14,560,347		$ 2,092,206		$ 1,074,692		$ 17,727,244	
	Subcontractor	$ 4,831,027		$ 3,742,560		$ 24,922,830		$ 33,496,417	
	Materials	**$ -**		**$ -**		**$ -**		**$ -**	
	IOU	$ -		$ -		$ -		$ -	
	Subcontractor	$ -		$ -		$ -		$ -	
F.	**EM&V Costs**	**$ 133,549,878**	**10.7%**	**$ -**	**0.0%**	**$ -**	**0.0%**	**$ 133,549,878**	**7.4%**
	Utility	$ 48,549,878		$ -		$ -		$ 48,549,878	
	Commission Staff	$ 85,000,000		$ -		$ -		$ 85,000,000	
	Budget	**$ 1,251,306,913**	**100.0%**	**$ 334,261,592**	**100.0%**	**$ 217,354,847**	**100.0%**	**$ 1,802,923,352**	**100.0%**
	Costs recovered from other sources	**$ -**		**$ -**		**$ -**			
	Budget (plus other costs)	**$ 1,251,306,913**		**$ 334,261,592**		**$ 217,354,847**		**$ 1,802,923,352**	
	Basis for table is Ruling (R.01-08-028, dated 2-21-2006) and E-3 calculator I/O								
	(1) Subcontractor administrative costs include overheads, HR support, and travel costs of the subcontractors.								

When reviewing this table, two areas stand out as not directly related to providing services. First, the Rebate Processing & Inspection subcategories included in the Direct Implementation Program Category is actually a cost of back-office administration of the relevant programs – assuring the rebates are paid properly or that jobs are inspected as required. It is not a direct service provided to customers.

The Marketing & Outreach category is also a support cost, like other administrative costs, as it does not directly deliver actual program savings. These categories do not serve the same "on the ground" purpose that, say, the paying of rebates, direct installation of measures, or even delivery of training courses does; rather, they support the "on the ground" investments, and should properly be considered program-administrative in nature.

All else equal, given the choice between two programs with the same rebate level and resulting energy savings, it would be better to choose the program with lower rebate processing and inspection costs. Similarly, a program having lower Marketing and Outreach costs, which are also administrative in nature, is more cost-effective at delivering EE.

To make further disaggregated analysis easier, the Commission should require the Utilities to separate the costs in Marketing & Outreach and Rebate Processing & Inspection into separate components (e.g., Marketing costs separate from Outreach, etc.).

b. High Level Review of Support Costs

A review of the utilities applications show that not only are administrative costs increasing, but these other support costs are at extremely high levels. TURN has

developed a comparison of both non-support[91] and support functions[92], which is presented in the table below. The support functions take into account other administrative functions (marketing and outreach and the back office functions of rebate processing and inspection).

Table 14:

Proposed Expenses (Non-support vs. Support), as a Percentage of Total Budget Excluding EM&V

Non-Support Function, as Percentage of Total Budget

	PGE				Edison				SDG&E			
Non-Support Function	Core	3P	GP	Total	Core	3P	GP	Total	Core	3P	GP	Total
Rebates & Incentives	39.6%	45.2%	34.7%	40.1%	53.2%	54.1%	54.0%	53.7%	41.3%	51.6%	0.0%	38.7%
Direct Implementation (Non-incentives & -rebates[1])	33.3%	27.2%	27.7%	31.3%	24.9%	32.9%	25.4%	28.6%	19.5%	23.2%	30.3%	21.6%
Total Direct Program	72.9%	72.4%	62.4%	71.5%	78.1%	87.0%	79.4%	82.2%	60.8%	74.8%	30.3%	60.3%

[1]Exclusive of Rebate Processing & Inspection

Support Function Spending, as Percentage of Total Budget

	PGE				Edison				SDG&E			
Support Funtion	Core	3P	GP	Total	Core	3P	GP	Total	Core	3P	GP	Total
Administrative	14.1%	20.8%	20.2%	16.3%	13.7%	9.4%	16.4%	12.0%	20.2%	15.1%	53.9%	23.0%
Marketing & Outreach	11.2%	5.0%	5.4%	9.2%	6.9%	3.4%	1.8%	4.9%	17.2%	8.6%	11.7%	14.7%
Rebate Processing & Inspection	1.7%	1.7%	12.0%	3.1%	1.2%	0.2%	2.4%	0.9%	1.7%	1.5%	4.1%	1.9%
Total Support Costs	27.1%	27.6%	37.6%	28.5%	21.9%	13.0%	20.6%	17.8%	39.2%	25.2%	69.7%	39.7%

[1]Exclusive of Rebate Processing & Inspection

The table is very instructive. It shows a number of things:

1. The net result is that only 60 cents on the dollar of actual spending (Sempra Utilities) is providing either rebates or other direct services for the Sempra Utilities. The figures are somewhat higher (71 cents) for PG&E, and higher still

[91] Composed of Rebates & Incentives and Non-Incentives & Rebates, exclusive of Non-Rebate Processing & Inspection.
[92] Composed of Utility-identified Administrative Costs, Marketing & Outreach, and Rebate Processing & Inspection.

at 80 cents on the dollar for Edison. The rest is general administration, marketing, or back office processing and inspections.

2. Within individual support functions, PG&E spends almost three times as much on rebate processing and inspection as Edison on a percentage basis and 1-1/2 times as much as SDG&E.

3. PG&E's Administration costs are higher when the utility is not in charge of the portfolio – 20-21% for third-parties and government partnerships versus 14% for the utility's own program. It apparently costs more to administer contracts than to run actual programs. Apparently, PG&E does not trust the government or its third parties.

4. The Government Partnership programs appear to have bloated administration and provide limited services for PG&E and even more so for SDG&E.

    a. Only 62.5 cents on the dollar of the GP program involves direct service for PG&E. In particular, 12% of the program for PG&E is Rebate Processing & Inspection cost. PG&E actually spends half of its Rebate Processing and Inspection budget on the government partnership program, even though that program amounts to less than 20% of total spending.

    b. For SDG&E, the picture is even worse than for PG&E. Almost 54% of government partnership costs are administrative, and another 16% are in support services of marketing and outreach and rebate processing and inspection. Only 30 cents on the dollar actually provides direct services to the partnership, and none of that money is in rebates. All of the 30 cents is contained in softer costs, such as training. This is not a program; it's a slush fund.

5. High administrative costs and high costs of direct implementation other than incentives and rebates together lead to less energy savings.

    a. This finding might appear painfully obvious, but we see it in the comparison of the three utilities. Edison spends 82 cents on the dollar for

its total portfolio direct services (53 cents in rebates and 29 cents in other services besides rebates and incentives) and spends 18 cents on its total portfolio administration and support services. PG&E only spends 71.5 cents on the dollar on direct services, but it is done with a lower emphasis on rebates (40 cents vs. 31 cents for other direct services, as opposed to the 53 cents vs. 29 cents that Edsion spends on its rebates vs. other services besides reabates and incentives) and 28.5 cents on administration. As a result, Edison is promising to spend 25% less money than PG&E, but its projected energy savings are only 12% less than PG&E. The difference is largely explained by Edison's lower administrative burden, as it plans to spend 14% less on programs than PG&E.

b. SDG&E is again worse. It spends 23.6% as much money as Edison and projects that it will achieve 13.9% as many savings. Virtually all of the relative difference between costs and savings when one compares SDG&E to Edison is caused by SDG&E's higher level of administration and support costs, as only 60.3 cents on the dollar of its money provides direct services to the customer.

3. The Commission Should Reverse the Past Practice that Allowed Utilities to Bury a Significant Block of All EE-related costs in General Rate Cases and Should Consider All EE Costs in This Case.

In order to properly ascertain the cost-effectiveness of the Utilities' proposed EE programs and properly allocate the costs of EE programs to ratepayers, it is necessary to include all expenses caused by their implementation. None of the Utilities has included the costs of pensions, other benefits, or workers' compensation for employees working on energy efficiency in their applications.[93] Additionally, none of the Utilities is including the cost of any additional purchased or leased space that the proposed EE programs might require.[94] PG&E and Edison have both neglected to include any other overheads normally treated as labor overheads, such as office space, vehicles, other A&G costs

[93] TURN-PG&E-1-07, TURN-SCE-1-07, TURN-SDG&E-1-07, and TURN-SoCalGas-1-07.
[94] SDG&E does include space for its Local Kitchen Learning Center program in its EE budget, but this program is an exception to the general rule because the space is specifically required to implement the program (to train non-SDG&E staff) and is not general office space housing utility employees.

related to labor such as human resources, etc., in its application.[95] Instead the Utilities are recording these costs in their general FERC accounts and recovering them through the GRC process. It is noteworthy that PG&E actually explicitly unbundles about $28 million of its A&G costs to public purpose programs in its GRC filings, but then includes those PPP-related A&G costs as part of its distribution rates.[96]

There are two ramifications of the failure to include the above-listed overhead costs in the present applications. First, the Utilities are artificially increasing the cost-effectiveness calculations of their EE portfolios because they are taking full credit for the energy and peak demand savings without accounting for all of the costs that make those savings possible. Essentially, cost-benefit ratios for all EE programs are worse than the utilities say they are because a pensions and benefits expense equal to 40-50% of utility labor plus additional overheads related to EE labor are left out. This has a direct effect of improperly inflating shareholder incentives. For every dollar of labor overhead costs that is excluded from EE cost-effectiveness calculations, the current incentive mechanism (assuming minimum performance is met) will give shareholders an extra 9 to 12 cents that they do not deserve because the full program cost is not included.

The second problem is that because these costs are included in the GRC's distribution rates instead of in EE, they are collected from the wrong ratepayers. These costs have been dumped into the distribution rates for years instead of being collected in the public goods charge. As a rule of thumb (though figures vary slightly among the

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[95] TURN-PG&E-1-08 and TURN-SCE-1-08. It is not clear yet how the Sempra Utilities treat other overheads normally treated as labor overheads, such as office space, vehicles, other A&G costs related to labor such as human resources, etc., in its application. TURN requested this information in TURN-SDG&E-1-08 and TURN-SoCalGas-1-08, but have not yet received it due to confidentiality issues.

[96] See App. 05-12-002, Exhibit PG&E-2, Chapter 6, Table 6-4 and pages 6-4 and 6-5.

utilities), residential electric customers pay 50% of distribution rates and about 35% of rates for electric public purpose programs.

In sum, for every dollar of EE labor overhead costs – real program costs – that the utilities and the Commission currently exclude from the cost of EE programs and collect in GRCs, the shareholders would be given the opportunity to illegitimately pocket 9 to 12 cents and the residential class will pay an extra 15 cents of the electric portion of the EE Cost. It is well past time to fix this problem. TURN recommends that the Commission determine the amount at least of pension and benefits costs that are related to EE, subtract those amounts from GRC funding, re-compute EE cost-effectiveness, and add them to the current EE budgets up for approval in this case. In the next EE funding cycle, all administrative overhead costs (including office space, human resources department, etc.) should be included in EE program costs.

I. New Construction Program

The IOUs propose to collectively spend between $209 and $223 million on new construction programs in 2009-2011[97]. PG&E proposes to spend $90 million on two subprograms; a "Savings by Design" (SBD) program and a "Residential New Construction" (RNC) program. The SBD Program seeks to partner engineers, architects, and building owners early in the construction design phase using incentives and technical assistance to foster more energy efficient buildings.[98] The RNC Program provides

[97] SDG&E and SoCalGas have different New Construction Program budgets for their "mandatory" versus "preferred" energy efficiency portfolios.

[98] The description of the new construction programs includes discussion of incorporating demand response capabilities. This at least suggests the possibility of double-funding, since the utilities' proposed 2009-2011 demand response programs also include such new construction programs. The Commission should seek further information on the distinction between the "new construction" programs proposed for funding in each forum.

incentives, technical education and design assistance to construct homes that exceed current Title 24 standards by 15 percent. Edison, SDG&E and SoCalGas each seeks funding for similar programs, with Edison requesting $77.66 million, SDG&E seeking approximately $24 million (for its preferred portfolio) or $31.03 million (for its compliant portfolio), and SoCalGas asking for $17.33 million (preferred portfolio) or $24.5 million (compliant portfolio).

TURN recommends that the Commission substantially reduce this proposed budget, given that the current economic and housing downturn has reduced housing starts dramatically from the forecasts the Utilities used to make their growth estimates when they originally filed their applications back in July of 2008. Rather unbelievably, the cumulative amount the utilities seek has gone up between the July 2008 application and the March 2009 revision, even as the new housing construction market seemed to grind to a halt.[99]

During the 2009-2011 program cycle, it is reasonable to expect that construction in California will continue to occur far below historical levels. In November of 2008 California's Department of Finance forecast only 57,000 building permits statewide in 2009 (Attachment 6). As a comparison, in recent years it was not unusual for builders to pull over 200,000 new single-family residential building permits statewide during more "normal" times. Even the Department of Finance's forecast may be overly optimistic—a more recent forecast by the California Building Industry Association (CBIA), issued in late March 2009 (Attachment 7), indicates that only 4,298 total permits were pulled in California for the first two months of 2009. And while the CBIA forecasts that 50,000

[99] PG&E's proposed funding level increased from $80 million to $90 million (a 12.5% increase), while Edison's jumped from $42 million to nearly $78 million (an 86% increase).

total permits will be issued by the end of 2009, this number seems optimistic—to reach it, the number of monthly building permits issued would have to double from March through December.[100] In fact, extrapolating to a full year, one can reasonably imagine on the order of less than 26,000 total units[101] will be built in all of California in 2009. As such, EE spending on New Construction programs on the order that the applicants have proposed in this proceeding is excessive.

TURN recommends that the Commission adopt a much smaller New Construction program budget. That amount should be commensurate with a severely reduced forecast of newly constructed units in the 2009-11 period. Instead of pushing ahead with the level of activities reflected in the utility-proposed New Construction program budgets, the Commission should use the 2009-2011 program cycle as an opportunity to step back and work on integrating all of the competing policies concerning new construction. This low-growth period should be used to create a comprehensive and integrated policy for new construction that combines the Commission's goals for demand response, energy efficiency, the California Solar Initiative, along with its current policies on using ratepayer funds to pay for new line extensions to reach the Commission's ultimate goal of mandating all new construction meet its "zero net energy" requirements.

As a policy matter, the Commission should consider changing the way in which line extension allowances are awarded from one that is based solely on expected future

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[100] Data from CBIA indicate that 11,531 permits were issued in the first two months of 2008. Extrapolating the first two months of 2008 to a full 2008 year sums to a little over 69,000 permits—just over 4,000 more than the 64,752 units that were actually produced in 2008. Therefore, the linear extrapolation of the first two months of 2009 is not an unreasonable approximation.

[101] (4,298 permits/2 months)*12 months.

revenues, to one based on building efficiency and efficiency of land use.[102] At present there is the risk, if not the likelihood, that the goals underlying the energy efficiency programs are undermined by the incentives created through line extension practices. To promote building efficiency, the Commission should consider requiring that all ratepayer funds supporting development (including line extension allowances) encourage developers to build structures that substantially surpass Title 24 minimum standards, install high efficiency air conditioning, or install or implement other measures that introduce similar efficiency gains. Allowances could also promote policies associated with more efficient use of land (e.g., encouraging the use of in-fill developments over the development of green-field developments, reducing land usage, etc.).

Additionally, many of the EE, DR, and building standards vendors have been vigorously pushing thermal energy storage for the residential class. While not an energy efficiency measure *per se*, thermal energy storage can virtually eliminate new peak load residential HVAC load. However, this technology is still expensive compared to existing HVAC equipment. The Commission should consider policies that encourage the use of existing ratepayer funds to promote the installation of this technology, rather than permitting allowances to be available to any new residential construction regardless of how efficient or peak-shaving the construction might be.

Furthermore, the line extension policies that set allowances to builders based on the future incremental sales and revenue to the utility are in direct conflict with the Commission's recently-adopted goals that all new construction meets its future "zero net energy" (ZNE) requirements. Unless changes are made, ratepayers will fund line

[102] Allowances are not necessary to induce developers to install electric and gas into new construction. While gas installation is optional in theory, in reality no new residential building would pass Title 24 building standards without gas water heating and, thus, gas service.

extension allowances based on outdated expectations of the new load from a new residential hook-up and simultaneously pay for installing energy efficiency measures in new houses. This would seem to be a textbook case of a policy that works at cross-purposes. The Commission should instead align its current policies to ensure ratepayer funds for new construction are all put to uses consistent with achieving California's 2020 ZNE goals. Moving toward such alignment would help achieve one of the "Biggest Boldest" policies. That alignment effort should start here, in the consideration of programs for the 2009-2011 funding cycle.

In addition, TURN notes that successful achievement of ZNE (on average) from new construction will mean that the new customers are not providing additional revenues to the utility. As a result, revenue-based line extension allowances would be significantly reduced or eliminated. Thus, regardless of TURN's position in this proceeding, the Commission will soon be faced with the need to seriously evaluate and radically changing policies that use ratepayer money to fund new construction.

TURN is reasonably confident that the utilities will respond to these line extension proposals at least in part by complaining that they belong in a different proceeding. Such an approach would ignore what should be obvious to the Commission – there is a strong interrelationship between the agency's energy efficiency policies (as well as demand response and the California Solar Initiative policies) and its line extension policies applicable to all new construction within a utility's service territory. The significant reduction in new construction resulting from the current financial downturn provides the Commission with a perfect opportunity to reevaluate its current practices concerning new construction. A reevaluation of the Commission's new

customer construction policies will position California to take advantage of a much greater opportunity -- to use the next few years (of relatively reduced new construction) to establish a comprehensive and integrated new construction policy consistent with achieving the State's ambitious energy efficiency goals, including the ZNE goals.

Finally, for the subprograms that deal with providing assistance and incentives to builders to construct homes that are more efficient than current Title 24 standards (RNC for PG&E, CAHP for Edison and the Sempra utilities), the utilities' goals of 15% over current standards (for PG&E, SDG&E, and SoCalGas) and 10% (for SCE) are not much of a stretch. The Sacramento Municipal Utility District (SMUD) has historically run new construction programs that required builders to construct homes that were 20% and 30% more efficient than Title 24—just to receive some level of line extension allowances. Builders that did not exceed Title 24 standards were required to pay full costs of hooking up to the utility system. While the 15% above-and-beyond Title 24 proposed by PG&E, SoCalGas, and SDG&E is underwhelming, it is at least better than Edison's proposed 10% requirement. At a minimum, the Commission should consider increasing the percentage figure for all of the utilities, and require Edison to use the same figure as the other utilities.

Recommendations:

TURN recommends setting the utility budgets at a level that is consistent with current conditions, that is, the economic downturn and the drastic reduction in new construction being forecast for 2009-2011 even as compared to forecasts prepared a few months ago for the same period. TURN's preliminary funding recommendation is based

on applying recorded costs for 2006-2008 to a later forecast of construction during 2009-2011.

The total recorded expenditures for new construction-related programs for all four utilities during 2006-2008 equates to roughly $47 million. According to the California Department of Finance (Attachment 6), 341,000 total building permits were issued for 2006-2008. The IOUs' service territories cover roughly 80% of California's new construction which equates to 272,800 building permits pulled in the IOUs service territories during 2006-2008. In contrast the California Department of Finance forecast of new construction for 2009-2011 envision approximately 200,000 permits pulled during this period. Edison also provided a forecast to its shareholders in December 2008 that indicates (after extrapolation to include the other 3 utility service territories) less than 190,000 building permits will be pulled during 2009-2011.[103]

At this juncture, the Commission should conclude that the IOUs have failed to demonstrate that a reasonable forecast of New Construction Program costs for 2009-11 would exceed the recorded costs of $47 million for 2006-08, given the state of California's new construction market. The IOUs will certainly focus on how much of a reduction this figure represents when compared to the amounts they requested. TURN urges the Commission to recognize that this is not a valid comparison; the utility-proposed figures appear to represent overreaching on the utilities' part, given the current forecast of the new construction market for 2009-2011. In light of the fact that two of the utilities actually increased their forecasts further in the revised application even as the

[103] SCE's Fall 2008 Sales, Customer & Peak Demand Forecast; CAM Group Conference Call; December 17, 2008.

new construction market continued its decline would seem to confirm this view. A substantial adjustment must be made to reflect the state's current economic situation.

The Commission should also set the targets for the New Construction Programs at a more ambitious and more uniform level, seeking to achieve at least a 15% improvement over the then-current Title 24 standards and having this goal apply to all four of the utilities.

Finally, TURN recommends that the Commission analyze and evaluate the best methods for developing a framework for integrating the Commission's various goals on energy efficiency, demand response, the California Solar Initiative, and ZNE construction goals into its policies that address ratepayer funding for new customer connections.

Date: April 23, 2009

Respectfully submitted,

By: _____/S/__

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ATTACHMENT 1

"Stabilizing California's Demand:
The real reasons behind the state's energy savings"

Cynthia Mitchell, et al.

Public Utilities Fortnightly, March 2009

Stabilizing California's Demand

The real reasons behind the state's energy savings.

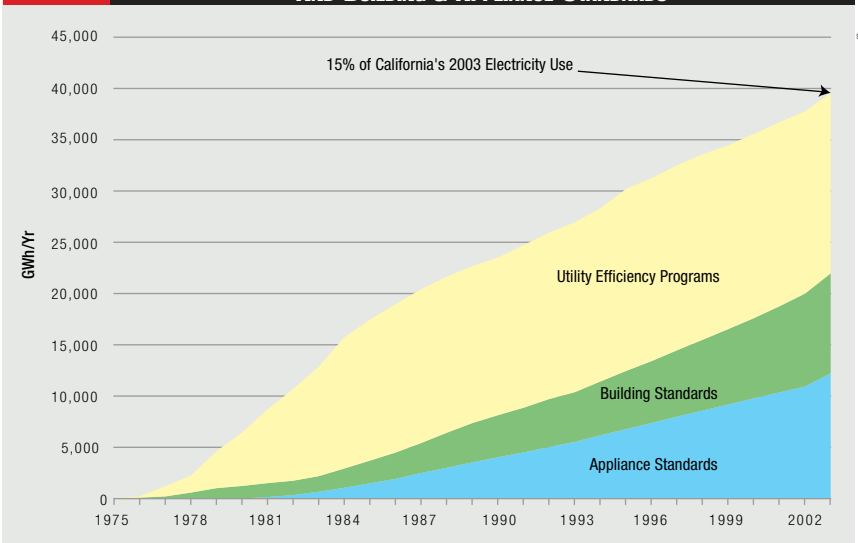
By Cynthia Mitchell, *et al.*

In 2005, California's energy policymakers and regulators established energy efficiency (EE) as California's highest priority resource for meeting future needs in a clean, reliable, and low-cost manner.[1] In 2006, the California legislature and governor positioned energy conservation and efficiency as the cornerstone of the state's Global Warming Solutions Act. The Act mandates a 2020 statewide limit on greenhouse gas (GHG) emissions to 1990 levels. Compliance will be nothing short of Herculean: California will have to reduce per capita energy usage in a manner that accommodates continued brisk population growth and protects the state's economy from economic dislocations and recessionary pressures.

The California Energy Commission (CEC) and California Public Utilities Commission (CPUC) point to California's historical record in saving energy (*see Figure 1*), coupled with its current stable per capita electricity use relative to the balance of the United States (*see Figure 2*), as proof that it is up to this formidable challenge:"Because of its energy efficiency standards and program investments, electricity use per person in California has remained relatively stable over the past 30 years, while nationwide electricity use has increased by almost 50 percent."[2]

The CEC and CPUC take credit for saving, on a cumulative statewide basis from 1975 to 2003, about 40,000 GWh, or the equivalent of 15 percent of annual electricity use, through a combination of utility EE programs and appliance and building standards (*see Figure 2*).[3] Figure 2 illustrates the trend in average per capita total consumption in California and the U.S. between 1960 and 2005.[4] Until the mid-1970s, total electricity use in California and the United States increased at about the same rate. After that, California's usage leveled off, while usage in the United States as a whole continued to increase. [5]

Fig. 1 California Cumulative GWH Savings: Utility EE Programs And Building & Appliance Standards



Source: California Energy Commission

California is Different

California's GHG-reduction policy appears in large part premised on the state already having achieved a strong and direct "cause and effect" between energy savings (utility EE programs and building and appliance standards) and energy consumption. As noted above, several documents highlight the role of EE savings in accounting for the different consumption trends evident in California and the rest of the United States.

When we started this project two years ago, we could find no studies that demonstrated the strength of the relationship between EE savings and consumption in California. Since then, some analyses have been undertaken, but, as yet, there has been no analysis that models consumption in California by looking at the specific contribution of changes in the level of EE savings to changes in consumption via multiple regression. Our own attempts to undertake such an analysis, while preliminary (and the best we felt it worthwhile to do given the limitations of the available data) showed that annual changes in the level of EE savings were not associated highly with changes in per capita electricity consumption. Even when many outliers were excluded, simple linear regression showed that the relationship

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between these two variables was less than 20 percent. In addition, the EE savings variable was not significant within any of the multiple regression models. A major issue we encountered was that on a per capita basis, annual changes in the level of EE savings, were small in relation to the changes in annual electricity consumption. While fully controlling for all other factors that contribute to annual fluctuations in the level of electricity consumption may have allowed us to identify the role of EE savings, we were able to control only for about half of the annual variation in consumption and did not succeed in specifying the role of EE savings.[6]

While we have no doubt that EE programs have contributed to the relatively stable[7] pattern of per capita electricity consumption in California, we were interested to see whether there were other factors that distinguish California from the rest of the country that also should be taken into account when explaining the divergence in consumption. We found that California is different from the rest of the United States in several other aspects (*i.e.,* in addition to the scope of its EE programs) that could help account for some of the difference in consumption trends. These are: the price of residential electricity; climate; household size; housing mix; conservation ethic; and the structure of the economy.

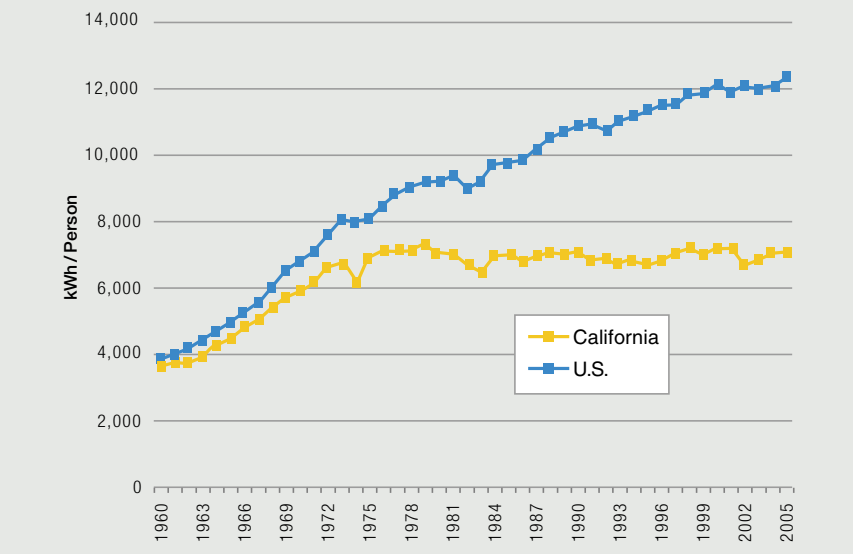
In addition to savings from EE programs, building codes and appliance standards could help account for the different consumption trends evident in California and the rest of the United States over the past 30 years.

■ **Electricity Prices:** In California, as elsewhere, there is a predictable relationship between electricity prices and the annual variation in residential per capita electricity consumption. On an annual basis, increases in the price of residential electricity are associated with decreases in consumption (*see Figure 3*). For every one mil increase in the price of residential electricity in California, per capita consumption declines by about 6 kWh per capita.[8] The data points lie relatively well clustered about the line, with price changes explaining about 40 percent of the annual variability in per capita consumption. These findings are in keeping with the national data on residential energy prices and residential per capita consumption that we analyzed: Those states with higher energy prices have lower per capita consumption and vice versa (*see Figure 4*).[9]

Electricity prices in California are higher than those in the United States as a whole, and the difference in price has become more marked over the past thirty-five years. In 1970, the price of residential electricity in California was 0.0809 cents per kWh, only a little higher than the U.S. average of 0.0806 cents/kWh. By 2005, the price had risen by 37 percent in California, to 0.1109 cents/kWh. In the United States as a whole, however, it had risen by just 4 percent, with the 2005 price, at 0.0838 cents/kWh, substantially lower than in California.[10]

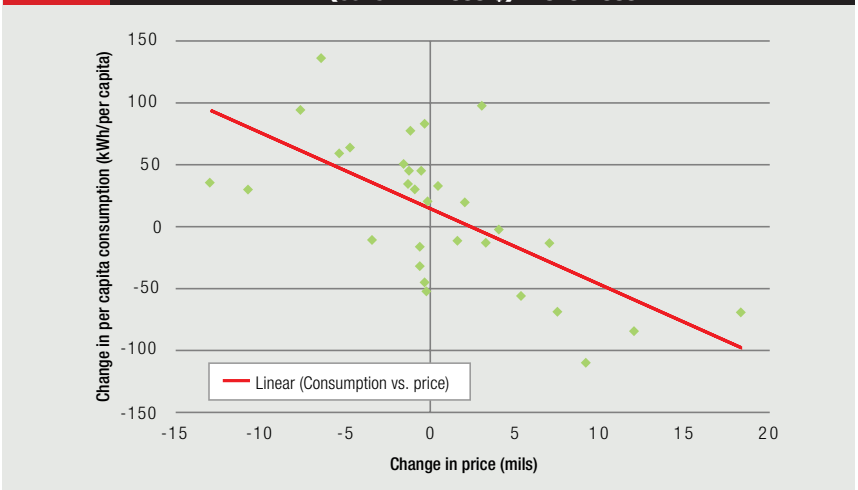
If there is a planetary imperative to

Fig. 2 Per Capita Electricity Use in the United States and California: 1960-2005



Source: Energy Information Administration

Fig. 3 Change in California Per Capita Residential Electricity Consumption vs. Change in California Price of Residential Electricity (constant 2000 $): 1970-2005



Source: Energy Economics Inc.

reduce overall energy consumption, and California's marked departure in historical per capita consumption trend in relation to the balance of the United States is in large part, energy price induced, one might ask, why not just raise energy prices further? California energy policymakers and regulators discuss EE as the one component of the state's aggressive GHG-emissions reduction policy that will keep money in state and local economies, while all of the other GHG-reduction strategies will be expensive. In other words, California needs moderate energy prices to help keep the economy going.[11]

■ **Climate:** Not surprisingly, the weather also is a strong driver of per capita electricity use. We conducted an analysis of the relationship between the number of cooling degree days (CDDs) in California against per capita residential electricity consumption.[12] This analysis showed that years with higher numbers of CDDs, are associated with higher levels of per capita electricity consumption (*see Figure 5*.). This is in large part due to the electricity demands of air conditioners in years with warm summers.

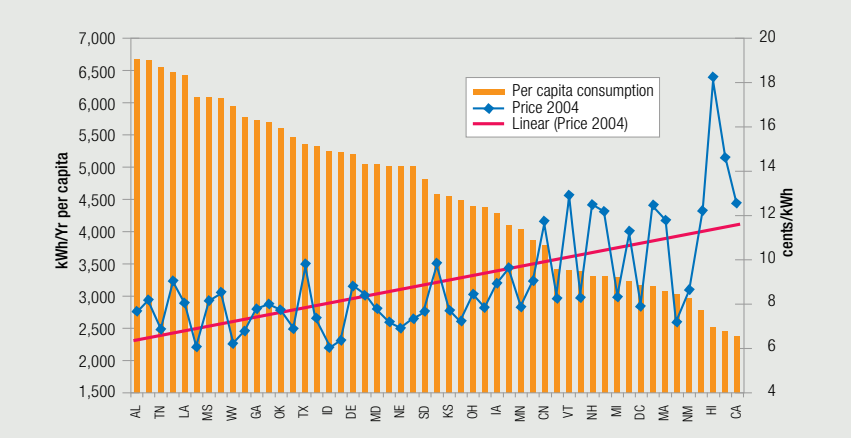
> Changes in energy-efficiency savings were small compared to changes in California's electricity consumption.

We also found that California tends to experience fewer CDDs than the United States as a whole. The state's relatively moderate climate greatly affects the amount of residential electricity that is used for space cooling in the summer. Heating is less of an issue because of the dominance of gas heating in the state. A good summary measure of the difference between California and the United States as regards climate is the annual number of CDDs each experience. For the period between 1975 and 2005, California had an average of 932 CDDs annually. This is substantially less than the U.S. average of 1,274 CDDs, and represents an average difference of 342 CDDs, or 27 percent fewer.[13] While there is limited evidence of a divergence between California and the United States in terms of the number of CDDs over the past 30 years, it is likely that part of the reason for California's relatively low per capita residential electricity consumption is due to the state's lower average number of CDDs. California's relatively mild climate means that the demand for air conditioning is likely to have increased less than in the United States as a whole, despite the rising income levels in the state.

■ **Household Size:** In explaining the overall trend in consumption, we need to assess the impact of variables such as household size and housing mix. In California, use per household has increased more than electricity use per capita since the introduction of EE programs. California households are larger than average for the United States: In 2006, they contained an average of 2.93 persons compared to 2.61 persons in the United States as a whole.[14]

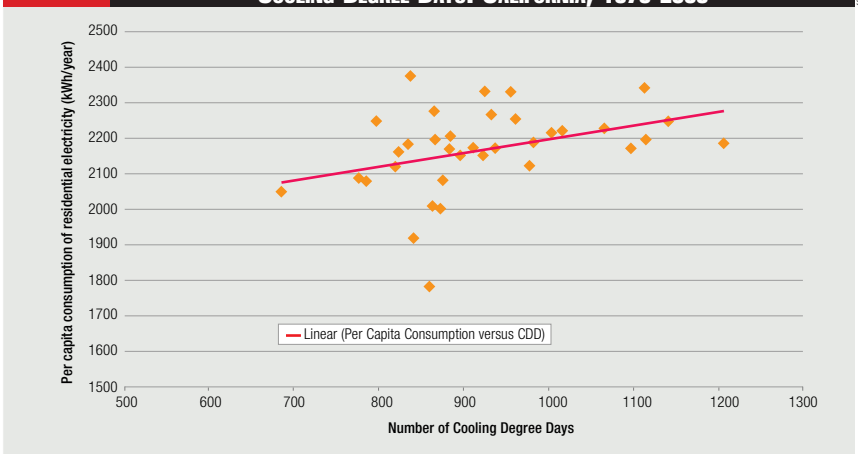
Household size is important because while each additional person in a household adds to household consumption, they do so by a declining amount.[15] Furthermore, in California, household size has increased since 1980, when there was an average of 2.68 persons per »

Fig. 4 Per Capita Residential Electricity Consumption and Price of Residential Electricity: 2004 by State



Source: Energy Economics Inc.

Fig. 5 Per Capita Residential Electricity Use vs. Number of Cooling Degree Days: California, 1970-2005



Source: Energy Economics Inc.

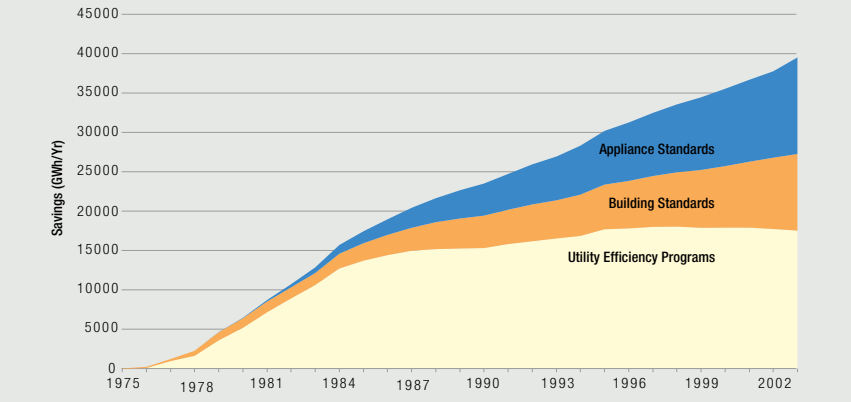
household. This is in contrast to the pattern in the United States as a whole, which has seen household size decline over the same period: In 1980 the average U.S. household size was 2.75, a little higher than for California, whereas by 2006 this figure had fallen to 2.61. Given that larger households consume less electricity per person than do smaller households, these trends in household size may have contributed to the divergence between California and the United States in terms of residential electricity consumption.[16]

■ **Housing Mix:** California has become more highly urbanized with multi-family and attached housing accounting for 39 percent of total units in 2000, compared to an average of 31 percent in the rest of the United States.[17] In addition, the state has diverged from the rest of the United States in this respect: Since 1970 the proportion of total units accounted for by multi-family and attached housing has increased in California (from 33 percent to 39 percent) whereas in the rest of the country it has remained stable. Housing mix is important to understanding per capita consumption of electricity because multi-family and attached housing units generally use less energy than detached structures due to the insulating effects of multiple units.

> California has become more highly urbanized with multi-family and attached housing accounting for 39 percent of total units.

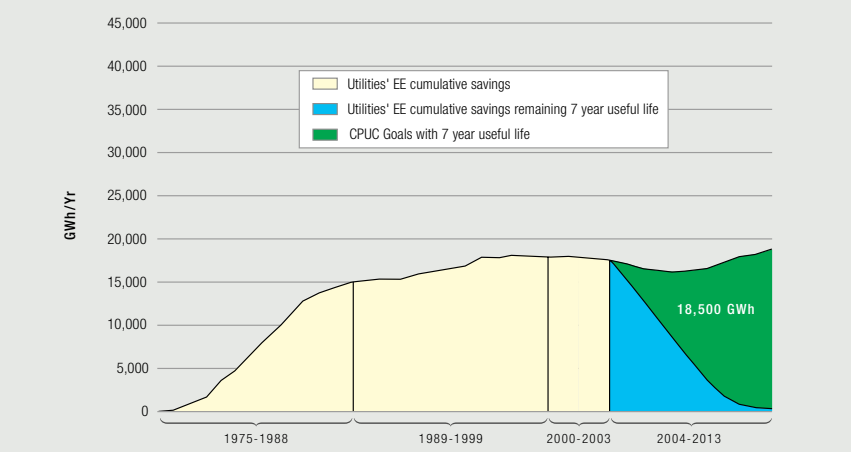
■ **California's Conservation Ethic:** While we found that annual changes in savings from EE programs do not well predict changes in per capita consumption of electricity in California, the state's focus on EE and conservation issues, along with the impact of price differentials, may have helped to create a "conservation ethic." Data from the 2001 Residential Energy Consumption Survey (RECS) show that California households are more likely than those in the United States overall to report that they lower their winter temperature settings when no one is at home or during sleeping hours. For example, almost 60 percent of California households reported lowering their winter temperature settings when no one is at home or during sleeping hours, compared to less than 45 percent of all U.S. households.[18] While this does not contribute significantly to reduced electricity usage, it is in keeping with other data that support the idea of a California "conservation ethic." For example, in California a smaller proportion of households report using electricity for heating water and cooking, and fewer households have electric dryers for clothing and a freezer separate from their refrigerator, than is the case nationally.[19] These findings likely reflect the state's efforts with regard to EE and the promotion of energy conservation.

Fig. 6 Re-ordered California Cumulative Energy GWh Savings: Utility EE Programs and Standards



Source: Energy Economics Inc.

Fig. 7 Forecast of California Cumulative GWh Savings 2004-2013 Based on the Utilities' Forecast of EE Program Savings



Source: Energy Economics Inc.

Industrial Shift

One of the factors that can influence a state's consumption of energy is the type of industries that dominate the economy. The manufacturing sector is second only to transportation in terms of its share of total energy consumed nationally, and so can heavily influence »

overall consumption levels. Thus, the mix of industries in California is likely to be a contributing factor to the state's relatively stable electricity consumption trend. Our analysis indicates that the manufacturing sector has contributed both to the relatively low levels of per capita consumption of electricity in California, and the divergence between trends in consumption in the state and those in the rest of the United States. The California manufacturing economy is more heavily dominated by non-energy-intensive industries than is the case nationally, and between 1990 and 2005, employment in energy-intensive industries declined more in California than was the case for the rest of the United States.

In California, energy-intensive manufacturing industries[20] accounted for about 20 percent of total manufacturing employment in 2005 compared to 26 percent in the rest of the United States.[21] In terms of trends over time, in California, energy-intensive manufacturing industries have shown greater reductions in employment than is the case for the rest of the United States. Between 1990 and 2005, employment in the groups of industries characterized by high energy use fell by 20 percent in California compared to 16 percent in the rest of the United States. This helps explain the divergence between California and the rest of the country in terms of overall energy consumption per capita. Trends within the primary metal industries provided additional evidence to suggest that employment in the specific industries that are particularly energy intensive declined to a greater extent in California than nationally. In California, the number of employees in the energy-intensive aluminum industry declined by 40 percent compared to 31 percent in the rest of the United States. Conversely, employment in the less energy-intensive pharmaceutical industry (a sub-industry within the chemicals group) grew more rapidly in California than nationally (by 81 percent compared to 34 percent). In addition, the energy intensity of one of California's most important industries, computer and electronic product manufacturing (which accounts for over one-fifth of both manufacturing employment and manufacturing value added in the state, compared to 10 percent nationally), has declined substantially over the past 20 years. Not only is this industry a relatively low user of energy, but its use of energy per $ value added also has declined.[22]

> Energy-intensive industries in California have shown greater reductions in employment than in the rest of the United States.

This analysis indicates that the manufacturing sector has contributed both to the relatively low levels of per capita consumption of electricity in California and the divergence between trends in consumption in the state and those in the rest of the United States. The California manufacturing economy is more heavily dominated by non-energy intensive industries than is the case nationally, and between 1990 and 2005 employment in energy-intensive industries declined more in California than was the case for the rest of the United States.

Energy-Efficiency Savings

Interestingly, our per capita analysis provides additional insight to our earlier separate analysis concerning the utility EE program savings portion of California's cumulative energy savings (*see Figure 2*).[23] If utility program EE savings are most likely less robust than historically characterized, then it makes sense that California's historical EE savings *(see Figure 1)* cannot fully account for California's per capita consumption *(see Figure 2)*.

Since the late 1980s, California's utility EE programs have contributed to only a modest growth in new or incremental savings;[24] building and appliance standards apparently register the lion's share of continued EE savings growth.[25] This is illustrated per Figure 6, which reorders or restacks the CEC's estimate of California's historical cumulative EE savings shown in Figure 1, so that the utility EE program savings are layered in first, followed by building and appliance standard savings.[26]

This is in part because the utilities have relied on EE measures that are short-lived, such as compact fluorescent lamps, (or CFLs). In essence what this means is the California utilities are treading water when it comes to growing cumulative long-term EE savings.[27]

The historical California utility EE program savings data used by the CEC in its DSM forecasting model is as reported by the utilities on an *ex ante* basis—or prior to measurement and verification. Recent preliminary independent analysis of the California utilities' 2006 and 2007 reported EE accomplishments indicate the utilities' claimed savings to be off or high by a significant amount.[28]

Not until 1989 were utility-reported savings adjusted for free ridership or net-to-gross (NTG) ratios. In response to the possible argument that via spillover (or "free drivers"), the California utilities have caused much greater levels of EE than reflected in Figure 1, it is important to note two important facts: The current NTG ratios were in fact derived by the California utilities; and the current NTG values include the effects of free ridership and both participant »

and nonparticipant spillover.[29]

From 1989 through 1999, some billing analysis also was used to adjust reported savings on an *ex post* basis. Since that time, the EE savings data has reverted to utility-reported *ex ante* savings. Also, for the first decade of run-up in claimed EE savings from zero to close to 15,000 GWh, the utility EE programs largely were home audits and education and information programs, with the first cash rebate given in 1982. Thus, to represent those EE savings as equivalent "steel in the ground" supply-side resources is extremely far-fetched. Further, about 10 percent of the generation and capacity savings are ascribed to utility T&D conservation voltage reduction implemented from 1975 through 1980. Such utility-system efficiency savings, while beneficial, are not generally classified as consumer EE.

If the current trend continues (from 2006 through 2008) in utility EE savings as forecasted by the utilities, there will be little if any new or incremental utility EE savings towards the CPUC's aggressive EE saving targets. That trend can be seen in the forecast of California's cumulative utility EE program savings from 2004 to 2013, based on PG&E, SCE, and SDG&E's forecast of 2006 through 2008 EE portfolio savings (*see Figure 7*).[30] To develop this forecast, a weighted average EE measure (energy useful life) EUL of 7.1 years was used, calculated from the IOUs' forecasts of the mix of EE measures in their 2006 through 2008 EE portfolios. By 2013 there will be little if any gains in new or incremental GWh savings.[31] *(See Fig. 7)*

Restarting Growth

Over the past 20 years, there has been a strong divergence between California and the United States with regard to per capita electricity consumption. This divergence has been attributed to California's ambitious and far-reaching EE programs and standards. However, this school of thought fails to address the fact that California is different from the rest of the United States in multiple respects—many of which influence electricity consumption. To isolate one particular difference between California and the United States (EE savings) and attribute the divergence in per capita use to this one factor, is likely to overstate the impact or import of that variable. While EE programs and standards undoubtedly have contributed to the relatively stable pattern of per capita electricity consumption in California, our analysis found a relatively weak association between California's EE savings and per capita consumption. Rather, these savings have been achieved within a specific socioeconomic context that also acted on electricity consumption trends.

A number of factors distinguish California from the rest of the United States, and may have contributed to keeping the state's electricity consumption relatively stable. Understanding the role of these factors, as well as savings from EE programs and standards, will allow for a better assessment of the extent to which the California model successfully can be transplanted to other states, regions, or countries. Although the California model may offer lessons for other states or countries, its applicability to meeting global warming targets is limited at best, since what's necessary are sustained absolute reductions in energy consumption, something not observed in the state of California as a whole or anywhere else.

Slow growth in California's per capita electricity consumption over the past several decades combined with population growth equals significant (~2 percent p.a.) growth in total electricity consumption for the state. This is the variable that must be tracked—and reversed. F

Endnotes

1. California's Energy Action Plan II adopted in 2005 by the California Public Utilities Commission (CPUC) and California Energy Commission (CEC) established a "loading order" of preferred resources—placing EE as the state's top priority procurement resource—and set aggressive long-term goals for EE. See CPUC and CEC, *Energy Action Plan II, October, 2005*. Available at: *http://docs.cpuc.ca.gov/word_pdf/REPORT/51604.pdf.*
2. CPUC and CEC, *Energy Efficiency: California's Highest Priority Resource - Lowering Energy Costs, Promoting Growth, and Protecting the Environment*, August 2006. Available at: *www.epa.gov/cleanenergy/documents/calif_cleanenergy.pdf.* See also the CEC's 2007 Integrated Energy Policy Report (IEPR), Executive Summary, p. 2:

   "Largely as a result of these [energy efficiency] policies, California has the lowest electricity use per person in the nation. While the United States has increased by nearly 50 percent over the past 30 years, California's per capita electricity use remained almost flat, demonstrating the success of a variety of cutting-edge energy efficiency programs and cost-effective building and appliance efficiency standards." (emphasis added).

   CEC, *Integrated Energy Policy Report*, CEC-100-2007-008-CMF-ES, December, 2007. Available at:*http://www.energy.ca.gov/2007publications/CEC-100-2007-008/CEC-100-2007-008-CMF-ES.PDF.* Further, see CPUC and CEC, *Energy Action Plan: 2008 Update*, February, 2008, Available at: *http://www.cpuc.ca.gov/NR/rdonlyres/58ADCD6A-7FE6-4B32-8C70-7C85CB31EBE7/0/2008_EAP_UPDATE.PDF*, February 2008.

   "Below we have included one of California's famous graphics of success in energy efficiency. As Figure 3 indicates *[U.S. v. California Per Capita Electricity Sales]*, electricity use per person in California has remained relatively stable over the past 30 years, while nationwide electricity use has increased by about 50 percent.

   While this stabilization of per capita electricity use is something we are proud of, it is not nearly enough to meet our AB 32 goals. To address this emissions reduction challenge for electricity, we will need to bend this curve downward, because, among other reasons, the population of California continues to grow rapidly, causing overall electricity use in the state to continue to rise by between one and two percent every year." (emphasis added) p.7.
3. Data supplied by CEC.
4. See Figure 1 in CPUC and CEC, *Energy Efficiency: California's Highest Priority Resource - Lowering Energy Costs, Promoting Growth, and Protecting the Environment*, August 2006. Available at: *www.epa.gov/cleanenergy/documents/calif_cleanenergy.pdf.*
5. Figure 2 reflects total per capita consumption, which includes, or has embedded in it, economic structural changes over time. To isolate this effect on per capita consumption from EE savings, in our statistical analysis to the extent data was available ,we utilized residential per capita »

consumption and residential savings.

6. See Mitchell, Cynthia, Reuben Deumling and Gill Court, "Is Energy Efficiency Enough? An Exploration of California Per Capita Electricity Consumption Trends," presented at ACEEE Summer Study on Energy Efficiency in Buildings, August 17-22, 2008, *http://www.aceee.org/conf.*
7. It is important to note that a relatively stable pattern of per capita electricity consumption in this case translates into a moderate but still exponential growth in total residential electricity consumption of an average 2.1 percent per year between 1985 and 2007 (residential account data for PG&E, SCE, and SDGE supplied by the CEC). Such observed growth, though it may be slower than in the majority of other states, is nevertheless antithetical to the state's global warming goals.
8. Energy Information Administration, *State Energy Consumption, Price and Expenditure Estimates*, various years, available at: h*ttp://www.eia.doe.gov/emeu/states/_seds.html*; Energy Information Administration, *State Energy Data 2004*, Appendix C: Resident Population, Tables C1-C5; and Energy Information Administration, *Annual Energy Review*, Appendix D1: Population, U.S. Gross Domestic Product, and Implicit Price Deflator, available at: *http://www.eia.doe.gov/emeu/aer/append_d.html.*
9. *Id*. A simple linear regression of 2004 per capita residential electricity consumption against the 2004 price of residential electricity by state indicated that 45 percent of the variability in consumption could be accounted for by the price variable.
10. All prices in constant 2000 $.
11. See page 3, heading "Supports Economic Development and Creates Jobs in California," in CPUC and CEC, *Energy Efficiency: California's HighestPriority Resource - Lowering Energy Costs, Promoting Growth, and Protecting the Environment*, supra note 2.
12. Energy Information Administration, *Electricity Consumption Estimates by Sector*, various years; Energy Information Administration, *State Energy Data 2004*, Appendix C: Resident Population, Tables C1-C5 Source; and National Climatic Data Center. A cooling degree day (CDD) indicates how heavy the air conditioning needs are under certain weather conditions. One CDD is accumulated for each degree the average temperature for a day is over 65 degrees F (see *http://www.energy.ca.gov/glossary/glossary-c.html and http://www.weather2000.com/dd_glossary.html*). A simple linear regression of California per capita consumption of residential electricity against the number of CDDs for the years 1970-2005 showed that the CDD variable "explained" almost 15 percent of the variability in the per capita consumption variable.
13. Data from the National Climatic Data Center.
14. 1970 data supplied by Reuben Deumling, Energy & Resources Group, UC Berkeley; 2006 data from U.S. Census Bureau, American Community Survey, 2006.
15 . See William B. Marcus, Gregory Ruszovan, and Jeffrey A. Nahigian, *Economic and Demographic Factors Affecting California's Residential Energy Use*, (West Sacramento, Calif.: JBS Energy, Inc., 2002), Figure 3.
16. This is not simply because larger households have larger houses. A recent study has found that larger houses have higher energy consumption not because there are more people in them but because the people in them consume proportionately more energy than people living in smaller houses. That is, electricity use per household member increases with the size of the house. See Mithra Moezzi and Rick Diamond. *Is Efficiency Enough? Towards a New Framework for Carbon Savings in the California Residential Sector*. CEC, PIER Energy-Related Environmental Research. CEC-500-2005-162.
17. U.S. Historical Census of Housing Tables – Units in Structure, available at: *http/www.census.gov/hhes/www/housing/census/historic/units.html.*
18. Energy Information Administration, *Residential Energy Consumption Survey, Table HC6-7a: Usage Indicators by Four Most Populated States, 2001*. Available at: *http://www.eia.doe.gov/emeu/recs/recs2001/hc_pdf/usage/hc6-7a_4popstates 2001.pdf*.
19. Energy Information Administration, *Residential Energy Consumption Survey 1997, Table HC5-7a: Appliances by Four Most Populated States.* Available at: *ftp://ftp.eia.doe.gov/pub/consumption/residential/four_states/appl_4states.pdf*; Energy Information Administration; *Residential Energy Consumption Survey 2001, Table CE4-7c: Water-Heating Energy Consumption in U.S. Households by Four Most Populated States. http://www.eia.doe.gov/emeu/recs/recs2001_ce/ce4-7c_4popstates2001.html*.
20. These include the following industries: nonmetallic minerals, primary metals, food, paper, petroleum and coal, and chemicals. See Energy Information Administration, *Annual Energy Outlook 2007*.
21. *Current Employment Statistics Survey* – various years, Bureau of Labor Statistics. Available at *http://data.bls.gov*. These data exclude the pharmaceutical industry, which in contrast to "bulk chemical" manufacturing, is not energy intensive. Pharmaceuticals dominate in California, accounting for over 50 percent of employment in the chemical industry in 2005 compared to 31 percent in the rest of the United States.
22. U.S. Department of Energy, *Indicators of Energy Intensity in the U.S: Industrial Sector Data*. Available at: *http://intensityindicators.pnl.gov/trend_data.stm.*
23. Work of Energy Economics Inc. as consultant to TURN in R.06-04-010 during 2nd and 3rd quarters 2007. *http://www.cpuc.ca.gov/Published/proceedings/R0604010_doc.htm*. Energy Economics Inc. per capita analysis separate and apart from the TURN work.
24. It is important to point out that "a modest growth in [energy] savings" is not the same thing as "an absolute reduction in energy consumption," although this often is implied. The only outcome commensurate with California's global warming policies is unambiguous and sustained declines in total energy/electricity consumption. Slight variations in the positive rate of growth are still movement in the opposite direction of that now mandated.
25. The characterization of California's historical building and appliance standard EE savings is an entirely separate matter worthy of additional detailed analysis, given the fact that the savings are highly dependent on assumed levels of compliance rates. The CEC DSM Forecast assumes relatively high levels of building and appliance standards compliance. The May 2007 "Statewide Codes and Standards Market Adoption and Noncompliance Rates," *Final Report*, CPUC Program No. 1134-04 SCE0224.01 by Quantec Consulting found very high noncompliance rates for residential building measures updated per California's Title 24 standard. *http://www.calmac.org/*. Appliance standard compliance rates are easier to estimate because: (1) appliance standards set dates for changes in appliance manufacturing and stocking; and (2) appliance turnover rates can be tracked through retail sales data (with additional consideration needed on whether the replaced appliance enters a secondary market).
26. Data supplied by CEC.
27. *http://docs.cpuc.ca.gov/Published/proceedings/R060410.htm, Decision 07-10-032*, Oct. 18, 2007, Commission Discussion, page 21: "TURN [The Utility Reform Network] correctly notes that an emphasis on measures with savings that decay quickly creates a 'treading water effect' whereby the measures are replaced in the next portfolio cycle with little development towards sustainability programs that do not require continual reinvestments of ratepayer funds."
28. *http://www.cpuc.ca.gov/PUC/energy/electric/Energy+Efficiency/EM+and+V/081117_Verification+Report.htm,* CPUC EE 2006-2007, Verification Report Review Draft prepared by Energy Division Feb. 5, 2009.The California utilities (Pacific Gas & Electric, Southern California Edison, San Diego Gas and Electric, and Southern California Gas) reported 2006 and 2007 EE accomplishments that collectively the utilities had achieved almost 130 percent of the CPUC's electric goal and over 110 percent of the CPUC's gas goal. In contrast, the CPUC's Energy Division Staff has reached a significantly different conclusion on California IOUs' 2006 and 2007 EE accomplishments. Per the CPUC's utility incentive mechanism based on a sharing between ratepayers and shareholders of the net benefits, the California IOUs claimed they were due a shareholder incentive of $236 million. Per the Energy Division's February 5, 2009 *Interim Claim Report*, the California IOUs are collectively at only 78% percent of the CPUC's combined electric and natural »

gas goals. On an individual basis, the thee electrics are entitled to zero shareholder incentives, with SoCalGas entitled to $2.89 million. *www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/081117_Verification+Report.htm*. CPUC *Decision 08-12-059* dated Dec. 18, 2008 authorized interim payments based on utility submitted performance reports subject to a 65 percent hold-back pending the results of Energy Division's ex post measurement and verification results.

http://docs.cpuc.ca.gov/Published/proceedings/R0604010.htm.

29. See Program Elements Attachment A: PG&E, SCE, SDG&E, SCG, Sept. 22, 2000; and CALMAC Public Workshops on PY 2001 EE Programs: Day 1 & 2, Sept. 12 and 13, 2000, Day 3 & 4, Sept. 19 and 20, 2000. California Measurement Advisory Council (CALMAC) Workshop Report 9/25/2000 Proposed NTG Ratios for PY2001. *http://www.calmac.org*.
30. Analysis of savings data supplied by the CEC and savings goals data in CPUC, *Interim Opinion: Energy Savings Goals for Program Year 2006 and Beyond*, *Decision 04-09-060*, Sept. 29, 2004, Table 1E. Available at: *http://docs.cpuc.ca.gov/WORD_PDF/FINAL_DECISION/40212.PDF.*
31. The utilities forecast of savings as shown in Figure 7 is more robust than the CPUC's Energy Division Staff November 2008 *Interim Claim Report* noted above in endnote 27.

ATTACHMENT 2

TURN CFL White Paper

TURN White Paper

Moving Beyond Utility CFL-Dominated Energy Efficiency Portfolios

Applications 08-07-021, et. al. Approval of 2009-2011 Energy Efficiency Plans

I. Introduction

This White Paper discusses why utility compact fluorescent lamps (CFLs) dominated energy efficiency (EE) portfolios are not an effective use of ratepayer funds. The focus is on California (CA) because of the CA IOUs March 2, 2009 2009-2011 EE Portfolio Amended Applications would continue the trend in CFL-dominated portfolios,[1] and the tremendous amount of energy (GWh) savings claimed by the utilities from CFLs.[2] The CA investor-owned utilities' (IOU) energy efficiency (EE) programs are some of the longest-running EE efforts in the country, particularly for CFLs. Most of the state's IOUs began implementing small-scale pilot programs in the late 1980s, with full-scale programs up and running by 1992. This paper may help other states avoid repeating the CA CFL experience, and instead leap frog ahead by focusing on more cost-effective high efficiency lighting and other key end use efficiency opportunities including HVAC, refrigeration, motors, and thermal integrity improvements.

TURN ATTACHMENT 2 Table 1 below entitled "**Residential** CFL Units (millions): Forecast & Reported 2006-2008; Forecast 2009-2011" shows that for the 2006-2008 EE Portfolio, the IOUs in aggregate forecasted 81 million, and reported 98 million CFLs discounted via their Upstream Lighting Programs (ULP). TURN Table 5 also shows that going forward, the IOUs show little indication of ramping down ratepayer discounted CFL unit counts. For 2009-2011 PG&E forecasts that 34 million CFL units, or 66% of their 06-08 total; SCE 33 million or

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[1] Unless otherwise noted, the CFLs discussed throughout this report are low-wattage screw-ins. Also significant sums of ratepayer funds were spent on CFLs during the 2000-2001 CA energy crisis, post-deregulation 2002-2005, and more recently the 2006-2008 IOU EE portfolios.

[2] While CFL - energy savings toward the CPUC's EE goals are likely to exceed 70% of the electric IOUs 06-08 claimed savings, on a verified and measured basis the CFL-savings are much lower. See p. 3 below.

98% their 06-08 total; and SDG&E 8 million or 77% of their 06-08 total; for a total of 76 million CFLs to residential consumers via the ULP.[3] As reflected in the notes to TURN Table 5, the 2009-2011 forecast for CFLs via the ULP is 7 million higher or 83 million when the IOUs' forecast of CFLs via ULP to non-residential consumers is factored in.

TURN ATTACHMENT 2 TABLE 1
Residential CFL Units (millions): Forecast & Reported 2006-2008; Forecast 2009-2011

	Forecast	Reported				% Increase	Forecast*	% Total
	2006-2008	2006	2007	2008	2006-2008	Forecast to Reported	2009-2011	to 06-08
PGE	60.0	6.8	18.6	27.4	52.6	-12.3%	34.9	66%
		13%	35%	52%	100%			
SCE	18.0	6.9	16.7	11.7	35.3	96.0%	33.0	93%
		20%	47%	33%	100%			
SDG&E	3.0	1.1	4.7	4.2	9.9	230.0%	8.0	81%
		11%	47%	42%	101%			
TOTAL	81.0	14.8	40.0	43.2	98.0	21.0%	75.9	77%
% Total		15%	41%	44%	100%			

Note: Traditional Upstream Lighting Program (ULP) CFLs only

*The 2009- 2011 forecast for the UPL residential and non-residential is higher:

PG&E	38.4
SCE	36.7
SDG&E	8.0
	83.0

Source: Table 1.4 of Compliance Tables

TURN ATTACHMENT 2 TABLE 2 "2009 -2011 Projected Lighting End Use and CFL Measure Mix: Compliance Portfolio" shows that the in aggregate, the IOUs are intending to "hold steady" with lighting dominated portfolios, at 53% GWh energy and 46% MW demand. Residential and Nonresidential CFL lamps are by far the largest component at 33% GWh energy and 28% MW demand; most of which is through the Upstream Lighting Program at 28% GWh energy and 24% MW demand (last 3 row entries in Bold **TOTAL**)

[3] Given past experience with the 2006-2008 EE Portfolios, TURN has every reason to believe that if anything, the IOUs 2009-2011 forecast of CFL units is conservative. The IOUs Commission approve 2006-2008 EE Portfolio Applications forecasted CFL GWh savings at 30% of total EE portfolio savings; with 2006-2008 EE Portfolio utility CFL claimed GWh energy savings likely to be over 65+% of the portfolio total.

TURN ATTACHMENT 2 Table 2 2009 - 2011Projected Lighting End Use and CFL Measure Mix: Compliance Portfolio				
PG&E	Net GWh	% T **Net** Savings	Net MW	% T **Net** Savings
Total Portfolio Savings	2,776		519	
All Lighting*	1,544	56%	240	46%
Res and Non-Res CFLs (Lamps Only)	1,022	37%	164	32%
Res & Non-Res CFLs (Lamps Only) - Upstream**	950	34%	152	29%
SCE				
Total Portfolio Savings	4,154		850	
All Lighting*	2,139	51%	380	45%
Res and Non-Res CFLs (Lamps Only)	1,294	31%	226	27%
Res & Non-Res CFLs (Lamps Only) - Upstream**	1,032	25%	190	22%
SDG&E				
Total Portfolio Savings	635		135	
All Lighting*	323	51%	66	49%
Res and Non-Res CFLs (Lamps Only)	161	25%	27	20%
Res & Non-Res CFLs (Lamps Only) - Upstream**	141	22%	23	17%
TOTAL	7,565		1,505	
All Lighting*	4,005	**53%**	685	**46%**
Res and Non-Res CFLs (Lamps Only)	2,477	**33%**	417	**28%**
Res & Non-Res CFLs (Lamps Only) - Upstream**	2,123	**28%**	366	**24%**

* "All Lighting" is Residential and Non-Residential per IOUs' Tables 1.4

**"Res & Non-Res CFLs" from IOUs' Tables 1.4. Upstream traditional CFLs only

Note: SDGE included 463 kW and 2,787,027 kWh for screw-in CFLs "Turn-in". This category has been excluded from this analysis.

Source: Table 1.4 Compliance Tables

Given past experience with the 2006-2008 EE Portfolios, TURN has every reason to believe that if anything, the IOUs 2009-2011 forecast of CFL units is conservative. As shown in TURN ATTACHMENT 2 Table 3 "Shifting CFL Portfolio Share: CPUC Approved & IOUs Reported 2006-2008 Portfolios", the Commission approved 2006-2008 Applications with forecasted CFL GWh savings at 30% of total EE portfolio energy savings. For 2006-2008, the IOUs reported CFL reported GWh energy savings likely at 59% of total. TURN estimates the year end 2008 data to reflect 65+% .

TURN ATTACHMENT 2 TABLE 3 Shifting CFL Portfolio Share: CPUC Approved & IOUs Reported 2006-2008 Portfolios			
	2006-2008 CPUC Approved % Total	2006-2007 IOUs Reported % Total	2006-2008 IOUs Reported % Total
CFLs Gwh Energy	30%	59%	65+%

* All CFLs: not just Upstream Lighting Program (UPL).
For 2006-2007, CFLs via ULP were 52%

The key measures of CFL market transformation – including sales, saturation, remaining cost-effective sockets, and freeridership rates[4] -- indicate the CA IOUs are well overdue to move away from CFL-dominated EE portfolios.[5] If managed properly[6], the CA market for CFLs will continue to grow even in the absence of a CA IOU CFL component of the utilities' Upstream Lighting Program (ULP),[7] because:

- The key metrics of market transformation indicate the CA IOUs are long overdue to move away from CFL-dominated EE portfolios. Section I.A.
- Wal-Mart and other big box and home improvement retailers have been very successful in increasing the availability and affordability of CFLs. Section I.B.
- Other states are finding that the CFL market does not have to be fully transformed before utility resources can in large part be shifted out of CFLs to other EE activities. Section I.C.

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[4] See discussion Section I on the key measures of market transformation.

[5] Per the CFL Market Effects Interim Report (Cadmus Group et al. January, 2009), the IOUs current ULP may actually be creating negative market effects. See discussion at Section II.E.

[6] See discussion Part 3 Section I on the CPUC's September 2008 "California Long Term EE Strategic Plan," Section 2 Residential and Low-Income, Goal 4: High-Performance Residential Lighting", Strategy 4-4: Coordinated phase out of Utility incentives for purchase of CFLs. Near-Term 2009-2011.

[7] TURN is referring to the IOUs Upstream Lighting Program (ULP) which buys down at the manufacturer level large bulk purchases of medium-sized screw-in compact florescent lamps that are then sold to consumers at the retail level through primarily big box and improvement stores.

- Recent international and national legislation phasing out the sale of incandescent light bulbs means that in the near future CFLs will in many applications become the existing baseline lighting technology. [We don't have a section corresponding to this statement]

While CFLs should be a major part of efforts to reduce energy consumption, CA IOU CFL-dominated EE portfolios are increasingly not a good fit from an economic or environmental perspective:

- The IOU reliance on CFLs with savings that decay quickly and have high levels of freeridership has resulted in a "treading water effect" in growing CA EE savings over time and reducing GHG emissions.[8] Section II.A.
- With residential lighting load largely off-peak,[9] short-lived EE savings from CFLs generally do not provide utilities with meaningful generation, transmission, and distribution (G,T,D) supply-side procurement offsets. Section II.A.1
- With residential lighting load greater in off-peak winter than on-peak summer, the generation, transmission, and distribution (G,T,D) supply-side procurement offsets associated with short-lived EE savings from CFLs are not as meaningful. Section II.B.
- CA consumers (including ratepayers) are paying more for utility-subsidized CFLs than CFLs in comparable national retail stores that are not subsidized by utilities. Section II.C.

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[8] D.07-10-032, October 28, 2007, page 21.
"TURN correctly notes that an emphasis on measures with savings that decay quickly creates a 'treading water effect' whereby the measures are replaced in the next portfolio cycle with little development towards sustainable programs that do not require continual reinvestments of ratepayer funds."

The DEER updates to NTG result in large percentage decreases in the IOUs' claimed savings. It is not surprising that the IOUs efforts have focused on eliminating the NTG adjustment in its entirety. These efforts are often couched in terms of the purported unfairness of requiring the IOUs to apply current NTG values that they had no input in establishing, especially where those values net out freeridership without also adding back in positive spillover market effects. While this is not the appropriate place to go into a detailed debate on NTG, TURN takes this opportunity to point out two important facts: **(1) the current NTG values were in fact derived by the IOUs, and (2) that the current NTG values include the effects of freeridership and both participant and nonparticipant spillover.**
CALMAC Workshop Report 9/25/2000 Proposed NTG Ratios for PY2001 Program Elements Attachment A: PG&E, SCE, SDG&E, SCG, September 22, 2000; and CALMAC Public Workshops on PY 2001 EE Programs: Day 1&2 September 12 and 13, 2000, Day 3&4 September 19 and 20, 2000.

[9] California's system peak is in the summer, between 4 and 7 p.m. The CFL EE savings are largely residential, and residential lighting peak is shifted several hours past the evening peak and the residential lighting load increases by as much as 40% in the winter. See Section II.A.1.

- The CA IOUs appear to be promoting lower quality Energy Star CFLs (lighting quality, hours of operation, buzzing, flickering). Section II.D.
- Because of the interactive effect of increased space heating offsetting the reduced heat gain from replacing incandescent lights with CFLs, the largely residential winter mid- and off-peak CFL-related electricity savings are offset by equivalent (or greater) increases in natural gas space heating requirements that coincide with natural gas distribution system peak. Section II.E.
- The CA IOUs are behind the national curve in CFL recycling and minimizing the mercury content of CFLs. Section II.F.

II. Why CA can move away from utility CFL-dominated EE portfolios.

A. The key metrics of market transformation indicate the CA IOUs are long overdue to move away from CFL-dominated EE portfolios.

1. California and the three state comparison area.

The recent draft CFL Market Effects report[10] details the preliminary findings of the CFL Market Effects Team. As part of this study, the team compared the market for CFLs in CA with the market in a three state Comparison Area (Georgia, Kansas, and Pennsylvania).[11] By contrasting the CFL market in CA (with a long history of utility-funded and –administered CFL programs) and the Comparison Area (no history of CFL programs) the study team hoped to be able to identify the effect of utility-run CFL programs on the market for CFLs.

The data in the Interim Report suggest that while the market for CFLs in CA may have been more buoyant than in the Comparison Area in the early 2000s, recently this situation has changed. The Interim Report points out that its survey of CFL Users in CA and the three comparison states showed that:

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[10] "Compact Fluorescent Lamps Market Effects Interim Report – DRAFT", The Cadmus Group, January 22, 2009. Referred to hereafter as the "Interim Report."

[11] This Comparison Area was chosen in an attempt to understand the market for CFLs in an area without significant utility-run energy efficiency programs.

- Awareness of CFLs is nearly universal (over 90%). Awareness was slightly higher in California (96%) than the Comparison Area (92%).[12]
- Among households buying light bulbs in the three months prior to the survey, similar proportions in CA and the comparison states bought CFLs (28% compared to 29%).
- Households in the Comparison Area bought *more* CFLs than those in CA in the three months prior to the survey.[13] In the Comparison Area an estimated 10.8 million CFLs were purchased compared to 10 million in CA.[14]

2. Recent national CFL sales data.

The Interim Report's findings echo TURN's analysis of national data suggesting that relatively high levels of CFL sales per capita can be achieved in the absence of significant utility programs. **An ENERGY STAR study of CFL sales for the first quarter of 2007 shows that states with some of the highest CFL sales per capita are those with modest if any utility CFL programs**.[15] National data from "18seconds.org"[16] confirms this: Using information on CFL sales by state from January 2007 to March 2008 suggests that some of the highest levels of CFL sales per capita came from states with modest utility EE programs. As shown in TURN ATTACHMENT 2 Table 4: Per Capita Sales of CFLs, from Jan. 2007 to March 2008, Arkansas

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[12] The authors of the report note that this difference is statistically significant at the 90% level.

[13] CFL Market Effects Interim Report, page 79-80. The comparison area data on the number of CFLs purchased were adjusted to the California population.

[14] The per capita difference is even greater as the combined populations of these three states (~19.8M) is only half the population of California (~38M).

[15] Source: EPA Office of Air and Radiation, Climate Protection Partnerships Division. *ENERGY STAR Qualifying CFLs: Sales Data from Major National and Regional Retailers for the First Quarter of 2007*. U.S. EPA, 2007. Prepared by the Cadmus Group; and U.S. Census Bureau. Available from: *www.energystar.gov/ia/partners/reps/pt_reps_res_retail/files/CFL_Sales_by_State_and_MSA120607.xls* Note: data are for six major regional and national retailers.

[16] www.18seconds.org 18seconds.org provides information on CFL sales by state. The website was put together by Yahoo and Nielsen. Participating retailers (excluding DIY stores) provided the Nielsen company with their sales data from January 2007 to March 2008. The data are available by state from January 2007 to mid-March 2008. Note: the data are heavily biased toward one major retailer (Wal-Mart).

ranked 1st while CA ranked 40th in CFL sales per capita. When just looking at the 1st quarter 2007, Arkansas ranked 2nd relative to CA at 43rd in CFL sales per capita.[17]

There are a number of possible reasons for these patterns, including the spatial distribution of the retailers reporting sales, the "low" starting point that may have been characteristic of some of the states without significant utility CFL programs, and the disproportionate influence of a few very large retailers in some states. There is also the very real possibility, at least for households that bought CFLs early, that they already have all the CFL bulbs they need—conceivably for many years to come. Their need for subsequent bulbs is likely much reduced. The point here is to indicate that sales of CFLs can be substantial even in the absence of large-scale utility energy efficiency programs. For example, sales of CFLs in Texas ranked 6th in the nation between January 2007 and March 2008 and 15th in the nation in the first quarter of 2007. This despite the fact that the Texas regulated electric utilities' energy efficiency programs do not allow incentives for energy efficiency measures such as CFLs with effective useful lives (EULs) of less than 10 years.

[17] This could be attributable to California's long history of utility-sponsored CFL programs resulting in greater awareness before 2007.

TURN ATTACHMENT 2 TABLE 4
Per Capita Sales of CFLs

1st Quarter 2007 (source: EPA ENERGY STAR)			January 2007 - March 2008 (source: Nielsen 18seconds.org)			
State	Ranking	Sales per 100 population	Ranking using July 2007 population data	Sales per 100 population	Number Wal-Marts	Wal-Marts per 1,000,000
California	43	12.29	42	36.20	208	5.69
Oregon	37	14.51	43	33.60	30	8.01
Wyoming	34	15.50	6	81.63	12	22.95
New Mexico	33	15.65	19	66.03	41	20.81
Colorado	32	15.88	16	70.27	81	16.66
Utah	31	16.15	35	48.32	40	15.12
Idaho	29	16.47	37	46.87	21	14.01
Arizona	28	16.59	36	47.95	86	13.57
Washington	21	17.61	41	37.29	50	7.73
Texas	15	18.87	12	73.67	40	17.15
Montana	8	20.58	29	52.09	15	15.66
Nevada	5	21.30	24	56.26	37	14.42
Oklahoma	4	21.77	2	95.34	93	25.71
New Hampshire	3	22.62	11	75.50	31	26.56
Arkansas	2	22.74	1	108.35	90	31.75
Delaware	1	24.05	34	49.69	10	11.56
Total Average		15.55		54.23	4099	13.59

Walmart Store data:
http://walmartstores.com/FactsNews/StateByState/State.aspx?st=CA
Store numbers refer to Wal-Mart Supercenters, Wal-Mart Discount Stores and Sam's Club as of August 08

3. Statistical study of the relationship between utility CFL programs and CFL sales.

The authors of the Interim Report also undertook a statistical analysis in order to understand the effect of utility-run CFL programs on the number of CFLs sold in a state. They constructed several regression models in an effort to find a correlation between CFL sales and a number of variables that may explain variations in the level of sales. The Interim Report's preliminary findings from these analyses found that there was no correlation between ENERGY STAR CFL sales per household and the presence or absence of a utility CFL Program. The regression analysis did, however, find a significant and robust association

between the number of ENERGY STAR (ES) Partner Retailers per 100,000 population and ES CFL sales per household.[18] This finding indicates that a key driver of CFL sales, and the variation among states in the level of such sales, is the extent to which households are exposed to CFL marketing in

4. Storage of CFLs.

There is strong evidence that not all CFLs purchased by consumers are being immediately put to use. The Interim Report found that "Among CFLs purchased in the past three years, CA households estimate an average of 1.5 bulbs are in storage (3.4 per purchasing household), compared to 0.9 in storage (2.3 in storage per purchasing household) in Comparison Area households. This translates into installation rates from three year purchases of 66% for CA and 73% in the Comparison Area." [19]

Additional information on California's residential lighting use shows that:

- On average, households with at least one CFL in storage have 6.7 CFLs in storage.
- Households with at least one incandescent bulb in storage have 11.5 incandescent bulbs in storage.
- Across all sites, the average household has 3.4 CFLs and 6.9 incandescent bulbs in storage.
- Households with more than 10 CFLs installed have 7 CFLs and 7 incandescent bulbs in storage.
- Households with 1-10 CFLs installed have 2 CFLs and 7 incandescent bulbs in storage.
- Household with 0 CFLs installed do not have any CFLs in storage and have 7 incandescent bulbs in storage.[20]

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[18] Interim Report page 70. ENERGY STAR Partner Retailers represent some of the nation's largest home improvement retailers, mass merchandisers, and membership clubs (Interim Report, page 43). Specific companies are not identified.

[19] CFL Market Effects Interim Report-Draft, page 80-81.

[20] Residential Lighting Metering Study: Preliminary results. Presentation by KEMA Inc.to the Commission's Energy Division and the CA electric IOUs February 2009, Slide 27. The table in the slideshow from which the above table is excerpted is inconclusive in that it populates the lower left cell of Table 1, which represents a non-existent category.

TURN ATTACHMENT 2 Table 5
Average Number of CFLs in Storage by Number of CFLs Installed: CA Households[21]

Segment	Average/Site (all households)	Average/Site (all households with at least one)
All Households	3.4	6.7
More than 10 CFLs installed	6.74	9.51
1-10 CFLs installed	1.97	4.31
0 CFLs installed	0.17	0.0

Preliminary results from a CPUC Residential Lighting Metering Study conducted by KEMA, Inc. indicate that 42 million basic CFLs are in storage in CA households.[22] The presence of CFLs for later use in households confirms that for these households at least, market transformation has most likely occurred and that any future utility CFL promotions via the mass market strategy of the current Upstream Lighting Program (ULP) these households might take advantage of could yield close to 100% freeridership.[23]

5. CFL socket saturation in California

As part of the CFL Market Effects Interim Report-Draft (see Section I.A.1.), and the Commission's Energy Division related measurement and verification (M&V) work on the CA

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[21] Residential Lighting Metering Study: Preliminary results. Presentation by KEMA Inc.to the Commission's Energy Division and the electric IOUs February 2009, Slide 27

[22] Ibid at p.20. While the IOUs are only responsible for about 70% of all CFL unit sales in CA in 2006-2008 (meaning CA total 06-08 CFL unit sales was about 127 million), and some of the CFLs in storage could be from prior to 2006, the data does indicate that a significant portion of the IOUs 06-08 CFLs went into storage. TURN calculation:

- 127 million CLF unit sales CA total 06-08
- 98 million IOUs discounted CFLs
- 33.6 million placed into storage during 2006-2008 (42 million in storage w/ one-fifth or 8.4 million in storage prior to 2006)
- Minimum of 26% of all 2006-2008 CFLs purchased in CA utility discounted or otherwise went into storage.

[23] All of this assumes that the CFLs in use and in storage are of high quality. To the extent that people have had bad luck with lower quality CFLs, their presence "in storage" could also indicate something else: left over inventory that no one plans on using but doesn't know what else to do with.

IOUs' 2006-07 EE claimed accomplishments, a Residential Lighting Metering Study[24] was conducted in part to assess current CFL socket saturation and the percentage of remaining sockets available for conversion to CFLs. Working with a socket sample of 29,576, the Study found that 21.2% of all residential sockets currently contain CFLs, 60.9% of all sockets currently contain non-CFL screw-base lamps (any base, any shape, any control), and 17.9% of sockets currently contain non-CFL, pin-based lamps (12.8% currently contain fluorescent bulbs). Under a "Business as Usual" scenario[25] the Study determined that in aggregate 23.8%, (or about 160[26] million sockets) of all CA residential lighting sockets are available for CFLs.[27]

However, it is not reasonable to assume that all of the approximately 24% of sockets can or should be filled via the utilities upstream lighting program (ULP) given that:

(1) a significant portion of the households can be expected to continue to convert available sockets to CFLs without utility incentives (and thus would be freeriders for a utility CFL program), and

(2) some sockets have such low hours of use as to make conversion via the utilities ULP non-cost effective.

TURN Table 3 below illustrates the additional segmenting in the Study of the approximate 30,000 residential sample sockets into high, moderate, and non-using CFL households,[28] with three levels of CFL usage categorized by room (high: living room, moderate:

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[24] Residential Lighting Metering Study: Preliminary Results. Presentation by KEMA, Inc. through the CA Energy Division to the CA IOUs in February 2009.

[25]Ibid. Slide 35. "Available Sockets for CFLs, Business as Usual": If the programs stayed the same as 2006-2008, this is the percent of all sockets potentially available for medium screw-based, A-line lamps applicable in non-dimmable/three way fixtures. The choice of the Business as Usual approach does not denote an endorsement of this approach by TURN. It is adopted here to demonstrate the need to scale back the estimates of what this approach could reasonably achieve.

[26] 160 million sockets is a TURN calculation derived by summing all the 'sockets able to accommodate a CFL' categories for the "Business As Usual" per KEMA's slide #36.

[27] Ibid. Slide 36.

[28] High CFL Using Households: > 10 CFLs installed; Moderate CFL Using Households: 1-10 CFLs installed; Non-User CFL Using Households: zero CFLs installed.

kitchen, and low: bathroom)[29] for each of the three CFL using household types. Under this more refined analysis, only the available sockets in the 'Moderate CFL Use Household' with high and moderate use are likely cost-effective per the utilities' ULP (see shaded cells in Table 3).[30] This means that the number of sockets that could plausibly be filled with CFLs is limited. On a combined basis there may be 56 million sockets available for these two market segments. Assuming at least 50% freeridership,[31] and that some of the 42 million CFLS currently in storage could be used to fill some of the remaining available sockets, there are no more than approximately 28 million sockets or 17.5% of the total identified sockets for the program. Per TURN Table 1, this 28 million is 10 million or 36% less than the 38 million CFLs via the Upstream Lighting Program PG&E forecasts for 2009-2011, and only about one-third of the three year amount forecast by the three electric utilities.

TURN ATTACHMENT 2 Table 6:[32]
Residential Lighting Metering Study
Available Sockets for CFLs by Segment
Scenario: Business as Usual

	CFL Using Household Type		
CFL Usage per Household	High User	Moderate User	Non-CFL User
Potential # of CFLs in High Use Areas	4 million	10 million	5 million
Potential # of CFLs in Moderate Use Areas	12 million	30 million	13 million
Potential # of CFLs in Low Use Areas	20 million	45 million	20 million

[29] The Study further divided each CFL using household into three levels of CFL usage: CFL High Use, CFL Moderate Use, CFL Low Use -- depending on the pattern of use of the lamp in its location. For instance, CFL High Use lamps were located in areas with high hours of use and low switch rates (e.g. living rooms); CFL Moderate Use lamps were in locations with moderate to high hours of use and moderate switch rates (e.g. kitchens and bedrooms); and CFL low use were those lamps located in areas with low expected hours of use and high switch rates (e.g. bathrooms).

[30] The high cost of the ULP means that it is not cost effective to promote standard CFLs for non-users or moderate users via the ULP market strategy. This segment must instead be reached through strategies outlined in Section 3 of this report. CFLs installed in low use/moderate use areas are unlikely to generate sufficient savings to offset the cost of the program: on a per lamp basis, the lamp is used very little, and there is little point in paying the high per bulb costs through the ULP to get a CFL installed.

[31] The 2009-2011 DEER freeridership rate is 60% "upstream: all channels". High users most likely are freeriders above the average. The problem with moderate users has less to do with the freeridership rate and more to do with the fact that the Upstream Lighting Program cannot target users easily.

[32] Residential Lighting Metering Study: Preliminary results. Presentation by KEMA Inc.to the Commission's Energy Division and the electric IOUs February 2009, Slide 36.

B. Wal-Mart and other big box and home improvement retailers have been very successful in increasing the availability and affordability of CFLs.

In contrast to the situation a decade ago, CFLs are now both widely available in retail stores and reasonably priced. The retail availability of CFLs has broadened considerably, with both the number and type of stores stocking CFLs increasing. In the late 1990s, national home improvement, hardware, and membership stores dominated the market. More recently, smaller regional and local drug, grocery, and discount stores have also become key retail outlets. A major shift occurred when Wal-Mart announced an initiative (in September 2006) to sell 100 million CFLs in 2007. As a result, there has been a shift in consumers' buying patterns: in the late 1990s about 85% of CA CFL purchasers bought their CFLs at a home improvement or hardware stores; by 2007-2008 this proportion had fallen to 50% and a higher proportion of purchasers reported buying CFLs from mass merchandise stores, warehouses, grocery stores, drug stores, and discount stores.[33]

The retail price of CFLs has also dropped markedly. Data from the Interim Report indicates that nationally the retail price of CFL bulbs has declined steadily over the past eight years. In 1999, a CFL bulb cost $12.00 or more. By 2007 the price had declined to between $2.00 and $2.50.[34] It should be noted that this national average masks considerable variation in retail price by region, retail type (big box, grocery, hardware, etc.), wattage, packaging (single or multi-pack), and style (twist vs. A-lamp, etc.)

These changes are reflected in recent production and sales data. Sales of ENERGY STAR -qualified CFLs in the U.S. nearly doubled in 2007 with 290 million CFLs sold,[35] accounting for

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[33]See "CFL Market Effects Study" by Cadmus, Figure 8 p. 36.

[34] The Interim Report, Figure 11, page 39. The Interim Report's source for this information is Itron, 2008. California Residential Efficiency Market Share Tracking: Lamps 2007. Prepared for Southern California Edison. September 15, 2008. The comparison of national to CA CFL retail sales price is both incomplete and misleading in that CA ratepayers (in their dual role as consumers) are paying more (about twice as much) for utility-subsidized CFLs than non-utility subsidized CFLs in comparable national retail stores. See additional discussion Section II.C.

[35] Some sources put total 2007 sales for the US as high as 350 or 370 million CFLs. For a discussion, see California Residential Efficiency Market Share Tracking: Lamps 2007, p. 41.

20% of the light bulb market through ES retail partners such as Wal-Mart, Lowe's, Home Depot, Costco, Menards, Ace Hardware, Sam's Club, etc. Also, Wal-Mart easily surpassed its 2007 goal of 100 million CFLs (finishing with 137 million sold). The European market for CFLs is also exploding, with the number of bulbs sold rising from 240 million in 2006 to 400 million by the end of 2007.[36] Incandescent lamp sales, meanwhile, have been falling by 10 -12% per year.

Available data indicate that relatively high levels of CFL sales are being recorded throughout the U.S. even in the absence of the high levels of utility-ratepayer subsidies characteristic of CA. For example, between 2004 and 2005 the number of CFLs purchased per household rose substantially, and the increase was greater in the rest of the U.S. (approximately 20 percent) than in CA (an increase of 17 per cent between 2004 and 2005).[37] While this can be explained at least partially by the lag in sales one would expect from switching to a more durable product earlier than the comparison states, in 2004 CA also embarked on an ambitious utility-administered energy savings program heavily oriented toward CFLs. National surveys of CFL sales confirm this asymmetry as well. As Figure 1 shows, CFL sales per household in the four regions of the US varied rather less than did spending on rebate programs. The Northeast was lowest at 2.2 CFLs/hh and the West highest with 2.8 CFLs/hh. But the South, which, according to the ENERGY STAR CFL Market Profile[38] included the fewest utility promotions, registered the second highest sales per household of the four regions at 2.65 CFLs/hh.

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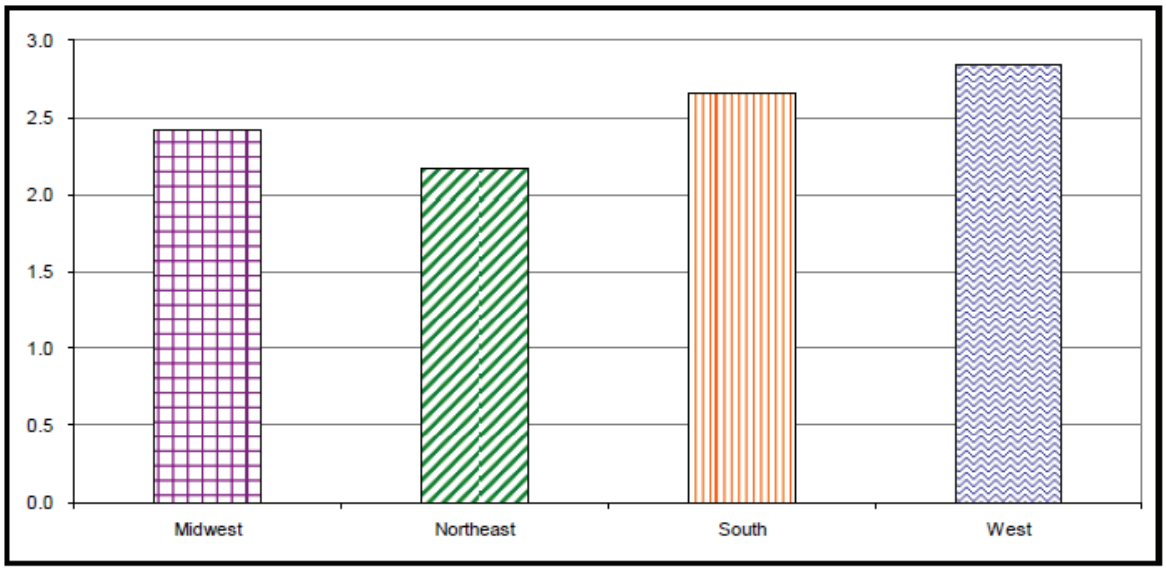
[36] http://www.lighting.philips.com/gl_en/news/press/sector/2007/cfl_savings2.php?main=global&parent=4390&id=gl_en_news&lang=en

[37] California Residential Efficiency Market Share Tracking: Lamps 2005. Itron, Inc. May 15, 2006, table 2, page 22. The same data do show that CA households purchased on average more CFLs than those in the rest of the U.S. (0.515 versus 0.304), but per household sales outside of CA increased faster.

[38] www.energystar.gov/ia/products/downloads/CFL_Market_Profile.pdf

Figure 1

Figure 38: 2007 CFL Sales per Household – CADMUS and RMST Data Combined



Source: California Residential Efficiency Market Share Tracking: Lamps 2007[39]

C. Other states are shifting utility resources out of CFLs to other EE activities before full transformation of the CFL market.

Over the past few years, manufacturers, trade allies, and retailers have engaged in national and international market transforming activities. The impacts of these activities, as well as the historic market transforming impacts of ratepayer-funded utility lighting programs, play into the determination of how and to what extent ratepayers should continue to subsidize CFLs. A number of organizations are realizing that their focus should shift away from the utility ratepayer subsidized promotion of CFLs to different activities. For example, the Northwest Energy Efficiency Alliance (NEEA)[40] recently decided to dedicate less effort to the CFL market in light of the success of its previous work in the area:

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[39] See www.CALMAC.org

[40] NEEA is a non-profit organization supported by the Bonneville Power Administration (BPA), electric utilities, public benefits administrators, state governments, public interest groups, and energy efficiency

"The lighting portion of ENERGY STAR Consumer Products will continue to focus on increasing market penetration and ensuring sustainability of the product category. We are at the final stages of cinching-in the changes in this market, and anticipate leaving this channel behind and possibly its relationships by the next funding cycle (post 2009)." (NEEA Strategic and Business Plans, 2005-2009, p. 10)[41]

As indicated in Figure 2: "Incremental CFL Sales vs. Investment", CFL bulb sales in the Northwest have continued to rise despite a leveling off in NEEA's investment. In 2007, over 18 million CFLs were sold in the area covered by NEEA, representing one in four of all bulbs sold. There is now an average of 10 CFLs per household in northwest homes, a figure that is double the national average (NEEA Annual Report, 2007).[42]

Figure 2

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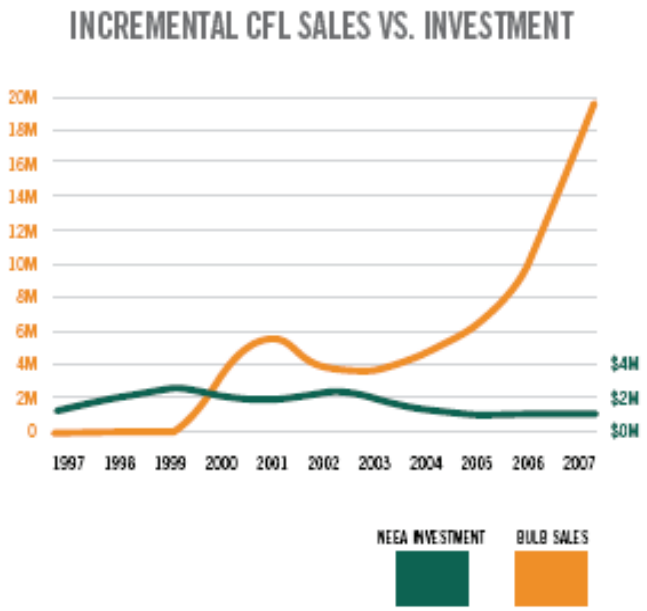
industry representatives. It has been in operation since 1997. NEEA receives funding from the region's utilities, but it is not a utility controlled entity, and it does not operate a utility CFL program. NEEA focuses on regional market transformation in Oregon, Washington, Idaho, and Montana. It has a long history of promoting CFL lighting. The organization's goal is to make affordable energy saving products and services accepted in the region's marketplace. The long term benefit is sustainable, cost-effective energy savings for ratepayers. (For more information go to http://www.nwalliance.org/index.aspx)

[41] September, 18, 2006: http://www.nwalliance.org/research/documentdetail.aspx?ID=438

[42]http://www.nwalliance.org/research/documents/NEEA%202007%20Annual%20Report_webready.pdf Preliminary data from NEEA suggest 2008 sales in the Northwest exceeded 25 million CFLs. (personal communication Reuben Deumling Energy Economics Inc. and TURN consultant with Anu Teja, NEEA April, 2009).



Source: NEAA Annual Report, 2007

NEEA has tracked the savings from four of its key market transformation initiatives since 1997 (ES Residential Lighting, ES Clothes Washers, ES Residential Windows, and ES Home Products. By 2005, these initiatives had produced savings of 37 average Megawatts (aMW) for the region. Figure 3: "1997-2005 Cumulative Energy Savings: NEEA Initiatives", shows that Energy Star lighting savings were by far the largest component of savings, with cumulative net regional market effects accounting for about two-thirds of the Energy Star Lighting cumulative gross regional savings. EE savings in Figure 3 are shown by both gross and net regional market effects, with the latter reflecting savings net of naturally occurring savings and savings from local utility or administrator incentive programs, i.e., they are market effects that can be attributed to NEEA. The value of gross savings minus net regional market effects puts an upper bound on the savings that can be attributed to utility programs. This approach in part demonstrates the viability of partitioning EE goals and attributing EE savings into different categories according to the responsible entity. In the Northwest, utility program savings are tracked separately from naturally occurring savings and savings that can be attributed to NEEA (market transformation). TURN has suggested that CA adopt a similar approach.[43]

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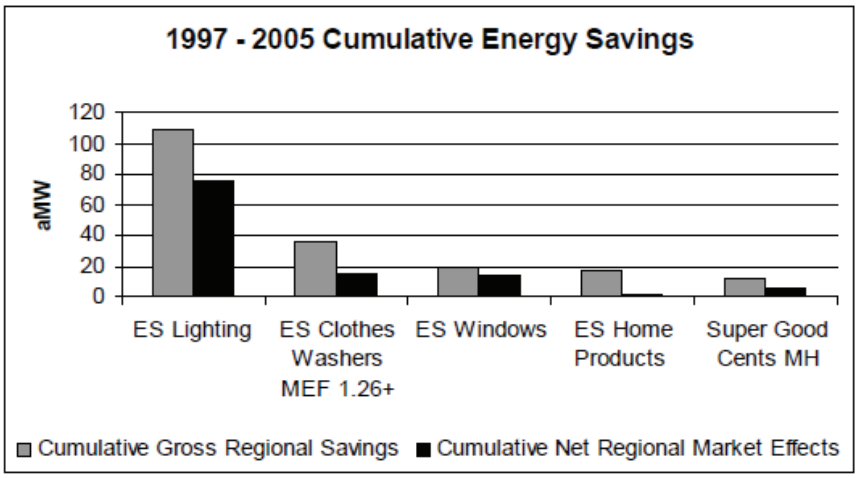
[43] Reply Comments of the Utility Reform Network on the Commission Draft Energy Efficiency Strategic Plan, August 7, 2008. See Attachment 1 for a detailed discussion of TURN's proposal to partition the

Figure 3: 1997-2005 Cumulative Energy Savings: NEEA Initiatives [44]



The Northeast Efficiency Partnership (NEEP) is a second regional market transformation entity that has registered considerable success in promoting CFLs. Like NEEA, NEEP recently recognized that its strategy regarding CFL lighting has to change due to the success of its programs and changes in the market. NEEP's 2009 Business Plan states that one of its high-level strategic goals is to:

CPUC's EE goals and attribute the EE savings into naturally occurring, ongoing market effects, and utility program, categories.

[44] NEEA Market Activities Report 2005, October 6, 2006, page 16-17. Available at: http://www.nwalliance.org/research/documents/2005MAR.pdf

"Establish regionally consistent transition strategies for products reaching the end of their viability and/or need for programs (e.g., CFLs and CFL-based lighting)."[45]

Similarly, a recently updated DOE article on CFL market transformation in CA concluded:

"A number of market changes have occurred that are likely to persist even after utility rebate levels and promotional efforts drop off. Unprecedented competition has fueled a wave of product innovation and aggressive pricing that will make CFLs affordable and potentially attractive to most purchasers from now on. Stores like Home Depot, Ikea, Costco, and Kmart have made inexpensive CFLs a standard promotional item, in many cases bypassing major manufacturers to offer a private-label brand at a lower price…Retailers now clearly understand the benefits of CFL technology, both to consumers (energy savings and convenience) and to the retailers themselves (higher sales revenues per unit of shelf space than incandescent bulbs). As a result, some level of in-store CFL promotion will now be self-sustaining, allowing the utilities to retarget or reduce their funding and still achieve a given level of market success."[46] (emphasis added.)

Steady and prolonged efforts at market transformation by organizations such as NEEA have produced long term results that allow them to turn their attention to other energy efficiency projects. They have capitalized on consumers' interest in energy efficiency and created the conditions for sustained savings via efforts to make CFLs available and affordable. Outlining the need to develop market or use niches rather than continuing to buy down mass market CFLs, Fred Gordon, who also works for the Energy Trust of Oregon, suggested that instead of "mass market manufacture – retail efficiency market strategies, the next wave of savings comes from better fit of tool to application, and program features to submarket."[47]

Recent international and national legislation phasing out the sale of incandescent light bulbs means that in the near future CFLs will in many applications become the existing baseline lighting technology.

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[45] Northeast Energy Efficiency Partnerships 2009 Business Plan, page 13. Available at: http://www.neep.org/about/09BizPlan.pdf

[46] State Energy Program: Laying the Foundation for Market Transformation. September-October, 2003. Accessed October 28, 2008, page 3-4. http://apps1.eere.energy.gov/state_energy_program/feature_detail_info.cfm/fid=24?print

[47] National informal energy advocates discussion list.

There are a number of international, national, and state bans phasing out the sale of incandescent lamps: Brazil and Venezuela started to phase them out in 2005, and other nations are planning scheduled phase-outs: Ireland in 2009, Australia in 2010, Canada in 2012, and the U.S. between 2012 and 2014. The ambitious December 2007 federal energy bill requires lighting to use up to 30 per cent less energy by 2020; achieving this target will force manufacturers to significantly improve the efficiency of incandescent bulbs or remove them from the market.[48] Here in California the passage of the Huffman bill (Assembly Bill 1109) requires energy consumption for indoor residential lighting in CA to decline by 50% and indoor and outdoor commercial lighting by 25% between 2007 and 2018. In sum, these legislative mandates should have the effect of making CFLs (or other high efficiency lighting technologies) the base lighting technology in homes and businesses, no longer requiring support from ratepayer-funded energy efficiency programs.

III. Why CA must move away from CFL-dominated utility EE portfolios.

A. The IOU's reliance on CFLs with savings that decay quickly and have high levels of freeridership has resulted in a "treading water effect" with regard to growing CA EE savings over time.

It is difficult from a utility resource procurement perspective to grow cumulative energy efficiency savings via CFLs over time, largely because CFLs are relatively short-lived (with a low energy useful life or EUL), meaning that CFL savings erode or decay in a few to several years. Utility EE programs with an emphasis on short-lived EE measures such as CFLs thus create a "treading water effect" in growing cumulative EE savings over time. CFLs' low EUL, coupled with the numerous indicators of achieved state, regional, and increasingly national market transformation, further means that CA utility CFL EE savings are reflect significant levels of freeridership. Until the IOUs exit the largely transformed CA CFL market, continual reinvestments of ratepayer funds in CFLs essentially saves the same kilowatthours over again

[48] See http://www.enn.com/energy/article/27822; http://www.washingtonpost.com/wp-dyn/content/article/2007/12/18/AR2007121800853.html?hpid=topnews

and thus limits development of sustainable energy efficiency savings.[49] Worse, continued pursuit of CFL programs where consumers already make the purchase based on non-discounted price, light quality and energy savings means utility rebates result in freeridership. Responding to this low EUL CFL "treading water effect" and freeridership rates in the 60+% range for screw-in CFLs via the IOUs Upstream Lighting Program (ULP), the CPUC recently directed the electric utilities to develop a "coordinated phase out of utility incentives for purchase of CFLs", while "ensur[ing] that big box and home improvement retailers such as Wal-Mart and Home Depot are ready to stock Energy Star price discounted CFLs in CA as utilities phase CFL programs out."[50]

1. The energy savings realized during CA's 2000 -2001 energy crisis (in large part via CFLs) were short-lived and not sustained.

The aggressive utility CFL-dominated EE programs created in response to the CA energy crisis of 2001 have not reduced the upward trajectory of CA energy use and peak demand. California Energy Commission (CEC) documents show that non-coincident peak demand snapped back soon after the 2001 crisis. As Figures 4 and 5 indicate, the effect of the 2001 crisis on peak demand was not fully sustained, with peak demand falling and then rebounding once the crisis had passed. Rising peak demand is associated with a declining load factor as are measures which reduce non-peak demand disproportionately.

"The general decline in the load factor over the last 20 years has been caused by a rising proportion of homes in warmer areas and more homes and businesses with central

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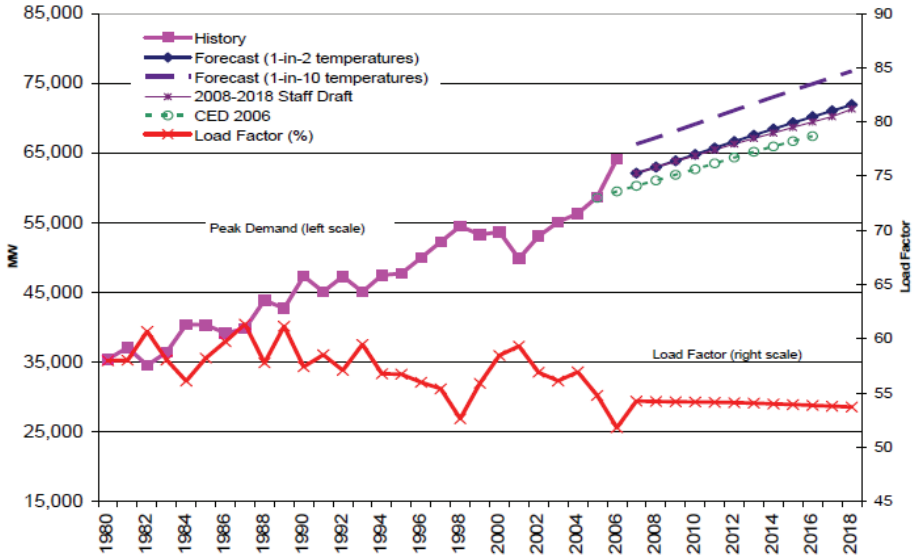
[49] California Public Utility Commission Decision 07-10-032 October 18, 2007, "Interim Opinion on Issues Relating to Future Savings Goals and Program Planning for 2009-2011 Energy Efficiency and Beyond", pages 21-22. http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/74107.htm.

[50] California Public Utility Commission Decision 08-09-040 September 18, 2008, Attachment A: California Term Energy Efficiency Strategic Plan (CEESP), Section 2 – Page 24. http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/91068.htm The CEESP also directed the utilities to engage in negotiations with manufacturers and retailers to buy-down prices and stock the next generation of high efficiency lighting.

air conditioning. These trends are projected to continue over the forecast period. Energy efficiency measures, such as more efficient residential lighting, can also contribute to the declining load factor by reducing overall electricity use while having a limited effect on peak."[51] Non-coincident electric peak demand has returned to its historical pattern since the energy crisis. These patterns indicate that the energy crisis sparked only a short-term decline in electricity non-coincident demand.

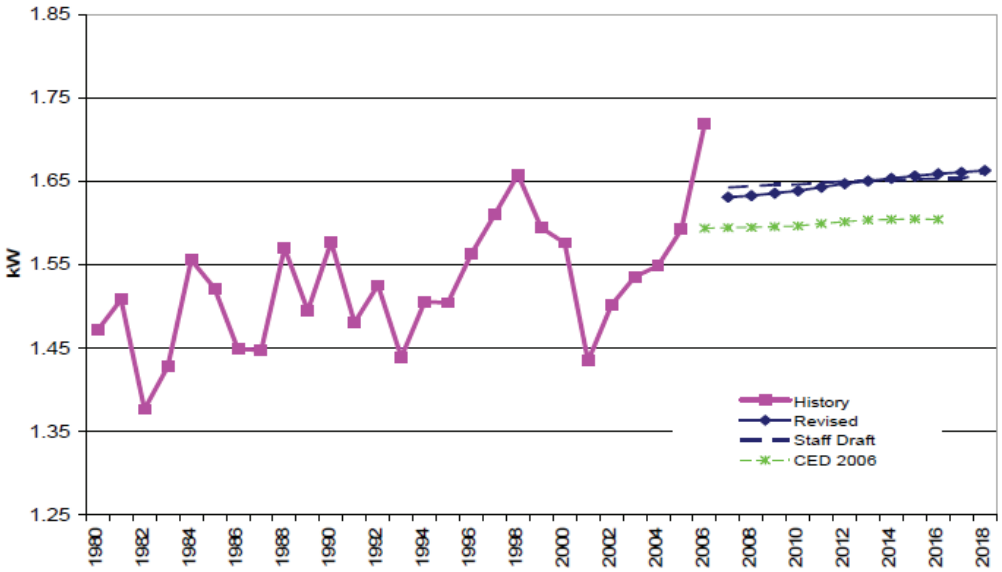
Figure 4: CA Statewide Non-Coincident Peak Demand



Source: California Energy Commission, 2007.

Figure 5: CA Statewide Non-coincident Peak Demand Per Capita

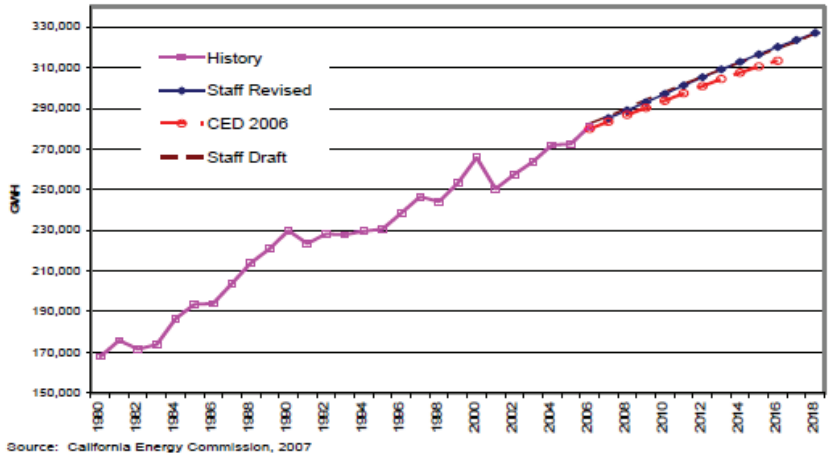
[51] Source Figures 1-2: Source: California Energy Demand 2008-2018 Staff Revised Forecast, November 2007, CEC-200-2007-015-SF2, pages 15-16; Available at: http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF2.PDF . The data in these graphs indicate the difficulty of substantiating claims regarding the lasting effect of IOU programs on actual electricity consumption. California program stakeholders claim that the "California energy crisis was crucial in creating the spark in 2001 that ignited consumer demand and accelerated the pace of market progress many times over" (Interim Report, page 60), and yet peak demand (as well as energy [see Figure 3, page 14, in California Energy Demand 2008-2018]) consumption data do not show a sustained effect.



Source: California Energy Commission, 2007.

A similar pattern is evident for energy consumption. Figure 6 shows that after dipping in 2001, energy consumption resumed its upward trajectory in subsequent years.[52]

Figure 6: CA Statewide Electricity Consumption: GWh 1990-2006 with forecast to 2018[53]



Source: California Energy Commission, 2007

[53] California Energy Demand 2008-2018 Staff Revised Forecast, November 2007, CEC-200-2007-015-SF2, page 13; Available at: http://www.energy.ca.gov/2007publications/CEC-200-2007-015/CEC-200-2007-015-SF2.PDF

B. With residential lighting load greater in off-peak winter than on-peak summer, the generation, transmission, and distribution (G,T,D) supply-side procurement offsets associated with short-lived EE savings from CFLs are not as meaningful.

Residential lighting loads as recorded by the CA electric utilities vary over the course of the day and from season to season. Figure 7: "CA Hours of Operation per Month" data show that lighting loads are perhaps 40% higher in winter than summer. In addition, Figure 8: "CA Hours of Day" data show that lighting load peaks in the evening.[54] Similar data compiled for CFLs specifically show a slightly higher level of afternoon and evening use, but in both cases the lighting peak registers several hours after the grid-peak from 2-5pm. This means that in terms of offsetting or avoiding utility procurement, residential CFL savings are of much less economic and environmental value than EE savings more closely associated with summer seasons and summer daily peak such as HVAC, and thermal integrity improvements that provide energy savings on a year round 24/7 basis.

Figure 7: CA Hours of Operation per Month

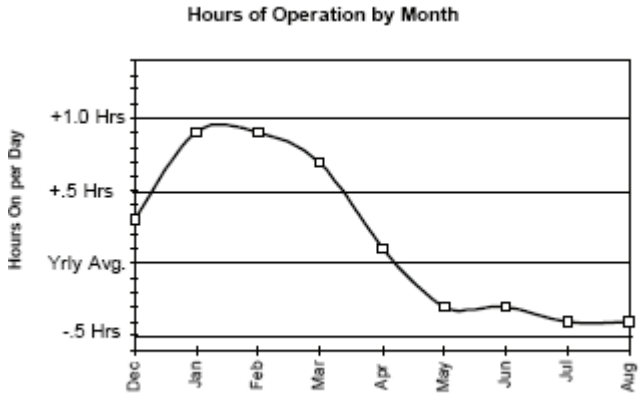


Figure 8: CA Hours of Day

[54] See Cynthia Mitchell, August 1, 2005, California Summer Peak Demand and Residential Lighting Load; derived from *CA Statewide Residential Sector Energy Efficiency Potential Study*, Kema-Xenergy, April 2003, http://www.cpuc.ca.gov/static/industry/electric/energy%2Befficiency/rulemaking/natlgassvgsstudies.htm ;. http://www.energy.ca.gov/efficiency/lighting/lighting_reports.html *Lighting Efficiency Technology Report, Volume I, CA Baseline*, CEC, September 1999.

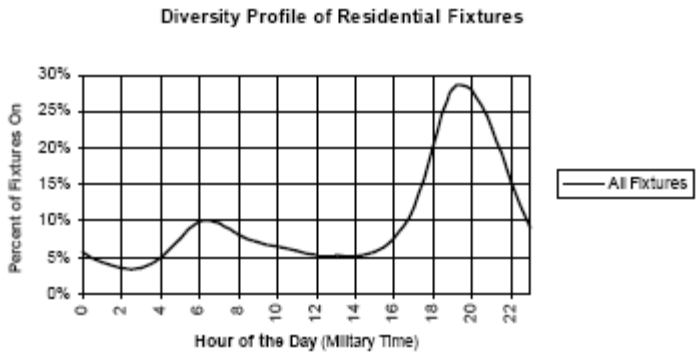


Figure 2-34 - Percent On by Hour, All Fixtures

C. CA consumers (including ratepayers) are paying more for utility-subsidized CFLs than CFLs in comparable national retail stores that are not subsidized by utilities.

Contrary to what one would expect, continued CA ratepayer investments are resulting in ratepayers paying more for utility-subsidized bulbs than non-utility-subsidized CFL bulbs in comparable major retail stores. In 2007 the national average price for a CFL purchased at Wal-Mart and Home Depot was less than $2.00 a CFL.[55] The CA utilities paid manufacturers $1.70 to $1.90 per CFL to bring the retail lamp price down to $0.50 - $1.25 per lamp, with an additional

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[55] When comparing CFL prices it is important to recognize the spread in prices by wattage, style, packaging, geographic region, as well as by retail category. As the study cited above: "California Residential Efficiency Market Share Tracking: Lamps 2007" reveals, the average price masks significant diversity among these categories. The (per bulb) price paid for a multi-pack of 13W CFLs at a big box retailer may differ from the price for an individually packaged bulb at a grocery store in the same town by a factor of two or three or even more. This example focuses on big box multi-pack CFLs.

The working websites at the time were as follows.
http://www.walmart.com/catalog/product.do?product_id=7850182 for the 13 watt bulbs

http://www.walmart.com/catalog/product.do?product_id=7850183 for the 18 watt bulbs

http://www.walmart.com/catalog/product.do?product_id=78501824 for the 23 watt bulbs

http://www.homedepot.com/webapp/wcs/stores/servlet/ProductDisplay?storeId=10051&langId=-1&catalogId=10053&productId=100527335&N=10000003+90401+502806

In September, 2007 Walmart was selling four-packs of CFLs in different wattage levels for $7.58, or $1.90 per CFL) http://blogs.consumerreports.org/home/2007/09/walmart-cfls.html

estimated $0.50 to $1.00 per lamp for the CA utilities' overhead and internal expenses,[56] which equals an estimated cost to the CA consumer/ratepayer of $2.70 to $4.15 per CFL. Thus, in 2007 the total cost of a CFL to California consumers and ratepayers ranged from about $1.00 to over $2.00 more per CFL than consumers in other areas of the country that were able to buy Wal-Mart and Home Depot discounted CFLs on a retail basis without the "benefit" of utility subsidies.

While the upstream lighting programs run by the California IOUs yield CFLs that may cost as much as $4.15, other IOU programs promoting CFLs involve considerably higher costs as seen in Figures 9 and 10 below. At some point these other programs will also be overtaken by the market price and general availability of CFLs.

Figure 9: per CFL cost in a PG&E Low Income program[57]

[56] In presenting this cost range per bulb TURN acknowledges that the administrative costs of the IOU energy efficiency portfolios can be distributed across the various (lighting) programs according to different assumptions. Assuming the ULP administrative costs are equal to the sum of the rebates paid out for CFLs, one method would divide the administrative costs across the entire portfolio based on lifetime kWh savings. At $1.80 for an average CFL rebate, this would yield a value for the administrative costs per CFL of $1.80.

[57] ALJ Fifth Ruling Seeking IOU Data - LIEE/CARE - A0805022 et al , p.1 http://www.liob.org/docs/PG&E%205th%20Response%20to%20ALJ%20Data%20Request%209-5-08.pdf

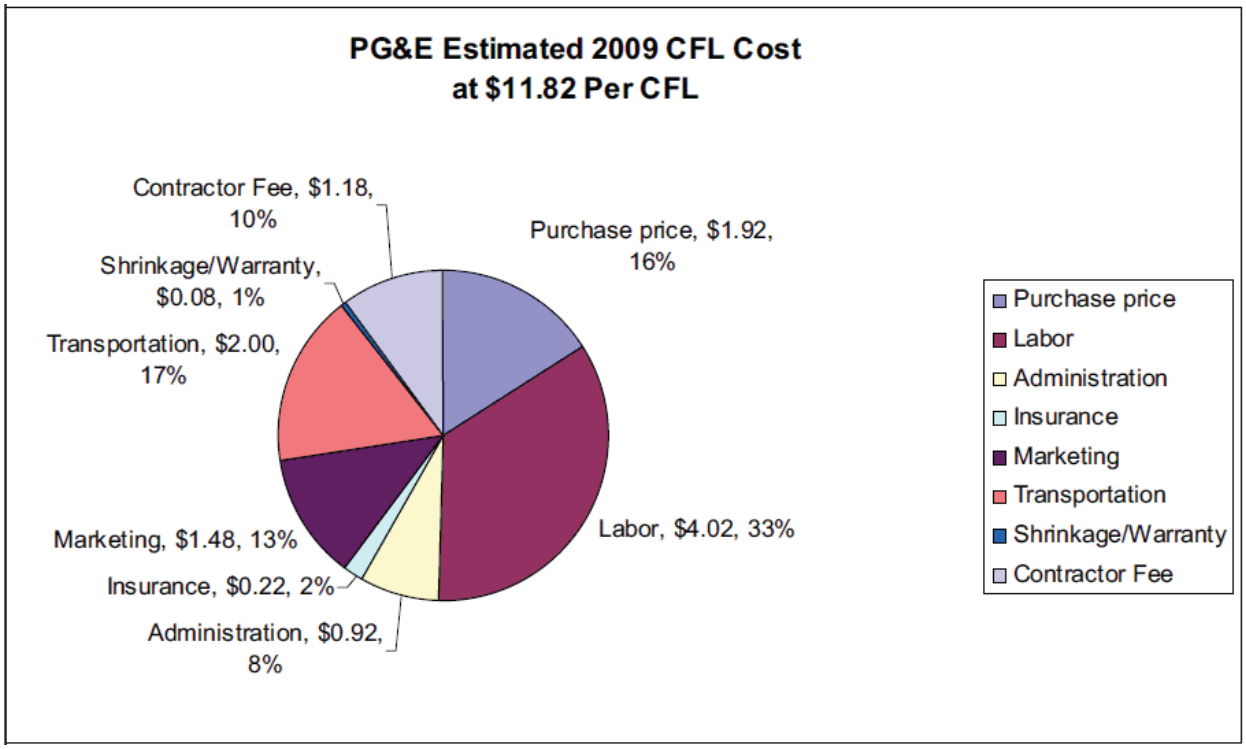

Figure 10: Cost per CFL delivered in various programs[58]

Table 1. CFL Volume and Delivery Cost by Delivery Mechanism			
Delivery Mechanisms	**CFL Volume**	**CFL Subsidy**	**Cost per CFL Delivered**
Targeted Event Giveaway	low	1 free	$15-$20*
Door-to-Door Giveaway	high	4 free	$8-$10**
Leveraging Other Programs incentive	low	5 free	instead of $35 cash $5-$6**
Reduced-Price Programs—Manufacturer Buy-Down	medium	$3 manufacturer buy-down	$6-$7
Reduced-Price Programs—POP Rebate	high	$3 POP rebate	$3-$5

[58] CFL Programs that Work: SEP Case Study, California, October 2003 (reprinted form Home Energy Magazine). http://apps1.eere.energy.gov/state_energy_program/case_study_detail_info.cfm/cs_id=8

*The cost figures were calculated based on program sponsor-provided administration, implementation, and CFL per unit cost data.

**The average cost of CFLs provided by the Targeted Event giveaways, the door-to-door giveaway, and the Leveraging program was between $5 and $6.

D. The CA IOUs appear to be promoting lower quality ENERGY STAR CFLs (lighting quality, hours of operation, buzzing, flickering).

The ENERGY STAR program seeks to increase market share for energy efficient products. In the case of CFLs, this has included attention to quality. By coordinating efforts to establish quality thresholds and test protocols for CFLs in the U.S., the ENERGY STAR label serves as the mark of minimum acceptable quality in this market.[59]

There is widespread agreement that CFL manufacturers continue to produce lamps of varying qualities.[60] Revisions to the ENERGY STAR CFL program quality criteria reflect this ongoing concern.[61] Quality charters have recently been enacted and strengthened not just in the US, but in Europe and Asia as well.[62]

The International CFL Harmonisation Initiative is devoted to identifying and addressing problems of CFL quality. The following is excerpted from the webpage that provides an overview of, among other topics, "Problems in the CFL Market."

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[59] "Do New Bulbs Save Energy if They Don't Work?" *New York Times*, March 28, 2009: http://www.nytimes.com/2009/03/28/business/energy-environment/28bulbs.html?_r=1&emc=eta1

[60] http://www.apec-esis.org/www/cfl/webnews.php?DomainID=10&NewsID=47

[61]" ENERGY STAR® Program Requirements for CFLs" (version 4.0 was finalized March, 7 2008): http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/cfls/Criteria_CFLs_V4.pdf Participation in the Energy Star program is voluntary and testing is based on self-certification

[62] "European Compact Fluorescent Lamps Quality Charter" February, 2005: http://sunbird.jrc.it/energyefficiency/CFL/pdf%20CFL%20quality%20charter/EU%20CFL%20QC%202003%20V4.pdf;
Asia CFL Quality Charter :2008: http://www.cleanenergyasia.net/upload/event/file/file_53.pdf

> The current climate of CFL production and distribution creates two problems, both of which the International CFL Harmonisation Initiative aims to tackle:
>
> *First, an abundance of poor-quality CFLs are entering the markets of economies either importing CFLs or manufacturing their own.* This is largely due to the fact that there exists no international quality mark, or minimum level of quality, for CFL lamps. Moreover, each economy maintains largely different standards of expected quality, or no standard at all. This proves to be problematic, as it leaves consumers to distinguish between products with no set of guidelines on which to base their CFL purchase. Without any universal quality guidelines, the consumer is attracted to cheaper, lower-quality products.
>
> *Second, CFLs are increasingly manufactured in a centralized location but regulated by no centralized or common set of standards*. Although nearly all CFLs are produced in China, each economy maintains different test procedures, specification levels, and minimum energy performance standards, if any at all. And many economies have in place neither the technical standards nor the method and means of testing CFL quality. In short, there is a lack of a common approach to regulating and certifying the quality of this globalised product.[63]

Two kinds of quality are to be differentiated here: (1) lamps produced in facilities or by companies that, because they use cheaper materials or less sophisticated production equipment, or simply the scale of manufacturing employed, populate the lower quality tiers; and (2) quality differences *within a given line of products* that may be due to any number of parameters related to the quality of the materials used in production and quality control of the production process itself. How well CFL test protocols are able in practice to sort out the lower quality bulbs of either variety is unclear. It should also be noted that participation in the ENERGY STAR program is voluntary and based on self-testing.

The CFL's technological complexity when compared, for instance, to an incandescent bulb partly explains the difficulty of achieving uniform high quality for the various output parameters. The variety of materials and number of manufacturing steps required to produce a CFL are much greater than for more traditional lighting products. Also, until quite recently twisting the glass

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[63] http://www.apec-esis.org/www/cfl/webnews.php?DomainID=10&NewsID=47

tube into the now-characteristic swirl shape of a CFL was accomplished by hand—no machine was able to achieve sufficiently consistent results.[64] Many industry observers note that the widespread (and largely successful) efforts to drive the CFL price down have had predictable repercussions on overall product quality. The degree of automation within a CFL-producing factory is but one variable which corresponds to the quality of the resulting product. Some of the materials used in CFL production also differ, in part because the material which yields the highest quality light—tri phospor powder—is quite expensive. Other, less expensive substitutes are used in many factories, with corresponding reductions in the output and quality of the light.

To summarize: some aspects of CFL quality can be captured by examining the test criteria; how many cycles does the test prescribe, what percent of the bulbs are allowed to fail, etc.[65] Another dimension relates to the question of the fit between test and real-world use patterns. Still another may elude the test regime altogether because the quality of a CFL may vary within an apparently identical population. That the current system of quality assurance in the U.S. does not work is evidenced by that fact that when tested independently, one in six *already qualified* ENERGY STAR bulbs had to be de-listed: "In the 2007-8 tests, five of 29 models failed to meet specifications for such categories as lifespan, luminosity and on-off cycling and were removed from Energy Star's list of qualified products."[66]

Eighty percent of the world's CFLs are produced in China, and the fraction imported from China into the U.S. is thought to be at least that high. To TURN's knowledge, no CFLs are currently manufactured in the US. The California IOUs confirm that all of the CFLs bought

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[64] In 2008, TCP (the world's largest manufacturer of CFLs and the US's largest supplier) announced it had succeeded in building a machine that could perform this task, see: http://www.tcpi.com/corp/press_releases/new_twist.aspx.

[65] The ENERGY STAR test protocol for the 'rapid cycle stress test,' for instance, requires 5 of 6 CFLs rated to last 10,000 hrs to survive 5,000 on-off cycles which equals only 4.2% of their rated life. By comparison the European quality charter requires twice as many ignitions: "The number of ignitions that the lamp can endure shall not be less than the claimed lamp life in hours."

[66] Do New Bulbs Save Energy if They Don't Work? NYT, March 28, 2009 http://www.nytimes.com/2009/03/28/business/energy-environment/28bulbs.html?emc=eta1&pagewanted=print

down through their programs are imported from China.[67] The California IOUs have not, for the most part, contracted with the larger companies whose CFLs are known to occupy the top quality tiers. Instead they have obtained their CFLs from the large number of small to mid-sized companies whose output corresponds to the second and perhaps third tiers.[68]

To obtain the CFLs for their myriad programs, the California IOUs have established contracts with the smaller CFL producers in China,[69] which rely to a greater extent on manual labor and generally fall into the lower two quality tiers. WalMart, by contrast, has a contract with General Electric, the largest producer of CFLs in China. In general the big box retailers contract with the larger scale producers of CFLs, whose technical capacity for automated production (and quality control) is higher. TCP, the manufacturer appearing at the bottom of the list in Table 7 supplies roughly 70% of the entire U.S. CFL market.[70] As such it is difficult to imagine that it is not a 1st tier manufacturer. General Electric supplies even fewer CFLs to IOU programs than does TCP—some 2.3 million.

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[67] TURN Data Request 003 2009-2011 Energy Efficiency A.08-07-021, Question 5.

[68] The correlation between scale of CFL manufacturing lamp quality is illustrated in slide 4 of the following presentation: "Current Situation of CFL Product in China," National Lighting Test Center China http://www.adb.org/Documents/Events/2008/ACEF/CFL-PRC.pdf

[69] General Electric, Osram-Sylvania, and Phillips represent the big three lighting companies producing CFLs for the international market. TCP is a more recent lighting manufacturer that supplies 70% of the US market with CFLs. Although the IOUs source modest quantities of CFLs from these four companies, the vast majority (87.9%) of the lamps subsidized in California come from other, smaller companies.

[70] http://www.tcpi.com/corporateSecondary.aspx?pageHistoryID=1809

TURN ATTACHMENT 2 Table 7: Top CFL manufacturers with whom CA IOUs contracted for PY 2006-08			
	manufacturer	number of CFLs	% of total
1	Greenlite	25,355,434	25.9%
2	Feit	16,480,147	16.8%
3	Sunrise	10,468,706	10.7%
4	Lights of America	7,772,904	7.9%
5	Maxlite	4,994,797	5.1%
6	U Lighting	4,611,118	4.7%
7	Broada Inc	4,092,300	4.2%
8	TCP	4,051,899	4.1%

Source: Responses to TURN Data Request 003-01 from PG&E, SCE, and SDG&E (March 26, 2009)
A.08-07-021 SCE Energy Efficiency Programs and Budgets for 2009-2011

Another dimension of the CFL programs besides quality which complicates their apparent success is termed 'interactive effects.' These effects transcend the focus on the lamp itself by acknowledging the larger context in which these lamps are inserted; the secondary effects their widespread adoption may precipitate.

E. There is an interactive effect of increased space heating offsetting the reduced heat gain that results from replacing incandescent lights with CFLs.

Incandescent light bulbs produce substantial amounts of heat energy. CFLs produce far less heat energy. Therefore, substituting CFLs for incandescents reduces the amount of heat energy, which can produce a corresponding increase in space heating requirements (commonly referred to as interactive effects). Consequently in climate zones where annual energy usage is dominated by heating (rather than cooling) the energy savings calculated and attributed to CFLs will overstate the associated reductions in net energy savings as well as greenhouse gas (GHG) emissions unless the interactive effects are taken into consideration. While it has long been recognized that lighting efficiency improvements in commercial buildings also reduces air conditioning costs, CA is now adjusting utility EE savings to account for the increase in winter heating load requirements in homes and offices retrofitted with higher efficiency lighting. Initial CA findings indicate that a high proportion of the savings in electricity demand from changing out a standard medium-size incandescent light bulb to a higher efficiency CFL may be offset by

the rise in heating energy required to compensate for the reduced heat produced by the CFL bulb.[71]

While the efficiencies and climate significance of generating a BTU of heat with an incandescent bulb are not equivalent to a BTU of heat generated with a gas furnace, both situations usually rely on utility supplied fuels. The details are important, but overall less significant for the issues discussed in this White Paper than the fact that a tradeoff occurs that must be accounted for when calculating net energy savings.

Including these interactive effects can significantly change the level of overall savings that can be attributed to CFL programs, and to overall EE Programs. A recent verification report by the CPUC Energy Division calculated the difference between the savings that resulted from CA EE programs under three scenarios: (1) positive interactive effects included (this is what the utilities currently do); (2) positive and negative interactive effects included; and (3) no interactive effects included. The analysis showed that the negative interactive effects outweighed the positive effects by a substantial amount.

The difficulty of estimating the net effect of reducing the amount of heat generated by lighting on the demand for central heating is that the effect varies by climate zone, the condition and system-wide-efficiency of the heating system, and the thermostat settings. A 1-for-1 replacement of the heat is probably a reasonable average, while keeping in mind that in many cases the effect can be assumed to be considerably more than 1 or considerably less than 1.

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[71] These effects can be expected to vary by climate zone, see also Appendix to ED Final Verification Report: http://eega2006.cpuc.ca.gov/ The positive interactive effect of high efficiency lighting reducing space cooling load (principally in commercial buildings) has been calculated and included in DEER for years. Similarly, the "negative" interactive effect of high efficiency lighting increasing space heating load has been discussed (and opposed by the utilities) in the utility - DEER community for some time. While the discussion of negative interactive effects is focused on CFLs, other high efficiency lighting measures such as high efficiency 4- and 8-foot linear fluorescent lamps, ballasts, fixtures, sensors, etc. (more prevalent in nonresidential) also work to reduce internal heat gain--meaning that space cooling requirements are reduced and space heating requirements are increased. Also, other high efficiency appliances and equipment such as refrigerators and freezers; stoves, ovens, and commercial dishwashing; motors; and commercial and industrial processing and manufacture, can reduce internal heat gain and thus contribute to varying levels of negative interactive effects.

In March, 2009, SDG&E submitted a "Report for the CFL Energy Impact Study"[72] to CALMAC, which attempted to refute the interactive effects of CFLs on domestic heating, as quantified in the May, 2008 update of the DEER. SDG&E also reproduced this study in their March 2nd Amended Applications. The report's principal findings were (1) "there is strong statistical evidence that replacing incandescent lights with compact fluorescent lights in a residential setting generates significant electricity savings," and (2) "there is no statistical evidence of any interactive effect of CFLs on the usage of natural gas." (p. 20)

The study also mentioned two trends manifest in the datasets employed: (1) "Specifically, there is some evidence that electricity usage is increasing over time, especially for the full sample." (p. 17) and (2) "The annual trends indicate that gas consumption in 2006 – 2008 is significantly smaller than usage recorded in 2005 even though there has been no substantive change in heating degree hours." (p. 21). The study made no efforts to test whether these (presumably exogenous) trends (increasing electricity consumption and falling natural gas consumption) were of sufficient magnitude to perhaps cancel out or overwhelm one or both of the effects of primary interest, yet still concluded that the CFL's salutary effect on electricity consumption is confirmed while the impact on natural gas consumption is found to be statistically insignificant. The data on which the report relies also differs both climatically and demographically from the average California household in which rebated CFLs are being installed: as compared to the CA average, the San Diego climate (as measured in heating degree days-HDD) is milder, the average household size of the sample population is larger, and the average household income level is higher.[73] In fact, the average monthly temperatures recorded in San Diego (see Table 8) cluster so close to 65F year-round that it is hard to imagine a climate in the US less likely to reveal interactive effects related to domestic heating.

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[72] http://www.calmac.org/publications/Appendix_C_-_CFL_Interactive_(2).pdf

[73] Both the house size and the number of people per household in the study population diverged from the CA average and even the SDG&E average, and in directions that one would reasonably expect to bias the interactive effect in question downward.

Table 8

San Diego Temperature (monthly averages)												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
57.4	58.6	59.6	62.0	64.1	66.8	71.0	72.6	71.4	67.7	62.0	57.4	64.2

Source: www.climate-zone.com[74]

Fundamentally the report skirts the issue of how the difference in heat introduced by the two lighting technologies is made up within the house. While one or two CFL substitutions in a mild climate in a smaller-than-average house may not in fact trigger the thermostat in a statistically significant manner, this observation does not invalidate the thermodynamic facts underlying the substitution.

F. The CA IOUs are behind the national curve in CFL recycling and minimizing the mercury content of CFLs.

1. CFL Recycling

One of the interesting findings from the Interim Report[75] is that CA consumers do not appear to be particularly well informed about the health and safety concerns surrounding CFLs and their disposal. The public's understanding of safe handling and disposal of mercury-containing CFLs is an important market effects issue.[76] See Section 4.9 "Concerns with CFLs and CFL Disposal" at page 98, and Tables 40, 41, and 42, pages 99 – 101:

- Per Table 40, only 7.6 % of CA respondents recognized that CFLs require special disposal or must be recycled. This is slightly lower than the Comparison Area proportion of 8%. The CA to Comparison Area data was also slightly lower for "Mercury Concerns" (CA 5.5% to Comparison 6.3%) and "Hazard if broken/fragile" (CA 0.8% to Comparison 1.2%).[77]

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[74] http://www.climate-zone.com/climate/united-states/california/san-diego/

[75] See FN 5 for citation.

[76] See TURN and DRA May 12, 2008 Protest to PG&E Advice Letter 3257-E-Modification of Existing Mass Market Program to Offer Limited Marketing Campaign of Fluorescent Lamp Recycling.

[77] While the two figures are very close, the surprise is that CA, with a much longer track record of publicly subsidizing this technology has put in place no (better) infrastructure for processing the mercury known to be present.

- Per Table 41, only a small portion (about 19%) of California and Comparison Area respondents identified concerns about CFLs requiring special disposal or must be recycled.
- Per Table 42, about two-thirds of all CA respondents threw no-longer functioning CFLs in the trash.

Thus, despite a long-running IOU CFL program, CA residents are not at the forefront of awareness about CFL safety issues. This is in keeping with the relatively late development of CA IOU interest in these concerns. They have joined campaigns initiated by others (California's DTSC, for instance), but don't lead the charge.[78] By contrast, the wider market and other states have been frontrunners in attempts to raise awareness about CFL safety and disposal. Several retailers have established CFL recycling programs. IKEA, True Value, and Home Depot accept CFLs for recycling, while some Wal-Mart stores offer periodic recycling events.[79] In addition, a recent market evaluation report of NEEA's lighting program highlights the need to address CFL safety issues:

> Several manufacturers' representatives and industry observers felt that recent media attention to the mercury content of CFLs could dissuade consumers from buying CFLs. They report that information has not been disseminated regarding the magnitude of the issue as compared to that of other mercury containing items in a typical household (e.g., thermometers and thermostats) and that recycling options are not available in many areas. One industry observer felt that the following three steps are necessary to address the mercury issue:
>
> 1. Reduce the amount of mercury in each lamp;

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[78] The tone of the IOU's responses to a recent DRA Data Request on the subject of CFL recycling indicates a willingness to comply with laws rather than a leadership role on this subject: "PG&E's Mass Market program will continue to combine messages of energy efficiency and proper disposal of end-of-life fluorescent lamps. PG&E will enhance activities as necessary to fulfill the requirements of any relevant legislation passed by the State." (EnergyEfficiency2009-2011-Portfolio_DR_DRA_002-19) a.SDG&E's response strikes an even less proactive tone: "We promote disposal and education. We don't pay for collection and recycling. SDG&E is actively working with outside organizations."

[79] See "Wal-Mart to Host Fluorescent Light Recycling Day in Five States" at http://www.treehugger.com/files/2007/06/walmart_cfl.php; Home Depot Offers Recycling for Compact Fluorescent Bulbs, New York Times, June 24 2008, http://www.nytimes.com/2008/06/24/business/24recycling.html

> 2. Make sure energy-efficiency program sponsors are sending a consistent message to consumers; and
>
> 3. Develop a regional and/or national recycling infrastructure for CFLs.
>
> While retailers were not specifically interviewed by the authors of the NEEA report cited below regarding CFL recycling, two retailers raised the subject. As previously indicated, one retailer indicated that they have received a lot of letters from customers expressing concern regarding the mercury content of CFLs.[80]

Some of the CA utilities have recently begun to pilot recycling programs in association with local governments, but these fall far short of what is necessary to eventually collect the hundreds of millions of CFL bulbs that the IOU programs have put into the market.[81] Instead, in 2006 the CA Department of Toxic Substances Control (DTSC) took the lead to establish CA's Take It Back program, which aims to provide CA residents with a free and convenient way to recycle CFLs. Despite the CA utilities' huge involvement in distributing CFLs, the nation's first free comprehensive CFL recycling program was launched not in CA, but in Maine. It is notable that the utilities' fledgling CFL recycling pilot programs are limited to a few locations, whereas Maine implemented a statewide program more than a year ago.[82]

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[80]ENERGY STAR Consumer Products Lighting Project: Market Progress Evaluation Report #4, Kema, Report #08-195, July 22, 2008, section4.4.3. Available at: http://www.nwalliance.org/research/reports/E08-195.pdf

[81] One such program run by the San Francisco Department of the Environment recently disclosed a recycling cost per bulb of $0.45. While this figure is quite high compared to costs of such programs in Europe, this may reflect the relative size and age of the San Francisco program, but even in Europe, a cost of €0.09 per bulb is calculated.

[82]PG&E Advice Letter 3257-E-A to Public Utilities Commission of the State of California. Supplemental Information: Modification of Existing Mass Market Program to Offer Limited Marketing Campaign of Fluorescent Lamp Recycling. May 20, 2008; Report Regarding the Recycling of Fluorescent Lamps and Consumer Education Efforts. Maine Department of Environmental Protection and Maine Public Utilities Commission, January 2008, p. 1).

All three CA IOUs, when asked (in March, 2009) about their efforts to comply with AB1109, evidenced a complete lack of initiative on the subject. What little outreach they did enumerate concentrates on informational displays at in-house technology centers and "encouragement to retailers." (A.08-07-023 SDGE 04/03/09 Response EE Programs and Budgets for PYs 2009-2011 DRA-SDGE-3 Data Request Dated March 20, 2009 CFL Basic and CFL Advanced Programs: Q5.

2. Minimizing the mercury content of CFLs

Several major retailers have recently announced limits on the mercury content of their CFL bulbs. For example, in May 2007 Wal-Mart announced that its suppliers had committed to a mercury content standard that is substantially below the 5 mg standard for most bulbs set by the National Electrical Manufacturers Association in early 2007.[83] The companies' suppliers will also "adhere to clean production techniques that will minimize mercury pollution from factories manufacturing CFLs."[84] Ikea has imposed a 3 mg mercury limit on the CFLs it sells, and several manufacturers already make CFLs that contain less than 3 mg of mercury.[85]

The CA utilities have recently also identified mercury content requirements for the 2009-11 upstream CFL buy down program at 5mg for standard CFLs and have created a specification for a "super CFL" intended to 'advance' or 'accelerate' development of new products, going beyond available technology. PG&E and SCE have proposed that this super CFL feature a mercury content limit of 3 mg, and plan to introduce these bulbs in mid-2009. The private sector, meanwhile, is also pursuing mercury limits, labeling, and competitive advantage through disclosure of mercury information. Home Depot shareholders have drafted a resolution calling for mercury content labeling and pursuit of non-mercury lighting.[86] NEMA has endorsed a 5mg limit of mercury for CFLs up to 25W and 6mg for those above 25W.[87]

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[83] Wal-Mart 2007.

[84] *See* "Wal-Mart to reduce mercury in CFLs – Agreement by suppliers reflects a little-known downside to light bulbs", May 10, 2007, MSNBC, http://www.msnbc.msn.com/id/17831334/; *Report Regarding the Recycling of Fluorescent Lamps and Consumer Education Efforts*, State of Maine Department of Environmental Protection and Maine Public Utilities Commission, January 2008, p.6. MNSBC, 2007 cited in TURN Comments, July 31, 2008, p.9.

[85] TURN Comments, July 31, 2008, p.9; Maine Department of Environmental Protection and Maine Public Utilities Commission, 2008, p. 6.

[86] http://www.onlineethicalinvestor.org/eidb/wc.dll?eidbproc~reso~8578

[87] http://www.nema.org/gov/env_conscious_design/lamps/upload/Recycling_Household_CFLs.pdf

ATTACHMENT 3

Next Generation Lighting

Next Generation Lighting

With standard CFLs fast becoming accepted in the market,[1] several organizations are looking to the future for next generation lighting technologies that could impact the lighting market, and energy efficiency, in the same way as standard CFLs have done.[2] A number of new technologies are being developed to further promote energy efficiency gains in lighting. This section identifies some of the main new technologies and the extent to which they are available in the market.

1. Non-standard CFLs

Non-standard, or specialty, CFLs refer to those CFLs that:

- Can be used in dimmable fixtures
- Are 3-way CFLs
- Offer more 'natural' light
- Have low levels of mercury.

These are becoming increasingly available through large retailers. In May 2007 WalMart announced that its suppliers will produce CFLs that use 50-60% less mercury than the current limit of 5 mg per bulb.

- Lights of America will reduce the amount of mercury in its CFLs by up to 50 percent. Wal-Mart's new standards have resulted in Lights of America identifying a different metal alloy technology that improves bulb performance while requiring less mercury per bulb. This technology is currently being added to Lights of America CFLs and the company expects all of its bulbs to have no more than 2 mg of mercury by the end of 2007.(WalMart http://walmartstores.com/FactsNews/NewsRoom/6457.aspx)

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[1] Recent data from NEMA suggest that one in four household lamps is a CFL. See "CFL share of Household Lamps Reaches New High" at: http://www.nema.org/media/pr/20081110a.cfm and http://www.lightsearch.com/lightnow/2008/1108/1108_lampindex.htm

[2] See for example, NEEAs 2005-2009 Strategic Plan, p.6 available at http://www.nwalliance.org/research/documents/NEEA_StratBizPlan_20060918.pdf

- A wide range of dimmable, 3-way, and more "natural" light CFLs are currently available from major retailers such as Home Depot, Lowes, and WalMart. These remain more expensive than standard CFLs, but address several of the concerns that consumers' have had about the standard CFLs. For example, Home Depot offers over 30 ENERGY STAR CFLs, including three color temperatures (daylight, soft white, and bright white), 3-way and dimmable bulbs, and multiple sizes and shapes.[3]

There has also been interest in promoting them from various organizations interested in energy efficiency.

- The Energy Trust of Oregon offers specialty CFLs (such as globes, high-heat reflectors, 3-way twists, candelabras, daylights and A-lamps) for as low as 97 cents in a special promotion through Costco, Home Depot, Lowe's and other retailers. (http://www.energytrust.org/residential/es/products/promotions_cfl.html)

- New Jersey's Change a Light Campaign provided discounted Specialty and Dimmable CFLs in its 2004 promotion. [4]

A new "Super CFL" is also being developed which operates on digital as opposed to analog technology and which has the following characteristics:

- –Fully dimmable -smooth dimming down to 10% light output, with no color shift (zero crossing detection on the input voltage –required to determine the position of the dimmer so that linear dimming can be achieved)
- –Compatible with all dimmers (both old and new dimming technologies)
- –Lamp will restart at any light level setting
- –High power factor
- –Better lumen maintenance –feedback adjustment on high frequency to lock lamp current

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[3] See for example: http://www.homedepot.com/webapp/wcs/stores/servlet/Navigation?Ntk=AllProps&N=10000003+90063+502955&storeId=10051&catalogId=10053&langId=-1

[4] http://www.energystar.gov/ia/partners/presentations/John_Raudenbush_NJCEP_CAL_2003.pdf

- –Reduced operating temperature by 50%
- –Improved efficacy (70 LPW minimum)
- –Smaller size (by reduced the number of components)

The Super CFL features a special pre-coating on the tube that blocks the mercury from penetrating the glass. The special coating delivers a CFL that features:

- –Lower levels of mercury –enough to operate the lamp without risking performance or the chance of mercury starvation (1.5mg Hg)* Up to 23W = 100W incandescent
- –Longer life (minimum 10,000 hours)
- –Better lumen maintenance (80% of initial lumens at the end of life) [5]

2. T8s and T5s

"The T8 market is evolving rapidly. CEE first developed a High Performance qualifying products list in September of 2005. By January of 2008 that list had grown to more than 75 lamps and 350 ballasts, illustrating that more lighting manufacturers are adding more High Performance lamps and high efficiency ballasts to their product lines. At the same time, manufacturers developed additional products in their reduced wattage T8 lines, and have been promoting those heavily."[6]

"When originally introduced into the market, the costs associated with the High Performance T-8 systems were significantly higher than the standard, 700 Series T-8. However, these costs have come down over time possibly due to increased demand and production economics. Still, the cost of a High Performance T-8 system is roughly 40-50% greater than that of a T-12 system. Compared to a standard 700 series T-8 system, the High Performance T-8 system is 25-30% greater."[7]

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[5] http://www.energyrating.gov.au/pubs/2008-phase-out-session5-yan.pdf
[6] Consortium for Energy Efficiency Commercial Lighting Initiative, January 2008. http://www.cee1.org/com/com-lt/com-lt-id.pdf
[7] http://www.cee1.org/com/com-lt/com-lt-id.pdf

A 2006 NEEP report concluded that high performance T8s were readily available in the Northeast U.S. and that the cost differential was not a significant factor in selecting high performance T8s over standard T8s.[8]

3. HIDs

High Intensity Discharge lighting uses a capsule of gas in place of the filament used in an incandescent bulb. They consume less power, provide more light, and a color temperature closer to that of natural daylight than standard halogen bulbs. HIDs are almost exclusively used in non-residential settings because of their highly specific voltage and current control requirements.[9] A recent innovation may improve the efficiency of these lights even further by allowing them to be dimmed (which is not currently possible). [10] A residential market for HIDs is unlikely to develop in the near future.

4. LEDs

LEDs use solid state technology to produce light. They generate light when an electric current is passed through a semiconductor material. Energy is given off as light and a small amount of heat. They do not require mercury and are even more efficient than CFLs. Currently, LED bulbs remain expensive (about $30-$40, and Philips introduced one in 2008 costing $107) but the market is growing for special uses such as holiday lights and nightlights. A traditional 26-light string of incandescents burns at 125 watts and lasts for about 1,000 hours. The same size string in LEDs lasts 20,000 hours and burns at 2.3 watts.[11]

- In 2007, industry leader Philips Lighting stated that LED strands are making up 10.5% of holiday light sales, up from 3.5% just two years ago. [12]

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[8] Market Research Report Prepared for NEEP Commercial Lighting Initiative, June 2006: http://www.neep.org/initiatives/NEEP_High_Performance_Lighting_Final_Report1.pdf
[9] http://www.halcyon.net/lights/hid-faq.shtml
[10] http://greenlight.greentechmedia.com/2008/08/25/hid-labs-and-the-modern-dimmer-switch-490/
[11] http://www.thedailygreen.com/green-homes/eco-friendly/leds-holiday-lights-sales-461220
[12] http://www.thedailygreen.com/green-homes/eco-friendly/leds-holiday-lights-sales-461220

- Discount strands of LED holiday lights are now available at drugstores and hardware stores for under $10, and fancier designs, from icicles to snowflakes, typically go for between $20 and $30. Most big box retailers now carry them, including Home Depot, Lowe's, Target and Big Lots. Considering that they literally cost just pennies to run for a season, the economic pendulum is starting to swing in their favor. [13]

- Many companies now sell LED nightlights, which are competitively priced with standard nightlights, and can be found at most home improvement, value and drugstores. They cost only pennies a year in energy, and result in much lower carbon emissions over traditional lighting.[14]

There are indications that the market for LEDs is expanding beyond holiday light and nightlight applications. A recent report indicated that over the next five years white LEDs will capture an increasing share of the lighting market as manufacturers move beyond their current focus on colored bulbs. The market for high brightness LEDs (as opposed to the ones used in digital clocks etc) in lighting is estimated to increase from $205 million in 2006 to just under a $1 billion in 2011 worldwide [15] Several large lighting companies, including industry leaders Philips and Osram Sylvania, will introduce LED replacement bulbs to the United States within the next several months. Prices for LED technology are falling and at least one large retailer is looking to market home versions of existing commercial LED lighting designs.[16] Philips is already looking to build its commercial market and released a new line of LED lamps for the hotel industry in November 2008.[17]

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[13] http://www.thedailygreen.com/green-homes/eco-friendly/leds-holiday-lights-sales-461220
[14] http://www.thedailygreen.com/going-green/tips/5134
[15] See http://downloads.pennnet.com/events/sil07/ledlightingreport%2020075.pdf
[16] http://bits.blogs.nytimes.com/2008/11/04/would-you-buy-this-funny-looking-bulb/; http://findarticles.com/p/articles/mi_m0VCW/is_9_34/ai_n28013135 (Home Depot approach to LEDs)
[17] http://greenlight.greentechmedia.com/2008/10/22/the-lighting-market-by-the-numbers-courtesy-of-philips-chairman-676/ . See also: http://www.greentechmedia.com/articles/sharp-turns-on-led-lighting-market-1227.html

The commercial market is also becoming aware of the advantages of LEDs, in part because of their successful use in stoplights. There are two major advantages of LEDs for commercial buildings: first they use substantially less energy than incandescent bulbs and CFLs, and with lighting making up 35-50% of commercial building electric energy use[18] savings on lighting can have a major impact; second they rarely need to be changed, which saves building managers the high costs associated with changing bulbs.[19]

Some lighting executives see LEDs as a more likely future successor to incandescent bulbs than CFLs. According to a New York Times report; "They say the large size of the bulbs (CFLs), the inability to dim many of them, the unpleasant color of the light and the five milligrams of mercury in each bulb will limit their appeal."[20] These issues may be addressed by efforts to improve CFLs. Philips Lighting, however, is no longer investing in R&D for CFLs and is putting the bulk of its R&D budget for lighting into LED research.[21]

LEDs use technology that is familiar to makers of computer chips. This may encourage computer chip manufacturers into the LED lighting market[22], providing an impetus to improve current manufacturing techniques and bring prices down further. In an effort to encourage innovation, the Department of Energy recently launched The L Prize™. This is the first government-sponsored technology competition designed to spur lighting manufacturers to develop high quality, high efficiency solid-state lighting products to replace the common light bulb. The L Prize program announcement calls for development of replacement technologies for two of today's

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[18] Greg D. Ander. Daylighting. November 5, 2008. The Whole Building Design Guide. Accessed February 26, 2009. World Wide Web at: http://www.wbdg.org/resources/daylighting.php
[19] Eric A Taub. Fans of LEDs Say this Bulb's Time Has Come. New York Times, July 28, 2008.
[20] Eric A Taub. Fans of LEDs Say this Bulb's Time Has Come. New York Times, July 28, 2008
[21] Eric A Taub. Fans of LEDs Say this Bulb's Time Has Come. New York Times, July 28, 2008
[22] http://greenlight.greentechmedia.com/2008/10/31/will-the-computer-giants-invade-lighting-too-700/

most widely used and inefficient products, 60W incandescent lamps and PAR 38 halogen lamps.[23]

In addition, the Northwest Energy Efficiency Alliance (NEEA) is funding research on the development of LEDs. NEEA is seeking to apply the lessons it learned in transforming the market for CFLs to the LED market. The organization also co-sponsored the 2006 Lighting for Tomorrow competition that sought successful applications of solid-state lighting in the market.[24] The Solid-State Lighting Program at the Lighting Research Center, Renssellaer Polytechnic, is also seeking to overcome market barriers to LEDs.[25]

Additional Material

LEDs

What will the computer world colonize next? Probably lighting.

Solid state light sources such as LEDs, plasma lights and OLEDs are expected to become popular over the next five to ten years as the price declines and mass manufacturing cranks up. Right now, LEDs are primarily made by the large lighting subsidiaries of conglomerates, like Philips Lighting. The nature of the industry and the technology, however, is opening the door to PC-centric companies.

Foundries, which make computer chips for companies that don't want to own their own factories, will likely enter lighting. Although LEDs are technically chips, the process and chemistry are different than what you need to make computer chips. Still, TSMC, the world's biggest foundry for silicon chips, is tinkering with strategies to serve as a factory-for-hire for LED designers.

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[23] http://www.lightingprize.org/ ; http://www.cee1.org/resid/rs-lt/ssl-tech-info-doe.php3
[24] NEEA 2006 Annual Report, page 10. Available at: http://www.nwalliance.org/research/documents/2006AnnualReport.pdf
[25] For details see: http://www.lrc.rpi.edu/researchareas/leds.asp

Applied Materials, meanwhile, is examining whether it should make equipment to produce OLED lights, which are thin and somewhat flexible. The OLED process is similar to the thin-film solar process, which in turn is similar to the process for making LCD TVs. (Applied also has equipment that can be used to make regular LEDs.)

Companies like HID Laboratories will use IT technologies to control and dim high-intensity discharge lights. Panasonic is putting automated light and air conditioner controls in green homes in Japan.

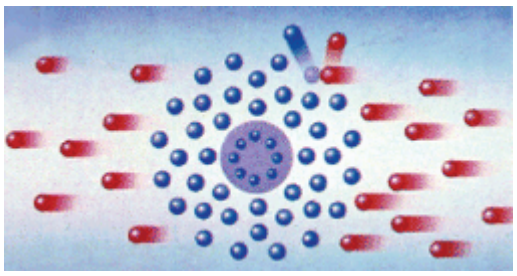
Interestingly, the LED companies themselves are moving from making individual chips to entire lighting solutions — i.e., packaged light sources for specific applications or even lamps. Early next year, LED manufacturer Bridgelux, which has raised $71 million already, will release white light LEDs in a variety of color temperatures. Rather than sell them to the general market, Bridgelux will target these for specific applications, said CEO Mark Swoboda. Philips Lighting, meanwhile, will begin to emphasize lamps in the future.

http://greenlight.greentechmedia.com/2008/10/31/will-the-computer-giants-invade-lighting-too-700/

HIDs

High Intensity Discharge (HID) lighting technology replaces the filament of the light bulb with a capsule of gas. The light is emitted from an arc discharge between two closely spaced electrodes hermetically sealed inside a small quartz glass tubular envelope capsule. To operate, they require ballasts, which supply proper voltage and control current. The amount of light produced is greater than a standard halogen bulb, while consuming less power, and more closely approximating the color temperature of natural daylight.

In all High Intensity Discharge lamps, light is produced by passing a current through a metal vapor. Free electrons colliding with an atom in the vapor



momentarily knock an electron into a higher orbit of the atom. When the displaced electron falls back to its former level, a quantum of radiation is emitted. The wavelength of radiation depends on the energy zone of the disturbed electron and on the type of metal vapor used in the arc tube.

Although it produces 5% of its output when first ignited, the HID light requires a few seconds (usually 15-20) to come up to full output. Also, if power to the lamp is lost or turned off, the arc tube must cool to a given temperature before the arc can be re-struck and light produced. Halcyon HID lights only require a brief (15-30 second) cooling period before they can be re-lit.

HID lighting has several advantages over conventional halogen primary lights:

- **More light output.** Halcyon's 18 Watt HID light source produces approximately the same lumens at the light source as a 55 Watt halogen bulb at a three to five times the halogen's efficiency. The 10 Watt HID only produces ~500 lumens, but thanks to its true 6000K color temperature it appears almost as bright as a 55 Watt halogen bulb when in use. The HID lamp's lumens per watt (LPW) efficacy is roughly six to eight times that of an incandescent lamp.
- **Whiter light.** The color temperature of HID lighting more closely approximates the color temperature of natural daylight than does a halogen system, which appears yellowish in comparison. We use the term "correlated color temperature" to indicate that the light appears as if the discharge lamp is operating at a given color temperature-- traditional measurements of color temperature are drawn from the properties of the metal used in the bulb's filament. Typical color temperatures are 2800K (incandescent), 3000K (halogen), 4100K (cool white or SP41 fluorescent), and 5000K (daylight-simulating fluorescent colors). Both of the Halcyon HID lights produce a light with a color temperature approaching or above 5000K. A white light has a perceived brightness which may equate to the higher stated efficacies-- ie., although an HID lamp might have equivilant lumens as a higher wattage halogen bulb, the HID will appear brighter and more pleasing to the eye than the output of a halogen lamp.

- **Longer Service Life.** An HID lamp will last, on the average, 3 to 5 times as long as a halogen bulb. In normal use, your Halcyon HID bulb should last beyond one thousand ignitions.

Source: http://www.halcyon.net/lights/hid-faq.shtml

It's a dimmer switch that potentially could save megawatts of power.

HID Laboratories, a Silicon Valley startup armed with technology from Oak Ridge, Tennessee, has developed a digital ballast for controlling high intensity discharge (HID) lights, the bright bulbs that illuminate stadiums, streets, industrial and big box retailers. American River Ventures, out of the Sacramento region, recently invested in the firm.

Overall, HID's digital ballast can cut the power consumed by an HID light by 40 percent or more, said CEO Antonio Espinosa. Lighting consumes 22 percent of the power generated in the U.S. and the majority of the juice of that total goes to more than 100 million HID sockets in the country. Thus, if used universally, you're talking a big whack in electricity consumption.

Venture capitalists have been putting money into energy efficient lighting for the last several years, but mostly into companies that produce bulbs. Companies with complimentary technologies have received less attention, but some, such as Nuventix (air-cooler for LEDs) and Intematix (designer phosphors) have emerged.

Digital ballasts effectively exploit the inefficiencies of magnetic ballasts, hoary devices devised decades ago, by finely controlling voltage and current. A ballast effectively delivers power to the bulb so that the bulb's internal gases get excited and create light.

With the digital ballast, administrators can dim HID lights to save on power consumption, something that isn't possible with HID lights hooked up to conventional magnetic ballasts. Humans don't notice a difference in illumination if a HID light is cranked down by ten percent. Thus, in a brownout scenario, a utility or facilities manager

could turn down HID lights, cut power bills and avoid a crisis without bothering anyone, said Espinosa.

Digital ballasts also can flip lights on rapidly. An HID hooked up to a conventional ballast takes about eight minutes or longer to warm up. Thus, HIDs can be turned off and on via motion sensors to cut power.
Facilities managers can also use lower wattage bulbs. Ultimately, a digital ballast can also allow HID to better compete against solid state lighting like LEDs.

"You can use a 320 watt bulb instead of a 450 watt bulb," he said. Maintenance costs go down as well because the digital ballast lets administrators predict and schedule replacements.

The company has shown the technology to several large lighting manufacturers and will begin beta tests in the fourth quarter. Manufacturing and commercial shipment could begin in the first quarter of next year. The company will primarily aim its initial product for lamps holding 200 to 450 watt light sources.

HID Labs makes the entire ballast. Competitor Metrolight, which last year received funds from Virgin Fuels and Gemini Israel Funds, is pursuing an OEM strategy.

Espinosa says the company will likely announce a round of funding in the relatively near future. The inventors initially approached Bill Fenwick about the idea. He was mildly interested. But on a subsequent night flight, he noticed how much electric light there is at night, most of it wasted. He called them back

http://greenlight.greentechmedia.com/2008/08/25/hid-labs-and-the-modern-dimmer-switch-490/[26]

[26] http://greenlight.greentechmedia.com/2008/08/25/hid-labs-and-the-modern-dimmer-switch-490/ ;

Twenty-two percent of America's power is used to create light. But a well-kept secret is that over half of that light comes out of bulbs that you've likely never seen up close, and certainly haven't ever bought.

They're the high intensity discharge (HID) lights that give the world's supermarkets and Wal-Marts that brighter-than-sunlight feel.

While HID lights are pretty efficient, especially when compared with incandescents, they have a few pretty serious problems. They take about 10 minutes to warm up, and they can't be dimmed. And, of course, no one would complain if they were a bit more efficient.

Well a startup called HID Technologies has developed a new digital ballast for HID lights that fixes all of those problems. The new technology could cut energy use by HID lights by 40%. Altogether this tremendously unsexy technology could save gigawatts of power.

The power would be saved by allowing stores to dim lights on sunny days (in concert skylights), allowing lights to turn on instantly (so they wouldn't have to stay on all the time), and simply because the new technology makes the lights more efficient, with a 320 watt new HID lamp being roughly as good as an old HID lamp.

Of course, it's a change that none of us will likely even notice, but in the end, that's the best kind of environmental innovation.

http://www.econewz.info/index.php/2008/08/new-dimmable-bulbs-could-save-gigawatts/

This year Intel, IBM, LG and others are jumping into the solar market, following a path blazed by Applied Materials two years ago.

Cisco, Freescale and several startups like GainSpan are busy porting wireless chips and equipment originally designed for consumer electronics and computers into smart meters and energy efficient appliances. WiMax, the wireless broadband protocol, is coming to connect homes and utilities.

ATTACHMENT 4

Do New Bulbs Save Energy if They Don't Work?

New York Times, March 28, 2009

March 28, 2009

Do New Bulbs Save Energy if They Don't Work? [1]

By LEORA BROYDO VESTEL

SAN FRANCISCO — It sounds like such a simple thing to do: buy some new light bulbs, screw them in, save the planet.

But a lot of people these days are finding the new compact fluorescent bulbs anything but simple. Consumers who are trying them say they sometimes fail to work, or wear out early. At best, people discover that using the bulbs requires learning a long list of dos and don'ts.

Take the case of Karen Zuercher and her husband, in San Francisco. Inspired by watching the movie "An Inconvenient Truth," they decided to swap out nearly every incandescent bulb in their home for energy-saving compact fluorescents. Instead of having a satisfying green moment, however, they wound up coping with a mess.

"Here's my sad collection of bulbs that didn't work," Ms. Zuercher said the other day as she pulled a cardboard box containing defunct bulbs from her laundry shelf.

One of the 16 Feit Electric bulbs the Zuerchers bought at Costco did not work at all, they said, and three others died within hours. The bulbs were supposed to burn for 10,000 hours, meaning they should have lasted for years in normal use. "It's irritating," Ms. Zuercher said.

Irritation seems to be rising as more consumers try compact fluorescent bulbs, which now occupy 11 percent of the nation's eligible sockets, with 330 million bulbs sold every year. Consumers are posting vociferous complaints on the Internet after trying the bulbs and finding them lacking.

Bulb makers and promoters say the overall quality of today's compact fluorescents is high. But they also concede that it is difficult to prevent some problem bulbs from slipping through.

Experts say the quality problems are compounded by poor package instructions. Using the bulbs incorrectly, such as by screwing low-end bulbs into fixtures where heat is prone to build up, can greatly shorten their lives.

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[1] http://www.nytimes.com/2009/03/28/business/energy environment/28bulbs.html?emc=eta1&pagewanted=print

Some experts who study the issue blame the government for the quality problems, saying an intensive federal push to lower the price essentially backfired by encouraging manufacturers to use cheap components.

"In the pursuit of the holy grail, we stepped on the consumer," said Michael Siminovitch, director of a lighting center at the University of California, Davis.

Compact fluorescents once cost as much as $30 apiece. Now they go for as little as $1 — still more than regular bulbs, but each compact fluorescent is supposed to last 10 times longer, save as much as $5.40 a bulb each year in electricity, and reduce emissions of carbon dioxide from burning coal in power plants.

Much of the credit for that sharp cost decline goes to the Energy Department. The agency asked manufacturers in 1998 to create cheaper models and then helped find large-volume buyers, like universities and utilities, to buy them. That jump-started a mass market and eventually led to sales of discounted bulbs at retailers like Costco, Wal-Mart Stores and Home Depot.

Consumers are supposed to be able to protect themselves by buying bulbs certified under the government's Energy Star program. But experts and some environmental groups complain that Energy Star standards are weak, permitting low-quality bulbs with too high a level of mercury, a toxic metal contained in all compact fluorescents.

"The standard essentially establishes a floor, which sorts out the junk, with the expectation that the rest is good," Mr. Siminovitch said. "It's not."

The government, which will begin enforcing tighter specifications this year, says it must seek a balance between quality and affordability to achieve its goal of getting millions of additional consumers to install the bulbs.

"Something that is perfect but not affordable wouldn't serve the broad interests," said Peter Banwell, the Energy Department's manager of product marketing for Energy Star.

Alan Feit, vice president of Feit Electric, says he does not think the problems experienced by the Zuerchers indicate an overall quality problem with his bulbs. But he acknowledged the difficulty of keeping tight quality control on a cheap, mass-market item. "There are 40 to 50 components that go into these things," Mr. Feit said. "While manufacturers try to inspect all incoming materials, one little mistake may cause a performance problem."

Victor Roberts, an independent expert in Burnt Hills, N.Y., who conducts failure analysis testing on compact fluorescents, suspects that some suppliers — many of them in China — are using substandard components.

"Somebody decides to save a little money somewhere," he said, "and suddenly we have hundreds of thousands of failures."

The Program for the Evaluation and Analysis of Residential Lighting at Rensselaer Polytechnic Institute in Troy, N.Y., tests Energy Star-certified bulbs to see if they still meet requirements.

In the 2007-8 tests, five of 29 models failed to meet specifications for such categories as lifespan, luminosity and on-off cycling and were removed from Energy Star's list of qualified products. Because of performance concerns, the government is expanding the watchdog program, vowing to test samples of 20 percent of the thousands of certified bulb models each year.

In California, where bulbs have been heavily encouraged, utilities have concluded that they will not be able to persuade a majority of consumers to switch until compact fluorescents get better. That is prompting them to develop specifications for a better bulb.

The effort aims to address the most consumer complaints: poor dimming, slow warm-up times, shortened bulb life because of high temperatures inside enclosed fixtures, and dissatisfaction with the color of the light.

"Because of the aggressive goals in California, we have to be pushing the envelope at all times," said Roland Risser, director of customer efficiency at Pacific Gas and Electric.

Experts and bulb manufacturers say that consumers need to play a role in solving the problems by learning more about the limitations of compact fluorescent bulbs. The Federal Trade Commission has begun to study whether it should force improvements in the labels of the bulbs.

Better labels might have helped the Zuerchers, the San Francisco couple. Initially, they put regular compact fluorescents in virtually every socket in their home, including enclosed ceiling lamps, dimmable fixtures and areas where lights are turned on and off frequently.

But some of those applications require specialized, more expensive bulbs, something the Zuerchers say was not made clear on the label of their Feit bulbs or on any sign they saw posted at Costco.

"We're both college-educated and pay attention to labels we read," Ms. Zuercher said. "It feels like someone forgot to put a place to find the information."

ATTACHMENT 5

National Trend in Sharing EE Goals

A: ACEEE Analysis of Savings Targets for Selected States with TURN Notes

State and/or Region	ACEEE Saving Target	ACEEE Notes	TURN Notes re. Goals
California	1%	10 year target. Target exceeded in 2007.	Target exceeded based on CA IOUs' reported accomplishments. See CPUC Energy Division Draft Interim Claim Report finding IOUs' metric average 76% of goals.
Connecticut	~1.5%	Derived from utility plan for 2008-2018.	Governor's goal is to reduce peak demand by 20% by 2020. Statewide goal with utility savings attributed toward the state goals net of free riders.
Illinois	2%	After 7 year ramp up; subject to cost caps.	Statewide goals with partitioning. The state is responsible for 25%, the utilities 75%, of the state goals.
Maryland	1.88%	15% by 2015. Target includes codes & standards.	Statewide goals with partitioning. Under the Act (Chapter 131, enacted in 2008), the statewide objectives are **15% reduction in per capita consumption by 2015** and 15% reduction in per capita peak demand by 2015.The Maryland Energy Administration is responsible for 33%, the utilities 67% of the state goals. Under the statute, the utilities are responsible for 5% reduction of per capita consumption by 2011 and 10% by 2015 so that other statewide initiatives (MEA, above) are responsible for the balance of the efficiency targets.
Massachusetts	2%+	Plan to ramp up to 1.5% by 2010, 2-3% per year over following decade.	Statewide goals with utility savings attributed toward the state goals net of free riders.
Minnesota	1.5%	2007 legislation. Target includes savings from codes and standards.	Statewide goals with utility savings attributed toward the state goals net of free riders.
New Jersey	1.54%	Legislation authorizes target of 20% in 2020.	Statewide goals with utility savings attributed toward the state goals net of free riders.

New York:	1.88%	15% by 2015. Target includes codes and standards.	Shared goals. Statewide goals with utility savings attributed toward the state goals net of free riders. Goals partitioned among utilities, state agencies, NYSERDA (New York State Energy Research & Development Authority), public power companies, codes and standards (NY Department of State).
Ohio	2%	After 10 year ramp up. PUC can modify.	Utilities and Dept. of Development to develop plans to meet new state goals. Department of Development runs an industrial EE program.
Vermont:	1.75%	Approved plan for 2007-2008. Target exceeded in 2007.	EE and RE are required to meet 2007-2012 growth in electricity demand. In 2007, Efficiency Vermont savings offset underlying electric load growth rate in Vermont. *In addition* to goals for Efficiency Vermont, Vermont has established an overall goal for energy reductions of 15% by 2012 (from the base year 2004) for state government operations, including state building infrastructure and state transportation. In addition, the Burlington Electric Department (run by the City of Burlington) administers its own EE programs.

B: TURN of Efficiency Utilities and Market Transformation Entities

State and/or Region	Savings Target	TURN re. Goals	TURN Notes re. Efficiency Utilities and Regional Market Transformation Entities
Delaware: Sustainable Energy Utility	30% savings in energy use by 2015	Goals are recommendations by Delaware Sustainable Energy Utility Task Force. Goals refer to statewide energy use by households and businesses.	Legislation establishing the SEU passed in 2007. The process of selecting an administrator to run the SEU is currently underway. The SEU will design and deliver comprehensive end-user energy efficiency and customer-sited renewable energy services to Delaware's households and businesses. The SEU will be responsible for meeting key Delaware state energy goals relating to energy savings and renewable generation
Maine: Efficiency Maine	10% new EE by 2017	Statewide goal.	Maine's energy efficiency programs are administered by Efficiency Maine. Efficiency Maine is run by the state's Public Utilities Commission. It develops and implements Maine's energy conservation programs. Efficiency Maine participates in NEEP's market transformation initiatives.

Midwest Energy Efficiency Alliance (MEEA)	n/a	Goal is to increase EE funding. No specific kWh or MW goal.	By 2010, MEEA has a goal of increasing annual energy efficiency funding investments to almost one billion dollars across the nine Midwest states. Iowa, Minnesota and Wisconsin currently lead the region with a combined investment of $220 million, while the remaining six states invest less than $10 million each year. MEEA is a regional organization whose activities include market transformation. It runs the Midwest's Change a Light, Change the World CFL promotion campaign involving four states: Illinois, Indiana, Missouri and Minnesota. MEEA was the first to create a regionally coordinated, policy-based approach to advancing energy efficiency. The organization goes beyond facilitating programs and working with a network of collaborative partners. It also works with government, policymakers and membership to: • Raise awareness of the importance and benefits associated with energy efficiency policies, funding and programs • Increase ratepayer investments for energy efficiency programs across the Midwest states • Increase adoption, implementation and enforcement of commercial and residential energy codes and appliance standards in the Midwest
Northeast Energy Efficiency Partnerships or NEEP: Connecticut, Maine, New Hampshire, Rhode Island, Vermont, Massachusetts, New Jersey, New York.	n/a	NEEP does not have numerical kWh or MW savings goals. It seeks to generally improve energy efficiency in the Northeast, in particular through marketplace availability and adoption of energy efficient products.	NEEP is a regional market transformation entity that coordinates regional initiatives. Initiatives planned for 2009 include activities focusing on retail products, high efficiency home performance, commercial buildings and technologies, solid state lighting, and workforce development. NEEP's evaluations focus on tracking the number of retailers participating in their promotions, and the market share of promoted items. It does not calculate energy savings from its activities, but individual partners use NEEP's tracking system to calculate savings from NEEP activities they sponsor in their service territories/states.

Northwest Energy Efficiency Alliance or NEEA: Idaho, Montana, Oregon, Washington	n/a	Historically NEEA has tracked market share and unit sales for the products it promotes. It has not had specific kWh and MW goals, although it does report the savings levels achieved by its programs.	NEEA is a regional market transformation organization that coordinates regional initiatives aimed at increasing market adoption of various Energy Star products such as CFLs, windows, and clothes washers. NEEA identifies the savings derived from its activities (active market effects or market transformation effects), distinguishing them from those that are ongoing, naturally occurring savings, and those that are due to utility programs. The savings from NEEA's programs contribute to energy efficiency savings for the states within which NEEA operates. Utilities and non-utility EE organizations within these states have their own savings or efficiency achievements targets.
Oregon: Energy Trust of Oregon	State goal is to reduce GHG emissions to 10% below 1990 level by 2020.	Energy Trust's 2007 goal is to save at least 20 average MW of electricity. Energy Trust expects to secure 430 aMW of electricity by 2013.	Energy Trust was created to invest in cost-effective energy conservation, help pay the above-market costs of renewable energy resources, and encourage energy market transformation in Oregon. Its performance targets include energy (aMW) and gas savings, and renewable energy. Energy Trust works with NEEA on market transformation activities. Oregon's utilities also fund and offer programs in addition to those offered by Energy Trust.
Wisconsin: Focus on Energy program implemented by WECC, Wisconsin Energy Conservation Corporation	State goal is to generate 25% of electric power and transportation fuels from renewable resources by 2025.	Wisconsin's energy efficiency programs (Focus on Energy) are administered by the Public Services Commission. The PSCW contracts with WECC to implement the programs for residential and non-residential efficiency. Focus on Energy does not have kWh or MW goals.	WECC implements Wisconsin's residential public benefits programs (Focus on Energy), the state's renewable energy public benefit program, and residential energy efficiency programs for Alliant Energy. The Focus on Energy programs have performance metrics related to increasing the number of energy efficient products sold, contractor participation, and market share of efficient products. Savings are calculated from this information. Savings are reported as gross savings.
C: TURN Analysis of Additional State Goals			

State	Savings Target	TURN Notes re. Goals
Pennsylvania	By 2013 annual consumption of retail customers must be reduced by 3% relative to utilities' forecast load in 2009-2010. Peak demand to be reduced 4.5% relative to utilities' peak demand for 2007-2008.	Utility goals, not state goals.
Michigan	Ramp up to save 1% of retail sales annually (compared to retail sales for prior year) for 2012-2015.	Utility, not state, goals. The legislation also determines maximum bill impacts based on the percentage of total retail sales revenues in prior years (for 2012 and thereafter the maximum impact is 2% of retail sales revenues of prior two years). The Energy Optimization Program (energy efficiency) savings objectives and plans do not apply if a utility sends the equivalent percentage of total sales revenues to a third party administrator selected by the commission. Very large customers control their own programs and are exempt from paying into optimization funding.

ATTACHMENT 6

Department of Finance Figures and Forecast on New Construction

California Personal Income

	Annual Averages							Annual Percent Change						
	2005	2006	2007	2008	2009	2010	2011	2005	2006	2007	2008	2009	2010	2011
Total Personal Income	1,342.8	1,445.3	1,519.9	1,576.8	1,608.7	1,642.9	1,718.5	6.1	7.6	5.2	3.7	2.0	2.1	4.6
Taxable Personal Income	1,047.3	1,139.7	1,198.4	1,242.0	1,251.9	1,272.4	1,333.2	6.9	8.8	5.2	3.6	0.8	1.6	4.8
Total Wages and Salaries	736.6	784.2	825.5	849.9	859.6	879.5	916.2	5.4	6.5	5.3	3.0	1.1	2.3	4.2
Supplements to Wages and Salaries	181.1	185.1	190.5	197.2	205.6	212.6	220.2	6.5	2.2	2.9	3.5	4.2	3.4	3.6
Proprietors' Income	146.0	154.1	149.4	151.3	155.2	161.5	168.2	6.0	5.5	(3.1)	1.3	2.6	4.1	4.1
Farm	3.3	1.9	3.8	3.5	3.2	3.1	3.1	(24.7)	(41.8)	100.0	(10.0)	(7.3)	(3.1)	(0.4)
Non-Farm	142.7	152.2	145.5	147.8	152.0	158.4	165.1	7.0	6.6	(4.4)	1.6	2.8	4.2	4.2
Property Income	228.3	262.5	287.7	299.1	296.8	294.2	312.8	8.9	15.0	9.6	4.0	(0.8)	(0.9)	6.3
Interest	139.1	156.5	172.3	174.1	172.4	169.3	183.0	20.0	12.5	10.1	1.0	(1.0)	(1.8)	8.1
Monetary	82.4	94.0	104.0	105.8	100.9	95.8	106.8	25.6	14.1	10.5	1.7	(4.6)	(5.1)	11.5
Non-Monetary	56.6	62.4	68.4	68.4	71.5	73.5	76.3	12.8	10.2	9.5	(0.0)	4.6	2.8	3.7
Dividends	75.4	98.1	109.6	115.2	113.4	114.9	118.4	8.0	30.2	11.7	5.1	(1.5)	1.3	3.1
Rent	13.8	7.9	5.8	9.8	11.0	10.1	11.3	(42.3)	(42.6)	(26.5)	68.6	11.5	(8.1)	11.9
Monetary	10.2	11.2	13.8	23.3	26.0	23.9	26.7	(12.1)	10.3	23.5	68.6	11.5	(8.1)	11.9
Transfer Receipts	169.9	183.1	193.7	210.7	225.4	231.9	243.8	4.3	7.8	5.8	8.8	7.0	2.9	5.1
Less: Contributions for Social Ins.	118.9	123.5	126.9	131.3	133.7	136.7	142.4	5.1	3.9	2.7	3.5	1.8	2.2	4.2
Residence Adjustment	(0.3)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)	(0.2)							
Less: Personal Taxes	176.8	198.2	216.2	219.0	220.5	224.2	234.9	17.6	12.1	9.0	1.3	0.7	1.7	4.8
Disposable Income	1,166.0	1,247.1	1,303.7	1,357.8	1,388.2	1,418.7	1,483.6	4.5	7.0	4.5	4.1	2.2	2.2	4.6

Units: Billion Current Dollars

California Construction

	Annual Averages							Annual Percent Change						
	2005	2006	2007	2008	2009	2010	2011	2005	2006	2007	2008	2009	2010	2011
Total Units (Thousand Permits)	210	164	112	65	57	81	123	(1.1)	(21.9)	(31.3)	(41.9)	(12.9)	42.2	51.4
Single Family	155	107	68	33	30	49	74	2.5	(30.9)	(36.8)	(51.3)	(8.3)	61.5	52.1
Units in Multiples	54	56	45	32	27	32	48	(10.0)	3.8	(20.8)	(27.7)	(17.6)	20.4	50.2
Total Valuation (Billion Dollars)	65.5	59.4	51.2	37.4	30.8	38.7	54.4	8.6	(9.3)	(13.8)	(27.0)	(17.7)	25.6	40.7
Residential	47.1	38.2	28.5	17.7	14.7	21.1	33.2	5.3	(19.0)	(25.3)	(37.8)	(17.0)	43.6	56.9
Non-Residential	18.4	21.2	22.7	19.7	16.1	17.6	21.3	17.9	15.7	6.9	(13.4)	(18.3)	9.2	21.3

California Wages and Salaries

	Annual Averages							Annual Percent Change						
	2005	2006	2007	2008	2009	2010	2011	2005	2006	2007	2008	2009	2010	2011
Total Wages and Salaries	736.6	784.2	825.5	849.9	859.6	879.5	916.2	5.4	6.5	5.3	3.0	1.1	2.3	4.2

Units: Billion Current Dollars

California Average Wages

	Annual Averages							Annual Percent Change						
	2005	2006	2007	2008	2009	2010	2011	2005	2006	2007	2008	2009	2010	2011
All Nonfarm Sectors	49,443	51,753	54,091	56,004	57,515	59,102	60,714	3.5	4.7	4.5	3.5	2.7	2.8	2.7

Units: Current Dollars per Employee

ATTACHMENT 7

California Building Industry Association Figures and Forecast on New Construction

California Building Industry Association

Housing Production Continues Decline in February, CBIA Announces

Homebuilders optimistic that tax credits will help the industry begin to recover

March 24, 2009

SACRAMENTO – Housing production continued to decline in February, the California Building Industry Association announced today, but CBIA officials were optimistic as builders reported increased traffic at sales offices in recent weeks and cited the recently enacted state and federal tax credits as the primary cause.

According to statistics compiled by the Construction Industry Research Board, just 2,298 permits were pulled throughout California during the month of February, down 66 percent when compared to the same month a year ago, but up 15 percent from January.

Robert Rivinius, CBIA's President and CEO, said the grim housing starts numbers prove once again the need for the $10,000 state tax credit for buyers of new homes that was included in the state budget package, along with the $8,000 federal first-time buyer tax credit enacted by Congress.

"We once again want to thank the Legislature and Governor Schwarzenegger for enacting the state tax credit as we have been hearing reports from builders saying that there is already an increase in traffic at their sales offices due to the credit," Rivinius said. "We are hopeful that sales will continue to increase over the next few months, helping to restore consumer confidence, clear out inventory, and get job-generating home construction back to healthy levels which will go a long way towards reinvigorating our economy."

In February, single-family permits totaled just 1,261, down 50 percent from February 2008 and down 0.2 percent from January, while multifamily permits totaled 1,037, down 76 percent when compared to February 2008. February's multifamily total was up 41 percent from January, when only 736 permits were pulled.

For the first two months of the year, permits were pulled for 4,298 units, down 63 percent when compared to the first two months of 2008 when 11,531 permits were issued. Single-family permits were down 52 percent while multifamily permits fell 72 percent.

CIRB is now forecasting 50,000 total units for 2009 which would be by far the lowest total on record, down 23 percent from the record-low 64,752 units produced in 2008.

"After hearing preliminary reports of increased sales traffic from local builders, we believe the tax credits are doing their job in attracting buyers and we remain hopeful that this will have a positive impact on homebuilding," Rivinius said.

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The California Building Industry Association is a statewide trade association representing thousands of homebuilders, remodelers, subcontractors, architects, engineers, designers, and

other industry professionals. More information is available on the Association's Web site, www.cbia.org.

The Construction Industry Research Board (CIRB) is a nonprofit research center established in 1974 to provide statistical information on the California building and construction industry. More information is available on the CIRB Web site, www.cirbdata.com.

ATTACHMENT 8

SCE New Customer Forecast – December 2008

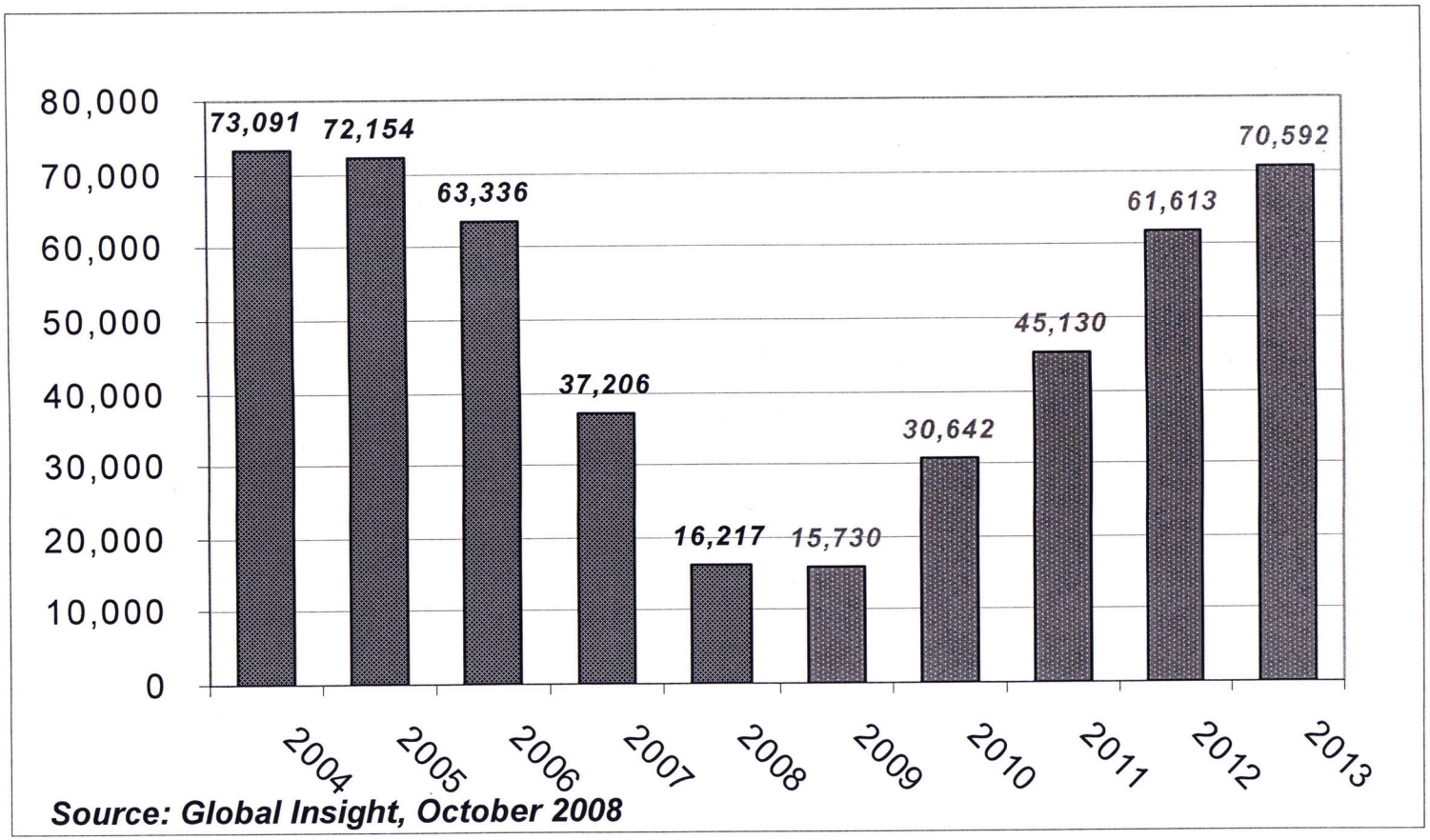
SCE's Fall 2008 Sales, Customer & Peak Demand Forecast

CAM Group Conference Call
December 17, 2008

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

The Current and Future Economic Environment

Residential Building Permits in SCE Service Area – Actual and Forecast



Source: Global Insight, October 2008

Permits are the major driver for new Residential Customers and Meters. 2008 & 09 levels are lower than the recession years of early 80's and early 90's and lowest in 41 years.

SOUTHERN CALIFORNIA EDISON

An EDISON INTERNATIONAL Company

CERTIFICATE OF SERVICE

I, Larry Wong, certify under penalty of perjury under the laws of the State of California that the following is true and correct:

On April 23, 2009 I served the attached:

AMENDMENT TO COMMENTS OF THE UTILITY REFORM NETWORK

ON THE JOINT UTILITIES' REVISED SHOWINGS OF MARCH 2, 2009

on all eligible parties on the attached lists **A.08-07-021, A.08-07-022, A.08-07-023 and A.08-07-031** by sending said document by electronic mail to each of the parties via electronic mail, as reflected on the attached Service List.

Executed this April 23, 2009, at San Francisco, California.

___/S/_____

Larry Wong

Service List for A.08-07-021, A.08-07-022, A.08-07-023 and A.08-07-031

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