Process Evaluation of 2006-2008 PG&E Mass Markets Program Portfolio and CFL, Swimming Pool Market Characterizations

Final Report

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1. Executive Summary

This section summarizes the more detailed findings found elsewhere in this report.

1.1. Introduction and Research Scope

This report contains KEMA's process evaluation of the 2006-2008 PG&E Mass Markets portfolio of energy efficiency programs.[1] It also contains market characterizations of the California CFL and PG&E swimming pool markets. Because of the large size of the PG&E portfolio and inherent limitations in evaluation time and resources, PG&E staff identified an evaluation scope that focused on particular programs or topics of interest. Table 1-1 identifies these programs and topics of interest and the researchable questions related to them. The findings in this report try to provide answers to these questions.

Table 1-1
Programs, Topics of Interest, Researchable Questions
Identified by PG&E Staff for Process Evaluation

Program, Topic of Interest	Researchable Questions
The Upstream Lighting Program (ULP - the Mass Markets portfolio's largest source of energy savings) and the characteristics of the California CFL market.	• *The CFL supply chain:* How long it takes from CFL manufacture to retail delivery, how shipment sizes are determined, how long it takes to sell through ULP-discounted CFL products, whether there have been any problems with the delivery of ULP-discounted CFLs, etc. • *The California CFL shopper:* What % of California residential customers are aware of CFLs, how they became aware of CFLs, whether they are purchasing CFLs, how many CFLs they are purchasing, where they are purchasing them, what barriers prevent them from purchasing more, etc. • *The California retail environment:* The relative availability of specialty CFLs in retail stores; the relative availability of ULP-discounted vs. non-ULP-discounted CFL products; how prevalent Energy Star CFLs are; what CFL lumen/wattage varieties, lamp shapes, package sizes, and prices they

[1] While the vast majority of the contents of this report are the work of KEMA, Mary Sutter of Equipoise Consulting provided valuable assistance with the section dealing with HVAC contractors and Quality Installations.

Program, Topic of Interest	Researchable Questions
	typically encounter; how CFLs are placed and promoted in the stores; and CFL quality issues. • *Indicators of free ridership:* Whether CFL purchasers entered the stores intending to purchase CFLs, shopper awareness of the ULP discounts and CFL point-of-purchase materials, the effects of CFL prices and pack sizes on purchase quantities, and what store managers estimate are the effect on CFL sales when ULP discounts go away. • *CFL disposition after the sale:* The prevalence of "CFL leakage" (improper sales of ULP-discounted CFLs outside the program); residential vs. non-residential use of ULP-discounted CFLs; CFL installation, storage and removal rates; and CFL disposal practices. • *Program satisfaction:* Satisfaction with the ULP's rebate allocation and retailing verification processes, with the program's mass marketing and in-store promotions, with the availability of ULP-discounted CFLs, satisfaction, with CFL bulb and fixture levels, with program staff, and with the ULP in general. What recommendations they had for program improvements.
PG&E lighting distributors and the nature of the lighting specification process	• *Characteristics of the PG&E Lighting Distributors:* What the range of company sizes are, whether they sell non-lighting electrical equipment, whether they specify and install lighting, whether they supply retrofit or new construction lighting project, and how they win their lighting jobs. • *The lighting specification processes for new construction and retrofit:* Who the main decisionmakers are, what are the key criteria for product selection, how the lighting specification process differs for quick construction projects, how new Title 24 requirements have affected lighting specification, and whether life-cycle costs are considered when specifying lighting. • *How PG&E can influence lighting specification:* What are the barriers to greater use of energy-efficient lighting, how PG&E can influence contractors and distributors to specify energy-efficient lighting, and which energy-efficient technologies PG&E should be encouraging.

Program, Topic of Interest	Researchable Questions
	• *Distributor awareness and use of EE lighting programs, new lighting technologies:* Whether distributors are aware of PG&E's lighting programs, where they turn for information on new lighting technologies, their awareness and specification of new CFL and linear fluorescent lighting technologies, and how PG&E can promote new lighting technologies.
The PG&E Change-a-Light CFL giveaway campaign	• *Participant and event characteristics:* What types of people participated in the giveaway events, how they heard about the events, what they recalled about the events (promotions, sponsorships), and how many CFLs they recall receiving. • *Disposition of, satisfaction with the CFLs:* What % of the giveaway CFLs were installed vs. stored, whether any of the giveaway CFLs were removed or installed outside the PG&E service territory, and how satisfied participants were with the CFLs.
Assessment of 2007-2008 PG&E CFL ad campaigns	• *Assessment of PG&E ad campaigns:* What % of customers recalled the CFL television ads; what % attributed the ads to PG&E; whether the ads affected consumer attitudes towards CFL quality and light color; whether the ads affected general satisfaction with CFLs; whether the ads affected the likelihood of consumers purchasing CFLs in the future; and whether consumers who viewed their CFL ads on television were more likely to have purchased PG&E-discounted CFLs than consumers who had not seen the ads. While the detailed results from these assessments do not appear in this report, a summary of the key findings from the first phase of this research can be found in Appendix H.
The PG&E swimming pool rebate program and the characteristics of the PG&E residential pool	• *Characteristics of the pool contractors/retailers:* How aware they are of the rebate program and its marketing efforts, how much they promote energy-efficient pool pumps, and how aware they are of PG&E training opportunities. • *Satisfaction with PG&E program processes:* How satisfied participating contractors/retailers were with rebate applications and eligibility determination; how easy it was to keep track of program changes; how

Program, Topic of Interest	Researchable Questions
market	satisfied they were with rebate levels, the program website, marketing efforts, the program staff, and the program as a whole. What recommendations they had for program improvements. • *Pool characteristics, equipment types, and maintenance practices:* What are the ranges of pool sizes, ages, and features; what are the ranges of speed options, horsepower, operating periods for pool filtration pumps; what % of customers have automatic pool cleaning systems, what systems they have, and how long they operate them; what types of pool filters are being used; whether they are using timers to control their pool pumps or automatic pool cleaning systems and how these times are controlled, whether they have pool heaters, pool covers, pool features, or spas; and whether they use pool professionals and what they use them for.
HVAC contractors and Quality Installations	• *Contractor perspective on the Verification Service Providers (VSPs):* How aware HVAC contractors were of the VSPs; whether they received training in using VSP procedures, and how often they use them; how helpful the VSPs were in providing information to help sell additional services; why the HVAC contractors did not have their technicians train with the VSPs; and what financial incentives are needed to get the technicians to use the VSPs more frequently. • *Quality Installation (QI) practices:* The frequency with which the HVAC contractors use QI practices; the relative importance of various barriers to QI practices; what PG&E could be doing to influence HVAC contractors to do more QIs; and the attractiveness of free half day or full day training sessions for QI practices. • *Other HVAC practices:* The frequency with which the contractors perform duct testing and sealing; what is the best way for PG&E to market new or innovative products to HVAC contractors; how many of their technicians are NATE-certified; whether there's a shortage of technicians in the HVAC industry and if so, how it has affected the contractors; whether contractors make more profits from installations or from service; whether contractors compete more on price or on quality; and business characteristics such as HVAC company size and annual revenues.

Program, Topic of Interest	Researchable Questions
2006-2008 PG&E Local Government Partnerships (LGPs)	• *The purpose of the LGPs:* To what degree are LGPs balancing goals of delivering immediate energy savings vs. establishing a permanent framework for sustainable, long-term local government energy management. • *Integration with other PG&E energy programs and services:* Whether PG&E was effectively integrating and coordinating its others energy programs and services with the LGP programs and how this integration/coordination could be improved. • *The effectiveness of different LGP implementation models:* Who implements the programs (i.e., local government staff or third-party contractor), to what degree the local government is engaged in the partnership, and which implementation models work best for which program goals. • *Contract and program administration:* How PG&E manages each individual LGP Program contract; how PG&E provides administrative support; how LGP program achievements are tracked; how well these contracting and administrative processes are working; and how they could be improved. • *How PG&E is addressing process evaluation recommendations in the 2009-2011 program.*
Steam Trap and Refrigerant Charge and Airflow (RCA) Impact Assessments	In addition to the process evaluations and market studies described above, the PG&E asked KEMA to examine: • *Ex ante savings assumptions for steam traps:* PG&E staff was concerned that their ex ante savings estimates for steam traps were deemed, on a per unit basis, and do not take into account site-specific operating conditions. In addition, findings from an initial review by PG&E did not provide significant evidence to support the *ex ante* impact estimates. Therefore KEMA was contracted by PG&E to conduct a more rigorous analysis of customer bills to better assess steam trap impacts, particularly in dry cleaning/laundry facilities. The study utilized a billing analysis approach that consisted of both simple pre-retrofit/post-retrofit bill comparisons and a regression-based billing analysis. • *The practicality of estimating RCA savings estimates from program tracking*

Program, Topic of Interest	Researchable Questions
	data: PG&E staff also asked KEMA to review the data assembled from applications submitted by the Verified Service Providers (VSPs) that conducted refrigerant charge and airflow (RCA) adjustments to air conditioning (AC) units during 2006 and 2007. PG&E asked KEMA to assess the viability of estimating the energy savings that were realized from these submissions regarding RCA adjustments made to residential and commercial air conditioning units. Based on a review of the data and a literature review, KEMA concluded that that the progam tracking data in its current form was not sufficient to estimate the energy savings with moderate certainty without considerably more effort. Because these two analyses are not process evaluations, they appear in the appendices rather than in the main body of this report.

1.2. High-Level Findings and Recommendations

This report is a compilation of subsidiary reports and memoranda that KEMA has already provided to PG&E staff over the 2008-2009 period. Since these subsidiary reports and memoranda, which make up the chapters in this report, were originally stand-alone reports, each already has its own executive summary with a summary of key findings. Therefore readers who seek more than the very high-level findings and recommendations that appear in this subsection should, at minimum, read the executive summaries that appear in each of the chapters.

1.2.1. The Process Evaluation of the Upstream Lighting Program and California CFL Market Characteristics Study

The ULP provides upstream financial incentives to lighting manufacturers and retailers to reduce the price of energy-efficient lighting products in California. PG&E along with SCE asked KEMA to also collect information about the supply chain and retail environment for CFL products in California as well as consumer purchasing behavior.

Data collection sources included interviews with lighting manufacturers, high-level lighting buyers, and store managers; shopper intercept surveys; in-store assessments of retail lighting products, promotions and prices; a general population telephone survey of California residential

lighting purchasers; interviews with program staff; and reviews of program documents and tracking databases.

- ***Participant program satisfaction:*** Eighty-eight percent of participating manufacturers, 87 percent of participating high-level retail lighting buyers, and 91 percent of participating PG&E store managers were satisfied with the program as a whole. They were very satisfied with the ULP staff and CFL fixture rebate levels, but somewhat less satisfied with the ULP rebate allocation and verification rules. Eighty-seven percent of retail lighting buyers were satisfied with CFL bulb rebate levels, but only 69 percent of manufacturers were. Both manufacturers and retail buyers were much less satisfied with the ULP's in-store promotions and mass marketing efforts. PG&E store managers were very satisfied with the CFL reservation processes (96%), the availability of ULP-discounted CFLs (94%), and the ULP signage (97%).

- **CFL market characteristics:** It is impossible to summarize these extensive findings in this short summary section. Interested readers should instead review the executive summary in section 2.1. Table 1-1 above summarizes the topics covered by the CFL market characteristics study.

- **Recommendations for program improvements:** KEMA's recommendations for improving the ULP are more thoroughly explained in section 2.1 along with a summary of evidence from the detailed findings used to justify these recommendations. However, a summary list of these recommendations include:

  1. *Continue mass consumer education about the increased performance and capabilities of newer CFLs and increase point of sale educational information (e.g., how to shop for CFLs, proper matching of CFL types and features with lighting applications).* This will be especially important as the 2010-2011 Upstream Lighting Program puts a greater emphasis on specialty CFLs in its product portfolio. While a greater menu of CFL options is a good thing, it can also lead to consumer confusion.

     - We recommend that PG&E resume the CFL mass advertising campaigns similar to those it conducted in 2007 and 2008. These campaigns used television, radio, online advertising, and microsites to educate consumers about the features and capabilities of the newer generation of CFLs.

- If PG&E does not have the resources to continue such campaigns, we recommend that they should work with Flex-Your-Power to insure that more ads about increased CFL performance and capabilities are broadcast in the PG&E service territory.

- The PG&E staff should work with CFL suppliers and retailers to develop more creative and eye-catching in-store displays that can educate consumers about CFL benefits, especially the specialty CFLs. Possible ideas might include in-store lighting education videos (e.g., "how to shop for a CFL"), meters that compare energy consumption of CFLs with incandescents, and lighting displays that show improved lighting quality of new CFL models.

- PG&E should consider publicizing any CFL education videos it helps develop to its broad customers base either through emailing the link to these videos to its customers (if it has this capability) or featuring the link on its bill inserts. Another possibility would be to add a link to its website for any good CFL educational videos that might have been produced by another reputable source.

2. *Work with Flex-your-Power and PG&E's marketing resources to develop a consumer education campaign to encourage early replacement of incandescent bulbs with CFLs.* While it may be challenging to succinctly explain the economic and environmental benefits of early incandescent replacement in a marketing campaign, we believe that Flex Your Power and the PG&E marketing team have the expertise to accomplish this.

3. *Consider implementing an incandescent bulb trade-in program.* Bulb trade-in programs are another strategy for encouraging early replacement of incandescent bulbs. Puget Sound Energy (http://www.rockthebulb.com/) has developed a bulb trade-in program in which consumers can get free CFLs in exchange for incandescent bulbs. SDG&E also has a lighting Turn-In program (http://www.sdge.com/residential/lightingTurnIn.shtml). While KEMA has not been able to find any evaluations of these programs – likely because they are relatively new -- one major retailer participant in the California Upstream Lighting Report that KEMA interviewed was very enthusiastic about these programs. PG&E staff should conduct telephone interviews with the managers of these Puget Sound Energy and SDG&E programs to get a better understanding of the benefits and challenges of these types of programs.

4. *PG&E should conduct telephone surveys with a random survey of retailers participating in the Upstream Lighting Program to learn why retailers are not retaining Program*

signage, to get ideas about best practices for in-store promotion of CFLs, and to make them aware of free PG&E signage.

5. *Work with other California utilities to organize a workshop to discuss best practices for CFL promotion and education.* Ideally this workshop would involve a large range of CFL stakeholders including utilities, Local Government Partnerships, LGPs, third-party program managers, regulators, evaluators, manufacturers, retailers, etc. Topics would include best practices for CFL product merchandising, consumer education, in-store product promotions, etc. Special attention should be given to promotion and education for specialty CFLs.

6. *Continue to be careful about introducing new technologies like dimmable CFLs or LED products, which may not yet provide the level of performance that consumers expect. Work with other IOUs to try to fund "secret shopper" quality testing efforts similar to those conducted by the PEARL program in the past.*

7. *Use price data from the shelf surveys to inform decisions about determining specialty CFL incentive levels.* Using this price data in this way should allow the Upstream Lighting Program to reduce incentive payments to specialty CFL products that require a lesser subsidy and redistribute these incentive dollars to specialty CFl products that require a greater subsidy. However, any analysis should be based on shelf survey data that had been properly weighted to reflect actual product sales.

8. *Continue to rebate bare spiral CFLs but only within selected retail channels.* We believe that there is still justification for the Upstream Lighting Program to provide discounts for bare spiral CFLs within selected retail channels. We have grouped these channels in to the following categories:

   - Discount, Small Grocery, and Small/Rural Hardware stores
   - Drug, Large Grocery Stores

   At the same time, we believe that free ridership concerns make it questionable whether the Upstream Lighting Program should continue to offer rebates for CFLs in channels such a Large Home Improvement, Mass Merchandise, and Membership Clubs. These concerns include high free ridership estimates for these channels from upstream market actors, evidence of large volumes of non-ULP sales, and well-publicized national sustainability initiatives by some of these retailers. It is for many such reasons that the Northwestern region has already removed CFL incentives for "Big Box" stores.

It is important to note, however, that due to federal lighting efficacy regulations that will go into effect in 2012, any continued subsidization of CFLs will be a short-term strategy.

9. *The PG&E program should continue to monitor for CFL leakage as long as current efforts are not overly taxing program resources.* "CFL leakage" refers to the phenomenon that some of the CFL products being discounted by the ULP have been discovered for sale on the Internet or by retailers outside of California. PG&E current efforts to discourage CFL leakage include.

   - *Educating manufacturers and retailers on the bulk purchase limits.* These limit how many ULP-discounted lighting products that consumers can get in a single purchase. They are designed to make it more difficult for consumers to try to resell large quantities of ULP-discounted products.

   - *Using its Central Inspection Team to monitor websites for improper sale of ULP-discounted lighting products.* Members of the inspection team search website for PG&E-stickered ULP-discounted lighting products. If they discover such product, they pose as consumers and have it shipped to an out of state address and then these products are shipped back to PG&E for review. PG&E also instructs the relevant lighting manufacture to work with the web site owner to remove the stickered product. This is done on a monthly basis.

   - *Secret shopper visits.* PG&E has members of its Photo Verification Team do "secret shopper" visits to retailers to see if they can purchase bulk quantities of product. If they can, PG&E notifies the manufacturer and retailer of the bulk purchase requirements. If the retailer is found a second time to be violating these bulk-purchase limits, the retailer is removed from the ULP program.

   When KEMA presented the interim process evaluation findings to PG&E staff in March 2009, we pointed out that some retailers objected to the "one size fits all" nature of the bulk purchase limit and urged that the California IOUs use more flexibility in the enforcement of these bulk purchase limits. For example, representatives of membership club stores argued that their customers paid annual fees specifically for the purpose of buying goods in bulk. Representatives of large home improvement stores also claimed that they have a lot of contractor or small business customers who need to purchase CFLs in bulk. In the March 2009 presentation we also showed that despite the claims of manufacturers and high-level retail buyers that they were educating their store managers about the bulk purchase limits, only 23 percent of the store managers reported being

aware of the bulk purchase limits. This suggested that the bulk purchase limit might be difficult and costly to enforce.

In July 2009 the three California IOU program managers decide to introduce some flexibility in the enforcement of the bulk purchase limits. New language in the manufacturer agreements would leave requirement of the bulk purchase limits to the discretion of each IOU and allow the removal of the bulk purchase limits on a case-by-case basis. We think that allowing greater flexibility in the enforcement of the bulk purchase limits is a reasonable policy.

10. *Keep retailers more informed about planned changes in ULP allocation strategies and the rationale for these decisions. Give both manufacturers and more retailers more advanced notice of changes in program strategy.* This was the most-cited recommendation for ULP program improvement from the high-level retail buyers. They claimed that they often hear about changes in program allocation strategies – such as moving away from multi-packs or moving towards specialty CFLs – long after the decision is made.

11. *Use program satisfaction and other program indicators identified in this report as benchmarks to track future program performance.* In addition to the program satisfaction indicators and free ridership information, other possible indicators that might be used as program metrics include:

    - The percentage of purchasers of PG&E-stickered ULP products who are aware (based on shopper intercept surveys) that PG&E provided the discounts,
    - The percentage of specialty CFLs rebated by the program,
    - The percentage of lighting products discounted through certain retail channels (see Recommendation #8), and
    - The percentage of store managers who are aware of the bulk purchase limits.

1.2.2. PG&E lighting distributors and the nature of the lighting specification process

This section of the report is based on our survey of 25 lighting distributors located in the PG&E service territory. This survey was developed with the assistance of the PG&E lighting staff and was completed in November 2007. Key findings and recommendations include:

- **Distributor awareness of PG&E lighting programs, rebates:** Forty-five percent of the respondents cited PG&E's low-wattage T8 rebates, 24 percent mentioned T5 rebates, and 12 percent named rebates for energy-efficient ballasts. In addition, 36 percent of the respondent cited rebates without specifying a particular lighting product. Yet only eight percent of the respondents cited PG&E's training courses.
- **Importance of energy efficiency:** Seventy-six percent of lighting distributors said that energy efficiency was very important for their businesses.
- **Distributor sources for information on new lighting technologies**: When asked what sources they typically use to keep abreast of new lighting technologies and design practices, 64 percent of the lighting distributors cited lighting manufacturers as a source for this sort of information. Trade magazines were the second most-cited source (36%). Only 16 percent cited utilities as an information source.
- **The new construction lighting specification process**: The distributors considered electrical engineers and architects to be the most influential actors in the lighting specification process for new construction. Yet they also said that this process can be very complex and there are opportunities for other actors like the lighting distributors, lighting manufacturers, and building owners to influence this process. Lighting distributors have more influence over "design and build" projects and in situations where an electrical engineer wants to specify an alternative lighting package in addition to the pre-specified package. As for the most important criteria for deciding what types of lighting get specified for new construction projects, distributors gave a wide range of responses with a dozen different criteria being named as important and eight criteria being named by at least two different interviewees. Although price/cost was the most cited of these important criteria, it was named by less than half of the respondents. Energy efficiency was the second most-cited of the important criteria, but was still only cited by a quarter of the respondents.
- **The retrofit lighting specification process**: The lighting distributors considered the building owners, electrical engineers, and themselves to be the most influential actors in this process. They said that their own influence over the lighting specification process depended on whether the lighting retrofit/remodeling jobs were ones that the owners/customers had initiated on their own, or jobs that their own salespeople had sold to the owners/customers. They gave a wide range of responses as to the most important criteria for deciding what types of lighting get specified for these retrofit of projects. They named 13 different criteria as being important and eight of these criteria were named by at least two different interviewees. While price/cost had been the most important criterion for the new construction

jobs, energy efficiency was the most important criterion for the retrofit/remodeling projects (45%) followed by price (27%).

- **Lighting specification in quick-turnaround projects:** The lighting distributors said that with quick projects the general contractors and their electric subcontractors often gain greater influence over the lighting specification process. For smaller projects the general/electrical contractor may be the only specifier. Yet even with bigger quick-turnaround projects which involve architects and lighting designers, the general/electrical contractors can still gain more influence over the specification process. For example, they can use the threat of missing project deadlines to persuade architects to go with product lines that are more readily available. There was broad agreement among distributors that product availability becomes a more important factor in these smaller, quicker-turnaround projects. Other distributors also claimed that with quick projects contractors are more likely to opt for lighting products they're most familiar with, whether or not these are energy-efficient. So if these products are not energy-efficient to begin with, the contractors are less likely to change them than they would for projects with longer timelines.

- **The influence of Title 24:** Lighting distributors said that the main effects of the new (2005) California Title 24 requirements included wider use and greater consumer acceptance of fluorescent lighting and occupancy sensors, greater competition among suppliers over the claimed energy efficiency of their products, and higher upfront lighting costs but improved products. They also claimed that awareness and knowledge of energy-efficient lighting has increased among some market actors but not others. Finally distributors said that Title 24 had created logistical challenges such as fewer product options and more time spent reading regulations.

- **Barriers to EE lighting:** Fifty-six percent of the distributors said that the higher prices for energy-efficient lighting was the most significant barrier followed by customer lack of knowledge of the features and benefits of this lighting (44% of respondents).

- **How PG&E can influence contractors to specify EE lighting:** The most-cited response (44%) was that PG&E should continue its current rebate programs for T5s and low-wattage T8s. While there were many other suggestions, none of these were suggested by more than a handful of distributors and some were suggested by only a single interviewee.

- **How PG&E can work with distributors to encourage EE lighting:** We then asked the lighting distributor reps what PG&E could do to help lighting distributors promote more energy-efficient lighting to these contractors. There were many different suggestions and none were made by more than a handful of the distributors. However, most of the

recommendations emphasized the education and training of contractors or distributors. Some of the topics that the distributors wanted PG&E to do more education about included which rebates are available, which energy-efficient lighting technologies are out there, why certain lighting products are being rebated, what lighting is required by Title 24 and other regulations; and future lighting products that will be eligible for rebates. As to the best ways to deliver this information, some distributor reps mentioned educational materials.

- **Which EE lighting technologies PG&E should be encouraging:** LED technologies were cited most by lighting distributors (28% of respondents) along with support for PG&E continuing its existing rebates of T5 (20%) and low-wattage T8 technologies (12%).
- **Distributor awareness/specification of new CFL fixture families:** The PG&E lighting staff was interested in knowing how aware lighting distributors were that lighting manufacturers, in response to initiatives such as Lighting for Tomorrow, were now producing entire families of CFL fixtures for both indoor and outdoor residential applications. Seventy-six percent of the lighting distributors were aware of these fixture families. Of those who were aware of the fixtures families, 69 percent said that they either specify or supply them. Most of the distributor reps who were aware of the fixture families but do not specify or supply them said that they simply do not work much with CFL fixtures. None of the lighting distributor reps said that they receive the *Lighting Tomorrow* catalog, although all but two of them were interested in receiving the catalog.
- **Distributor awareness/specification of high-performance T5, T8 recessed fixtures**: The PG&E lighting staff wanted to know how aware the lighting distributors were of high performance T5 and T8 recessed fixtures such as the Lithonia RT5 or the MetaLux Accord and whether they specified these fixtures for any of their projects. Nearly all (96%) of the lighting distributors were familiar with these recessed fixture types, although two acknowledged that they were familiar with the Lithonia RT5 but not the MetaLux Accord. Seventy-two percent of the lighting distributors who were aware of these fixtures said that they sold or specified them.
- **Sales and promotion of lighting controls:** The PG&E lighting staff was also interested in know ing how much lighting distributors promote lighting controls. Seventy-nine percent of distributors claimed that their companies actively promote these controls. Those who did not actively promote lighting controls mostly said it was because they do not much lighting specification and they leave the decision to use lighting controls up to those that do.
- **Variable speed drives (VSDs):** The PG&E staff wanted to know how many lighting distributors sold VSDs and their awareness of PG&E VSD rebates. Sixty-eight percent of the distributors said that their companies sell VSDs, but some of them said that the quantity was

very small. Of the lighting distributor reps who sold VSDs, only 21 percent were aware that PG&E offered rebates for VSDs.

- **Ways that new lighting technologies can be encouraged:** We asked the lighting distributor reps how new energy-efficient lighting technologies could be encouraged. The most common response by far (57%) was that there needed to be more marketing and education to build awareness of the energy efficient lighting products that were available, their benefits, and the rebate programs that make them more affordable. The need to educate consumers about the long-term cost savings of energy-efficient lighting products was cited by a number of distributor reps. Others thought that market actors in the lighting supply business also needed more education. More rebates was the second-most-cited response (22%).

1.2.3. Evaluation of the Change-a-Light Campaign

According to PG&E's Mass Markets program staff, PG&E gave away approximately 1.1 million CFLs during the fourth quarter of 2007 through hundreds of giveaway events in its service territory. The giveaways were tied to the eighth annual Change-a-Light, Change-the-World national campaign sponsored by the U.S. EPA's ENERGY STAR® program.

PG&E partnered with a number of event organizers (such as local governments, the Sierra Club, and community groups) that hosted CFL giveaways as part of PG&E's Change-a-Light campaign. At each event, organizers asked recipients of the free CFLs to pledge to take their CFL home and install it. Event organizers also asked CFL recipients to fill out pledge forms that collected the customer's name, address, telephone number, and email address.

In some cases, the giveaways were one component of "energy awareness" events throughout PG&E's service territory, while others were held at senior centers, retail store parking lots, and various community events. Many CFL giveaways were part of a larger event such as a town fair, business meeting, or sporting event, and in other cases, the CFL giveaway was a stand-alone event such as special tables set up on college campuses or at hospitals.

The CFL giveaways represented an enormous undertaking for PG&E and also a new approach to distributing CFLs to consumers. Additionally, these CFLs represented significant energy-savings potential. Therefore PG&E staff expressed interest in understanding the effectiveness of these events and the rate at which the free CFLs are being installed by recipients.

Some key findings from the process evaluation of the Change-a-Light campaign included:

- **Respondent demographics.** Respondent education and income levels among Change a Light survey respondents was very similar to those of California CFL purchasers identified in recent general population surveys.

- **Giveaway sponsorship.** Forty-seven percent of the survey respondents identified PG&E as the sponsor of the CFL giveaway.

- **Source of giveaway event awareness.** Forty-five percent of survey respondents reported that they heard about PG&E's CFL giveaway as they were passing by, a significantly higher proportion than reported hearing about the event through any other source. Another 14 percent heard about the events through word of mouth (friends, family).

- **Recall of Change a Light event promotional materials.**

    - *Event signage and information.* Fifty-three percent of survey respondents recalled having seen signs or information about CFLs, the giveaway, and/or giveaway sponsors when they received their free CFLs.

    - *Giveaway materials*. Eighty-nine percent of survey respondents reported receiving something in addition to the free CFLs at from the giveaway event.

- **Number of CFLs distributed (among survey respondents).** The 400 survey respondents reported receiving 735 CFLs through the giveaway events -- an average of 1.8 CFLs per respondent. Thirteen percent of respondents reported that more than one person in their households received CFLs at the same event.

- **CFL installation.** Of the 735 free CFLs received by survey respondents, 638 were discussed during the survey (87% of the total CFLs they received). Approximately 82 percent of these CFLs were reported as installed. Results suggested that installation rates decline somewhat as the number of free CFLs received by an individual increases. The reported installation rate was significantly higher for CFLs distributed through events that recipients classified as "energy-related" (than for events that were not classified as energy-related. Ninety percent of the free CFLs installed by survey respondents were reported to be replacing incandescent bulbs

- **CFL purchases:** Twenty-eight percent of respondents who received CFLs reported that they had never purchased them before. While it is possible that some fraction of these respondents have been exposed to CFLs through other mechanisms (e.g., received them for free through another giveaway program), it is likely that PG&E's Change a Light giveaways distributed CFLs to many individuals who had never before used them.

- **CFL storage:** The overall CFL storage rate for CFLs discussed during the survey (n=638) was 12 percent. The storage rate was significantly lower for the first CFL (8%) than for the second CFL (17%) or the third (25%).

- **CFL removal:** Only one percent of CFLs received by survey respondents were reported as installed and then removed.

- **CFL leakage:** Only one percent of the first, second, and third CFLs received by respondents were reported as given away to individuals who were not present at the giveaway events. All but one of these recipients were reported to live within the state of California.

- **CFL satisfaction:** The survey asked respondents to rate their satisfaction with the free CFLs they received from PG&E on a scale of 1 to 10 where 1 means "not at all satisfied" and 10 means "extremely satisfied." Fifty percent of respondents provided a rating of 10, and 79 percent provided a top 3-box rating (8, 9, or 10).

- **Recommendations for program improvement:** To maximize the effectiveness of future CFL giveaways, we recommend the following:

  1. *Improve enforcement of requirement forms for all CFL recipients to fill out Change a Light pledge.* To ensure accurate program tracking, PG&E should make additional efforts to require pledge forms for all CFL recipients. This requirement was in place for the 2007 giveaways but proved difficult to enforce because the majority of giveaways were run by other (non-PG&E) event organizers. In the future, PG&E may wish to consider having PG&E staff present at all giveaways to ensure proper pledge collection procedures.

  2. *Focus on giveaways through PG&E's local payment offices.* The data show that these giveaways reached the highest proportion of new CFL users; had the highest reported installation rate of all event types; and were the most effective in terms of CFL recipient recognition of PG&E as provider of the free CFLs. Because these giveaways were conducted directly by PG&E staff, they also provide an opportunity to implement additional quality control procedures regarding the data collection process (i.e., direct enforcement of the requirement for each CFL recipient to complete a pledge form) and minimize implementation costs.

  3. *Improve CFL tracking procedures.* Although PG&E's mass markets staff requested information from event organizers regarding the number of CFLs distributed at each

event, staff did not anticipate the level of noncompliance among giveaway organizers experienced in 2007. For impact evaluation purposes, it will be of critical importance for PG&E to demonstrate where each CFL was shipped, how many of these CFLs were distributed, and the fate of any remaining CFLs. Again, having PG&E staff present at all giveaways may improve compliance with these data collection requirements.

4. *Limit the number of free CFLs to one or two per household.* The data suggest that CFL installation rates decline as the number of free CFLs per household increases, with highest installation rates for the first CFL received by each household. PG&E should make this per-household limit on CFLs explicit to event organizers. Presence of PG&E staff at events could help enforce this limit.

5. *Continue to offer high-efficacy CFLs through PG&E giveaways.* PG&E focused on providing high-efficacy CFLs through its giveaway events and satisfaction with the CFLs was very high. Although it's possible that satisfaction with the free CFLs was high simply because they were free, the high-efficacy CFLs may also have positively affected customer satisfaction.

Recommendation number two above suggests that PG&E should focus on giveaways through its local payment offices. However, if PG&E wishes to continue its partnerships with other giveaway organizers, we also make the following recommendations:

6. *Assign a PG&E staff person to each giveaway.* As described above, PG&E should strongly consider having a PG&E staff member present at all giveaways to ensure proper data collection procedures. This will aid PG&E in obtaining disposition information for all CFLs distributed to an event site.

7. *Focus on energy-related events.* If PG&E wishes to continue to partner with outside organizations to hold giveaway events, PG&E should focus on events with an "energy theme" to maximize installation rates. The study found higher installation rates for energy-related events than for "non-energy events" such as town fairs, athletic events, and the like.

1.2.4. Evaluation of Pool Rebate Program, Pool Characteristics

One of the main purposes of this research task was to collect information on the typical pool characteristics, pool equipment types, and pool maintenance practices that currently exist in the PG&E service territory. PG&E program staff was interested in this information to better inform

the development of new pool-related rebate offerings. Although the California Residential Appliance Saturation Survey (RASS) will provide some information about pool equipment, this information is not expected to be available until 2010 and will not contain the level of detail that the PG&E program staff was looking for.

Another important purpose of the participating contractor/retailer surveys was to assess participant satisfaction with the PG&E and SCE pool rebate programs. The PG&E general population contractor/retailer survey also collected information about awareness of the PG&E pool rebate program. Finally all the contractor/retailer surveys also collected information on awareness of pool professional training opportunities and market practices concerning the promotion of energy-efficient pool pumps.

The findings in this report come from 1) a survey of 59 participating PG&E and SCE pool contractors/retailers; 2) a random sample of 31 pool contractors/retailers from the PG&E service territory drawn from lists of pool services professionals; and a survey of 300 residential swimming pool owners in the PG&E service territory. These surveys were all completed in 2008.

Key findings included:

- **Characteristics of the pool contractors/retailers:** The average company size was eight employees but the median was only three. Almost all the contractors/retailers in the PG&E service territory installed pool pumps and the large majority offered pool maintenance and cleaning services. About three quarters were C-53 licensed contractors. Forty-one percent of the PG&E participating contractors built pools. Yet only about a quarter of the contractors/retailers in the PG&E service territory had retail stores or showrooms. Only a third of the PG&E pool owners claimed to use a pool service/maintenance contractor. However, it is likely that many interpreted this to mean someone who comes on a regular basis -- e.g. they have a regular service contract with – as opposed to contractors they might use on an as-needed basis. Of those that used such contractors, the large majority got pool chemical services, more than half got cleaning services, and almost half got equipment maintenance services.

- ***Awareness of the rebate program, marketing efforts:*** Ninety-seven percent of both the participating and general population contractors/retailers claimed awareness of PG&E's $100 customer rebate for multi-speed pumps. Claimed awareness of PG&E rebates for trained contractors -- $100 for two-speed pool pumps and $200 for variable-speed pool pumps – was also high. The most cited sources of rebate awareness included manufacturing seminars, profession pool associations, PG&E seminars, and PG&E

representatives. Sixty-two percent of participating contractors/retailers and 58 percent of general population contractor/retailers claimed to be aware of PG&E efforts to promote greater use of multi-speed pool pump motors. However, none of PG&E's participating contractors/retailers knew point-of-purchase signage was available for these rebates.

- **General promotion of energy-efficient pool pumps:** For participating contractors/retailers the most-cited factor influencing the energy efficiency of the pools pumps they installed was the energy or cost savings that customers could potentially receive by getting a multi-speed pool pump. Forty-six percent of the PG&E participating contractor/retailers and 72% percent of the SCE participating contractor/retailers cited these as factors in their decision-making. Three quarters of the PG&E participating pool retailers said that they promoted multi-speed pool pump motors differently than other pool pump motors they sell. When asked about the most effective strategies for promoting energy efficient pool pumps, the PG&E pool retailers pointed to direct mail, in-store promotions and demonstrations – especially those showing the cost/energy savings from multi-speed pumps, and conversations with customers.

- **Training opportunities:** A large majority (70-79%) of PG&E's participating and general population contractors/retailers said they were aware of the education and training events offered by California utilities. All but one of the training-aware PG&E participating contractors/retailers and about three quarters of the training-aware PG&E general population contractors/retailers said that they participated in at least one of these trainings or seminars. Using a five-point scale where 5 equals "very useful", 86% of the respondents gave usefulness ratings of 5 or 4. Eighty-percent of the trainees said they had changed their practices as a result of the training. Only 17 percent of the contractors/retailers said they had they had any concerns or reservations about specifying multi-speed pool pump motors after taking the training courses.

- **Satisfaction with program processes:**

    - *Rebate applications and eligibility determination:* Eighty-four percent of participating contractors found the rebate forms to be reasonable in terms of length and level of detail. A quarter of the PG&E participating contractors/retailers said they were aware of at least one application being rejected. Most of the PG&E contractors/retailers with rejected applications said that these applications were eventually paid.

    - *Keeping track of program changes:* PG&E participating contractors/retailers reported a wide variety of ways to keep track of program changes, with the most common being trade association or supplier sources and utility mailings or literature. Seventy-

two percent of the PG&E participating pool contractors/retailers found tracking program changes to be at least somewhat easy.

- *Satisfaction with program incentives:* When asked if the $100 rebates for the installation of new qualifying multi-speed pool pump motors were sufficient to encourage greater use of these products, 52% said they were not. When asked what would be an adequate level of rebate, their average estimate was $264. However, 72 percent of the PG&E participating contractors/retailers were satisfied with rebate availability and 72 percent also said the split rebate structure (introduced in 2006) motivates contractors/retailers to promote more of the multi-speed pumps.

- *Satisfaction with the program website:* Seventy-four percent of the PG&E participating contractors/retailers were satisfied with the rebate program website.

- *Satisfaction with program marketing efforts:* Only 39 percent of the PG&E participating contractors/retailers were satisfied with the way the utility promotes and explains the rebates for energy-efficient pool pumps. The two most common statements of the dissatisfied PG&E respondents were that they had not seen any evidence of program marketing and that their customers were unaware of the rebates. They suggested ways to promote the program more including mailings to pool owners, mailings to installers, use of radio or television advertising -- including featuring pool pumps in Flex Your Power ad campaigns, and utility representative visits to pool stores.

- *Satisfaction with the program staff:* The PG&E participating pool contractors/retailers were generally satisfied with the program staff. The average satisfaction rating was 4.2 on a 5-point satisfaction scale where 5 equaled “very satisfied.”

- *Satisfaction with the program as a whole:* Eighty-five percent of the PG&E participating contractors/retailers were satisfied with the rebate programs a whole. The PG&E participating contractors/retailers that were less than satisfied with the rebate programs cited difficulty getting the rebates approved, difficulty with the rebate paperwork, waiting too long to receive rebate payments, customers not being aware of the rebates, and improvements needed for the program staff and marketing materials.

- **Recommendations for program improvements:** The PG&E participating contractors/retailers had many recommendations for program improvements. The most

commonly-cited were more marketing to pool owners (24% of respondents) and increasing rebates to pool owners (17%).

- **PG&E residential pool characteristics, equipment types, and maintenance practices:** These sections of the report do not lend themselves to easy summarization. Readers are encouraged to view the executive summary in the pool evaluation section. Researchable questions covered in these section include: what are the ranges of pool sizes, ages, and features; what are the ranges of speed options, horsepower, operating periods for pool filtration pumps; what percentage of customers have automatic pool cleaning systems, what systems they have, and how long they operate them; what types of pool filters are being used; whether they are using timers to control their pool pumps or automatic pool cleaning systems and how these times are controlled, whether they have pool heaters, pool covers, pool features, or spas; and whether they use pool professionals and what they use them for.

1.2.5. HVAC Contractors and Quality Installations

In October/November 2007 KEMA surveyed 75 HVAC contractors located in the PG&E service territory. The main purpose of this survey was to identify barriers to wider adoption of Quality Installations (QIs) of air-conditioning equipment as well as duct testing and sealing practices. These practices are all encouraged by the Refrigerant Charge & Airflow Program that is part of the PG&E Mass Markets program portfolio. This program uses third-party Verification Service Providers (VSPs) to train HVAC contractors in QI methods and to confirm that the installations meet QI standards so that contractors can qualify for PG&E rebates.

Key findings from this study included:

- ***Unawareness of the VSP training opportunities remains a barrier to participation:*** When asked why they have not participated in VSP training, 25 percent of the nonparticipating contractors said it was because they did not know about the training. This was the most-cited reason for nonparticipation.

- ***Contractor beliefs that they already do QI or have received necessary training are other reasons for nonparticipation in VSP services:*** When asked why they have not participated in VSP training, 18 percent of the nonparticipating contractors said that it was because they already do this kind of work but just use different procedures. Another nine percent said that their nonparticipation was because they had already gone through other training.

- ***Not seeing the value of VSP training is another major reason for nonparticipation:*** When asked why they have not participated in VSP training, 14 percent of the nonparticipating contractors said that it was because they saw no need for it, nine percent said that it was because AC was too insignificant a part of their business, nine percent said it was because their company was too small, and nine percent said that training didn't add anything to their business.

- ***Of the logistical barriers to VSP training, inconvenient timing or location were more significant than training costs****:* The most-cited (43% of all contractors) suggestion for increasing the use of QI techniques was to make training sessions more local and frequent while at the same time promoting them more. When asked why they did not participate in training, only 12 percent of HVAC contractors said it was because it takes too much time and only two percent said it was due to the cost of training.

- ***If VSP training can be made convenient in location and timing, there is the potential for much higher participation:*** Seventy-five percent of the contractors said they would send staff to a free whole day technical training on QI services if it was offered in their area.

- ***HVAC contractors believe that increasing rebates and wider promotion of QI benefits are the best ways for PG&E to help expand QI practices:*** When HVAC contractors were asked how PG&E could help them sell QI services, the two most-cited reasons were increasing the size of the rebates (32% of all contractors) and more advertisement of the value of QI and maintenance (24%). Another seven percent of the contractors suggested that PG&E do more to promote the QI rebates to their customers.

- ***Those who received VSP training did find value in it:*** Of the contractors with VSP-trained technicians, 50 percent said that they do QI on every service call and another 33 percent said that they do QI under certain conditions (e.g., when their technicians have the time, when there is a difficult system). When asked if the information gained from the VSP techniques helped to convince customers of the value of additional services such as repairs or system replacements, 83% of the contractors with VSP-trained technicians said that it helped some of the time while 11 percent thought it helped all the time.

- **Recommendations for program improvements:**

    - *Increase efforts to educate HVAC contractors and consumers about what QI practices are and why they are valuable:* Since those who have taken the VSP training courses are finding value from them, develop case studies and testimonials

from these participating HVAC contractors that can be advertised in relevant trade publications along with links to the program website.

- *Assess the clarity of message regarding what QI services include and determine how to differentiate QI from regular practices in short, succinct phrases.* To increase knowledge of this difference, create a postcard size synthesis of these phrases and use in a targeted postcard mailing to HVAC contractors. To increase knowledge of this difference in the public, use the same phrases on the PG&E website and in any other marketing regarding this service.

- *Make the VSP training sessions more convenient:* Determine if the program can provide free QI training sessions in multiple locations within PG&E service territory. If so, include information about the free training on the targeted postcard mailing and other marketing.

- *Try to increase the financial incentives for QI services:* Differentiating the differences between QI and standard practice and making training options more convenient may bring in some contractors. However, larger changes in participation may not take place unless increases in the rebate level also occur. To enable larger incentives for QI services, PG&E should assess the ability to include demand reduction benefits into the overall incentive payment.

1.2.6. 2006-2008 Local Government Partnership Process Evaluation

Local government partnerships are innovative, market-based, local and statewide energy efficiency efforts for cities, groups of cities, counties, and other local jurisdictions within PG&E's service territory. During the 2004-2005 program cycle, several local government agencies in PG&E's service territory implemented publicly funded energy efficiency programs either as third parties or in partnership with PG&E. The most successful of the 2004-2005 programs were continued during the 2006-2008 program cycle, and new partnerships were formed. A total of eighteen partnerships comprise PG&E's partnership portfolio for 2006-2008.

The overarching vision for this partnership effort is to achieve immediate energy and peak demand savings and establish a permanent framework for a sustainable, long-term energy management program for local governments. To achieve this vision, PG&E's 2006-2008 LGP Program relied on a number of implementation strategies to achieve its immediate energy savings goals, including providing incentives for energy efficiency retrofits to residential and commercial buildings and local government facilities, providing outreach and direct install of

energy efficiency measures (such as lighting, heating and cooling equipment) to hard-to-reach customer segments, and energy audits and technical services.

The program also provides services for which there are no immediate energy savings but will help establish an infrastructure for sustainable, long-term management of energy efficiency. These services included workshops and trainings for contractors and end-use customers, development and enforcement of building codes and standards for residents and businesses, hard-to-reach customer energy efficiency marketing and outreach (such as to non-English speaking residents), and building local governments' energy efficiency resources.

The overarching objectives of KEMA's process evaluation of the LGP Program were to evaluate the effectiveness of program processes and to guide PG&E's program managers in improving program processes. The major research activities included review of program materials and relevant regulatory filings and in-depth interviews with PG&E, local government, and implementation contractor staff. Key findings and recommendations from the process evaluation included:

- **The Purpose of the Partnerships:**
    - *Evaluator finding:* According to program filings, the LGP Program intends to both deliver immediate energy savings and to establish a permanent framework for sustainable, long-term local government energy management. During the 2006-2008 program cycle, the California Public Utilities Commission (CPUC) evaluated PG&E's program performance based on immediate energy savings achievements and cost-effectiveness. However, due to the CPUC's emphasis on immediate savings in 2006-2008, the 2006-2008 LGP Program primarily focused on achieving immediate energy savings at the expense of making progress towards its long-term goals.
    - *Evaluator recommendation:* Going forward, the program needs to strike an appropriate balance between achieving immediate energy savings and meeting the program's long-term strategic objectives.
        - *PG&E plans to address recommendation:* PG&E has lowered its 2009-2011 LGP Program cost-effectiveness targets, and developed incentives that encourage installation of a broader mix of measures. PG&E also plans to track the types and locations of participating customers and use that information to encourage broader customer treatment both in terms of the sectors of customers and the mix of measures. Finally, PG&E, through the

innovative program category in its 2009-2011 implementation plan, is explicitly encouraging innovative program strategies for 2009-2011. These activities will not be subject to energy savings claims and are intended to meet the long-term objectives of the LGP as depicted by the state's Strategic Plan.

- *Evaluator recommendation:* PG&E and the California Public Utilities Commission should track and monitor program strategies that are designed to yield long-term benefits and in line with the Strategic Plan.
    - *PG&E plans to address recommendations:* PG&E is working with the CPUC to develop a tracking system for long-term energy savings accomplishments. PG&E is also using the Strategic Plan to prioritize infrastructure activities for its 2009-2011 plans. Finally, PG&E is working internally to develop evaluation strategies to quantify savings from programs with long-term strategies that may yield indirect energy savings.

- **Integration of Services**
    - *Evaluator finding:* PG&E offers a variety of energy programs and services to local governments and their constituents, addressing energy efficiency, demand response and renewable technologies. The energy efficiency programs include LGPs; PG&E's territory-wide core programs aimed at the mass market, low-income customers, businesses and industry; and programs delivered by third-party implementers to targeted customers. In most locations within PG&E's service territory, customers are eligible for program services from several programs. However, during the 2006-2008 Program period, PG&E did not effectively integrate its energy efficiency programs, which led to customer confusion and dissatisfaction and inefficiencies in program implementation. Additionally, PG&E did not provide access to its broader energy services to local government partners. This inhibited progress towards fully engaging local governments in achieving the state's long-term, strategic energy goals.
    - *Evaluator recommendation:* Develop a tracking system to monitor implementation traffic for utility third-party, LGP, core, and low-income program coordination and cross-referrals to be shared by local governments and PG&E.
        - *PG&E plans to address recommendations:* PG&E has developed a coordinated model for LGP, low-income, core and third-party programs that

are being pilot tested in 2009 in some locations in PG&E's service territory. It will likely be rolled out full-scale later in the program cycle to cover PG&E's territory.

- *Evaluator recommendation:* Integrate PG&E's energy services that are applicable to local governments.
  - *PG&E plans to address recommendations:* PG&E has taken measures to integrate its service offerings for 2009-2011 and has explicitly described these efforts in its 2009-2011 LGP Program implementation plan submitted to the CPUC. PG&E has also held regular market segment strategy meetings, which assess its program offerings by market segment (including local government). This initiative is intended to ultimately integrate program offerings for each market segment, which will inform an integrated outreach strategy to local governments.

- **Implementation Model**
  - *Evaluator finding:* Two key characteristics that distinguished LGPs were:
    - The type of implementer (i.e., local government staff or third-party contractor) and,
    - The degree to which the local government is engaged in the partnership.

    These characteristics varied among PG&E's LGPs depending on the unique context of each local area and produced varying results. Using a third-party is more efficient in meeting short-term energy savings goals, and an engaged local government is most effective in meeting long-term LGP goals. Each characteristic is needed to meet both short and long-term goals.
  - *Evaluator recommendation:* Balance the program's objectives when establishing new partnerships and determining how they will be implemented, to ensure that the program meets its short-term energy savings goals while effectively engaging the local government to achieve its long-term strategic objectives.
    - *PG&E plans to address recommendation:* When considering new partnerships, PG&E will assess the level of engagement of the local government on energy efficiency issues, and its ability to take on

administrative functions. These considerations in turn inform the partnership's implementation model and geographic coverage.

- **Contract and Program Administration:**
  - *Evaluator finding:* PG&E manages each individual LGP Program contract, which is either with the local government or a third-party implementer. PG&E designates a program manager for each partnership, who oversees the contract and monitors program accomplishments. Other PG&E staff (e.g., from the contracts and information technology groups) also provide administrative support for the LGP Program as needed. However, even with the support the overall contract program administrative process had gaps that delayed making important changes to the program, paying customer rebates and fulfilling data requests. The contracting process proved to be:
    - Too lengthy,
    - Complex and inflexible,
    - Negatively impacting Had customer and partner satisfaction, and
    - Reducing program cost-effectiveness.

    The process for tracking program accomplishments and responding to data requests was also very cumbersome and was perceived to create a heavy burden on partners. Finally, PG&E systems, processes, and staffing levels were constrained during the 2006-2008 program, which hindered LGP Program progress.
  - *Evaluator recommendations:* Ensure that the 2009-2011 contract process does not adversely affect delivery of program services due to lengthy delays and excessive administrative requirements on implementers. Set up 2009-2011 contracts to provide flexibility to make mid-course corrections in program implementation to maximize program success.
    - *PG&E plans to address recommendation:* PG&E plans to improve the contracting process for 2009-2011 programs by allowing greater flexibility for implementers to make mid-course changes to improve programs.
  - *Evaluator recommendations:* Add progress reporting (beyond counting of energy savings by measure) to the 2009-2011 contracts to monitor the successes and

challenges of each program strategy. Determine whether PG&E's administrative infrastructure that supports the LGP Program is sufficient to accomplish its priorities and make improvements if warranted (e.g., add staff, update IT systems, etc.).

- *PG&E plans to address recommendation:* As mentioned previously, PG&E will track measures and customers more closely in the 2009-2011 program period in order to ensure broader customer and measure treatment. PG&E has added some strategic senior staff to the LGP group, as well as some program support staff. PG&E has also been working on process improvements to streamline operations, which should help improve program implementation. And finally, PG&E has streamlined its data request process, assigning one individual to process external requests and standardizing its process for addressing data requests.

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2. Process Evaluation of the 2006-2008 Upstream Lighting Program and California CFL Market Characterization

2.1. Executive Summary

This Executive Summary presents a summary of the detailed findings presented later in the report. It also contains the evaluators' recommendations for improving Pacific Gas and Electric's (PG&E's) Upstream Lighting Program (ULP).[2]

2.1.1. Introduction

This introductory section describes how the findings in the Executive Summary are organized and briefly describes the various surveys and interviews that these findings are based upon.

Organization of the Findings

In this Executive Summary we group the findings from this process evaluation of the Upstream Lighting Program and characterization of the California CFL market into the following thematic subsections:

- ***The California CFL supply chain.*** Findings summarized in this subsection include:
    - *Where retailers get their CFL supplies from.* This concerns the frequency with which retailers get their supplies from their own distribution centers, from non-affiliated lighting distributors or directly from manufacturers;
    - *Full-cycle CFL delivery time:* This is the typical amount of time it takes from the time a new shipment of ULP-discounted CFLs is ordered from the factory and the time it arrives at the retailer's location;
    - *How shipment sizes of ULP-discounted CFLs are determined;*
    - *Problems with delivery of ULP-discounted CFLs;*
    - *How long it takes to sell a shipment of ULP-discounted CFLs; and*
    - *The actions of retailers when selling ULP-discounted lighting products.*

[2] SCE also identifies this program as the Residential Lighting Program, although some program-discounted lighting products are sold to customers for nonresidential applications.

- ***The California CFL shopper:*** Findings summarized in this subsection include:
    - *CFL awareness:* This covers awareness levels of CFLs among lighting purchasers and the demographic differences between those who claimed awareness of CFLs and those who did not. It also covers sources of consumer awareness of CFLs;
    - *CFL purchasing behavior:* This covers the prevalence of CFL purchasers among the general population, the typical quantities they are purchasing, and where they are purchasing their CFLs;
    - *Reasons for purchasing CFLs; and*
    - *Demand-side barriers to CFL purchase.*
- ***The California CFL retail environment:*** Findings summarized in this subsection include:
    - *The relative availability of ULP-discounted vs. non-ULP-discounted CFL products;*
    - *The relative frequency of Energy Star products;*
    - *CFL lumen and wattage varieties;*
    - *CFL lamp shapes;*
    - *CFL package sizes;*
    - *The availability and variety of specialty CFLs;*
    - *CFL quality;*
    - *CFL prices and retail pricing strategies; and*
    - *CFL point-of-purchase placement and promotional activities.*
- ***Preliminary indicators of program attribution and free ridership:*** Findings summarized in this subsection include:
    - *Whether CFL purchasers had prior intentions to purchase CFLs:* If a person entered a store without specific plans to purchase a CFL and ended up purchasing one, due to some combination of the ULP-discounted price and/or greater product prominence due to ULP-influenced signage or product placement, then such a purchase should be attributed to the ULP. This subsection discusses the evidence from the shopper intercept surveys in terms of the relationship between shopper intentions and purchase behavior.
    - *Shopper awareness of CFL point-of-purchase materials and their influence;*

- *The effect of CFL multi-packs on purchase quantities;*
- *The effect of CFL price on purchase quantities;*
- *Shopper awareness of the ULP discounts and their influence; and*
- *Store manager estimates of free ridership.*

- ***CFL disposition after the sale:*** Findings summarized in this subsection include:
  - *CFL leakage:* "CFL leakage" is the phenomenon where ULP-discounted lighting products are improperly sold in stores outside of California or on the Internet to non-California buyers. This subsection covers retailer/manufacturer reports on the prevalence of leakage, their opinions on where in the supply chain this leakage is likely occurring, their opinions on the bulk purchase limits introduced in 2007 to help mitigate CFL leakage, how these bulk purchase limits are enforced, procedures to avoid delivering ULP-discounted CFLs to the wrong location, what happens to unsold ULP-discounted products, and the evidence for "internal CFL leakage" where customers of one California utility are purchasing CFLs that have been discounted by a different California utility;
  - *Residential vs. non-residential use of ULP-discounted CFLs:* This subsection discusses evidence from both store manager interviews and shopper intercept surveys as to what percentage of ULP-discounted CFLs are likely going into residential vs. nonresidential sockets;
  - *CFL installation:* This covers the average number of installed CFLs reported by respondents;
  - *CFL storage:* This covers the average number of stored CFLs reported by respondents;
  - *CFL removal:* This covers how frequently respondents removed CFLs and their reasons for doing so; and
  - *CFL disposal:* This subsection covers manufacturer and retailer practices and preferred policies concerning the disposal and recycling of CFLs.

- **Satisfaction with the ULP, CFLs:** Findings summarized in this subsection include:
  - *Satisfaction with the ULP processes*;
  - *Recommendations for improvements in the ULP*; and
  - *Consumer satisfaction with CFLs*.

- **Other sections of the report:** In addition to this Executive Summary, other sections of the report include:
    - *The ULP program theory;*
    - *Program energy savings;*
    - *Prior evaluation recommendations and disposition; and*
    - *The detailed evaluation findings.*

Information Sources

This executive summary brings together findings from multiple data collection efforts. These include:

- *Upstream Market Actor Interviews:*
    - *141 "store managers" representing retailers participating in the ULP:* For the sake of simplification we will call these market actors "store managers" even though some of them do not manage the whole store; for example, they may be responsible for lighting and a few additional products housed within the store. We surveyed 70 store managers operating in the PG&E service territory and 71 in the Southern California Edison (SCE) service territory. These surveys were completed in May 2008;
    - *18 participating high-level retail lighting buyers:* With one exception, these buyers worked for large retail chains. We completed 16 of these interviews during the September – November 2008 time period. Two more were completed in the July – September 2009 time period. These interviews were originally being done for the California Public Utilities Commission's (CPUC's) impact evaluation of the Residential Retrofit Programs. However, because we knew from past experience that it was difficult to gain permission for interviews with many of these high-level buyers, a number of process-related questions were added to the interview guide; and
    - *18 lighting manufacturers:* Seventeen of these are currently participating in the ULP and the eighteenth participated as recently as 2007. We completed 16 of these interviews during the July – November 2008 time period. Two more were completed in the June – September 2009 period. As with the case with the high-level buyers, these interviews were originally being done for the CPUC impact evaluation, but in the interest of efficiency, the interview guide was amended to include process-related questions.

- *The shopper intercept and shelf surveys:* These surveys were conducted all during the course of 2008 from January to December. The objectives of the in-store consumer intercept survey task were to conduct interviews with lighting purchasers (including CFLs and non-CFLs) at the time of purchase to provide feedback on the primary influences on CFL purchase decisions, and to better understand how decisions vary under different product type availability, pricing and packaging scenarios. In addition, the surveys provided indicators of free ridership, CFL leakage, and residential vs. nonresidential purchases.

  There were two different types of shopper intercept surveys:

  - *The revealed preference survey:* This survey was administered to shoppers who had already placed a light bulb in their shopping cart. These shoppers were then asked about their decision-making criteria for choosing these light bulbs.

  - *The stated preference survey:* This survey was administered to shoppers who had not purchased a light bulb but who had agreed to accompany the surveyor to the lighting section of the store to engage in a hypothetical purchase scenario. The researcher asked consumers to imagine that they were shopping to replace a light bulb installed in a typical fixture in their homes and to select a CFL or incandescent lamp for that purpose. Once they selected the light bulb (or multi-pack of bulbs), we administered a limited version of the revealed preference survey. Stated preference surveys were needed because, in some store types, the volume of shoppers is so low that researchers may encounter no light bulb purchasers or very few.

  As part of the data collection process, we also conducted comprehensive shelf surveys to provide detailed information on the variety of product types, prices, packaging configurations, etc. that were available to consumers at the time of the survey. These shelf surveys represented more than 5,000 CFL packages observed in 321 stores. The shelf survey database contains detailed characteristics data for both CFLs and incandescent lamps, including specialty lamps. The shelf survey data provides additional context for understanding consumer purchase decisions.

- *The PG&E/SCE general population telephone survey:* In the August-October 2008 time period, KEMA conducted a general population telephone survey focused on consumer purchase, installation, and storage of CFLs. The survey included separate batteries of questions for individuals who were aware of CFLs and for those who were unaware, as well as for CFL purchasers and non-purchasers. A total of 1,267 surveys were completed including 1,205 with respondents who were aware of CFLs and 62 with respondents who were unaware. Overall we completed 627 surveys with residential customers in PG&E's

service territory and 640 with residential customers in SCE's service territory. Differences between the PG&E and SCE results are presented in this report.

- *Interview and discussions with PG&E ULP staff:* In 2007 we had discussions with PG&E's ULP program staff about the scope of our research. In 2008 and 2009 we presented updates on the ULP process evaluation resource to PG&E's ULP program staff and also presented preliminary results.

2.1.2. The CFL Supply Chain

In our surveys of lighting manufacturers, high-level retail lighting buyers, and store managers we asked them a number of questions to better understand this supply chain. A summary of these findings include:

- *Retailer sources of CFL supply:* Nearly two thirds of the managers of stores located in the PG&E/SCE service territories stated that they received CFL bulbs from their company's distribution centers with only 16 percent saying bulbs were obtained from non-affiliated lighting distributors with 15 percent receiving them directly from the manufacturer;

- *Full-cycle CFL delivery times:* The manufacturers and high-level retail lighting buyers reported that the time it takes from when a new shipment of ULP-discounted CFLs is ordered from the factory and when it arrives at the retailer is 70-71 days. These market actors also provided estimates for manufacturing times, shipment times, and warehousing times. These estimates appear in the detailed findings;

- *How shipment sizes of ULP-discounted CFLs are determined:* Managers of stores, along with high level buyers located in the PG&E/SCE service territory said that using historical sales information was the most common way for determining shipments levels for ULP-discounted CFLs, although there are various approaches;

- *Problems with delivery of ULP*-discounted CFLs: In the evaluation of the 2004-2005 ULP there was anecdotal evidence that some retailers had received deliveries of ULP-discounted CFLs that were much larger than the allocation and which arrived at a time different from the agreed upon delivery date. Therefore in the evaluation of the 2006-2008 ULP we asked all the store managers located in the PG&E and SCE service territories whether they had encountered these problems. Only 12 percent of the store managers said that they received

larger-than-expected orders of ULP-discounted CFLs. Only seven percent of them said they received shipments that arrived at an unexpected time;

- *How long it takes to sell through a shipment of ULP*-discounted CFLs: The managers of Big Box/Mass Merchandise and Small Hardware stores claimed to sell through their ULP-discounted CFLs the quickest. Fifty-four percent of the Big Box/Mass Merchandise and 51 percent of the Small Hardware store managers said they sold through their shipments in five weeks or less. In contrast, 50 percent of the Large Grocery store managers, 78 percent of the Small Grocery store managers, and 54 percent of the Discount store managers said that it takes nine weeks to a year to sell through their shipments of ULP-discounted CFLs. These slower sales were likely due to a combination of factors discussed in the detailed findings; and

- *What retailers do when they sell through their ULP-discounted lighting products:* The most common responses of the store managers from the PG&E service territory were that they would reorder more ULP-discounted products or that they never sell out. The most common responses of the store managers in the SCE service territory were that they stopped selling CFLs or they would reorder more of the ULP-discounted products. Stores which never ran out, or which could acquire more ULP product immediately, tended to be Big Box and Mass Merchandise stores with automatic replenishment systems and/or ULP suppliers with domestic warehousing. 99¢/$1 stores and the discount Grocery stores were most likely to stop selling CFLs when they ran out of their ULP-discounted products.

2.1.3. The California CFL Shopper

This subsection discusses CFL awareness, CFL purchasing behavior, reasons for CFL purchase, and barriers to CFL purchase.

CFL awareness

Some key findings concerning CFL awareness include:

- *Awareness levels:* The general population telephone survey found that 95 percent of both the PG&E and SCE respondents said they were aware of CFLs. These awareness levels are the same as a similar survey fielded in the PG&E, SCE, and San Diego Gas and Electric (SDG&E) service territories in 2006;

- *Timing of awareness:* Four out of five of the general population telephone survey respondents reported that they became aware of CFLs within the past five years, and approximately one-fourth said that they first became aware of CFLs when they saw a television advertisement and/or when they saw CFLs in retail stores;

- *Aware vs. unaware consumers:* The general population telephone survey respondents who were aware of CFLs were much more likely to be homeowners than respondents who were unaware. Respondents who were aware of CFLs were more likely to have at a least college degree (or higher education) than respondents who were unaware of CFLs. Unawareness of CFLs was higher among the lower-income respondents; and

- *Sources of awareness:* The three most common sources of CFL awareness among the 2008 general population survey respondents had not changed since 2006. These include becoming aware of CFLs in stores (due to a display, a sale, or point-of-purchase materials), through television, and through word of mouth. However, the 2008 survey did see an increase in the percentage of respondents claiming to have learned about CFLs from television. This is likely the result of increased promotion of CFLs via television commercials such as those sponsored by PG&E in 2007 and 2008 and the statewide Flex Your Power advertising campaign.

CFL purchasing behavior:

Some key findings concerning CFL purchasing behavior included:

- *CFL purchasers vs. non-purchasers:* A significantly larger proportion of respondents to the general population survey who purchased CFLs were homeowners than respondents who had not purchased CFLs. CFL purchasers were more likely to have at a least college degree (or higher education) than non-purchasers, and a greater proportion of purchasers had higher incomes than non-purchasers;

- *Purchase rate:* The CFL purchase rate in California has been increasing steadily for the past several years. Responding to the general population survey, 70 percent of PG&E and SCE residential customers said they have purchased at least one CFL. Two-thirds of these respondents reported that their primary reason for purchasing CFLs was to save energy;

- *Purchase locations:* Forty percent of the general population survey respondents said that they made their most recent CFL purchases at home improvement or hardware stores. Twenty percent reported that they made their most recent purchases at big box stores (such as Wal-Mart, Target, etc.), 15 percent at Costco, and 10 percent at supermarkets;

- *Purchase quantity:* The general population survey respondents said that they purchased an average of 7.1 CFLs during their most recent purchases. Consumers who shopped at Costco purchased more CFLs, on average, than purchasers at other store types. This is likely because of the relatively larger package sizes (multi-packs) at Costco compared to other retailers. Overall, 65 percent of respondents reported that their most recently-purchased CFLs came in multi-packs (packages with 2 or more lamps); and

- *Purchasing experience of the intercept survey respondents:* Overall, 89 percent of all respondents to the shopper intercept surveys said that they had purchased or been given CFLs in the past. CFL purchasers were more likely to have purchased or been given CFLs in the past, as compared to incandescent lamp purchasers. There was no difference between IOU-discounted CFL purchasers and other CFL purchasers.[3] Respondents within the mass merchandise channel were least likely to have purchased or been given CFLs; respondents in the large grocery and membership club channels were most likely to have purchased or been given CFLs.

Reasons for purchasing CFLs

Some key findings concerning consumer reasons for purchasing CFLs included:

- *General reasons for purchase from the general population telephone surveys:* When asked about their most recent CFL purchases, the majority of the general population survey respondents said that the most important factor in choosing a CFL over an incandescent was to save or conserve energy. Respondents mentioned energy conservation more than twice as often as any other reason. Roughly one in five purchasers mentioned electricity bill reductions and CFLs lasting longer as reasons for purchase.

[3] Because the ULP-discounted CFLs have stickers and possibly signage that associate the discounts with a particular California IOU, we asked the shoppers in the intercept surveys about IOU discounts rather than ULP discounts since they were more likely to recognize the former.

- *General reasons for purchase from the shopper intercept surveys:* Consistent with prior research, the top reasons respondents purchased CFLs include saving money and/or saving energy (68% and 40%, respectively). In addition, general product performance issues (e.g., CFLs "work better/are higher quality" than incandescent lamps, CFLs have longer life, etc.) were mentioned fairly commonly as reasons for purchasing CFLs. About one in five mentioned environmental benefits as the reason they purchased CFLs and a similar percentage specifically mentioned the low/affordable price as they reason they purchased CFLs. Other reasons for purchasing CFLs include respondents' prior experience with the product, specific packaging/merchandising characteristics, and/or other product design features. Less than one percent of the respondents overall mentioned the IOU discount as a reason they purchased CFLs.

- *How reasons differed by IOU:* In the shopper intercept survey the SCE respondents were more likely than other IOU respondents to cite saving money and/or energy as their reasons for selecting CFLs and somewhat more likely to cite the packaging/merchandising characteristics as the reasons they selected CFLs. SCE respondents were slightly less likely than PG&E respondents in particular to cite the low/affordable price and/or product performance characteristics as their reason for selecting CFLs.

- *How reasons differed by where people shopped:* In the shopper intercept surveys, respondents surveyed in Drug stores more commonly cited environmental benefits as the reason they selected CFLs, and less commonly cited saving money and/or low/affordable CFL prices. Respondents surveyed in Hardware stores were similar to respondents surveyed in Drug stores in that they more commonly cited environmental benefits and less commonly cited saving money as the reason for selecting CFLs. Saving energy, money and environmental benefits were all more commonly cited by respondents surveyed in Large Grocery stores. Low/affordable CFL prices were more often cited by respondents surveyed in Small Grocery stores and Mass Merchandise stores, and least often cited by respondents surveyed in Home Improvement stores.

Barriers to CFL purchase

Some key findings concerning barriers to consumer purchase included:

- *Barriers identified in the shopper intercept surveys:* The most common barriers to purchase cited by the respondents to the shopper intercept included awareness/information barriers, aesthetic/functionality barriers, product performance barriers, and price barriers. Other

barriers such as mercury or product packaging were cited much less often. There were a few differences in the types of barriers identified depending on which IOU served the customer, in which retail type the intercept survey was conducted, and whether they had entered the store intending to purchase CFLs.

- *Awareness/information barriers:* Overall, 39 percent of all respondents cited some type of awareness/information barrier to CFL purchase that could be potentially overcome with targeted educational and/or outreach strategies. For example, about a fifth said that they purchased/selected incandescent lamps out of "habit;" and a few others cited similar reasons (i.e., prior experience with incandescent lamps, wanted an exact replacement model). Others said that they needed more information or were unaware of CFLs. Still others reported that they did not purchase/select CFLs because of prior (bad) experience with CFLs, warnings from friends and family, and/or general perceptions that incandescent lamps were "better" than CFLs. A few respondents (2%) said that because they "already have CFLs" they did not need to purchase any more.

- *Aesthetic or functionality barriers:* Just over one-third of all respondents cited some type of aesthetic or functionality limitation of the CFL as their reason for not purchasing/selecting CFLs. Most common were features such as the way CFLs look and/or fit in fixtures, as well as other aspects of the bulb shape or size. Others mentioned that they needed some specific type of bulb (e.g., three-way, dimmable, specific wattage) or some other specification (e.g., appliance replacement bulb, outdoor/safety fixture, etc.).

- *Product performance barriers:* Overall, 30 percent of all respondents mentioned some aspect of product performance as their reason for not purchasing/selecting CFLs, the most common of which related to light quality/color. A few others mentioned that CFLs took too long to start-up, burn out too fast, and/or flicker.

- *Price barriers:* About a quarter (26%) of all respondents mentioned price (i.e., too expensive) as their reason for not purchasing/selecting CFLs.

- *Other barriers:* A small (but most likely growing) percentage of respondents (7%) mentioned their concerns about the mercury content in CFLs as a barrier to purchase. Only about three percent mentioned barriers related to product packaging (i.e., multi-packs) and merchandising (i.e., location in the store) as reasons for not purchasing CFLs.

- *Barrier differentiation by IOU:* For the most part, these results from the shopper intercept surveys were fairly consistent across the IOUs. SCE respondents were somewhat more likely to cite barriers that related to a lack of awareness or information (e.g., "habit," prior experience, etc.), and SDG&E respondents were more likely to cite barriers related to product design features (e.g., lamp "look" or fit).

- *How barriers differed by where people shopped:* Overall, the results were also fairly consistent across channels, with a few noteworthy differences:

  - *Price:* Channels where price barriers were least common include Discount and Small Grocery, whereas price barriers were more commonly cited in the Drug and Mass Merchandise channels.

  - *Product Performance and Design:* These barriers were most commonly cited in the Small Grocery channel. Product design barriers were least common within the Drug store channel.

  - *Awareness/Information:* This barrier was cited most commonly within the Discount store channel.

- *How barriers differed depending on whether the shopper intended to purchase CFLs or had purchased light bulbs:* There were some differences in the barriers to CFL purchase between respondents who had considered purchasing CFLs (but did not) and respondents who had not even considered purchasing CFLs. These differences may highlight a need to develop different strategies for overcoming barriers that prevent consumers from even considering purchasing CFLs, versus those barriers that may prevent consumers from making purchases when they were actively considering it.

  For example, one barrier that could be affecting whether or not respondents would even consider purchasing CFLs relates to perceptions regarding product performance (i.e., light quality/color). Nearly one third of all respondents who said that they had not even considered purchasing CFLs (32%) cited product performance barriers, whereas only 23 percent of all respondents who had considered CFLs cited these reasons. While it is true that overcoming product performance barriers specifically related to light quality/color may require actual improvements in CFL design, it is also highly possible that educational campaigns designed to inform consumers of the availability of CFLs in various light quality/color categories would also be effective in overcoming (mis)perceptions in the market that all CFLs have poor light quality/color characteristics.

  Other barriers that may be affecting whether or not respondents would even consider purchasing CFLs also relate to perceptions, beliefs or “habits” that targeted educational/outreach campaigns could effectively overcome. Respondents who said that they had not even considered purchasing CFLs were more likely to cite barriers related to “habit,” lack of awareness/information, prior (bad) experience with CFLs, and concerns about mercury/disposal.

  Finally, price and product design features (e.g., lamp shape, size, fit) were more commonly cited among respondents who had considered purchasing CFLs (but did

not). This may indicate that, if a wider variety of CFL product styles and prices were available at the time of purchase, they may have selected CFLs instead of incandescent lamps.

These findings are further supported when looking at the differences in barriers to CFL purchase as cited by revealed preference intercept survey respondents versus stated preference intercept survey respondents. Revealed preference respondents (who did not purchase CFLs) were more likely to cite specific barriers related product design (e.g., lamp shape, size, fit) and stated preference respondents (who did not select CFLs in their hypothetical choice experiment) were more likely to cite barriers features related to product performance (e.g., light quality/color). It is possible that these results indicate that consumers who are actively considering purchase decisions may be basing these decisions, at least in part, on the actual characteristics/features of products that they have available to them at the time of purchase. Consumers who are inactively or hypothetically considering purchase decisions may be basing these decisions on perceived or expected characteristics/features that may or may not be accurate or even known/understood.

- *The supplier perspective on consumer barriers to general CFL use:* High-level retail lighting buyers and lighting manufacturers most frequently pointed to price/cost barriers as factors that limit consumer demand for CFLs. As to other consumer barriers, high-level buyers were more likely than manufacturers to point to consumer concerns about CFL light quality and bulb fit. In contrast, manufacturers were more likely than the buyers to point to CFL disposal and the limited availability of specialty CFLs as lingering barriers.

- *The supplier perspective on consumer barriers to specialty CFL use:* When participating store managers located in the PG&E and SCE service territories who sold specialty CFLs were asked to characterize recent sales of these products, 40 percent of the respondents said that sales were either “fair” or “poor.” Only 10 percent said that sales were “excellent.” These store managers identified cost as the top barrier to greater specialty CFLs sales with lack of consumer awareness/knowledge and limited availability being other barriers.

2.1.4. The California CFL Retail Environment

This subsection summarizes findings concerning the California CFL retail environment. These cover the relative availability of ULP-discounted vs. non-ULP-discounted CFLs, the relative frequency of Energy Star CFLs, CFL lumen and wattage varieties, CFL shapes, CFL packages, the availability and variety of specialty CFLs, CFL fixtures, CFL quality, CFL pricing and pricing strategies, and CFL point-of-purchase placement and promotional activities.

The relative availability of ULP-discounted vs. non-ULP-discounted CFLs

Some key findings concerning the relative availability of ULP-discounted vs. non-ULP-discounted CFLs:

- *Retailer reports on the availability of the ULP and The availability of non-ULP-discounted CFLs:* Over half (56%) of the participating store managers in the PG&E and SCE service territories reported selling non ULP-discounted spiral CFLs. All Large Home Improvement, Small Hardware, and Lighting/Other store managers reported selling non-program bulbs. Only in the Small Grocery and Discount channels did a minority of store managers' report selling non-program bulbs.

- *Whether retailers stock ULP-discounted CFLs year-round:* Across all retail channels over two thirds (69%) of the store managers who were surveyed in 2008 said that they stocked these year round. In contrast, only 35 percent of the high-level retail lighting buyers said that they did. The detailed section of the report discusses possible explanations for this difference.

- *Whether the ULP-discounted CFLs and non-program CFLs are sold at the same time:* Across all retail channels, 64 percent of the store managers in the 2008 survey said that they did this always or often. Among the high-level buyers, the buyers that represented the Big Box/Mass Merchandise, Large Home Improvement, Small Hardware, and Drug retailers all reported that this happen always.

- *The frequency of ULP-discounted CFLs in the stores:* The 2008 shelf surveys identified 13 percent of the CFLs in the store as discounted by an IOU.[4] It also identified 10 percent of the CFLs as discounted by the retailer. IOU-discounted CFLs were most commonly found in retail stores located in SCE's service territory (16%), followed by PG&E (13%) and SDG&E (8%). Retailer discounts were more common in stores located in SDG&E's service territory (14%) as compared to SCE (9%) or PG&E (7%). IOU-discounts were most commonly found within the Small Grocery and Discount Channels (58% and 52%, respectively), whereas

[4] It is important to note that these percentages only represent the proportion of unique CFL package types that the surveyors found in the stores and are not sales weighted. We assume that because the ULP-discounted CFLs had much lower prices, their share of store CFL sales was likely much higher than 13 percent.

retailer discounts were most common within the Large Grocery channel (39%). Discounts of any common were infrequent in the Drug and Mass Merchandise channels.

The relative frequency of Energy Star products

In the 2008 shelf surveys we found the large majority of CFLs in the stores to have the Energy Star label on the packaging.[5] Energy Star-labeled CFLs were most common in the globe-style and twister/spiral-style shapes, and least common among torpedo/bullet-style and bug light CFLs. The Home Improvement and Hardware channels stood out, with only 76 percent and 84 percent of the CFLs carried having the Energy Star label. For all of the other channels, more than 90 percent of the CFLs had Energy Star labels.

CFL lumen and wattage varieties

- *Lumen levels:* The 2008 shelf surveys found that about one third of all CFLs were less than 800 lumens, 27 percent were 800-1,099 lumens, 19 percent were 1,100-1,599 lumens,19 percent were 1,600 lumens or greater. There was quite a range of lumen levels available in the twister/spiral-style CFL models observed during the shelf survey. About two thirds of the A-lamp CFLs (65%) and three quarters of the globe-shaped CFLs (76%) had lumen levels less than 800. Just over half of the reflector/flood CFLs were less than 800 lumens and 30 percent were 1,100-1,599 lumens. Nearly all of the torpedo/bullet-style CFLs were less than 800 lumens. These results were not sales-weighted.

- *Wattage levels:* The 2008 shelf surveys found that 22 percent of the CFLs were less than or equal to 12 watts, 34 percent were 13-15 watts, 16 percent were 16-22 watts, 15 percent wee 23-25 watts, and 12 percent were 26 watts or greater. The average twister/spiral-style CFL was 18.2 watts, and the average reflector/flood CFL was 18.2 watts. A-lamp shaped CFLs were 11.4 watts on average, torpedo/bullet-style CFLs were 8.0 watts on average, and CFL bug lights were 13.4 watts on average. Lumen levels followed wattage categories in the expected pattern – i.e., lower wattage CFLs had lower lumen levels and higher wattage CFLs had higher lumen levels. These results were not sales-weighted.

[5] As noted, these percentages from the shelf survey only represent the proportion of unique CFL package types that the surveyors found in the stores and are not sales weighted.

The variety of CFL shapes

The 2008 shelf surveys found that 62 percent of the observed packages and 70 percent of the total lamps were twister/spiral CFLs. The average twister/spiral-style CFL package contained 2.2 lamps. The next most common CFL lamp shapes after the twisters/spirals included:

- *Reflector/flood CFLs*: This CFL lamp shape accounted for 16 percent of packages and 11 percent of lamps with an average package size of 1.3 lamps;
- *A-lamp shaped CFLs:* This CFL lamp shape accounted for nine percent of packages and nine percent of lamps, with an average of 1.8 lamps per package; and
- *Globe-shaped CFLs:* This CFL lamp shape accounted for six percent of packages and five percent of lamps, average with an average of 1.8 lamps per package.

Small Grocery stores almost exclusively carried twister/spiral-style CFLs, and more than 70 percent of CFLs sold at Discount and Drug stores were twister/spiral-style. Membership Club stores had a wider variety of CFL shapes and styles, with only 31 percent of all CFLs being the twister/spiral-style shape. These results were not sales-weighted.

The variety of CFL package sizes

The 2008 shelf surveys found that over half of the CFLs in the stores were single-packs (57%), 18 percent were two-packs, 11 percent were three-packs, eight percent were four-packs and six percent were packages of five or more CFLs. The average number of CFLs in the packs with five or more CFLs was between 6 and 7. As expected, Membership Club stores had the highest average number of lamps/package (4.1), followed by Mass Merchandise (2.4). These results were not sales-weighted.

The availability and variety of specialty CFLs

The 2008 shelf surveys found that five percent of all the CFLs observed in the stores surveyed were dimmable, and just under three percent had three-way wattage capabilities. About half of the dimmable CFLs were twister/spiral-style, 45 percent were reflector/flood-style CFLs, and a small percentage (less than 4%) were torpedo/bullet-style CFLs. All of the three-way wattage CFLs were twister/spiral-style.

The shelf surveys also found that Membership Club stores and Drug stores accounted for the largest share of the dimmable CFLs (7% respectively). Membership Club stores accounted for the largest share of the three-way wattage CFLs (8%). These types of CFLs were not found in any of the Small Grocery stores surveyed through this effort, and only a very small fraction of the Discount stores. These results were not sales-weighted.

Exactly half of the store managers in the PG&E and SCE service territories who were surveyed in 2008 said that they sold specialty CFLs such as dimmables, 3-way, or reflector CFLs. A large majority of the Big Box/Mass Merchandise, Large Home Improvement, Small Hardware, and Lighting/Other stores sold these specialty CFLs. Store managers in the PG&E service territory were much more likely (61%) to report selling specialty CFLs than store managers in the SCE service territory (39%).

The availability of CFL fixtures

Almost half (45%) of the store managers in the PG&E and SCE service territories who were surveyed in 2008 said that they sold CFL fixtures. Two thirds or more of the store managers in the Large Home Improvement, Lighting/Other, Big Box/Mass Merchandise, and Discount channels reported selling CFL fixtures.

CFL quality

- *Valuing CFL quality:* Seventy percent of the store managers and 78 percent of the store managers who gave responses other than “don’t know” said quality was very important. Nineteen percent of the respondents and 22 percent of the respondents who gave responses other than “don’t know” said that quality was “somewhat important” or “not at all important.”

- *Detecting CFL quality:* When we asked store managers how they could tell whether their store were selling quality products, their most common responses included by the number of returned CFLs, by customer feedback, by whether their CFL products had a quality brand name, and by the retailer’s personal examination of or experience with the CFL product.

- *Ensuring CFL quality:* We asked the store managers whether their companies do anything to assure the quality of the CFLs that they sell. Only about a quarter of the store managers said that their companies do something. When asked what actions their companies took to insure quality, these store managers said their companies either offered free product

replacements/guarantees or discontinued CFL products that had high return rates. Finally we asked the store managers whether there were any CFLs that they stopped offering due to customer complaints related to quality. Only three of the 71 store managers (4%) said that they had.

CFL prices and pricing strategies

- *Price differences between ULP-discounted and non-program CFLs:*
    - *Evidence from the retailer interviews:* Forty-four store managers provided estimates with the ULP-discounted CFLs being on average $2.35 lower in price. There were significant differences in the average price differences among the various retail channels. For 16 store managers who provided estimated price differences in percentage discount terms rather than dollars, the most common discount levels were 50 percent and 75 percent off the non-program CFL prices.
    - *Evidence from the shelf surveys:* The shelf surveys found that twister/spiral-style CFLs discounted by the IOU were about $2 less expensive than similar shaped lamps that were not IOU-discounted. The greatest differential in average price/lamp – between IOU-discounted and non-IOU discounted CFLs – could be found in the Small Hardware and Drug channels.
- *CFL pricing strategies:* The 2008 survey of store managers found that those who claimed to know how the retail prices for ULP-discounted CFLs were determined, the most commonly-cited strategies included basing them on competitor prices, using a standard price or markup, keystone pricing, and selling them for 99 cents or a dollar – either because that was their store format or because that's what their competitors were doing. The high-level buyers' most-cited ways to determine retail prices for ULP-discounted CFLs were basing them on competitor pricing or using some kind of standard price or markup. Most of the store managers and most of the buyers identified retail prices for ULP-discounted CFLs that were significantly less than a dollar per CFL.
- *Determining the retail prices of free ULP-discounted CFLs:* When asked how they price these free CFLs, the most-cited responses of the store managers were that they based these prices on competitor pricing, used a standard price or markup, and gave them away. The high-level retail lighting buyers gave very similar responses. Almost all of the manufacturers said that they provided advice to retailers on how to price these free or nearly free CFL products. This advice usually took the form of a suggested retail price based on their understanding of the California CFL market.

CFL point-of-purchase placement and promotional activities

- *Product placement:* Nearly eighty percent of the store managers said that they always or very often give the ULP-discounted CFLs a more prominent display than their other lighting products.

- *More prominent signage:* Over 80 percent of the store managers said that they give the ULP-discounted CFLs more prominent signage with 72 percent saying that they do this always. Seventy-seven percent of the store managers said that their signage promoted the price reductions resulting from the ULP discounts.

- *Signage sources:* Over half the store managers said that they use hand-made signs with only 15 percent using utility signage. Only 21 percent said they knew that the utilities participating in the ULP provided free signage.

- *Signage satisfaction:* The store managers gave an average satisfaction rating of 4.4 -- on a five-point satisfaction scale – for the signage that they used for the ULP.

- *Use of illuminated CFL displays:* Only 14 percent of store managers said that they used the se. However, 80 percent of those who used them said that they helped sell CFLs.

2.1.5. Program Attribution, Preliminary Free Ridership Indicators

Although free-ridership levels for the ULP will be officially determined by the CPUC-sponsored impact evaluation of the Residential Retrofit Program, PG&E and SCE asked us to provide them with some preliminary indicators of ULP free ridership. To this purpose, we asked all the store managers in the PG&E and SCE service territories to estimate how their sales of CFL products would be affected if the ULP buydown discounts had not been available. In the shopper intercept surveys we also asked the shoppers a number of questions which explore the role that the ULP may play in CFL purchase decisions. Finally the general population telephone survey also provided some information on the influence of in-store promotional displays and discounts on CFL purchasing decisions. The follow subsections summarize the responses to these questions.

Whether CFL purchasers had prior intentions to purchase CFLs

If a person entered a store without specific plans to purchase a CFL and ended up purchasing one, due to some combination of the ULP-discounted price and/or greater product prominence due to ULP-influenced signage or product placement, then such a purchase should be attributed to the ULP. This subsection discusses the evidence from the shopper intercept surveys in terms of the relationship between shopper intentions and purchase behavior.

- *Most respondents were planning to purchase some type of lighting product the day they were surveyed.* About half of those who had planned to purchase lighting products reported that they were specifically planning to purchase CFLs. Thirty-five percent of the respondents who actually made a lighting purchase had specific plans to purchase CFLs on the day the survey was conducted. The remaining respondents (65%) either did not plan on purchasing any lighting or planned on purchasing something other than a CFL. As compared to PG&E and SDG&E, SCE respondents were less likely to plan to purchase lighting in general. However, of those with plans, more were likely to purchase CFLs. Channels most likely to result in "impulse buys" (i.e., CFL purchases with no prior plans to purchase lighting) included Small Grocery, Membership Club, and Discount stores.

- *Actual purchase behavior:* Overall, just over half of all respondents (59%) purchased CFLs on the day the survey was conducted, and two-thirds of these respondents (63%) purchased IOU-discounted CFLs. This means that about a third of all respondents (37%, or 63% of 59%) purchased IOU-discounted CFLs on the day the survey was conducted, with the remainder purchasing non-program CFLs.

- *The relationship between intentionality and CFL purchasing:*

    - Overall, the majority of respondents who did not plan to purchase any lighting products actually purchased CFLs and most of those CFLs were IOU-discounted. Only eight percent of respondents overall were not planning to purchase any lighting products and actually purchased incandescent lighting products.

    - Nearly all of the respondents who planned to purchase CFLs in particular actually did (i.e., 233 out of 238), with about 55 percent of them purchasing IOU-discounted CFLs.

    - The majority of respondents who did not plan to purchase CFLs in particular (91%) actually purchased incandescent lighting products. Only about nine percent who were not planning to purchase CFLs actually did.

Shopper awareness of CFL point-of-purchase materials and their influence

The 2008 general population survey found that the most common way that respondents first became aware of CFLs was seeing them in stores (due to a display, a sale, or point-of-purchase materials). In addition, approximately one third of CFL purchasers reported that they saw signs, brochures, displays, or other materials regarding CFLs in the stores during their most recent purchases. Nearly two-thirds said that these materials were either very influential or somewhat influential on their decisions to purchase CFLs.

Shoppers' awareness of the ULP discounts and their influence

This subsection summarizes findings concerning three different types of awareness: 1) the awareness that the CFL that one has just purchased is ULP-discounted, 2) the awareness that ULP-discounted CFLs are in the store that one is visiting, and 3) awareness that the IOUs offer discounted CFLs. It then discusses the survey evidence concerning the influence of these discounts on the lighting purchase decision.

- *Awareness that the CFL one has purchased is discounted:* Overall, only about a third of the shopper intercept survey respondents who purchased IOU-discounted CFLs (38%) were aware that the specific product they purchased was discounted by the IOU. Another 41 percent were aware that the product was discounted but not necessarily by the IOU and the remaining 21 percent were unaware that the product they purchased was discounted at all. PG&E respondents were most likely to be aware that the product they were purchasing was discounted by PG&E, whereas SCE and SDG&E respondents were more likely to be aware that the product they were purchasing was discounted but not necessarily by the IOU.

  Retailer channels in which awareness of IOU-discounted CFLs was the highest include Small Grocery (58%) and Discount (46%). Awareness of discounts -- but not necessarily IOU discounts -- was highest in the Home Improvement (65%) and Mass Merchandise (59%) channels. Overall, 43 percent of the respondents who were aware that the CFLs they purchased were discounted by the IOU reported that they had come into the store specifically to purchase IOU-discounted CFLs.

- *Awareness that one can find ULP-discounted CFLs in the store.* Overall, 43 percent of shopper intercept respondents were aware that they could find IOU-discounted CFLs at the specific store where the survey was conducted. In this case, revealed preference respondents were somewhat more likely (49%) to report that they were aware compared to

stated preference respondents (41%). SCE respondents were less likely to be aware of IOU-discounted CFLs at the store where the survey was conducted (35%), whereas SDG&E respondents were more likely to be aware (62%). Awareness by channel was highest for the Mass Merchandise stores (58%) and lowest for Drug (22%), Home Improvement (38%) and Membership Club (36%) stores.

- *Awareness that the IOUs offer discounted CFLs:* Nineteen percent of revealed preference respondents in the shopper intercept surveys were aware that the IOU provided discounts for CFLs prior to taking part in the survey compared to 30 percent of stated preference respondents. This indicates that there could be a slight bias in the stated preference survey data toward shoppers with greater awareness of IOU discounts for CFLs. Within the Membership Club channel, stated preference respondents were much more likely to report that they were aware of IOU discounts on CFLs. Among revealed preference respondents, those within the Small Grocery channel were more likely to report they were aware of IOU discounts on CFLs.

- *The influence of the ULP discounts on purchase decisions:* Both the 2008 general population telephone survey and the shopper intercept surveys asked CFL purchasers questions that shed light on the influence of the CFL discounts on their purchase decisions.

    - *General population survey results:* In response to the 2008 general population survey, more than a third of recent CFL purchasers reported that their most recently-purchased CFLs were on sale or discounted. Of these, one quarter said that they were not at all likely to have purchased the CFLs if the discount was not available. Three-quarters reported that the discount encouraged them to purchase a greater number of CFLs than they would have in absence of the discount.

    - *Shopper intercept survey results:* When asked why they purchased the CFLs, about one in five of the purchasers mentioned environmental benefits as the reason they purchased CFLs, and a similar percentage specifically mentioned the low/affordable price as they reason they purchased CFLs. Less than one percent of the respondents overall mentioned the IOU discount as a reason they purchased CFLs.

The effect of CFL multi-packs on purchase quantities

The 2007 evaluation of the 2004-2005 indicated that the ULP might have been encouraging the use of CFL multi-packs and recommended that the ULP try to reduce the size of these multi-packs. While multi-packs may, in theory, increase program claimed savings by encouraging people to buy more CFLs than they had planned to, some of these savings are removed in the evaluation process if it is discovered that many of these purchased CFLs ended up in closets or

pantries rather than installed in lighting sockets. Our communications with PG&E and SCE ULP staff indicated that in recent years they had tried to encourage retailers to use smaller pack sizes, although they were not always successful.

But do multi-packs actually encourage consumers to purchase more CFLs than they would if there had been single packs? About half (55%) of the respondents the shopper intercept surveys said that they would have purchased the same number of CFLs even if they could have purchased them individually at the multi-pack, per-bulb price. About 30 percent reported that they would have purchased fewer, indicating that the multi-packs may have encouraged larger quantities of CFLs to be purchased than perhaps were needed. For about 15 percent of the respondents, the multi-packs limited the total number of CFLs they wanted to purchase (i.e., they would have purchased more if they could have purchased them at the same per-bulb price individually).

There were some differences in the survey responses depending on the retail channel. Channels that would have resulted in fewer CFLs purchased overall if they were available individually at the multi-pack, per-bulb price included Hardware and Membership Club. Channels that would have resulted in more CFLs purchased overall include Discount, Large Grocery, and Small Grocery. The effect of multi-packs seems to have had the least effect in the Home Improvement channel, with 68 percent of respondents indicating they would have purchased the same quantity of CFLs regardless of the price/packaging.

The effect of CFL price on purchase quantities

In the shopper intercept surveys -- both the revealed preference and stated preference versions – we asked the shoppers to gauge the influence of price on their CFL purchase/selection decisions. Overall, the majority of stated preference respondents (68%) reported that they would have selected CFLs even if they cost twice as much, whereas only 34 percent of revealed preference respondents said that they would have purchased the same number of CFLs if they cost twice as much. While about one in four (26%) of the revealed preference respondents reported they would have purchased fewer CFLs had the price between twice as high, fully 40 percent said that they would not have purchased any CFLs had they cost twice as much. As a result, stated preference respondents appear to be overstating purchase intentions when compared to revealed preference respondents.

“Free ridership,” as defined as a respondent’s willingness to purchase at least some CFLs at a higher price, was highest among SDG&E’s revealed preference respondents and lowest among

PG&E's revealed preference respondents. Over half (52%) of PG&E revealed preference respondents reported that they would not have purchased any CFLs had they cost twice as much, which compares to about one third of SCE respondents (33%) and only 15 percent of SDG&E respondents. Further, half of SDG&E respondents (50%) said that they would have purchased the same number of CFLs even if they cost twice as much, which compares to 38 percent of SCE respondents and 22 percent of PG&E respondents.

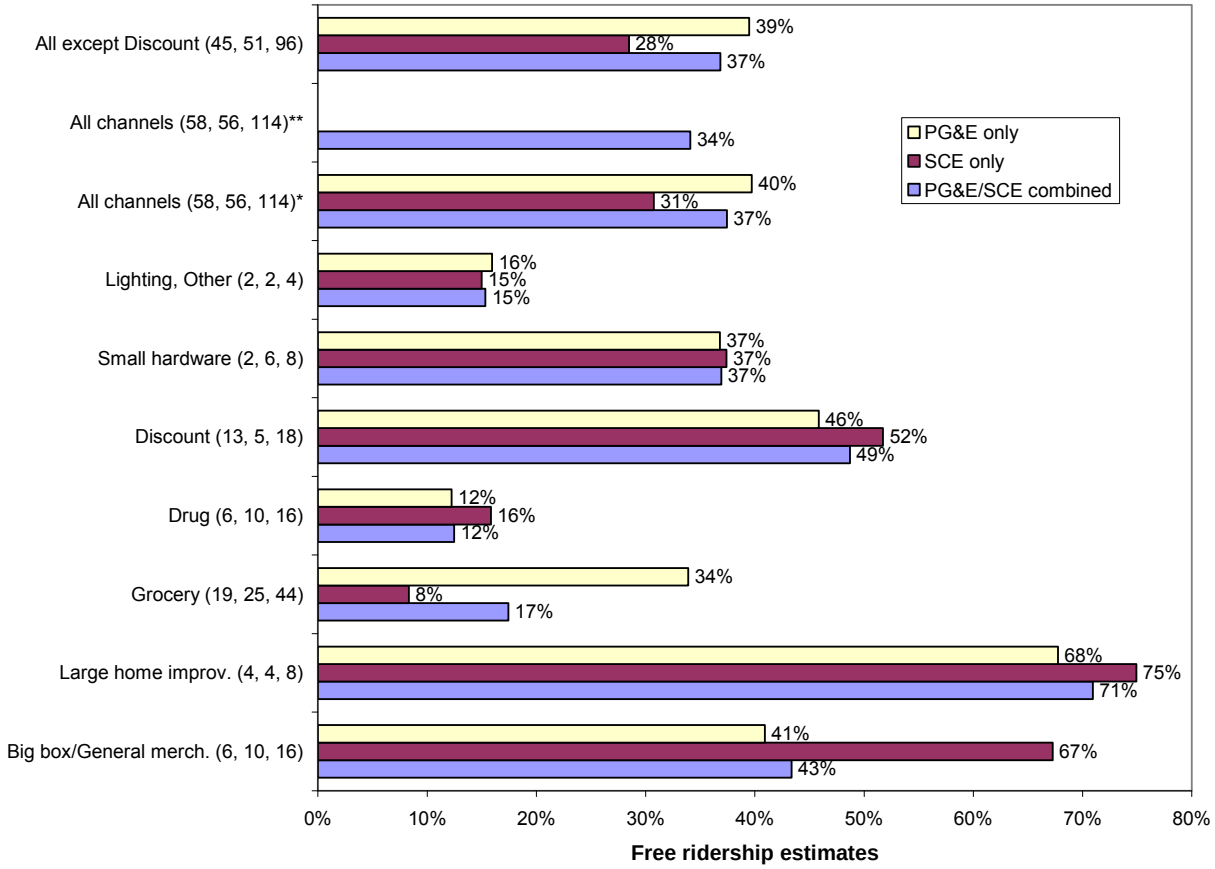
There were few significant differences in these results by channel. In general the Discount, Mass Merchandise, Membership Club, and Small Grocery shoppers were less willing to purchase at least some CFLs at a higher price The Home Improvement and Hardware Channels shoppers were more likely to do so.

Store manager estimates of free ridership

In 2008 we asked the store managers in the PG&E and SCE service territories about the effects on their CFL sales if the ULP discounts had not been available. The following summarize their responses:

- *Free ridership estimates for ULP-discounted non-specialty CFLs:* The sales-weighted free ridership estimates of the store managers in the PG&E and SCE service territories across all retail channels ranged from 34 to 37 percent depending on the sales weighting methodology. This was close to the 38 percent that KEMA estimated in 2007 for the evaluation of the 2004-2005 SFEER program. As Figure 2-1 shows, these free-ridership estimates ranged widely depending on the retail channel. However, it also shows that, with the exception of the Big Box/General Merchandise and Grocery channels, the average free-ridership estimates of the store managers in the PG&E and SCE service territories were pretty similar. The detailed findings in this report discuss possible explanations for the differences between these store manager estimates. This detailed section also discusses possible explanations for differences between these 2008 channel-specific estimates and those that KEMA estimated for the evaluation of the 2004-2005 SFEER program.

Figure 2-1
Non-Specialty CFL Free-Ridership Estimates
from Store Managers in the PG&E and SCE Service Territories
by Retail Channel



Note: *Retail channel weights are based on the distribution of non-specialty ULP CFL sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 non-specialty ULP CFL sales in the PG&E/SCE service territories.

- *Free ridership estimates for ULP-discounted specialty CFLs:* Only 24 store managers provided free-ridership estimates for the specialty CFLs, with 17 of them coming from the PG&E service territory. Overall free-ridership estimates ranged from 29 percent to 49 percent depending on the weighting scheme.

- *Free ridership estimates for ULP-discounted CFL fixtures:* Thirty-four store managers provided free-ridership estimates for CFL fixtures, with almost two thirds of them coming from the PG&E service territory. Overall free-ridership estimates ranged from 35 percent to 51 percent depending on the weighting scheme.

- *Other sales effects of the ULP:* We asked the participating store managers in the PG&E and SCE service territories whether the ULP does anything, besides the discounts, to help them sell CFLs. Across all utilities and all retailer types only about a third of the store managers said that the program was doing this. When they were asked what the ULP was doing besides the discounts to help them sell CFLs, the most common responses included increasing consumer awareness and unspecified types of advertising.

2.1.6. The Disposition of CFLs after the Sales

This subsection summarizes findings from the market actor and customer survey concerning what happens to the CFL after the retail sale. It addresses issues like "CFL leakage," the use of ULP-discounted CFLs in residential vs. nonresidential sockets, CFL installation and storage, CFL removal, and CFL disposal and recycling.

CFL Leakage

As noted, "CFL leakage" is the phenomenon where ULP-discounted lighting products are improperly sold in stores outside of California or on the Internet to non-California buyers. This subsection covers retailer/manufacturer reports on the prevalence of leakage, their opinions on where in the supply chain this leakage is likely occurring, their opinions on the bulk purchase limits introduced in 2007 to help mitigate CFL leakage, how these bulk purchase limits are enforced, procedures to avoid delivering ULP-discounted CFLs to the wrong location, what happens to unsold ULP-discounted products, and the evidence for "internal CFL leakage" where customers belonging to one non-IOU California utility are purchasing ULP-discounted CFLs.

- *Awareness of CFL leakage:* Table 2-1 shows the responses of participating manufacturers and retailers to a number of questions about the prevalence of CFL leakage. It shows that the manufacturers were much more likely to have seen evidence of CFL leakage than retailers. The fact that over half the manufacturers have seen evidence of leakage with their own ULP-discounted products, and a large majority has seen evidence of leakage with ULP-discounted products in general, suggests that leakage is a real phenomenon. However, it is important to note that many of the respondents thought that the volume of ULP-discounted CFLs that were being "leaked" was relatively small.

Table 2-1
Summary of Responses to Questions Related to CFL "Leakage"

Questions	Lighting manufacturers (n=15)	High-level lighting buyers (n=12-15)	Store managers (n=141,42)
Any of your ULP-discounted CFLs sold outside of California?	53%	7%	Not asked
Seen evidence of any ULP-discounted CFLs sold outside of California or on Internet?	87%	7%	Not asked
Would your unsold ULP-discounted CFLs ever be sold outside the IOU or state?	Not asked	8%	0%

- *Where in the supply chain leakage is likely occurring:* We asked the high-level retail lighting buyers and the lighting manufacturers: "There is evidence that some lighting products receiving discounts from the California Upstream Lighting Program are being sold out-of-state or through out-of-state buyers through the Internet. At what point in the supply and distribution chain do you think this might be happening?" The two most common responses were that the leakage was a result of customers reselling the products after buying them at retail or due to retailers trying to get rid of some overstock. In most cases the respondents based this on speculation, although in a few cases it was based on actual instances of leakage.

- *The bulk purchase limits:* In late 2007 the utilities participating in the ULP introduced bulk purchase limits that restricted the number of ULP-discounted lighting products that customers could buy in a single purchase. The main purpose of this bulk purchase limit was to make it more difficult for purchasers to resell bulbs on the Internet to non-California buyers. In addition to introducing these bulk purchase limits, the utilities also told the suppliers participating in the ULP to educate their retailers about the bulk purchase limits and even to monitor their sales figures for indications that certain retailers might not be abiding by the limits.

- *Retailer/manufacturer opinions of the bulk purchase limits:* Nearly all the lighting manufacturers, but only little more than half of the high-level retail lighting buyers, approved of the bulk purchase limits. Most respondents who approved of the limits said that they were necessary to discourage leakage and a couple of them claimed that the limits could reduce "pantry storage" of CFLs by customers. The manufacturers and high-level buyers who disapproved of the bulk purchase limits complained that the limits were too low; that they discriminated again legitimate volume purchasers such as builders and managers of

apartment buildings, motels, or nursing homes; that they discriminated against membership stores that operated on a bulk purchase basis; that they caused the ULP to lose legitimate energy-saving opportunities; and that the CFL leakage problem was overblown.

- *Enforcement of the bulk purchase limits:* Nearly half of the store managers who were aware of the limits said that they remind staff about the bulk purchase limits at regular meetings and about a third said that they program the limits into their cash registers. Most of the high-level buyers said that they are enforcing the limits by informing their stores through bulletins or through direct education of the cashiers. Nearly three quarters of the manufacturers said that they enforce these limits through educating store managers or cashiers. Other enforcement procedures -- cited by at least a quarter of the manufacturers -- included posting the limits on CFL packages/trays or point-of-purchase signage and monitoring retailer sales figures to try to identify evidence of bulk purchase sales.

- *Awareness of the bulk purchase limits and their enforcement:* Table 2-2 shows that while there was a high-level awareness of the bulk purchase limits among the lighting manufacturers and high-level buyers, less than a quarter of these store managers said they were aware of these limits. This indicates that the educational efforts of the suppliers and buyers need to improve dramatically. It also shows that only a little more than half of the high-level lighting buyers were aware that lighting manufacturers were helping to police the bulk purchase limits.

Table 2-2
Summary of Responses to Questions Related to Bulk Purchase Limits According to Lighting Manufacturers, High-Level Buyers, Store Managers

Questions	Lighting manufacturers (n=15)	High-level lighting buyers (n=12-15)	Store managers (n=141,42)
Aware of bulk purchase limits?	100%	93%	23%
Aware that lighting manufacturers are helping to police the bulk purchase limits?	Not asked	57%	Not asked

- *Avoiding misdirected ULP-discounted CFLs:* We asked the lighting manufacturers what safeguards they had in place to insure that CFLs which receive the program stickers and packaging were not sent to retailers that are not participating in the program. Measures that they mentioned to prevent this included using different Universal Product Codes (UPCs) or

Stock-Keeping Units (SKUs) for the ULP-discounted products, shipping directly to the stores, keeping ULP-discounted product and non-ULP-discounted products in separate inventories, giving retailers unique UPCs, and the utility labels on the product packages that can help avoid product misdirection.

- *What happens to unsold ULP-discounted products:* About three quarters of the participating store managers in the PG&E and SCE service territories claimed that they do not face this situation because they sell through all their ULP-discounted CFLs. Only a small percentage said that they allowed unsold ULP-discounted CFLs to leave their stores. High-level buyers identified a wider range of actions for dealing with these unsold ULP-discounted CFLs. They were much more likely than the store managers to say that these unsold might be redistributed to one of their other stores.

- *Evidence of "internal CFL leakage":* "Internal CFL leakage" is the selling of IOU-discounted CFLs to California shoppers who are not customers of that IOU. In some cases these customers might belong to another IOU that is also participating in the ULP. In other cases they may belong to a California municipal or cooperative utility that is not participating in the ULP. ULP staff said that internal CFL leakage is less of a concern because leakage between participating IOUs is bidirectional and therefore likely offsetting. And such bidirectional leakage may also be occurring with non-ULP California utilities – such as SMUD – that have their own CFL rebate programs.

  The shopper intercept surveys found that the incidence of internal leakage was low. Overall, only about three percent of all respondents who purchased CFLs said that they were not an electric customer of the relevant IOU. Among respondents who purchased IOU-discounted CFLs, the "leakage" percentage increased to four percent. There were significant differences by IOU: about 16 percent of respondents who purchased CFLs in SDG&E stores reported that they were not electric customers of SDG&E. The comparable "leakage" percentage is two percent for SCE and one percent for PG&E.

Use of ULP-discounted CFLs in residential vs. nonresidential sockets

The IOUs participating in the ULP are interested in knowing how many ULP-discounted CFLs are installed in residential vs. nonresidential fixtures because it influences how much energy savings they can claim. It is assumed that nonresidential customers would use CFLs for longer hours and more often during periods of peak system load. This subsection summarizes findings from both the market actor and consumer surveys.

- *Evidence from the market actor surveys:* Based on estimates from the store managers in the PG&E and SCE service territories, we calculated that residential customers purchased 78 percent of the ULP-discounted CFLs, nonresidential customers purchased 14 percent, and the remaining eight percent were purchased by builders or contractors for use in construction or retrofit projects. High-level retail lighting buyers and lighting manufacturers estimated that 90-91 percent of the ULP-discounted CFLs were going into residential fixtures.

- *Evidence from the consumer surveys:* Overall, about three percent of revealed preference respondents planned to install the lighting products they purchased in their business and another four percent of the stated preference respondents said that they were shopping for their business. These results do not differ for respondents who purchased/selected CFLs versus incandescent lamps. PG&E respondents said a slightly higher percentage of nonresidential purchasers (4%), as compared to SCE (2%) and SDG&E (0%). As expected, there were some differences by channel – i.e., channels most likely to result in nonresidential CFL purchases include Membership Club, Hardware and Home Improvement. None of the CFLs purchased within the Mass Merchandise channel were intended for nonresidential use.

CFL installation and storage

In the 2008 general population telephone survey 90 percent of the CFL purchasers in the PG&E and SCE service territories said that they have at least one CFL installed either in their homes or in exterior fixtures outside their homes. On average, purchasers reported 10.3 CFLs installed, up from 6.8 CFLs in 2006. The majority (89%) also said that they currently have CFLs installed, and over half (58%) reported that they have CFLs in storage.

CFL purchasers responding to the 2008 survey were more likely to have CFL installed and in storage, as compared to incandescent lamp purchasers. There was no difference between IOU-discounted CFL purchasers and other CFL purchasers. PG&E respondents were most likely to have CFLs installed and in storage. Respondents within the Membership Club channel were more likely to have CFLs installed and in storage; respondents within the Hardware channel were more likely to have CFLs in storage; and respondents within the Mass Merchandise and Large Home Improvement channels were less likely to have CFLs in storage.

In the 2008 general population telephone survey 60 percent of purchasers said that they were storing CFLs. On average, purchasers reported 3.4 lamps in storage, significantly higher than

the average number reported just two years ago (2.5 lamps). Despite the increase in the average number of CFLs stored per household, the ratio of CFLs stored to CFLs purchased was the same in 2008 as it was in 2006. Nearly two-thirds of 2008 respondents who said they were storing CFLs also said they were storing incandescent lamps.

CFL removal

In the 2008 general population telephone survey 20 percent of the CFL purchasers who said they had installed CFLs also said they had removed at least one of these CFLs. More than half of these purchasers said they removed the CFLs because they burned out. On average, CFL purchasers reported removing 0.7 CFLs over time.

CFL disposal and recycling

This subsection summarizes manufacturer and retailer practices concerning CFL disposal and recycling and the CFL disposal/recycling policies that they advocate.

- *Manufacturer practices/positions:* Lighting manufacturers practiced or advocated a wide variety of CFL disposal/recycling policies. CFL disposal/recycling practices named by at least three different manufacturers included educating or encouraging their retailers to recycle (e.g., providing them with in-store recycling bins), developing or actively working with CFL recyclers – whether private or governmental, and providing CFL recycling information on their packaging.

- *Retailer practices:* Only 26 percent of store managers reported offering standard CFL recycling recommendations and only 15 percent said that they offer CFL recycling on site. Of those store managers who said their stores do not currently offer CFL recycling, only 10 percent have ever considering doing so. The store managers who said that they had standard CFL recycling recommendations reported that these included telling customers to take their CFLs to an authorized recycling center, handing out recycling information, and advising their customers not to throw the CFLs into the garbage. Like the store managers, the high-lever buyers reported a low incidence of standardized CFL recycling recommendations for their customers and a low incidence of on-site recycling. Yet the high-level buyers were much more likely to report that their companies were considering on-site recycling (42% vs. 10% for the store managers). This was likely because the high-level buyers are more involved in this decision-making – or at least closer to the corporate decision-makers -- than the store managers are.

2.1.7. Satisfaction with the Program, CFLs

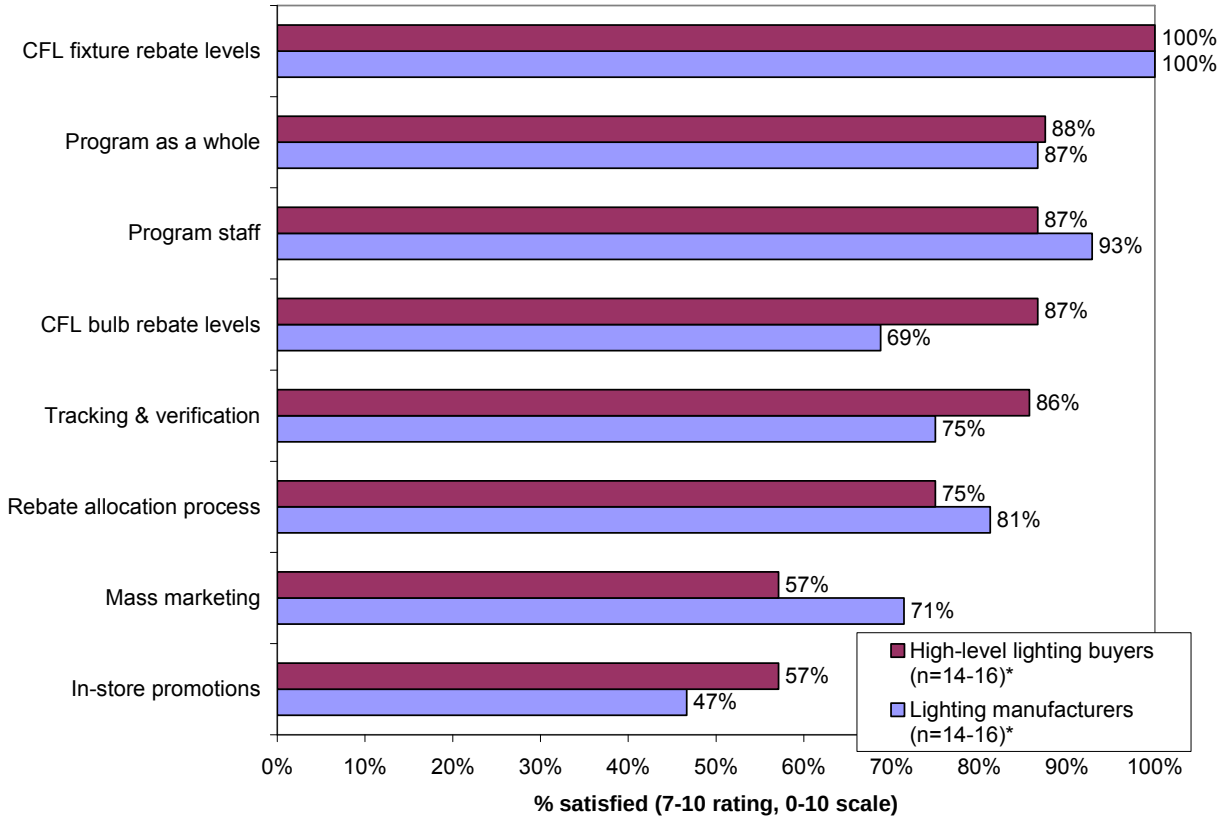
This subsection summarizes findings concerning satisfaction with the ULP processes and program as a whole, recommendations for program improvements made by the participating manufacturers and retailers, and consumer satisfactions with CFLs.

Satisfaction with program processes and the program as a whole

We asked the participating retailers and manufacturers how satisfied they were with the various ULP processes as well as with the program as a whole. This subsection shows the responses of these participating market actors and explains some of their reasons for dissatisfaction.

- *Satisfaction from the high-level lighting buyer and lighting manufacturer perspective:* Figure 2-2 shows the percentage of high-level lighting buyers and lighting manufacturers who were satisfied with the ULP and its processes. In this case, we had them use a zero to ten satisfaction scale in which ten equaled “very satisfied” and zero equaled “very dissatisfied.” We considered ratings of 7-10 to indicate satisfaction. The chart shows that all of the respondents were satisfied with the CFL fixture levels and that both the high-level buyers and the manufacturers gave their lowest ratings for the ULP’s assistance with in-store promotions. It also shows that high-level buyers were much less satisfied than the manufacturers with the ULP’s mass marketing efforts but were much more satisfied with the CFL rebate levels.

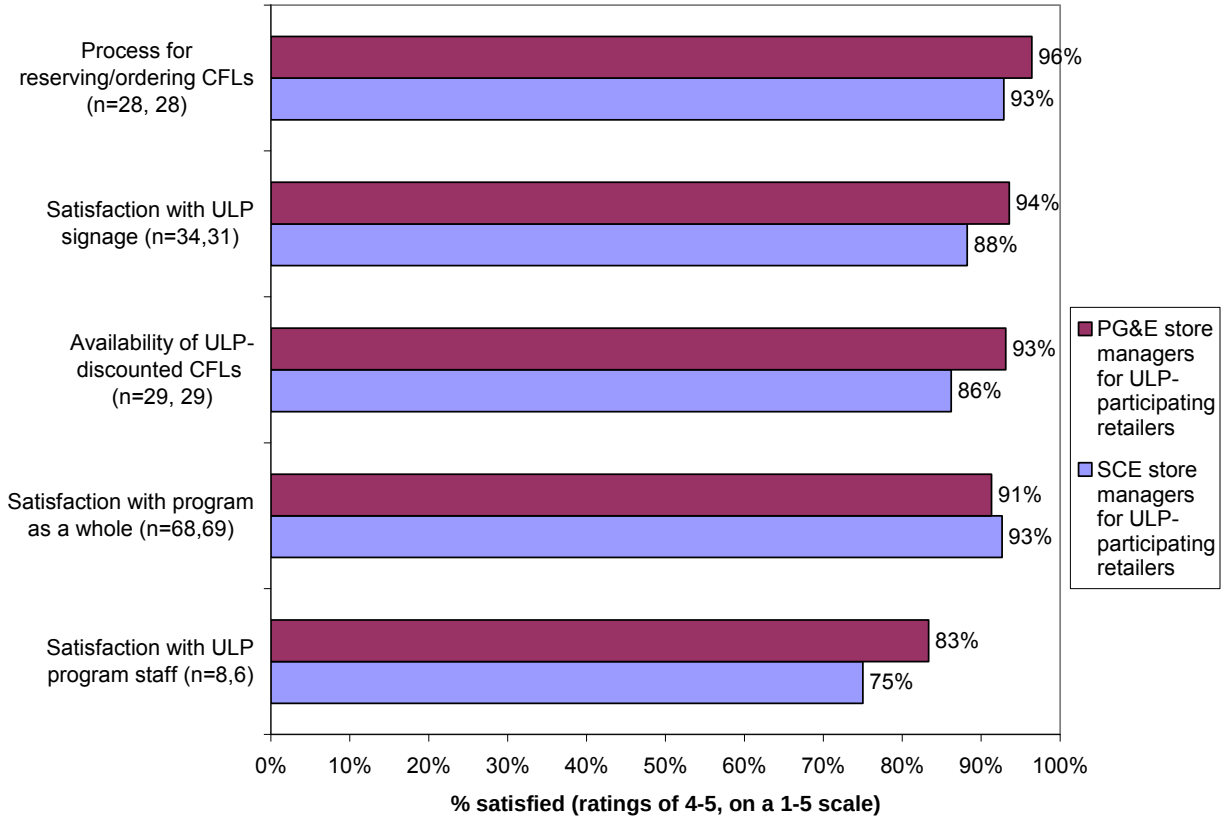
Figure 2-2
Satisfaction with ULP Processes
According to High-Level Lighting Buyers and Lighting Manufacturers



Note: *Sample sizes ranged between 14-16 for all satisfaction ratings except the ratings for CFL fixture rebate levels where the sample sizes were 4 respondents for high-level buyers and 5 respondents for lighting manufacturers.

- *Satisfaction from the store manager perspective:* Figure 2-3 shows the average satisfaction ratings for ULP processes according to the store managers in the PG&E and SCE service territories. In our experience any satisfaction level 90 percent or greater is very good and any satisfaction rating of 80 percent or greater is good. The chart shows that all the satisfaction ratings were in this good to very good range with the exception of the rating of the program staff. However, this last rating may be biased by a self selection effect. Store managers were only asked this question if they said that they had some communication with the ULP program staff. It is likely that store managers who were having some problems with the ULP would be more likely to call the ULP program staff than those who were satisfied with the program.

Figure 2-3
Satisfaction with ULP Processes
According to Participating Store Managers
from the PG&E and SCE Service Territories



- *Areas of concern:* While average satisfaction ratings for most program processes were in the good to very good range, some participating market actors raised issues of concern about some program processes.

  - *The rebate allocation process:* Some high-level buyers complained that they had no input on the ULP rebate allocation process. They thought that the process was too manufacturer-focused and manufactured-driven. Most of the manufacturer complaints revolved around delays in getting ULP allocations approved.

  - *The tracking and verification process:* High-level buyers and manufacturers variously described the ULP tracking and verification process as "cumbersome," "burdensome," "a very labor-intensive process," "a major hassle," and "no fun." Yet there were actually fewer complaints about this process than when we last interviewed these market actors in 2007. This may be due to some reductions in the participants' tracking and verification responsibilities. It also may be due to suppliers and retailers having developed systems or processes to better accommodate these tracking and verification requirements. The high-level buyers and manufacturers gave the utility staff mixed ratings for the enforcement of the bulk purchase rule and other ULP rules.

  - *Rebate levels:* In general, the manufacturers were less happy than the high-level buyers with the ULP rebate levels. This was likely due to the manufacturers' longer average experience participating in the ULP. This meant they knew more about how current incentive levels compare to past ones. A number of manufacturers urged that the incentive levels for specialty CFLs, in particular, be increased, not only to increase sales but also to avoid reductions in quality due to production cost cutting.

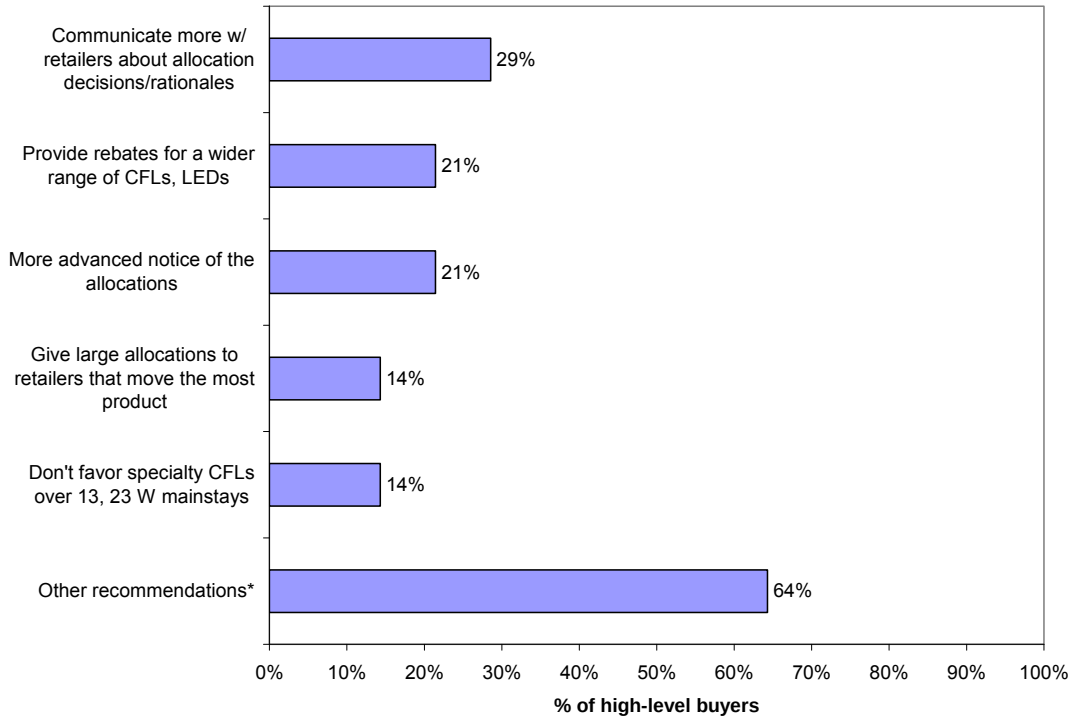
  - *Program mass marketing and in-store promotions:* Both high-level buyers and manufacturers gave their lowest satisfaction ratings for the ULP's mass marketing and in-store promotion efforts. The general nature of the comments was that there was little evidence of mass marketing by the utilities and that the in-store promotions were mostly being done by the manufacturers and retailers with only minimal assistance from the utilities. In fact, the average satisfaction scores would have been much lower if not for the fact that some retailers and manufacturers actually preferred to do their own marketing.

  - *The ULP staff and the program as a whole:* The manufacturers and high-level buyers who interacted with the ULP staff generally had very positive things to say. Yet a few of the high-level buyers complained that the ULP staff talked only to the manufacturers and not to them. In assessing the ULP as a whole, most of the respondents were very positive. They generally thought that the positive aspects of the program outweighed the deficiencies and the sometimes onerous participation requirements.

Recommendations for program improvements from the participating market actors

- *Recommendations from the high-level buyers:* The high-level lighting buyers had many recommendations for program improvements as shown in Figure 2-4. The most-cited recommendation was for the program to communicate more with the high-level buyers about allocation decisions and rationales. The high-level buyers claimed that they often hear about changes in program allocation strategies – such as moving away from multi-packs or moving towards specialty CFLs – long after the decision is made. They believed that if they were involved in these discussions much earlier, they would, at minimum, be better prepared and might be able to suggest more efficient implementation strategies.

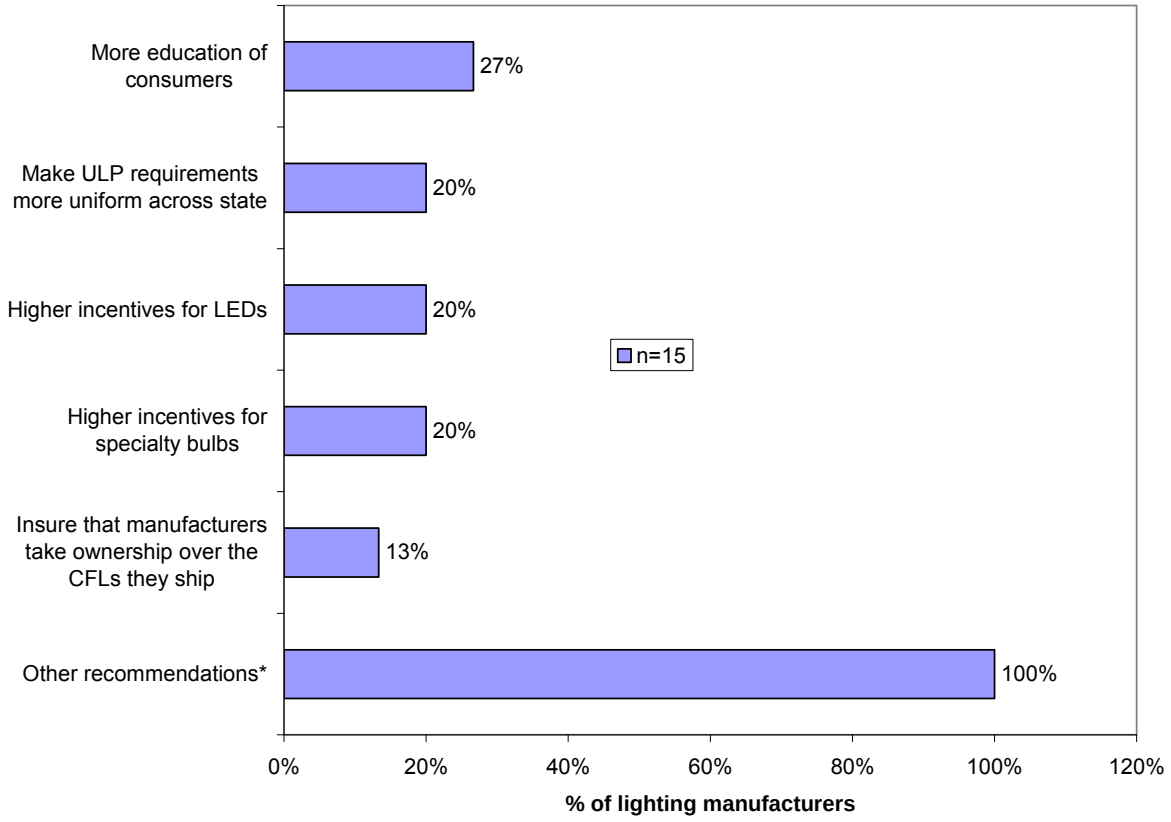
Figure 2-4
Recommendations for Program Improvements from High-Level Lighting Buyers



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other recommendations include: do more coop advertising; have more realistic expectations on how quickly retailers can get ULP products into stores, customize bulk limits for different types of retailers; work with manufacturers to improve the fit, size, brightness of CFL products; provide more customer education; pay rebates on everyday CFL sales not just special promotions; do more bilingual advertising, and have more utility representatives in the stores.

- *Recommendations from the lighting manufacturers:* The lighting manufacturers had even more recommendations for program improvements than the high-level buyers did. Figure 2-5 shows that the most-cited recommendations were more consumer education, more uniformity of ULP requirements across the state (e.g., uniform labels, consistency in LED rebate offerings), and higher incentives for LEDs and specialty CFLs. However, there were over a dozen other recommendations that were each suggested by a single manufacturer.

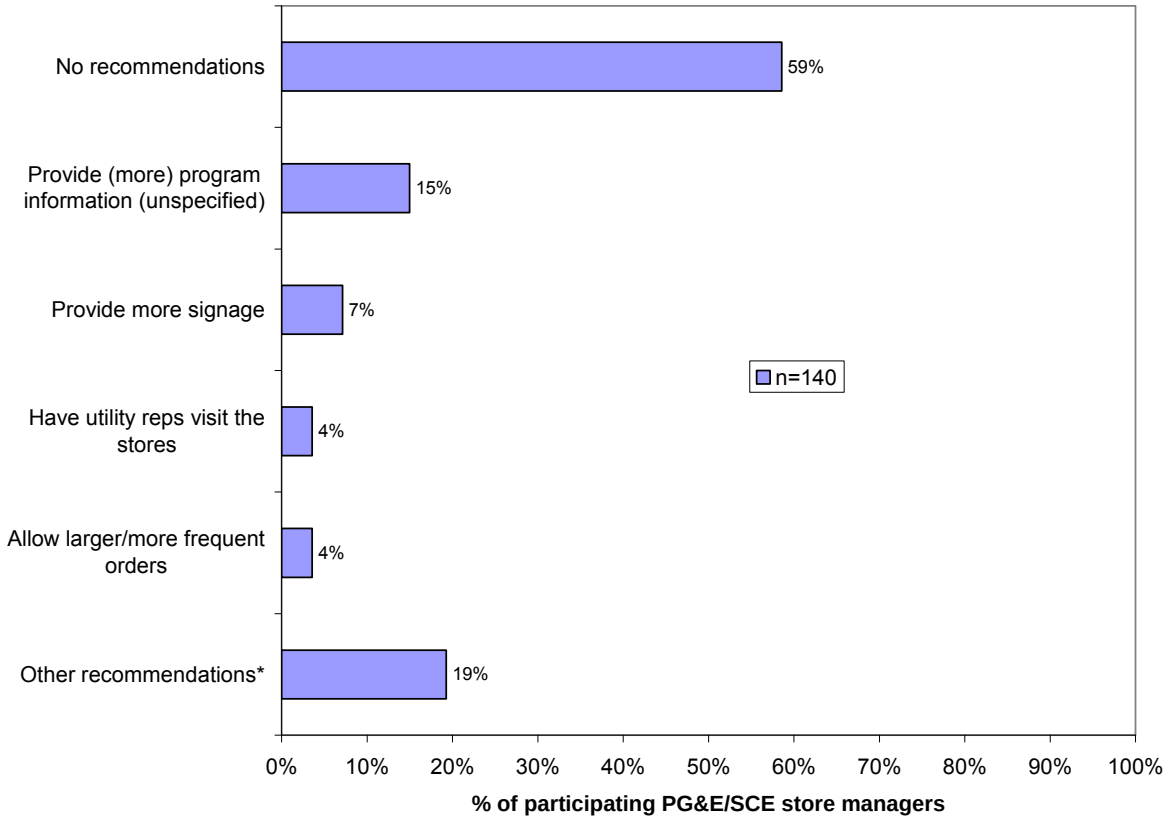
Figure 2-5
Recommendations for Program Improvements from Lighting Manufacturers



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other recommendations include: offer higher incentives for bulbs with higher power factors; offer higher incentives for bulbs with better CRI; offer rebates for a wider range of CFLs; establish maximum sizes for CFLs with a given lumen output; do more in-store marketing; do more mass advertising; do more education of retailers; contract out the development of websites where consumers can purchase utility-approved CFLs; allow municipal utilities to participate in the ULP; don't just work with retailers, work with organizations also; have separate programs for smaller, larger retailers; give larger allocations to small manufacturers; provide more advanced notice of expected allocation sizes; don't push specialty CFLs over non-specialty CFLs; and make the verification process less onerous.

- *Recommendations from the store managers:* Figure 2-6 shows that over half of the store managers did not have any recommendations for making program participation easier. The most common suggestions were to provide or provide more program information (the precise nature of the information was unspecified) and to provide more signage.

Figure 2-6
Ways that the ULP
Could Make it Easier for Retailers to Participate
According to Participating Store Managers
from the PG&E and SCE service Territories



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other recommendations include lowering CFL prices; explaining energy saving / money saving benefits of CFLs; provide lists of participating distributors/wholesalers; provide a better variety of products; provide more free products; standardize the ULP across California; explain the environmental benefits of CFLs; provide information on CFL recycling, provide emails with program updates; use recyclable packaging; provide demonstrations; streamline the ordering process; provide program brochures, make program stickers larger, provide information on other programs, deliver fewer CFLs, do fewer surveys, and make the tracking/verification process less onerous.

Satisfaction with CFLs

CFL satisfaction was moderately high among the 2008 respondents to the general population telephone survey, with an average satisfaction rating of 7.9 out of 10. Of all the CFL attributes, these respondents were most satisfied with the length of life of CFLs. In general, satisfaction with CFLs has improved over time.

2.1.8. Evaluator Recommendations for Improving the ULP

Marketing and Education Recommendations

- *Recommendation #1: Continue mass consumer education about the increased performance and capabilities of newer CFLs and increase point of sale educational information (e.g., how to shop for CFLs, proper matching of CFL types and features with lighting applications).* This will be especially important as the 2010-2011 Upstream Lighting Program puts a greater emphasis on specialty CFLs in its product portfolio. While a greater menu of CFL options is a good thing, it can also lead to consumer confusion.
    - *We recommend that PG&E resume the CFL mass advertising campaigns similar to those it conducted in 2007 and 2008.* These campaigns used television, radio, online advertising, and microsites to educate consumers about the features and capabilities of the newer generation of CFLs.
    - *If PG&E does not have the resources to continue such campaigns, we recommend that they should work with Flex-Your-Power to insure that more ads about increased CFL performance and capabilities are broadcast in the PG&E service territory.*
    - *The PG&E staff should work with CFL suppliers and retailers to develop more creative and eye-catching in-store displays that can educate consumers about CFL benefits, especially the specialty CFLs.* Possible ideas might include in-store lighting education videos (e.g., "how to shop for a CFL"), meters that compare energy consumption of CFLs with incandescents, and lighting displays that show improved lighting quality of new CFL models.
    - *PG&E should consider publicizing any CFL education videos it helps develop to its broad customers base either through emailing the link to these videos to its customers (if it has this capability) or featuring the link on its bill inserts.* Another possibility would be to add a link to its website for any good CFL educational videos that might have been produced by another reputable source.
- *Supporting evidence for this recommendation.*
    - *KEMA evaluations of the 2007 and 2008 PG&E CFL ad campaigns found some evidence that these campaigns may be influencing consumer attitudes towards CFL capabilities.*

- *More consumer education was the most-cited recommendation for improving the Upstream Lighting Program by the lighting manufacturers.*

- *The effectiveness of illuminated CFL displays.* The 2008 survey of 141 participating store managers from the PG&E and SCE service territories found that only 14 percent of store managers said that they used illuminated CFL displays. However, 80 percent of those who used them said that they helped sell CFLs.

- *Awareness/information barriers were top barriers cited by intercept survey respondents.* Overall, 39 percent of the shopper-intercept survey respondents cited some type of awareness/information barrier to CFL purchase that could be potentially overcome with targeted educational and/or outreach strategies.

- *Dissatisfaction with specific CFL design features was the second-most-cited barrier for intercept survey respondents.* Just over one-third of shopper-intercept survey respondents cited some type of specific product design feature as their reason for not purchasing/selecting CFLs. Most common were features such as the way CFLs look and/or fit in fixtures, as well as other aspects of the bulb shape or size. Others mentioned that they needed some a specific type of bulb (e.g., three-way, dimmable, specific wattage) or some other specification (e.g., appliance replacement bulb, outdoor/safety fixture, etc.).

- *Dissatisfaction with product performance was third-most-cited barrier for intercept survey respondents.* Overall, 30 percent of all respondents mentioned some aspect of product performance as their reason for not purchasing/selecting CFLs, the most common of which related to light quality/color.

- *A closer examination of the shopper intercept survey data points to more consumer education as a key need.*

    - Those not considering CFL purchases were more likely to cite product performance barriers. For example, one barrier that could be affecting whether or not respondents would even consider purchasing CFLs relates to perceptions regarding product performance (i.e., light quality/color). Nearly one third of all survey intercept respondents who said that they had not even considered purchasing CFLs (32%) cited product performance barriers, whereas only 23 percent of all respondents who

had considered CFLs cited these reasons. While it is true that overcoming product performance barriers specifically related to light quality/color may require actual improvements in CFL design, it is also highly possible that educational campaigns designed to inform consumers of the availability of CFLs in various light quality/color categories would also be effective in overcoming (mis)perceptions in the market that all CFLs have poor light quality/color characteristics.

- Those not considering CFL purchases were more likely to cite barriers related to "habit," lack of awareness/information, prior (bad) experience with CFLs, and concerns about mercury/disposal. Intercept survey respondents who said that they had not even considered purchasing CFLs were more likely to cite these barriers than those who were considering CFL purchases.

- Those not considering CFL purchases were more likely to cite barriers related to product design features (e.g., lamp shape, size, fit). Intercept survey respondents who said that they had not even considered purchasing CFLs were more likely to cite these barriers than those who were considering CFL purchases.

- These findings are further supported when looking at the differences in barriers to CFL purchase as cited by revealed preference intercept survey respondents versus stated preference intercept survey respondents. Revealed preference respondents (who did not purchase CFLs) were more likely to cite specific barriers related product design (e.g., lamp shape, size, fit) and stated preference respondents (who did not select CFLs in their hypothetical choice experiment) were more likely to cite barriers features related to product performance (e.g., light quality/color). It is possible that these results indicate that consumers who are actively considering purchase decisions may be basing these decisions, at least in part, on the actual characteristics/features of products that they have available to them at the time of purchase. Consumers who are inactively or hypothetically considering purchase decisions may be basing these decisions on perceived or expected characteristics/features that may or may not be accurate or even known/understood.

- *Recommendation #2: Work with Flex-your-Power and PG&E's marketing resources to develop a consumer education campaign to encourage early replacement of incandescent bulbs with CFLs.* While it may be challenging to succinctly explain the economic and environmental benefits of early incandescent replacement in a marketing campaign, we believe that Flex Your Power and the PG&E marketing team have the expertise to accomplish this.

- *Supporting evidence for this recommendation.*

    - *Waiting for incandescent bulbs to burn out was most-cited reason for not purchasing CFLs.* In the PG&E/SCE general population telephone survey, which was conducted in late 2008, we asked respondents who said that they were aware of CFLs but had never purchased them, or had not purchased them recently (most recent purchase before 2006), why they had not purchased CFLs. Their most-cited reason (24% of respondents) was that they were waiting for their existing bulbs to burn out.

    - *Evidence of increased CFL storage levels:* The PG&E/SCE general population telephone found that 60 percent of CFL purchasers said that they were storing CFLs. On average, purchasers reported 3.4 lamps in storage, significantly higher than the average number reported just two years ago (2.5 lamps). The shopper intercept surveys also found that 58 percent of consumers said that they had CFLs in storage.

    - *Early replacement of incandescents with CFLs would have significant energy and environmental benefits.*

- *Recommendation #3: Consider implementing an incandescent bulb trade-in program.* Bulb trade-in programs are another strategy for encouraging early replacement of incandescent bulbs. Puget Sound Energy (http://www.rockthebulb.com/) has developed a bulb trade-in program in which consumers can get free CFLs in exchange for incandescent bulbs. SDG&E also has a lighting Turn-In program (http://www.sdge.com/residential/lightingTurnIn.shtml). While KEMA has not been able to find any evaluations of these programs – likely because they are relatively new -- one major retailer participant in the California Upstream Lighting Report that KEMA interviewed was very enthusiastic about these programs. PG&E staff should conduct telephone interviews with the managers of these Puget Sound Energy and SDG&E programs to get a better understanding of the benefits and challenges of these types of programs.

- *Supporting evidence for this recommendation: See Recommendation #2*

- *Recommendation #4: PG&E should conduct telephone surveys with a random survey of retailers participating in the Upstream Lighting Program to learn why retailers are not retaining Program signage, to get ideas about best practices for in-store promotion of CFLs, and to make them aware of free PG&E signage.*

- *Supporting evidence for this recommendation:*

    - *PG&E staff confirmed the statements of SCE program staff that it has been a serious challenge to get participating retailers to retain Program signage.* In interviews the SCE program staff posited some theories as to why this might be happening – e.g. signage gets removed when CFLs gets moved from displays to shelves. However, they acknowledged that they would like to know more. While one theory might be that the store managers did not like the signage they were receiving, this was not supported by the evidence. In 2008 KEMA surveyed store managers from the PG&E and SCE service territories participating in the Upstream Lighting Program and these store managers gave an average satisfaction rating of 4.4 -- on a five-point satisfaction scale – for the signage that they used for the Program.

    - *Only one third of CFL purchasers recalled seeing point-of-purchase signs/displays, but nearly two thirds of those who recalled them said they were influential in the purchase decision.* In response to the PG&E/SCE general population telephone survey, which was conducted in late 2008, approximately one third of CFL purchasers reported that they saw signs, brochures, displays, or other materials regarding CFLs in the stores during their most recent purchases. However, nearly two-thirds (62%) of those who recalled seeing the point-of-purchase materials said that these materials were either very influential or somewhat influential on their decisions to purchase CFLs.

    - *Less than half of those who purchased a PG&E-discounted CFL were aware that PG&E was offering the discount.* In the shopper intercept surveys, only 47% of the PG&E customers who purchased a PG&E-discounted CFL were aware that PG&E was offering the discount. This low attribution rate may be partly due to the absence of point-of-purchase signage.

- *Only a fifth of participating store managers were aware that the utilities provide free Program signage.* The 2008 survey of 141 participating store managers from the PG&E and SCE service territories found that only 21 percent said they knew that the utilities participating in the ULP provided free signage.

- *Collecting information about best practices for in-store CFL promotions would benefit future program in-store marketing efforts.*

- *Recommendation #5: Work with other California utilities to organize a workshop to discuss best practices for CFL promotion and education.* Ideally this workshop would involve a large range of CFL stakeholders including utilities, Local Government Partnerships, LGPs, third-party program managers, regulators, evaluators, manufacturers, retailers, etc. Topics would include best practices for CFL product merchandising, consumer education, in-store product promotions, etc. Special attention should be given to promotion and education for specialty CFLs.

Program Process/Design Recommendations:

- *Recommendation #6: Continue to be careful about introducing new technologies like dimmable CFLs or LED products, which may not yet provide the level of performance that consumers expect. Work with other IOUs to try to fund "secret shopper" quality testing efforts similar to those conducted by the PEARL program in the past.* Both PG&E and SCE program staff said that they are concerned about the quality of the CFL or LED products that they introduce into the Upstream Lighting Program and they do some limited in-house testing to appraise new products. However, they also acknowledged that their internal quality control resources are inherently limited and substandard products have slipped through their screening procedures in the past. In the past PG&E and SCE have been co-sponsors of the Program for the Evaluation and Analysis of Residential Lighting (PEARL). This program did random testing of CFL products taken from the retail shelves. Although the new Energy Star standards (version 4.0) do have product testing requirements, the current system does have some potential for misuse. For example, although lighting manufacturers must send their bulbs for testing to unaffiliated and NVLAP-certified laboratories, they choose which bulbs are sent to these labs. Since most of the manufacturers own labs to do their own internal testing, they can insure that they only submit products to the independent labs that have been successfully tested internally. This is in contrast to the PEARL program in which bulbs were randomly pulled off of retail shelves. Because lab testing is very

expensive, any effort to reproduce the PEARL testing procedures would have to be a collaborative effort. Finally, because some CFL "quality" problems may be due to consumers putting the wrong CFL products in the wrong sockets, some of the consumer education efforts recommended above should also help reduce the incidence of complaints about CFL performance.

- *Supporting evidence*
    - *Interviews with lighting manufacturers/retailers who participated in the Upstream Lighting Program, indicated that some dimmable products that the Program has rebated in the past did not provide good performance.*
    - *In a recent (July 2009) interview, one very large retailer participating in the Upstream Lighting Program reported that LED products accounted for a large percentage of the company's lighting product returns, even though they accounted for a small percentage of lighting product sales. The most common complaint was inadequate brightness.*
- *Recommendation #7: Use price data from the shelf surveys to inform decisions about determining specialty CFL incentive levels.* Using this price data in this way should allow the Upstream Lighting Program to reduce incentive payments to specialty CFL products that require a lesser subsidy and redistribute these incentive dollars to specialty CFl products that require a greater subsidy. However, any analysis should be based on shelf survey data that had been properly weighted to reflect actual product sales.
- *Supporting evidence*
    - *KEMA's analysis of the shelf survey data found that the average discounted price for some types of specialty CFLs, such as globes and reflectors, were actually lower than their incandescent equivalents and in some cases were significantly lower.* For example, the average price of a non-discounted CFL globe was $4.93 (n-330), the average price of a ULP-discounted CFL was $1.06 (n=65), and the average price of an incandescent globe was $2.01 (n=1,692). We believe that because CFLs offer significant energy savings over incandescents, consumers will be willing to pay a small premium for them. Therefore PG&E could reduce the incentive payments for these CFL globes and redistribute the incentives to other specialty CFL products – such as dimmables or A-lamps – where the discounted CFL products are more than

twice as expensive as their incandescent equivalents. It should be cautioned, however, that these average prices are straight averages of the different prices found on the products on the shelves and have not yet been weighted based on sales estimates.

- *Recommendation #8: Continue to rebate bare spiral CFLs but only within selected retail channels.* We believe that there is still justification for the Upstream Lighting Program to provide discounts for bare spiral CFLs within selected retail channels. We have grouped these channels in to the following categories:
    - Discount, Small Grocery, and Small/Rural Hardware stores
    - Drug, Large Grocery Stores

  At the same time, we believe that free ridership concerns make it questionable whether the Upstream Lighting Program should continue to offer rebates for CFLs in channels such a Large Home Improvement, Mass Merchandise, and Membership Clubs. These concerns include high free ridership estimates for these channels from upstream market actors, evidence of large volumes of non-ULP sales, and well-publicized national sustainability initiatives by some of these retailers. It is for many such reasons that the Northwestern region has already removed CFL incentives for "Big Box" stores.

  It is important to note, however, that due to federal lighting efficacy regulations that will go into effect in 2012, any continued subsidization of CFLs will be a short-term strategy.

- *Supporting evidence:*
    - *Discount, Small/Ethnic Grocery, and Small/Rural Hardware stores*
        - These retail channels tend to have either no CFL sales or limited non-program CFLs sales when ULP discounts are not available. Therefore their reported free ridership levels tend to be lower – based both on supplier and end user self reports.
        - These retail channels provide CFLs to hard-to-research sectors (low-income, ethnic, and rural) with minimal retailer cannibalization (taking CFL sales away from other retail stores).

        - Participating lighting manufacturers and retailers indicated that these channels were the ones where the economic downturn was most likely to encourage customers to switch back from CFLs to incandescent bulbs due to the lower incandescent price points.

    - *Drug, Large Grocery Stores*

        - *These channels tend to have lower free ridership levels.* This is partly due to the fact that these stores have smaller lighting sections than large home improvement or big box stores. These smaller sections likely make it easier for customers to compare CFLs prices with incandescent products. However, because shoppers who shop in these stores also shop in large home improvement and membership club stores, providing ULP discounts in these drug and grocery stores will likely lead to some cannibalization of CFL sales from these other store types.

- *Recommendation #9: The PG&E program should continue to monitor for CFL leakage as long as current efforts are not overly taxing program resources.* "CFL leakage" refers to the phenomenon that some of the CFL products being discounted by the ULP have been discovered for sale on the Internet or by retailers outside of California. PG&E current efforts to discourage CFL leakage include.

    - *Educating manufacturers and retailers on the bulk purchase limits.* These limit how many ULP-discounted lighting products that consumers can get in a single purchase. They are designed to make it more difficult for consumers to try to resell large quantities of ULP-discounted products.

    - *Using its Central Inspection Team to monitor websites for improper sale of ULP-discounted lighting products.* Members of the inspection team search website for PG&E-stickered ULP-discounted lighting products. If they discover such product, they pose as consumers and have it shipped to an out of state address and then these products are shipped back to PG&E for review. PG&E also instructs the relevant lighting manufacture to work with the web site owner to remove the stickered product. This is done on a monthly basis.

- *Secret shopper visits.* PG&E has members of its Photo Verification Team do "secret shopper" visits to retailers to see if they can purchase bulk quantities of product. If they can, PG&E notifies the manufacturer and retailer of the bulk purchase requirements. If the retailer is found a second time to be violating these bulk-purchase limits, the retailer is removed from the ULP program.

When KEMA presented the interim process evaluation findings to PG&E staff in March 2009, we pointed out that some retailers objected to the “one size fits all” nature of the bulk purchase limit and urged that the California IOUs use more flexibility in the enforcement of these bulk purchase limits. For example, representatives of membership club stores argued that their customers paid annual fees specifically for the purpose of buying goods in bulk. Representatives of large home improvement stores also claimed that they have a lot of contractor or small business customers who need to purchase CFLs in bulk. In the March 2009 presentation we also showed that despite the claims of manufacturers and high-level retail buyers that they were educating their store managers about the bulk purchase limits, only 23 percent of the store managers reported being aware of the bulk purchase limits. This suggested that the bulk purchase limit might be difficult and costly to enforce.

In July 2009 the three California IOU program managers decide to introduce some flexibility in the enforcement of the bulk purchase limits. New language in the manufacturer agreements would leave requirement of the bulk purchase limits to the discretion of each IOU and allow the removal of the bulk purchase limits on a case-by-case basis. We think that allowing greater flexibility in the enforcement of the bulk purchase limits is a reasonable policy.

- *Supporting evidence:*

  - *There was a general sentiment among participating lighting manufacturers and high-level retail buyers that the CFL leakage problems have dissipated due to better monitoring of Internet sales as well as the bulk purchase limits.* Although a majority of these manufacturers and buyers did recall at least one incidence of CFL leakage, they generally indicated that the quantity of leaked bulbs was very small.

  - *As noted, despite the claims of manufacturers and high-level retail buyers that they were educating their store managers about the bulk purchase limits, only 23 percent of the store managers reported being aware of the bulk purchase limits. This suggested that the bulk purchase limit might be difficult and costly to enforce.*

- *Recommendation #10: Keep retailers more informed about planned changes in ULP allocation strategies and the rationale for these decisions.* Give both manufacturers and more retailers more advanced notice of changes in program strategy.

- *Supporting evidence: This was the most-cited recommendation for ULP program improvement from the high-level retail buyers.* They claimed that they often hear about changes in program allocation strategies – such as moving away from multi-packs or moving towards specialty CFLs – long after the decision is made. They believed that if they were involved in these discussions much earlier, they would, at minimum, be better prepared and might be able to suggest more efficient implementation strategies. In recent (June/July 2009) interviews with lighting manufacturers, some manufacturers also expressed frustration with the decision of PG&E and SCE in early 2009 to use the bridge funding allocations primarily for non-specialty CFL bulbs. They said that this represented a mixed message compared to what the IOUs had been saying in late 2008 – that the ULP would shift towards a greater emphasis on specialty CFLs. This shift in program allocation strategy also caused logistic problems for some of the CFL suppliers.

- *Recommendation #11: Use program satisfaction and other program indicators identified in this report as benchmarks to track future program performance.* In addition to the program satisfaction indicators and free ridership information, other possible indicators that might be used as program metrics include:

    - The percentage of purchasers of PG&E-stickered ULP products who are aware (based on shopper intercept surveys) that PG&E provided the discounts,

    - The percentage of specialty CFLs rebated by the program,

    - The percentage of lighting products discounted through certain retail channels (see Recommendation #8), and

    - The percentage of store managers who are aware of the bulk purchase limits.

2.2. Detailed Findings from Upstream Market Actors

2.2.1. Purpose, Scope, and Methodology

This section describes the purpose, scope, and methodology for the findings from our process evaluation of the California's Upstream Lighting Program (ULP) that are derived from surveys and in-depth interviews with lighting manufacturers, high-level retail lighting buyers, and retail store managers.

2.2.2. Purpose and Scope

Key topics covered in this report include:

- What types of CFL products that lighting retailers sell including whether they sell CFL products not discounted by the ULP;
- Participant market actor estimates of what proportion of the ULP-discounted CFL products they sold were being installed in residential vs. nonresidential fixtures;
- What factors are limiting consumer demand for CFLs;
- Where retailers get their CFL products from and their processes for ordering ULP-discounted CFL products;
- How long it takes for manufacture, shipment, warehousing and retail delivery of ULP-discounted CFLs;
- Problems with the delivery of ULP CFLs;
- Processes for stocking CFLs;
- How long it takes to sell through a shipment of ULP-discounted CFLs and what retailers do when they sell through their ULP-discounted lighting products;
- What happens to unsold ULP-discounted products;
- Strategies for pricing CFLs including free CFLs received from the ULP;
- Average price differences between ULP-discounted and non-program CFLs;

- In-Store CFL promotional practices;
- Free-Ridership estimates for non-specialty CFLs, specialty CFLs, and CFL fixtures;
- Other sales effects of the ULP;
- Satisfaction with program processes;
- Recommendations for program improvements; and
- Leakage of CFL products outside the ULP service territories.

2.2.3. Methodology

This subsection describes our sampling strategies for the three surveys/interviews.

The store managers

Our sampling strategy for the survey of participating store managers from the PG&E and SCE service territories began with the compilation of lists of unique retail stores participating in the PG&E and SCE versions of the ULP. We compiled these lists from the tracking databases of these programs. We then grouped the retailer stores under the retail channel strata (Big Box/General Merchandise, Large Home Improvement, Grocery, Drug, Discount, Small Hardware, Lighting/Other) that we had developed for the evaluation of the 2004-2005 Single-Family Energy-Efficiency Rebate (SFEER) Program. For retail strata such as Grocery, Drug, and Discount – where there were numerous stores – we also developed substrata based on the sizes of the retail chains within these strata. If these chain-size-based substrata contained a sufficient number of retail stores we kept them as distinct substrata. If they did not contain a sufficient number of retail stores, we merged them into a larger stratum or substratum. We also separated the Small Hardware stores into affiliated (e.g., ACE/ True Value) and independent strata.

To determine the number of surveys to complete for each retail stratum or substratum, the evaluators considered a number of possible measures of program activity including:

- Number of participating stores/store managers;
- Number of CFL product packages sold; and

- Number of CFL bulbs/fixtures sold.

- Table 2-3 and Table 2-4 show how the different retail strata and substrata were represented for each one of these measures of program activity in both the PG&E and SCE service territories.

Table 2-3
PG&E Lighting Retailers Participating in the Upstream Lighting Program (2006-2007) by Retail Channel with Various Program Activity Measures

Stratum	Retail Type	% of Stores	% of Bulbs/ Fixtures	% of Packages
1	Big Box - Costco	2%	29%	10%
2	General Merch. - Wal-Mart	3%	5%	9%
3	Discount	10%	12%	18%
4	Drug	32%	11%	6%
5	Large Chain Grocery	21%	11%	14%
6	Small Grocery	14%	13%	23%
7	Large Home Improvement	8%	8%	7%
8	Lighting, Other Retail	2%	2%	4%
9	Independent Small Hardware	4%	4%	6%
10	Small Hardware - Affiliated	5%	3%	4%
		100%	100%	100%

Table 2-4
SCE Lighting Retailers Participating in the Upstream Lighting Program (2006-2007) by Retail Channel with Various Program Activity Measures

Stratum	Retail Type	% of Stores	% of Bulbs/ Fixtures	% of Packages
11	Big Box - Costco	2%	7%	3%
12	General Merch. - Wal-Mart	3%	6%	7%
13	Large Discount	12%	14%	14%
14	Small Discount	5%	9%	13%
15	Drug	26%	4%	3%
16	Large Chain Grocery	30%	17%	13%
17	Small Grocery	11%	26%	31%
18	Large Home Improvement	8%	12%	9%
19	Lighting, Other Retail	2%	3%	4%
20	Independent Small Hardware	0%	1%	1%
21	Small Hardware - Affiliated	2%	2%	2%
		100%	100%	100%

There are good arguments for using each one of these measures of program activity. The store managers were the ones being interviewed, so it could be argued that the number of participating stores/store managers should be used to determine the target number of surveys for each retail stratum or substratum. Yet since the survey addresses free ridership, it is important that any free-ridership estimates be based on a significant volume of CFL sales. Table 2-3 shows that while the Big Box stratum only accounts for two percent of PG&E's participating stores during the 2006-2007 periods, it accounted for 29 percent of the CFL bulbs/fixtures discounted by the Upstream Lighting Programs during this period. Therefore using only the number of participating stores/store managers as the weighting criterion would result in the Big Box stratum being significantly underrepresented. And should CFL sales be based on the number of packages sold or the number of bulbs/fixtures? Once again it's not clear. Consumer purchase decisions are made at the package level and yet the energy savings for the Upstream Lighting Programs are based on the number of bulbs or fixtures.

Because there are good arguments for using each one of these measures of program activity as the unit of analysis and because using only one might lead to the overrepresentation or under-representation of a given retail stratum (see Table 2-5 and Table 2-6), we decided to use all three. The number of target completed surveys for each stratum was based on the straight average of the percentage shares that each stratum had for each one of the three measures of program activity.

Table 2-5
Sample Frame for
Participating PG&E Lighting Retailers

		# of Stores		# Completes	
Stratum	**Retail Type**	**Number**	**Percent**	**Target**	**Obtained**
1	Big Box - Costco	38	2%	9	10
2	Big Box - Wal-Mart	49	3%	5	5
3	Discount	188	10%	9	8
4	Drug	581	32%	11	11
5	Large Chain Grocery	378	21%	11	11
6	Small Grocery	256	14%	12	12
7	Large Home Improvement	138	8%	5	5
8	Lighting, Other Retail	44	2%	2	2
9	Independent Small Hardware	73	4%	3	3
10	Small Hardware - Affiliated	90	5%	3	3
		1,835	100%	70	70

Table 2-6
Sample Frame for
Participating SCE Lighting Retailers

		# of Stores		# of Stores Released in First Wave	# Completes	
Stratum	**Retail Type**	**Number**	**Percent**	**Number**	**Target**	**Obtained**
11	Big Box - Costco	32	2%	32	3	3
12	Big Box - Wal-Mart	53	3%	40	4	4
13	Large Discount	222	12%	90	9	9
14	Small Discount	93	5%	70	7	7
15	Drug	490	26%	70	7	7
16	Large Chain Grocery	562	30%	140	14	14
17	Small Grocery	209	11%	160	16	18
18	Large Home Improvement	144	8%	60	6	5
19	Lighting, Other Retail	36	2%	20	2	2
20	Independent Small Hardware	8	0%	8	1	1
21	Small Hardware - Affiliated	33	2%	10	1	1
		1,882	100%	700	70	71

The high-level retail lighting buyers

For the interviews of the high-level retail lighting buyers we attempted to interview every retailer who represented a significant volume of CFL sales through the ULP (at least 100,000 units). We compiled our target contact list from the ULP tracking data with PG&E and SCE providing some of the contact names. We went after these high-volume participants for a number of reasons including:

- For the free ridership calculations we wanted to insure that the ULP sales represented by our completed interviews accounted for a large percentage of the total program sales;

- Because many of the questions in the interview guide addressed “big picture” issues -- such as California CFL market trends, market effects, and product trends -- we wanted to make sure that the respondents had the broad market experience to intelligently address these issues; and

- We believed that the store manager survey adequately addressed the perspective of the smaller ULP participants.

Based on 2006-2007 ULP tracking data, we calculated that the 16 participating high-level buyers that we completed interviews with accounted for over 70 percent of ULP sales.

The lighting manufacturers

For the interviews of lighting manufacturers we went after the whole universe of participating manufacturers. We compiled our target contact list from the ULP tracking data with PG&E and SCE providing some of the contact names. Based on 2006-2007 ULP tracking data, we calculated that the 16 participating high-level buyers that we completed interviews with accounted for over 90 percent of ULP sales.

2.2.4. Characteristics of the Lighting Products and Lighting Customers

This section describes the types of lighting products that the store managers said that they sold. It also summarizes their opinions on what proportion of the ULP-discounted CFL products they sold were being installed in residential vs. nonresidential fixtures.

Selling Specialty CFLs

We asked the store managers whether they sold specialty CFLs such as dimmables, 3-way, or reflector CFLs. Table 2-7 shows that half the participating store managers from the PG&E and SCE service territories said that they did. Across all channels store managers in the PG&E service territory were much more likely (61%) to report selling specialty CFLs than store managers in the SCE service territory (39%). A large majority of the Big Box/Mass Merchandise, Large Home Improvement, Small Hardware, and Lighting/Other stores sold these specialty CFLs. Half of the Drug stores also sold specialty CFLs. However, only a minority of the Large Grocery, Small Grocery, and Discount stores sold these products.

Table 2-7
Whether Participating Lighting Retailers from the PG&E and SCE Service Territories Sold Specialty CFLs According to Store Managers

Sell specialty CFLs?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
	PG&E/SCE Combined								
Yes	50%	95%	100%	28%	30%	50%	17%	88%	100%
No	45%	5%	0%	56%	70%	44%	79%	13%	0%
DK/Refused	4%	0%	0%	16%	0%	6%	4%	0%	0%
Sample size	141	22	10	25	30	18	24	8	4
	PG&E								
Sell specialty CFLs?	**All Stores**	**Big Box/ MM**	**LHI**	**Large Grocery**	**Small Grocery**	**Drug**	**Discount**	**Small Hardware**	**Lighting/ Other**
Yes	61%	100%	100%	45%	33%	55%	13%	83%	100%
No	36%	0%	0%	45%	67%	36%	88%	17%	0%
DK/Refused	3%	0%	0%	9%	0%	9%	0%	0%	0%
Sample size	70	15	5	11	12	11	8	6	2
	SCE								
Sell specialty CFLs?	**All Stores**	**Big Box/ MM**	**LHI**	**Large Grocery**	**Small Grocery**	**Drug**	**Discount**	**Small Hardware**	**Lighting/ Other**
Yes	39%	86%	100%	14%	28%	43%	19%	100%	100%
No	55%	14%	0%	64%	72%	57%	75%	0%	0%
DK/Refused	6%	0%	0%	21%	0%	0%	6%	0%	0%
Sample size	71	7	5	14	18	7	16	2	2

Selling CFL Fixtures

We also asked the store managers whether they sold CFL fixtures; Table 2-8 shows that almost half of them said that they did. When the responses from the store managers in the PG&E and SCE service territories were combined, two thirds or more of the store managers in the Large Home Improvement, Lighting/Other, Big Box/Mass Merchandise, and Discount channels reported selling CFL fixtures.

Table 2-8
Whether Participating Lighting Retailers from the PG&E and SCE Service Territories Sold CFL Fixtures

	PG&E/SCE Combined								
Sell CFL fixtures?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	45%	68%	90%	16%	27%	22%	67%	50%	75%
No	52%	32%	0%	76%	73%	78%	33%	38%	25%
DK/Refused	3%	0%	10%	8%	0%	0%	0%	13%	0%
Sample size	141	22	10	25	30	18	24	8	4
	PG&E								
Sell CFL fixtures?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	56%	80%	80%	27%	42%	18%	100%	50%	100%
No	40%	20%	0%	64%	58%	82%	0%	33%	0%
DK/Refused	4%	0%	20%	9%	0%	0%	0%	17%	0%
Sample size	70	15	5	11	12	11	8	6	2
	SCE								
Sell CFL fixtures?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	34%	43%	100%	7%	17%	29%	50%	50%	50%
No	65%	57%	0%	86%	83%	71%	50%	50%	50%
DK/Refused	1%	0%	0%	7%	0%	0%	0%	0%	0%
Sample size	71	7	5	14	18	7	16	2	2

Selling Non-Program Discounted CFLs

We asked the store managers whether their stores sold spiral CFLs that had not been discounted by the PG&E/SCE ULP Programs. According to their responses over half (56%) of the retail stores sell non ULP-discounted spiral CFLs (Table 2-9). However, the table also shows that the retail channels differ a lot in terms of the percentage of their stores which sell "non-program" bulbs. All Large Home Improvement, Small Hardware, and Lighting/other store managers reported selling non-program bulbs. A majority of Big Box/Mass Merchandise, Large Grocery, and Drug store managers also reported selling these non-program bulbs. Only in the Small Grocery and Discount channels did a minority of store managers report selling non-program bulbs.

Table 2-9
Whether Participating Lighting Retailers from the PG&E and SCE Service Territories Sold Non ULP-Discounted Spiral CFLs

Sell non-ULP-discounted CFLs?	PG&E/SCE Combined								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	56%	64%	100%	71%	14%	78%	29%	100%	100%
No	40%	27%	0%	21%	86%	22%	67%	0%	0%
DK/Refused	4%	9%	0%	8%	0%	0%	4%	0%	0%
Sample size	139	22	10	24	29	18	24	8	4
Sell non-ULP-discounted CFLs?	PG&E								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	59%	53%	100%	70%	25%	91%	0%	100%	100%
No	36%	33%	0%	20%	75%	9%	100%	0%	0%
DK/Refused	4%	13%	0%	10%	0%	0%	0%	0%	0%
Sample size	69	15	5	10	12	11	8	6	2
Sell non-ULP-discounted CFLs?	SCE								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	53%	86%	100%	71%	6%	57%	44%	100%	100%
No	44%	14%	0%	21%	94%	43%	50%	0%	0%
DK/Refused	3%	0%	0%	7%	0%	0%	6%	0%	0%
Sample size	70	7	5	14	17	7	16	2	2

Sales to Residential vs. Nonresidential Customers

In the survey we asked the store managers the following questions:

- Can you estimate what percentage of the customers buying CFLs in your store are buying these bulbs for their own home or business and which percentage are builders or contractors buying them for construction or retrofit projects?

- [IF YES] What's your estimate of this breakdown?

- [If estimate provided] Of the customers who are buying CFLs in your store for their own home or business can you estimate what percentage are buying CFLs for their home vs. for their business?

- [IF YES] What's your estimate of this breakdown?

Seventy-eight out of the 141 participating store managers in the PG&E and SCE service territories provided estimates in response to these questions. We weighted their responses

based on the volume of ULP-discounted CFLs sold through their stores. As a result, we calculated that residential customers purchased 78 percent of the rebated CFLs sold by participating retailers and nonresidential customers purchased 14 percent. The remaining eight percent are purchased by builders or contractors for use in construction or retrofit projects. We do not know the extent to which CFLs purchased by builders or contractors are eventually installed in residential vs. nonresidential applications. Therefore, we estimated the range of residential installations to be between 78 and 86 percent. The overall results are slightly different for PG&E vs. SCE, as shown in Table 2-10.

Table 2-10
Estimated Proportion of ULP-Discounted Bulbs Sold to Various Customer Types According to Participating Store Managers from the PG&E and SCE Service Territories

	PG&E (n=40)	SCE (n=38)
Residential	79%	76%
Nonresidential	13%	16%
Builders/Contractors	8%	8%

As expected, there is considerable difference by retail channel, as shown in Table 2-11.

Table 2-11
2008 Participating Store Managers
Estimated Proportion of ULP-Discounted Bulbs
Sold to Various Customer Types
by Retail Channel

Retail Channel	n	Residential			Nonresidential			Builder/Contractor		
		Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.
Big Box – Costco	6	79%	56%	86%	13%	5%	25%	8%	2%	20%
Big Box – Wal-Mart	2	66%	65%	70%	26%	0%	35%	7%	0%	30%
Large Discount Chain	6	60%	6%	90%	17%	5%	34%	23%	0%	75%
Medium Discount Chain	4	85%	79%	100%	14%	0%	20%	0%	0%	1%
Small/Independent Discount	4	57%	25%	95%	20%	5%	25%	24%	0%	50%
Drug	7	85%	56%	100%	8%	0%	19%	7%	0%	25%
Large Chain Grocery	15	76%	35%	95%	15%	0%	30%	9%	0%	50%
Small Grocery	21	85%	60%	100%	12%	0%	40%	2%	0%	20%
Large Home Improvement	5	41%	3%	74%	23%	15%	30%	36%	0%	70%
Small Hardware – Affiliated	4	80%	67%	81%	15%	9%	29%	6%	1%	10%
Independent Small Hardware	2	60%	40%	70%	40%	30%	60%	0%	0%	0%
Lighting Stores	2	20%	10%	38%	14%	13%	15%	66%	50%	75%

As shown, the weighted average for home improvement stores indicates that builders/contractors and nonresidential customers purchase a much higher percentage (59%) of ULP-discounted CFLs. However, responses from only five of these stores were available for this analysis and there was a fairly wide range of responses to the first question.

In addition, as expected, residential sales are highest for small grocery (85%, n=21) and drug stores (85%, n=7). Nonresidential sales are highest for independent small hardware (40%, n=2), and builder/contractor sales are highest for lighting stores (66%, n=2). When combined, residential sales via any type of discount store (i.e., large chains such as Big Lots, 99 Cent Only and Dollar Tree, as well as medium-sized chains and independent discount stores) are 67 percent (n=14). Nonresidential sales are 16 percent and sales to builders/contractors are 17 percent.

In evaluating these estimates, it is a reasonable question to ask how retailers could know whether their customers were buying CFLs for residential or nonresidential uses. We did ask the retailers that provided estimates of this breakdown: "What information is your estimate based on?" The most common responses were that their observations were either based on the volume of CFLs that they saw customers purchasing or were variations of the response: "I know my customers."

We also asked the high-level retail lighting buyers and lighting manufacturers to estimate the proportion of ULP-discounted CFLs that were going into residential vs. nonresidential fixtures. Only six high-level buyers and seven lighting manufacturers provided estimates. Table 2-12 shows that their average estimates of these proportions were very close to each other.

Table 2-12
Estimated Proportion of ULP-Discounted Bulbs
Sold to Various Customer Types
According to High-Level Retail Lighting Buyers and Lighting Manufacturers

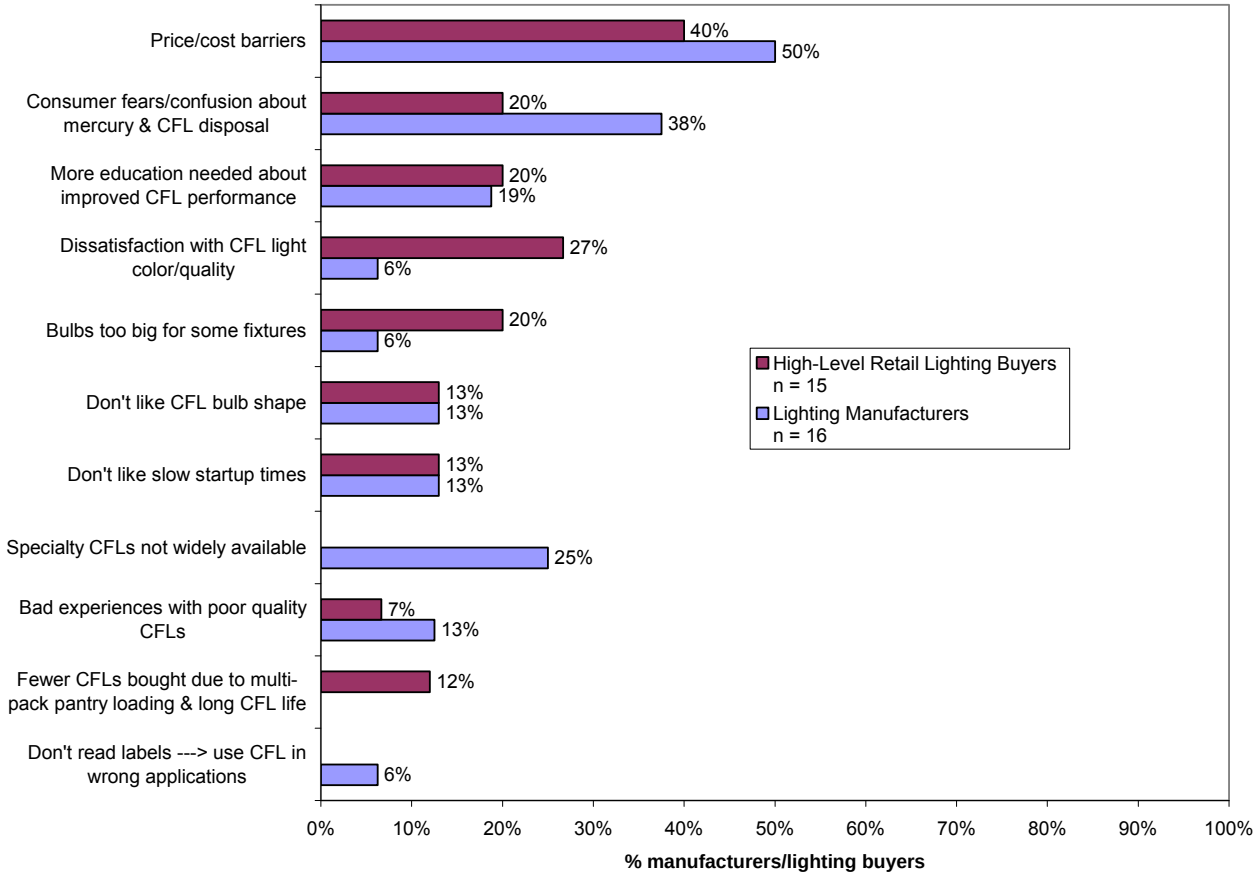
	Average Estimates Provided by High-Level Lighting Buyers (n=6)	Average Estimates Provided by Lighting Manufacturers (n=7)
Residential	90%	91%
Nonresidential	10%	9%

2.2.5. Barriers to CFL Purchase

The 2008 California lighting logger study found that only about 20 percent of the lighting sockets in California households have CFLs in them. This low CFL penetration is occurring even though the ULP has spent years making CFLs more widely available at significant discounts. We asked the high-level retail lighting buyers and lighting manufacturers: "What are the most important factors that are limiting customer demand for CFL products?" Figure 2-7 shows their responses. The chart shows that despite the efforts of the ULP to make CFLs more affordable, the high-level buyers and manufacturers most frequently pointed to price/cost barriers as factors that limit consumer demand for CFLs. A number of them said that the current economic crisis has made shoppers more price sensitive and some raised concerns that lower-income customers might revert back to incandescent bulbs despite the ULP discounts.

The chart shows that the high-level buyers were more likely than the manufacturers to point to consumer concerns about CFL light quality and bulb bit as barriers to consumer demand. In contrast, the manufacturers were more likely than the high-level buyers to point to CFL disposal and the limited availability of specialty CFLs as lingering barriers.

Figure 2-7
Barriers to Consumer Demand for CFLs in General
According to Lighting Manufacturers and High-Level Retail Lighting Buyers

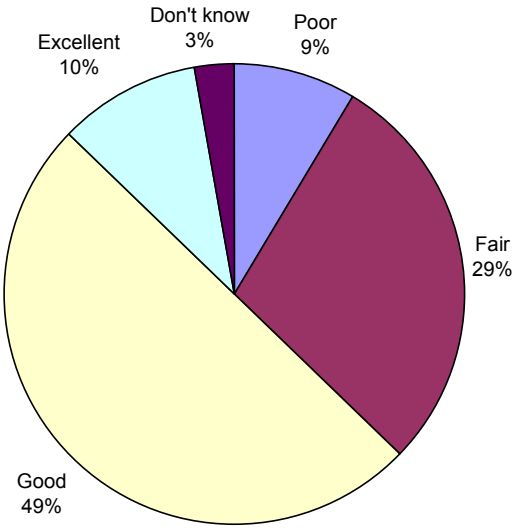


Although the California IOUs have been promoting specialty CFLs more in recent years than they have done in the past, the penetration of specialty CFLs in the ULP and in the California CFL market at large remains relatively low. According to the program tracking data, the specialty CFLs only accounted for about 10 percent of 2006-2008 ULP sales. We asked the participating store managers in the PG&E and SCE service territories who sold specialty CFLs: "Within the past year would you characterize sales of these products as being excellent, good,

fair, or poor?" Figure 2-8 shows that almost 40 percent of the respondents said that sales were either "fair" or "poor." Only 10 percent said that sales were "excellent."

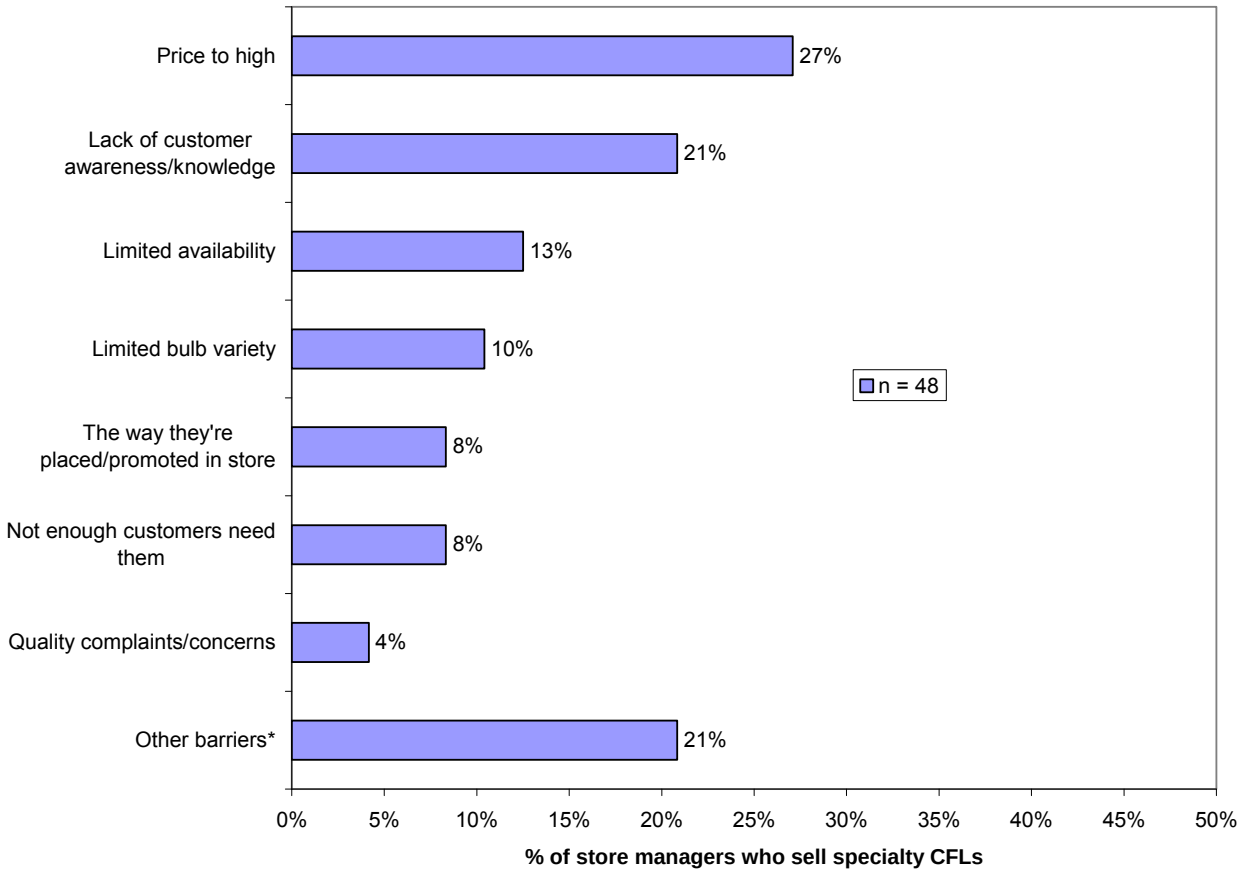
Figure 2-8
How Participating Store Managers
in the PG&E and SCE Service Territories
Characterized Sales Levels for Specialty CFLs

n = 70



We then asked these store managers: "What factors or barriers prevent more of these specialty CFLs from being sold?" As the high-level buyers and manufacturers did, the store managers most frequently cited cost as a barrier to consumer demand. Lack of consumer awareness/knowledge and limited availability were other oft-cited barriers (Figure 2-9).

Figure 2-9
Barriers to Wider Use of Specialty CFLs
According to Participating Store Managers
in the PG&E and SCE Service Territories
Who Sell Specialty CFLs



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other barriers include large multi-packs providing consumers with more CFLs than they can quickly use, specialty CFL being too large for some fixtures, people disliking the light quality, and lack of consumer demand for specialty CFLs.

2.2.6. CFL Distribution Processes

PG&E and SCE are very interested in knowing more about the distribution processes for ULP-discounted CFLs. One reason for this interest is that they want to gain a better understanding of how long it typically takes from the time an ULP-discounted CFL is ordered from the manufacturer to the time it is sold by a retailer. This is important information because the participating utilities claim energy savings for the ULP-discounted products based on shipment

data and they want to make sure that the energy savings from those shipped CFL products are realized within a reasonable time frame. Another reason why the utilities' are interested in the distribution processes for ULP-discounted CFLs is because they are concerned about "leakage" – the phenomenon of ULP-discounted lighting products being sold either at retail outside the service territories of the ULP-participating utilities or through the Internet. A later section of this report discusses this CFL leakage problem and the pros and cons of the CFL bulk purchase limit that was introduced to combat it.

Retailer Sources of Supply

We asked the store managers whether the CFL bulbs they sold in their store came directly from the manufacturer, from a retail distribution center, or from a non-affiliated lighting distributor. Table 2-13 shows the distribution of responses. Nearly two thirds of the participating store managers from the PG&E and SCE service territories said that they got their CFL bulbs from their company's own distribution centers (Table 2-13) with only 16 percent saying they came from non-affiliated lighting distributors and 15 percent saying they came directly from the manufacturer.

However, for some of the retail channels this distribution of supply sources was much different. For example, only 17 percent of the store managers in the Small Grocery channel, which includes many small-chain or independent ethnic grocery stores, said that they get their CFLs from a retail distribution channel. Interviews with participating lighting suppliers confirmed that they often direct-ship their CFL products to these smaller stores.

Table 2-13
Where Participating Retailers
from the PG&E and SCE Service Territories
Get Their CFL Bulbs

	PG&E/SCE Combined								
Source of CFL products	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
All from retailer's distribution center	62%	91%	60%	92%	17%	89%	46%	75%	0%
All from manufacturer	14%	5%	30%	8%	21%	6%	17%	13%	50%
All from non-affiliated lighting distributor	16%	0%	0%	0%	52%	6%	13%	13%	50%
From multiple sources/Other arrangements	1%	0%	10%	0%	0%	0%	0%	0%	0%
Don't know	7%	5%	0%	0%	10%	0%	25%	0%	0%
Sample size	140	22	10	25	29	18	24	8	4
	PG&E								
Source of CFL products	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
All from retailer's distribution center	70%	93%	80%	91%	17%	82%	63%	83%	0%
All from manufacturer	13%	7%	20%	9%	17%	9%	13%	17%	50%
All from non-affiliated lighting distributor	14%	0%	0%	0%	58%	9%	13%	0%	50%
From multiple sources/Other arrangements	0%	0%	0%	0%	0%	0%	0%	0%	0%
Don't know	3%	0%	0%	0%	8%	0%	13%	0%	0%
Sample size	70	15	5	11	12	11	8	6	2
	SCE								
Source of CFL products	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
All from retailer's distribution center	54%	86%	40%	93%	18%	100%	38%	50%	0%
All from manufacturer	16%	0%	40%	7%	24%	0%	19%	0%	50%
All from non-affiliated lighting distributor	17%	0%	0%	0%	47%	0%	13%	50%	50%
From multiple sources/Other arrangements	1%	0%	20%	0%	0%	0%	0%	0%	0%
Don't know	11%	14%	0%	0%	12%	0%	31%	0%	0%
Sample size	70	7	5	14	17	7	16	2	2

Timing of CFL Delivery

We asked the store managers, high-level retail lighting buyers, and lighting manufacturers how long it takes CFL products to be delivered to retailers after ordering. We also asked the high-level retail lighting buyers and the lighting manufacturers to try to disaggregate these estimates of CFL product delivery times into:

- The typical time required for manufacture;
- The typical time required for shipment from the manufacturing facilities (in China); and
- The typical time required for temporary warehousing or storage before the retailer receives the product.

Full-Cycle Delivery Time

We asked the store managers how long it typically takes from the time they order CFL products from the manufacturer to the time these products arrives in their stores. Table 2-14 shows that the average delivery time was four weeks over all 84 participating store managers who provided estimates. However, a closer look at the retail channel breakouts reveals that all but two of the channels had delivery times of 1.5-2.7 weeks. Only the Small Grocery channels (8.2 weeks) and the Drug channel (3.6 weeks) had longer delivery times than this and only the store managers from the SCE service territory reported delivery times for these retail channels that were significantly longer than the other retail channels.

Why were the waiting times so much longer for the SCE Small Grocery and Drug store managers? The most likely explanation has to do with the timing of the survey in conjunction with the reliance of stores in these channels on the ULP. When the store manager surveys were conducted in May 2008, SCE's ULP – which got a late start -- was only just beginning to get ULP-discounted CFLs into the stores. Previous evaluations have shown that the ULP has been a key factor in introducing CFLs into the Small Grocery channel and that the manufacturers and resellers that supply CFLs to ethnic groceries are only able to do so through the ULP. Therefore if a small grocery store in the SCE service territory ran out of its 2007 allocation of ULP-discounted CFLs in late 2007 or early 2008, it would have to wait a significant period until the 2008 allocation of CFLs were first delivered in May.

Another explanation, as indicated in Table 2-13, is that most stores in the Small Grocery channel do not have their own distribution centers, but get their products from the manufacturers or unaffiliated distributors, which likely takes longer. Finally, for the Drug channel the explanation may have to do more with the small sample size (3) and one of the three respondents being an outlier (12 week delivery time).

Table 2-14
How Long Participating Store Managers from the PG&E and SCE Service Territories Typically Have to Wait for a New Order of Bulbs

How long it typically takes from time they order CFL products to the time they arrive in store	PG&E/SCE Combined								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Mean (# of weeks)	4.0	1.6	2.0	1.5	8.2	3.6	2.7	2.4	2.0
Maximum (# of weeks)	36	2	4	4	36	12	10	8	4
Minimum (# of weeks)	1	1	1	1	1	1	1	1	1
Sample size	84	10	7	10	24	10	11	8	7
How long it typically takes from time they order CFL products to the time they arrive in store	**PG&E**								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Mean (# of weeks)	2.4	1.3	2.3	1.4	3.2	3.1	2.3	2.8	2.0
Maximum (# of weeks)	12	2	4	3	12	11	4	8	3
Minimum (# of weeks)	1	1	1	1	1	1	1	1	1
Sample size	43	6	4	5	9	7	4	6	2
How long it typically takes from time they order CFL products to the time they arrive in store	**SCE**								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Mean (# of weeks)	5.6	2.0	1.7	1.6	11.2	4.7	3.0	1.0	1.0
Maximum (# of weeks)	36	2	2	4	36	12	10	1	1
Minimum (# of weeks)	1	2	1	1	2	1	1	1	1
Sample size	41	4	3	5	15	3	7	2	2

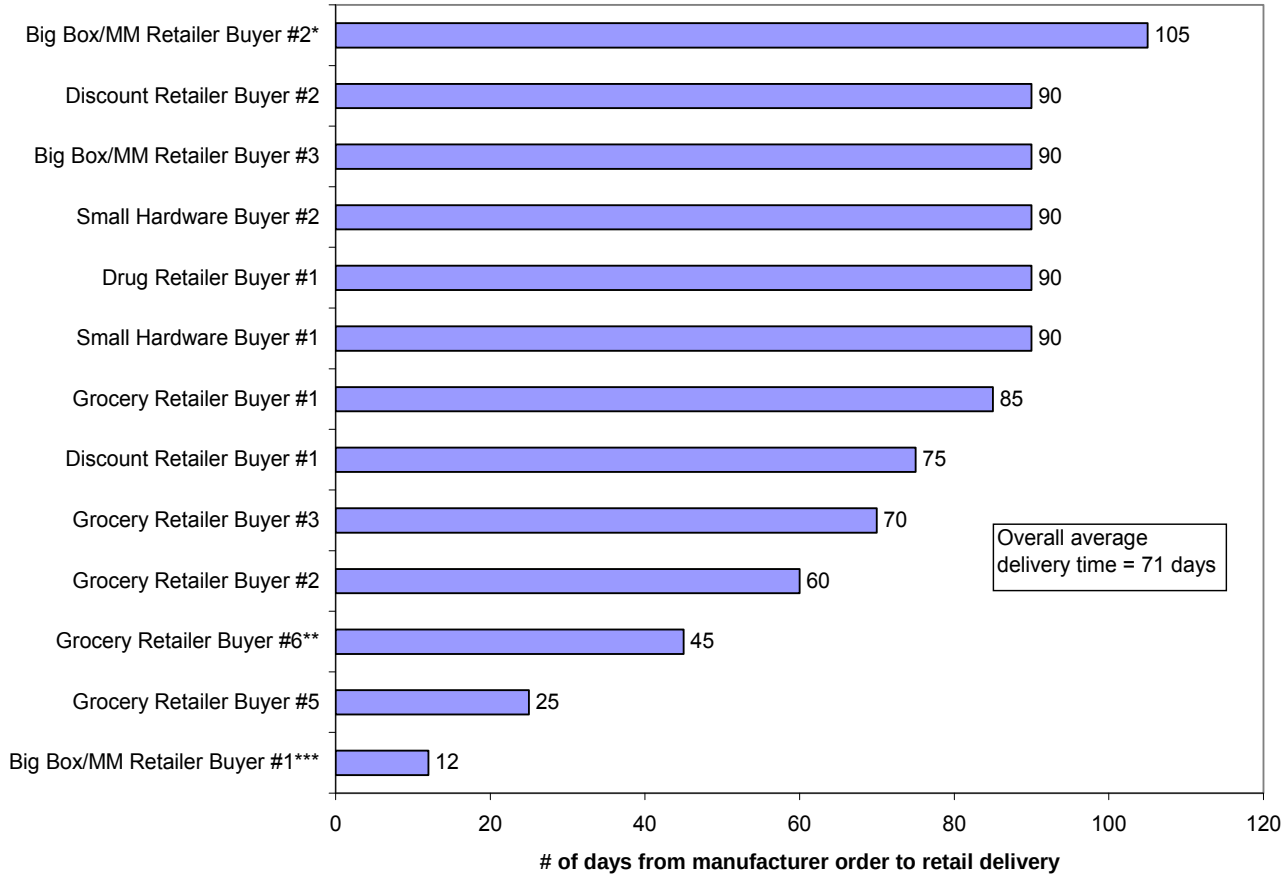
In the interviews of high-level retail lighting buyers that we conducted between August and November 2008 we also asked them about typical delivery times for CFL products. Although the delivery time question was similar to that asked of the store managers,[6] we realized that since these lighting buyers were further up the CFL distribution chain, they would have a better sense of the total amount of time involved in manufacturing, shipment, and temporary warehousing than the store managers would. Thirteen of the 16 participating lighting buyers that we interviewed provided quantifiable estimates (e.g., something more precise than "several weeks").

Seventy-one days was the average delivery time estimate provided by the high-level retail lighting buyers with a median estimate of 85 days (Figure 2-10). Most of these delivery time estimates were for scenarios that included the time for production (in China), shipment to the United States, the clearance of customs, temporary warehousing (if relevant) and delivery to the retail store. The shorter delivery time estimates were from retailers who received ULP CFLs

[6]The question was: "How long does it typically take from the time that you place an order with the manufacturer or distributor and the time that you receive delivery of this order in your stores?"

from large established lighting manufacturers who have domestic warehouses. Some of these retailers also said that they receive non-ULP CFLs in less than a week from these same manufacturers.

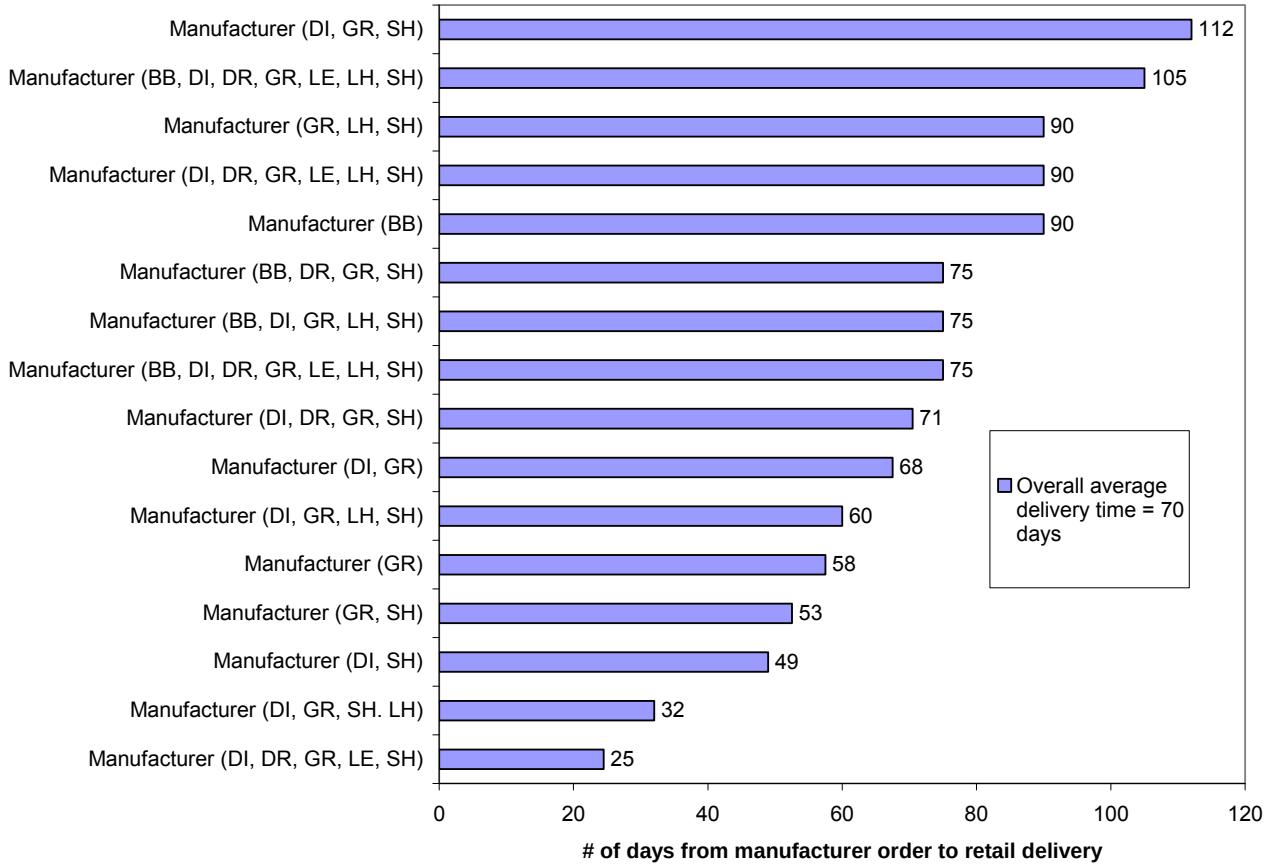
Figure 2-10
Typical Full-Cycle Delivery Times for CFL Products
As Estimated by High-Level Retail Lighting Buyers
Participating in the ULP



Note: Some lighting buyers provided a range of delivery times and the estimate represented here is the mid-point of these estimates. *This estimate is for manufacturer buydown part of the ULP. The retailer indicated that for the point-of-sale part of the ULP would be much quicker than this, but did not provide a quantifiable estimate for this. **This estimate does not include manufacturing time includes the time to get from the manufacturing warehouses in China to the retailer's stores.
***This retailer's manufacturer has domestic warehousing. So this estimate is for the time it takes the CFL products to get from the manufacturer's warehouse to the retailer (e.g., no manufacturing or overseas shipment time is included).

The lighting manufacturers' average estimated delivery time – 70 days – was very close to the estimate from the high-level retail lighting buyers. Figure 2-11 shows the full range of estimates. There appeared to be no pattern between the length of the delivery time estimates and the types of retail channels that the lighting manufacturers delivered to.

Figure 2-11
Typical Full-Cycle Delivery Times for CFL Products
As Estimated by Lighting Manufacturers
Participating in the ULP



Note: Some lighting manufacturers provided a range of delivery times and the estimate represented here is the mid-point of these estimates. Abbreviations indicate the retail channels that the manufacturer used to sell ULP-discounted CFLs. These include Big Box/Mass Merchandise (BB), Discount (DI), Drug (DR), Grocery (GR), Lighting, Electronics, Miscellaneous (LE), Large Home Improvement (LH), and Small Hardware (SH).

Manufacturing Times

Only five of the high-level retail lighting buyers felt comfortable estimating the typical time required for manufacturing. Their average estimate was 38 days with a range in estimates from 18 to 60 days.

However, 15 of the 16 lighting manufacturers were willing to estimate the typical manufacturing time for CFL products. Their average and median estimates were both 30 days, although the estimates could range widely, as Figure 2-12 shows.

The manufacturers noted that manufacturing times could be influenced by a number of variables including:

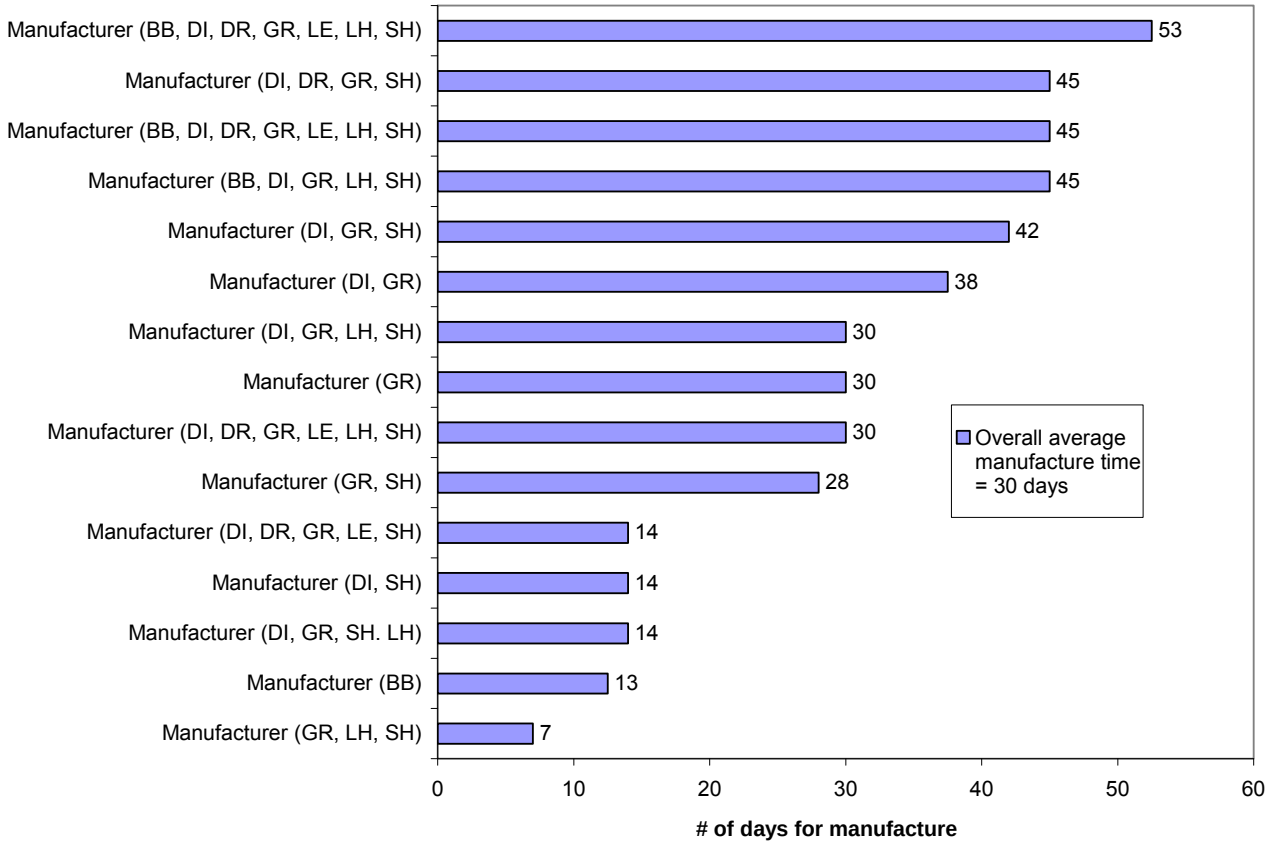
- *The size of the order:* Bigger orders take longer and if unexpected are less likely to be accommodated by existing production forecasts.

- *Whether the order is expected or not:* A couple of manufacturers provided estimates of typical manufacture times for "unexpected" orders. They noted that if the order had been expected, or could be accommodated by their forecasted production volume, or was a "reorder" of a previously-manufactured product, the manufacturing times were much shorter. Unexpected orders take longer in part because it takes a certain amount of time to gather the necessary packaging, raw materials and components such as burners and circuit boards.

- *The type of CFL product manufactured:* As discussed later in this section, lighting manufacturers said that specialty CFLs and CFL fixtures take longer to produce.

- *The timing of the order:* A number of manufacturers noted that there are spikes of CFL orders during Energy Star's Change-a-Light promotion in October as well as whenever a large national retailer such as Wal-Mart or Home Depot does a special promotion. During such periods production capacity can be constrained. Manufacturers also observed that the lengthy Chinese New Year celebrations might temporarily slow down CFL production levels.

Figure 2-12
Typical Manufacture Times for CFL Products
As Estimated by Lighting Manufacturers
Participating in the ULP



Note: Some lighting manufacturers provided a range of delivery times and the estimate represented here is the mid-point of these estimates. Abbreviations indicate the retail channels that the manufacturer used to sell ULP-discounted CFLs. These include Big Box/Mass Merchandise (BB), Discount (DI), Drug (DR), Grocery (GR), Lighting, Electronics, Miscellaneous (LE), Large Home Improvement (LH), and Small Hardware (SH).

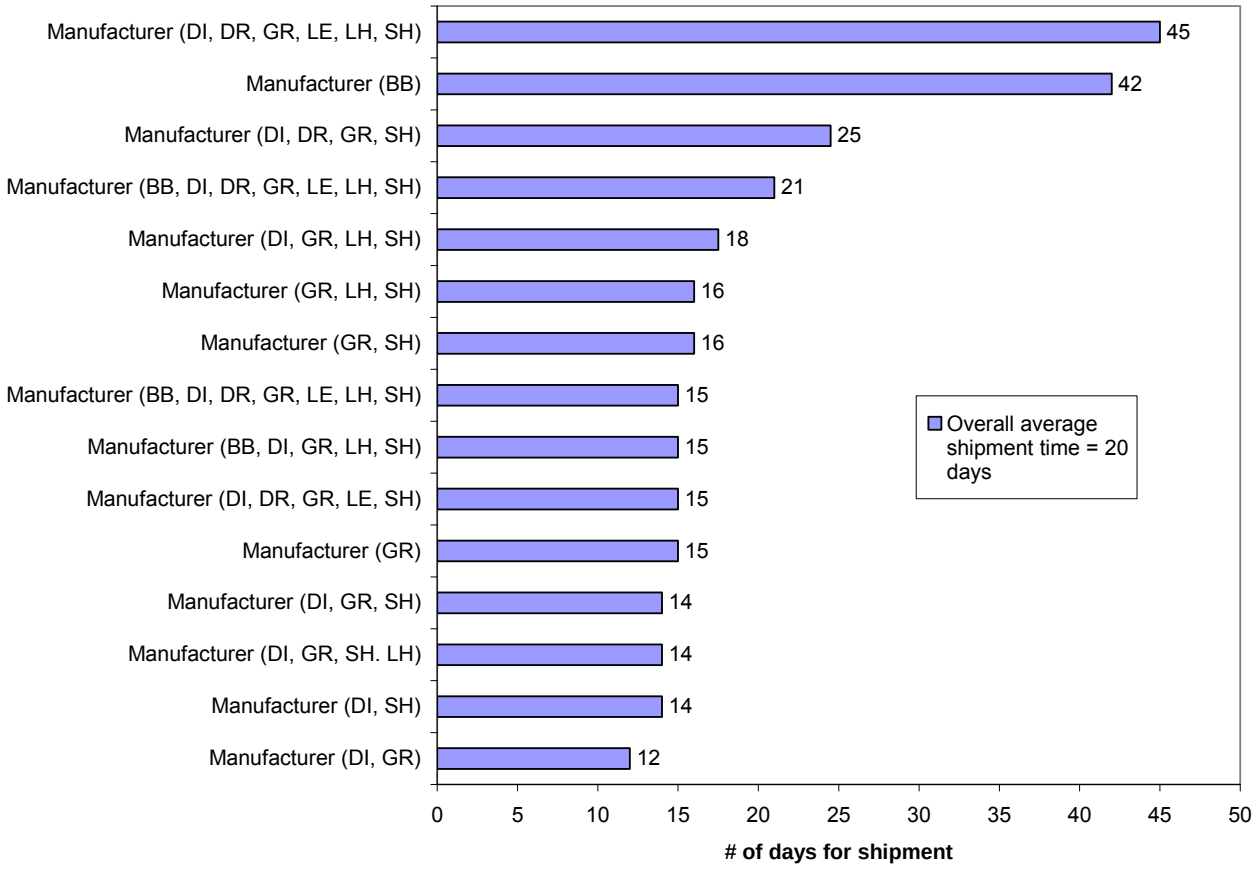
Shipment Times

Only five of the high-level retail lighting buyers offered estimates on the typical time required for shipping CFLs. Their average estimate was 27 days with a range in estimates from 15 to 38 days.

Fifteen of the 16 lighting manufacturers did provide estimates of the typical shipment times for CFL products. The average estimate was 20 days with a median estimate of 15 days. Figure 2-13 shows the full range of estimates. The lighting manufacturers said that some of the

variables that might influence their shipment times included weather factors such a typhoons in Asia and shipping congestion problems that can occur at certain times of the year such as before holidays.

Figure 2-13
Typical Shipment Times for CFL Products
As Estimated by Lighting Manufacturers
Participating in the ULP



Note: Some lighting manufacturers provided a range of delivery times and the estimate represented here is the mid-point of these estimates. Abbreviations indicate the retail channels that the manufacturer used to sell ULP-discounted CFLs. These include Big Box/Mass Merchandise (BB), Discount (DI), Drug (DR), Grocery (GR), Lighting, Electronics, Miscellaneous (LE), Large Home Improvement (LH), and Small Hardware (SH).

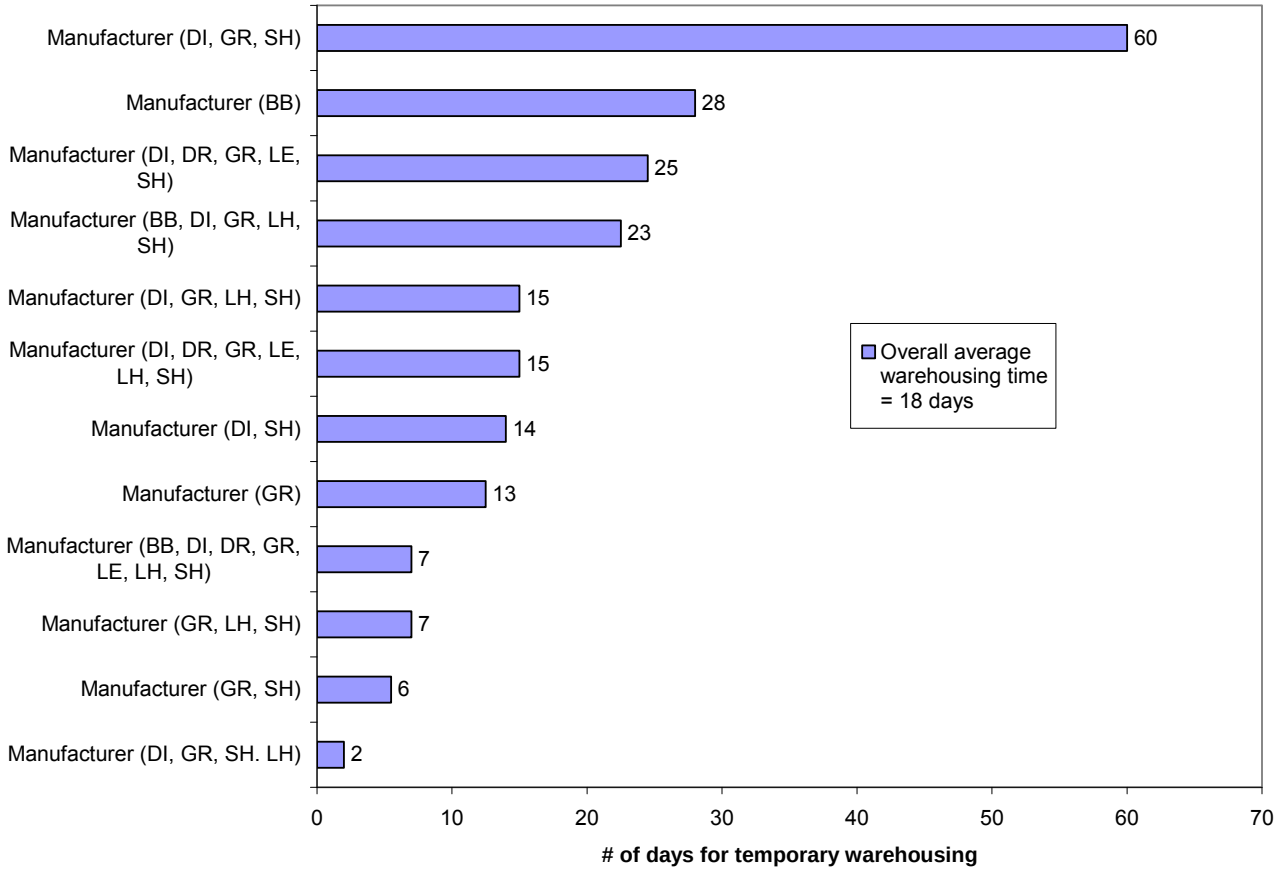
Warehousing

Only five of the high-level retail lighting buyers offered estimates on the typical time required for warehousing CFLs. Their average estimate was 28 days with a range in estimates from 11 to 58 days. Some retailers had their own warehousing while others had the CFL products shipped

directly from the supplier to their stores. One high-level retail lighting buyer said that because the lighting manufacturers only get paid for their ULP-discounted CFLs upon retail delivery, they had an economic incentive to deliver these CFLs to the retailers as quickly as possible after they arrived in the United States.

Twelve of the 16 lighting manufacturers provided quantifiable estimates of the typical times for temporary warehousing of CFL products before the retailer or distributor receives them. The average estimate was 18 days with a median estimate of 15 days. However, there was a lot of variation in the estimates, as Figure 2-14 makes clear. One likely explanation is the variation in the amount of warehousing that the different lighting manufacturers. Some of the smaller manufacturers deliver the product to their California retailers directly from the California port where the CFLs arrived from China. In such cases, the “warehousing” is limited to the few days at the port it takes to clear U.S. Customs. In contrast, other, larger manufacturers have their U.S.-based warehousing facilities. Another possible factor is whether or not the manufacturer sells non-ULP-discounted CFLs. Manufacturers who only sell ULP-discounted CFL products would have to store their CFLs longer if the ULP took a long time to get started, as was the case with SCE in 2008.

Figure 2-14
Typical Temporary Warehousing Times for CFL Products
As Estimated by Lighting Manufacturers
Participating in the ULP



Overview of the Delivery Time Estimates

Table 2-15 summarizes the delivery time estimates described in the previous subsections. It shows that the lighting manufacturer's average estimate for full-cycle delivery time (70 days) was very similar to the sum of their disaggregated time estimates for the separate CFL distribution chain components (manufacture, shipment, and warehousing) -- 68 days. This was not the case for the high-level lighting buyers. However, the variation here is likely due to the fact that while 13 of the high-level lighting buyers provided full-cycle delivery time estimates, only five provided time estimates for the disaggregated portions of the CFL distribution chain.

Table 2-15
Overview of the Delivery Time Estimates
Provided by ULP-Participating
High-Level Lighting Buyers and Lighting Manufacturers

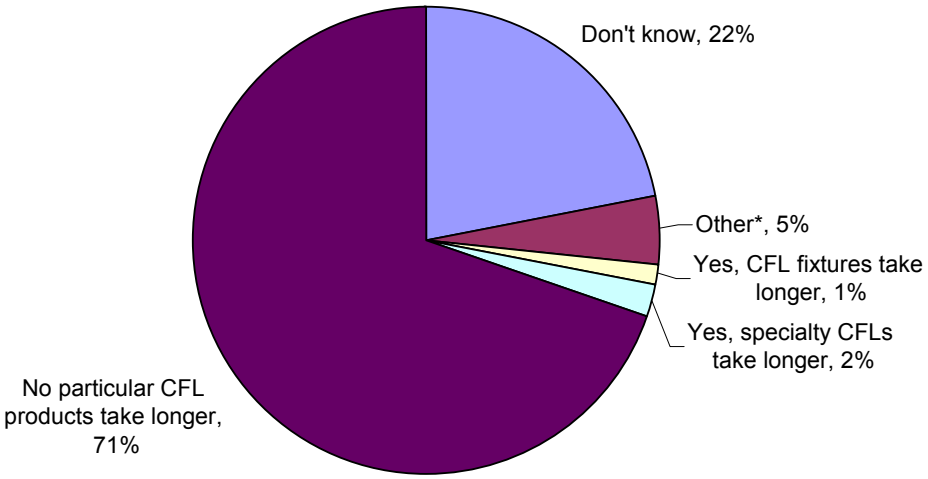
Portion of CFL Distribution Chain	Estimates from High-Level Lighting Buyers (Avg. # of days)	Estimates from Lighting Manufacturers (Avg. # of days)
Manufacture times (buyer n=5, manufacturer n=15)	38	30
Shipment times (buyer n=5, manufacturer n=15)	27	20
Warehousing times (buyer n=5, manufacturer n=12)	28	18
Sum of disaggregated estimates (buyer n=5, manufacture n=12-15)	93	68
Full-cycle delivery times (buyer n=13, manufacturer n=16)	71	70

CFL Products That Take Longer To Deliver

We asked the store managers, high-level retail lighting buyers, and lighting manufacturers whether there were any particular CFL products that took longer to deliver than the typical time periods discussed in the previous subsections. Figure 2-15 and Figure 2-16 show the responses of the store managers and the high-level retail lighting buyers. The charts show that nearly three quarters of the store managers and high-level buyers did not identify any CFL product type that took longer than average for delivery. A handful of respondents identified specialty CFLs or CFL fixtures as taking longer.

Figure 2-15
Whether There Are Any CFL Product Types That Take Longer Than Average for Delivery According to Participating Store Managers from the PG&E and SCE Service Territories

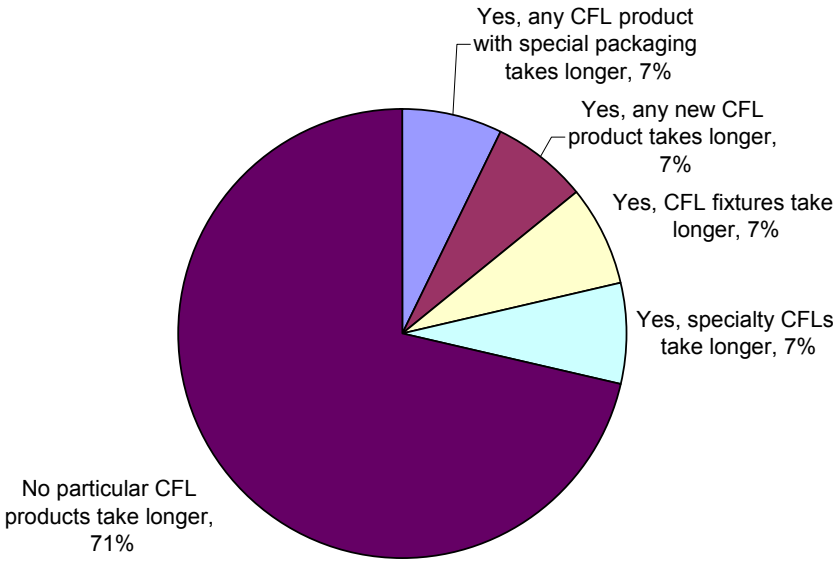
n = 140



Note: *Other includes products that need to be specially "direct imported" from China, LED night lights, replacement bulbs for certain CFL fixtures, products for large promotions, and any ULP products.

Figure 2-16
Whether There Are Any CFL Product Types That Take Longer Than Average for Delivery According to High-Level Retail Lighting Buyers Participating in the ULP

n = 14

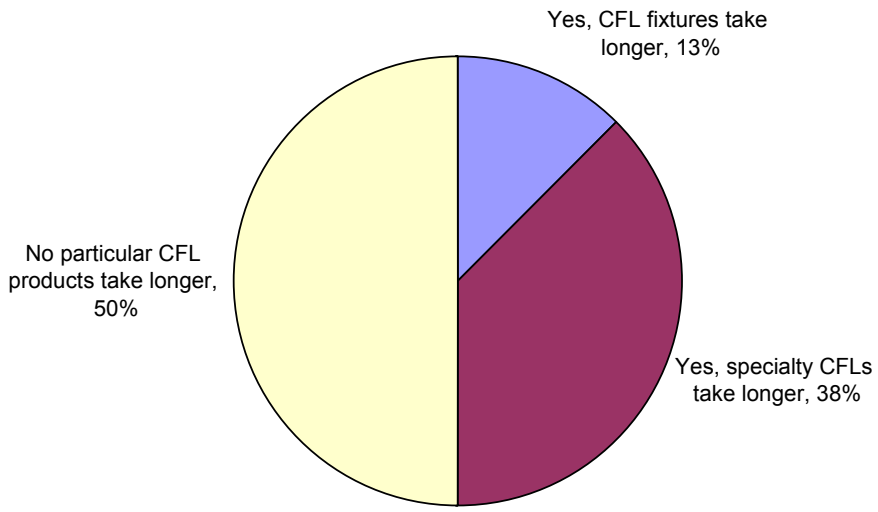


However half of the lighting manufacturers did say that certain CFL products took longer to deliver than the typical time periods mentioned above. Figure 2-17 shows that they identified specialty CFLs and CFL fixtures as taking longer than normal to deliver. Some of the reasons for these longer delivery times included:

- The longer time needed to source and order special components such as extra glass covers or special circuit boards;
- The greater complexity of the manufacturing process for these products; and
- "The slower moving the goods, the slower the production time," said one manufacturer. They don't run [production for specialty CFLs] as often."

Figure 2-17
Whether There Are Any CFL Product Types That Take Longer Than Average for Delivery According to Lighting Manufacturers

n = 16



Other Reasons for Longer CFL Product Delivery Times

We asked the high-level retail lighting buyers and lighting manufacturers what other factors – besides product type – might cause CFL products to take longer than normal to deliver. Figure 2-18 and Figure 2-19 show their responses. The most-cited reasons, by both lighting buyers and lighting manufacturers, were various difficulties with the manufacturing process. Some of these manufacturing difficulties that were mentioned by at least two respondents included:

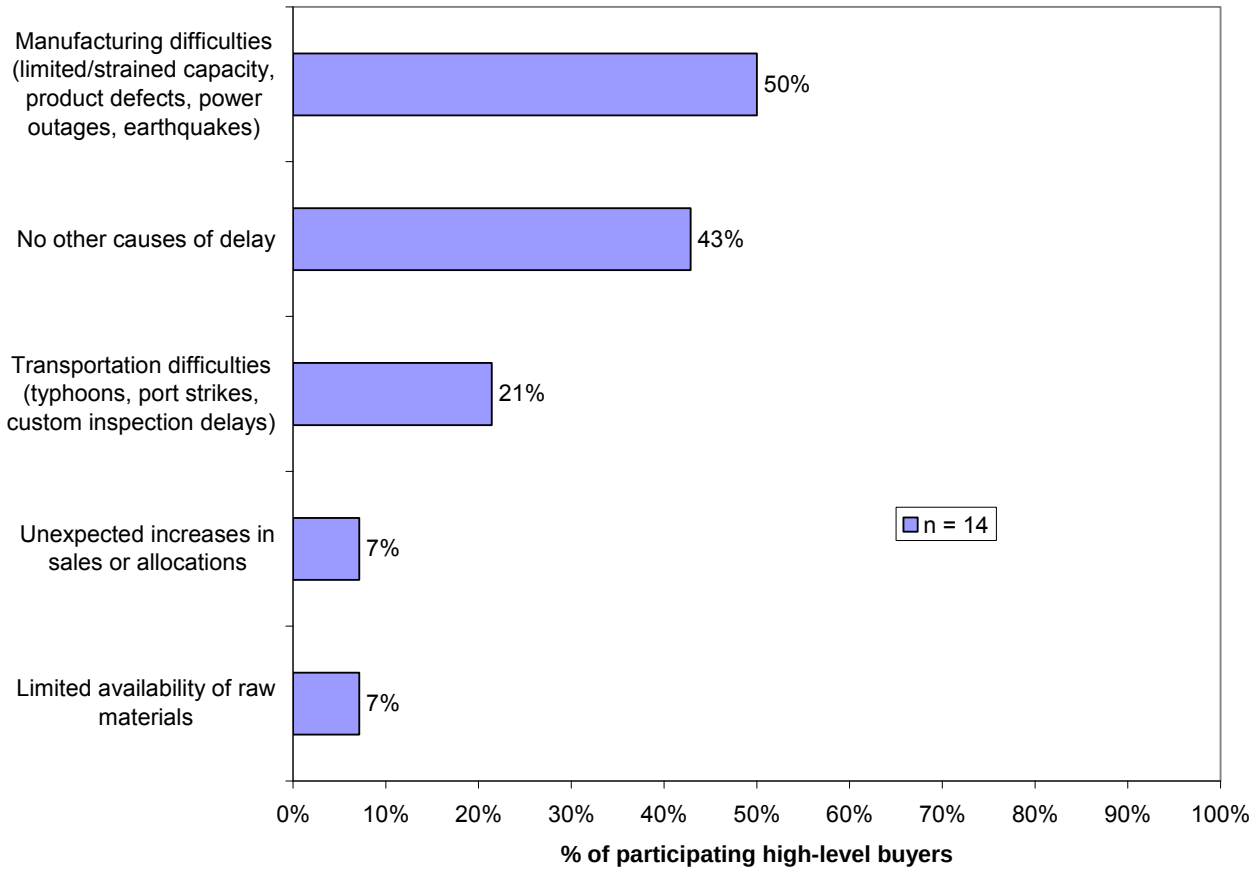
- *Limited/strained capacity:* A number of manufacturers and retailers said there was a period of time in the recent past when CFL manufacturing capacity temporarily had trouble keeping up with a surge in CFL demand. They said that the addition of new CFL production capacity has since relieved the problem.

- *Product defects:* Two retailers said that lighting manufacturers have sometimes detected flaws in their products through internal testing and had to cancel and then re-start production runs.

- *Summer heat in the factories:* A couple of manufacturers said that because Chinese CFL factories are not air-conditioned, production levels usually go down during the summertime.

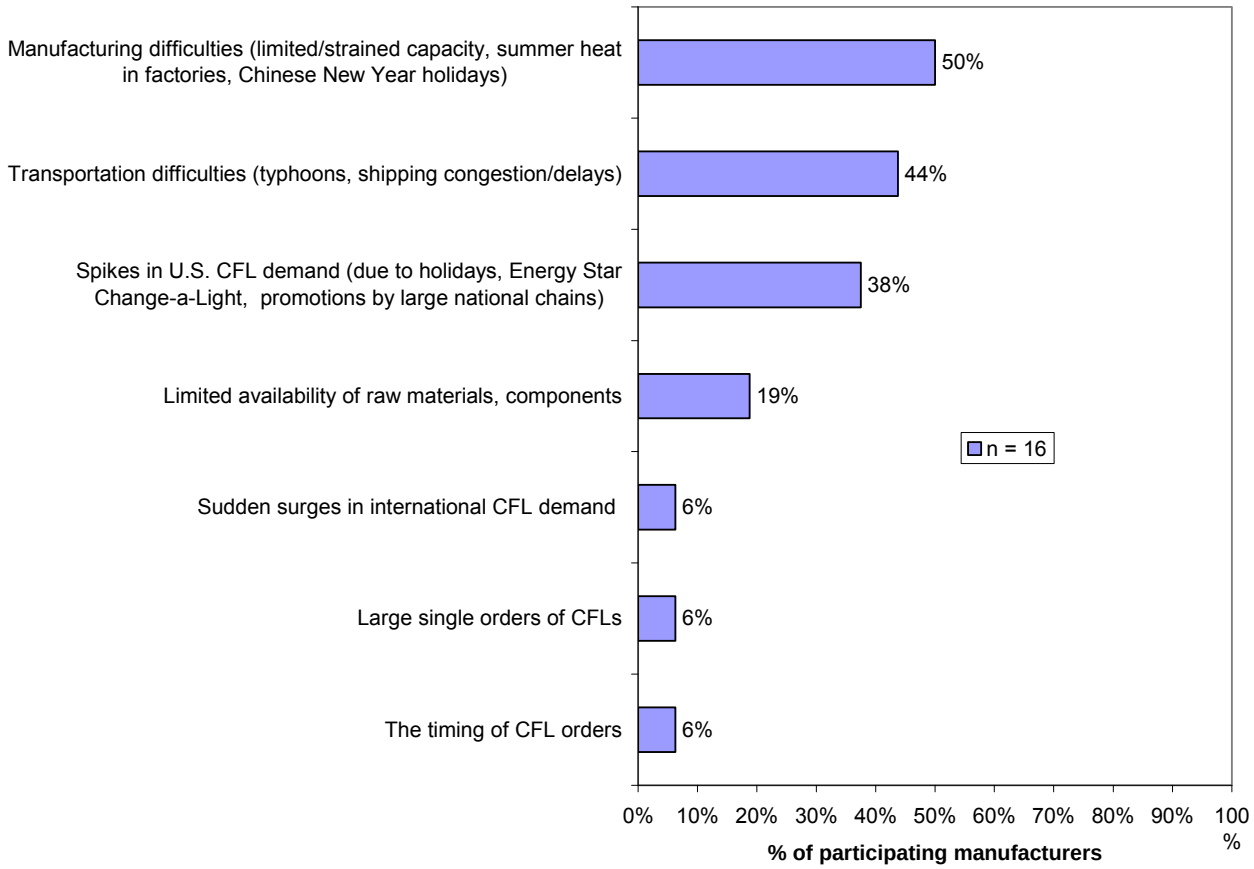
- *Chinese New Year celebrations:* These are two-week celebrations during which most production is suspended.

Figure 2-18
Other Reasons Besides Product Type
Why It Would Take Longer Than Average
for Delivery of CFL Products
According to High-Level Retail Lighting Buyers



Note: Total exceeds 100% because some interviewees provided multiple responses.

Figure 2-19
Other Reasons Besides Product Type
Why It Would Take Longer Than Average
for Delivery of CFL Products
According to Lighting Manufacturers



Note: Total exceeds 100% because some interviewees provided multiple responses.

Whether the Delivery Time of ULP-Discounted Products Is Different Than Non-ULP Products

We asked the high-level retail lighting buyers and lighting manufacturers whether the delivery times for the ULP-discounted CFL products was different than for their other CFL products. About a quarter of the high-level buyers and a little more than a third of the manufacturers said that the delivery times were different between the ULP and non-ULP products. All but a couple of these said that the ULP products took longer to deliver than the non-ULP products although some pointed out that the time difference was a week or less. A couple of high-level buyers who

get some ULP products from suppliers with domestic warehousing and other ULP products from suppliers who did not, said that the ULP products only took longer than their non-ULP products when they had to be “direct ordered” from China. Other explanations for why ULP products took longer than non-ULP to deliver included the larger size of the ULP deliveries, the need for the ULP products to have special signage or displays, and the time it took to put the ULP stickers on the product packages.

Figure 2-20
Whether ULP-Discounted CFL Products
Have a Different Delivery Time Than Other CFL Products
According to High-Level Retail Lighting Buyers

n = 13

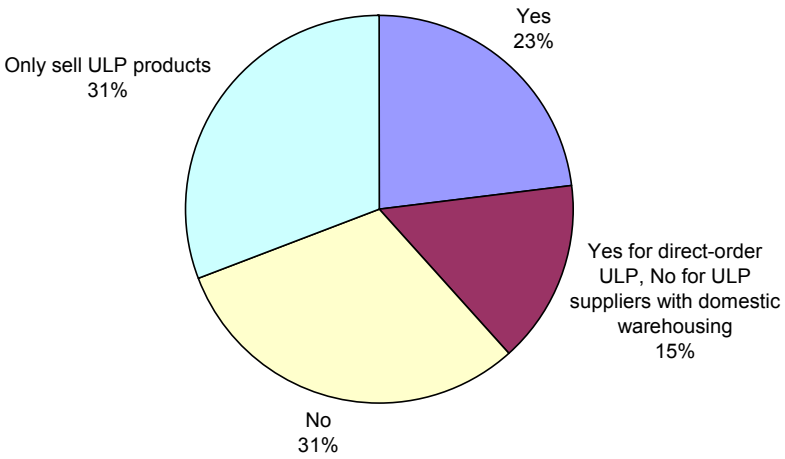
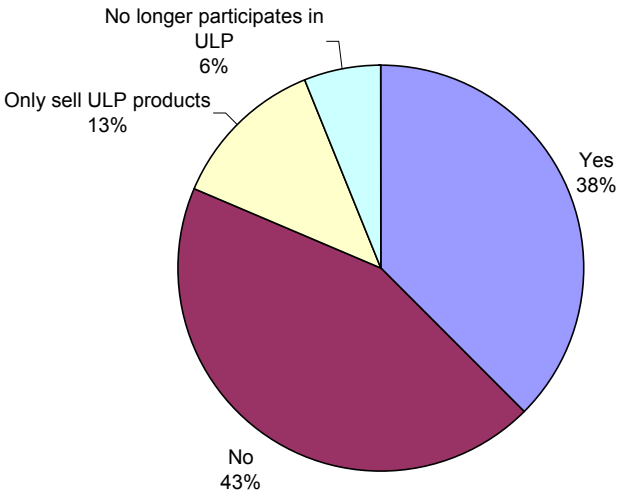


Figure 2-21
Whether ULP-Discounted CFL Products
Have a Different Delivery Time Than Other CFL Products
According to Lighting Manufacturers

n = 16

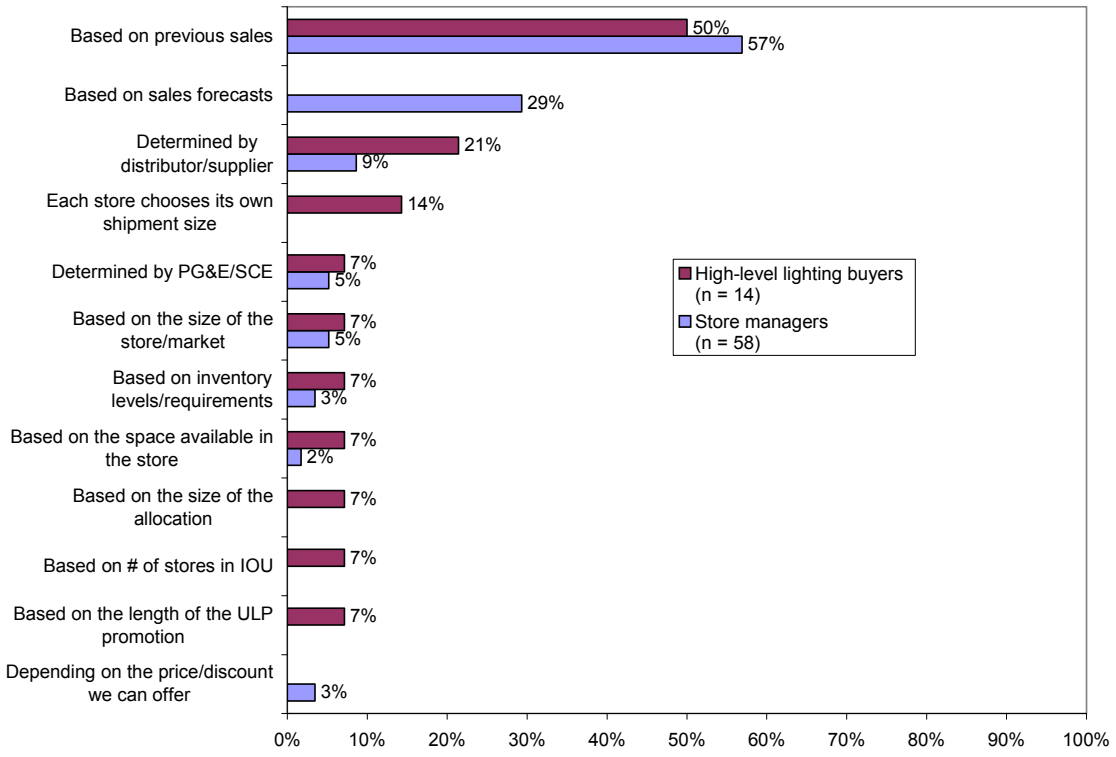


2.2.7. Processes for Ordering Shipments of ULP-Discounted CFL Products

We asked both participating store managers[7] and high-level lighting buyers how they determine the size of the shipments of ULP-discounted CFL products to their stores. Figure 2-22 shows that using historical sales information was the most common way although there were many other approaches.

[7] This question was only asked of 58 store managers who said that they were the primary person who decided how many ULP-discounted CFLs their store received.

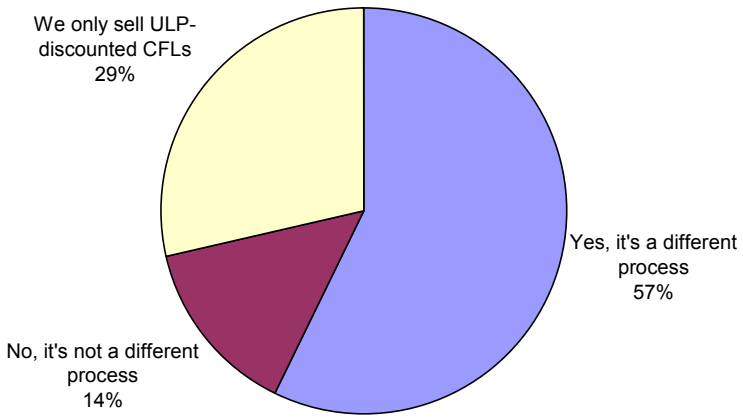
Figure 2-22
How the Size of ULP-Discounted CFL Shipments Are Determined According to High-Level Retail Lighting Buyers and Participating Store Managers from the PG&E and SCE Service Territories



We also asked the store managers and high-level lighting buyers whether their process for ordering the ULP-discounted CFL products was different than the process for the non-ULP products. Forty-three percent of the store managers (n=58) and 57 percent of the high-level buyers (Figure 2-23) said it was. The most common difference was that many stores get their non-ULP lighting products through automatic replenishment systems – sometime called "truck-to-shelf" systems – in which products are automatically re-supplied from the warehouse, based on inventory levels or predicted sales. In contrast, the ULP products usually are not supplied this way due to the suppliers not having domestic warehousing or due to the greater unpredictability of the timing of the ULP allocations. Since the Program can only pay ULP-participating suppliers after their products are delivered to retailers, these suppliers also have an incentive to deliver their ULP-discounted products quickly to retailers once they arrive in California from China.

Figure 2-23
Whether the Process for Ordering ULP-Discounted CFL Products Is Different Than For Ordering Non-ULP Products According to High-Level Retail Lighting Buyers

n = 14



2.2.8. Problems with Delivery of ULP CFLs

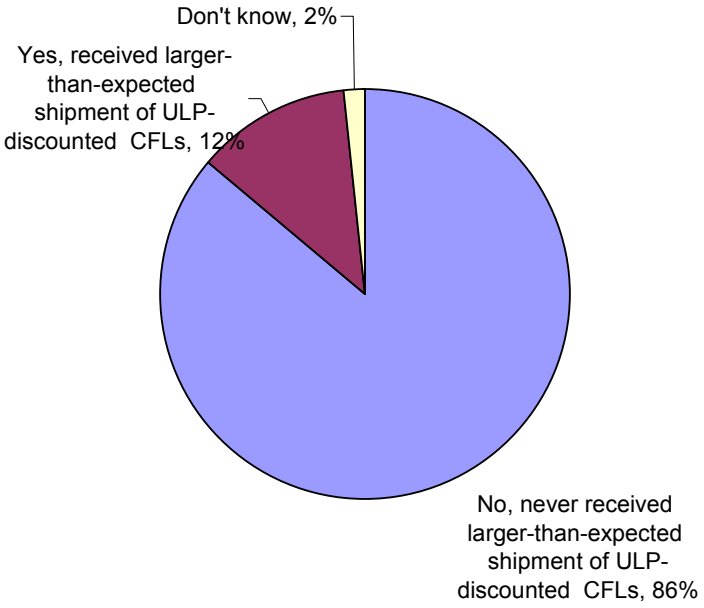
In our 2007 survey of lighting manufacturers and high-level lighting buyers we collected anecdotal information about retailers receiving deliveries of ULP-discounted CFL products that arrived at unexpected times or in unexpected amounts – usually more than the retailer had asked for. Since these delivery problems have the potential to contribute to CFL "leakage" problems, in our 2008 surveys we asked the high-level lighting buyers and store managers directly about the frequency of these types of delivery problems.

We first asked the participating store managers whether they had ever received a shipment of ULP-discounted CFLs from their ULP-participating supplier (the supplier was named) that was larger than they expected or ordered. Figure 2-24 displays the responses of the of 58 participating store managers who said that they were the primary person who decided how many ULP-discounted CFLs their stores received. The chart shows that only a small minority of

these store managers received larger-than-expected orders. We asked the seven store managers who had encountered this situation how long it took them to sell through the extra CFLs. Their estimates ranged from three months to a year.

Figure 2-24
Whether Participating Store Managers From the PG&E and SCE Service Territories Received Deliveries of ULP-Discounted CFLs That Were Larger Than Expected or Ordered

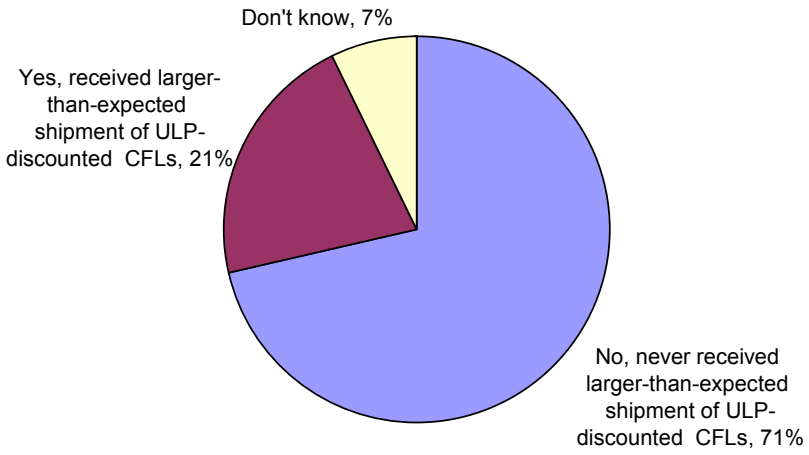
n = 58



We also asked the high-level lighting buyers whether they had received larger-than-expected orders of ULP-discounted CFLs. In this case, however, if they said “yes” we asked a follow-up question as to whether this happened frequently, occasionally, or rarely. Figure 2-25 shows that less than a third of these buyers experienced such situations and most of these only experienced them rarely.

Figure 2-25
Whether High-Level Retail Lighting Buyers Received Deliveries of ULP-Discounted CFLs That Were Larger Than Expected or Ordered

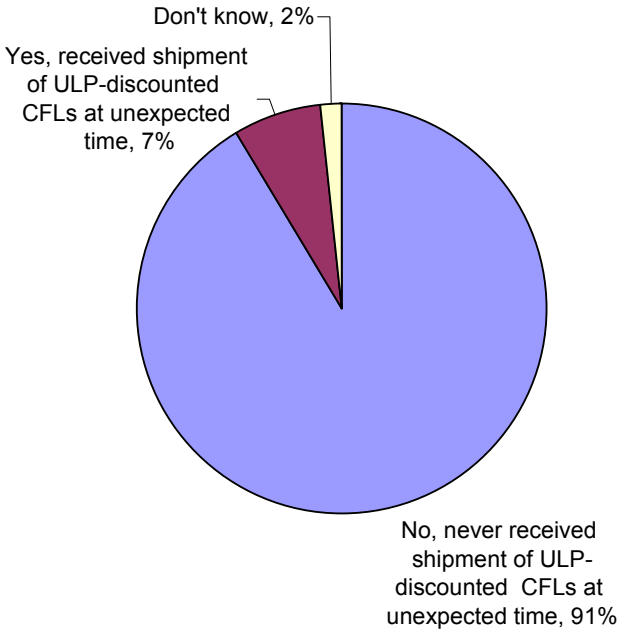
n = 14



We then asked the store managers whether they ever received a shipment of ULP-discounted CFLs from their ULP-participating supplier that came at an unexpected time. Figure 2-26 displays the responses of the of 58 participating store managers who said that they were the primary person who decided how many ULP-discounted CFLs their stores received. The chart shows that over 90 percent of these store managers did not receive the ULP-discounted CFLs at an unexpected time. We asked the four store managers who received the ULP-discounted CFLs at an unexpected time how they deal with the situation. Two of them had adequate floor space and simply increased the size of their CFL displays. The other two had their suppliers take back the excess bulbs.

Figure 2-26
Whether Deliveries of ULP-Discounted CFLs Came At Unexpected Times According to Participating Store Managers from the PG&E and SCE Service Territories

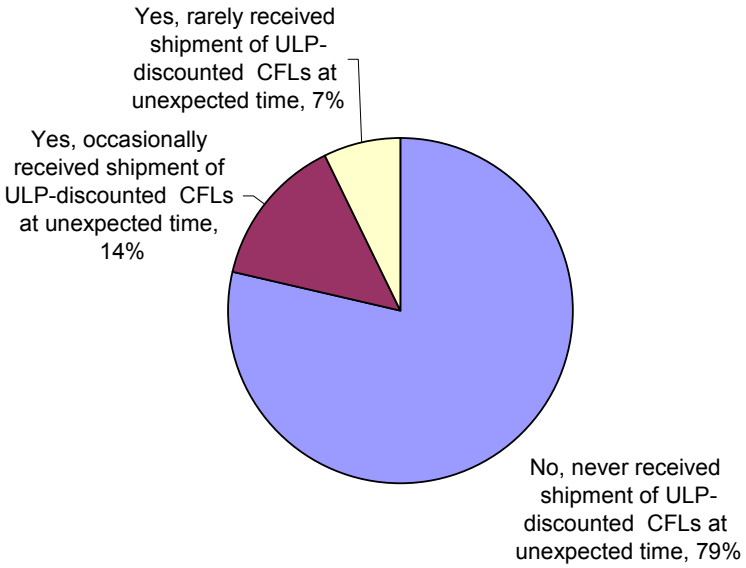
n = 58



We also asked this same question of the high-level retail lighting buyers. Figure 2-27 shows that about a fifth of these lighting buyers did receive deliveries of ULP-discounted CFLs that came at an unexpected time, although this occurred occasionally or rarely.

Figure 2-27
Whether Deliveries of ULP-Discounted CFLs Came At Unexpected Times According to High-Level Retail Lighting Buyers

n = 14



2.2.9. Processes for Stocking CFLs

This section address a number of topics related to stocking CFLs including:

- Whether retailers stock CFLs year round,
- Whether stocking practices differ depending on the CFL product type,
- Whether ULP-discounted and non-ULP CFLs are sold at the same time,
- How long it takes to sell through a shipment of ULP-discounted CFLs,
- What retailers do when they sell through their ULP-discounted lighting products, and
- What happens to unsold ULP-discounted products.

Whether retailers stock CFLs year round

One topic of interest is whether CFLs are available year-round or whether retailers only stock them when ULP-discounted CFL products are available or during certain promotional periods such as Earth Day or the Energy Star Change-a-Light promotion in October. We asked the store managers whether they stocked CFLs year-round. Table 2-16 shows that store managers from all retailer types claim to do so, except for a small percentage of the Grocery, Drug, and Discount stores. The claims of so many Discount store managers that they sell CFLs year-round is curious because this is contrary to the claims of the lighting manufacturers and high-level retail lighting buyers who supply these stores. We discuss below some possible explanations for these differences.

Table 2-16
Whether Retailers Stock CFLs All Year Round
According to Store Managers

	PG&E/SCE Combined								
Stock CFLs year round?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	86%	100%	100%	80%	79%	94%	71%	100%	100%
No	12%	0%	0%	16%	21%	6%	25%	0%	0%
DK/Refused	1%	0%	0%	4%	0%	0%	4%	0%	0%
Sample size	140	22	10	25	29	18	24	8	4
	PG&E								
Stock CFLs year round?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	93%	100%	100%	82%	92%	91%	88%	100%	100%
No	7%	0%	0%	18%	8%	9%	13%	0%	0%
DK/Refused	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sample size	70	15	5	11	12	11	8	6	2
	SCE								
Stock CFLs year round?	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	80%	100%	100%	79%	71%	100%	63%	100%	100%
No	17%	0%	0%	14%	29%	0%	31%	0%	0%
DK/Refused	3%	0%	0%	7%	0%	0%	6%	0%	0%
Sample size	70	7	5	14	17	7	16	2	2

We asked the store managers who said they stocked CFLs all year round whether they also stocked ULP-discounted CFLs year round. Across all retail channels over two thirds (69%) of the store managers said that they did. However, less than a third of the Large Home Improvements stores, and about half of the Large Grocery and Drug store managers said that they did (Table 2-17). The Small Grocery channel was the only retail channel where the store managers said that they sell ULP-discounted CFLs all year round. This may be due to the relatively low volume of CFL sales in these stores, which allows them to preserve their allocation of ULP-discounted CFLs all year round.

Table 2-17
Whether Retailers Stock ULP-Discounted CFLs All Year Round According to Store Managers

Stock ULP-discounted CFLs year round?	PG&E/SCE Combined								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	69%	68%	30%	50%	100%	53%	82%	88%	75%
No	30%	32%	70%	50%	0%	41%	18%	13%	25%
DK/Refused	1%	0%	0%	0%	0%	6%	0%	0%	0%
Sample size	121	22	10	20	23	17	17	8	4
Stock ULP-discounted CFLs year round?	PG&E								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	77%	67%	40%	67%	100%	70%	100%	83%	100%
No	22%	33%	60%	33%	0%	20%	0%	17%	0%
DK/Refused	2%	0%	0%	0%	0%	10%	0%	0%	0%
Sample size	65	15	5	9	11	10	7	6	2
Stock ULP-discounted CFLs year round?	SCE								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	61%	71%	20%	36%	100%	29%	70%	100%	50%
No	39%	29%	80%	64%	0%	71%	30%	0%	50%
DK/Refused	0%	0%	0%	0%	0%	0%	0%	0%	0%
Sample size	56	7	5	11	12	7	10	2	2

Interestingly when we asked the high-level lighting buyers whether they stock ULP-discounted CFLs year-round, only two buyers (14%) of them said that they did (Figure 2-28). Both of them represent retailers that participate in the point-of-sale part of the ULP and they said that this aspect of the program provides quicker access to the CFLs than the manufacturer buydown

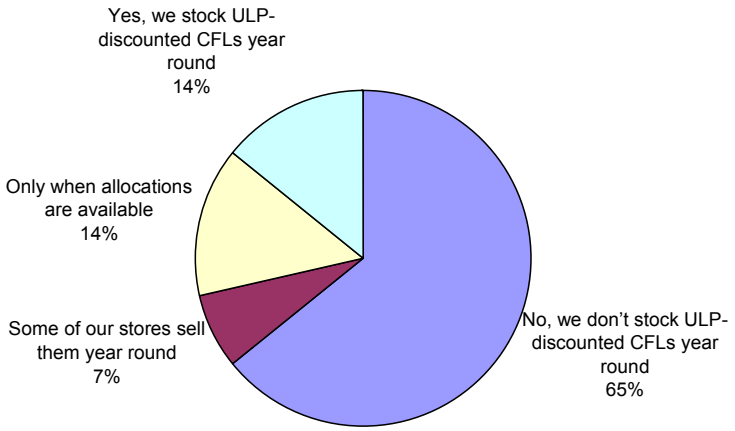
component of the ULP (which they participate in also). Both of these retailers also use CFL suppliers with US-based warehousing, which also means quicker re-supply of CFLs.

Two other buyers said that their stores keep ULP-discounted CFLs in their stores year round only when ULP allocations are available year round. One of these buyers said that this has happened recently but was not feasible a few years ago. One buyer said that his stores with slower CFL sales have ULP-discounted CFLs year-round while those with higher sales levels eventually run through their ULP allocations. The buyers representing retailers that did not sell ULP-discounted CFLs year round also said that this was because they sell through their allocations.

We asked the five buyers who sell ULP-discounted CFLs year-round -- at least some years or at least in some of their stores -- whether they stock approximately the same number of ULP-discounted CFL year round. Only one buyer – whose stores have automatic inventory re-supply systems – said that his company did. The others said that their supplies of ULP-discounted CFLs ebb and flow. They said they typically have a large supply right after an allocation arrives then this steadily diminishes until the next allocation arrives.

Figure 2-28
Whether Retailers Stock ULP-Discounted CFLs All Year Round According to High-Level Retail Lighting Buyers

n = 14



Why would 69 percent of the store managers say that they sell ULP-discounted CFLs year round while only 35 percent of the high-level retail lighting buyers said that they did? One explanation is that the store managers represent independent and small-chain stores that are not being represented by the high-level buyers who, with one exception, work for large retail chains. For example, the high-level buyers do not represent the perspectives of the 23 store managers from the Small Grocery channel.[8] As noted above, slower CFL sales in these small grocery chains may allow their stores to stock ULP-discounted CFLs year round. Other possible explanations for the different responses of the store managers and high-level buyers include some managers not being involved with stocking CFLs year-round or else not hearing the question correctly and providing responses applicable to non-ULP CFLs only.

[8] It should be noted that the word "small" in the Small Grocery channel refers to the size of the retail chains (if they are not independent stores). Although the size of the stores in this Small Grocery channel may also be small, this can also be said of some grocery stores that belong to large discount chains that are in the Large Grocery channel.

Whether stocking practices differ depending on the CFL product type

We asked the store managers and high-level buyers who sold both non-specialty and specialty CFLs whether their stocking practices differed between these two bulb categories. Only 18 percent of the store managers (n=38) and 29 percent of the high-level buyers (n=14) said their practices were different. Those citing differences mostly mentioned giving the non-specialty CFLs larger displays or more prominent placements (e.g., near the cash registers) because these were bigger sellers.

Similarly we asked store managers and high-level buyers who sold both CFL bulbs and fixtures whether their stocking practices differed between the bulbs and fixtures. Only 17 percent of the store managers (n=35) and one of the high-level buyers (n=6) said their stocking practices were different. The one high-level buyer said that because the ULP-discounted CFL fixtures are such good values, they usually sell out pretty quickly so they display them in end-caps rather than bothering to put them on the shelves.[9]

Whether ULP-discounted and non-ULP CFLs are sold at the same time

We asked the store managers whether they ever sold ULP-discounted and non-discounted CFLs at the same time.[10] If they said "yes," we asked them whether this happens always, very often, sometimes, or not very often. The Small Grocery, Drug, and Discount channels were the channels least likely to do this (Table 2-18). As noted, the Small Grocery and Discount stores cater to lower-income consumers who demand lower prices. The Large Home Improvement store managers were most likely to say that they were always selling ULP-discounted and non-discounted CFLs at the same time.

[9] The survey did not ask the store managers *how* their stocking practices for CFL bulbs were different than for CFL fixtures.

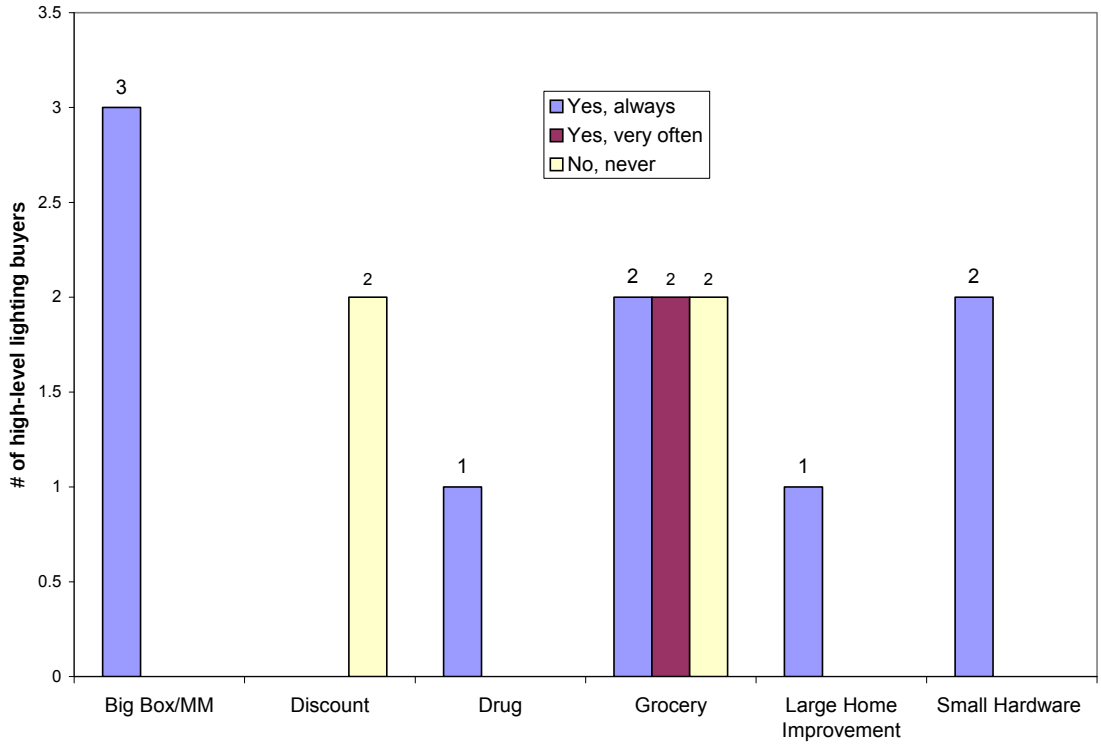
[10] Because we expected the store managers to more readily recognize the ULP discounts as being utility discounts, the question actually read: "Do you ever sell <UTILITY>-discounted CFLs and non-discounted CFLs at the same time?"

Table 2-18
Whether/How Often ULP-Discounted and Non-Discounted CFLs Are Sold at the Same Time According to Store Managers

Ever sell PG&E/SCE-discounted CFLs and non-discounted CFLs at same time?	PG&E/SCE Combined								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes, always	26%	18%	43%	17%	11%	0%	0%	50%	
Yes, very often	38%	18%	14%	17%	0%	0%	22%	0%	
Yes, sometimes	6%	18%	14%	0%	0%	22%	11%	0%	
Yes, but not very often	4%	18%	14%	8%	6%	11%	0%	0%	
No	22%	27%	14%	50%	78%	56%	67%	50%	
Don't know	3%	0%	0%	8%	6%	11%	0%	0%	
Sample size	68	11	7	12	18	9	9	2	0
Ever sell PG&E-discounted CFLs and non-discounted CFLs at same time?	**PG&E**								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes, always	39%	13%	25%	20%	25%	0%	0%	50%	
Yes, very often	58%	13%	25%	0%	0%	0%	0%	0%	
Yes, sometimes	3%	13%	25%	0%	0%	20%	0%	0%	
Yes, but not very often	0%	25%	0%	20%	0%	0%	0%	0%	
No	0%	38%	25%	60%	63%	80%	100%	50%	
Don't know	0%	0%	0%	0%	13%	0%	0%	0%	
Sample size	36	8	4	5	8	5	4	2	0
Ever sell SCE-discounted CFLs and non-discounted CFLs at same time?	**SCE**								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes, always	13%	33%	67%	14%	0%	0%	0%		
Yes, very often	16%	33%	0%	29%	0%	0%	40%		
Yes, sometimes	9%	33%	0%	0%	0%	25%	20%		
Yes, but not very often	9%	0%	33%	0%	10%	25%	0%		
No	47%	0%	0%	43%	90%	25%	40%		
Don't know	6%	0%	0%	14%	0%	25%	0%		
Sample size	32	3	3	7	10	4	5	0	0

We also asked the high-level retail lighting buyers whether their companies ever sell ULP-discounted and non-ULP-discounted CFLs at the same time. If they said "yes," we asked them whether this happens always, very often, sometimes, or not very often. The buyers that represented the Big Box/Mass Merchandise, Large Home Improvement, Small Hardware, and Drug retailers all reported that this happen always (Figure 2-29). The buyers for the Discount stores said that they only sold ULP-discounted CFLs. Only the Grocery channel showed some variation in the frequency.

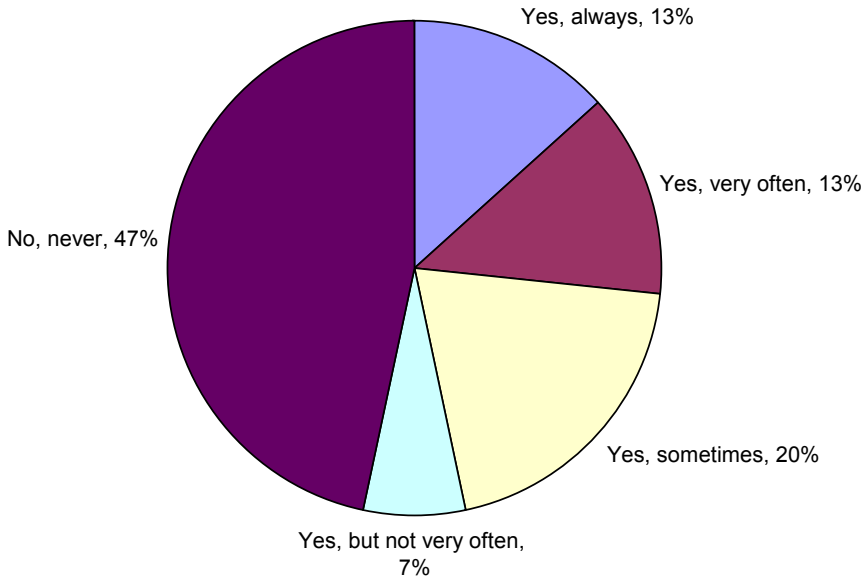
Figure 2-29
Whether/How Often
ULP-Discounted and Non-Discounted CFLs
Are Sold at the Same Time
According to High-Level Retail Lighting Buyers



Finally we asked the lighting manufacturers whether the retailers that they supply ever sell ULP CFLs and the non-ULP CFLs at the same time and, if so, how often this happens. Figure 2-30 shows that nearly half (47%) of the manufacturers said that this never happens. These tended to be smaller manufacturers who mostly supplied 99¢/$1 stores or discount grocery stores that only sell CFLs when ULP discounts are available.

Figure 2-30
Whether the Retailers That They Supply
Sell ULP-Discounted and Non-Discounted CFLs
At the Same Time
According to Lighting Manufacturers

n = 15



How long it takes to sell through a shipment of ULP-discounted CFLs

We asked the store managers how long a typical shipment of ULP-discounted CFLs lasts before being sold out. The managers of Big Box/Mass Merchandise and Small Hardware stores claimed to sell through their ULP-discounted CFLs the quickest with slightly over half saying they sold through their shipments in five weeks or less (Table 2-19). Twenty-three percent of the

Big Box/Mass Merchandise managers and 13 percent of the Small Hardware store managers reported that they did not sell through their ULP-discounted CFLs. Yet this is usually not because of slow sales but because these stores get their non-ULP lighting products through automatic replenishment systems from their warehouses, as discussed previously.

The table also shows that 50 percent of the Large Grocery store managers, 78 percent of the Small Grocery store managers, and 54 percent of the Discount store managers said that it takes nine weeks to a year to sell through their shipments of ULP-discounted CFLs. These slower sales are likely due to a combination of smaller package sizes, grocery stores catering more to occasional or "impulse" CFL buyers, and discount and discount grocery stores more likely to receive large shipments directly from smaller CFL manufacturers rather than more moderate shipments from larger CFL manufacturers delivered from their domestic warehouses.

Table 2-19
How Long It Takes to Sell Through
A Typical Shipment of ULP-Discounted CFLs
According to Store Managers

How long does shipment of PG&E/SCE-discounted CFLs last before being sold out?	PG&E/SCE Combined								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
0-2 weeks	12%	27%	0%	8%	3%	11%	13%	38%	0%
3-5 weeks	16%	27%	10%	21%	10%	28%	4%	13%	0%
6-8 weeks	3%	0%	10%	4%	0%	0%	4%	0%	25%
9-11 weeks	12%	0%	30%	13%	10%	11%	21%	13%	0%
12-15 weeks	12%	0%	0%	8%	34%	0%	13%	13%	25%
16-26 weeks	12%	0%	0%	29%	17%	17%	8%	0%	0%
27-51 weeks	4%	0%	0%	0%	7%	0%	4%	0%	50%
1 year	4%	0%	0%	0%	10%	6%	8%	0%	0%
Several weeks	2%	5%	0%	4%	0%	6%	0%	0%	0%
Several months	1%	0%	0%	0%	3%	6%	0%	0%	0%
We don't sell out	9%	23%	10%	4%	0%	6%	13%	13%	0%
It varies	3%	9%	10%	0%	0%	0%	4%	0%	0%
Don't know	9%	9%	30%	8%	3%	11%	8%	13%	0%
Sample size	139	22	10	24	29	18	24	8	4

We also asked the high-level retail lighting buyers how long it took to sell through a shipment of ULP-discounted non-specialty CFLs. They found it more difficult to generalize than the store managers because they said that there was a lot of variation in the sales volumes of their stores due to location and the promotional efforts of the store managers. A number of the high-level

buyers also noted that the sell-through period depends on the size of the allocation that the store receives. “I have one utility that will give me six pallets per store in one shipment, and one utility that will give me six cases per store per shipment, so there’s really no easy answer,” one buyer explained. For these reasons some high-level buyers refused to estimate a typical sell-through period. These considerations, along with the small number of respondents, explain the large variability in the estimates of sell-through periods that appear in Table 2-20.

Table 2-20
How Long It Takes to Sell Through
A Typical Shipment of ULP-Discounted CFLs
According to High-Level Retail Lighting Buyers

Retail Channel	# of High-Level Buyers Providing Quantifiable Estimates	Avg. # of Weeks to Sell Through a Shipment of ULP-Discounted Non-Specialty CFLs	Do ULP-discounted specialty CFLs take longer to sell through than ULP-discounted non-specialty CFLs?
Big Box/MM	2	2-7 weeks	Yes, 3-10 weeks average sell through period for specialties.
Discount	2	5-20 weeks	No, because we order smaller quantities of the specialties
Drug	1	11 weeks	In the past, no, because the quantities were smaller. However, in 2008 ordered larger quantity of dimmables and have had trouble selling through them.
Grocery	4	4-6 weeks*	Three said no difference between sell-through time of non-specialty vs. specialty CFLs. Fourth respondent said that specialty CFLs take longer
Small Hardware	2	2-7 weeks	No, because we order smaller quantities of the specialties

Note: *One buyer based her estimate on delivery of a single pallet and another based his estimate on delivery of 500-600 packages.

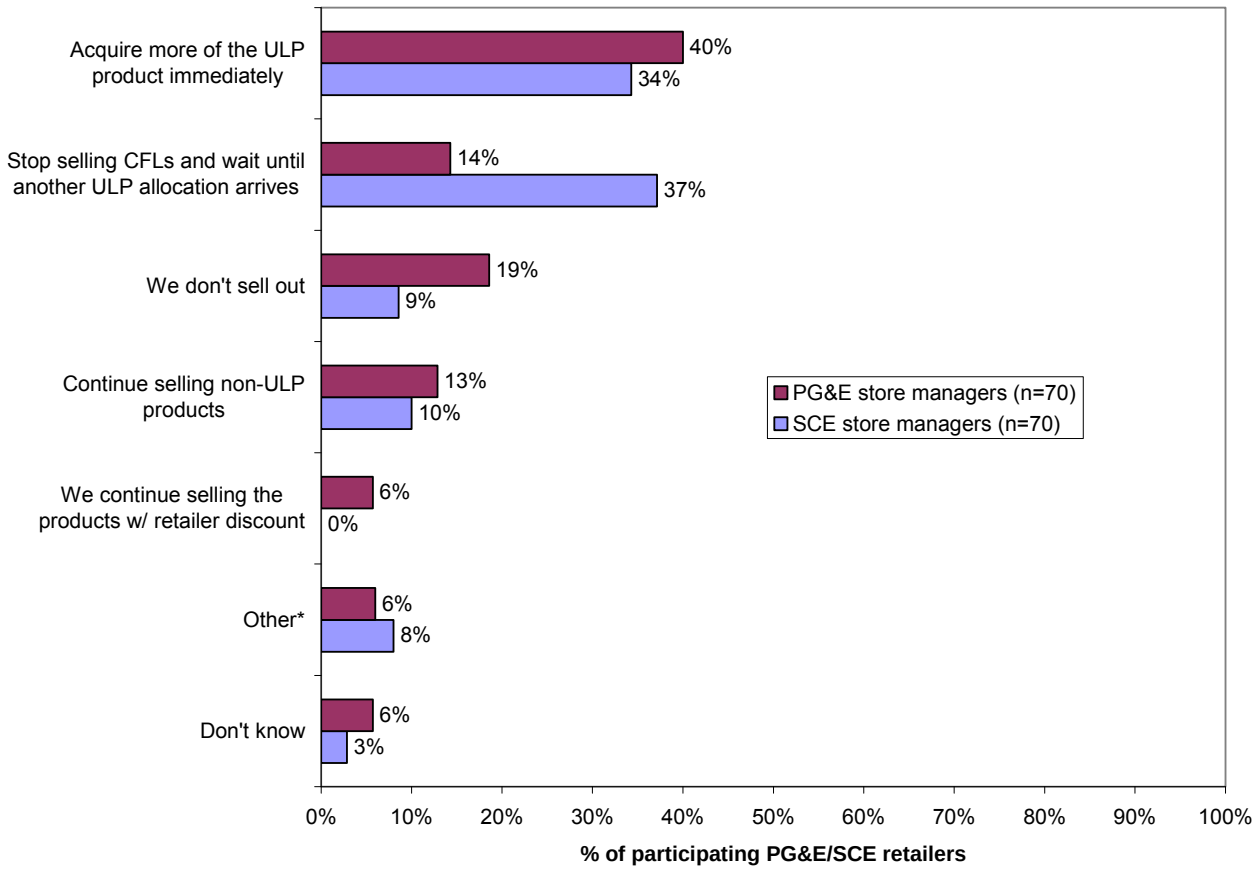
The table also shows that most of the high-level buyers said that the shipments of ULP-discounted specialty CFLs did not typically take longer to sell through than shipments of the ULP-discounted non-specialty CFLs. In most cases this was because they deliberately ordered smaller shipments of the specialty CFLs. One buyer said that package size actually made more

of a difference in the sell-through rate than whether the CFL was specialty or non-specialty. He claimed that the four-CFL packages they sold through the ULP in the past were much quicker sellers than the two-packs and singles they sell now.

What retailers do when they sell through their ULP-discounted lighting products

We asked the participating store managers: “If the supply of <UTILITY>-discounted CFLs in your store sells out, what do you typically do?” The most common responses of the store managers from the PG&E service territory were that they would reorder more ULP-discounted products or that they never sell out (Figure 2-31). The most common responses of the store managers in the SCE service territory were that they stopped selling CFLs or they would reorder more of the ULP-discounted products. As noted, the stores which never ran out, or which could acquire more ULP product immediately, tended to be the Big Box and Mass Merchandise stores with automatic replenishment systems and/or ULP suppliers with domestic warehousing. The 99¢/$1 stores and the discount Grocery stores were most likely to stop selling CFLs when they ran out of their ULP-discounted products. This was due to the price barriers (e.g., they could not sell CFLs for $1 or less) and the fact that they relied on suppliers who did not have domestic warehousing and therefore there was a lag before new supplies could be shipped from China.

Figure 2-31
What Retailers Do
When They Sell Through Their ULP-Discounted Lighting Products
According to Participating Store Managers
from the PG&E and SCE Service Territories



Note: *Other responses include: "our corporate office decides," "we receive products from another store," "we replace with like products," and "we sell like products at full price." Totals exceed 100% due to multiple responses.

We asked some of the store managers who sold specialty CFLs or CFL fixtures whether their processes for dealing with a selling out of ULP-discounted products were any different.[11] None

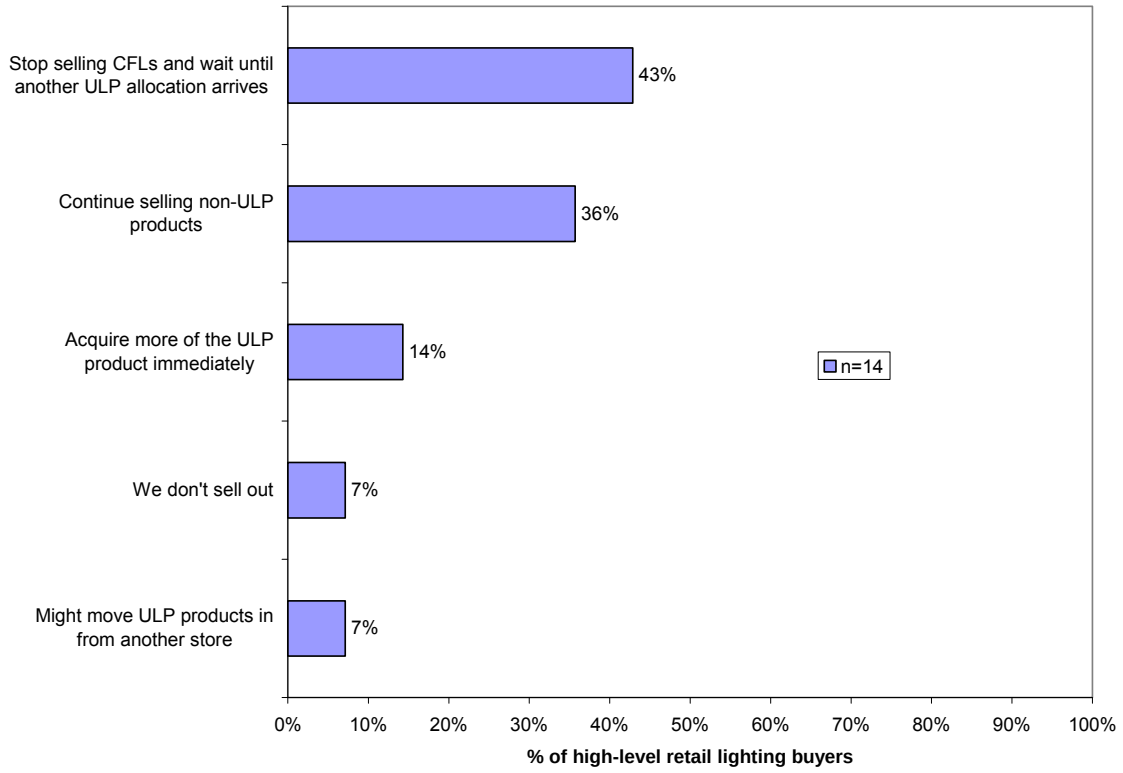
[11] To reduce the length of the survey, the PG&E/SCE retailers were randomly assigned to either Group A or Group B. While we asked all the store managers the questions that we deemed most important, some of the secondary questions were posed only to those in Group A or only to those in Group B. We posed the questions about what sellers of specialty CFLs or CFL fixtures would do

of the respondents said that their processes were any different for the specialty CFLs and only 13 percent said that the processes were different for the CFL fixtures. Those who said that the processes were different for the CFL fixtures all said that they were less likely to reorder CFL fixtures than they were CFL bulbs because the fixtures did not sell as well.

We also asked the high-level retail lighting buyers what they typically do when their ULP-discounted non-specialty CFLs sell out in one of their stores. Almost half of the high-level buyers –most of them with 99¢/$1 or discount Grocery stores – reported that they stop selling CFLs until they can get another ULP allocation (Figure 2-32). Over a third said that they continue selling non-ULP products. These were Drug, Grocery, and Small Hardware stores who carry a “main line” of more expensive CFL products year-round.

when they sold out their ULP-discounted products to only sellers of these products that were in Group B. This represented 16 specialty CFL retailers and 23 CFL store managers.

Figure 2-32
What Retailers Do
When They Sell Through Their ULP-Discounted Lighting Products
According to High-Level Retail Lighting Buyers

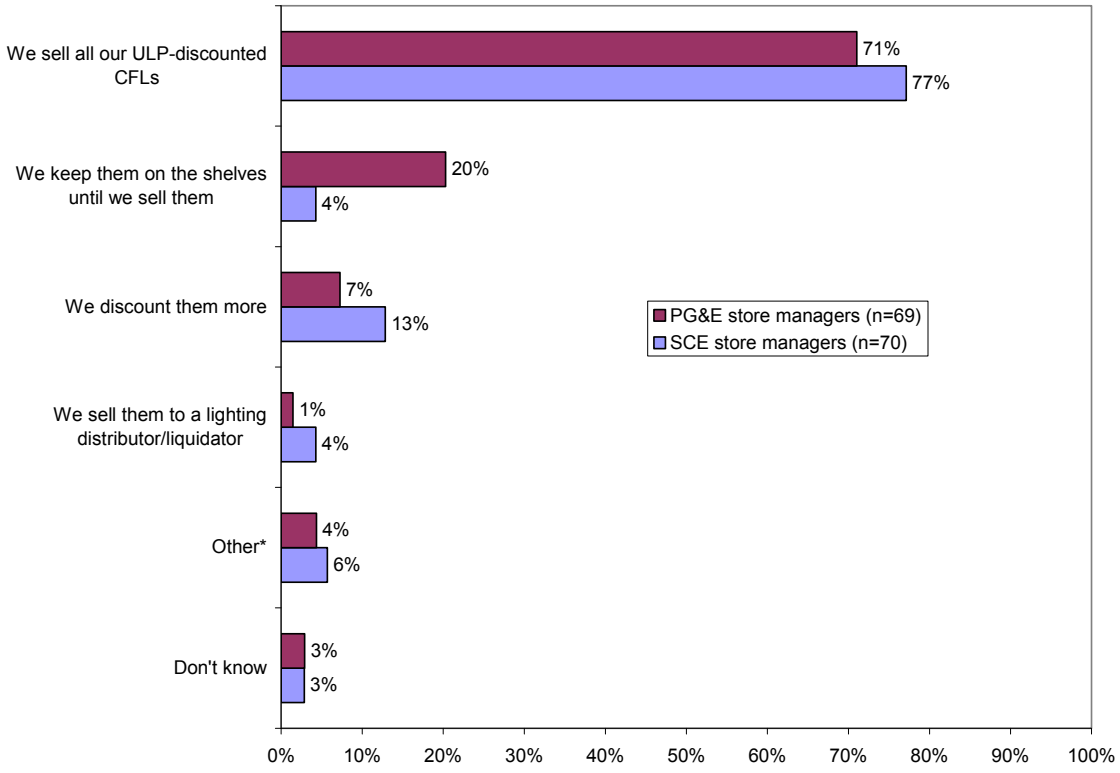


Note: Totals exceed 100% due to multiple responses.

What happens to unsold ULP-discounted products

The PG&E and SCE ULP staffs were interested in knowing what retailers do with their ULP-discounted CFLs that remain unsold for a long period of time. They were concerned that retailers seeking to dispose of these products might be contributing to the leakage problem. We asked the participating store managers: "What happens to <UTILITY>-discounted CFLs that remain unsold after a long period of time?" Figure 2-33 shows that about three quarters of the participating store managers claimed that they do not face this situation because they sell through all their ULP-discounted CFLs. Only a small percentage said that they allowed unsold ULP-discounted CFLs to leave their stores.

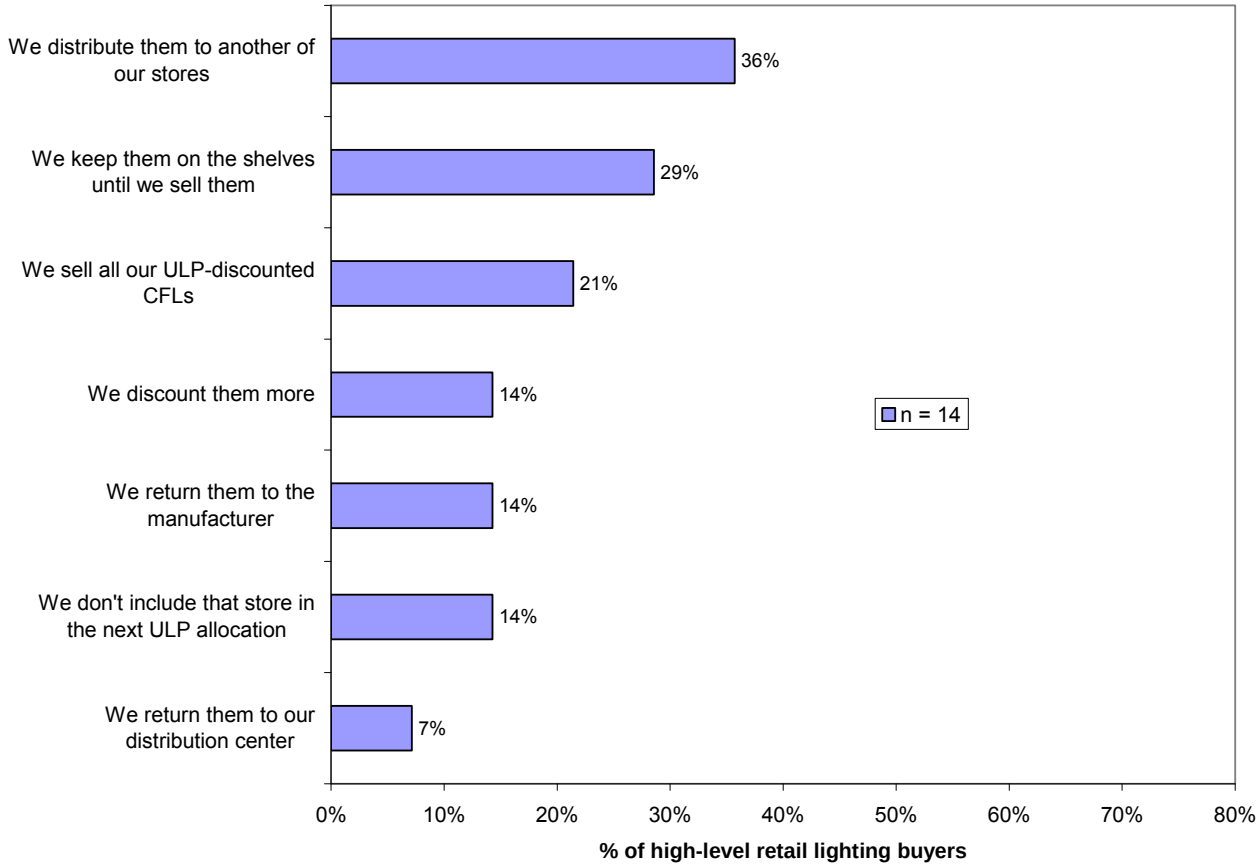
Figure 2-33
What Retailers Do When Their ULP-Discounted CFLs Remain Unsold for a Long Period of Time According to Participating Store Managers from the PG&E and SCE Service Territories



Note: *Other responses include: "we give them away," "we use them in the store," "we run a special promotion," "we return them to our distribution center," "we return them to our manufacturer," and "we distribute them to one of our stores."

We posed a similar question to the high-level retail lighting buyers: "If one of your stores has program-discounted CFLs that remain unsold after a long period of time, what typically happens to these products?" Figure 2-34 shows the high-level buyers identified a wider range of actions than the store managers for dealing with these unsold ULP-discounted CFLs. They were much more likely than the store managers to say that these unsold ULP-discounted CFLs might be redistributed to one of their other stores. A number of them said that based on location or promotional activity some of their stores simply move a lot more of the ULP-discounted CFLs more than others so it makes sense to move this product to the higher-volume stores.

Figure 2-34
What Retailers Do When Their ULP-Discounted CFLs Remain Unsold for a Long Period of Time According to High-Level Retail Lighting Buyers



Note: Totals exceed 100% due to multiple responses.

Why did the high-level retail lighting buyers provide different answers to this question than the store managers? One possible explanation is that since the high-level buyers deal with numerous stores, they are aware of a broader array of strategies for dealing with the unsold ULP-discounted CFLs than a single store manager. Another possible explanation is that the store managers may not be aware of some of the strategies for dealing with unsold ULP-discounted CFLs. For example, as discussed earlier, the most-cited way to determine the size of shipments of ULP-discounted CFLs is to base it on historical sales. Figure 2-34 also shows that some high-level buyers will cut off future allocations to stores that have trouble selling through their current allocations. Therefore whether a given stores sells through all their ULP-discounted CFLs, or is even selling ULP-discounted CFLs, may be determined by allocation decisions that the high-level buyers make further upstream and which are invisible to the store managers. Finally it is possible that some response bias manifested itself in the survey of store managers. For example, it is possible that store managers that had success selling through their ULP-discounted CFLs -- and were therefore positively disposed towards the Program -- were more likely to respond to the telephone survey than those who had difficulty selling through these CFLs.

2.2.10. CFL Pricing

This section address a number of topics related to CFL pricing including:

- CFL pricing strategies,
- The pricing of free ULP-discounted CFLs, and
- Price differences between ULP-discounted and non-program CFLs.

CFL pricing strategies

Some have argued that paying rebates to manufacturers to buy down the cost of CFLs is preferable to paying rebates to customers directly at the point of sale because customers see greater cost reductions with the first approach. One frequent assumption in this argument is that many retailers practice “keystone pricing” where they double the wholesale prices to determine the retail prices. For example, retailers receiving CFLs at wholesale prices of $3 per bulb would sell these for $6 per bulb if they were using keystone pricing. If a CFL program paid $2 to buy down the wholesale cost of the CFLs, then the final retail prices for these retailers would be $2 per CFL. In contrast, a $2 point-of-sale rebate would only reduce the price of the CFL from $6 to $4.

We were interested in finding out how many retailers participating in the ULP actually practice keystone pricing. Only eight percent of the participating store managers said that their stores use keystone pricing for the ULP-discounted CFLs (Table 2-21). However, the table also shows that over half of the store managers said they did not know how the retail prices for these CFLs were determined. Of those store managers who claimed to know how the retail prices for these CFLs were determined, the most commonly-cited strategies included basing them on competitor prices, using a standard price or markup, keystone pricing, and selling them for 99 cents or a dollar – either because that was their store format or because that's what their competitors were doing. Most of those who named their standard retail prices for their ULP-discounted CFLs cited prices of less than a dollar per CFL with some selling two or three CFLs for a dollar.

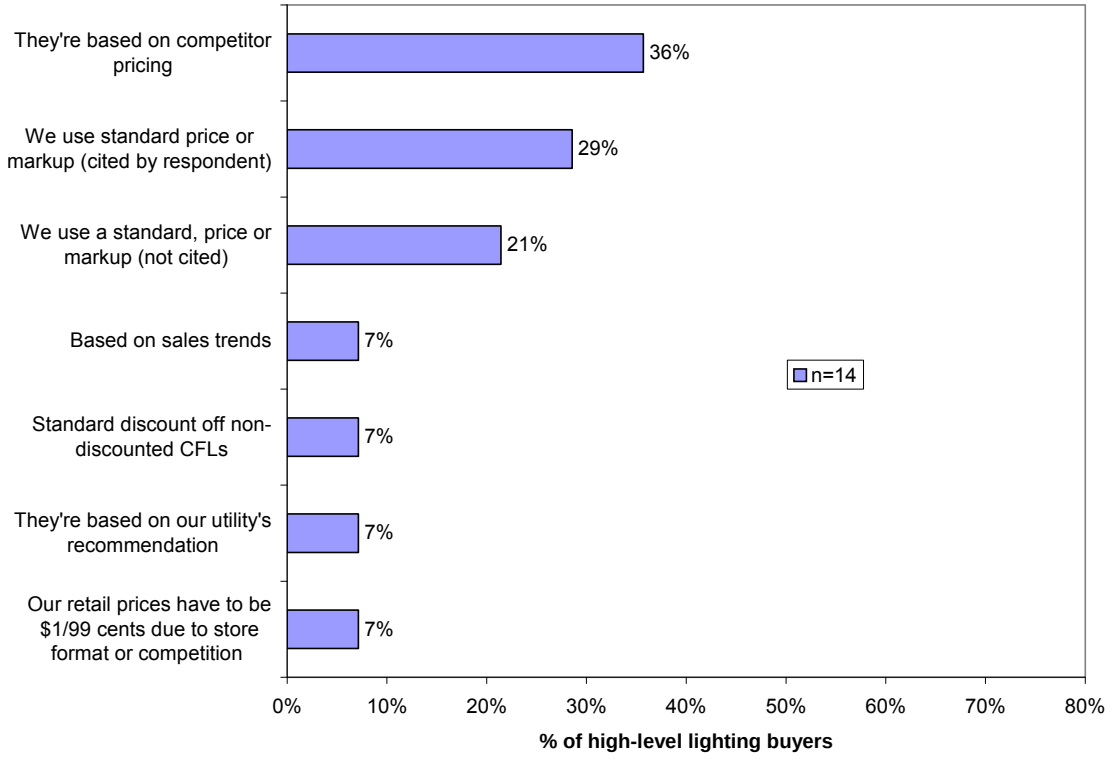
Table 2-21
How Retail Prices for ULP-Discounted CFLs Are Determined According to Participating Store Managers from the PG&E and SCE Service Territories

How retail prices of ULP-discounted CFLs are determined	PG&E/SCE								
	All Stores (n=140)	Big Box/ MM (n=22)	LHI (n=10)	Large Grocery (n=25)	Small Grocery (n=29)	Drug (n=18)	Discount (n=24)	Small Hardware (n=8)	Lighting, Other Retail (n=4)
They're determined in our corporate office & we don't know how	15%	9%	20%	24%	0%	44%	13%	0%	0%
They're based on competitor pricing	10%	0%	20%	4%	28%	0%	0%	13%	50%
We use standard price or markup (cited by respondent)	9%	5%	0%	0%	34%	0%	4%	0%	0%
We double the wholesale price (keystone pricing)	8%	5%	10%	0%	14%	6%	8%	13%	25%
We know the method isn't keystone, but don't know what it is	7%	5%	20%	12%	0%	6%	8%	13%	0%
Their retail prices have to be $1/99 cents due to store format or competition	7%	0%	0%	0%	10%	0%	25%	13%	0%
They're based on our supplier's recommendation	2%	0%	0%	0%	7%	0%	4%	0%	0%
They're based on our utility's recommendation	2%	0%	0%	0%	3%	0%	0%	13%	25%
We use a standard, price or markup (not cited)	2%	0%	0%	0%	7%	0%	4%	0%	0%
Other methods	4%	0%	0%	0%	14%	0%	4%	13%	0%
Don't know/Refused	38%	77%	40%	60%	0%	44%	29%	25%	0%

Note: Totals exceed 100% in some columns due to multiple responses. Other pricing methods included comparisons with other similar products, standard discounts off non-ULP-discounted CFLs, prices based on previous retail prices, and the adding of additional discounts when CFLs need to be moved more quickly.

We also asked the high-level retail lighting buyers if they used keystone pricing for the ULP-discounted CFLs. None of them said that they did. However, it is important to point out that over half of the store managers who said that they used keystone pricing were in the Small Grocery, Small Discount, and Lighting/Other retail chains and the high-level buyers that we surveyed represented none of these chains. Figure 2-35 shows that the high-level buyers' most-cited ways to determine retail prices for ULP-discounted CFLs were basing them on competitor pricing or using some kind of standard price or markup. Like the store managers, most of the buyers identified retail prices for ULP-discounted CFLs that were significantly less than a dollar per CFL.

Figure 2-35
How Retail Prices for ULP-Discounted CFLs Are Determined According to High-Level Retail Lighting Buyers

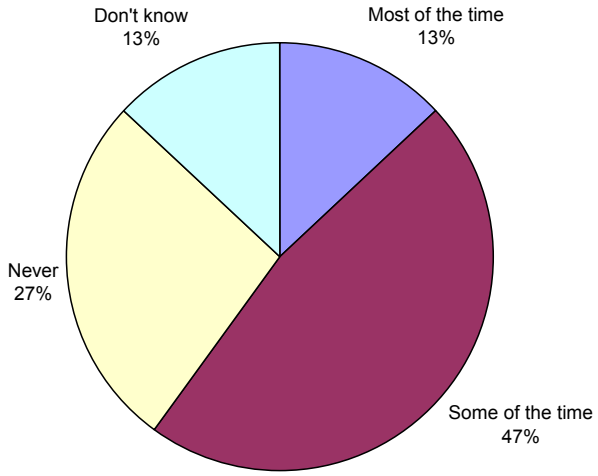


Finally we asked the lighting manufacturers: "In your experience, how frequently is this keystone pricing used for setting retail prices for CFL products. Would you say it is done always, most of the time, some of the time, or never?" Figure 2-36 shows that 60 percent of the lighting manufacturers said that retailers use keystone pricing either "some of the time" or "most of the

time." Manufacturers who worked mostly with small grocery and discount stores were more likely to say that keystone pricing was being practiced. One manufacturer representative said that retailers sometimes will use keystone pricing as the starting point for their retail CFL prices and then will discount this further if the CFLs are not selling quickly enough. A manufacturer representative who claimed that keystone pricing never happens explained that all the retailers that he was familiar with got their ULP-discounted CFLs for free. "They don't double it because they get it free," he said.[12] The next subsection discusses the prevalence of free ULP-discounted CFLs and how these CFLs are priced at retail.

Figure 2-36
The Frequency with which Retailers Use Keystone Pricing to Set Retail Prices for CFL Products According to Lighting Manufacturers

n = 15



[12] Of course, retailers could theoretically still be using keystone pricing if they gave away the CFLs they received at no wholesale cost (2 x $0 wholesale = $0 retail). The ULP discourages retailers giving away CFLs for free, although some are still doing this, as shown in the next subsection.

The pricing of free ULP-discounted CFLs

One factor that may explain the relative infrequency of keystone pricing for ULP-discounted CFLs is that many of the participating store managers in the PG&E and SCE service territories said that they received their ULP-discounted CFLs for free. Table 2-22 shows that overall a third of the participating store managers said that they had received ULP-discounted CFLs for free. In the Small Grocery and Lighting/Other retail channels three-quarters of the store managers reported receiving these free CFLs. Seventy-one percent of the high-level retail lighting buyers (n=14) also reported receiving free ULP-discounted CFLs.

Table 2-22
% of Participating Store Managers
from the PG&E and SCE Service Territories
Who Said They Received ULP-Discounted CFLs for Free

Have you ever received <utility>-discounted CFLs for free?	PG&E/SCE								
	All Stores (n=140)	Big Box/ MM (n=22)	LHI (n=10)	Large Grocery (n=25)	Small Grocery (n=29)	Drug (n=18)	Discount (n=24)	Small Hardware (n=8)	Lighting, Other Retail (n=4)
Yes	34%	0%	30%	32%	76%	6%	33%	25%	75%
No	46%	77%	30%	16%	24%	78%	54%	75%	25%
Don't know	20%	23%	40%	52%	0%	17%	13%	0%	0%

We asked the participating store managers who said that they received free ULP-discounted CFLs how they determined the retail prices for these free CFLs. The most-cited responses were that they based these prices on competitor pricing, used a standard price or markup (e.g., the two ULP-discounted CFLs for a dollar mentioned above), and gave them away (Table 2-23). We asked the high-level retail lighting buyers the same question and they gave very similar responses. Finally we asked the lighting manufacturers whether they provide any advice to retailers on how to price these free or nearly free CFL products. Almost all of the manufacturers said that they did. This advice usually took the form of a suggested retail price based on their understanding of the California CFL market, although some of the manufacturers also warned the retailers against giving away the free CFLs.

Table 2-23
How Participating Store Managers
from the PG&E and SCE Service Territories
Determined Retail Prices for the Free ULP-Discounted CFLs They Received

How retail prices of ULP-discounted CFLs are determined	PG&E/SCE								
	All Stores (n=46)	Big Box/ MM (n=1)	LHI (n=4)	Large Grocery (n=9)	Small Grocery (n=18)	Drug (n=3)	Discount (n=8)	Small Hardware (n=1)	Lighting, Other Retail (n=2)
They're based on competitor pricing	24%		50%	11%	17%	33%	25%		100%
We use standard price or markup (cited by respondent)	22%	100%			44%		13%		
We give them away	17%		50%	11%	17%	33%			50%
They're based on our supplier's recommendation	15%		25%	11%	17%		13%		50%
We use a standard, price or markup (not cited)	15%			22%	11%	67%	25%		
They're determined in our corporate office & we don't know how	11%		25%	44%					
They're discounted off the price of our non-ULP CFLs	7%				11%		13%		
Their retail prices have to be $1/99 cents due to store format or competition	4%				6%		13%		
Other methods	11%		25%		17%			100%	

Note: Totals exceed 100% in some columns due to multiple responses. Other pricing methods included utility recommendations, comparisons with other similar products, prices based on previous retail prices, and the adding of additional discounts when CFLs need to be moved more quickly.

Price differences between ULP-discounted and non-program CFLs

We asked the participating store managers who sold both ULP-discounted CFLs and non-program CFLs for the average price differences between these products. Forty-four of the store managers provided estimates with the ULP-discounted CFLs being on average $2.35 lower in price.

Figure 2-37 below shows the full range of price difference estimates.

Figure 2-37
Average Price Differences
Between ULP-Discounted CFLs and Non-Program CFLs
According to Participating Store Managers
from the PG&E/SCE Service Territories

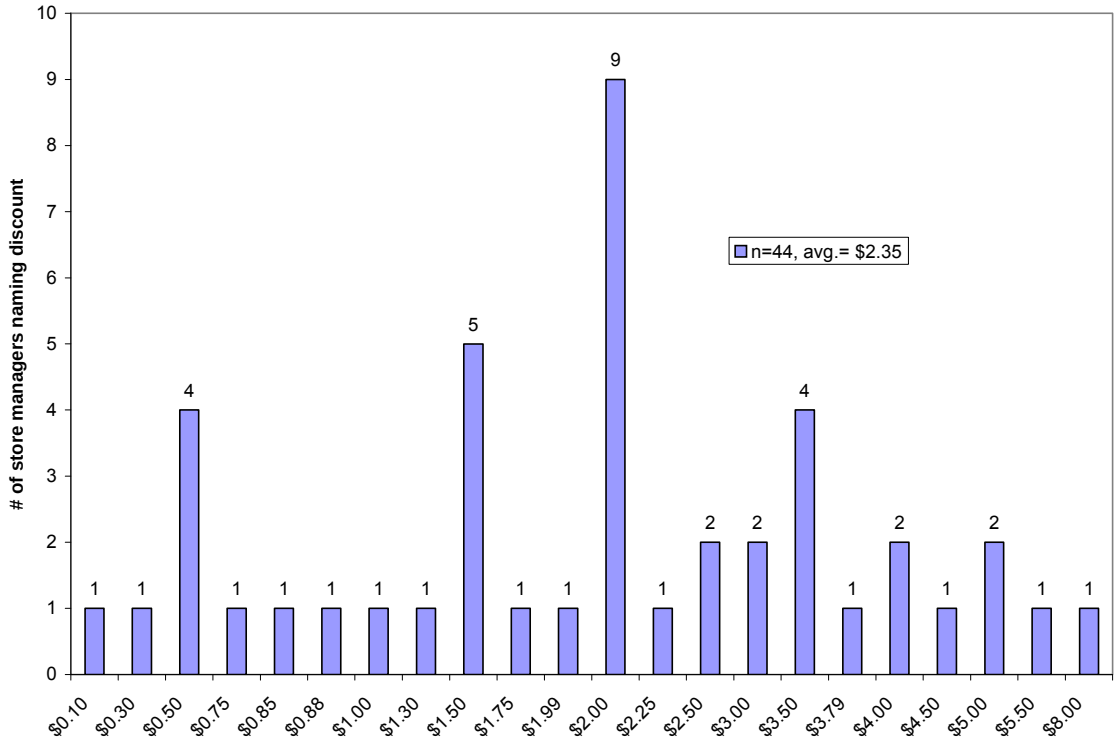
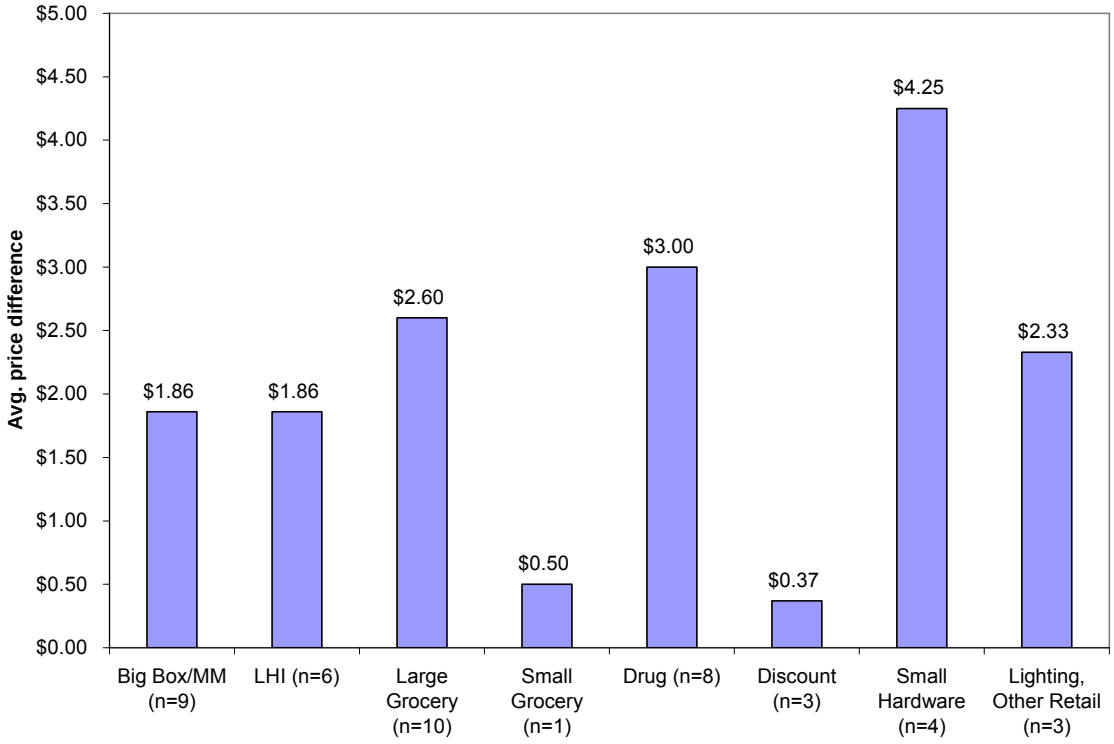


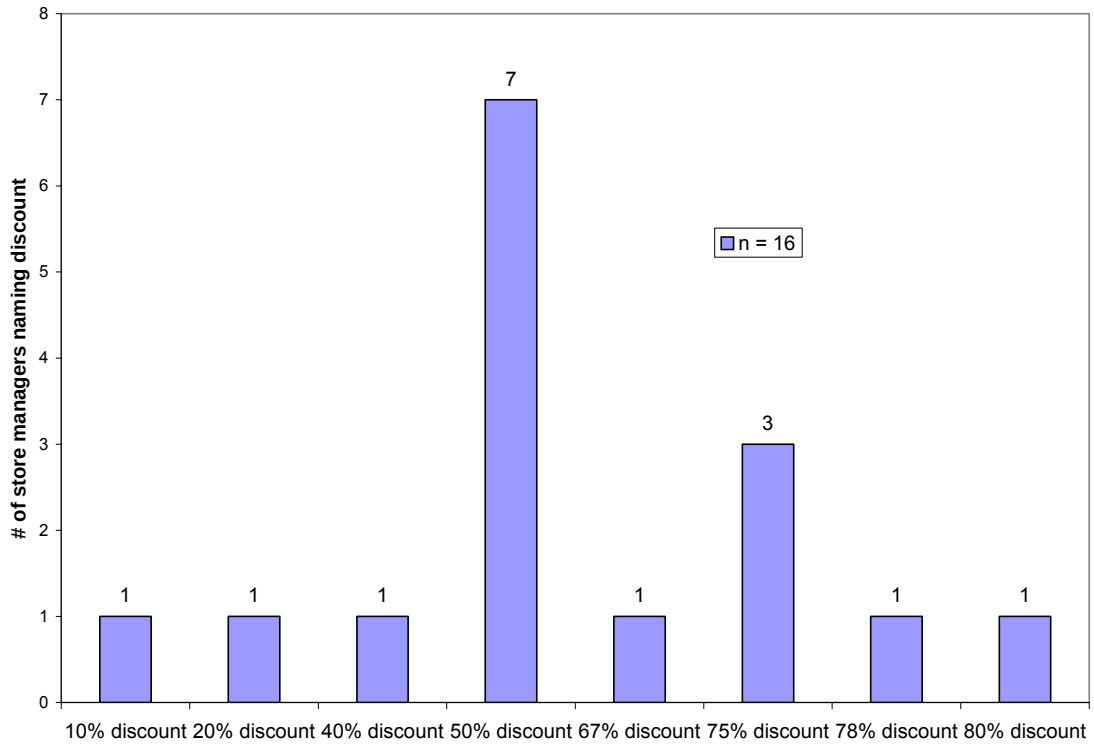
Figure 2-38 uses the same data as in the previous chart but this time breaks out the average price differences by retail channel. The chart shows that there are significant differences in the average price differences among the various retail channels. The small samples sizes for the Discount and Small Grocery channels are due to the fact that most of these stores only sell ULP-discounted CFLs and therefore have no basis of comparison.

Figure 2-38
Average Price Differences
Between ULP-Discounted CFLs and Non-Program CFLs
According to Participating Store Managers
by Retail Channel



Some store managers chose to provide their estimated price differences in percentage discount terms rather than dollars. Figure 2-39 shows that the most common discount levels were 50 percent and 75 percent off the non-program CFL prices.

Figure 2-39
Average % Price Discounts
of ULP-Discounted CFLs vs. Non-Program CFL Prices
According to Participating Store Managers
from the PG&E and SCE Service Territories



2.2.11. In-Store CFL Promotions

One manufacturer representative said that the more prominent locations that ULP-discounted CFLs often receive in stores are underestimated drivers of CFL sales. She said:

> *[Without the ULP] there's no way the CFLs would get the prime space location which is an added value. It's not usually accounted for, especially with the California IOUs. It's worth about a $500 per store value. … When you drop a pallet display in the front aisle at a Safeway … that's like unheard of, and [the ULP is] allowed to do that.*

To confirm the anecdotal evidence that ULP-discounted CFLs receive more prominent store locations than non-program CFLs, we asked the participating store managers: "When you're selling <UTILITY>-discounted CFLs in your store(s), do you ever place them in a more prominent place in your store than you do for your other lighting products?" If they said "yes," we

asked them: “Would you say it was always, very often, sometimes, or not very often?” Table 2-4 shows that nearly eighty percent of the store managers said that they give the ULP-discounted CFLs a more prominent display either always or very often. The Small Grocery, Drug, and Discount channels were the only ones where a significant portion of the store managers was not doing this. It’s possible that this was due to CFLs not being core products for the Small Grocery and Drug stores or because the ULP-discounted CFLs were about the same price as other items in the $1/99¢ stores.

Table 2-24
How Frequently Participating Store Managers from the PG&E and SCE Service Territories Give ULP-Discounted CFLs More Prominent Placement in Their Stores Than Other Lighting Products

In-store promotional practices	Frequency	PG&E/SCE								
		All Stores (n=72)	Big Box/ MM (n=11)	LHI (n=3)	Large Grocery (n=13)	Small Grocery (n=11)	Drug (n=9)	Discount (n=15)	Small Hardware (n=6)	Lighting, Other Retail (n=4)
ULP product placement: When you’re selling <UTILITY>-discounted CFLs in your store(s), do you ever place them in a more prominent place in your store than you do for your other lighting products?	Yes, always	57%	18%	33%	77%	64%	56%	47%	83%	100%
	Yes, very often	21%	55%	67%	0%	9%	22%	20%	17%	0%
	Yes, sometimes	8%	27%	0%	8%	0%	0%	13%	0%	0%
	Yes, not very often	1%	0%	0%	8%	0%	0%	0%	0%	0%
	No	13%	0%	0%	8%	27%	22%	20%	0%	0%

We asked the store managers a similar set of questions about whether they give their ULP-discounted CFLs more prominent signage than their other lighting products and how often they do this. Table 2-25 shows that over 80 percent of the store managers said that they give the ULP-discounted CFLs more prominent signage with 72 percent saying that they do this always. When asked whether their signage promoted the price reductions resulting from the ULP discounts, 77 percent of the store managers (n=65) said that they did.

Table 2-25
How Frequently Participating Store Managers from the PG&E and SCE Service Territories Give ULP-Discounted CFLs More Prominent Signage in Their Stores Than Other Lighting Products

In-store promotional practices	Frequency	PG&E/SCE								
		All Stores (n=72)	Big Box/ MM (n=11)	LHI (n=3)	Large Grocery (n=13)	Small Grocery (n=11)	Drug (n=9)	Discount (n=15)	Small Hardware (n=6)	Lighting, Other Retail (n=4)
ULP product signage: When you're selling <UTILITY>-discounted CFLs in your store(s), do you ever use signage that makes them more prominent than your other lighting products?	Yes, always	72%	45%	67%	69%	82%	78%	67%	100%	100%
	Yes, very often	10%	9%	33%	0%	9%	11%	20%	0%	0%
	Yes, sometimes	6%	27%	0%	0%	0%	11%	0%	0%	0%
	Yes, not very often	3%	9%	0%	8%	0%	0%	0%	0%	0%
	No	10%	9%	0%	23%	9%	0%	13%	0%	0%

We asked the store managers where they get the signage that promotes the ULP-discounted CFLs. Over half of them said that they use hand-made signs with only 15 percent using utility signage (Table 2-26). When we asked the store managers whether they knew that the utilities participating in the ULP provided free signage, only 21 percent said they knew this.

Table 2-26
Where Participating Store Managers from the PG&E and SCE Service Territories Get the Signage They Use for ULP-Discounted CFLs

Source/Type of Signage	PG&E/SCE								
	All Stores (n=65)	Big Box/ MM (n=10)	LHI (n=3)	Large Grocery (n=10)	Small Grocery (n=10)	Drug (n=9)	Discount (n=13)	Small Hardware (n=6)	Lighting, Other Retail (n=4)
Supplier	32%	40%	0%	20%	20%	22%	38%	33%	75%
Retailer manufactured sign	23%	40%	33%	10%	30%	22%	15%	17%	0%
Retailer handmade sign	55%	10%	67%	70%	60%	89%	62%	50%	25%
Utility sign	15%	30%	33%	0%	30%	0%	8%	17%	0%

Note: Totals exceed 100% in some columns due to multiple responses.

We asked the store managers whether they were satisfied with their signage. Using a five-point scale in which 5 equaled "very satisfied" and 1 equaled "not satisfied at all," the average satisfaction score was 4.4 (n=65). The six store managers who were less than satisfied with the signage said the signs were not colorful, not "appealing to the eye," had lettering that was too small, were not big enough, and were too big to be used in their shelves.

Finally we asked the store managers whether they used displays with illuminated CFLs in any of their stores. Only 14 percent (n=72) said that they did. However, 80 percent of the store managers who used these displays said that they helped them sell CFLs.

2.2.12. Effects of the ULP on Lighting Retailer Sales of CFL Products

Although free ridership levels for the ULP will be officially determined by the CPUC-sponsored impact evaluation of the Residential Retrofit Program, PG&E and SCE asked us to provide them with some preliminary indicators of ULP free ridership.[13] To this purpose, we asked all the participating store managers from the PG&E and SCE service territories to estimate how their sales of CFL products would be affected if the ULP buydown discounts had not been available.[14] This was done through the following series of questions:

- **A3.** If the discounts of $0.50-$2.75 per spiral CFL of less than 30 Watts were not available, do you think your store(s) would have sold these CFLs in the 2006-2007 period?;
- [IF A3 ≠ "NO"] **A4.** If the discounts of $0.50-$2.75 per spiral CFL of less than 30 Watts were not available, do you think your sales of these CFL bulbs would be about the same, lower, or higher?
- [IF A4 = "SAME" OR "HIGHER"] **A5.** Why do you think this is?
- [IF A4 = "LOWER"] **A6.** By what percentage do you estimate your store's sales of these spiral CFLs of less than 30 Watts would be lower during this 2006-2007 period if <UTILITY> discounts of $0.50-$2.75 per CFL bulb were not available?
- **A7.** I want to make sure I understand you correctly. When you say your store's sales would be [PERCENTAGE FROM QUESTION A6] lower without the <UTILITY> discounts. So you're saying that if you sold 100 CFLs in a given week with the <UTILITY> discounts, you would have only sold [100 - (PERCENTAGE FROM QUESTION A6 * 100)] that week without the <UTILITY> discounts. [IF RESPONSE IS ≠ YES THEN CLARIFY RESPONSE TO A6]

We asked the store managers who sold specialty CFLs and CFL fixtures a similar series of questions.

[13] The free ridership results in this section for the non-specialty CFLs were presented to PG&E and SCE in July 2008.

[14] We also asked the high-level retail lighting buyers and lighting manufacturers a similar set of questions. These free ridership results will be reported with the CPUC-sponsored impact evaluation of the Residential Retrofit Programs.

Free-Ridership Estimates for Non-Specialty CFLs

Figure 2-40 shows the sales-weighted free-ridership estimates that the participating store managers from the PG&E and SCE service territories made for their non-specialty CFLs. We broke out these estimates by retail channel and by the utility service territory where the retailers are located.

Our evaluation of the 2004-2005 ULP (contained within the evaluation of the 2004-2005 SFEER program) discussed many reasons why certain retail channels have higher free ridership levels than others. For example, manufacturers and retailers participating in the California CFL market have said that Large Home Improvement stores can support higher price points than discount or grocery because consumers often go to Large Home Improvement stores to seek specific lighting products and are not doing impulse buying as they might do in a grocery store or drug store, for example. In addition, since Large Home Improvement stores have broad offerings of lighting products, with each type of lighting have its own discrete section in the store, consumers are much less likely to do price comparisons between non-specialty CFLs and incandescent bulbs, as they might do in grocery or drug stores where such products are usually grouped closely together in a small lighting section.

Figure 2-40 shows that with the exception of the Big Box/General Merchandise and Grocery channels, the average free-ridership estimates of the store managers from the PG&E and SCE service territories were pretty similar. It also shows, surprisingly, that the managers of the discount stores estimated free- ridership levels of 49 percent. This was surprising because in 2007 lighting manufacturers who sold ULP CFLs through the discount channel had estimated free-ridership levels for the Discount channel to be only 3 percent.[15] These manufacturers had pointed out that, due to the 99¢/$1 price caps that these retailers operated under, it was nearly impossible to sell CFLs at these price points without receiving discounts from the ULP. Why were the managers of the discount stores providing much higher free-ridership estimates than the manufacturers who supplied them?

One possible explanation for this is that the store managers, unlike the manufacturers, did not know about, or did not consider, the extreme difficulty of supplying CFLs at 99¢/$1 or less

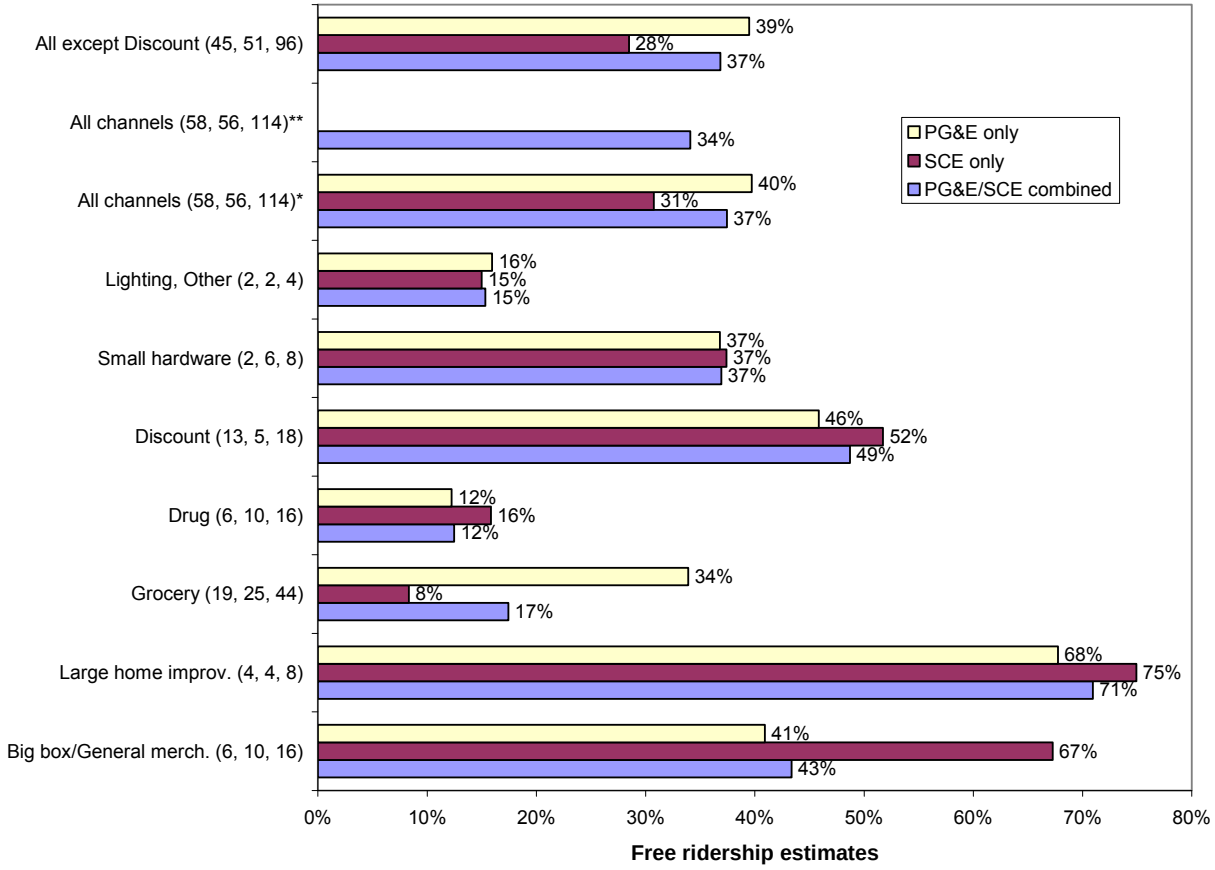
[15] This survey was conducted in the first quarter of 2007 as part of the evaluation of the 2004-2005 California Single-Family Energy Efficiency Rebate Program.

without these ULP buydown discounts. Unfortunately our 2008 survey did not collect information from the store managers about whether they had considered these price cap issues in providing their free-ridership estimates. However, it is reasonable to believe that the manufacturers would be more knowledgeable about CFL supply costs than the store managers would be. That is why we provided two total free-ridership estimates in the chart – one with the Discount channel and one without.

Another possible explanation was that while the lighting manufacturers who had been surveyed in 2007 had been asked only about sales in 99¢/$1 stores, some of the respondents to the 2008 survey were managing stores that we classified as “discount” even though they did not have a strict 99¢/$1 price cap. It was possible that these discount stores without the 99¢/$1 price caps would provide higher free-ridership estimates because their stores could sell CFLs for more than 99¢/$1.

We did examine this second theory and found that the data did not support it. Many managers of 99¢/$1 stores provided higher free-ridership estimates. In fact the free-ridership estimates provided by the managers of the non-99¢/$1 discount stores were lower, on average, than those provided by the managers of the 99¢/$1 stores.

Figure 2-40
Non-Specialty CFL Free-Ridership Estimates from Participating Store Managers from the PG&E and SCE Service Territories by Retail Channel



Note: *Retail channel weights are based on the distribution of non-specialty ULP CFL sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 non-specialty ULP CFL sales in the PG&E/SCE service territory.

Since the Grocery channel is the largest retail channel in terms of ULP CFL sales, we took a closer look at why the PG&E grocery store manager free-ridership estimates were higher than those from the SCE grocery store managers.[16] One theory we had was that managers of discount or independent (often ethnic) grocery stores, because they serve more price-sensitive

[16] Because of the small sample sizes, the differences between the PG&E grocery estimate of 34% and the SCE grocery estimate of 8% is only significant at the 80% confidence level.

low-income customers, would provide lower free-ridership estimates than managers of large-chain, non-discount grocery stores. If this was true, and if a larger proportion of the SCE grocery store respondents were in this first group, then this would explain the lower free-ridership estimates for SCE.

Table 2-27 shows that the managers of the large, non-discount grocery stores did, on average, provide higher free-ridership estimates than the managers of the discount/independent stores.[17] Yet the proportion of discount/independent grocery stores in the PG&E sample was the same as that in the SCE sample, both when measured by the number of respondents providing free-ridership estimates (44% each), and by the volume of ULP CFL sales (70% each). Therefore the reason the PG&E grocery free-ridership estimate was higher than SCE's estimate was not because its sample had a different mix of grocery store types than the SCE sample. Regardless of the grocery store type, the PG&E grocery store managers, for whatever reason, simply provided higher free-ridership estimates than their SCE counterparts.

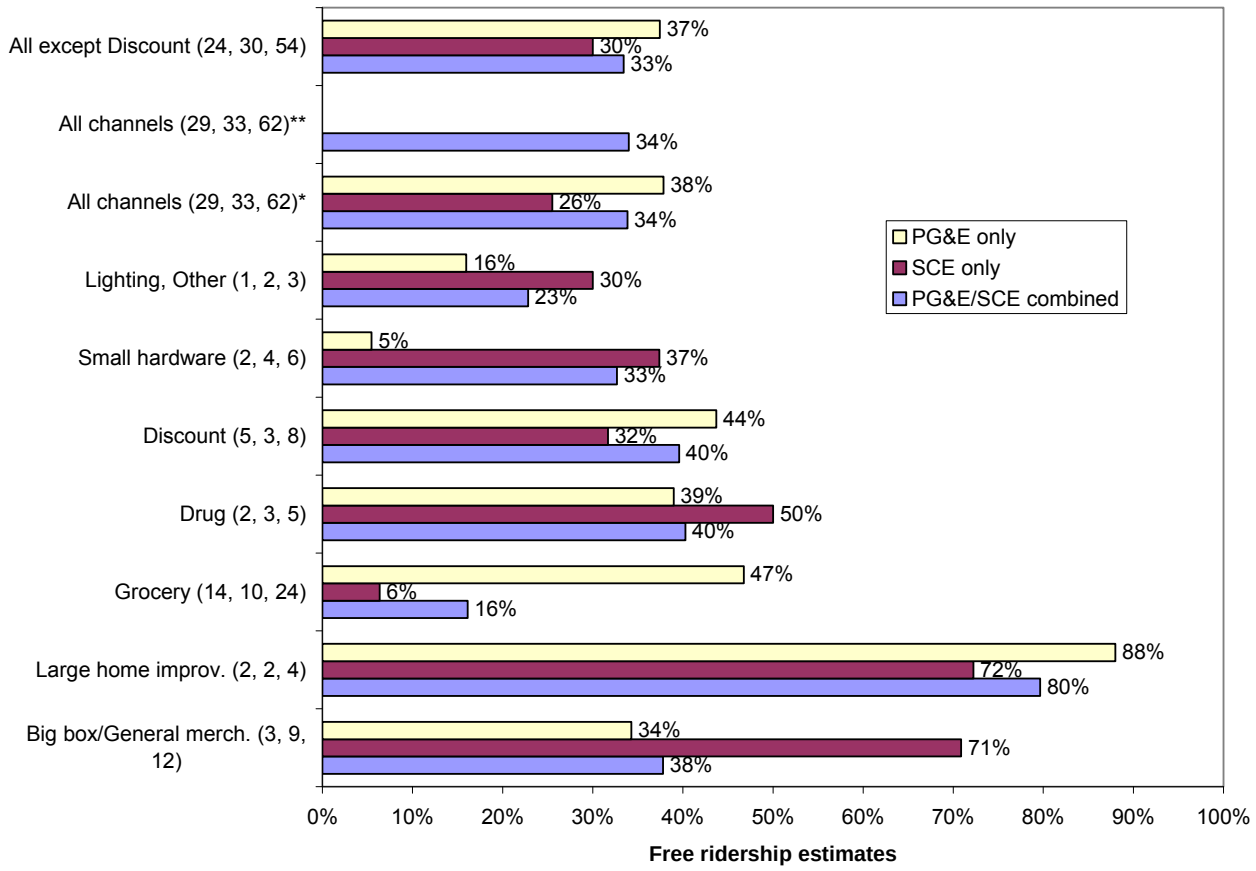
Table 2-27
Comparing Non-Specialty CFL Free-Ridership Estimates by Grocery Store Type and Utility

Utility (sample sizes)	Large/ Non-Discount Grocery Free Ridership Estimates	Discount/Independent Grocery Free Ridership Estimates	Sales-Weighted Total Grocery Free Ridership Estimates
PG&E (8, 11, 19)	39%	32%	**34%**
SCE (11, 14, 25)	19%	3%	**8%**

Earlier in the survey we had asked the store managers: "**A1.** Are you familiar with recent sales trends for CFLs [and CFL fixtures] in your store(s)?" About half (51%) of them said that they were. Figure 2-41 is similar to Figure 2-40 except that it only shows the free-ridership estimates from these store managers who said that they were more familiar with recent CFL sales trends. With the exception of the Drug channel estimates, these free-ridership estimates are not that much different than the estimates provided by the whole retailer population.

[17] Although because of the small sample sizes, the difference between the 39% and 32%, and even between the 19% and the 3%, are not statistically significant.

Figure 2-41
Non-Specialty CFL Free-Ridership Estimates from Participating Store Managers Most Knowledgeable About CFL Sales Trends by Retail Channel



Note: *Retail channel weights are based on the distribution of non-specialty ULP CFL sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 non-specialty ULP CFL sales in the PG&E/SCE service territory.

One research question of interest is how these 2008 retail-channel-specific free-ridership estimates compare to those from the 2007 survey of ULP-participating lighting manufacturers and retailer lighting buyers. Figure 2-42 shows these comparisons. The overall free-ridership estimate of 35 percent from the 2008 store managers is very close to the estimate of 34%-37% from the 2007 market actors. However, with the exception of the Grocery and Large Home Improvement channels, the free-ridership estimates by retail channel differ greatly between the 2007 and 2008 surveys. We have already discussed above some possible reasons for the

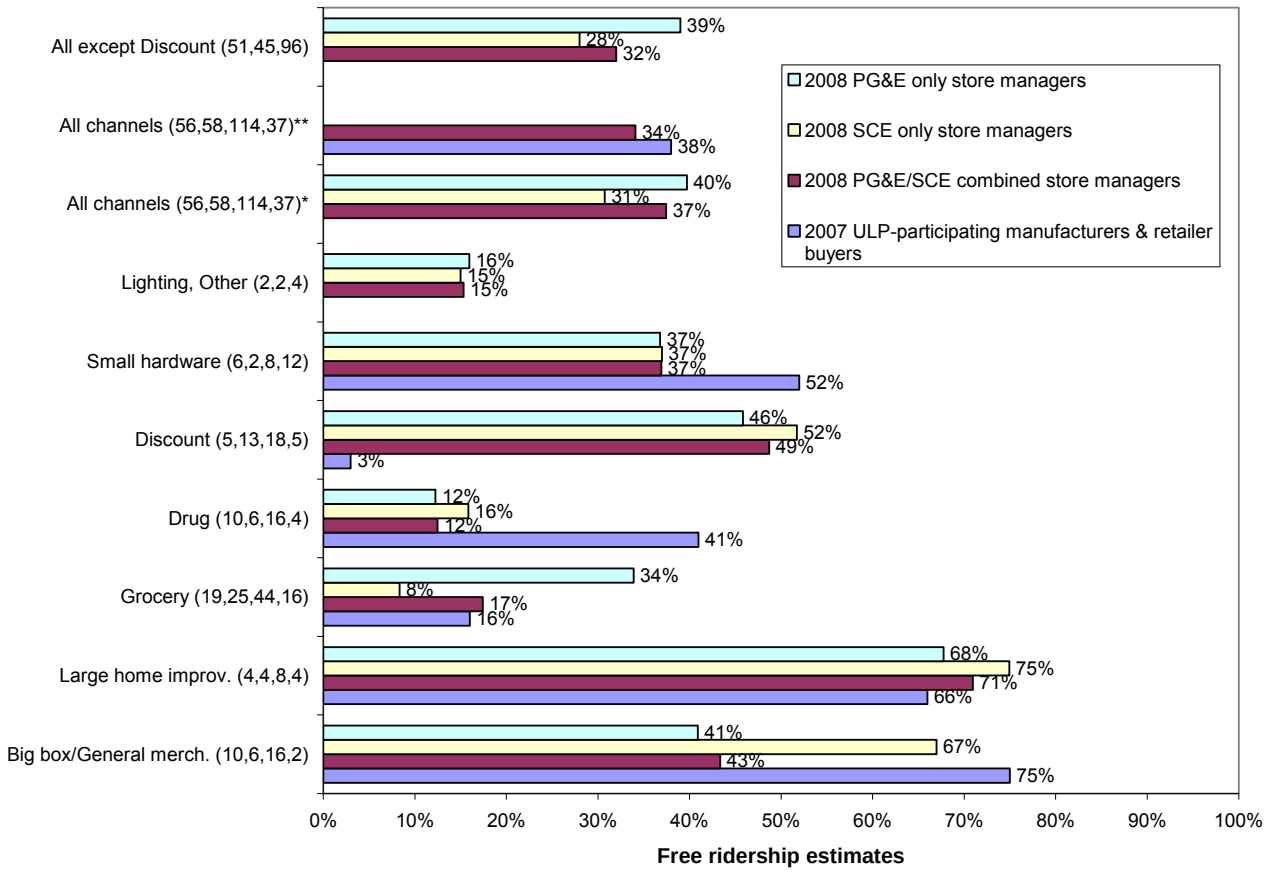
differences between the 2007 and 2008 Discount channel free-ridership estimates. Other possible explanations would include:

- *Different market actor perspectives:* The 2007 respondents were high-level representatives of lighting manufacturers or high-level lighting buyers for major retailers. The 2008 respondents were store managers. It is possible that these differences in the types of market actors would explain the differences in the free-ridership estimates. One piece of evidence for this explanation is that Figure 2-40 shows that, with the exception of the Grocery channel, the free-ridership estimates of the PG&E and SCE retailer store managers are pretty close.[18]

- *Timing issues:* The 2007 CFL market actor interviews were primarily conducted in the first quarter of 2007 while the 2008 CFL market actor interviews were was conducted in the second through fourth quarters of 2008. There may have been changes in the California CFL marketplace over the more than yearlong interval that may explain some of these differences in free-ridership estimates. However, because the 2007 interviews, with the exception of the small hardware sector, were not conducted with store managers, we are not able to see whether the store manager estimates changed between Q1 20007 and Q2 2008.

[18] The closeness in the PG&E and SCE free ridership estimates goes away when only the free ridership estimates from the store managers are used. But this may just be a case of variability naturally increasing with smaller sample sizes.

Figure 2-42
Comparing 2008 Participating Store Manager Free-Ridership Estimates for Non-Specialty CFLs with 2007 Free-Ridership Estimates from Lighting Manufacturers and High-Level Retail Lighting Buyers



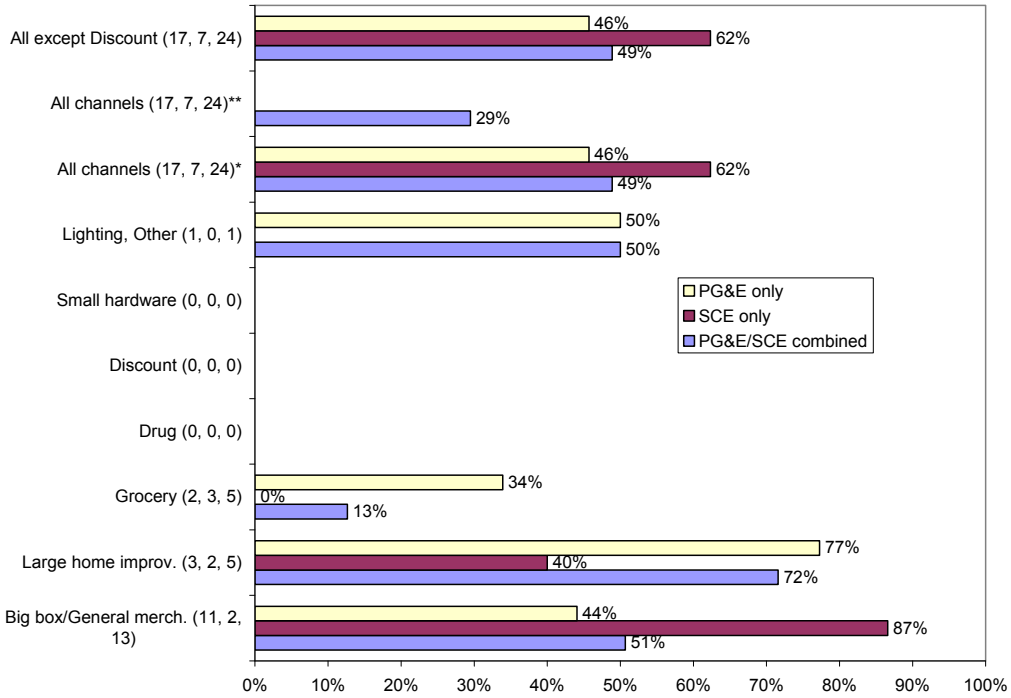
Note: *Retail channel weights are based on the distribution of non-specialty ULP CFL sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 non-specialty ULP CFL sales in the PG&E/SCE service territory.

Free-Ridership Estimates for Specialty CFLs

Only 24 store managers provided free-ridership estimates for the specialty CFLs, with 17 of them coming from the PG&E service territory. Figure 2-43 shows these estimates by retail channel with overall free-ridership estimates ranging from 29 percent to 49 percent depending

on the weighting scheme.[19] It shows that over half of the store managers came from a single retail channel – the Big Box/General Merchandise channel and all but one store manager came from either the Big Box/General Merchandise, Large Home Improvement, or Grocery channels. This was as expected since these retail channels accounted for over 99 percent of the specialty CFLs sold through the ULP. There was greater variability between the PG&E and SCE free-ridership estimates than there had been with the non-specialty CFLs. This was likely an effect of the smaller samples sizes, especially for the store managers from the SCE service territory.

Figure 2-43
Specialty CFL Free-Ridership Estimates from 2008 Participating Store Managers by Retail Channel

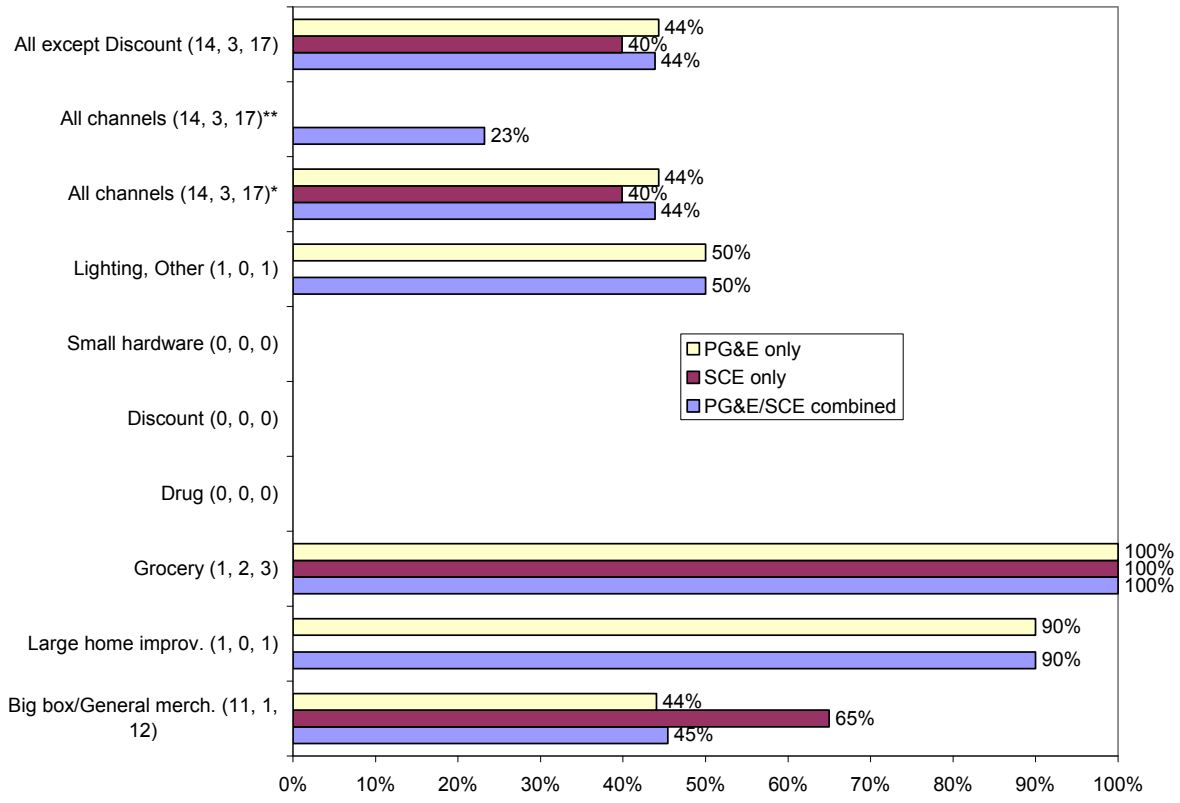


Note: *Retail channel weights are based on the distribution of specialty ULP CFL sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 specialty ULP CFL sales in the PG&E/SCE service territory.

[19] The higher free-ridership estimate calculated using sample weighting was due to specialty CFL sales of the Big Box/Mass Merchandise store managers offering free-ridership estimates accounting for a much higher percentage (90%) of the sample than they did for overall 2006-2007 PG&E/SCE ULP specialty CFL sales (20%).

Figure 2-44 shows the free-ridership estimates for specialty CFLs from those store managers who said that they were more familiar with recent CFL sales trends. Once again the majority of the estimates are coming from store managers in the Big Box/General Merchandise category. This explains why the overall free-ridership estimate based on the sample sales weights is much higher than the estimate based on total program sales weights (see footnote on previous page).

Figure 2-44
Specialty CFL Free-Ridership Estimates
from 2008 Participating Store Managers
Most Knowledgeable About CFL Sales Trends
by Retail Channel



Note: *Retail channel weights are based on the distribution of ULP specialty CFL sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 ULP specialty CFL sales in the PG&E/SCE service territory.

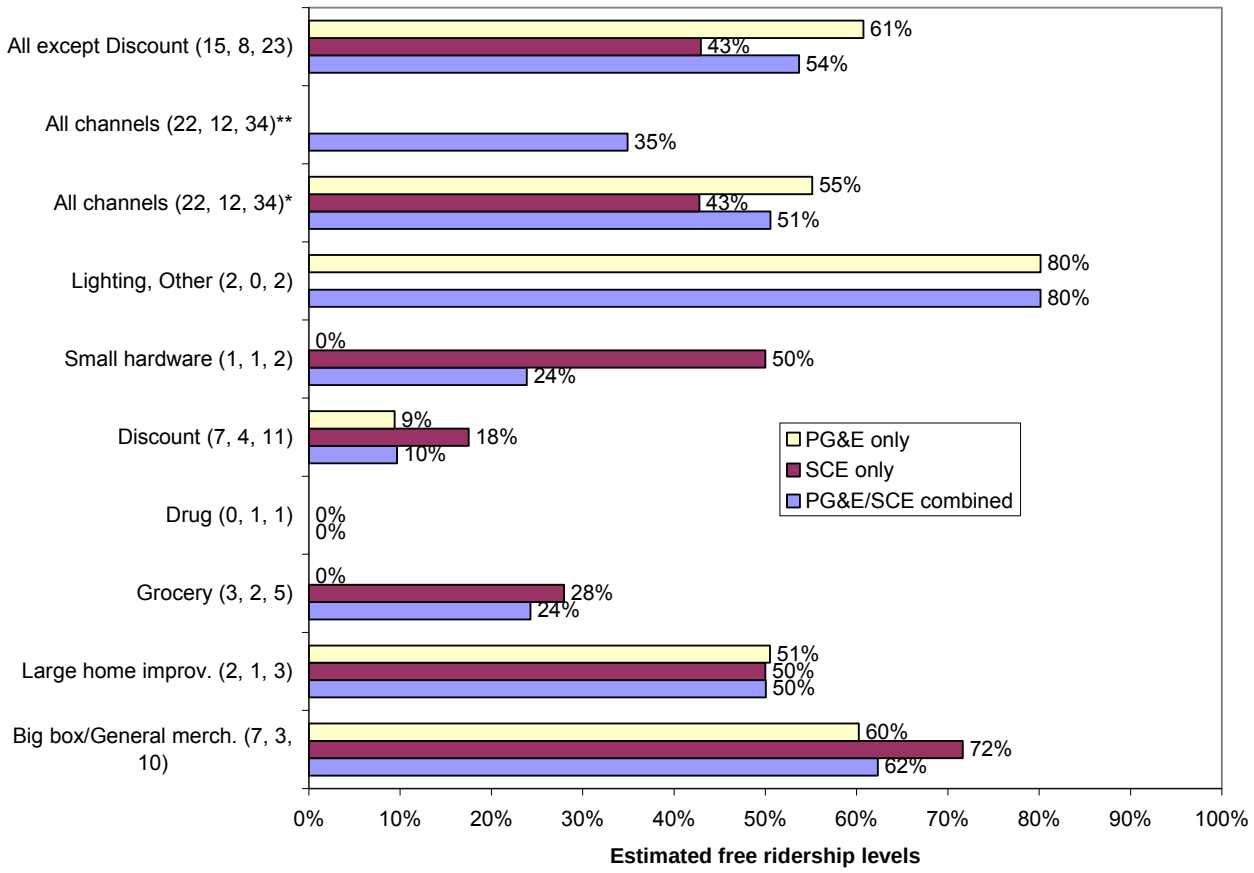
The evaluation of the 2004-2005 SFEER Program only obtained a free-ridership estimate for specialty CFLs from a single manufacturer in 2007, even though this manufacturer did account for 41 percent of the Program's specialty CFL sales during the 2004-2005 period. This free-ridership estimate was 28 percent.

Free-Ridership Estimates for CFL Fixtures

Thirty-four store managers provided free-ridership estimates for CFL fixtures, with almost two thirds of them coming from the PG&E service territory. Figure 2-45 shows these estimates by retail channel with overall free-ridership estimates ranging from 35 percent to 51 percent depending on the weighting scheme.[20] With the exception of the Small Hardware channel, the retail channel free-ridership estimates of the store managers from the PG&E and SCE service territories are fairly close (for cases where store managers from both utilities provided an estimate). However, the sample sizes for many of these retail channels are very small.

[20] The higher free-ridership estimate calculated using sample weighting was due to CFL fixture sales of the Big Box/Mass Merchandise store managers offering free-ridership estimates accounting for a much higher percentage (52%) of the sample than they did for overall 2006-2007 PG&E/SCE ULP CFL fixture sales (18%).

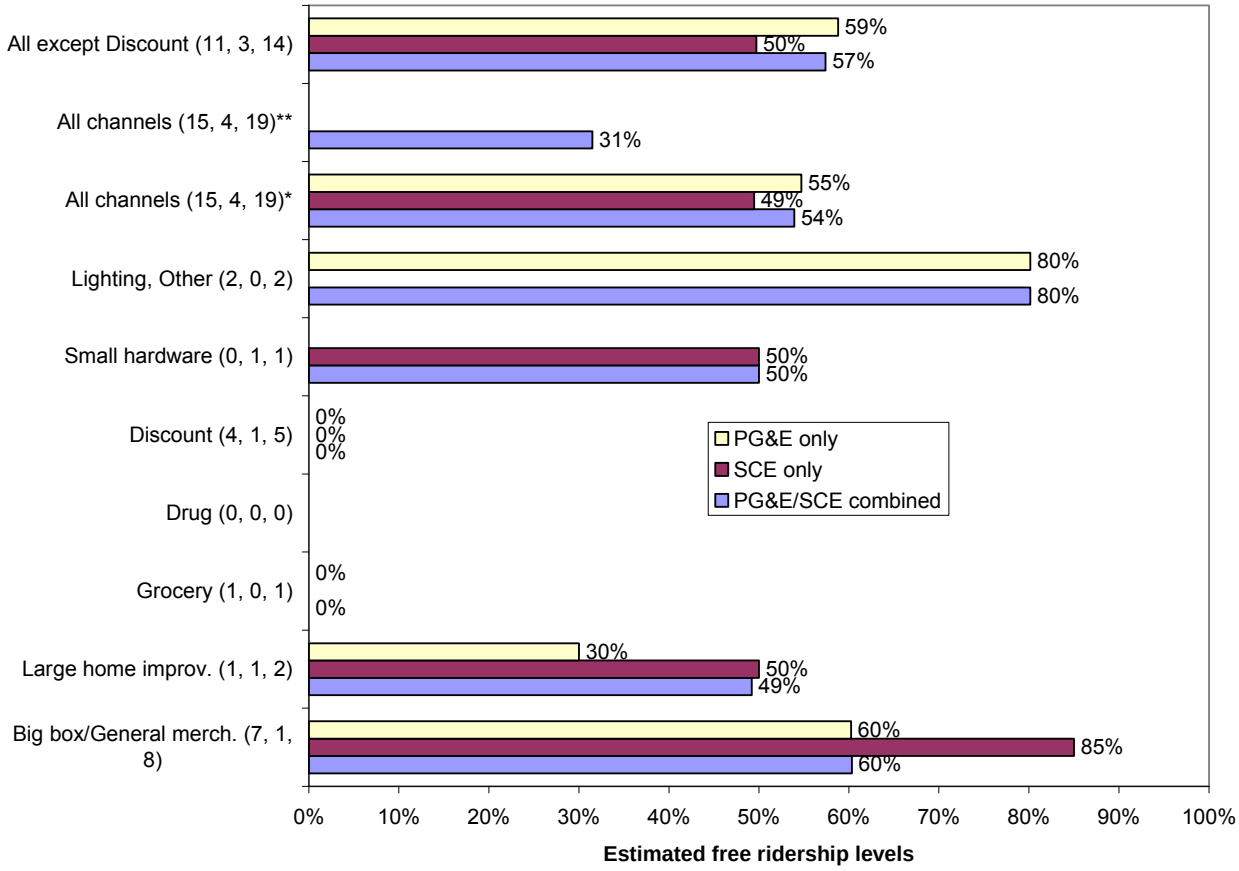
Figure 2-45
CFL Fixture Free-Ridership Estimates from 2008 Participating Store Managers by Retail Channel



Note: *Retail channel weights are based on the distribution of ULP CFL fixture sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 ULP CFL fixture sales in the PG&E/SCE service territory.

Figure 2-46 shows the free-ridership estimates for CFL fixtures from those store managers who said that they were more familiar with recent CFL sales trends. Nearly half of the estimates are coming from store managers in the Big Box/General Merchandise category.

Figure 2-46
CFL Fixture Free-Ridership Estimates
from 2008 Participating Store Managers
Most Knowledgeable About CFL Fixture Trends
by Retail Channel



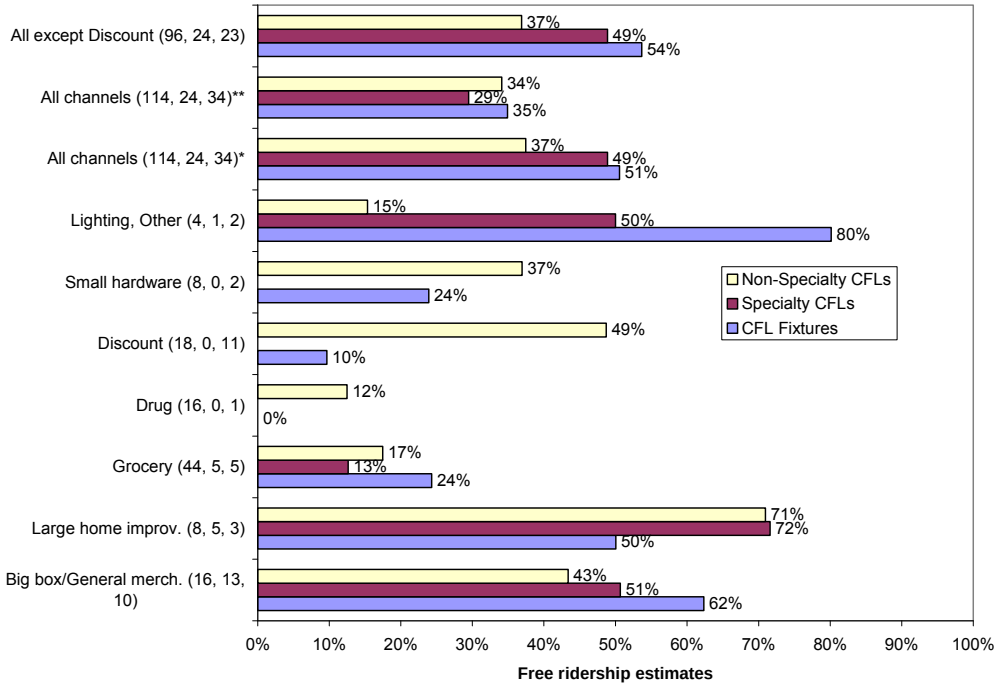
Note: *Retail channel weights are based on the distribution of ULP CFL fixture sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 ULP CFL fixture sales in the PG&E/SCE service territory.

Free-Ridership Estimates for all CFL Products Combined

Figure 2-47 combines the free-ridership estimates from all store managers for all CFL products discounted by the ULP. It shows that when all retail channels are combined, the free-ridership estimates for non-specialty CFLs, specialty CFLs, and CFL fixtures are very similar when the results are weighted by sales of the whole participant population rather than just those of the sample. However, when disaggregated by retail channel, there is more variability.

Some manufacturers and retailers who have participated in the California CFL market in the past have suggested that free ridership might be less for specialty CFLs and CFL fixtures than for non-specialty CFLs. This is because they have claimed that shoppers looking for specialty CFLs and CFL fixtures are expecting to pay a premium for products with niche applications and the willingness to pay higher prices can diminish the influence of the ULP discounts. However, Figure 2-47 shows that, except for the Big Box/Mass Merchandise and Lighting/Other Retail channels, the free-ridership estimates for the specialty CFLs and CFL fixtures were not significantly higher than those for the non-specialty CFLs.

Figure 2-47
Free-Ridership Estimates for All CFL Products from All 2008 Participating Store Managers by Retail Channel



Note: *Retail channel weights are based on the distribution of ULP CFL fixture sales in the lighting retailer sample. **Retail channel weights are based on the combined 2006-2007 ULP CFL fixture sales in the PG&E/SCE service territory.

Other Sales Effects of the ULP

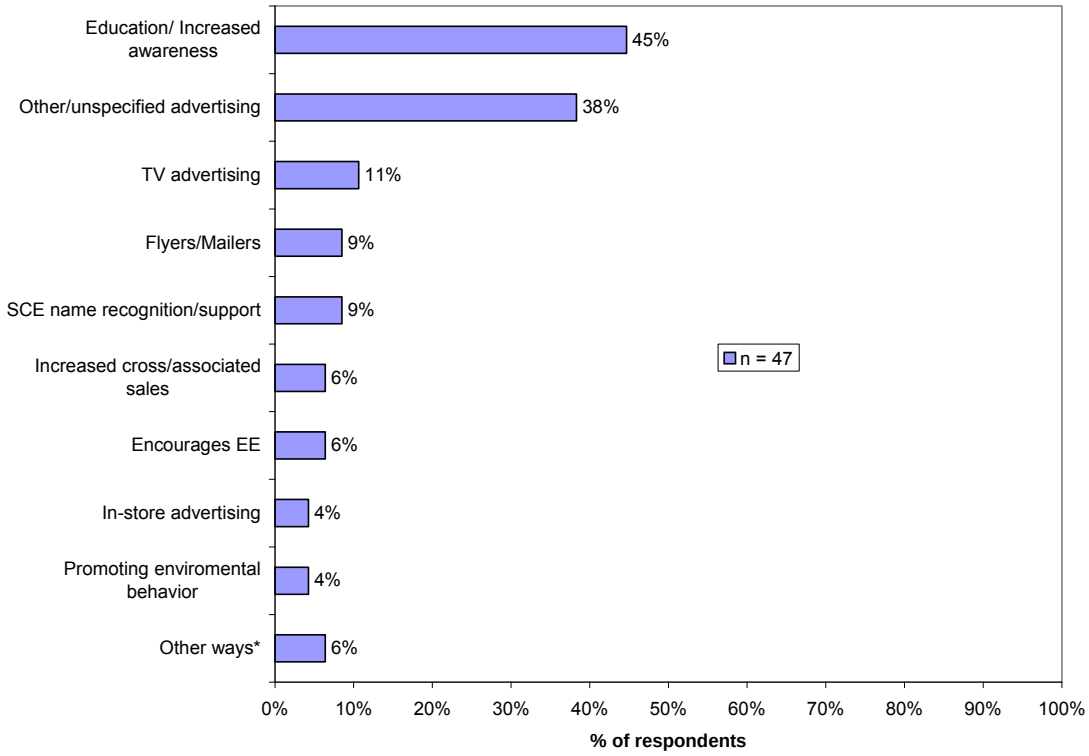
We asked the participating store managers: "Besides the discounts, do you think the <UTILITY> Residential Lighting Incentive Program does anything else to help you sell energy efficient lighting products such as CFLs?" Table 2-28 shows that across all utilities and all retailer types only about a third of the store managers said that the Program was doing something besides the discounts to help them sell CFLs. Large Home Improvement and Small Hardware were the retail channels where store managers were most likely to say that the Program was doing something besides the discounts.

Table 2-28
Whether the ULP Does Anything Besides the Discounts to Help Retailers Sell EE Lighting Products According to Participating Store Managers

Does the ULP do anything besides the discounts to help you sell EE lighting products?	PG&E/SCE Combined								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	34%	27%	50%	36%	33%	22%	29%	75%	25%
No	56%	68%	30%	52%	50%	72%	63%	25%	75%
DK/Refused	9%	5%	20%	12%	13%	6%	8%	0%	0%
Sample size	141	22	10	25	30	18	24	8	4
Does the ULP do anything besides the discounts to help you sell EE lighting products?	**PG&E**								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	40%	27%	60%	55%	25%	18%	50%	83%	50%
No	50%	67%	0%	27%	67%	82%	38%	17%	50%
DK/Refused	10%	7%	40%	18%	8%	0%	13%	0%	0%
Sample size	70	15	5	11	12	11	8	6	2
Does the ULP do anything besides the discounts to help you sell EE lighting products?	**SCE**								
	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware	Lighting/ Other
Yes	29%	29%	40%	21%	41%	29%	19%	50%	0%
No	63%	71%	60%	71%	41%	57%	75%	50%	100%
DK/Refused	9%	0%	0%	7%	18%	14%	6%	0%	0%
Sample size	70	7	5	14	17	7	16	2	2

We asked the 47 store managers who said that the ULP was doing something besides the discounts to help them sell CFLs what other things the Program was doing. The most common responses were increasing consumer awareness and unspecified types of advertising. Figure 2-48 shows the full range of responses.

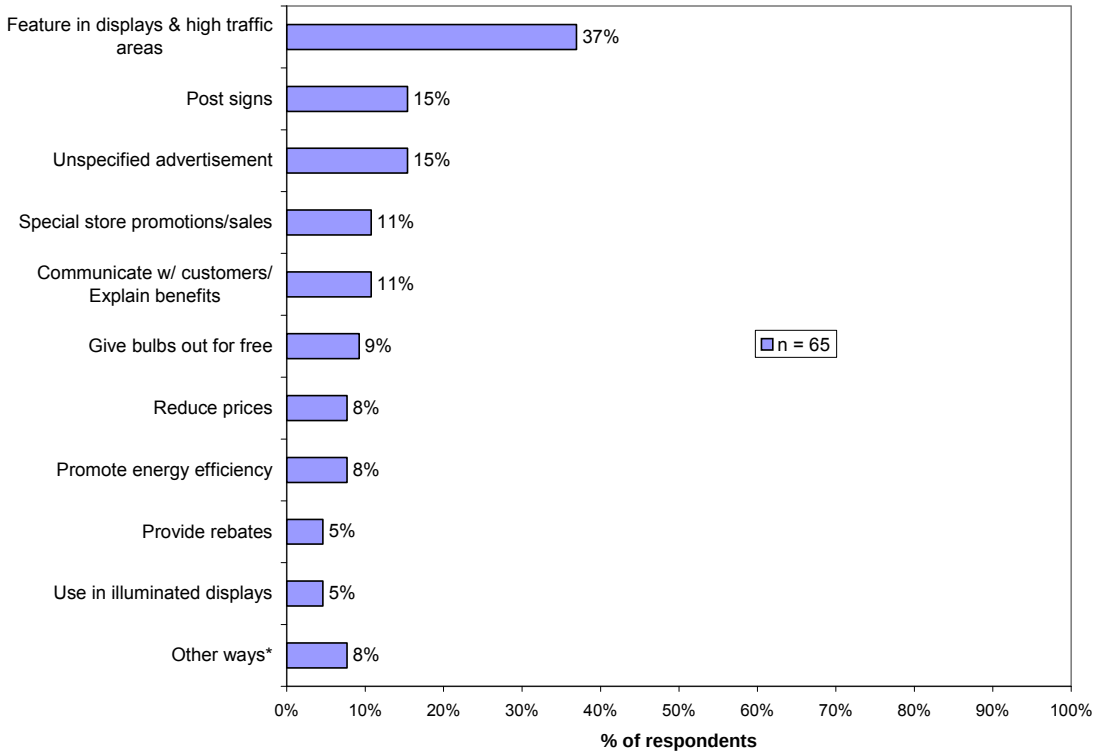
Figure 2-48
What Else the ULP Does Besides the Discounts to Help Retailers Sell EE Lighting Products According to Participating Store Managers



Note: *Other ways include radio and website advertising. Total exceeds 100% because some interviewees provided multiple responses.

We also asked the store managers whether their companies do anything on their own, without the utility program's help, to help sell energy-efficient lighting products. About half of them (51%) said that they did. Figure 2-49 shows what store managers said they did to help sell these lighting products. Displaying the CFLs in high-traffic areas of the store was the most-cited activity.

Figure 2-49
What the Retailers Do Without the Program's Help To Sell Energy-Efficient Lighting Products According to Participating Store Managers



Note: Total exceeds 100% because some interviewees provided multiple responses.

2.2.13. Satisfaction with Program Processes

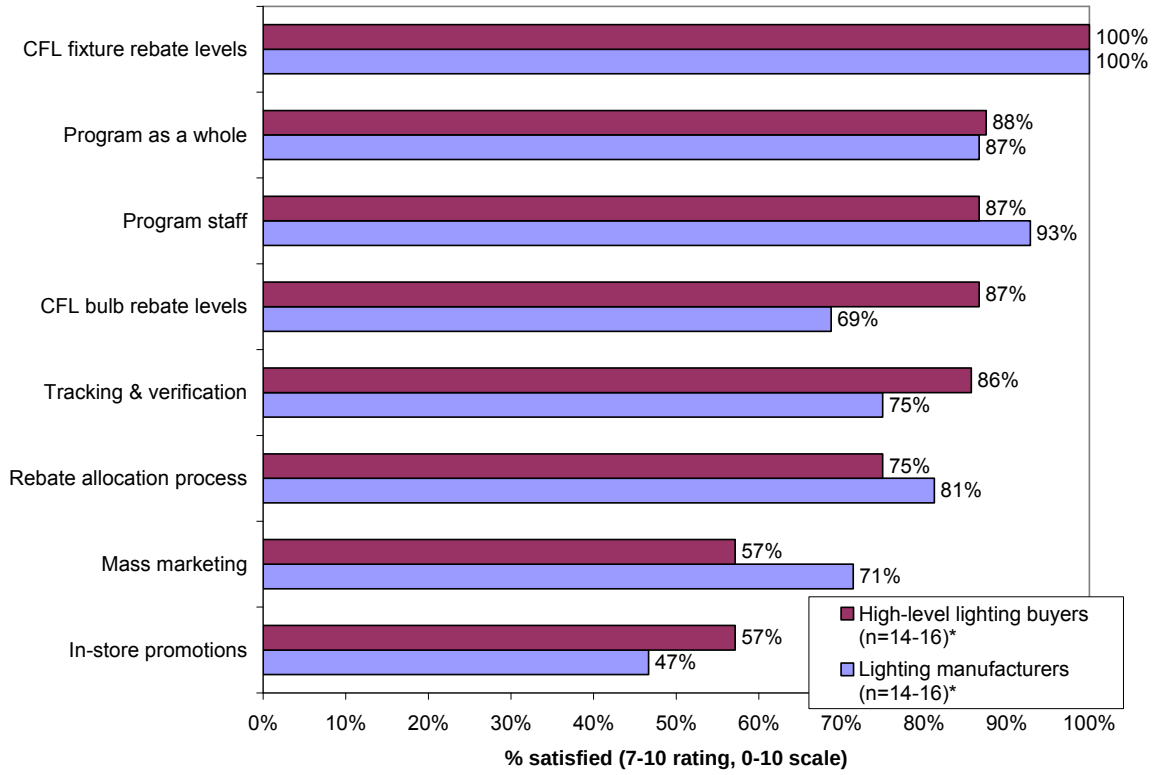
This section summarizes the satisfaction ratings that the participating store managers, high-level retail lighting buyers, and lighting manufacturers gave for the ULP processes and for the program as a whole. It also discusses various concerns or complaints about program processes that were raised by participating market actors. Finally it summarizes recommendations for program improvements that these market actors made.

Levels of Satisfaction

We asked the participating retailers and manufacturers how satisfied they were with the various ULP processes as well as with the program as a whole. This subsection shows the responses of these participating market actors and explains some of their reasons for dissatisfaction.

- *Satisfaction from the high-level lighting buyer and lighting manufacturer perspective:* Figure 2-50 shows the percentage of high-level lighting buyers and lighting manufacturers who were satisfied with the ULP and its processes. In this case, we had them use a zero to ten satisfaction scale in which ten equaled “very satisfied” and zero equaled “very dissatisfied.” We considered ratings of 7-10 to indicate satisfaction. The chart shows that all of the respondents were satisfied with the CFL fixture levels and that both the high-level buyers and the manufacturers gave their lowest ratings for the ULP’s assistance with in-store promotions. It also shows that high-level buyers were much less satisfied than the manufacturers with the ULP’s mass marketing efforts but were much more satisfied with the CFL rebate levels.

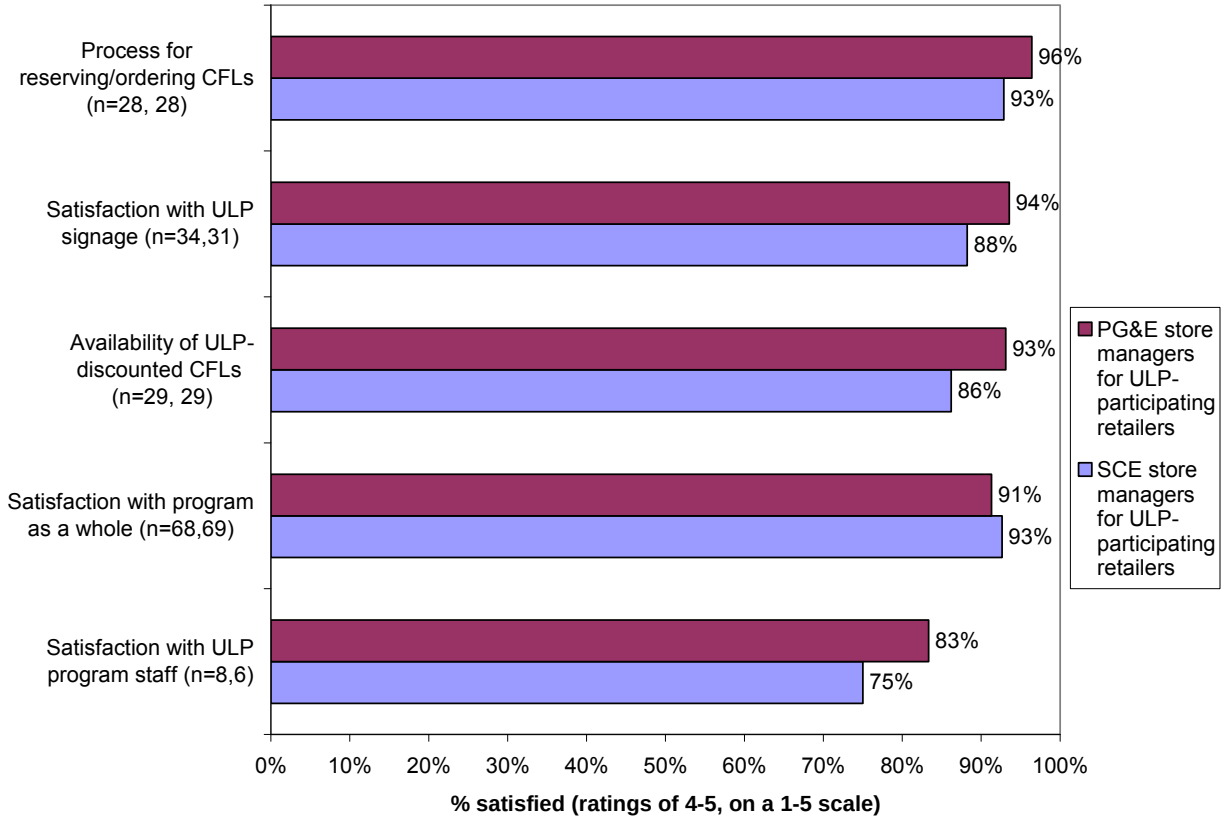
Figure 2-50
Satisfaction with ULP Processes
According to High-Level Lighting Buyers and Lighting Manufacturers



Note: *Sample sizes ranged between 14-16 for all satisfaction ratings except the ratings for CFL fixture rebate levels where the sample sizes were 4 respondents for high-level buyers and 5 respondents for lighting manufacturers.

- *Satisfaction from the store manager perspective:* Figure 2-51 shows the participating store manager average satisfaction ratings for ULP processes. In our experience any satisfaction level 90 percent or greater is very good and any satisfaction rating of 80 percent or greater is good. The chart shows that all the satisfaction ratings were in this good to very good range with the exception of the rating of the program staff. However, this last rating may be biased by a self selection effect. Store managers were only asked this question if they said that they had some communication with the ULP program staff. It is likely that store managers who were having some problems with the ULP would be more likely to call the ULP program staff than those who were satisfied with the program.

Figure 2-51
Satisfaction with ULP Processes
According to Participating Store Managers



Areas of concern

Although average satisfaction ratings for most program processes were in the good to very good range, some of the participating store managers, high-level buyers, and lighting manufacturers raised issues of concern about some program processes. The following subsections discusses these concerns

The rebate allocation process

Some of the high-level buyers complained that they had no input on the ULP rebate allocation process. They thought that the process was too manufacturer-focused and manufactured-driven. “It’s not being able to talk to the utility companies,” said one high-level buyer in explaining why he gave the allocation process a lower satisfaction rating. “They want to go just through the manufacturers … the manufacturers don’t really have a clear understanding of what a retailer can actually help deliver to the program. … It would be nice to have more … input with the utility companies and have a better understanding what the goals are and what we can both deliver together.” “My only complaint [about the rebate allocation process] is that they speak more to the vendors than they do the retailers,” said another high-level buyer. “There are a couple of utilities that I don’t think I’ve ever spoken to before.”

Most of the manufacture complaints revolved around delays in getting ULP allocations approved. Some manufacturer complaints included:

- “When we go with the customer to sign the purchase order and we submit the paper to any of the utilities, it takes two or three months for the stuff to be coming back,” one manufacturer said. “We should be able to know certain amounts or percentages of the allocation we should receive for the funding.” He also noted that long waits for allocation approvals can be difficult for the retailers also. “[If the allocation process takes] too long, the customers who haven’t heard from us … would call us and see … when they will be able to receive the bulbs,” he said. “And we don’t know how to answer the customers because every time we call in and the program managers or the person that works for the programs always tell us that they are still working on it.”

- “Delay in getting the final allocations out, especially in the past year, have been a little bit of a nightmare,” said another dissatisfied manufacturer.

- It's hard as a manufacturer to project how many CFLs to make," said a third respondent. "The reservation fund takes quite a long time so we put some … money up front on the manufacturing side and we don't actually see anything come in until several months later."

Other manufacturer complaints concerned the paperwork. "The forms are way over-complicated," said one manufacturer. Others objected to the ULP allowing smaller manufacturers to participate in the allocation process. One of the larger manufacturers said:

> *I don't understand how companies that are not in business -- that have nothing -- are allocated millions of dollars. And there are companies that bring the product in and they distribute it out of a parking lot. They don't even have a warehouse because they were allocated funds and they've gotten into business based upon the fact that they were able to buy a product that was Energy Star. And they're fly-by-night and you don't even know who they are.*

The program tracking and verification process

A number of high-level buyers and manufacturers variously described the ULP tracking and verification process as "cumbersome," "burdensome," "a very labor-intensive process," "a major hassle," and "no fun." Yet there were actually fewer complaints about this process than when we last interviewed these market actors in 2007. This may be due to some reductions in the participants' tracking and verification responsibilities. For example, in past years the suppliers were responsible for taking photos of their displays of ULP-discounted CFLs, while currently some members of the utility staff perform these functions. The lower level of complaints may also be due to the suppliers and retailers having developed systems or processes to better accommodate these tracking and verification requirements.

One high-level buyer thought that if the utilities participating in the ULP could engage the retailers more, it could make the tracking and verification process less burdensome. "If we had more collaboration with the utility company up front," he said, "we could eliminate a lot of costs for both sides in the extra stickering and stuff where we can use the technology that we have in our systems."

The high-level buyers and manufacturers gave the utility staff mixed ratings as to their enforcement of the bulk purchase rule and other ULP rules. Some of their comments included:

- “In the past year I know that PG&E, as well as SDG&E and SCE, have been sending their people out more,” said one manufacturer. “They're taking more photos and providing feedback to me that I can provide back to the retailer to say: ‘Hey, you're not complying with what you have agreed to for your allocation.’” However, this same manufacturer said: “in other states we have utility contractors actually managing more of that process for the utilities, manufacturers and the retailers and this makes it a far easier process.”

- “The majority of the utility companies have stepped up and actually have done a lot more on their part to make sure that the manufacturers and that the products are being properly labeled and promoted,” said another manufacturer.

- “They need to be more stringent with the retailer and the supplier on the rules,” said a high-level buyer. While noting that some store managers are good about following the rules, he added that “other retailers would have let me buy the whole shelf if I asked.”

CFL rebate levels

In general the manufacturers were less happy than the retailers with the ULP rebate levels (see Figure 2-50 and Figure 2-51). This was likely because the manufacturers had, on average, longer experience participating in the ULP and therefore knew more about how current incentive levels compare to past ones. Some of the manufacturer complaints included:

- “Cutting the incentives the way SCE has done this year I think will be a great detriment to their program,” said one manufacturer.

- “If you asked me that question two years ago, I would put a ten [satisfaction rating] because the production cost was low and I could live with that,” said another manufacturer. “Now because the production costs are getting higher and higher, it would be nice to increase the incentive level a little bit if they can … we get a very, very skinny profit margin.”

- “From when it started to where it is now, the buy-down is continues to be reduced regularly year to year,” said a third manufacturer.

A number of manufacturers urged that the incentive levels for specialty CFLs, in particular, be increased, not only to increase sales but also avoid reductions in quality due to production cost-cutting. Some of these comments included:

- “For some new products and specialty products, we hope that the [CPUC] can put more consideration into these new products,” said one manufacturer. “It costs more to make them and if the incentive is not high enough … the price level is not going to be low enough to cover for this consumer to buy.”

- “I don't think the incentive levels are based on current market conditions as it relates to the market penetration of non-specialty vs. specialty CFLs and CFL fixtures,” said another manufacturer.

- [Higher incentives for specialty CFLs] are need in order to have better quality in the market,” said a third manufacturer. “Because [the manufacturers] just squeeze everything just barely enough to cover their costs. And some manufacturers will find a way to cut their production costs in different ways that can affect the quality of the product.”

Program mass marketing and in-store promotions

As noted above, both high-level buyers and manufacturers gave their lowest satisfaction ratings for the ULP’s mass marketing and in-store promotion efforts. The general nature of the comments was that there was little evidence of mass marketing by the utilities and that the in-store promotions were mostly being done by the manufacturers and retailers with only minimal assistance from the utilities. In fact, the average satisfaction scores would have been much lower if not for the fact that some of the retailers and manufacturers actually preferred to do their own marketing.

Some participant comments on the ULP mass marketing efforts included:

- “They can do more to promote the program,” said one high-level buyer.”

- “I don’t think they’ve done a really good job of mass marketing,” said another high-level buyer.”

- “Basically we don’t see the utilities doing much mass marketing of CFLs,” said a manufacturer.

- “I feel that the utilities need to take more onus on promoting their own programs to all the retailers,” said another manufacturer.

Some participant comments on the ULP's contribution to in-store promotions included:

- "I don't know how much the utility people have actually done with regard to [in-store promotion] in my stores," said one high-level buyer. "All I know they ever come into the store for is to check on their products with the labels to make sure the utility is in the right place."
- "They're not working through the retailers. They're working through the manufacturers," said another high-level buyer.
- "I know that there definitely could be more contact at the store level," said a third high-level buyer. "Just go out and work more one-on-one with the stores that are selling these promotions."
- "All of our warehouses work autonomously," said a fourth high-level buyer. "And so to orchestrate any type of in-store product demonstration or education requires a lot of involvement from the merchandising staff here and coordinating it with the utility, the manufacturer, and the warehouse."
- "I even tried to work with the utilities and tried to ask them if they are willing to provide us parts of the funding to do advertising and to do activities or onsite promotions with the retail stores," said one manufacturer. "They said that they don't have the funding for doing this."
- "The biggest thing that they don't help with is implementing the program," said another manufacturer. "With other utilities in the U.S. that work through contractors, the contractors are responsible for implementing programs, for making sure signs are up, getting signs into the store by a certain time, taking photos if needed, and talking to the store managers. In our experience with utilities that have contractors, the programs were run much better than the California utilities where you have program managers sitting at a desk every day."

The ULP staff and the program as a whole

The manufacturers and high-level buyers who interacted with the ULP staff generally had positive things to say. Some typical comments included:

- "In the state of California, I believe I know the names and contacts for each of those three major utility companies, which I do not for the rest of the country," said one high-level buyer. "I think they do a great job … they seem to genuinely care about their jobs and their mission,

and they keep everything equal. It's hard to be in their position with retailers always calling: 'I need more funding, I need this, I need that.' It's a lot for them to juggle."

- "They do a very good job of planning and coordinating and following through," said another high-level buyer.
- "The communications have been very, very strong, and they follow up very well," said one manufacturer. "Usually, they answer most of my questions in a very expeditious manner."
- "They have been very good, and they really try to help us and teach us what we have to change, and what is the best we should do to work with the retailers," said another manufacturer.
- "They're very efficient. They are very dedicated to the program," said a third manufacturer.

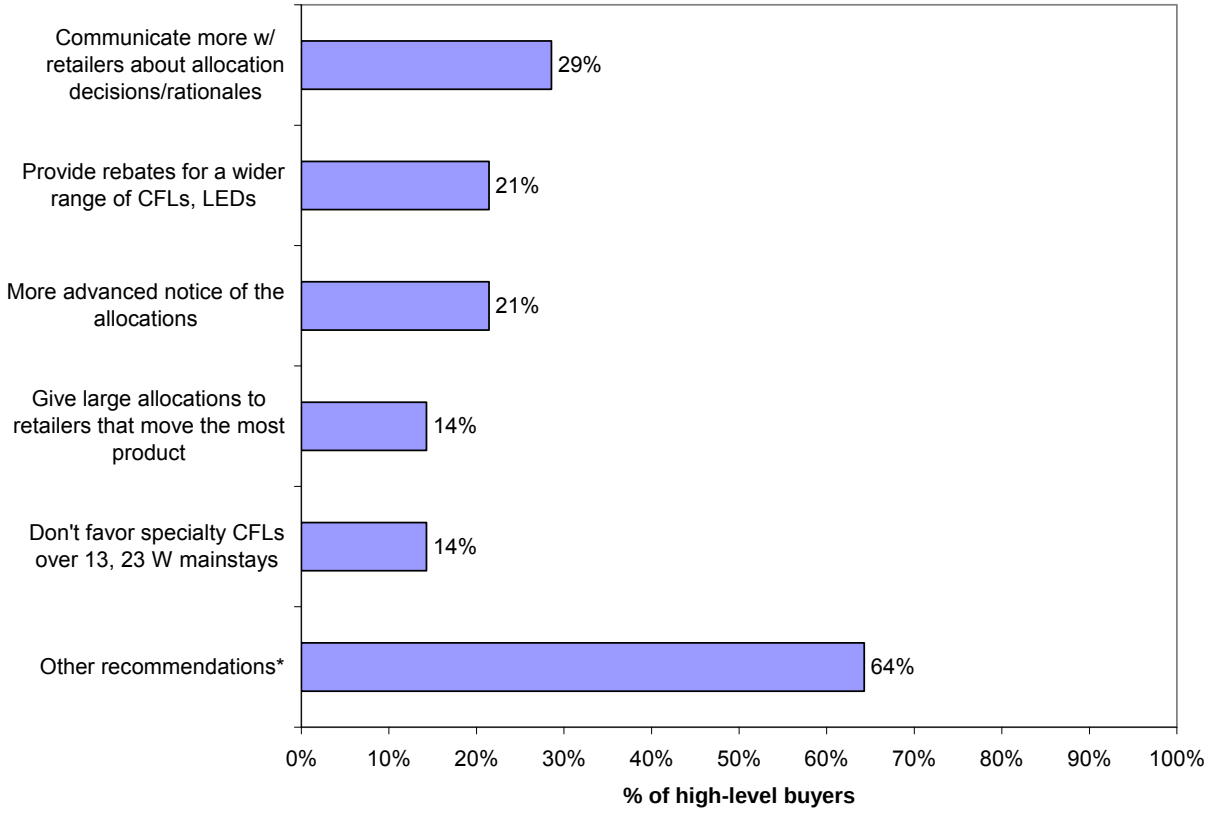
However, a few of the high-level buyers complained that the ULP staff talked only to the manufacturers and not to them.

In assessing the ULP as a whole, most of the respondents were very positive. They generally thought that the positive aspects of the program outweighed the deficiencies and the sometimes onerous participation requirements. The next section discusses some of their recommendations for program improvements.

Recommendations for Program Improvements

The high-level lighting buyers had many recommendations for program improvements. Figure 2-52 summarizes these. The most-cited recommendation was for the program to communicate more with the high-level buyers about allocation decisions and rationales. The high-level buyers claimed that they often hear about changes in program allocation strategies – such as moving away from multi-packs or moving towards specialty CFLs – long after the decision is made. They believed that if they were involved in these discussions much earlier, they would, at minimum, be better prepared and might be able to suggest more efficient implementation strategies.

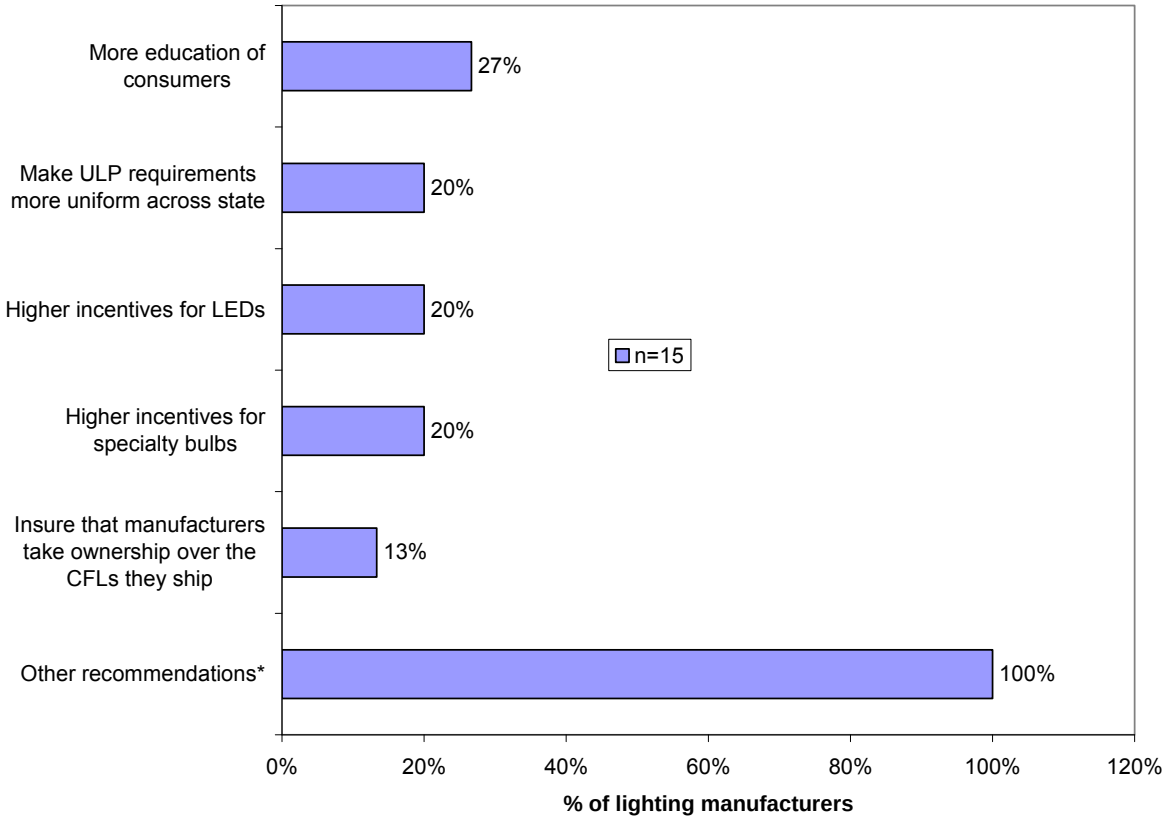
Figure 2-52
Recommendations for Program Improvements from High-Level Lighting Buyers



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other recommendations include: do more coop advertising; have more realistic expectations on how quickly retailers can get ULP products into stores, customize bulk limits for different types of retailers; work with manufacturers to improve the fit, size, brightness of CFL products; provide more customer education; pay rebates on everyday CFL sales not just special promotions; do more bilingual advertising, and have more utility representatives in the stores.

The lighting manufacturers had even more recommendations for program improvements than the high-level buyers did. Figure 2-53 shows that the most-cited recommendations were more consumer education, more uniformity of ULP requirements across the state (e.g., uniform labels, consistency in LED rebate offerings), and higher incentives for LEDs and specialty CFLs. However, there were over a dozen other recommendations that were each suggested by a single manufacturer.

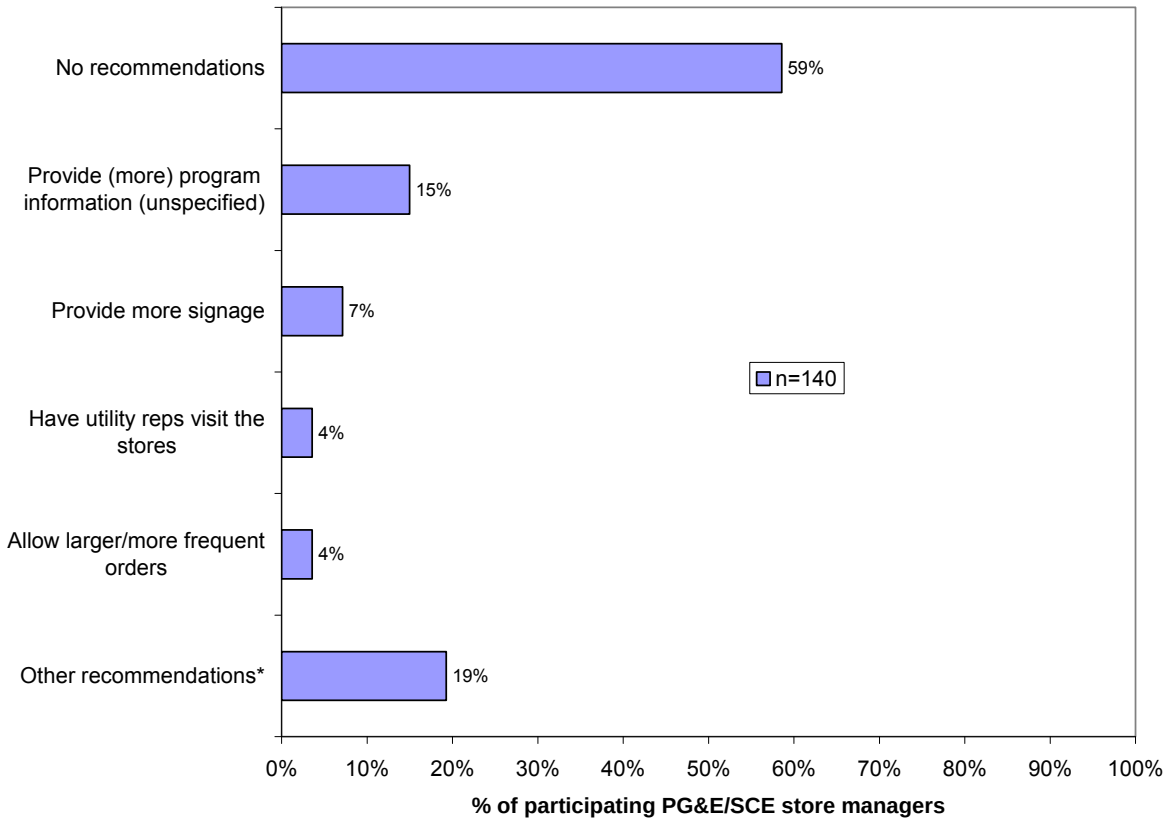
Figure 2-53
Recommendations for Program Improvements from Lighting Manufacturers



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other recommendations include: offer higher incentives for bulbs with higher power factors; offer higher incentives for bulbs with better CRI; offer rebates for a wider range of CFLs; establish maximum sizes for CFLs with a given lumen output; do more in-store marketing; do more mass advertising; do more education of retailers; contract out the development of websites where consumers can purchase utility-approved CFLs; allow municipal utilities to participate in the ULP; don't just work with retailers, work with organizations also; have separate programs for smaller, larger retailers; give larger allocations to small manufacturers; provide more advanced notice of expected allocation sizes; don't push specialty CFLs over non-specialty CFLs; and make the verification process less onerous.

Finally we asked the participating store managers: “What suggestions do you have to make it easier for retailers like <RESPONDENT’S RETAILER> to participate in this program?” Figure 2-54 shows that over half of the store managers did not have any recommendations for making program participation easier. The most common suggestions were to provide or provide more program information (the precise nature of the information was unspecified) and to provide more signage.

Figure 2-54
Ways that the ULP Could Make it Easier for Retailers to Participate According to Participating Store Managers



Note: Total exceeds 100% because some interviewees provided multiple responses. *Other recommendations include lowering CFL prices; explaining energy saving / money saving benefits of CFLs; provide lists of participating distributors/wholesalers; provide a better variety of products; provide more free products; standardize the ULP across California; explain the environmental benefits of CFLs; provide information on CFL recycling, provide emails with program updates; use recyclable packaging; provide demonstrations; streamline the ordering process; provide program brochures, make program stickers larger, provide information on other programs, deliver fewer CFLs, do fewer surveys, and make the tracking/verification process less onerous.

2.2.14. Leakage of CFL Products Outside the ULP Service Territories

This section discusses the retailer and manufacturer perspectives on CFL "leakage" – the phenomenon of ULP-discounted lighting products being sold in stores in non-IOU service territories, outside of California or on the Internet. It also summarizes their opinions on the CFL bulk purchase limits that the ULP introduced to combat the leakage problem and how they are enforcing these limits. Finally it asks them how they enforce these limits.

The ULP bulk purchase limits

In late 2007 the utilities participating in the ULP introduced bulk purchase limits that restricted the number of ULP-discounted lighting products that participants could buy in a single purchase.[21] The main purpose of this bulk purchase limit was to make it more difficult for purchasers to resell bulbs. This was prompted by discoveries that some ULP-discounted lighting products were being sold in stores outside of California or on the Internet. This phenomenon is often called "leakage."

In addition to introducing these bulk purchase limits, the utilities also told the suppliers participating in the ULP to educate their retailers about the bulk purchase limits and even to monitor their sales figures for indications that certain retailers might not be abiding by the limits. In the SCE service territory, the Notification of Allocation Form that retailers signed contained language committing them to the bulk purchase limits. One utility representative even said that "secret" shopping was being done to make sure retailers were enforcing the bulk purchase limits.

Retailer/Manufacturer awareness of the bulk purchase limits and CFL leakage

We asked the participating manufacturers and retailers a number of questions related to these bulk purchase limits and the prevalence of leakage. With some small variations in wording for the different surveys, we asked them:

- Whether they were aware of the bulk purchase limits (asked of all three manufacture/retailer groups),
- What they thought about the bulk purchase limits (asked only of the lighting manufacturers and the high-level buyers),

[21] Under the initial agreement, all three IOUs set the bulk purchase limit to 15 ULP-discounted CFL bulbs and 5 other CFL products per sale. In the first quarter of 2008 PG&E changed its bulk purchase limit to 10 CFL bulbs, 3 CFL fixtures, or 5 LED nighlights per sale. In the same period SCE changed its bulk purchase limit to 16 CFL bulbs or 5 other ULP-discounted lighting products per sale.

- How they were enforcing the bulk purchase limits (asked of all three manufacture/retailer groups),
- Whether they were aware that lighting manufacturers were helping to police the bulk purchase limits (asked only of the high-level buyers),
- Whether they had seen evidence of *their own* ULP-discounted CFLs being sold outside of California (asked only of the lighting manufacturers and the high-level buyers),
- Whether they had seen evidence of *any* ULP-discounted CFLs being sold outside of California or on the Internet (asked only of the lighting manufacturers and the high-level buyers), and
- Whether their unsold ULP-discounted CFLs would ever be sold outside the IOU service territory (asked only of high-level lighting buyers and store managers who said that they sometimes did not sell through their ULP-discounted CFLs.

Table 2-29 shows the responses of the participating manufacturers and retailers to most of these questions.

Table 2-29
Summary of Responses to Questions Related to CFL "Leakage"
According to Lighting Manufacturers, High-Level Buyers, Store Managers

Questions	Lighting manufacturers (n=15)	High-level lighting buyers (n=12-15)	Store managers (n=141,42)
Aware of bulk purchase limits?	100%	93%	23%
Aware that lighting manufacturers are helping to police the bulk purchase limits?	Not asked	57%	Not asked
Any of your ULP-discounted CFLs sold outside of California?	53%	7%	Not asked
Seen evidence of any ULP-discounted CFLs sold outside of California or on Internet?	87%	7%	Not asked
Would your unsold ULP-discounted CFLs ever be sold outside the IOU or state?	Not asked	8%	0%

The table shows that while there was a high-level awareness of the bulk purchase limits among the lighting manufacturers and high-level buyers, less than a quarter of these store managers said they were aware of these limits. This indicates that the educational efforts of the suppliers

and buyers need to improve dramatically. The fact that over half the manufacturers have seen evidence of leakage with their own ULP-discounted products, and a large majority has seen evidence of leakage with ULP-discounted products in general, suggests that leakage is a real phenomenon. However, it is important to note that many of the respondents thought that the volume of ULP-discounted CFLs that were being "leaked" was relatively small. "I think that the eBay part of it is so small to be meaningless, but it's visible," was the comment of one manufacturer.

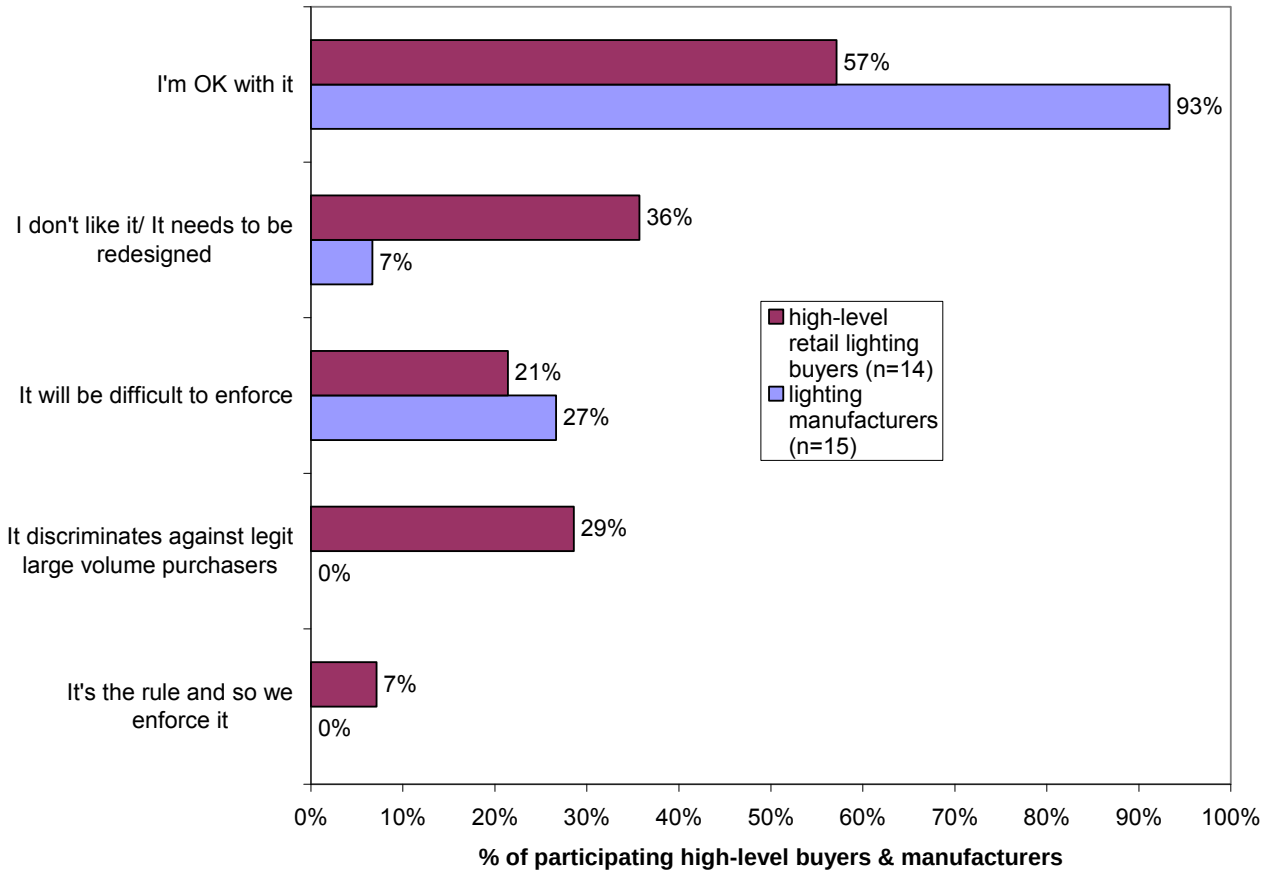
Retailer/Manufacturer opinions of the bulk purchase limits

We asked the high-level retail lighting buyers and the lighting manufacturers an open-ended question: "What is your opinion of these bulk purchases limits?" Figure 2-55 shows that nearly all the lighting manufacturers, but only little more than half of the high-level retail lighting buyers, were okay with the bulk purchase limits.[22] Most respondents who approved of the limits said that they were necessary to discourage leakage and a couple of them claimed that the limits could reduce "pantry storage" of CFLs by customers. Two manufacturers who had separate wholesale CFL distribution channels also said that they approved of the bulk purchase limits because it would likely force some large-volume CFL purchasers back into the wholesale market. When we interviewed these manufacturers in early 2007 for the evaluation of the SFEER program, some had complained that the ULP price discounts were causing builders and property managers to buy their CFLs from retailers rather than through their traditional wholesale channels.

The manufacturers and retailers who disapproved of the bulk purchase limits complained that the limits were too low; that they discriminated again legitimate volume purchasers such as builders and managers of apartment buildings, motels, or nursing homes; that they discriminated against membership stores that operated on a bulk purchase basis; that they caused the ULP to lose legitimate energy-saving opportunities; and that the CFL leakage problem was overblown.

[22] Since this was an open-ended question, we could not categorize their "level" of approval in any precise way. But the responses that were categorized as "I'm OK with it" included those who thought the limits were "OK," those who thought them "good," and those who thought them "necessary."

Figure 2-55
Opinions of the Bulk Purchase Limits
According to High-Level Buyers and Lighting Manufacturers



Note: Total exceeds 100% because some interviewees provided multiple responses.

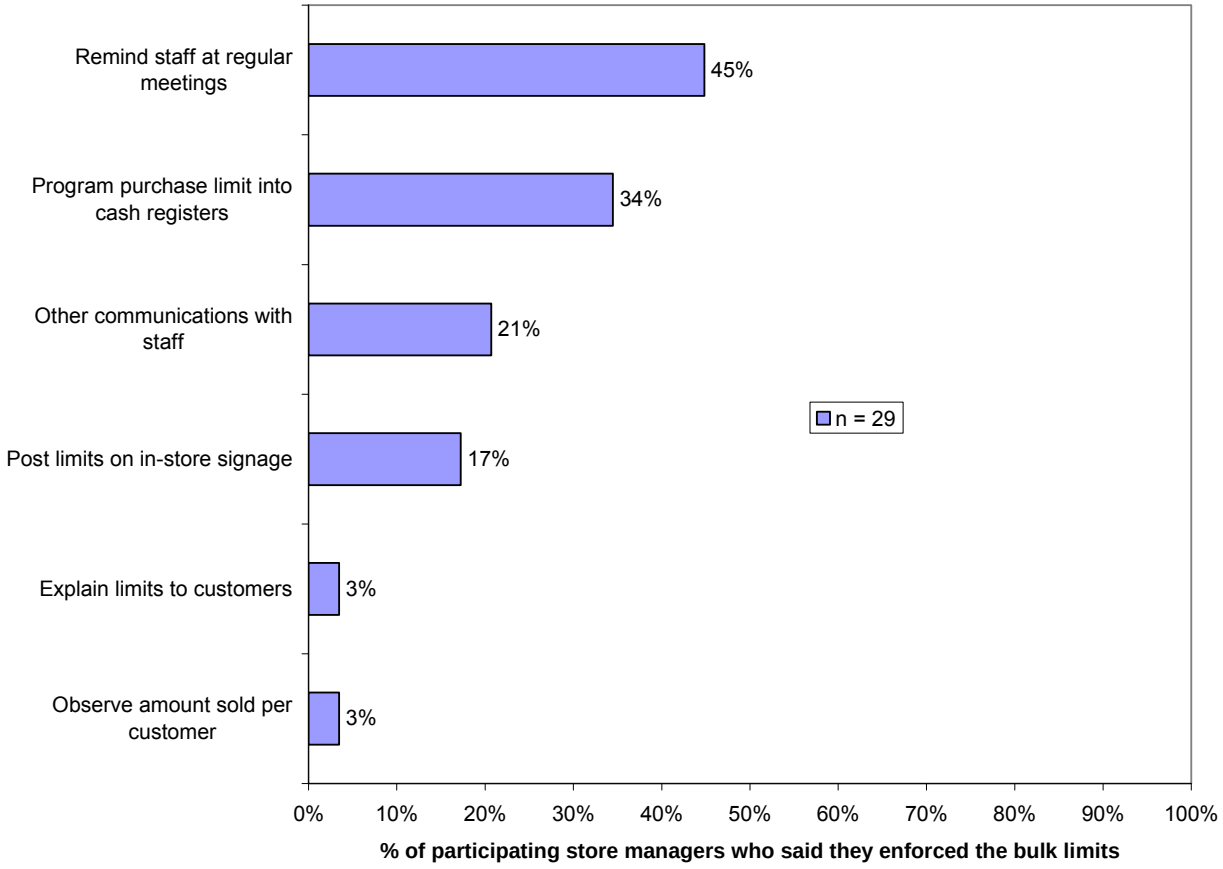
Enforcement of the ULP bulk purchase limits

We asked the retailers and manufacturers who said they were aware of the bulk purchase limit whether they enforce these limits and how they enforce them. Of the 32 store managers who were aware of the bulk purchase limits, 29 (91%) said they enforce the limits. Figure 2-56 shows that nearly half of the store managers said that they remind staff about the bulk purchase limits at regular meetings and about a third said that they program the limits into their cash registers.

When asked how they are enforcing the bulk purchase limits, most of the high-level buyers said that they are informing their stores through bulletins or through direct education of the cashiers. Two of the high-level buyers reported that they also post the limits on their signage. A couple of

high-level buyers noted that their companies have the capability to program the limits into their cash registers. One of them even said that he had proposed this to the ULP but it had not been acted upon. One of the discount retailers, however, said that his company did not have the capability to program these limits into the cash registers.

Figure 2-56
How Store Managers
Are Helping to Enforce the ULP Bulk Purchase Limits

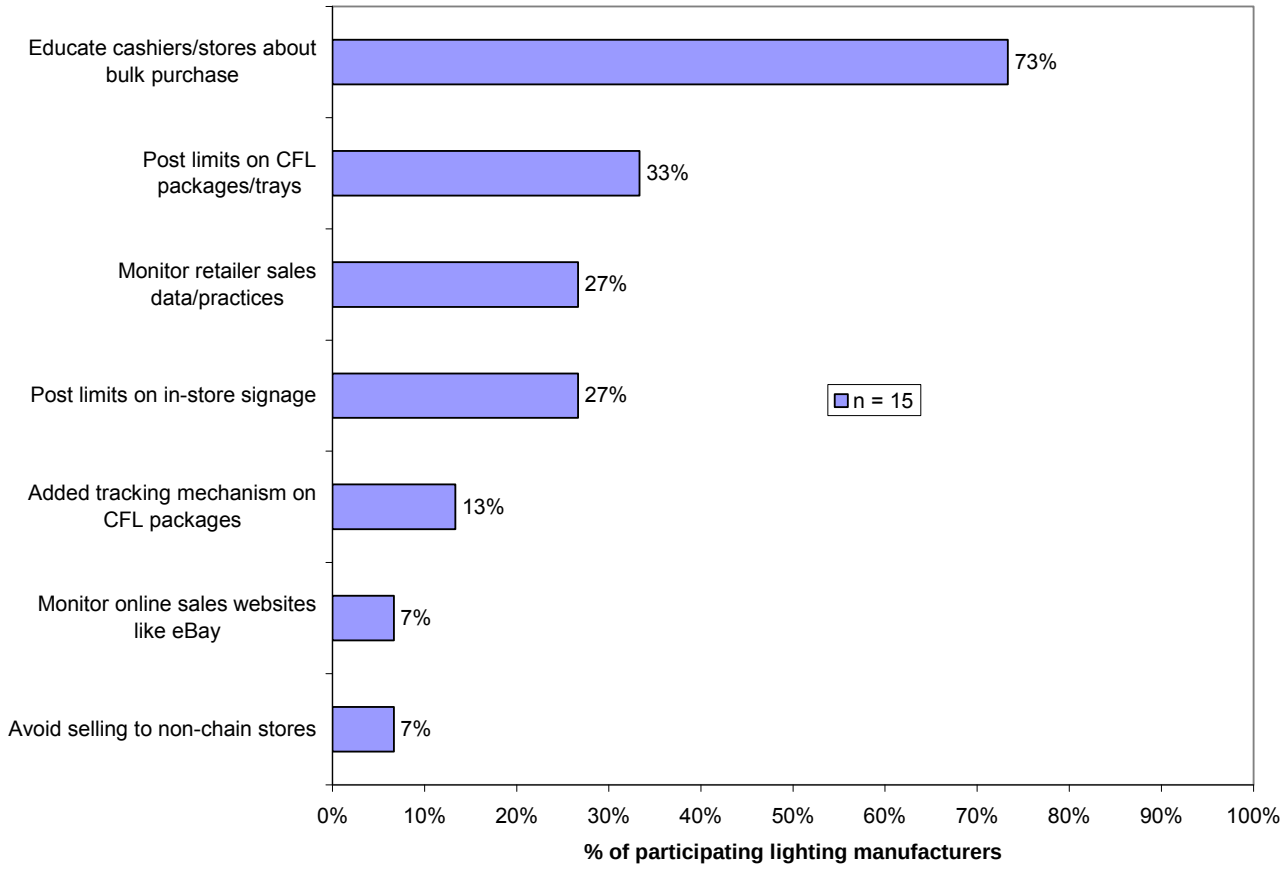


Note: Total exceeds 100% because some interviewees provided multiple responses.

We also asked the lighting manufacturers how they are enforcing the bulk purchase limits. Nearly three quarters of them said that they enforce these limits through educating store managers or cashiers (Figure 2-57). Many said that this educational function was performed by their salespersons. Other enforcement procedures -- cited by at least a quarter of the manufacturers -- included posting the limits on CFL packages/trays or point-of-purchase

signage and monitoring retailer sales figures (and in one case using "secret shoppers") to try to identify evidence of bulk purchase sales.

Figure 2-57
How Lighting Manufacturers
Are Helping to Enforce the ULP Bulk Purchase Limits



Note: Total exceeds 100% because some interviewees provided multiple responses.

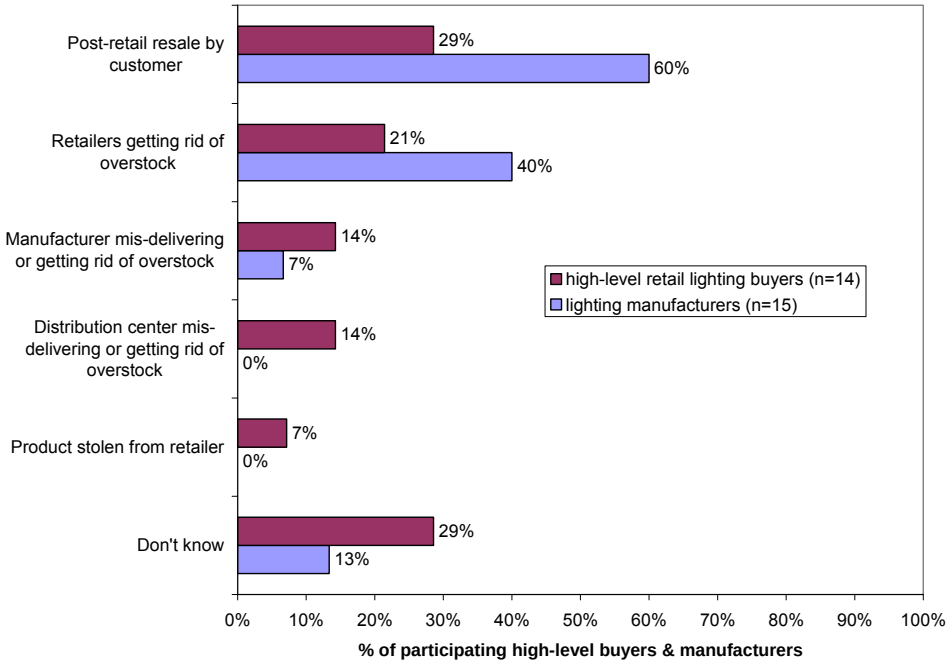
Post-retail consumer resale is not the only possible cause of CFL leakage. There is also the possibility that manufacturers might accidentally ship ULP-discounted products to retailers that are not located in the service territories of the California investor-owned utilities. This includes not only out-of-state retailers but also California retailers that located in the service territories of municipal or cooperative utilities. We asked the lighting manufacturers: "What safeguards do you have in place to insure that CFLs which receive the program stickers and packaging are not sent to retailers that are not participating in the program?" The manufacturers mentioned a number of different measures to prevent this including using different UPC codes or SKUs for

the ULP-discounted products, shipping directly to the stores, keeping ULP-discounted product and non-ULP-discounted products in separate inventories, giving retailers unique products codes, and the utility labels on the product packages that can help avoid product misdirection.

Where in the CFL distribution chain leakage is occurring

We asked the high-level retail lighting buyers and the lighting manufacturers: "There is evidence that some lighting products receiving discounts from the California Upstream Lighting Program are being sold out-of-state or through out-of-state buyers through the Internet. At what point in the supply and distribution chain do you think this might be happening?" The two most common responses were that the leakage was a result of customers reselling the products after buying them at retail or due to retailers trying to get rid of some overstock (Figure 2-58). In most cases the respondents based this on speculation, although in a few cases it was based on actual instances of leakage.

Figure 2-58
Where in the CFL Distribution Chain Leakage is Occurring According to High-Level Buyers and Lighting Manufacturers



Note: Total exceeds 100% because some interviewees provided multiple responses.

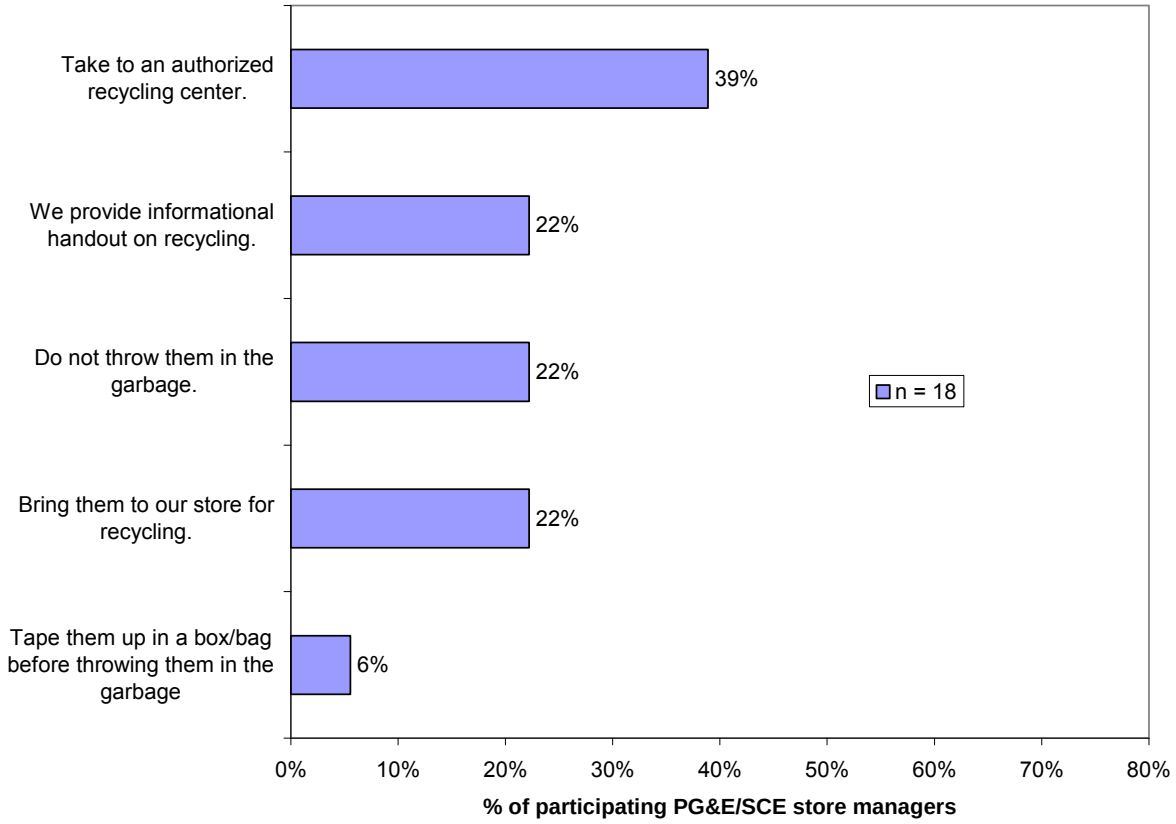
2.2.15. CFL Disposal and Recycling

In recent years there has been increasing focus in the media and elsewhere on the issue of the recycling and disposal of CFLs. We asked the participating store managers whether they give their customers any standard recommendations on how to recycle their CFLs, whether their stores offer CFL recycling on site, and, if they did not offer recycling, whether they have ever considered doing so. Table 2-30 shows that only 26 percent of store managers reported offering standard CFL recycling recommendations and only 15 percent said that they offer CFL recycling on site. It also shows that of those that said their stores do not currently offer CFL recycling, only 10 percent of them have ever considering doing so. The participating store managers who said that they had standard CFL recycling recommendations reported that these included telling customers to take their CFLs to an authorized recycling center, handing out recycling information, and advising their customers not to throw the CFLs into the garbage (Figure 2-59). The three store managers who considered offering on-site recycling -- but never did so -- cited store floor space concerns and difficulty of transport to the recycling center as barriers to implementation.

Table 2-30
CFL Recycling Practices
According to Participating Store Managers

		PG&E/SCE							
Recycling/Disposal Questions	Responses	All Stores	Big Box/ MM	LHI	Large Grocery	Small Grocery	Drug	Discount	Small Hardware
Do you have standard recommendations you give to customers about how to recycle their CFLs?	Yes	26%	45%	43%	0%	39%	11%	0%	100%
	No	72%	55%	57%	100%	61%	89%	89%	0%
	Don't know	1%	0%	0%	0%	0%	0%	11%	0%
Sample size		68	11	7	12	18	9	9	2
Do you offer CFL recycling on site?	Yes	15%	27%	57%	0%	6%	11%	0%	50%
	No	85%	73%	43%	100%	94%	89%	100%	50%
	Don't know	0%	0%	0%	0%	0%	0%	0%	0%
Sample size		68	11	7	12	18	9	9	2
Have you ever considered offering CFL recycling on site? (asked of those not already recycling)	Yes	10%	0%	0%	8%	12%	13%	11%	100%
	No	72%	50%	67%	67%	88%	63%	89%	0%
	Don't know	17%	50%	33%	25%	0%	25%	0%	0%
Sample size		58	8	3	12	17	8	9	1

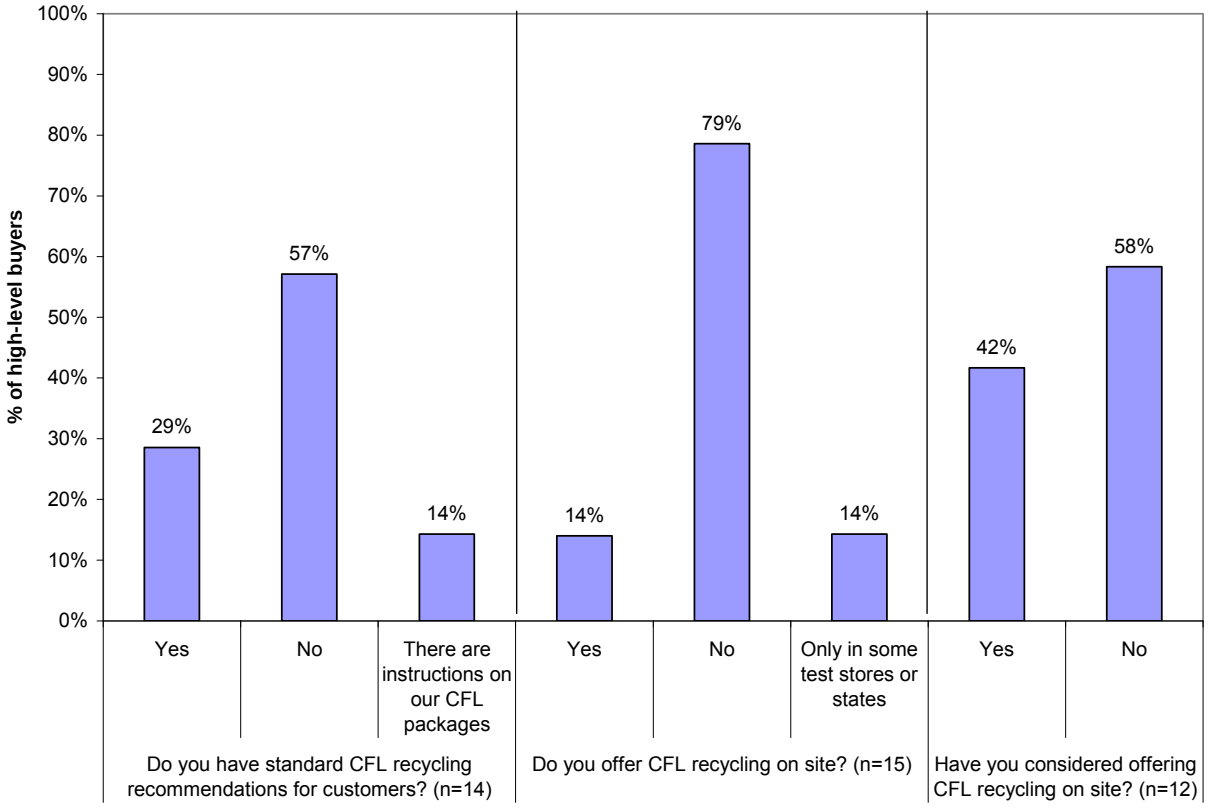
Figure 2-59
Standard CFL Disposal/Recycling Recommendations Provided by Participating Store Managers



Note: Total exceeds 100% because some interviewees provided multiple responses.

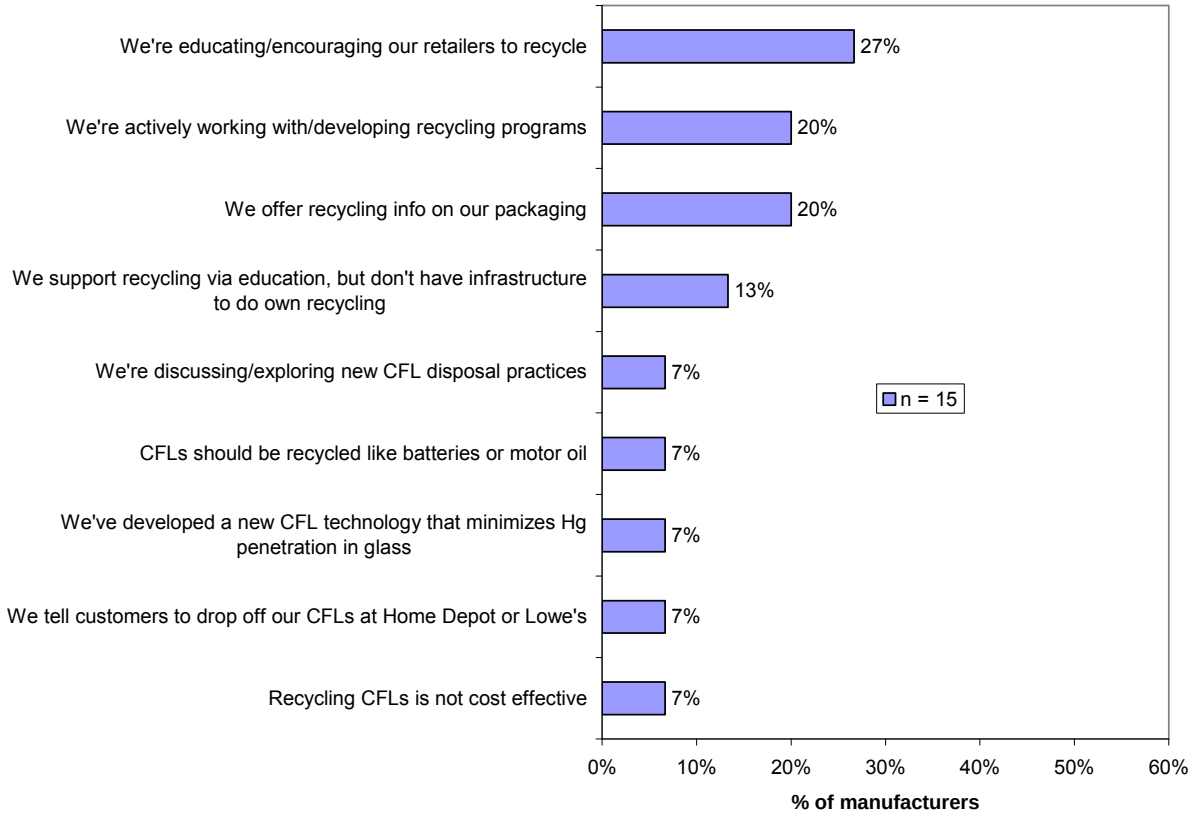
We asked the high-level retail lighting buyers a similar set of questions about CFL disposal and recycling. Like the store managers they reported a low incidence of standardized CFL recycling recommendations for their customers and a low incidence of on-site recycling (Figure 2-60). However, the high-level buyers were much more likely to report that their companies were considering on-site recycling (42% vs. 10% for the store managers). This was likely because the high-level buyers are more involved in this decision-making – or at least closer to the corporate decision-makers -- than the store managers are.

Figure 2-60
CFL Disposal/Recycling Practices
According to High-Level Retail Lighting Buyers



Finally we asked the lighting manufacturers what policies they advocated for dealing with CFL disposal. Some described concrete actions that their companies were taking to encourage safer CFL disposal while others simply described their preferred policy approaches. Figure 2-61 shows that the lighting manufacturers practiced or advocated a wide variety of CFL disposal/recycling policies. CFL disposal/recycling practices named by at least three different manufacturers included educating or encouraging their retailers to recycle (e.g., providing them with in-store recycling bins), developing or actively working with CFL recyclers – whether private or governmental, and providing CFL recycling information on their packaging.

Figure 2-61
CFL Disposal/Recycling Policies
Practiced/Advocated by Lighting Manufacturers



2.2.16. CFL Quality

In interviews conducted for the 2007 evaluation of the 2004-2005 SFEER program, a number of lighting manufacturers raised questions as to quality of some of the CFLs that the ULP was offering discounts for. We asked the participating store managers a number of questions about CFL quality. First we asked the store managers: “How important is product quality in deciding what types/brands of CFLs you’re selling in your store?” We expected almost all of the store managers to say “very important”, but only 70 percent of the respondents and only 78 percent of the respondents who gave responses other than “don’t know” said quality was very important (Table 2-31). Nineteen percent of the respondents and 22 percent of the respondents who gave responses other than “don’t know” said that quality was “somewhat important” or “not at all important.”

Table 2-31
The Importance of CFL Quality
According to Participating Store Managers

Importance of CFL quality	PG&E/SCE								
	All Stores (n=70)	Big Box/ MM (n=11)	LHI (n=3)	Large Grocery (n=12)	Small Grocery (n=11)	Drug (n=9)	Discount (n=15)	Small Hardware (n=6)	Lighting, Other Retail (n=4)
Very important	70%	91%	67%	25%	82%	78%	80%	67%	50%
Somewhat important	16%	0%	33%	17%	9%	22%	7%	33%	50%
Not at all important	3%	0%	0%	0%	9%	0%	7%	0%	0%
Don't know	13%	9%	0%	58%	0%	0%	7%	0%	0%

When we asked the store managers: "How can you tell whether the CFLs your store is selling are quality products?" their four most common responses were:

- By the number of returned CFLs,
- By customer feedback,
- By whether they are a quality brand name, and
- The retailer's personal examination of or experience with the CFL product.

We asked the store managers whether their companies do anything to assure the quality of the CFLs that they sell. Table 2-32 shows that only about a quarter of the store managers said that their companies do something. When asked what actions their companies took, these store managers said their companies either offered free product replacements/guarantees or their companies discontinued CFL products that had high return rates.

Table 2-32
Whether Retailers Do Anything
to Assure the Quality of the CFLs They Sell
According to Participating Store Managers

Is your company doing anything to assure the quality of the CFLs it sells?	PG&E/SCE								
	All Stores (n=71)	Big Box/ MM (n=11)	LHI (n=3)	Large Grocery (n=12)	Small Grocery (n=11)	Drug (n=9)	Discount (n=15)	Small Hardware (n=6)	Lighting, Other Retail (n=4)
Yes	27%	36%	0%	17%	18%	22%	13%	50%	100%
No	48%	18%	100%	33%	82%	56%	60%	33%	0%
Don't know	25%	45%	0%	50%	0%	22%	27%	17%	0%

Finally we asked the store managers whether there were any CFLs that they stopped offering due to customer complaints related to quality. Only three of the 71 store managers (4%) said that they had.

2.3. Detailed Findings from General Population Telephone Survey

2.3.1. Detailed Findings

This section discusses, in much more detail, the findings that are summarized in the Executive Summary above. The sections that make up these detailed findings include:

- Introduction,
- CFL Awareness,
- CFL Purchases,
- CFL Disposition,
- Program Effects,
- CFL Non-Purchasers / Non-Recent Purchasers, and
- Demographic Characterizations of Respondents

2.3.2. Introduction

2008 General Population Survey

KEMA, Inc. conducted a General Population telephone survey focused on consumer purchase, installation, and storage behavior of compact fluorescent lamps (CFLs) as part of its process evaluation contracts with PG&E and SCE. An experienced Computer-Assisted Telephone Interviewing (CATI) company conducted the surveys using random digit dial of residences within the zip codes that comprise PG&E's and SCE's service territories. Calls were completed during the August - October 2008 period.

The survey included separate batteries for individuals who were aware of CFLs (the majority of respondents) and for individuals who were unaware. Table 2-33 shows the number of

completed surveys by IOU service territory and CFL awareness. As shown in the table, we completed 1,267 total surveys including 1,205 with respondents who were aware of CFLs and 62 with respondents who were unaware.

Table 2-33
Completed Surveys by IOU Territory, 2008

IOU	CFL Awareness		Total Completed Surveys
	Aware	Unaware	
PG&E	602	25	627
SCE	603	37	640
Overall	**1,205**	**62**	**1,267**

Comparisons with Prior Survey Data

Evaluators fielded the 2008 general population survey among PG&E and SCE customers as part of process evaluation contracts with each of the two IOUs. The most recent data available for comparison is from the 2004/2005 Single Family Energy Efficiency Rebate Program evaluation[23] for which general population surveys were fielded in the PG&E, SCE, and SDG&E service territories in 2006. Although results of the 2008 general population survey are not directly comparable to these prior data sources (because prior sources include SDG&E), these results have been included where appropriate to show general trends over time.

2.3.3. CFL Awareness

We asked the 2008 PG&E and SCE respondents whether they had ever heard of CFLs. If respondents said they had no knowledge of CFLs, or were unsure, surveyors provided them with a description of the lamps.[24] As shown in Figure 2-62, CFL awareness in California increased substantially between 2001 and 2006, but has stayed constant since then. In both 2006 and 2008, 95 percent of survey respondents claimed to be aware of CFLs, compared to

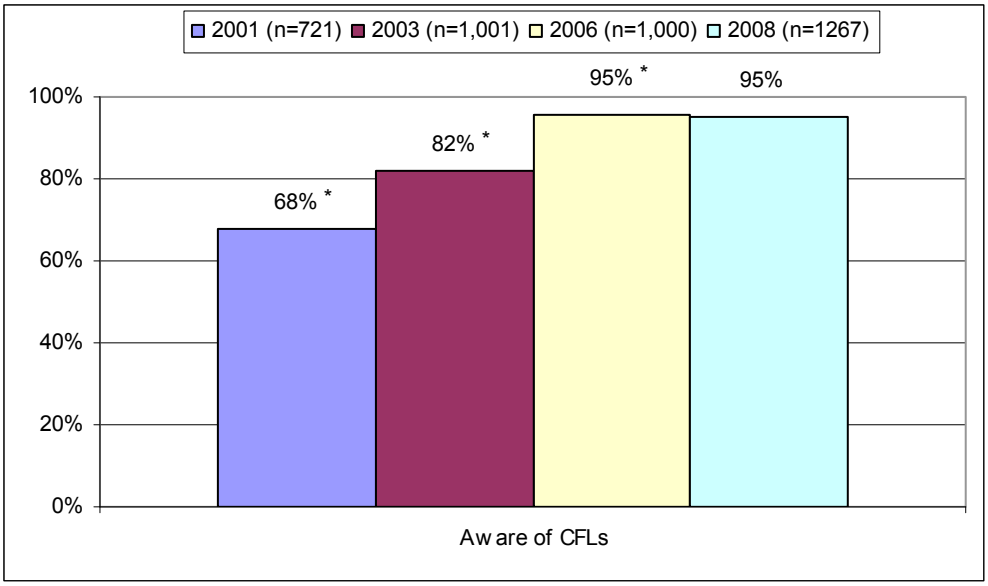
[23] Itron and KEMA Inc., 2007. 2004/2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation. Prepared for The California Public Utilities Commission, Pacific Gas & Electric, San Diego Gas & Electric, Southern California Edison, and Southern California Gas Company. Submitted to California Public Utilities Commission Energy Division. September 26, 2007.

[24] The description was as follows: "Compact fluorescent light bulbs, or CFLs, are small fluorescent bulbs that fit in regular light bulb sockets. They are also called 'energy saving bulbs' and look different than standard bulbs. They are often made out of thin tubes of glass bent into loops or a spiral shape."

68 percent in 2001. In the 2008 data, there were no statistically significant differences in awareness rates between the PG&E and SCE respondents.

Forty-four percent of the 2008 PG&E and SCE respondents who claimed CFL awareness said that they became aware within the past two years. More than a third (36%) said they became aware three to five years ago (between 2004 and 2006). Twelve percent reportedly learned about CFLs between six and ten years ago, and five percent reported that they became aware over ten years ago.[25] A higher proportion of the 2008 SCE respondents said they became aware of CFLs between 2004-2006 than PG&E respondents. There were no other statistically significant differences in dates of awareness between the PG&E and SCE respondents.

Figure 2-62
CFL Awareness Over Time



* Difference from prior years statistically significant at the 90 percent level of confidence

2001 data source: XENERGY Inc., 2002. Phase 4 Market Effects Study of California Residential Lighting and Appliance Program. Prepared for San Diego Gas & Electric. April 26, 2002. 2003 data source: KEMA-XENERGY and Quantum Consulting, 2003. Evaluation of the 2002 Statewide Crosscutting Residential Lighting Program. Prepared for San Diego Gas & Electric, Pacific Gas & Electric, and Southern California Edison. October 13, 2003. 2006 data source: Itron and KEMA Inc., 2007.

[25] Roughly 3.5 percent did not know when they became aware of CFLs.

How Consumers Became Aware of CFLs

The three most common sources of CFL awareness among telephone survey respondents have not changed since 2006, as Table 2-34 shows. These include becoming aware of CFLs in stores (due to a display, a sale, or point-of-purchase materials), through television, and through word of mouth. However, the 2008 survey did see an increase in the percentage of respondents claiming to have learned about CFLs from television. This is likely the result of increased promotion of CFLs via television commercials such as those sponsored by PG&E in 2007 and 2008 and the statewide Flex Your Power advertising campaign.

Table 2-34
Source of First Awareness of CFLs, 2006 and 2008*

Source of Awareness	% of Consumers Aware of CFLs	
	2006	2008
In-store display / Sale / POP materials	30%	27%
Television	14%	23%**
Word of mouth	22%	19%
Utility (bill insert or mailing)	7%	7%
Newspaper	6%	6%
Magazines	5%	6%
Other†	13%	29%
Don't know/Refused	18%	11%
n	**965**	**1205**

* Questions allowed multiple responses; total may exceed 100 percent.
** Difference from prior year is statistically significant at 95 percent level of confidence.
† "Other" sources of awareness include received free CFL at an event or giveaway, employer, installed in building where I live, internet, advertising (other/unspecified), radio, contractors, sales person, received CFL for free in the mail, Consumer Reports, Energy Star program website, announcement by governor or other government official, received free CFL coupon in the mail, and FLEX YOUR POWER. Each of these accounted for less than 5 percent of sources cited by the general population.
2006 data source: Itron and KEMA Inc., 2007.

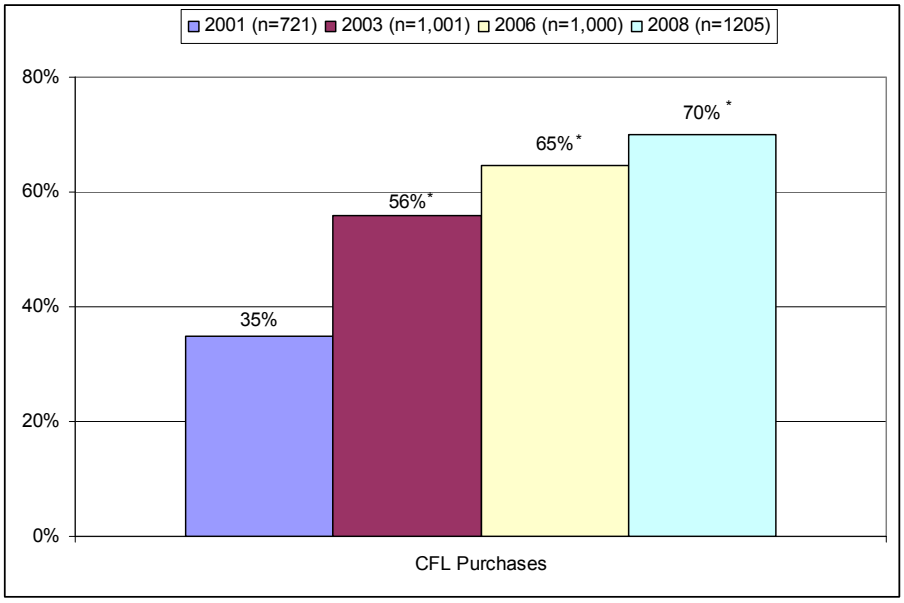
Of the respondents who first became aware of CFLs in stores due to a display, a sale, or point-of-purchase materials, 24 percent reported that they saw a PG&E/SCE sticker/ logo on the CFL packaging, on the display, or in the point-of-purchase (POP) materials. Twenty-nine percent said that they did not see an IOU sticker/logo on the CFLs, and the remaining 47 percent did not know. There are no statistically significant differences between the responses of the PG&E and SCE customers.

2.3.4. CFL Purchases

Purchase Rate

The CFL purchase rate in California has steadily increased since 2001. Figure 2-63 shows that as of 2008, 70 percent of consumers have purchased at least one CFL (a statistically significant increase over 2006 results). While the purchase rate increased significantly between 2001 and 2003, the rate of increase slowed between 2003 and 2006, and between 2006 and 2008. This slower rate of increase occurred despite increased CFL availability, increased promotion, improved quality, and declining CFL prices. This could be evidence of a typical bell-shaped technology adoption curve, where the pace of adoption slows with the last 20-30 percent of consumers. There are no significant differences between PG&E and SCE respondents or between demographic groups.

Figure 2-63
CFL Purchase Rates Over Time



* Difference from prior years statistically significant at the 90 percent level of confidence.
2001 data source: XENERGY Inc., 2002.
2003 data source: KEMA-XENERGY and Quantum Consulting, 2003.
2006 data source: Itron and KEMA Inc., 2007.

Quantity Purchased During Most Recent Purchase

We asked the 2008 PG&E/SCE respondents to estimate the number of CFLs that they had most recently purchased from a retail store. For the purpose of this survey, we defined the most recent purchase as the last CFL purchase that the respondent made. In addition, this purchase had to be between 2006 and 2008. The overall mean number of CFLs most recently purchased, shown in Table 2-35 below, is 7.1 CFLs. The table shows that the average number of bulbs per purchase is declining over time, even though not all the year-to-year differences are statistically significant. Possible explanations for this include the increased number of bulbs that consumers have in storage as well as the efforts by some IOUs participating in the ULP to discourage use of the larger multi-packs.

Table 2-35
Average Number of CFLs Purchased
by IOU and Year of Most Recent Purchase

Year of Most Recent Purchase	IOU		Overall
	PG&E	SCE	
2006	8.9	8.6	**8.8**
2007	8.1	7.6	**7.8**
2008	6.7	6.4	**6.6****
Overall	**7.3**	**6.9**	**7.1**

** Difference from prior year statistically significant at the 90 percent level of confidence.
Number of respondents for PG&E: 2008 n = 225; 2007 n = 106; 2006 n = 35.
Number of respondents for SCE: 2008 n = 245; 2007 n = 87; 2006 n = 30.
Number of respondents overall: 2008 n =470; 2007 n = 193; 2006 n = 65.

Reasons for Choosing CFLs

In both 2006 and 2008, when asked about their most recent CFL purchases, the majority of survey respondents stated that the most important factor in choosing a CFL over an incandescent was to save or conserve energy. Table 2-36 shows that respondents mentioned energy conservation more than twice as often as any other reason. Roughly one in five purchasers mentioned electricity bill reductions and CFLs lasting longer. As purchase rates and saturation rates have increased with time, fewer respondents have been claiming that they recently purchased CFLs “to try them out”. It appears that an overall increase in CFL adopters has reduced the number of purchasers looking to investigate a new technology.

Table 2-36
Reasons for Choosing CFLs, 2006 and 2008*

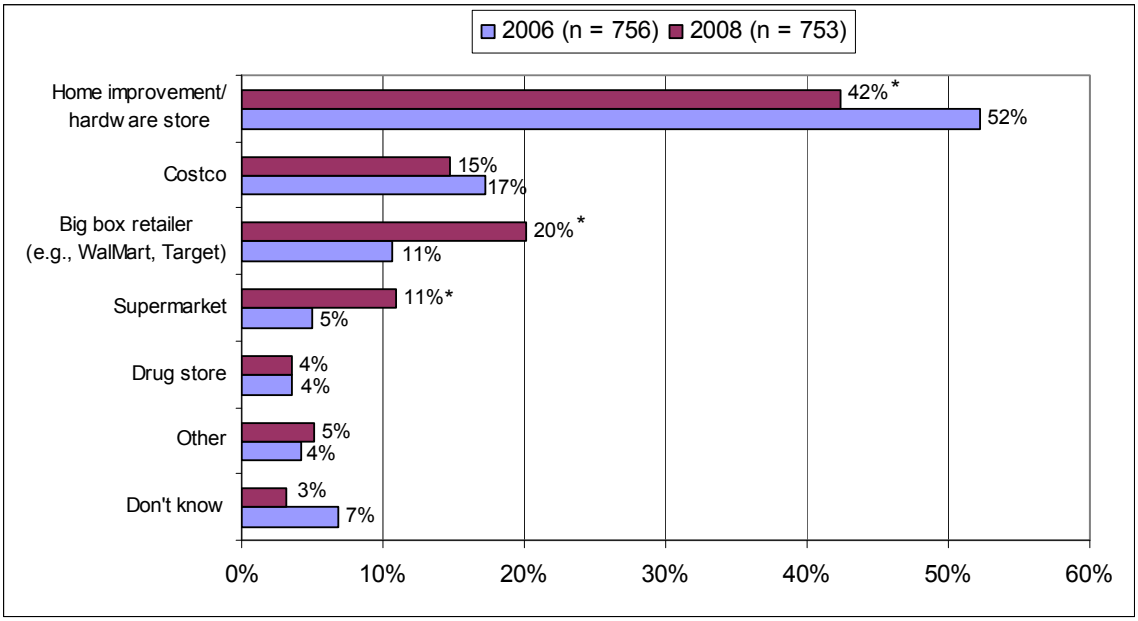
Reason	% of Purchasers	
	2006	2008
Save / conserve energy	66%	68%
Save money / reduce electricity bill	19%	23%
CFLs last longer	22%	23%
"Right thing to do" (environmental reasons)	3%	7%**
Product works better / higher quality	5%	5%
On sale / low price	3%	4%
To try them out	7%	3%**
Less heat given off by bulb	N/A††	2%
Other†	9%	12%
n	**756**	**753**

* Questions allowed multiple responses; total may exceed 100 percent.
** Difference from prior year is statistically significant at 95 percent level of confidence.
† "Other" reasons include energy savings worth the extra up-front cost; cost savings worth the extra up-front cost; suggestions from friends or family; suggestions from salesperson; a desire to have new, high-tech products, to replace bulbs already installed in fixture; the belief that CFLs were required by local building code; and to redeem a coupon. Each was cited by less than 4 percent of the population.
†† Not a response from 2006.
2006 data source: Itron and KEMA Inc., 2007.

Where Consumers Purchased CFLs

As Figure 2-64 shows, as compared to the 2006 survey respondents, the 2008 survey respondents were less likely to have said that they made their most recent CFL purchase at home improvement or hardware stores. Yet the 2008 respondents were more likely to report that they made their most recent CFL purchase at big box retailers (e.g., Wal-Mart, Target, etc.) or supermarkets.

Figure 2-64
Where Consumers Purchased CFLs Most Recently, 2006 and 2008

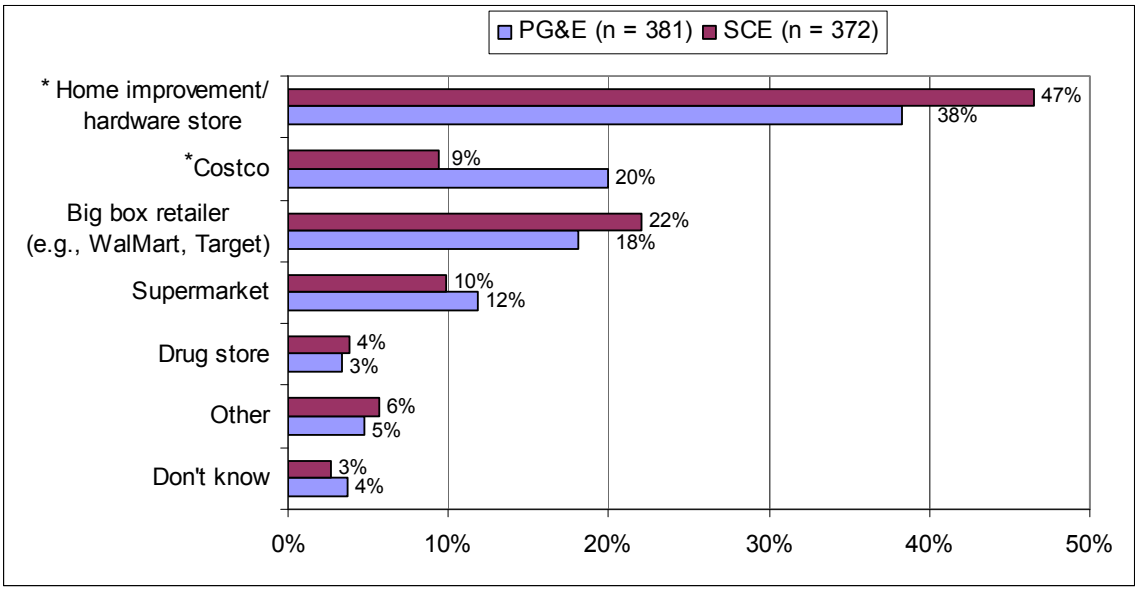


* Difference from prior year is statistically significant at the 90 percent level of confidence.
2006 data source: Itron and KEMA Inc., 2007.

When considering purchase location along with the number of lamps in the most recent CFL purchases, Costco accounts for over 21 percent of CFLs purchased (compared to 15% of *purchasers* who cited Costco as the purchase location). All other store types accounted for an equal or smaller proportion of CFLs purchased as compared to the proportion of purchasers citing each store type. This means that respondents purchased more CFLs on average at Costco during their most recent CFL purchase than at other stores. This is likely due to the relatively large CFL package sizes (multi-packs) at Costco compared to other channels.

There were significant differences in the CFL purchasing locations reported by PG&E customers and SCE customers in 2008. As Figure 2-65 shows, SCE customers made almost half (47%) of their most recent purchases at home improvement or hardware stores, compared to 38 percent of PG&E customers. The difference in recent purchase percentage is made up by a higher incidence of Costco CFL purchases among PG&E customers compared to SCE customers. Purchases through other channels were statistically the same among respondents between IOU service territories. This mirrors the ULP tracking data where Costco accounts for a much higher percentage of discounted CFLs in the PG&E service territory than in the SCE service territory.

Figure 2-65
Where Consumers Purchased CFLs Most Recently by IOU (2008)



* Difference between IOUs is statistically significant at the 90 percent level of confidence.

Home ownership and income level also played a substantial role in differences among respondent self-reports of recent CFL purchase locations. Almost half (46%) of home owners and over half (51%) of people in households with annual incomes of greater than $60,000 had most recently purchased a CFL at a home improvement or hardware store, compared to only 33 percent of renters and 34 percent of respondents in households earning less than $60,000 per year. Noticeably, a larger proportion of renters and respondents who live in households with incomes of less than $60,000 per year recently purchased CFLs at big box retailers (26% and 27%, respectively) than homeowners and higher-income respondents (18% and 15%, respectively). There are two possible explanations for this. First renters and less affluent purchasers may be less likely to make home improvements and therefore to shop in these types of stores. Second the CFL price points are often lower in the big box stores than they are in the home improvement stores.

Package Type

About two thirds of the 2008 PG&E/SCE respondents said that their recent CFL purchases were multi-packs (Table 2-37). There were no statistically significant differences between the package type recently purchased by PG&E and SCE respondents. However, a larger proportion (70%) of households with incomes greater than $100,000 per year have most recently purchased a multi-pack than households making less than $30,000 per year (58%).

Table 2-37
Packaging Type for Most Recent Purchase, by IOU, 2008

Package Type	% of Purchasers		
	PG&E	SCE	Overall
Multi-pack	66%	64%	65%
Single Pack	26%	25%	25%
Both	6%	9%	8%
Don't know	2%	2%	2%
n	**381**	**372**	**753**

2.3.5. CFL Selection

As Table 2-38 shows, more than a quarter of recent PG&E/SCE CFL purchasers chose the specific CFL that they most recently purchased because of its price. About a fifth of them also cited the wattage, the bulb style/shape, or the color of the bulb's light as their most important factors in selecting which CFL to purchase. There were no statistically significant differences among respondents between IOU service territories.

Table 2-38
Most Important Factor in Selecting Which CFL to Purchase, 2008*

Reason	% of Purchasers		Overall
	PG&E	SCE	
Bought what was cheapest / on sale	25%	28%	26%
Looked at wattage	22%	20%	21%
Style or shape of bulb / color of light	17%	18%	18%
Bought only bulbs they had available	10%	8%	9%
Looked at lumens	7%	6%	6%
Energy savings / efficiency	6%	5%	6%
Brand name / Already know / use this manufacturer's products	4%	5%	5%
Longevity / lifespan	3%	5%	4%
Already familiar with / use this model	3%	2%	3%
IOU logo / sticker / signs	4%	1%	3%
Other reasons†	10%	6%	8%
Don't know	4%	10%	7%
n	**381**	**372**	**753**

* Questions allowed multiple responses; total may exceed 100 percent.
† "Other" reasons include seeing the ENERGY STAR logo; which fixture / room its being installed in; recommendation from friend or family member; recommendation from store staff; and how it compares to previous bulbs. Each was cited by less than 3 percent of the population.

2.3.6. CFL Disposition

CFL Installation

Ninety-three percent of the 2008 PG&E/SCE CFL purchasers (n =950) said they had at least one CFL installed either in their home or in an exterior fixture outside of their homes. Table 2-39 shows the average numbers of CFLs installed, in storage, and ever removed for households of CFL purchasers. On average, the 2008 CFL purchasers reported 10.3 CFLs installed in their homes, significantly higher than the 6.8 lamps per home reported in 2006. In addition, the 2008 survey found the average number of stored lamps to be significantly higher than in 2006. Despite the average increase in CFLs per household, the relative percentages of CFLs being installed, stored and removed were statistically unchanged since 2006.

Table 2-39
Bulb Disposition in Purchaser Households, 2006 and 2008

Disposition of All CFLs Ever Acquired by Purchaser Household	2006		2008	
	Mean Number of Bulbs	% of Total Bulbs	Mean Number of Bulbs	% of Total Bulbs
CFLs currently installed	6.8	70%	10.3*	71%
CFLs currently in storage	2.5	26%	3.6*	24%
CFLs ever removed	0.3	3%	0.7	5%
Total Number of CFLs Ever Acquired	**9.6**	**100%**	**14.6***	**100%**

* Difference from 2006 results is statistically significant at 90 percent level of confidence.
2006 data source: Itron and KEMA Inc., 2007.

As Table 2-40 shows, households in PG&E's territory reported having, on average, more lamps in storage than households in SCE's territory. Yet the average numbers of CFLs installed, CFLs removed, and total CFLs acquired per household were not statistically different between PG&E and SCE respondents.

Table 2-40
Bulb Disposition in Purchaser Households, by IOU, 2008

Disposition of All CFLs Ever Acquired by Purchaser Household	PG&E		SCE	
	Mean Number of Bulbs	% of Total Bulbs	Mean Number of Bulbs	% of Total Bulbs
CFLs currently installed	10.5	69%	10.2	73%
CFLs currently in storage	4.1	26%	3.2*	22%
CFLs ever removed	0.7	5%	0.7	5%
Total Number of CFLs Ever Acquired	**15.3**	**100%**	**14.0**	**100%**

* Difference from PG&E results is statistically significant at 95 percent level of confidence.

Time Between Purchase and Installation (of Installed Lamps)

As Table 2-41 shows, a large majority of the 2008 respondents who had recently purchased CFLs said that these bulbs had been installed within a week of purchase. Very few CFLs remained in storage for longer than a week before ultimately being installed. There were no statistically significant differences in time-to-installation among respondents between IOU service territories.

Table 2-41
Duration of Installation After Purchase of Recently-Purchased CFL, by IOU, 2008

Duration After Purchase	% of Lamps Installed		
	PG&E	SCE	Overall
Zero to 1 week	85%	87%	86%
2 to 6 weeks	7%	5%	6%
6 to 12 weeks	3%	1%	2%
More than 12 weeks	1%	1%	1%
Don't know	5%	6%	6%
Total Lamps	**1520**	**1511**	**3031**

Installation Location of Recently Purchased CFLs

Table 2-42 shows that bedrooms were the most common rooms where the 2008 respondents reported CFLs being installed. This is likely partly due to households having a higher percentage of bedrooms than any other room type. The next most common rooms for CFLs were living rooms, kitchens, and full bathrooms. PG&E respondents reported a higher percentage of CFLs installed in exterior fixtures than SCE respondents and a higher percentage in dining room fixtures. These differences are statistically significant.

Table 2-42
Location of Recently Purchased Lamps, by IOU, 2008

Location	% of Lamps		
	PGE	SCE	TOTAL
Bedroom	28%	26%	27%
Living room	16%	19%	18%
Kitchen	11%	13%	12%
Bathroom (full bath)	10%	12%	11%
Outdoors†	9%	6%**	8%
Family room/den	7%	8%	7%
Dining room	5%	3%**	4%
Hallway or entryway	3%	4%	4%
Other room (interior)††	7%	8%	8%
Don't know / refused	4%	1%	2%
n (Total Lamps)	**788**	**767**	**1555**

** Difference from PG&E is statistically significant at 95 percent level of confidence.
† Outdoors includes porch/patio, entryway, walkways, and landscape lighting.
†† Other room (interior) includes garage, laundry/utility room, half baths, and closets.

Nonresidential Installations

Only three percent of recent purchasers claimed that they installed some or all of their recently-purchased CFLs in a business location other than a home office (4% for PG&E and 2% for SCE). Of the 17 respondents who estimated how many CFLs they had installed in a business location, the average number installed was 4.3. Given the small sample size, there was no statistically significant difference in the number of CFLs installed in business locations among respondents in the two IOU service territories.

CFL Storage

Sixty-one percent of CFL purchasers said that they were storing CFLs, while 35 percent were not (the remainder did not know). The number of purchasers storing CFLs is statistically unchanged since 2006. In the 2008 survey, more PG&E respondents reported storing lamps than SCE respondents (64% and 58%, respectively). Sixty-four percent of homeowners were storing CFLs, compared to only 52 percent of renters (a statistically significant difference). Of the respondents who were storing CFLs to be installed at a later date, 63 percent also said that they were storing incandescents.

As Table 2-43 points out, a smaller proportion of the 2008 PG&E/SCE respondents were storing CFLs than the 2006 survey respondents. Interestingly, in 2008 more than double the percentage of households with incomes greater than $100,000 per year were storing CFLs because they bought them on sale than households with incomes less than $30,000 per year (15% and 6%, respectively). This is likely related to the finding, as reported earlier, that the higher customers are more likely to buy their CFLs at Costco, which sells the largest CFL multi-packs.

Table 2-43
CFL Purchaser Reasons for Storing CFLs, 2006 and 2008*

Reason for Storing CFLs	% of Purchasers	
	2006	2008
So I have them on hand if a bulb burns out	77%	70%**
Purchased more CFLs than I needed	19%	23%
Bought them on sale	6%	11%**
Can't / won't use them in certain applications	3%	4%
Other reasons†	7%	13%
Don't know	2%	1%
n	**460**	**582**

* Question allowed multiple responses; total may exceed 100 percent.
** Difference from prior year is statistically significant at 90 percent level of confidence.
† "Other reasons" include did not like them, can't / won't use them in certain rooms, CFLs don't fit in fixtures. Each was cited by less than 4 percent of respondents.
2006 data source: Itron and KEMA Inc., 2007.

Decision to Install CFL or Incandescent from Storage

Interviewers asked the 364 survey respondents who had both incandescent lamps and CFLs in storage how they decide which lamp type to install when a currently-installed lamp burns out. As shown in Table 2-44, the most commonly-cited criterion was the fixture type. Other criteria for bulb choice included whether or not a CFL would fit into the fixture and the type of room in which the lamp will be installed. There were no statistically significant differences in this decision-making process among respondents between the two IOU service territories.

Table 2-44
How Decision to Install CFL or Incandescent from Storage is Made, 2008*

Reason	% of Respondents
Depends on fixture type	34%
CFLs don't fit all fixtures	17%
CFLs are first choice	15%
Depends on room type	13%
No system / random replacement	7%
Use up incandescent before using CFLs	5%
Incandescents for ambiance / mood lighting	4%
CFLs don't work in dimmers / 3-ways	4%
Other reasons†	14%
Don't know	4%
n	**364**

* Question allowed multiple responses; total may exceed 100 percent.
† "Other reasons" include incandescents for task lighting; won't use CFLs; incandescents for reading; CFLs for ambience / mood lighting; CFLs for reading; and don't like CFLs because of mercury / need to recycle. Each was cited by less than 4 percent of respondents.

Reasons for Purchasing Additional CFLs When Already Storing CFLs

Approximately 100 of the 2008 respondents had recently purchased and stored CFLs when they already had CFLs in storage. Their most common reasons for doing so included wanting a different wattage or size, seeing a low CFL price, and simply wanting more CFL in storage (Table 2-45). Survey results show no statistically significant differences in results between the PG&E and SCE respondents.

Table 2-45
Reason for Additional CFL Purchase
(Among Respondents Storing CFLs from Prior Purchase[s]), 2008*

Reason	% of Recent Purchasers Storing CFLs
Wanted different wattage / size	42%
Price was good / low	41%
To have more in storage	32%
To give as a gift	9%
Forgot I already had CFLs in storage	6%
Wasn't sure how many CFLs I had stored at ho	4%
Wanted to try / test a specific model	4%
Other reasons†	12%
Don't know	2%
n	**100**

* Question allowed multiple responses; total may exceed 100 percent.
† "Other reasons" include: planning to switch out incandescents; wanting dimmable lamps; package size; and use in different location. Each was mentioned by less than 4 percent of respondents.

CFL Removal

Twenty percent of the 2008 respondents who had installed CFLs said they had removed at least one of these CFLs. Table 2-46 shows that over half of them did so because the CFLs burned out. Removing CFLs because they did not fit properly in the fixture or because they were not bright enough were other oft-cited reasons. There were no statistically significant differences among the PG&E and SCE respondents.

Table 2-46
Reasons for Removing CFLs, 2008*

Reason for Removing CFLs	% of Purchasers
Burned out	56%
Didn't fit in fixture	16%
Wasn't bright enough	14%
Broken bulb	10%
Didn't like the color	8%
Didn't like the way it looked	6%
Bulb hummed / flickered	6%
Other reasons†	8%
Don't know	1%
n	**192**

* Question allowed multiple responses; total may exceed 100 percent.
† "Other reasons" include the lamp was too bright; needed a dimmable CFL; replaced fixture; worry regarding mercury pollution. Each was mentioned by less than 5 percent of respondents.

CFL Satisfaction

On a scale of 1 to 10 where 1 meant the respondents were 'not at all satisfied' and 10 meant they were 'extremely satisfied' with the CFLs they purchased most recently (of purchasers who have purchased at least one CFL since 2006), PG&E and SCE respondents had an average satisfaction rating of 7.9. There was no statistically significant difference between the satisfaction ratings of the PG&E and SCE respondents.

Table 2-47 shows that CFL users cited length of life as the CFL attribute that they were most satisfied with. Respondents were least satisfied with the way CFLs look in fixtures. SCE customers were more satisfied with the brightness and light color of CFLs than PG&E customers. There were no other significant differences among respondents between the two IOU service territories

Table 2-47
Satisfaction with CFLs and Their Attributes, by IOU, 2008

CFL Attribute	Satisfaction					
	PG&E		SCE		Overall	
	Mean Rating	n	Mean Rating	n	Mean Rating	n
Overall satisfaction with CFLs	7.8	465	8.0	470	7.9	935
Length of life	8.7	406	8.7	409	8.7	815
Brightness	7.8	461	8.1**	469	7.9	930
Color of light	7.7	455	8.0**	464	7.8	919
Amount of time to light up	7.7	449	7.8	462	7.8	911
The way they fit into fixtures	7.9	457	7.8	472	7.8	929
The way they look in fixtures	7.0	443	7.1	462	7.1	905

** Difference between IOUs is statistically significant at 95 percent level of confidence.

Overall satisfaction with CFLs has improved between 2006 and 2008. In 2008 PG&E and SCE respondents rated their overall satisfaction with CFLs as an average 7.9 out of 10, compared to 7.7 out of 10 for all California IOUs in 2006 (Table 2-48). Average satisfaction ratings for four out of six CFL attribute categories have significantly improved since 2006: brightness, color of light, startup time, and the way CFLs look in fixtures. The largest improvement in satisfaction between 2006 and 2008 was for the way CFLs look in fixtures. There were no significant satisfaction differences regarding length of life or the way CFLs fit into fixtures among respondents of the 2006 and 2008 surveys.

Table 2-48
Satisfaction with CFLs and Their Attributes, 2006 and 2008

CFL Attribute	Satisfaction			
	2006		2008	
	Mean Rating	n	Mean Rating	n
Overall satisfaction with CFLs	7.7	756	7.9**	935
Length of life	8.5	357	8.7	815
Brightness	7.5	377	7.9**	930
Color of light	7.4	395	7.8**	919
Amount of time to light up	7.5	347	7.8**	911
The way they fit into fixtures	7.7	386	7.8	929
The way they look in fixtures	6.6	366	7.1**	905

** Difference from prior year is statistically significant at 90 percent level of confidence.
2006 data source: Itron and KEMA Inc., 2007.

2.3.7. Program Effects

Influence of General Promotional Materials

Thirty percent of recent CFL purchasers reported that they saw signs, brochures, lighting displays, or other information providing facts about CFLs when shopping for CFLs most recently. Of these people, 53 percent saw signs, 25 percent saw a lighting display, 24 percent saw brochures, and 6 percent saw information on the CFL packaging.[26] When asked how influential these materials were on their decision to purchase CFLs, approximately 62 percent reported that the materials were very or somewhat influential (Table 2-49). There were no statistically significant differences in influence of promotional materials between respondents in the two IOU territories.

Table 2-49
Influence of Promotional Materials on CFL Purchase, 2008

Influence of Promotional Materials	% of Purchasers Aware of Promotional Materials
Very influential (3)	35%
Somewhat influential (2)	27%
Not at all influential (1)	36%
Don't know	2%
n	**197**

Influence of General Promotions or Price Discounts

Thirty-seven percent of the 2008 respondents claimed that there was a special promotion or discount on the CFLs they most recently purchased. When we asked these respondents how likely they would have been to purchase CFLs in absence of the discount, 26 percent reported that they would have been not at all likely to purchase the CFLs. Thirty-eight percent reported that they would have been only somewhat likely to purchase CFLs in absence of the discount, and 35 percent reported that they would have been very likely to purchase the CFLs in absence of the discount (n = 278). Of the same group, nearly three-quarters (73%) claimed that the discount encouraged them to purchase more CFLs than they would have in absence of the

[26] The remainder saw some other form of information.

discount. There were no statistically significant differences among the PG&E and SCE respondents in terms of the influence of CFL discounts on purchasing decisions.

Awareness of IOU Discount

We asked the 2008 respondents whether they had seen special stickers on the discounted CFLs they most recently purchased. We also asked them if they noticed from the sticker who had provided the discount. Of the respondents (n = 278) who claimed that their recently-purchased CFLs were discounted, 28 percent reported that they saw special stickers on the CFL packaging to indicate the discount. Of those who saw such stickers (n = 79), 60 percent claimed that SCE or PG&E provided the discount.

2.3.8. CFL Non-Purchasers / Non-Recent Purchasers

Reasons for Not Purchasing CFLs Recently

The 2008 survey asked respondents who said that they were aware of CFLs but had never purchased them, or had not purchased them recently (most recent purchase before 2006), why they had not purchased CFLs. As Table 2-50 shows, about one quarter said that they were waiting for installed bulbs to burn out. Eighteen percent of the non-purchasers/non-recent purchasers reported that they do not purchase the lighting for their household and twelve percent said that they already had enough CFLs in storage. A similar percentage of all non-purchasers/non-recent purchasers had no reason for not purchasing CFLs.

The table also shows that SCE non-purchasers/non-recent purchasers were much more likely than PG&E respondents to have said that they had not purchased CFLs because they were waiting for installed bulbs to burn out. In contrast, PG&E non-purchasers/non-recent purchasers were much more likely than their SCE counterparts to have reported that they had not purchased CFLs because they had enough CFLs in storage.

Table 2-50
Reasons for Not Purchasing CFLs, 2008*

Reason	% of Respondents		
	PG&E	SCE	Overall
Waiting for bulbs installed to burn out	18%	30%**	24%
Someone else buys them / given to me as a gift	19%	17%	18%
Have enough CFLs in storage	12%	7%**	10%
CFLs are too expensive / cost too much	7%	5%	6%
Don't like CFLs / incandescents are fine	5%	5%	5%
CFLs aren't bright enough	4%	5%	4%
Contains mercury / needs to be recycled	5%	4%	4%
CFL light color isn't what I want / isn't right	5%	3%	4%
No reason	13%	10%	11%
Other reasons†	14%	16%	15%
Don't know	11%	9%	10%
n	**221**	**231**	**452**

* Question allowed multiple responses; total may exceed 100 percent.

** Difference from prior year is statistically significant at 90 percent level of confidence.

† "Other reasons" include storing incandescent bulbs; don't like the way CFLs look / fit in fixtures; CFLs take too long to light up; low operating hours for remaining non-CFLs; need 3-way bulbs; and need dimmable bulbs. Each was mentioned by less than 4 percent of respondents.

Potential Motivations to Purchase

Nearly one quarter of non-purchasers/non-recent purchasers reported that they could not be motivated by anything to purchase CFLs in 2008 (see Table 2-51). However, 25 percent of them said that they will buy CFLs if they need more bulbs or if they run out of what they currently have. Eighteen percent reported that they would purchase CFLs if they were cheaper, and 12 percent said that they were not yet convinced of their energy saving potential. There were no statistically significant differences among respondents between IOU territories.

Table 2-51
Potential Motivation to Purchase CFLs, 2008*

Potential Motivation	% of Respondents
If I need to buy more bulbs / if I runout of what I have	25%
They need to be cheaper	18%
Need to be convinced of their energy saving potential	12%
Improved quality of the light	6%
If they didn't contain mercury / didn't need to be recycled	4%
Nothing at all	23%
Other source†	16%
Don't know	8%
n	**452**

* Question allowed multiple responses; total may exceed 100 percent.
† "Other sources" include needing to make them look attractive in fixtures; need more information about CFLs; preference for incandescents; need to make them fit in fixtures; need 3-way and dimmable features; and need to see them in stores where lighting is purchased. Each was mentioned by less than 4 percent of respondents.

2.3.9. Demographic Characterizations of Respondents

The interviews included a series of demographic questions for all respondents (including those who were aware or unaware of CFLs as well as purchasers and non-purchasers). The section below compares socio-demographics between respondents who were aware or unaware of CFLs and between respondents who had or had not purchased CFLs. Generally, we found statistically significant differences between these groups for the following demographic categories:

- Home ownership;
- Building type;
- Level of education; and
- Annual household income.

The text below provides additional detail – first for unaware versus aware respondents, and then for CFL purchasers versus non-purchasers.

Comparison of Aware/Unaware Respondents

A significantly larger proportion of CFL-aware respondents were homeowners than respondents who were unaware of CFLs. Respondents who were aware of CFLs were more likely to have at a least college degree (or higher education) than respondents who were unaware of CFLs, and a greater proportion of aware respondents had higher incomes than unaware respondents. The text below provides additional detail.

Home ownership. Table 2-52 shows that the 2008 PG&E/ SCE respondents who were aware of CFLs were more likely to be homeowners than unaware respondents.

Table 2-52
Home Ownership by CFL Awareness, 2008

Home Ownership	% of Respondents	
	Aware	Unaware
Own	74%	61%**
Rent	24%	39%**
Don't own or rent	1%	0%
Refused	2%	0%
n	**1205**	**62**

** Difference between aware and unaware populations is statistically significant at the 90 percent level of confidence.

Building Type. A significantly higher proportion of aware respondents live in detached single-family homes than unaware respondents, as shown below in Table 2-53. In addition, a higher proportion of unaware respondents lived in apartment buildings with five or more units than aware respondents. There were no statistically significant differences between aware and unaware populations for any other building types.

Table 2-53
Building Type by CFL Awareness, 2008

Building Type	% of Respondents	
	Aware	Unaware
Detached single family home	74%	56%**
A bldg with five+ apts	9%	19%**
Attached single family bldg with two a	7%	5%
Mobile home	4%	6%
A bldg with three to four apts	4%	5%
Refused/Don't know	2%	8%
n	**1205**	**62**

** Difference between aware and unaware population is statistically significant at the 90 percent level of confidence.

Level of Education. Table 2-54 shows that respondents who were aware of CFLs were more likely to have at least a college degree than respondents who were unaware. In addition, more than a third (35%) of unaware respondents had at most completed high school or received their General Education Degree, compared to 22 percent of aware respondents. This suggests that education may directly impact awareness of CFLs.

Table 2-54
Highest Level of Education by CFL Awareness, 2008

Highest Level of Education	% of Respondents	
	Aware	Unaware
High school grad or equivalent (GED) or less	22%	35%**
Trade / tech school or some college	25%	23%
College degree or more	48%	29%**
Refused	4%	13%
Don't know	0%	0%
n	**1205**	**62**

** Difference from prior year is statistically significant at the 90 percent level of confidence.

Household Income. Table 2-55 shows that unawareness of CFLs was higher among the lower-income respondents. Unaware respondents were more than twice as likely as aware respondents to live in households earning less than $20,000 per year. Households making more than $100,000 also made up a much larger proportion of the CFL-aware population than the unaware population. Since income and education are usually highly correlated, it's possible that this may be another manifestation of the education effect.

Table 2-55
Annual Household Income by CFL Awareness, 2008

Annual Household Income	% of Respondents	
	Aware	Unaware
> $20k per year	9%	19%**
$20k to less than $50k	22%	15%
$50k to less than $100k	22%	16%
$100k or more	20%	6%**
Refused	20%	29%
Don't know	6%	15%
n	**1205**	**62**

** Difference between aware and unaware population is statistically significant at the 90 percent level of confidence.

Comparison of CFL Purchasers/Non-purchasers

The 2008 survey found that a significantly larger proportion of respondents who have purchased CFLs were homeowners compared to respondents who had not purchased CFLs, and more purchasers lived in detached single-family homes than non-purchasers. CFL purchasers were more likely to have at a least college degree (or higher education) than non-purchasers, and a greater proportion of purchasers had higher incomes than non-purchasers. The text below provides additional detail.

Home ownership. Table 2-56 shows that of the 2008 PG&E/SCE respondents, CFL purchasers were more likely to be homeowners than non-purchasers.

Table 2-56
Home Ownership Among
CFL Purchasers/Non-purchasers, 2008

Home Ownership	% of Respondents	
	Purchaser	Non-Purchaser
Own	78%	61%**
Rent	20%	37%
Don't know / Refused	2%	2%
n	**950**	**250**

** Difference between purchasers and non-purchasers is statistically significant at the 90 percent level of confidence.

Building Type. A significantly higher proportion of purchasers lived in detached single-family homes than non-purchasers (see Table 2-57).

Table 2-57
Building Type Among CFL Purchasers/Non-purchasers, 2008

Building Type	% of Respondents	
	Purchaser	Non-Purchaser
Detached single family home	77%	61%**
A bldg with five+ apts	8%	16%**
Attached single family bldg with two apts	6%	9%**
Mobile home	4%	7%**
A bldg with three to four apts	3%	7%**
Refused	2%	1%
n	**950**	**250**

** Difference between purchasers and non-purchasers is statistically significant at the 90 percent level of confidence.

Level of Education. A significantly higher proportion of CFL purchasers had a college degree or higher education than non-purchasers (Table 2-58). Similarly, a significantly higher proportion of non-purchasers had a high school education or less as compared to purchasers. These results suggest that level of education and CFL purchases are related.

Table 2-58
Highest Level of Education Among CFL Purchasers/Non-purchasers, 2008

Highest Level of Education	% of Respondents	
	Purchaser	Non-Purchaser
High school grad or equivalent (GED) or less	19%	35%**
Trade / tech school or some college	26%	26%
College degree or more	52%	35%**
Don't know / refused	3%	4%
n	**950**	**250**

** Difference from prior year is statistically significant at the 90 percent level of confidence.

Household Income. Table 2-59 shows that the lower-income brackets have a higher proportion of CFL non-purchasers. Almost half (46%) of purchasers had household incomes of at least $50,000 per year, compared with only 27 percent of non-purchasers (a statistically significant difference). Households with incomes of at least $100,000 per year also comprised a larger proportion of the aware population than the unaware population. As noted above, since income and education are usually highly correlated, it's possible that this may be another manifestation of the education effect.

Table 2-59
Annual Household Income Among CFL Purchasers/Non-purchasers, 2008

Annual Household Income	% of Respondents	
	Purchaser	Non-Purchaser
> $20k per year	7%	16%**
$20k to less than $50k	20%	32%**
$50k to less than $100k	24%	15%**
$100k or more	22%	12%**
Refused	6%	9%
Don't know	21%	16%
n	**950**	**250**

** Difference between purchasers and non-purchasers is statistically significant at the 90 percent level of confidence.

2.4. Detailed Findings from Consumer Intercept and Shelf Surveys

2.4.1. Methodology

The objectives of the in-store consumer intercept survey task were to conduct interviews with lighting purchasers (including CFLs and non-CFLs) at the time of purchase to provide feedback on the primary influences on CFL purchase decisions, and to better understand how decisions vary under different product type availability, pricing and packaging scenarios. In addition, the surveys provided indicators of free ridership, “leakage” (i.e., CFL sales to non-IOU customers), and residential vs. nonresidential purchases.

There were two different types of shopper intercept surveys:

- *The revealed preference survey:* This survey was administered to shoppers who had already placed a light bulb in their shopping cart. These shoppers were then asked about their decision-making criteria for choosing these light bulbs.
- *The stated preference survey:* This survey was administered to shoppers who had not purchased a light bulb but who had agreed to accompany the surveyor to the lighting section of the store to engage in a hypothetical purchase scenario. The researcher asked consumers to imagine that they were shopping to replace a light bulb installed in a typical fixture in their homes and to select a CFL or incandescent lamp for that purpose. Once they selected the light bulb (or multi-pack of bulbs) they would have chosen, we administered a

limited version of the revealed preference survey. Stated preference surveys were needed because, in some store types, the volume of shoppers is so low that researchers may encounter no light bulb purchasers or very few.

As part of the data collection process, we also conducted comprehensive shelf surveys to provide detailed information on the variety of product types, prices, packaging configurations, etc. that were available to consumers at the time of the survey. The shelf survey database contains detailed characteristics data for both CFLs and incandescent lamps, including specialty lamps. The shelf survey data provides additional context for understanding consumer purchase decisions.

Sample Design

The 2006-2008 Upstream Lighting Program tracking databases provided the sample frame for the intercept and shelf surveys. The sample was designed to represent the channels and key retail chains that had participated in the program during 2006-2008. Table 2-60 presents an overview of the sample design, as well as the final sample sizes achieved by channel.

Table 2-61 provides additional information about the achieved sample – i.e., the average number of revealed preference and stated preference surveys completed by channel, the number of CFL models observed at the surveyed stores within each channel and the percentage of observed CFLs models that were discounted by the IOU.

Table 2-60
Sample Design and Achieved Sample Sizes by Channel

Channel	Percent of 2006-2008 Shipments	Number of Intercept Surveys Completed			Number of Stores Surveyed	Percent of Intercept Surveys Completed	Percent of Stores Surveyed
		RP	SP	RP+SP			
Discount	20%	92	214	306	53	17%	17%
Drug	7%	21	139	160	42	9%	13%
Grocery	40%	121	327	448	80	25%	25%
Hardware	8%	68	121	189	43	10%	13%
Home Improvement	7%	163	113	276	42	15%	13%
Lighting & Electronics	2%	0	0	0	0	0%	0%
Mass Merchandise	6%	204	142	346	41	19%	13%
Membership Club	10%	37	44	81	20	5%	6%
Other	0%	0	0	0	0	0%	0%

Note: RP = revealed preference survey, SP = stated preference survey

Table 2-61
Average Number of Intercept Surveys/Store and
Percent of Observed CFLs that Were IOU-Discounted

Channel	Number of RP Surveys Completed	Number of SP Surveys Completed	Number of Stores Surveyed	Average Number of RP Surveys Completed/ Store	Average Number of SP Surveys Completed/ Store	Number of CFL Models Observed	Percent of CFLs Observed that Were IOU-Discounted
Discount	92	214	53	1.7	4.0	227	60%
Drug	21	139	42	0.5	3.3	529	3%
Grocery	121	327	80	1.5	4.1	618	21%
Hardware	68	121	43	1.6	2.8	830	14%
Home Improvement	163	113	42	3.9	2.7	1261	11%
Mass Merchandise	204	142	41	5.0	3.5	1484	6%
Membership Club	37	44	20	1.9	2.2	144	26%

Note: RP = revealed preference survey, SP = stated preference survey

The following summarizes the information presented in Table 2-60 and Table 2-61 by channel:

- ***Discount*** **–** accounts for 20 percent of the shipments through ULP during 2006-2008. A total of 311 intercept surveys were completed at 53 discount stores, which represents 17 percent of the total number of intercept surveys completed and 17 percent of the total number of stores surveyed. On average, we completed 1.7 revealed preference surveys and 4.0 stated preference surveys at each discount store. A total of 227 CFL models were observed at the 53 discount stores included in the sample, 136 of which (60%) were IOU-discounted.

- ***Drug*** **–** accounts for 7 percent of the shipments through ULP during 2006-2008. A total of 169 intercept surveys were completed at 42 drug stores, which represents which represents 9% of the total number of intercept surveys completed and 13 percent of the total number of stores surveyed. On average, we completed 0.5 revealed preference survey and 3.3 stated preference surveys at each drug store. A total of 529 CFL models were observed at the 42 drug stores included in the sample, only 18 of which (3%) were IOU-discounted.

- ***Grocery –*** accounts for 40 percent of the shipments through ULP during 2006-2008. A total of 458 intercept surveys were completed at 80 grocery stores, which represents which represents 25 percent of the total number of intercept surveys completed and 25 percent of the total number of stores surveyed.[27] On average, we completed 1.5 revealed preference surveys and 4.1 stated preference surveys at each grocery store. A total of 618 CFL models were observed at the 80 grocery stores included in the sample, 130 of which (21%) were IOU-discounted.

- ***Hardware –*** accounts for 8 percent of the shipments through ULP during 2006-2008. A total of 192 intercept surveys were completed at 43 hardware stores, which represents which represents 10 percent of the total number of intercept surveys completed and 13 percent of the total number of stores surveyed. On average, we completed 1.6 revealed preference surveys and 2.8 stated preference surveys at each hardware store. A total of 830 CFL models were observed at the 43 hardware stores included in the sample, 118 of which (14%) were IOU-discounted.

- ***Home Improvement –*** accounts for 7 percent of the shipments through ULP during 2006-2008. A total of 277 intercept surveys were completed at 42 home improvement stores, which represents which represents 15 percent of the total number of intercept surveys completed and 13 percent of the total number of stores surveyed. On average, we completed 3.9 revealed preference surveys and 2.7 stated preference surveys at each home improvement store. A total of 1,261 CFL models were observed at the 42 home improvement stores included in the sample, 135 of which (11%) were IOU-discounted.

- ***Mass Merchandise –*** accounts for 6 percent of the shipments through ULP during 2006-2008. A total of 346 intercept surveys were completed at 41 mass merchandise stores, which represents which represents 15 percent of the total number of intercept surveys completed and 13 percent of the total number of stores surveyed. On average, we

[27] The reason the grocery channel appears to have been under-sampled has to do with the fact a large number of small independent stores participated in the program during 2006-2008, contributing to the large percentage of shipments going through this channel. Even though our sample included many small grocery chains/independent stores, the sales/per store for these types of stores is very low and, as such, we would have had to include a lot of these store fronts in our sample frame to get a higher representation in our final sample. However, given that traffic/sales per store is also very low, the cost/intercept/store would have been too high to include many more of these types of stores in our final sample.

completed 5.0 revealed preference surveys and 3.5 stated preference surveys at each mass merchandise store. A total of 1,484 CFL models were observed at the 41 mass merchandise stores included in the sample, 87 of which (6%) were IOU-discounted.

- ***Membership Club*** **–** accounts for 10 percent of the shipments through ULP during 2006-2008. A total of 85 intercept surveys were completed at 20 membership club stores, which represents which represents five percent of the total number of intercept surveys completed and six percent of the total number of stores surveyed. On average, we completed 1.9 revealed preference surveys and 2.2 stated preference surveys at each membership club store. A total of 144 CFL models were observed at the 20 membership club stores included in the sample, 37 of which (26%) were IOU-discounted.

The lighting and electronics channel was not included in the sample design because of its small contribution to the overall volume of sales through the program. (In addition, one of the major lighting and electronics store chains refused to participate in the study.) Finally, the "other" category consists of shipments that were not delivered through retail channels – e.g., utility-sponsored direct install/give-away campaigns, school-based programs, etc.

Table 2-62 presents sample characteristics information for each IOU.

Table 2-62
Intercept and Shelf Survey Characteristics by Channel and IOU

Channel	Percent of 2006-2008 Shipments	Number of Intercept Surveys Completed			Number of Stores Surveyed	Percent of Intercept Surveys Completed	Percent of Stores Surveyed	Average Number of RP Surveys Completed/ Store	Average Number of SP Surveys Completed/ Store	Number of CFL Models Observed	Percent of CFLs Observed that Were IOU-Discounted
		RP	SP	RP+SP							
PG&E											
Discount	16%	42	109	151	24	16%	15%	1.8	4.5	125	63%
Drug	9%	15	74	89	22	10%	14%	0.7	3.4	245	4%
Grocery	37%	69	155	224	37	24%	24%	1.9	4.2	139	34%
Hardware	10%	41	81	122	27	13%	17%	1.5	3.0	448	15%
Home Improvement	7%	55	49	104	16	11%	10%	3.4	3.1	499	12%
Lighting & Electronics	2%	0	0	0	0	na	na	na	na	na	na
Mass Merchandise	7%	110	78	188	23	20%	15%	4.8	3.4	715	6%
Membership Club	11%	13	43	56	7	6%	4%	1.9	6.1	60	37%
Other	0%	0	0	0	0	na	na	na	na	na	na
SCE Channels											
Discount	27%	41	77	118	21	19%	18%	2.0	3.7	74	68%
Drug	3%	5	54	59	17	10%	14%	0.3	3.2	195	4%
Grocery	43%	43	129	172	33	28%	28%	1.3	3.9	341	21%
Hardware	6%	18	28	46	9	7%	8%	2.0	3.1	183	7%
Home Improvement	7%	88	45	133	20	21%	17%	4.4	2.3	552	11%
Lighting & Electronics	2%	0	0	0	0	na	na	na	na	na	na
Mass	5%	43	30	73	8	11%	7%	5.4	3.8	334	7%

Channel	Percent of 2006-2008 Shipments	Number of Intercept Surveys Completed			Number of Stores Surveyed	Percent of Intercept Surveys Completed	Percent of Stores Surveyed	Average Number of RP Surveys Completed/ Store	Average Number of SP Surveys Completed/ Store	Number of CFL Models Observed	Percent of CFLs Observed that Were IOU-Discounted
		RP	SP	RP+SP							
Merchandise											
Membership Club	8%	23	0	23	12	4%	10%	1.9	0.0	73	19%
Other	0%	0	0	0	0	na	na	na	na	na	na
SDG&E Channels											
Discount	14%	9	28	37	8	15%	18%	1.1	3.5	28	25%
Drug	9%	1	11	12	3	5%	7%	0.3	3.7	89	1%
Grocery	39%	9	43	52	10	21%	22%	0.9	4.3	138	9%
Hardware	8%	9	12	21	7	9%	16%	1.3	1.7	199	20%
Home Improvement	9%	20	19	39	6	16%	13%	3.3	3.2	210	5%
Lighting & Electronics	2%	0	0	0	0	na	na	na	na	na	na
Mass Merchandise	6%	51	34	85	10	34%	22%	5.1	3.4	435	4%
Membership Club	12%	1	1	2	1	1%	2%	1.0	1.0	11	9%
Other	2%	0	0	0	0	na	na	na	na	na	na

Note: RP = revealed preference survey, SP = stated preference survey

The individual store fronts selected for this research were spread out throughout the service territories of PG&E, SCE and SDG&E. A total of 41 different regions were included in the study as shown in Figure 2-66.

Figure 2-66
Geographic Regions Included in Intercept and Shelf Survey Sample Design

Agoura / Ventura	Fresno	Riverside / Moreno Valley / Corona / Mira Loma
Anaheim / Buena Park / Fullerton / Placentia	Huntington Beach / Newport Beach	San Bernardino / Redlands / Colton / Highland
Bakersfield	Inglewood / Carson	San Clemente / Mission Viejo
Barstow / Hesperia	La Mesa / Lemon Grove / Spring Valley	San Diego
Carlsbad / Oceanside	Lakewood / Paramount / Compton	San Dimas / Pomona / Rialto
Central Coast	Long Beach	San Fernando / Lancaster
Cerritos / Bellflower / Artesia	Los Angeles	San Francisco
Chico	Lynwood / Huntington Park	San Jose
Costa Mesa / Irvine / Fountain Valley	Monterey Park / Arcadia	Santa Ana / Orange / Garden Grove / Tustin
East Bay	National City / Chula Vista / Bonita	South Central Coast
El Cajon / Santee / Lakeside	North Bay	Stockton
El Monte / Monrovia / Glendora	Norwalk / Whittier / Brea	Temecula / Lake Elsinore
El Segundo / Rancho Palos Verdes	Palm Springs	West Hollywood / Santa Monica
Escondido / San Marcos	Poway / Ramona / Borrego Springs	

Several high-volume retail chains and independent stores were not included in the study because either their management refused to participate or failed to respond to our multiple attempts to obtain permission to conduct research in their stores. Chains/stores that were not included in this study are listed in Table 2-63.

Table 2-63
List of Chains/Stores Excluded from Intercept and Shelf Survey

Store Name
Costco
Orchard Supply
Lowe's
Winco
Food 4 Less
Raley's/Nob Hill Foods
Mollie Stone's
Stater Brothers Supermarkets
Smart & Final
Fry's Electronics
Lamps Plus
Ganahl Lumber
Bed Bath & Beyond
New Oakland Pharmacy
Delano Markets
Food Maxx / Save Mart / Lucky
Longs / CVS Pharmacy
Lunardi's Market

Survey Design

As mentioned above, the intercept surveys were designed to provide feedback on the primary influences on CFL purchase decisions, and to better understand how decisions vary under different product type availability, pricing and packaging scenarios. Specifically, questions were included to assess the following potential influences on CFL purchase decisions:

- Shopping/CFL purchase intent (impulse buy vs. planned purchase),
- Recall/influence of CFL price (initial versus discount),
- Recall/influence of IOU program/discount,
- Recall/influence of product placement, signage, etc. (end-cap vs. in-aisle),
- Recall/influence of product packaging (multi- vs. single-packs),
- Recall/influence of CFL advertising,
- Prior awareness/usage of CFLs, and
- Location/application for which CFL will be/is being used.

Two different yet similar intercept survey instruments were designed for this study. The first is referred to as the “revealed preference” survey and was administered to consumers who selected a light bulb to purchase and asked about specific purchase decision-making criteria. The second involved asking consumers (who were not planning to purchase lighting products that day) to conduct a “stated preference” survey. The two instruments were very similar in the specific issues they address, but the stated preference version elicited consumer preferences based on a hypothetical, rather than actual, purchase scenario.

Two additional research issues addressed in both the revealed preference and stated preference survey instruments were (1) whether or not the respondent was a customer of one of California’s three electric IOUs and (2) whether the respondent was purchasing (or hypothetically shopping for) light bulbs for their home or business. Because some retail locations overlap utility service territories, it was important to understand the extent of any product ‘leakage’ (i.e., sales of IOU-discounted products to ratepayers from other jurisdictions). The second issue was also important because of the very different factors that influence lighting purchase decisions in residential versus nonresidential settings. In addition, lighting usage patterns vary significantly across residential and nonresidential segments, so it was important to determine where consumers plan to install the products so that estimates of energy savings can be forecast more accurately by program planners and policymakers.

In addition to the intercept surveys, comprehensive shelf surveys were conducted to provide the context for CFL purchase decisions. The shelf survey collected detailed information on a wide variety of product types, prices, packaging configurations, etc. The shelf survey also store-level data, such as a summary of the types of lighting products sold, promotional characteristics, placement information, CFL styles available, and lighting shelf space measurements. In addition, the shelf survey collected a detailed inventory of both CFL and incandescent lighting products:

- CFL inventory data – manufacturer, style, model, location, quantity in pack, original price per pack, discount amount, discount provider, wattage, lumens, 3-way, dimmable, Energy Star label.

- Incandescent inventory data – manufacturer, style, model, location, quantity per pack, price per pack, wattage, 3-way, dimmable.

Survey Logistics

Store managers (national, regional, local) were contacted to obtain permission to enter stores. Often store managers dictated which days of the week and which times of day we could conduct the research. About one quarter of the surveys conducted through this research were conducted on weekdays, with the remaining conducted on weekends. Surveys were either conducted in the morning (10am-2pm) or afternoon (3-7pm).

For the revealed preference surveys, trained researchers would “intercept” consumers after they had made a lighting purchase decision and recruit them to participate in a brief, in-aisle survey. Ideally, consumers were recruited immediately following their decision to purchase a particular light bulb (i.e., after they have placed it in their shopping cart or basket). This positioning and timing enabled the researcher to discuss the range of available light bulbs in a particular store with a consumer who has just selected from among those products.

For the stated preference surveys, consumers were recruited to conduct a similar survey based on a hypothetical, rather than actual, purchase scenario. Stated preference surveys were needed because, in some store types, the volume of shoppers was so low that researchers encountered very few (or zero) light bulb purchasers during the time they were in the stores conducting the research. The researcher asked consumers to imagine that they were shopping to replace a light bulb installed in a typical fixture in their homes and to select a CFL or incandescent lamp for that purpose. Once they have selected the light bulb (or multi-pack of bulbs) they would choose, a limited version of the revealed preference survey was administered.

Both the revealed and stated preference surveys lasted only two to four minutes, and consumers were recruited to participate with the offer of a gift card of nominal value (e.g., $5 or $10, depending on the store). Copies of both the revealed and stated preference intercept survey instruments are included in this Appendix.

2.4.2. Intercept Survey Results

This section discusses results from the intercept surveys. Results are presented for the following topics:

- Shopping intentions (i.e., plan to purchase lighting products? plan to purchase CFLs?)
- Actual vs. planned purchases (i.e., CFLs, IOU-discounted CFLs, incandescent lamps)
- Awareness of IOU CFL discounts (i.e., aware of discounts in general, aware of discounts available at this store, aware of discounts for products purchased/selected)
- Reasons for purchasing CFLs (e.g., save money, low/affordable price, prior experience, etc.)
- Barriers to CFL purchase (e.g., product design/performance characteristics, lack of awareness/information, price, etc.)
- "Free ridership" indicators (i.e., quantity of CFLs that would have been purchased if they cost twice as much or half as much)
- Effects of multi-packs on quantity of CFLs purchased
- Assessment of residential versus nonresidential CFL purchases
- Prior CFL usage, installation and storage
- "Leakage" indicators (i.e., percent of non-IOU customers purchasing CFLs)

For each topic, results are presented overall, as well as by IOU and by retail channel (e.g., discount, drug, hardware, mass merchandise, grocery, etc.). In addition, where applicable, we make relevant comparisons between the revealed and stated preference survey responses.

Shopping Intentions

The revealed preference intercept surveys started out with the question, *"Were you planning on purchasing lighting products today?"* This question was asked to engage the respondent in the survey, as well as initiate a discussion about their shopping intentions and whether or not they planned to purchase lighting products in general and CFLs in particular.

Overall, the results to this initial question indicate that about 70 percent of all revealed preference intercept survey respondents were planning to purchase lighting products the day the survey was conducted. Overall, half of these respondents (50%) had specifically planned to purchase CFLs the day the survey was conducted.

Results by IOU are presented in Table 2-64. As shown, SCE respondents were less likely to indicate they had planned to purchase lighting products the day the survey was conducted (65%), and 60 percent of these respondents had specifically planned to purchase CFLs. This is much different than respondents from PG&E and SDG&E, where respondents were more likely to report that they had planned to purchase lighting products the day the survey was conducted, but less likely to indicate that they had specifically planned to purchase CFLs.

Results by channel are presented in Table 2-65. As shown, respondents within the drug channel were more likely to plan lighting purchases overall but less likely to plan CFL purchases in particular. Respondents within the hardware channel were also more likely to plan lighting purchases in general, and respondents within the large grocery and mass merchandise channels were less likely to plan CFL purchases in particular. Finally, respondents within the membership club and small grocery channels were less likely to plan lighting purchases in general but more likely to plan CFL purchases in particular. Respondents within the discount and large grocery channels were not that much different than respondents overall.

Table 2-64
Plans to Purchase Lighting and Plans to Purchase CFLs by IOU
(Revealed Preference Only)

All Respondents			
Plan to purchase lighting?	**Plan to purchase CFLs?**	**Number of Respondents**	**Percent of Respondents**
Didn't plan to purchase lighting		210	30%
Planned to purchase lighting		479	70%
	Didn't plan to purchase CFLs	241	50%
	Planned to purchase CFLs	238	50%
PG&E Respondents			
Plan to purchase lighting?	**Plan to purchase CFLs?**	**Number of Respondents**	**Percent of Respondents**
Didn't plan to purchase lighting		96	28%
Planned to purchase lighting		247	72%
	Didn't plan to purchase CFLs	138	56%
	Planned to purchase CFLs	109	44%
SCE Respondents			
Plan to purchase lighting?	**Plan to purchase CFLs?**	**Number of Respondents**	**Percent of Respondents**
Didn't plan to purchase lighting		88	35%
Planned to purchase lighting		166	65%
	Didn't plan to purchase CFLs	66	40%
	Planned to purchase CFLs	100	60%
SDG&E Respondents			
Plan to purchase lighting?	**Plan to purchase CFLs?**	**Number of Respondents**	**Percent of Respondents**
Didn't plan to purchase lighting		26	28%
Planned to purchase lighting		66	72%
	Didn't plan to purchase CFLs	37	56%
	Planned to purchase CFLs	29	44%

Table 2-65
Plans to Purchase Lighting and Plans to Purchase CFLs by Channel
(Revealed Preference Only)

Channel	Plan to purchase lighting?	Plan to purchase CFLs?	Number of Respondents	Percent of Respondents
Discount	Didn't plan to purchase lighting		35	38%
	Planned to purchase lighting		57	62%
		Didn't plan to purchase CFLs	24	42%
		Planned to purchase CFLs	33	58%
Drug	Didn't plan to purchase lighting		4	19%
	Planned to purchase lighting		17	81%
		Didn't plan to purchase CFLs	12	71%
		Planned to purchase CFLs	5	29%
Hardware	Didn't plan to purchase lighting		11	17%
	Planned to purchase lighting		53	83%
		Didn't plan to purchase CFLs	25	47%
		Planned to purchase CFLs	28	53%
Home Improvement	Didn't plan to purchase lighting		37	24%
	Planned to purchase lighting		117	76%
		Didn't plan to purchase CFLs	54	46%
		Planned to purchase CFLs	63	54%
Large Grocery	Didn't plan to purchase lighting		12	29%
	Planned to purchase lighting		29	71%
		Didn't plan to purchase CFLs	20	69%
		Planned to purchase CFLs	9	31%
Mass Merchandise	Didn't plan to purchase lighting		43	21%
	Planned to purchase lighting		158	79%
		Didn't plan to purchase CFLs	102	65%
		Planned to purchase CFLs	56	35%
Membership Club	Didn't plan to purchase lighting		17	46%
	Planned to purchase lighting		20	54%
		Didn't plan to purchase CFLs	0	0%
		Planned to purchase CFLs	20	100%
Small Grocery	Didn't plan to purchase lighting		51	65%
	Planned to purchase lighting		28	35%
		Didn't plan to purchase CFLs	4	14%
		Planned to purchase CFLs	24	86%

Revealed Preference Lighting Purchases

Table 2-66 displays the results from the intercept surveys related to the type of lighting products actually (revealed preference) or hypothetically (stated preference) purchased. As shown:

- More than half (59%) of all respondents to the revealed preference intercept survey purchased CFLs. Of these, just about two thirds (63%) purchased IOU-discounted CFLs. Overall, 37% of all respondents to the revealed preference intercept survey purchased IOU-discounted CFLs.

- This compares to the stated preference survey results as follows:

    - Slightly more respondents to the stated preference intercept survey results indicated that they would have purchased CFLs (68% vs. 59% of revealed preference respondents).

    - However, stated preference survey respondents were less likely to indicate that they would have purchased the IOU-discounted CFLs (48% of stated preference CFL purchasers, and 33% of stated preference respondents overall).

    - This may indicate that stated preference respondents are slightly over-estimating their willingness to purchase CFLs and somewhat under-estimating their willingness to purchase IOU-discounted CFLs.

Results by IOU are displayed in Table 2-66. As shown, SCE respondents differ from respondents from the other IOUs in that a significantly greater percentage of SCE revealed preference survey respondents purchased CFLs (68%). In addition, SCE stated preference respondents fairly accurately predicted their willingness to purchase CFLs in general as well as IOU-discounted CFLs in particular. This was not the case for the respondents from PG&E and SDG&E.

Table 2-66
CFL Purchasers and IOU-Discounted CFL Purchasers by IOU

All Respondents	Revealed Preference		Stated Preference	
	Percent of Respondents		Percent of Respondents	
Purchased CFLs	59%	(413 / 701)	68%	(736 / 1085)
Purchased IOU-Discounted CFLs (as percent of all respondents)	37%	(260 / 701)	33%	(354 / 1085)
Purchased IOU-Discounted CFLs (as percent of CFL purchasers)	63%	(260 / 413)	48%	(354 / 736)
PG&E				
Purchased CFLs	54%	(186 / 343)	75%	(433 / 578)
Purchased IOU-Discounted CFLs (as percent of all respondents)	37%	(126 / 343)	33%	(189 / 578)
Purchased IOU-Discounted CFLs (as percent of CFL purchasers)	68%	(126 / 186)	44%	(189 / 433)
SCE				
Purchased CFLs	68%	(177 / 259)	62%	(223 / 362)
Purchased IOU-Discounted CFLs (as percent of all respondents)	41%	(107 / 259)	36%	(130 / 362)
Purchased IOU-Discounted CFLs (as percent of CFL purchasers)	60%	(107 / 177)	58%	(130 / 223)
SDG&E				
Purchased CFLs	51%	(50 / 99)	55%	(80 / 145)
Purchased IOU-Discounted CFLs (as percent of all respondents)	27%	(27 / 99)	24%	(35 / 145)
Purchased IOU-Discounted CFLs (as percent of CFL purchasers)	54%	(27 / 50)	44%	(35 / 80)

Results by channel are presented in Table 2-67. As shown:

- ***Discount.*** About two-thirds of the respondents within this channel (67%) purchased CFLs, the majority of which (95%) purchased IOU-discounted CFLs.
- ***Drug.*** Although the sample size for this channel is very small, the results tend to indicate that few respondents purchased CFLs overall, but those who did often purchased IOU-discounted CFLs.
- ***Hardware.*** About half of the respondents within this channel (51%) purchased CFLs, but only about half of them purchased IOU-discounted CFLs.
- ***Home Improvement.*** While 60 percent of the respondents within this channel purchased CFLs, less than one third of them purchased IOU-discounted CFLs.
- ***Large Grocery.*** Less than half of the respondents within this channel (46%) purchased CFLs, two-thirds of which purchased IOU-discounted CFLs (63%).
- ***Mass Merchandise.*** Only 41 percent of the respondents within this channel purchased CFLs, and only 46% of them purchased IOU-discounted CFLs.
- ***Membership Club.*** All of the respondents in this channel purchased CFLs, and most of them purchased IOU-discounted CFLs (68%).
- ***Small Grocery.*** The majority of respondents within this channel purchased CFLs, and all of them purchased IOU-discounted CFLs (100%).

Table 2-67
CFL Purchasers and IOU-Discounted CFL Purchasers by Channel
(Revealed Preference Only)

Channel	Percent of Respondents Who:			Sample Sizes		
	Purchased CFLs?	Purchased IOU-Discounted CFLs? (of all respondents)	Purchased IOU-Discounted CFLs? (of CFL purchasers)	All Revealed Preference Respondents	All CFL Purchasers	All IOU-Discounted CFL Purchasers
Discount	67%	64%	95%	92	62	59
Drug	33%	24%	71%	21	7	5
Hardware	51%	28%	54%	68	35	19
Home Improvement	60%	17%	28%	159	95	27
Large Grocery	46%	29%	63%	41	19	12
Mass Merchandise	41%	19%	46%	204	84	39
Membership Club	100%	68%	68%	37	37	25
Small Grocery	94%	94%	100%	79	74	74
All Channels	59%	37%	63%	701	413	260

Revealed Preference Plans vs. Purchases

Table 2-68 compares responses from revealed preference survey respondents regarding their plans to purchase lighting products – CFLs in particular – and their actual purchases. As indicated above, overall, 70 percent of all revealed preference survey respondents planned to purchase lighting products on the day the survey was conducted and half of these (50%) planned to purchase CFLs in particular.

As shown in Table 2-68:

- Overall, the majority of respondents who did not plan on purchasing any lighting products actually purchased CFLs and most of those CFLs were IOU-discounted. Only eight percent of respondents overall were not planning to purchase any lighting products and actually purchased incandescent lighting products.

- Nearly all of the respondents who planned to purchase CFLs in particular actually did (i.e., 233 out of 238), with about 55 percent of them purchasing IOU-discounted CFLs.

- The majority of respondents who did not plan to purchase CFLs in particular (91%) actually purchased incandescent lighting products. Only about nine percent who were not planning to purchase CFLs actually did.

Finally, overall, about 17 percent of all respondents purchased IOU-discounted CFLs but did not plan to purchase any lighting products the day the survey was conducted. This compares to about 19 percent of all respondents who planned to purchase CFLs in particular the day the survey was conducted and they actually purchased IOU-discounted CFLs.

Table 2-68
Comparison of Planned versus Actual Lighting Purchases
(Revealed Preference Only)

Plan to purchase lighting?	Plan to purchase CFLs?	Purchased CFLs?	Purchased IOU-discounted CFLs?	Number of Respondents	Percent of Respondents
Did not plan to purchase lighting		Purchased incandescents		55	8%
		Purchased CFLs	Did not purchase IOU-discounted CFLs	35	5%
			Purchased IOU-discounted CFLs	120	17%
Planned to purchase lighting	Did not plan to purchase CFLs	Purchased incandescents		219	32%
		Purchased CFLs	Did not purchase IOU-discounted CFLs	12	2%
			Purchased IOU-discounted CFLs	10	1%
	Planned to purchase CFLs	Purchased incandescents		5	1%
		Purchased CFLs	Did not purchase IOU-discounted CFLs	105	15%
			Purchased IOU-discounted CFLs	128	19%

Results by IOU are shown in Table 2-69 and summarized below: PG&E and SCE respondents do not differ significantly from the overall results:

- Overall, the majority of respondents who did not plan on purchasing any lighting products actually purchased CFLs, and most of those CFLs were IOU-discounted. Few respondents were not planning to purchase any lighting products and actually purchased incandescent lighting products.

- Nearly all respondents who planned to purchase CFLs in particular actually did, with most of them purchasing IOU-discounted CFLs.

Table 2-69
Comparison of Planned versus Actual Lighting Purchases by IOU
(Revealed Preference Only)

IOU	Plan to purchase lighting?	Plan to purchase CFL?	Purchased CFL?	Purchased IOU-discounted CFL?	Number of Respondents	Percent of Respondents
PG&E	Didn't plan to purchase lighting		Purchased incandescent		27	8%
			Purchased CFL	Didn't purchase IOU-discounted CFL	9	3%
				Purchased IOU-discounted CFL	60	17%
	Planned to purchase lighting	Didn't plan to purchase CFL	Purchased incandescent		126	37%
			Purchased CFL	Didn't purchase IOU-discounted CFL	5	1%
				Purchased IOU-discounted CFL	7	2%
		Planned to purchase CFL	Purchased incandescent		4	1%
			Purchased CFL	Didn't purchase IOU-discounted CFL	46	13%
				Purchased IOU-discounted CFL	59	17%
SCE	Didn't plan to purchase lighting		Purchased incandescent		17	7%
			Purchased CFL	Didn't purchase IOU-discounted CFL	20	8%
				Purchased IOU-discounted CFL	51	20%
	Planned to purchase lighting	Didn't plan to purchase CFL	Purchased incandescent		60	24%
			Purchased CFL	Didn't purchase IOU-discounted CFL	5	2%
				Purchased IOU-discounted CFL	1	0%
		Planned to purchase CFL	Purchased incandescent		1	0%
			Purchased CFL	Didn't purchase IOU-discounted CFL	45	18%
				Purchased IOU-discounted CFL	54	21%
SDGE	Didn't plan to purchase lighting		Purchased incandescent		11	12%
			Purchased CFL	Didn't purchase IOU-discounted CFL	6	7%
				Purchased IOU-discounted CFL	9	10%
	Planned to purchase lighting	Didn't plan to purchase CFL	Purchased incandescent		33	36%
			Purchased CFL	Didn't purchase IOU-discounted CFL	2	2%
				Purchased IOU-discounted CFL	2	2%
		Planned to purchase CFL	Purchased incandescent		0	0%
			Purchased CFL	Didn't purchase IOU-discounted CFL	14	15%
				Purchased IOU-discounted CFL	15	16%

- The majority of respondents who did not plan to purchase CFLs in particular actually purchased incandescent lighting products. Very few respondents who were not planning to purchase CFLs actually did.

- The percentage of respondents who were not planning to purchase any lighting products at all but purchased IOU-discounted CFLs is about the same as the percentage of respondents who were planning to purchase CFLs and actually purchased IOU-discounted CFLs.

The overall sample size for SDG&E was fairly small. However, SDG&E respondents are somewhat different than the other IOU respondents in that slightly more than half of the respondents who did not plan on purchasing lighting products (58%) actually purchased CFLs, and only about one third of them (35%) purchased IOU-discounted CFLs.

Awareness of IOU CFL Discounts

Overall, only about one third of respondents who purchased IOU-discounted CFLs (38%) were aware that the specific product they purchased was discounted by the IOU. Another 41 percent were aware that the product was discounted but not necessarily by the IOU and the remaining 21 percent were unaware that the product they purchased was discounted at all. PG&E respondents were most likely to be aware that the product they were purchasing was discounted by PG&E, whereas SCE and SDG&E respondents were more likely to be aware that the product they were purchasing was discounted but not necessarily by the IOU. Table 2-70 displays these results by IOU.

Table 2-70
Awareness of CFL Discounts by IOU
(Revealed Preference Only)

	All Respondents	PG&E	SCE	SDG&E
	(n=188)	(n=74)	(n=88)	(n=28)
Aware CFLs were discounted by IOU	38%	47%	35%	25%
Aware CFLs were discounted but not necessarily by IOU	41%	24%	50%	54%
Unaware CFLs were discounted at all	21%	28%	15%	21%

Channels in which awareness of IOU-discounted CFLs was the highest include small grocery (58%) and discount (46%). Awareness of discounts but not necessarily IOU discounts was highest in the home improvement (65%) and mass merchandise (59%) channels. Sample sizes

for the hardware, drug and large grocery channels were too small to report meaningful differences.

Respondents who were aware that the CFLs they purchased were discounted by the IOU were then asked if they came into the store specifically to purchase IOU-discounted CFLs. Overall, 43 percent of these respondents indicated that they had. The overall sample size for this result is very small (n=61). As a result, meaningful differences by IOU or channel cannot be reported.

Respondents were also asked whether or not they were aware – before coming into the store on the day the survey was conducted – that the IOUs were offering discounts on CFLs. Overall, 19 percent of all revealed preference intercept survey respondents were aware of IOU discounts before the survey was conducted. This compares to 30 percent of all stated preference respondents, indicating that there may be a slight bias in the stated preference survey data toward shoppers with greater awareness of IOU discounts for CFLs. This result is consistent across the IOUs.

Table 2-71 shows these results by channel. Within the membership club channel, stated preference respondents were much more likely to report that they were aware of IOU discounts on CFLs before they completed the survey. Revealed preference respondents within the small grocery channel were more likely to report they were aware of IOU discounts on CFLs before they completed the survey.

Table 2-71
Awareness of IOU Discounts on CFLs (Before Survey) by Channel

Channel	Aware of IOU Discounts on CFLs (Before Survey)			
	Revealed Preference		Stated Preference	
	Percent of Respondents	Number of Respondents	Percent of Respondents	Number of Respondents
Discount	21%	71	29%	208
Drug	22%	18	32%	127
Hardware	17%	60	35%	119
Home Improvement	18%	154	29%	109
Large Grocery	19%	37	25%	197
Mass Merchandise	19%	189	30%	138
Membership Club	14%	29	48%	44
Small Grocery	25%	57	31%	115
All Channels	19%	615	30%	1,057

Respondents were also asked if they were aware that they could find IOU-discounted CFLs at the specific store where the survey was conducted. Overall, 43 percent of all respondents indicated they were aware IOU-discounted CFLs were available at the store where they survey was conducted. In this case, revealed preference respondents were somewhat more likely to report that they were aware as compared to stated preference respondents (49% vs. 41%, respectively).

SCE respondents were less likely to be aware of IOU-discounted CFLs at the store where the survey was conducted (35%), whereas SDG&E respondents were more likely to be aware (62%). Awareness by channel was highest for the mass merchandise stores (58%) and lowest for drug (22%), home improvement (38%) and membership club (36%) stores.

Reasons for Purchasing CFLs

Revealed preference intercept survey respondents who purchased CFLs, as well as stated preference intercept survey respondents who selected a CFL over its incandescent equivalent, were asked to indicate their reasons for their revealed or stated preferences. As shown in Table 2-72, consistent with prior research, the top reasons are included saving money and/or saving energy (multiple responses were allowed). In addition, product performance issues were mentioned fairly commonly as reasons for purchasing CFLs. About one in five mentioned environmental benefits as the reason they purchased CFLs, and a similar percentage specifically mentioned the low/affordable price as they reason they purchased CFLs. Other reasons for purchasing CFLs include respondents' prior experience with the product, specific packaging/merchandising characteristics, and/or other product design features. Less than 1% of the respondents overall mentioned the IOU discount as a reason they purchased CFLs.

Table 2-72
Reasons for Purchasing CFLs

Reason for Purchasing CFLs	All Respondents	Revealed Preference	Stated Preference
	Percent of Respondents	Percent of Respondents	Percent of Respondents
	(n=1149)	(n=413)	(n=736)
Save Energy	68%	65%	70%
Save Money	40%	40%	40%
Product Performance	25%	24%	26%
Low/Affordable Price	19%	26%	14%
Environmental Reasons	19%	14%	22%
Prior Experience	10%	10%	10%
Packaging/Merchandising	5%	8%	3%
Product Design	4%	8%	1%
IOU Discount	0%	1%	0%
Other	0%	1%	0%

There were some differences between respondents revealed and stated preferences for CFLs. First, stated preference intercept survey respondents were much less likely to cite the low/affordable price of CFLs as their reason for selecting a CFL over an incandescent lighting product. On average, the CFLs selected by stated preference survey respondents were three times more expensive (on a per lamp basis) than the selected incandescent products ($2.23 vs. $0.74), as shown in Table 2-73. On a per package basis, the CFLs selected were about one and a half times more expensive than the selected incandescent lamps ($4.76 vs. $2.81). Exactly half (50%) of the CFLs selected were offered at a discounted price. The selected discounted CFLs compared more favorably to the selected incandescent products in terms of both average price per package ($2.11 vs. $2.81) as well as average price per lamp ($1.02 vs. $0.74).

Stated preference intercept survey respondents were somewhat more likely to cite environmental and/or energy savings benefits as the reason for wanting to purchase CFLs over incandescent lamps, perhaps indicating a slight bias in their response.

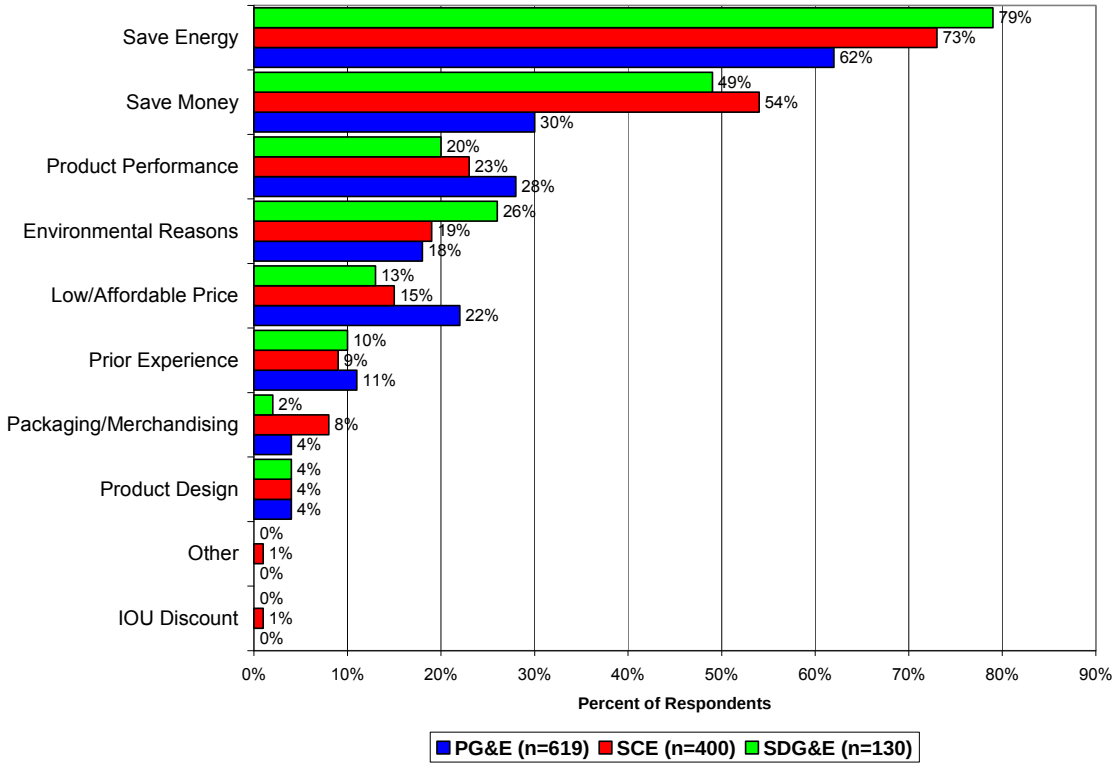
Table 2-73
Average Price and Packaging Characteristics of Selected CFLs and Incandescent Products (Stated Preference Only)

Product Selected	Sample Size	Price Per Package			Number of Lamps per Package			Price Per Lamp
		Average	Min	Max	Average	Min	Max	Average
CFL	736	$4.76	$0.25	$19.67	2.13	1	10	$2.71
- Non-discounted	381	$7.37	$0.99	$19.67	2.19	1	10	$4.13
- Discounted	355	$2.11	$0.25	$13.86	2.06	1	8	$1.23
Incandescent	351	$2.83	$0.48	$24.97	3.74	0	12	$1.05

Stated preference intercept survey respondents were also somewhat less likely to indicate specific product design features and packaging/merchandising characteristics as their reason for selecting a CFL over an incandescent lamp. This may be due in part to the way in which the stated preference intercept survey was implemented – for example, respondents were given a choice between a package containing 60-100W incandescent lamps and the equivalent package of CFLs. These choices were based on the actual products and packaging that was available on the shelf the day the survey was conducted. Therefore, to some extent, product design features such as wattage, shape, control type, etc., as well as packaging/merchandising characteristics such as number in package, location in the store, signage, etc., were held constant in the stated preference exercise.

Figure 2-67 displays the overall results by IOU. With revealed and stated preference responses combined, SCE respondents were more likely than other IOU respondents to cite saving money and/or energy as their reasons for selecting CFLs, and somewhat more likely to cite the packaging/merchandising characteristics as the reasons they selected CFLs. SCE respondents were slightly less likely than PG&E respondents in particular to cite the low/affordable price and/or product performance characteristics as their reason for selecting CFLs.

Figure 2-67
Reasons for Purchasing CFLs by IOU



There were also some meaningful differences in the results by channel, as shown in Table 2-74 and summarized below:

- Respondents surveyed in drug stores more commonly cited environmental benefits as the reason they selected CFLs, and less commonly cited saving money and/or low/affordable CFL prices.
- Respondents surveyed in hardware stores were similar to respondents surveyed in drug stores in that they more commonly cited environmental benefits and less commonly cited saving money as the reason for selecting CFLs.
- Saving energy, money and environmental benefits were all more commonly cited by respondents surveyed in large grocery stores.

- Low/affordable CFL prices were more often cited by respondents surveyed in small grocery stores and mass merchandise stores, and least often cited by respondents surveyed in home improvement stores.

Table 2-74
Reasons by Purchasing CFLs by Channel

Reason s for Purch-asing CFLs	Discount (n=219)	Drug (n=105)	Hardware (n=115)	Home Improve-ment (n=162)	Large Grocery (n=139)	Mass Merch-andise (n=173)	Member-ship Club (n=79)	Small Grocery (n=157)
Save Energy	66%	70%	63%	72%	76%	65%	72%	63%
Save Money	41%	30%	31%	43%	53%	39%	44%	39%
Product Perfor-mance	27%	31%	29%	28%	27%	20%	20%	21%
Low/ Affordable Price	13%	10%	18%	9%	15%	30%	13%	36%
Environ-mental Reasons	14%	28%	28%	17%	30%	15%	14%	14%
Prior Exper-ience	12%	9%	9%	9%	8%	13%	6%	13%
Packaging/ Merch-andising	5%	2%	5%	2%	5%	7%	1%	7%
Product Design	3%	1%	5%	9%	0%	8%	3%	1%
IOU Discount	1%	0%	1%	0%	0%	1%	0%	0%
Other	0%	0%	0%	1%	0%	0%	3%	1%

Note: Yellow highlight indicates reasons less commonly cited, blue highlight indicates reasons more commonly cited.

Barriers to CFL Purchase

Revealed preference intercept survey respondents who did not purchase CFLs were asked to indicate their primary reasons for not purchasing CFLs, and stated preference intercept survey respondents who did not select CFLs were also asked to indicate their primary reasons for not selecting CFLs. When the results are combined, the most common reasons for not purchasing/selecting CFLs fell into one of the following four categories (as shown in Table 2-75):

- ***Awareness/Information.*** Overall, 39 percent of all respondents cited some type of awareness/information barrier to CFL purchase that could be potentially overcome with targeted educational and/or outreach strategies. For example, about one in five indicated that they purchased/selected incandescent lamps out of "habit;" and a few others cited similar reasons (i.e., prior experience with incandescent lamps, wanted an exact replacement model). Others indicated that they needed more information or were unaware of CFLs. Finally, others reported that they did not purchase/select CFLs because of prior (bad) experience with CFLs, warnings from friends and family, and/or general perceptions that incandescent lamps were "better" than CFLs. A few respondents (2%) indicated that because they "already have CFLs" they did not need to purchase any more.

- ***Product Design.*** Just over one-third of all respondents cited some type of specific product design feature as their reason for not purchasing/selecting CFLs. Most common were features such as the way CFLs look and/or fit in fixtures, as well as other aspects of the bulb shape or size. Others mentioned that they needed some a specific type of bulb (e.g., three-way, dimmable, specific wattage) or some other specification (e.g., appliance replacement bulb, outdoor/safety fixture, etc.).

- ***Product Performance.*** Overall, 30 percent of all respondents mentioned some aspect of product performance as their reason for not purchasing/selecting CFLs, the most common of which related to light quality/color. A few others mentioned that CFLs took too long to start-up, burn out too fast, and/or flicker.

- ***Price.*** About one in four of all respondents (26%) mentioned price (i.e., too expensive) as their reason for not purchasing/selecting CFLs.

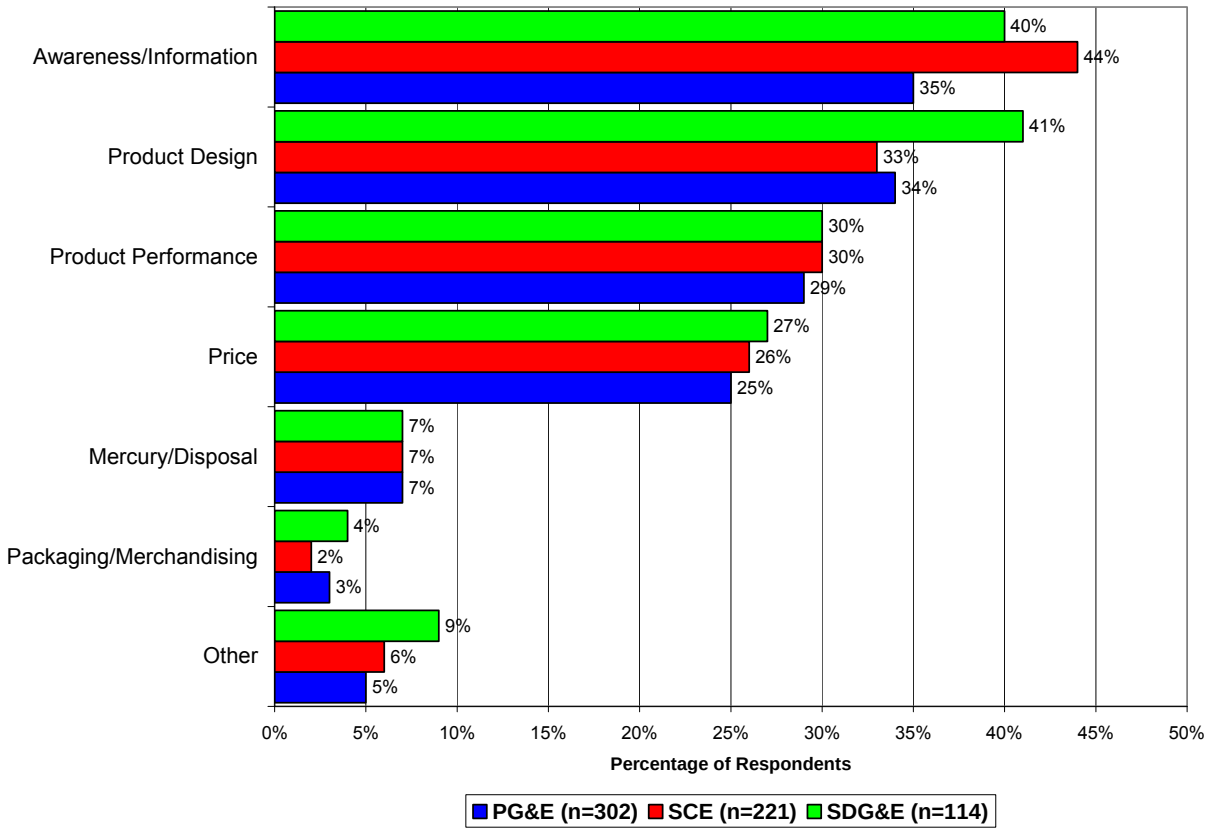
A small (but most likely growing) percentage of respondents (7%) mentioned their concerns about the mercury content in CFLs as a barrier to purchase. Finally, only about three percent mentioned barriers related to product packaging (i.e., multi-packs) and merchandising (i.e., location in the store) as reasons for not purchasing CFLs.

Table 2-75
Barriers to CFL Purchase
Percentage of All Respondents (n=637)

Awareness and Information	**39%**		
Habit	21%	Need more information	12%
Unaware of CFLs	7%	Prior experience with incandescent lamps	4%
Already have CFLs	2%	Prior experience with CFLs	1%
Better	<1%	Not recommended by F&F	<1%
Wanted exact replacement model	<1%		
Product Design	**35%**		
Look	14%	Fit	11%
Need other specification	8%	Needed three-way	4%
Brand	3%	Shape	3%
Needed dimmable	2%	Needed specific wattage	1%
Size	<1%		
Product Performance	**30%**		
Color	24%	Start-up	5%
Life	3%	Flicker	2%
Brightness	<1%		
Price	**26%**		
Mercury/disposal	**7%**		
Packaging and Merchandising	**3%**		
Location	2%	Wanted multi-pack	1%
Didn't want multi-pack	0%		
Other	**6%**		

For the most part, these results are fairly consistent across the IOUs, as shown in Table 2-62. SCE respondents are somewhat more likely to cite barriers that relate to a lack of awareness or information (e.g., “habit,” prior experience, etc.), and SDG&E respondents are more likely to cite barriers related to product design features (e.g., lamp “look” or fit).

Figure 2-68
Barriers to CFL Purchase by IOU



The overall results are also fairly consistent across channels, as shown in Table 2-76, with a few noteworthy differences summarized below:

- ***Price.*** Channels where price barriers were least common include discount and small grocery, whereas price barriers were more commonly cited in the drug and mass merchandise channels.

- ***Product Performance and Design.*** These barriers were most commonly cited in the small grocery channel. Product design barriers were least common within the drug store channel.

- ***Awareness/Information.*** This barrier was cited most commonly within the discount store channel.

Table 2-76
Barriers to CFL Purchase by Channel

	Discount (n=86)	Drug (n=55)	Hardware (n=74)	Home Improvement (n=109)	Large Grocery (n=103)	Mass Merchandise (n=173)	Small Grocery (n=36)
Awareness/Information	47%	42%	36%	36%	38%	39%	42%
Product Design	38%	24%	35%	40%	38%	31%	42%
Product Performance	28%	25%	24%	34%	32%	28%	39%
Price	16%	36%	23%	20%	28%	33%	17%
Mercury/Disposal	7%	11%	9%	4%	8%	6%	3%
Packaging/Merchandising	7%	4%	1%	2%	1%	2%	6%
Other	1%	4%	11%	6%	8%	6%	11%

Notes: Yellow highlight indicates reasons less commonly cited, blue highlight indicates reasons more commonly cited. Membership club channel results not shown because the sample size was too small (n=1).

Reasons CFLs May or May Not Have Been Considered for Purchase

Revealed preference intercept survey respondents who did not purchase CFLs were asked whether or not they even considered purchasing CFLs the day the survey was conducted. Stated preference intercept survey respondents were also asked a similar question when they selected incandescent lamps over CFLs. These results are shown in Table 2-77. As indicated, there are some differences in the barriers to CFL purchase between respondents who had considered purchasing CFLs (but did not) and respondents who had not even considered purchasing CFLs. These differences may highlight a need to develop different strategies for overcoming barriers that prevent consumers from even considering purchasing CFLs, versus those barriers that may prevent consumers from making purchases when they were actively considering it.

For example, one barrier that could be affecting whether or not respondents would even consider purchasing CFLs relates to perceptions regarding product performance (i.e., light quality/color). Nearly one third of all respondents who indicated that they had not even considered purchasing CFLs (32%) cited product performance barriers, whereas only 23 percent of all respondents who had considered CFLs cited these reasons. While it is true that overcoming product performance barriers specifically related to light quality/color may require actual improvements in CFL design, it is also highly possible that educational campaigns designed to inform consumers of the availability of CFLs in various light quality/color categories

would also be effective in overcoming (mis)perceptions in the market that all CFLs have poor light quality/color characteristics.

Other barriers that may be affecting whether or not respondents would even consider purchasing CFLs also relate to perceptions, beliefs or "habits" that targeted educational/outreach campaigns could effectively overcome. Respondents who indicated that they had not even considered purchasing CFLs were more likely to cite barriers related to "habit," lack of awareness/information, prior (bad) experience with CFLs, and concerns about mercury/disposal.

Finally, price and product design features (e.g., lamp shape, size, fit) were more commonly cited among respondents who had considered purchasing CFLs (but did not). This may indicate that, if a wider variety of CFL product styles and prices were available at the time of purchase, they may have selected CFLs instead of incandescent lamps.

Table 2-77
Barriers to CFL Purchase Among Respondents
Who Considered and Did Not Consider Purchasing CFLs

Reasons for Not Purchasing CFLs	Considered CFLs (n=155)	Didn't Consider CFLs (n=477)
Awareness/Information	35%	41%
Product Design	37%	34%
Product Performance	23%	32%
Price	31%	25%
Mercury/Disposal	4%	8%
Other	5%	7%
Packaging/Merchandising	3%	3%

These findings are further supported when looking at the differences in barriers to CFL purchase as cited by revealed preference intercept survey respondents versus stated preference intercept survey respondents. Revealed preference respondents (who did not purchase CFLs) were more likely to cite specific barriers related product design (e.g., lamp shape, size, fit) and stated preference respondents (who did not select CFLs in their hypothetical choice experiment) were more likely to cite barriers features related to product performance (e.g., light quality/color). It is possible that these results indicate that consumers who are actively considering purchase decisions may be basing these decisions, at least in part, on the actual characteristics/features of products that they have available to them at the time of purchase. Consumers who are inactively or hypothetically considering purchase decisions may

be basing these decisions on perceived or expected characteristics/features that may or may not be accurate or even known/understood.

"Free Ridership" Indicators

Both revealed and stated preference intercept survey respondents were also asked a specific question to gauge the influence of price on their CFL purchase/selection decisions. Specifically, revealed preference respondents were asked: "How many CFLs would you have purchased today if they cost twice as much?" Responses of none, fewer or the same number were recorded. Stated preference respondents were asked: "Would you have still chosen CFLs if they cost twice as much?" Responses of yes or no were recorded.

As shown in Table 2-78, the results indicate interesting differences in how these questions are answered based on hypothetical versus actual decision choices. Overall, the majority of stated preference respondents (68%) reported that they would have selected CFLs even if they cost twice as much, whereas only 34 percent of revealed preference respondents indicated that they would have purchased the same number of CFLs if they cost twice as much. While about one in four (26%) of the revealed preference respondents reported they would have purchased fewer CFLs had the price between twice as high, fully 40 percent indicated that they would not have purchased any CFLs had they cost twice as much. As a result, stated preference respondents appear to be over-stating purchase intentions when compared to revealed preference respondents.

Table 2-78
Free Ridership Indicators

How many CFLs would you have purchased today if they cost twice as much?	Revealed Preference (n=387)	Would you have still chosen CFLs if they cost twice as much?	Stated Preference (n=629)
None	40%	No	32%
Fewer	26%		
Same number	34%	Yes	68%

As shown in Table 2-79, there are some significant differences between the IOUs in terms these indicators. These results suggest that "free ridership," as defined as a respondent's willingness to purchase at least some CFLs at a higher price, is highest among SDG&E's revealed preference respondents and lowest among PG&E's revealed preference respondents. Over half (52%) of PG&E revealed preference respondents reported that they would not have purchased any CFLs had they cost twice as much, which compares to about one third of SCE respondents

(33%) and only 15 percent of SDG&E respondents. Further, half of SDG&E respondents (50%) indicated that they would have purchased the same number of CFLs even if they cost twice as much, which compares to 38 percent of SCE respondents and 22 percent of PG&E respondents.

Table 2-79
Free Ridership Indicators by IOU
(Revealed Preference Only)

How many CFLs would you have purchased today if they cost twice as much?	PG&E (n=180)	SCE (n=159)	SDG&E (n=48)
None	52%	33%	15%
Fewer	27%	29%	35%
Same number	22%	38%	50%

As shown in Table 2-80, there are not very many significant differences in these results by channel. The following channels show results going in a favorable direction (i.e., toward lower free ridership): discount, mass merchandise, membership club, and small grocery. The home improvement and hardware channels show results going in a less favorable direction (i.e., toward higher free ridership). The results for the drug and large grocery channels are based on very small sample sizes and, as such, should not be interpreted one way or the other.

Table 2-80
Free Ridership Indicators by Channel
(Revealed Preference Only)

Channel	None	Fewer	Same Number	Sample Size
Discount	42%	25%	33%	60
Drug	14%	57%	29%	7
Hardware	37%	23%	40%	35
Home Improvement	33%	29%	39%	83
Large Grocery	32%	26%	42%	19
Mass Merchandise	38%	30%	32%	79
Membership Club	36%	33%	30%	33
Small Grocery	55%	14%	31%	71
All Channels	40%	26%	34%	387

Effects of Multi-Pack on Quantity of CFLs Purchased

Both revealed and stated preference respondents were asked about the effects of multi-packs on the quantity of CFLs purchased. Specifically, respondents were asked: “If the CFLs were sold individually but at the same price you’d be paying per bulb, do you think you would have purchased/selected the same number, more or fewer bulbs?” Overall, about half of all respondents (55%) indicated that they would have purchased the same number of CFLs. About 30 percent reported that they would have purchased fewer, indicating that the multi-packs may have encouraged larger quantities of CFLs to be purchased than perhaps were needed. For about 15 percent of the respondents, the multi-packs limited the total number of CFLs they wanted to purchase (i.e., they would have purchased more if they could have purchased them at the same per-bulb price individually).

Similar to results presented above, stated preference respondents tended to over-state their intentions with respect to the effects of multi-packs on the quantity of CFLs purchased. That is, revealed preference respondents were more likely to report they would have purchased the same quantity of CFLs, whereas stated preference respondents more likely to indicate they would have purchased more CFLs if they were available individually at the per-bulb price. There were no significant differences in effects of multi-packs on quantity of CFLs purchased by IOU.

Results by channel are presented in Table 2-81. As shown, channels that would have resulted in fewer CFLs purchased overall if they were available individually at the multi-pack per-bulb price include hardware and membership club. Channels that would have resulted in more CFLs purchased overall include discount, large grocery, and small grocery. The effect of multi-packs seems to have had the least effect in home improvement channel, with 68% of respondents indicating they would have purchased the same quantity of CFLs regardless of the price/packaging.

Table 2-81
Effects of Multi-Packs on Quantity of CFLs Purchased by Channel

	Fewer	More	Same Number	Sample Size
Discount	24%	22%	54%	54
Drug	38%	6%	56%	48
Hardware	45%	16%	39%	38
Home Improvement	20%	12%	68%	100
Large Grocery	25%	28%	48%	61
Mass Merchandise	33%	12%	55%	99
Membership Club	42%	7%	51%	67
Small Grocery	16%	23%	61%	31
All Channels	30%	15%	55%	498

Residential vs. Nonresidential Purchases

The revealed and stated preference intercept surveys were designed to provide information that could be used to determine the percentage of IOU-discounted CFLs that are installed in nonresidential applications. Specifically, revealed preference respondents were asked if they planned to install the lighting products they purchased in their home, business or both. Stated preference respondents were asked if they were shopping for their home, business or both.

Overall, about three percent of revealed preference respondents planned to install the lighting products they purchased in their business, and another four percent of the stated preference respondents indicated that they were shopping for their business. These results do not differ for respondents who purchased/selected CFLs versus incandescent lamps.

Table 2-82 shows the results for CFL purchasers by IOU. As shown, PG&E respondents indicated a higher percentage of nonresidential purchasers (4%), as compared to SCE (2%) and SDG&E (0%).

Table 2-82
Residential and Nonresidential CFL Purchases by IOU
(Revealed Preference Only)

	Residential	Nonresidential	Sample Size
PG&E	96%	4%	185
SCE	98%	2%	175
SDG&E	100%	0%	49
All IOUs	97%	3%	409

As expected, there are some differences by channel, as shown in Table 2-83. Channels most likely to result in nonresidential CFL purchases include membership club, hardware and home improvement. None of the CFLs purchased within the mass merchandise channel were intended for nonresidential use.

Table 2-83
Residential and Nonresidential CFL Purchases by Channel
(Revealed Preference Only)

	Residential	Nonresidential	Sample Size
Discount	98%	2%	62
Drug	100%	0%	7
Hardware	86%	14%	35
Home Improvement	97%	3%	95
Large Grocery	100%	0%	19
Mass Merchandise	100%	0%	82
Membership Club	94%	6%	35
Small Grocery	99%	1%	74
All Channels	97%	3%	409

Prior CFL Usage, Installation and Storage

All respondents were asked if they ever purchased and/or had been given CFLs for use in their home or business. Overall, 89 percent of all respondents indicated that they had purchased or been given CFLs. Results differed across segments as follows:

- CFL purchasers were more likely to have purchased or been given CFLs in the past, as compared to incandescent lamp purchasers; no difference between IOU-discounted CFL purchasers and other CFL purchasers.

- Stated preference respondents were more likely to have purchased or been given CFLs.
- Respondents within the mass merchandise channel were least likely to have purchased or been given CFLs; respondents in the large grocery and membership club channels were most likely to have purchased or been given CFLs.

All respondents were also asked if they currently had any CFLs installed in their home or business, as well as whether or not they currently had any CFLs in storage. The majority (89%) indicated that they have CFLs installed, and over half (58%) reported that they have CFLs in storage. These percentages varied across different segments as follows:

- CFL purchasers were more likely to have CFL installed and in storage, as compared to incandescent lamp purchasers; no difference between IOU-discounted CFL purchasers and other CFL purchasers.
- PG&E respondents most likely to have CFLs installed and in storage.
- Stated preference respondents were more likely to have CFLs in storage.
- Respondents within the membership club channel were more likely to have CFLs installed and in storage; respondents within the hardware channel were more likely to have CFLs in storage; and respondents within the mass merchandise and home improvement channels were less likely to have CFLs in storage.

“Leakage” Indicators

At the end of each survey, respondents were asked to indicate if PG&E, SCE or SDG&E provided electricity service to their home or business. Overall, only about three percent of all respondents who purchased CFLs indicated that they were not an electric customer of the relevant IOU. Among respondents who purchased IOU-discounted CFLs, the “leakage” percentage increased to four percent.

There are significant differences by IOU, as shown in Table 2-84. About 16 percent of SDG&E respondents who purchased CFLs reported that they were not electric customers of SDG&E. The comparable “leakage” percentage is two percent for SCE and one percent for PG&E. It is not possible to determine the “leakage” percentage for IOU-discounted CFLs among SDG&E respondents due to the small sample size (n=27). For SCE and PG&E, the “leakage” percentages for IOU-discounted CFLs are three percent and one percent, respectively.

Table 2-84
"Leakage" Indicators by IOU –
Percent of Non-IOU Customers Purchasing CFLs
(Revealed Preference Only)

		Purchased CFLs	Purchased IOU-Discounted CFLs
All Respondents	Percent	3%	4%
	n	408	258
PG&E	Percent	1%	1%
	n	184	125
SCE	Percent	2%	3%
	n	175	106
SDG&E	Percent	16%	26%
	n	49	27

Channels with relatively high "leakage" percentages include hardware, mass merchandise, and home improvement. All of the other channels show zero percent leakage, as shown in Table 2-85.

Table 2-85
"Leakage" Indicators by Channel –
Percent of Non-IOU Customers Purchasing CFLs
(Revealed Preference Only)

		Purchased CFLs	Purchased IOU-Discounted CFLs
Discount	Percent	0%	0%
	n	61	58
Drug	Percent	0%	0%
	n	7	5
Hardware	Percent	9%	16%
	n	35	19
Home Improvement	Percent	2%	4%
	n	93	27
Large Grocery	Percent	0%	0%
	n	18	12
Mass Merchandise	Percent	11%	18%
	n	84	39
Membership Club	Percent	0%	0%
	n	37	25
Small Grocery	Percent	0%	0%
	n	73	73

2.4.3. Shelf Survey Results

The shelf survey collected comprehensive and detailed information on a variety of CFL and incandescent lighting products available to consumers in the stores where the intercept surveys were also conducted. Information was collected for a wide variety of CFL lamp styles, including twister/spiral as well as other "specialty" shapes and features. Detailed pricing data was also collected for both CFLs and incandescent lamps[28], including whether or not the products were discounted by the IOU or the retailer (or both).

Over 5,000 different CFL product "observations" are included in the full 2008 shelf survey dataset. In this case, an observation is a unique package that was observed in the store and for which detailed data was collected. Observations are not counts of total packages only counts of unique packages observed in a store. If the same package was observed in two different locations within the same store, the observation is only entered into the database once. If the same package was found in two different stores, the observation is in the database twice.

There were two distinct data collection periods for this study: Spring 2008 and Fall 2008. A total of 1,114 CFL product observations were collected in the Spring 2008, and 3,979 CFL product observations were collected in the Fall 2008, for a total of 5,093 CFL product observations. There is an important difference in scope between the data collected in the Spring and the Fall of 2008:

- ***Only*** non-dimmable/single wattage 9-30W twister/spiral-style CFLs were included in Spring 2008 data collection, and
- ***All*** CFL models were included in Fall 2008 data collection.

This difference in scope generally reflects the fact that the Spring 2008 data collection effort primarily supported the IOUs' process evaluation efforts, whereas the Fall 2008 data collection was administered by the CPUC as part of the 2006-2008 Upstream Lighting Program Impact Evaluation. The scope of the CPUC impact evaluation was more comprehensive than the utilities' process evaluation scope. However, for the purposes of this report, we have been given

[28] The analysis of incandescent lamp prices has not been included in this draft report. A full analysis of all pricing data will be included in the final report for the CPUC Impact Evaluation.

permission by both the IOUs and the CPUC to combine the two datasets. Where applicable, appropriate notes have been added to the text to distinguish between the two sources of data.

Finally, it is very important to note that none of the data in the shelf survey database has yet to be weighted to reflect total sales or even sales through the program. Formal and final weighting for this dataset will be done in conjunction with the CPUC 2006-2008 Upstream Lighting Program impact evaluation and/or next DEER measure cost update. We expect these weights to be available and applied to this dataset by late summer 2009.

This section presents results from the shelf survey related to CFL lamp features, packaging characteristics and average prices, organized as follow:

- Lamp shape
- Lumens
- Wattage
- Control type (i.e., dimmable)
- Number in package
- Price paid per package, per bulb
- Discount provider (e.g., none, IOU, retailer)
- Energy Star label indicator

Results are presented by IOU, retail channel, and CFL lamp type as appropriate.

Lamp Shape

As shown in Table 2-86, about two thirds of the unique CFL packages observed during the shelf surveys were twister/spiral-style shaped – i.e., 62 percent of the observed packages, and 70 percent of the total lamps. The average twister/spiral-style CFL package contained 2.22 lamps. Other common CFL lamp shapes included reflector/flood CFLs and A-lamp-shaped CFLs.

Table 2-86
Distribution of CFL Lamp Shapes and Average Lamps/Package

Lamp Shape	Total Obs	Percent of Obs	Total Lamps	Percent of Lamps	Avg Lamps/Package
A-lamp	374	9%	692	9%	1.85
Bug light	78	2%	84	1%	1.08
Circline	5	0%	5	0%	1.00
Globe	224	6%	400	5%	1.79
Other	39	1%	43	1%	1.10
Reflector/flood	634	16%	838	11%	1.32
Torpedo/bullet	134	3%	246	3%	1.84
Tube-style	31	1%	36	0%	1.16
Twister/spiral	2460	62%	5448	70%	2.22
All Lamp Shapes	3979				1.96

There are no meaningful differences in the distribution of CFL lamps shapes by IOU service territory.

Results by retail channel are presented in Table 2-87. As shown, small grocery stores almost exclusively only carry twister/spiral-style CFLs, and more than 70% of CFLs sold at discount and drug stores are twister/spiral-style. Membership club stores have a wider variety of CFL shapes and styles, with only 31% of all CFLs being the twister/spiral-style shape.

Table 2-87
Distribution of CFL Lamp Shapes by Channel

Lamp Shape	All Channels	Discount	Drug	Home Improvement	Large Grocery	Mass Merchandise	Membership Club	Small Grocery	Hardware
A-lamp	9%	3%	8%	7%	6%	15%	13%	2%	7%
Bug light	2%	1%	3%	3%	2%	2%	0%	0%	1%
Circline	0%	0%	0%	0%	0%	0%	0%	0%	1%
Globe	6%	10%	5%	5%	3%	7%	8%	2%	5%
Other	1%	1%	1%	0%	3%	1%	0%	0%	1%
Reflector/flood	16%	13%	10%	22%	14%	13%	40%	0%	15%
Torpedo/bullet	3%	1%	3%	2%	4%	5%	7%	0%	4%
Tube-style	1%	1%	0%	0%	0%	1%	2%	3%	3%
Twister/spiral	62%	72%	71%	61%	68%	57%	31%	94%	62%
Sample Size	3,979	183	382	954	495	1,165	120	62	618

Lumens

Table 2-88 presents information on the distribution of CFL lumen levels for the unique observed packages, as well as the average lumens per lamp. As shown, about one third of all CFLs are less than 800 lumens, about a quarter are 800-1,099 lumens, and about a fifth are 1,100-1,599 lumens and 1,600 lumens or greater.

Table 2-88
Distribution of CFL Lumen Levels and Average Lumens/Lamp

Lumens	No Obs	Percent Obs	Avg Lumens/Lamp
<800	1,363	35%	529
>=800 and <1100	1,081	27%	865
>=1100 and <1600	761	19%	1232
>=1600	730	19%	1781
All Lamps	3,935		989

Results by CFL lamp shape are provided in Table 2-89. As shown, there is quite a range of lumen levels available in the twister/spiral-style CFL models observed during the shelf survey. About two thirds of the A-lamp CFLs (65%) and three quarters of the globe-shaped CFLs (76%) have lumen levels less than 800. Just over half of the reflector/flood CFLs are less than 800

lumens, and 30% are 1,100-1,599 lumens. Nearly all of the torpedo/bullet-style CFLs are less than 800 lumens.

Table 2-89
Distribution of CFL Lumen Levels and Average Lumens/Lamp by Lamp Shape

Lamp Shape	Percent of Obs				Total Obs
	<800	>=800 and <1100	>=1100 and <1600	>=1600	
A-lamp	65%	31%	4%	0%	374
Bug light	99%	1%	0%	0%	71
Circline	0%	0%	40%	60%	5
Globe	76%	23%	0%	0%	224
Other	95%	0%	3%	3%	38
Reflector/flood	58%	12%	29%	0%	625
Torpedo/bullet	99%	1%	0%	0%	133
Tube-style	11%	25%	11%	54%	28
Twister/spiral	14%	34%	23%	29%	2,437
All Lamps	35%	27%	19%	19%	3,935

Lamp Shape	Average Lumens/Lamp				
	<800	>=800 and <1100	>=1100 and <1600	>=1600	All Lamps
A-lamp	449	814	1,190	1,600	593
Bug light	622	800	na	na	625
Circline	na	Na	1,200	2,350	1,660
Globe	502	800	1,100	1,600	577
Other	684	Na	1,100	6,825	856
Reflector/flood	618	919	1,256	1,717	844
Torpedo/bullet	358	800	na	na	362
Tube-style	367	843	1,280	2,282	1,610
Twister/spiral	537	871	1,226	1,762	1,164
All Lamps	529	865	1,232	1,781	989

Wattage

Table 2-90 presents a summary of CFL distributions by wattage and lumen level categories. As shown, 22 percent of all CFLs are less than or equal to 12 watts, 34 percent are 13-15 watts, 16 percent are 16-22 watts, 15 percent are 23-25 watts, and 12 percent are 26 watts or greater. Lumen levels follow wattage categories in the expected pattern – i.e., lower wattage CFLs have lower lumen levels and higher wattage CFLs has higher lumen levels.

Table 2-90
CFL Distributions by CFL Wattage and Lumen Level Categories

Wattage	Percent of Obs				
	<800 lumens	>=800 and <1100 lumens	>=1100 and <1600 lumens	>=1600 lumens	All Lamps
<=12	62%	<1%	<1%	na	22%
13-15	29%	91%	3%	<1%	34%
16-18	8%	2%	13%	na	6%
19-22	<1%	3%	48%	<1%	10%
23-25	<1%	2%	23%	53%	15%
26-30	<1%	1%	13%	36%	10%
>=31	<1%	<1%	na	11%	2%
All Lamps	100%	100%	100%	100%	100%
Wattage	**Average Wattage/Lamp**				
	<800 lumens	>=800 and <1100 lumens	>=1100 and <1600 lumens	>=1600 lumens	All Lamps
<=12	9.1	7.0	9.0	na	9.1
13-15	14.2	13.7	14.9	14.5	13.8
16-18	16.0	17.8	18.0	na	17.2
19-22	19.3	19.5	19.8	19.3	19.7
23-25	23.0	23.1	23.0	23.1	23.1
26-30	26.0	29.0	26.4	26.9	26.7
>=31	41.0	46.0	na	42.0	44.0
All Lamps	11.3	14.3	21.0	26.5	17.1

Table 2-91 presents the average wattage by CFL lamp shape. As shown, the average twister/spiral-style CFL is 18.2 watts, and the average reflector/flood CFL is 18.2 watts. A-lamp shaped CFLs are 11.4 watts on average, torpedo/bullet-style CFLs are 8.0 watts on average, and CFL bug lights are 13.4 watts on average.

Table 2-91
Average Wattage by CFL Lamp Shape

Lamp Shape	Number of Obs	Average Wattage/Lamp
A-lamp	374	11.4
Bug light	78	13.4
Circline	5	27.8
Globe	224	10.7
Other	39	14.6
Reflector/flood	633	18.1
Torpedo/bullet	134	8.0
Tube-style	31	35.5
Twister/spiral	3466	18.2

Table 2-92 presents the average wattage by channel. Recall from above that small grocery stores almost exclusively only carry twister/spiral-style CFLs, and more than 70 percent of CFLs sold at discount and drug stores are twister/spiral-style. The average wattage for twister/spiral-style CFLs in these channels is 19-21 watts, which has the effect of raising the overall average wattage for CFLs in these channels.

Despite 40 percent of the CFLs observed in membership club stores being reflector/flood-style CFLs, the average lamp in this channel is only 15.2 watts due to the presence of lower wattage A-lamp shaped, globe-style, and torpedo/bullet-style CFLs. Even the twister/spiral-style CFLs in this channel have lower than average wattage for this lamp shape (16 watts v. 18 watts overall).

Table 2-92
Average Wattage by Channel

Channel	Number of Obs	Average Wattage/Lamp
Discount	182	18.6
Drug	369	17.4
Home Improvement	928	17.0
Large Grocery	483	17.0
Mass Merchandise	1144	15.6
Membership Club	111	15.2
Small Grocery	62	21.1
Small Hardware	591	18.5

Dimmable and Three-Way Wattage CFLs

Five percent of all the CFLs observed in the stores surveyed are dimmable, and less than three percent have three-way wattage capabilities. About half of the dimmable CFLs are twister/spiral-style, 45 percent are reflector/flood-style CFLs, and a small percentage (less than four percent) are torpedo/bullet-style CFLs. All of the three-way wattage CFLs are twister/spiral-style.

The percentage of CFLs that have dimmable or three-way wattage features does not vary significantly by IOU. Table 2-93 shows the distribution by retail channel. Membership club stores and drug stores accounted for the largest share of the dimmable CFLs (7% respectively); membership club stores account for the largest share of the three-way wattage CFLs (8%). These types of CFLs were not found in any of the small grocery stores surveyed through this effort, and only a very small fraction of the discount stores.

Table 2-93
Dimmable and Three-way Wattage CFL Distributions by Channel

Channel	Number of Obs	Percent Dimmable	Percent Three-way
Discount	183	1%	1%
Drug	382	7%	3%
Home Improvement	954	6%	2%
Large Grocery	495	3%	2%
Mass Merch	1165	5%	2%
Membership Club	120	7%	8%
Small Grocery	62	0%	0%
Small Hardware	618	4%	4%
All Channels	3,979	100%	100%

Energy Star Label

The majority of CFLs observed in the stores surveyed through this research were found to have the Energy Star label on the packaging. As shown in Table 2-94, Energy Star labeled CFLs were most common in the globe-style and twister/spiral-style shapes, and least common among torpedo/bullet-style and bug light CFLs. The home improvement and hardware channels stand out, with only 76 percent and 84 percent of the CFLs carried having the Energy Star label. For all of the other channels, more than 90 percent of the CFLs have Energy Star labels.

Table 2-94
Percent of CFLs with Energy Star Label by Lamp Shape and Channel

Lamp Shape	Number of Obs	Percent with ES Label	Channel	Number of Obs	Percent with ES Label
A-lamp	374	87%	Discount	182	92%
Bug light	78	71%	Drug	381	92%
Circline	5	60%	Home Improvement	953	76%
Globe	224	94%	Large Grocery	495	93%
Other	39	95%	Mass Merchandise	1165	96%
Reflector/flood	634	86%	Membership Club	120	94%
Torpedo/bullet	133	68%	Small Grocery	62	98%
Tube-style	31	74%	Small Hardware	618	84%
Twister/spiral	2458	91%	All Channels	3976	
All Lamps	3976				

Multi-packs and Average Lamps/Pack

Just over half of the CFLs observed in the stores surveyed for this research were single-packs (57%), 18 percent were two-packs, 11 percent were three-packs, eight percent were four-packs and six percent were packages of five or more CFLs. The average number of CFLs in the packs with five or more CFLs is between 6 and 7.

Table 2-95 below presents the average number of lamps/package by channel. As expected, membership club stores have the highest average number of lamps/package (4.1), followed by mass merchandise (2.4).

Table 2-95
Average Lamps/Package by Channel

Channel	Number of Obs	Number of Lamps	Average Lamps/Package
Discount	183	271	1.5
Drug	382	648	1.7
Home Improvement	954	1815	1.9
Large Grocery	493	794	1.6
Mass Merchandise	1165	2759	2.4
Membership Club	120	488	4.1
Small Grocery	62	87	1.4
Small Hardware	618	930	1.5
All Channels	3977	7792	1.96

IOU and Retailer Discounted CFLs

Only about 13 percent of the CFLs observed during the shelf surveys were identified as discounted by an IOU, and 10 percent were identified as discounted by the retailer. Results by IOU are shown in Table 2-96 below.

Table 2-96
Percent of CFLs Discounted by IOU and/or Retailer

IOU	Percent of CFLs		Sample Size
	IOU Discounted	Retailer Discounted	
PG&E	13%	7%	1509
SCE	16%	9%	1360
SDG&E	8%	14%	1110
Sample Size	3979		

As shown, IOU-discounted CFLs were most commonly found in retail stores located in SCE's service territory (16%), followed by PG&E (13%) and SDG&E (8%). Retailer discounts were more common in stores located in SDG&E's service territory (14%) as compared to SCE (9%) or PG&E (7%).

Table 2-97 presents these results by channel. As shown, IOU-discounts were most commonly found within the small grocery and discount channels (58% and 52%, respectively), whereas

retailer discounts were most common within the large grocery channel (39%). Discounts of any common were infrequent in the drug and mass merchandise channels.

Table 2-97
Percent of CFLs Discounted by IOU/Retailer by Channel

Channel	Number of Obs	Percent IOU-Discounted	Percent Retailer-Discounted
Discount	183	52%	13%
Drug	382	2%	4%
Home Improvement	954	12%	12%
Large Grocery	495	15%	39%
Mass Merchandise	1165	6%	1%
Membership Club	120	28%	0%
Small Grocery	62	58%	3%
Small Hardware	618	12%	5%
All Channels	3,979	13%	10%

Table 2-98 provides these results by lamp shape.

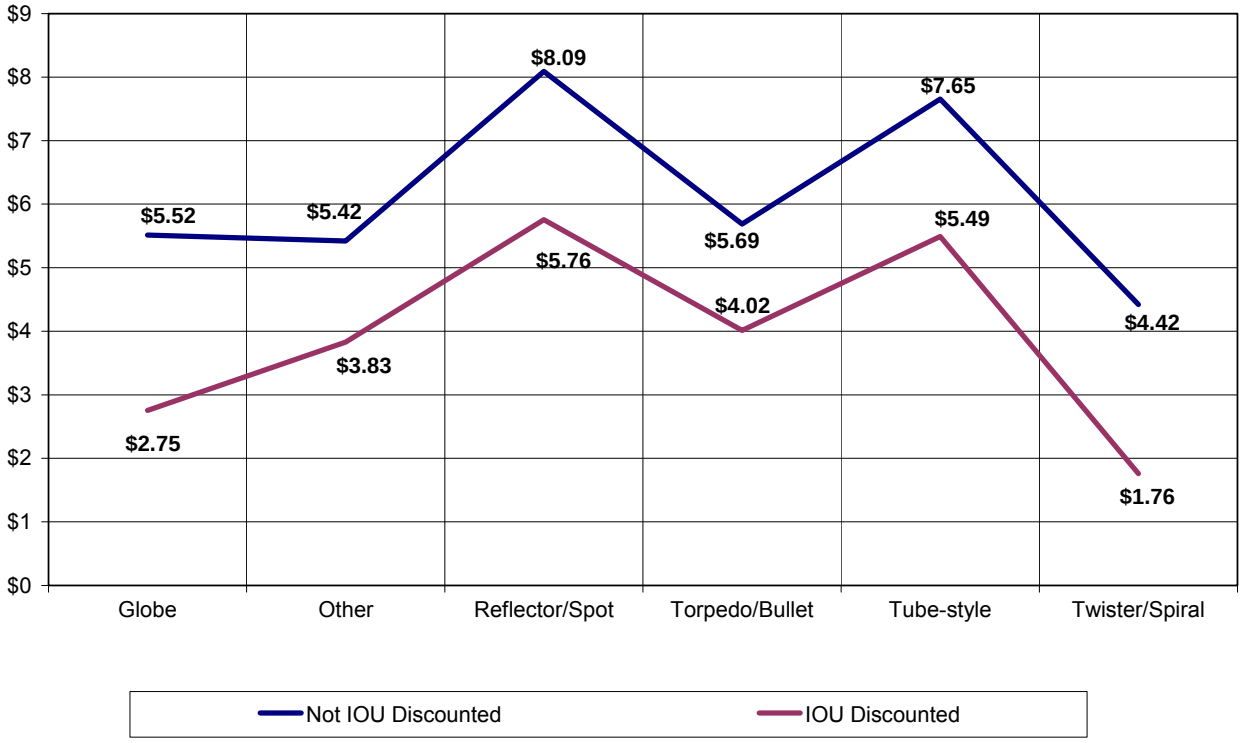
Table 2-98
Percent of CFLs Discounted by IOU/Retailer by Lamp Shape

Lamp Shape	Number of Obs	Percent IOU-Discounted	Percent Retailer-Discounted
A-lamp	374	11%	5%
Bug light	78	3%	6%
Circline	5	0%	20%
Globe	224	14%	8%
Other	39	5%	5%
Reflector/flood	634	7%	8%
Torpedo/bullet	134	11%	9%
Tube-style	31	13%	0%
Twister/spiral	3574	15%	11%

Average Prices/Lamp

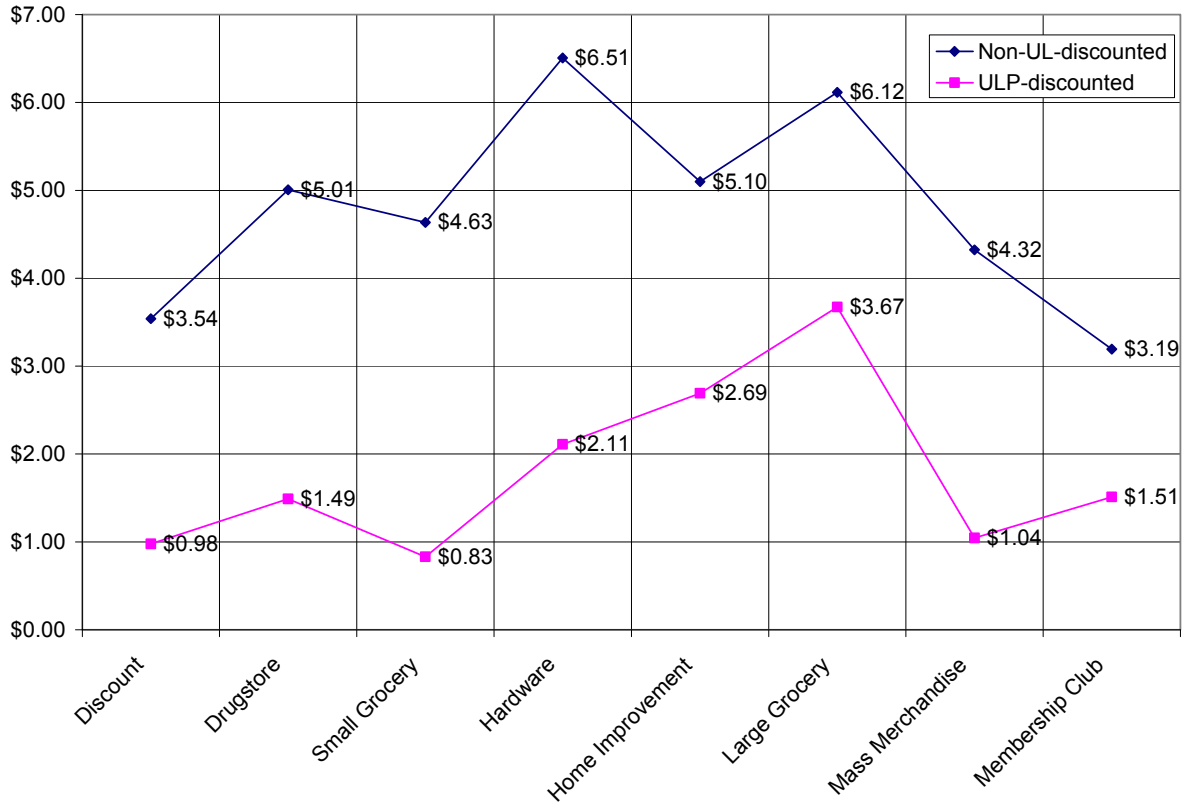
Figure 2-69 displays the average price/lamp by lamp shape, distinguishing between IOU-discounted CFLs and non-IOU discounted CFLs. As shown, twister/spiral-style CFLs discounted by the IOU are over $2.50 less expensive than similar shaped lamps that are not IOU-discounted.

Figure 2-69
Average CFL Price/Lamp by Lamp Shape –
IOU-Discounted v. Non-IOU Discounted



As shown in Figure 2-70, the greatest differential in average price/lamp – between IOU-discounted and non-IOU discounted CFLs – can be found in the small hardware and drug channels.

Figure 2-70
Average CFL Price/Lamp by Channel
– IOU-Discounted v. Non-IOU Discounted



3. The Energy Efficiency Practices of Lighting Distributors

This section contains a summary of the detailed findings found later in the report.

3.1. Purpose and Scope

This section summarizes our findings from a survey of 25 lighting distributors located in the PG&E service territory. This survey was developed with the assistance of the PG&E lighting staff and was completed in November 2007. Although previous evaluations of the PG&E mass-market energy-efficiency programs have looked at the practices of lighting manufacturers and retailers, this is the first examination of the important distributor segment of the lighting sector. Key topics covered in this report include:

- *Characteristics of the surveyed lighting distributors:* This section describes characteristics of the lighting distribution companies whose representatives (reps) we completed interviews with. These characteristics include the number of employees, annual revenue, the types of lighting services offered, how the company's business is allocated between the new construction and retrofit/remodeling markets, and the importance of energy efficiency in their business.

- *The lighting specification process:* This section describes the lighting specification process characterized by the lighting distributor reps. It discusses separately the lighting specification processes for new construction and retrofit/remodeling projects. This section also compares the lighting specification processes for these two markets including the types of market actors involved in specification and the criteria used to choose lighting. It discusses how new Title 24 requirements have affected lighting specification. Finally the section discusses to what degree life cycle costs are considered in the lighting specification process.

- *How PG&E can influence lighting specification:* This section discusses the barriers to greater use of energy-efficient lighting (as identified by the distributor reps), how PG&E can influence contractors to specify energy-efficient lighting, how PG&E can work with distributors to encourage energy-efficient lighting, and which energy-efficient lighting technologies PG&E should be encouraging.

- *Distributor awareness and utilization of energy-efficient lighting programs, new lighting technologies:* This section first discusses which PG&E energy-efficient lighting programs that distributors are aware of. It then covers what sources distributors typically use to keep abreast of new lighting technologies and design practices. The next subsection summarizes the degree to which these distributors are aware of some new lighting technologies and specify them in their projects. Finally the distributor reps provide advice on how new energy-efficient lighting technologies can be encouraged.

3.2. Characteristics of the Surveyed Lighting Distributors

The average number of full-time employees for the lighting distributors was 34 and the average number of part-time employees was three. Only 12 of the 25 interviewees were willing or able to report annual revenues and there was a wide range in revenue estimates from $2 million to $6 billion range. We suspect that some interviewees were reporting local revenue figures while others were reporting national figures.

All of the companies sold lighting equipment and the large majority also sold non-lighting electrical equipment. Over half of the companies also provided lighting specification services. However, only three of the companies did lighting installations and none of them manufactured any lighting products. The large majority of the lighting distributors do both retrofit and new construction projects, but they varied a lot in terms of how their volume of business was distributed. Yet overall the average share of retrofit business (46%) was very close to the average share of new construction business (54%).

When asked about how they win their lighting jobs, the distributor reps attributed most of their business to sole source jobs based on a previous relationship, followed closely by competitive jobs won on price, followed more distantly by competitive jobs won on non-price factors. Over three quarters of the distributor reps ranked energy efficiency as “very important” for their companies.

3.3. The New Construction Lighting Specification Process

3.3.1. Market Actors

The distributor reps considered electrical engineers and architects to be the most influential actors in the lighting specification process for new construction. Yet this process can be very

complex and there are opportunities for other actors like the lighting distributors, lighting manufacturers, and building owners to influence this process.

- Lighting distributors will most influence the lighting specification process in “design and build” projects and in situations where an electrical engineer wants to specify an alternative lighting package in addition to the pre-specified package. Other roles that distributors play in the process include distributing the products from the manufacturer to the contractor and providing price quotes or price shopping services for a specific lighting package.

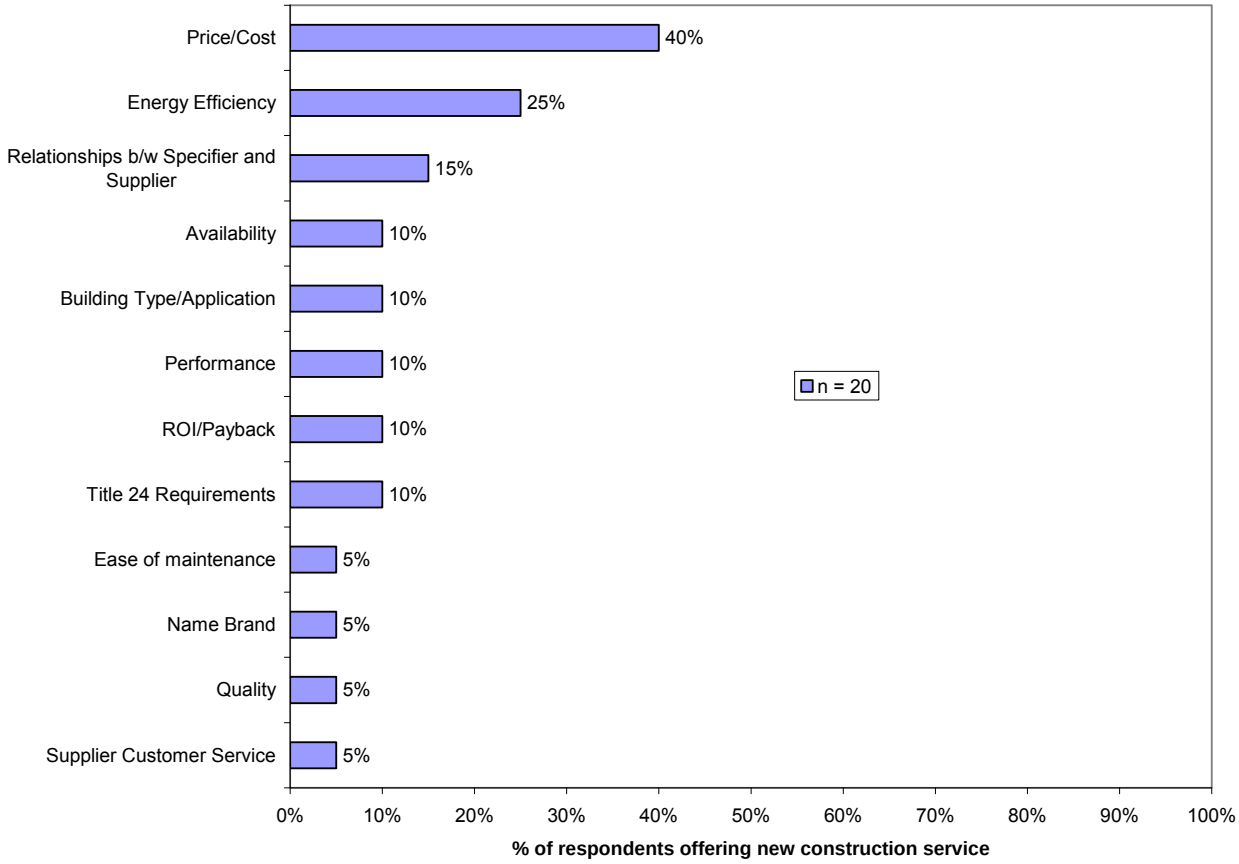
- Lighting manufacturers often work behind the scenes, using their relationships with architects to get their particular lighting products specified for the job.

- The influence of the building customer/owner is usually not in choosing which lighting fixtures to specify but in approving what the architects or electrical engineers have already specified. No matter how much agreement there is between the electrical engineer, architect, and lighting distributor as to what the lighting package should be, if the building owner doesn’t like it then the whole specification process must be redone.

3.3.2. Key Criteria for Product Selection

When asked about the most important criteria for deciding what types of lighting get specified for new construction projects, lighting distributor reps gave a wide range of responses with a dozen different criteria being named as important and eight criteria being named by at least two different interviewees. Although price/cost was the most cited of these important criteria, it was named by less than half of the respondents. Energy efficiency was the second most-cited of the important criteria, but was still only cited by a quarter of the respondents (Figure 3-1:).

Figure 3-1:
Most Important Criteria in
Specifying Lighting for New Construction



Many of these important criteria are things that PG&E's upstream lighting efforts should be able to influence. For example, the PG&E programs can continue to reduce the cost of energy-efficient lighting through rebates, increase the availability of energy-efficient lighting products, and educate lighting specifiers about the ROI and ease of maintenance benefits of energy-efficient lighting. However, other important criteria – such as the relationship between lighting specifiers and lighting suppliers, or the level of customer service provided by the lighting suppliers, will be more difficult for PG&E to influence.

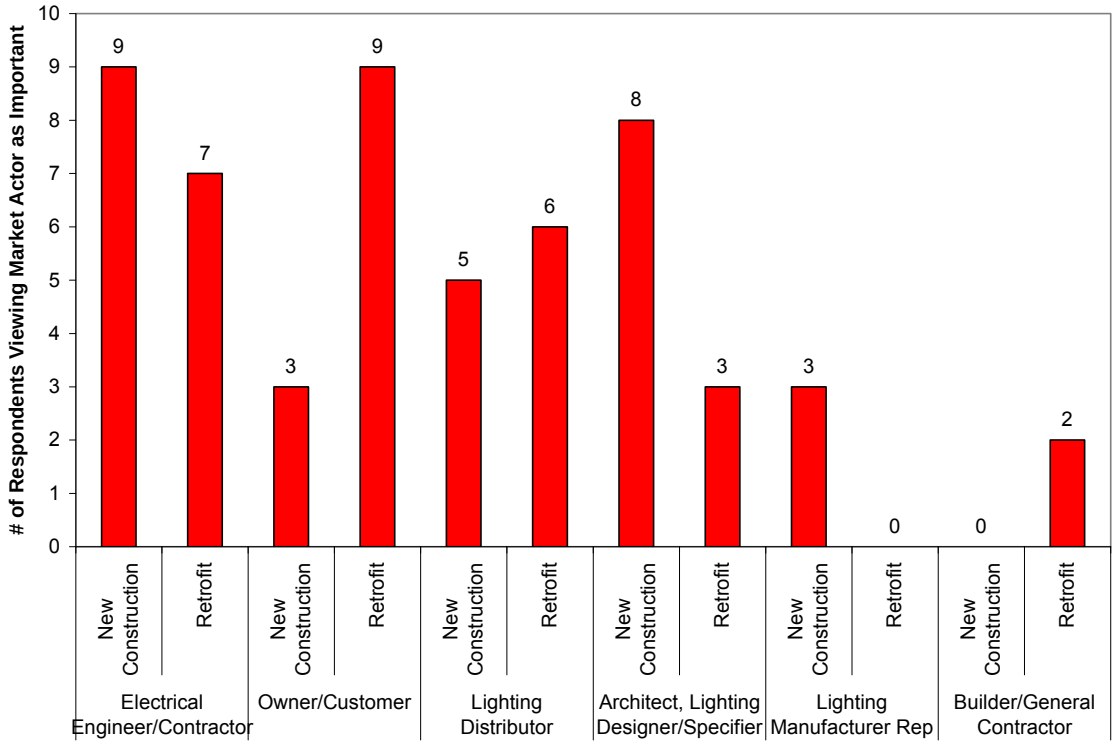
3.4. The Retrofit/Remodeling Lighting Specification Process

3.4.1. Market Actors

The distributor reps considered building owners, electrical engineers, and themselves to be the most influential actors in the lighting specification process for new construction. They noted that the owners/customers had multiple layers of decision-making. While their salespeople would prefer to communicate with the owners'/customers' Chief Financial Officers or even Chief Executive Officers, they sometimes have to settle for operations managers or project managers. The lighting distributor reps also said that their influence over the lighting specification process depended a lot on whether the lighting retrofit/remodeling jobs were ones that the owners/customers had initiated on their own, or jobs that their own salespeople had sold to the owners/customers.

Figure 3-2: compares market actors identified as important for the new construction lighting specification process with those identified as important for the retrofit/remodeling lighting specification process. It shows that while there is some overlap – namely the electrical engineers/contractors and lighting distributors – there are significant differences. Building owners/customers are much more important in specifying lights for the lighting retrofit/remodeling jobs than they are for new construction. Architects and lighting designers are much more important for specifying lighting for new construction than they are for retrofit/remodeling jobs.

Figure 3-2:
Most Important Market Actors in
Lighting Specification Process
New Construction vs. Retrofit/Remodeling

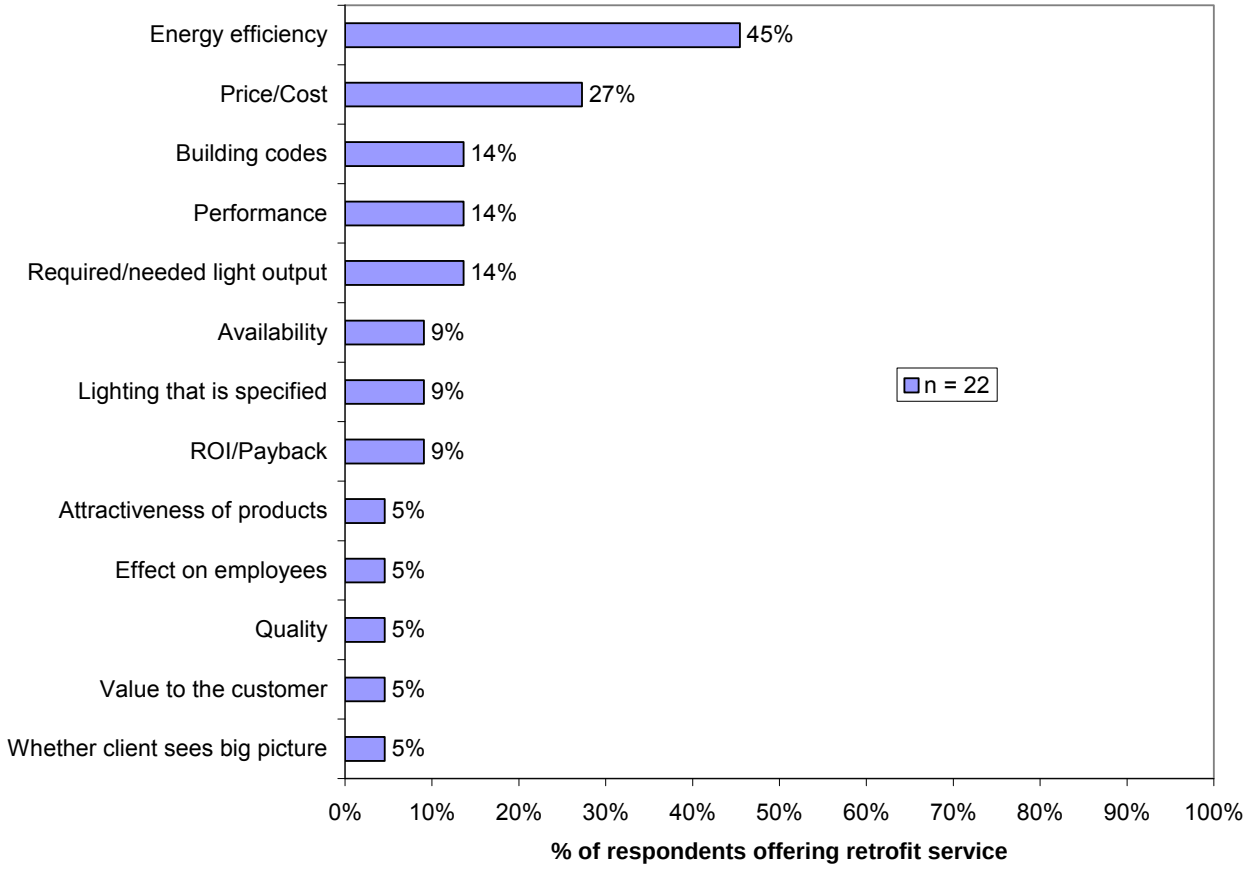


Note: n = 19 for new construction and 23 for retrofit/retrofit remodeling. The total numbers of "important" market actors are greater than 19/23 because some respondents cited multiple important market actors.

3.4.2. Key Criteria for Product Selection

When asked about the most important criteria for deciding what types of lighting get specified for retrofit/remodeling jobs, the lighting distributor reps gave a wide range of responses. Figure 3-3: shows that they named 13 different criteria as being important and eight of these criteria were named by at least two different interviewees. While price/cost had been the most important criterion for the new construction jobs, energy efficiency was the most important criterion for the retrofit/remodeling projects.

Figure 3-3:
Most Important Criteria
In Specifying Lighting for Retrofit/Remodeling



3.5. Lighting Specification for Quick Projects

PG&E was particularly interested in how these lighting specifications practices would differ for very short tenant improvement projects or small quick-build projects, where there is a shorter-than-normal timeframe for getting the lighting installed. The lighting distributor reps described two key differences.

- *General/electrical contractors have more influence in quick-turnaround projects.* For smaller projects the general/electrical contractor may be the only specifier. Yet even with bigger quick-turnaround projects which do involve architects and lighting designers, the general/electrical contractors can still gain more influence over the specification process. "On a tenant improvement job, there will be more horsepower available, if you will, to the

contractor," said one distributor rep, "because the contractor has got a short timeline to get things done."

- *Product availability becomes more important.* There was broad agreement among lighting distributor reps that product availability becomes a more important factor in these smaller, quicker-turnaround projects. "[The lighting specification process for quick projects] is significantly impacted by local stock and cost," said one distributor rep. "So you don't go specifying something that you can't get almost immediately and so availability drives it."

3.6. How New Title 24 Requirements Have Affected Lighting Specification

We asked the lighting distributor reps about the impacts of the latest (2005) Title 24 requirements on how lighting is specified. Some of the impacts cited included:

- *Wider use and greater consumer acceptance of fluorescent lighting and occupancy sensors.* A number of distributor reps pointed to the proliferation of fluorescent lighting products and occupancy sensors in the California new construction market as a direct result of Title 24.

- *Greater competition over energy efficiency claims.* "It seems like it's a competition now that you be as energy-efficient as possible," said one distributor rep.

- *Higher upfront lighting costs but improved products.* A few of the lighting distributor reps said that compliance with the new Title 24 requirements has forced them to use more expensive lighting products and that installation costs are also higher. Yet a number of the reps also described these lighting products as improvements over what they had been using before.

- *Awareness and knowledge of energy-efficient lighting has increased among some market actors but not others.* Some distributor reps thought the new Title 24 requirements had generally increased awareness and knowledge of energy-efficient lighting among market actors and customers. However, others saw knowledge gaps among some market actors.

- *Logistical challenges for the new construction industry.* A number of distributor reps said that the Title 24 requirements have created logistical challenges for them and other new construction market actors. Some of these included the need to introduce new lighting products and discontinue others, fewer choices for lighting fixtures, and the need to have Title 24-knowledgeable people on job sites.

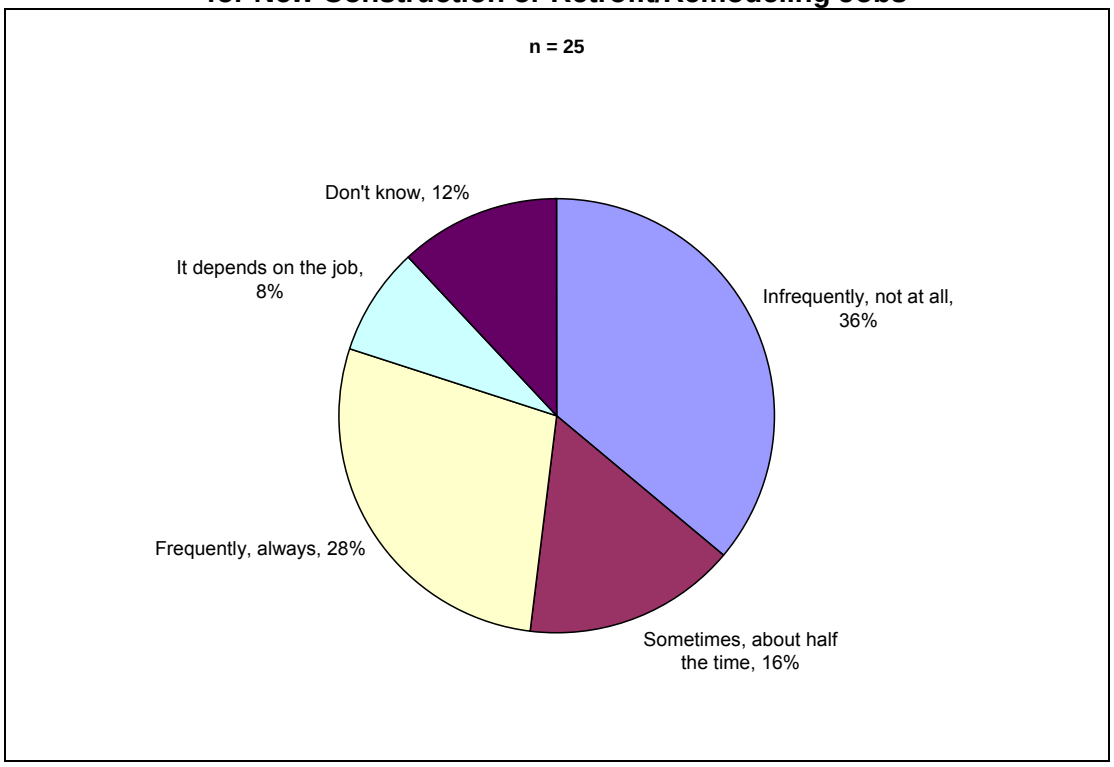
Most lighting distributor reps involved in new construction said the large majority of their lighting specifications are being driven by Title 24 and they rarely see specs for lighting that exceeds Title 24. Some estimated the share of homes/businesses being built above Title 24 at 10-20%. They said that when this happens in the residential sector it generally is driven by a homeowner who is environmentally-conscious and who is getting a “high-end” custom-built home. They said that when this happens in the commercial sector it is usually due to a company trying to cultivate a “green” image – for example, by demanding a LEED-certified building. Another possible driver for above-Title 24 lighting specifications would be lighting distributors seeking a competitive advantage. Yet while only a small minority of residential or commercial customers is demanding buildings with above-code lighting, some lighting distributor reps thought that attitudes towards energy efficiency were improving.

When asked how common it is for new construction jobs to specify lighting that does not comply with the latest Title 24 standards, most distributor reps gave responses such as “uncommon,” “not very often,” or “never.” Of those providing estimates of the incidence, one estimated it happened 30 percent of the time, another estimated that it happened 20-25 percent of the time, and a third, surprisingly, said that it occurred 95 percent of the time. A couple of distributor reps thought that compliance has recently been improving.

3.7. Consideration of Life-Cycle Costs in Lighting Specification

We asked the lighting distributor reps how frequently life cycle costs are considered when specifying lighting for new construction or retrofit projects. There was a broad range of opinion on this, as Figure 3-4: shows. A number of the distributor reps said that life cycle costs were more likely to be considered on retrofit jobs than on new construction jobs. Yet even in retrofit situations, a couple of distributor reps said that it is a secondary consideration compared to energy savings.

Figure 3-4:
Frequency of Considering Life-Cycle Costs When Specifying Lighting for New Construction or Retrofit/Remodeling Jobs



When asked about the types of projects where life-cycle costs might be an important consideration for specifying lighting equipment, they cited the following:

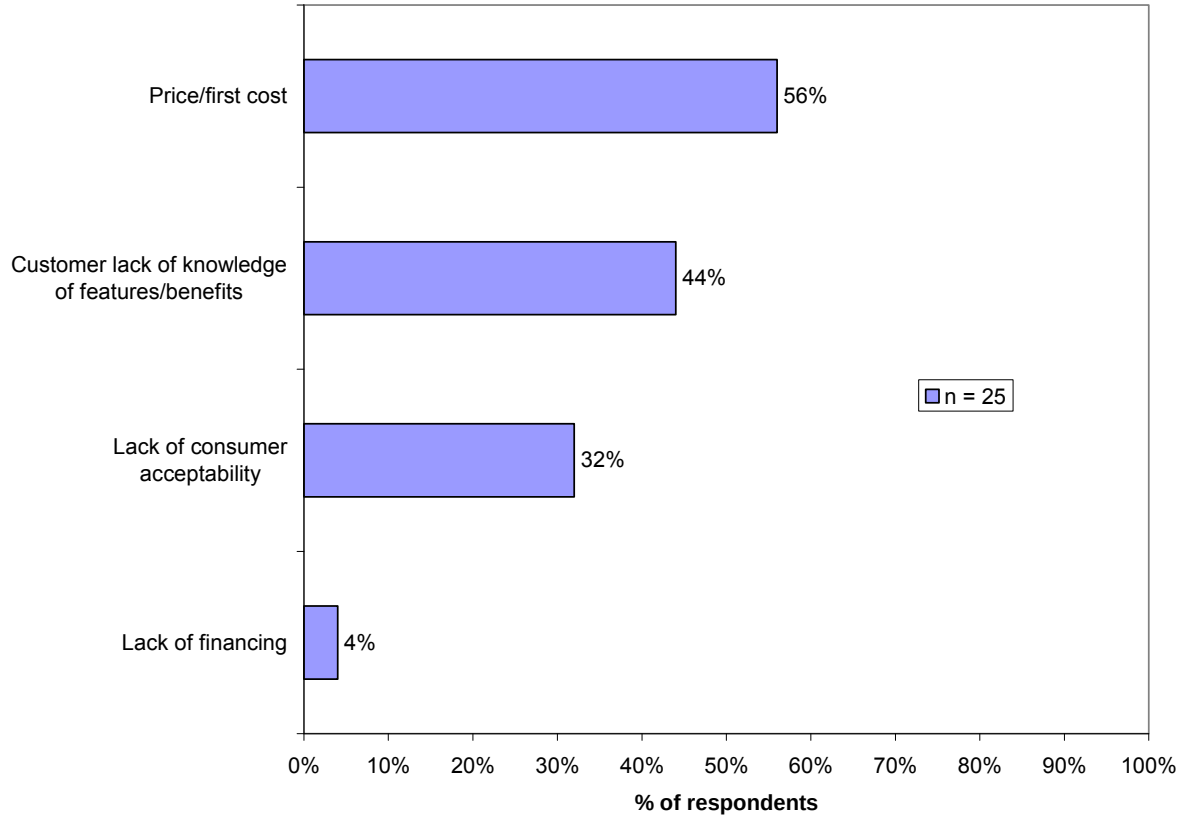
- Office or manufacturing buildings which are owner-occupied.
- Buildings such as warehouses that have high ceilings and high-bay fixtures and which require a boom truck or scissor lift to change lighting.
- Other hard-to-reach lighting locations such as in parking lots, stairwells, or exterior security lighting.
- Buildings owned by schools or institutions.
- Buildings where lights are on for long periods of time.
- Retrofit or remodeling projects in general.

3.8. How PG&E Can Influence Lighting Specification

3.8.1. Barriers to Greater Use of Energy-Efficient Lighting

We asked the lighting distributor reps which barriers to the greater use of energy-efficient lighting were the most significant. Figure 3-5: shows that a little over half of the distributor reps said that the higher cost of energy-efficient lighting was the most significant barrier followed by customer lack of knowledge of the features and benefits of this lighting. The detailed part of this report provides elaborations on these barriers by the distributor reps.

Figure 3-5:
Most Significant Barriers to
Greater Use of Energy-Efficient Lighting

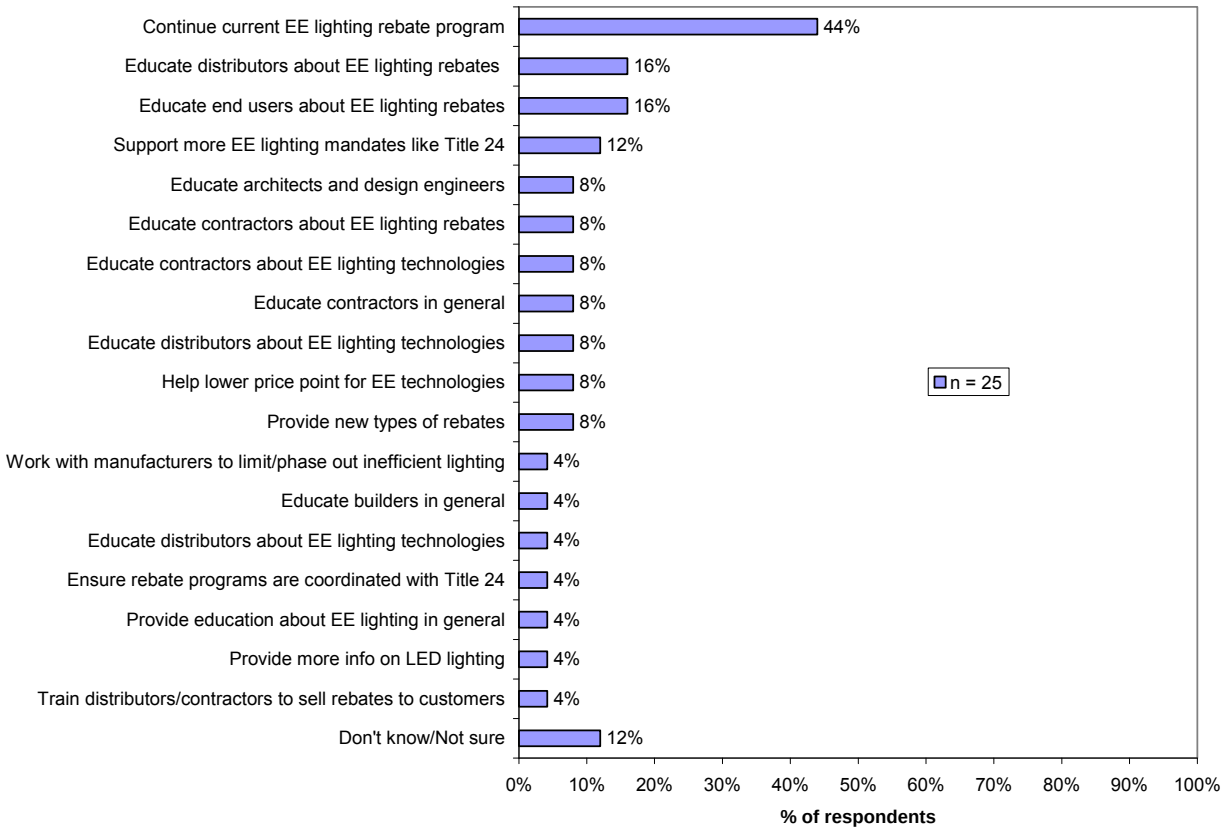


Note: Total exceeds 100% because some interviewees provided multiple responses.

3.8.2. How PG&E Can Influence Contractors/Distributors to Specify EE Lighting

We asked the lighting distributor reps how PG&E can influence contractors to specify more energy-efficient lighting for new construction or retrofit jobs. Nearly half of the distributor reps suggested that PG&E should continue its current rebate programs for T5s and low-wattage T8s. While there were many other suggestions, none of these were suggested by more than a handful of distributor reps and some were suggested by only a single interviewee (Figure 3-6:). The detailed part of the report contains many clarifications and elaborations of these suggestions.

Figure 3-6:
Ways for PG&E to Influence Contractors to Specify More EE Lighting for New Construction and Retrofit Jobs



Note: Total exceeds 100% because some interviewees provided multiple responses.

The lighting distributor reps were also asked what PG&E could do to help lighting distributors promote more energy-efficient lighting to these contractors. There were many different suggestions with no suggestion being made by more than a handful of the distributor reps. Yet most recommendations emphasized the education and training of contractors or distributors. Topics for PG&E to do more education about included which rebates are available, which energy-efficient lighting technologies are out there, why certain lighting products are being rebated, what lighting is required by Title 24 and other regulations, and future lighting products that will be eligible for rebates.

As to the best ways to deliver this information, some distributor reps mentioned educational materials while others mentioned low-key trainings sessions like “lunch and learns” at distributor offices. As to whether their advice on what PG&E could do to help lighting distributors promote more energy-efficient lighting to contractors would vary depending on whether it was a new construction or retrofit job, forty-percent said that their advice would be the same regardless of the scenario. Others said that PG&E would have to influence different market actors or it would be more difficult to influence the energy efficiency of new construction. In terms of different market actors to affect, the distributor reps said that for new construction PG&E should concentrate less on the electrical contractors or distributors and more on the builders, general contractors, architects, and specifying engineers.

The lighting distributor reps were also asked how PG&E could influence their companies to stock and support energy efficient fixtures. The most-cited response (32% of respondents) was that they stock what their customers demand and therefore they encouraged PG&E to create more demand for the energy-efficient products. The next most common responses were that they already stock energy-efficient products or they thought that PG&E’s current rebate offerings were good. Some of the distributor reps providing interesting suggestions such as:

- PG&E providing laminated reference cards for salespeople on how to specify energy-efficient fixtures;
- PG&E subsidizing free/cheap energy-efficient fixtures with the purchase of non-energy-efficient fixtures; and
- PG&E subsidizing the cost of inventorying energy-efficient products.

The detailed part of this report provides further elaboration of these and other suggestions.

3.8.3. Which EE Lighting Technologies PG&E Should Be Encouraging

We asked the lighting distributor reps whether there were any particular types of energy-efficient lighting that they would like to see PG&E help influence. The most common suggestions were LED technologies (28%), T5 fluorescents (20%), and low-wattage T8 fluorescents (12%) although many other lighting technologies were named by at least one respondent.

3.9. Distributor Awareness and Utilization of Energy-Efficient Lighting Programs, New Lighting Technologies

3.9.1. Distributor Awareness of PG&E EE Lighting Programs

When asked to name PG&E programs or services to promote energy-efficient lighting, the lighting distributor reps were much more aware of PG&E's rebate programs than they were of the utility's education or training efforts. Forty-percent of the respondents cited PG&E's low-wattage T8 rebates, 24 percent mentioned T5 rebates, and 12 percent named rebates for energy-efficient ballasts. In addition, 36 percent of the respondent cited rebates without specifying a particular lighting product. Yet only eight percent of the respondents cited PG&E's training courses.

3.9.2. Distributor Sources for Information on New Lighting Technologies

When asked what sources they typically use to keep abreast of new lighting technologies and design practices, nearly two-thirds (64%) of the lighting reps cited lighting manufacturers as a source for this sort of information. Trade magazines were the second most-cited source (36%). Only 16 percent cited utilities as an information source.

3.9.3. Distributor Awareness/Specification of New CFL Fixture Families

The PG&E lighting staff was interested in knowing how aware lighting distributors were that lighting manufacturers, in response to initiatives such as Lighting for Tomorrow, were now producing entire families of CFL fixtures for both indoor and outdoor residential applications. They also wanted to know how many of these lighting manufacturers were specifying these fixtures and if the distributors receive the *Lighting Tomorrow* catalog.

Over three quarters (76%) of the lighting distributors were aware of these fixture families. Of those who were aware of the fixtures families, 69 percent said that they either specify or supply them. Most of the distributor reps who were aware of the fixture families but do not specify or supply them said that they simply do not work much with CFL fixtures. None of the lighting distributor reps said that they receive the *Lighting Tomorrow* catalog, although all but two of them were interested in receiving the catalog.

3.9.4. Distributor Awareness/Specification of High-Performance T5, T8 Recessed Fixtures

The PG&E lighting staff was also interested in knowing about how aware the lighting distributors were of high performance T5 and T8 recessed fixtures such as the Lithonia RT5 or the MetaLux Accord. They also wanted to know if the lighting distributors specified these fixtures for any of their projects.

Nearly all (96%) of the lighting distributors were familiar with these recessed fixture types, although two acknowledged that they were familiar with the Lithonia RT5 but not the MetaLux Accord. Seventy-two percent of the lighting distributors who were aware of these fixtures said that they sold or specified them.

3.9.5. Sales and Promotion of Lighting Controls

The lighting distributor reps were asked whether they sell lighting controls such as occupancy sensors and automatic timers. If they did sell these, then we asked them whether they actively promote them or only supply them if a customer requests them. The large majority (79%) of distributor reps claimed that their companies actively promote these controls. Those who did not actively promote lighting controls mostly said it was because they do not much lighting specification and they leave the decision to use lighting controls up to those that do.

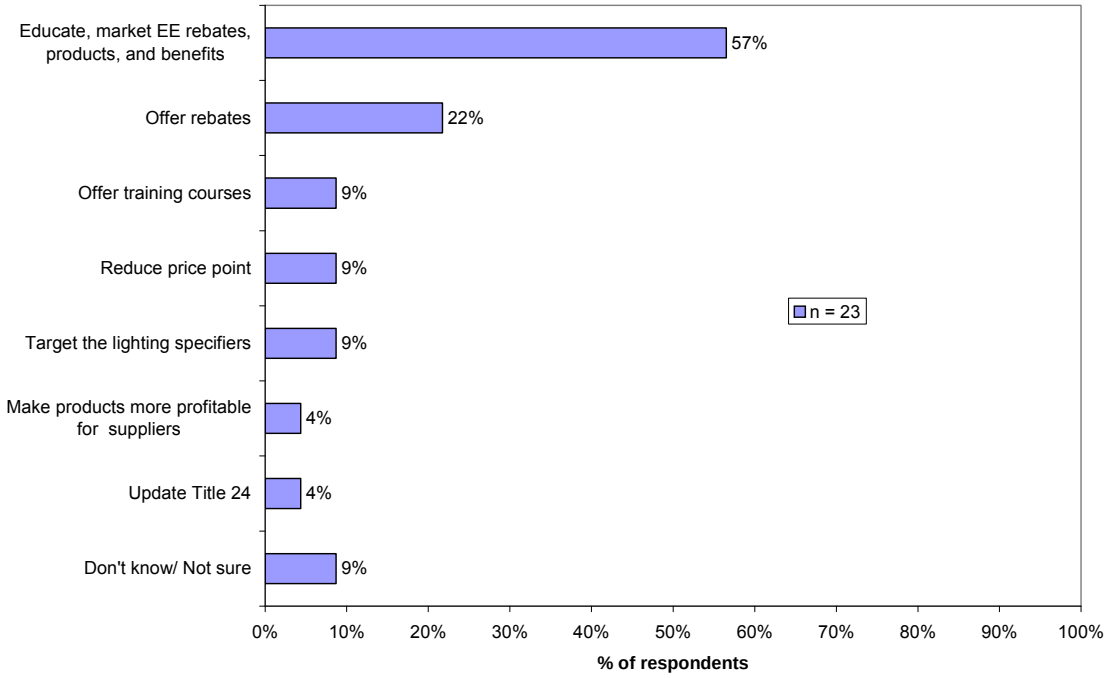
3.9.6. Variable Speed Drives

The PG&E staff was also interested in knowing how many of the lighting distributors sold variable speed drives (VSDs) and their awareness that PG&E offered rebates for VSDs. Seventeen of the twenty-five lighting distributor reps said that their companies sell VSDs, but four of them said that the quantity was very small. Of the lighting distributor reps who sold VSDs, only four (21%) were aware that PG&E offered rebates for VSDs.

3.9.7. Ways That New Lighting Technologies Can Be Encouraged

We asked the lighting distributor reps how new energy-efficient lighting technologies could be encouraged. Over half of them (Figure 3-7:) said that there needed to be more marketing and education to build awareness of the energy efficient lighting products that were available, their benefits, and the rebate programs that make them more affordable. The need to educate consumers about the long-term cost savings of energy-efficient lighting products was cited by a number of distributor reps. Others thought that market actors in the lighting supply business also needed more education.

Figure 3-7:
How New EE Lighting Technologies Can Be Encouraged



3.10. Detailed Findings

This section provides more detail on the findings summarized above, including clarifications and elaborations of key statements and suggestions.

3.10.1. Purpose, Scope, and Methodology

This section summarizes our findings from a survey of 25 lighting distributors located in the PG&E service territory. This survey was completed in November 2007. Although previous evaluations of the PG&E mass-market energy-efficiency programs have looked at the practices of lighting manufacturers and retailers, this is the first examination of the important distributor segment of the lighting sector.

The lighting distributor survey, which was developed with the assistance of the PG&E program staff, covered a number of topics including:

- How lighting products get specified for retrofit/replacement or new construction projects;
- Whether this lighting specification process differs for short-timetable projects such as tenant improvements or small quick-build projects;
- How energy-efficient lighting gets specified for such projects;
- The impacts of California's Title 24 rules on which lighting products they supply to new construction or retrofit/replacement jobs;
- Which of the possible barriers to greater use of energy efficient lighting – such as price, availability, consumer acceptability –are most significant;
- How knowledgeable they are of recent improvements in the appearance of CFL fixtures and the availability of whole product lines of CFL fixtures;
- How PG&E can influence them to stock, supply, and specify more energy-efficient lighting; and
- Whether they are aware the PG&E offers rebate for variable speed drivers.

Our surveyed sample was a random sample taken from a database of PG&E lighting distributors that combined distributor names from two sources:

- *A list of lighting distributors that had been compiled by PG&E lighting staff.* The PG&E staff said that the list came from a number of different sources including distributors who had participated in their T5 and low-wattage T8 rebate programs,

distributors that had been identified by PG&E field representatives and participating lighting contractors, and distributors that the PG&E staff had identified through Internet research.

- *A list of lighting distributors from a Dun & Bradstreet database.* To supplement the PG&E list we also pulled a random sample from a Dun & Bradstreet database of lighting distributors that had zip codes in the PG&E service territory.

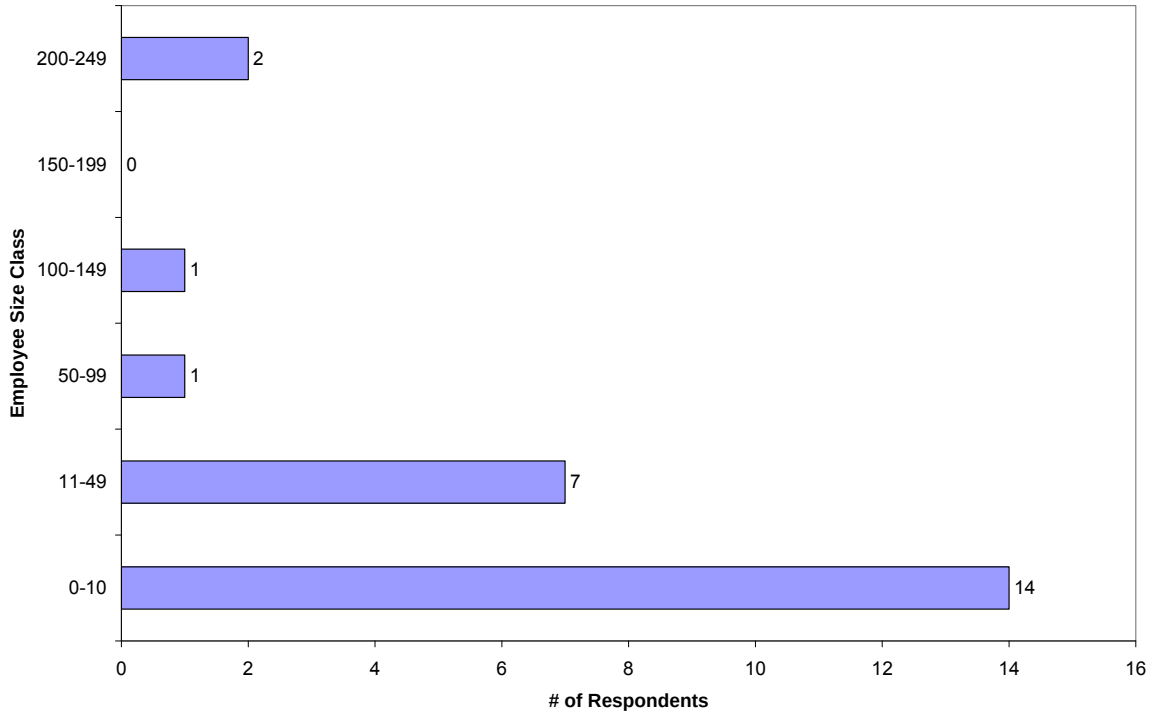
3.11. Characteristics of the Surveyed Lighting Distributors

This section describes some basic characteristics of the lighting distribution companies whose representatives we completed interviews with. These characteristics include the number of employees, annual revenue, the types of lighting services offered, how the company's business is allocated between the new construction and retrofit/remodeling markets, and the importance of energy efficiency in their business.

3.12. Company Size

In order to characterize their companies' sizes, we asked the lighting distributor representatives (reps) about the number of full-time and part-time employees at their company as well as their company's annual revenues. Figure 3-8: shows that the large majority of the lighting distributors had fewer than 50 employees with over half of them having fewer than 10 employees. The average number of full-time employees was 34 and the average number of part-time employees was three, with only 10 of the 25 lighting distributors having part-time employees. Only 12 of the 25 interviewees were willing or able to report annual revenues and there was a wide range in revenue estimates. Six interviewees reported annual revenue in the $2-$20 million range, two reported annual revenue as $100 million, and four reported revenue in the $1.5-$6 billion range. We suspect that some interviewees were reporting local revenue figures while others were reporting national figures.

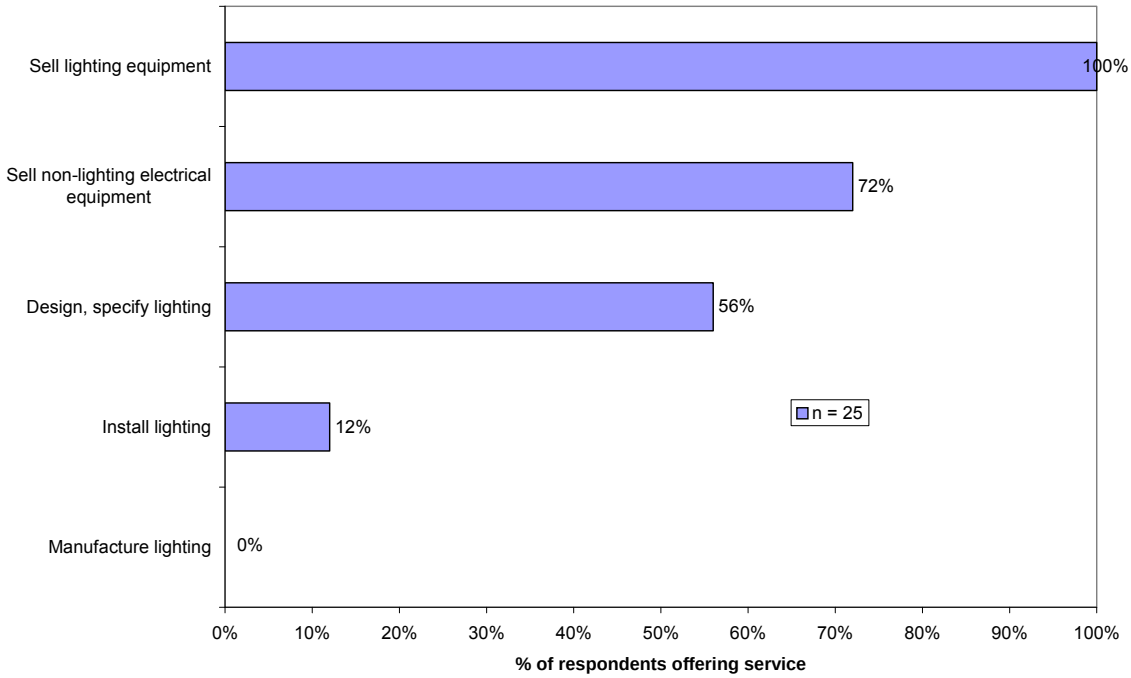
Figure 3-8:
Full-Time Employee Levels
of PG&E Lighting Distributors



3.13. Overview of Services

We asked the lighting distributor reps which lighting services their companies offered. All of the companies sold lighting equipment and the large majority also sold non-lighting electrical equipment (Figure 3-9:). Over half of the companies also provided lighting specification services. However, only three of the companies did lighting installations and none of them manufactured any lighting products.

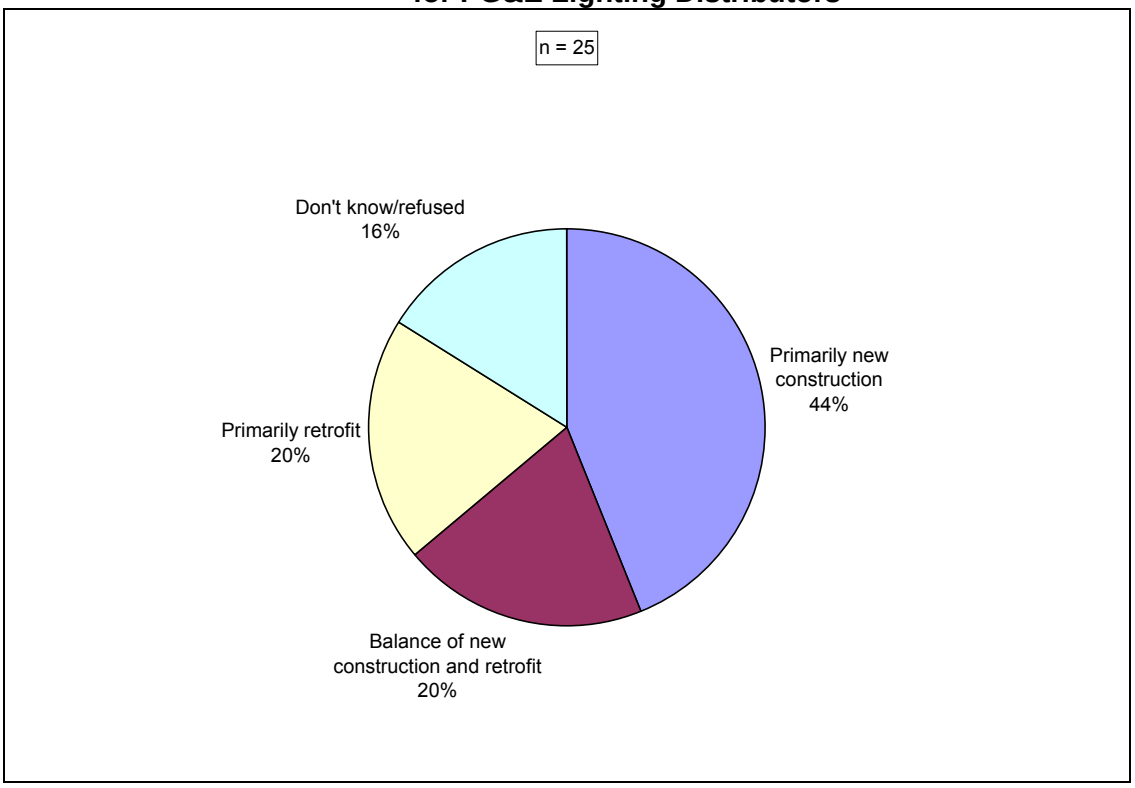
Figure 3-9:
Lighting Services Offered
by PG&E Lighting Distributors



We also asked the lighting distributor reps whether their companies offer their services to both the retrofit and new construction markets and how the volume of business is distributed between these two markets. The large majority of the lighting distributors do both retrofit and new construction projects, but they varied a lot in terms of how their volume of business was distributed (Figure 3-10:). Overall the average share of retrofit business (46%) was very close to the average share of new construction business (54%).

When asked about how they win their lighting jobs, the distributor reps attributed most of their business to sole source jobs based on a previous relationship, followed closely by competitive jobs won on price, followed more distantly by competitive jobs won on non-price factors. When asked how these job-winning proportions would change depending on whether the work was retrofit or new construction, of the 11 lighting distributor reps who ventured an opinion, seven said that these proportions would not change or that it would depend on the contractors. The four remaining interviewees thought that retrofit jobs tended to be more relationship-based than new construction jobs.

Figure 3-10:
Retrofit vs. New Construction Business Share
for PG&E Lighting Distributors

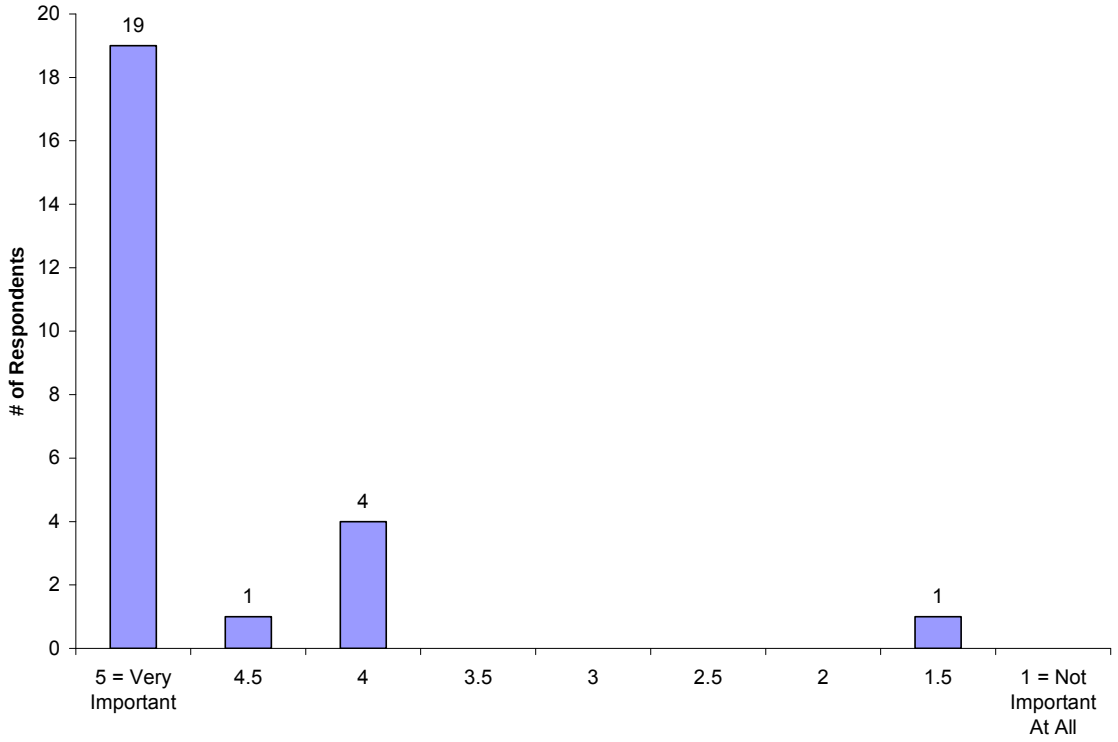


Note: "Primarily" indicates 70-99% share of business. "Balance" indicates a 50-50% or 60-40% split.

3.14. The Importance of Energy Efficiency

We asked the lighting distributor reps how important it was for their companies, in terms of maintaining their firm's competitive position, to offer energy efficient lighting technologies or design options to their clients. They were told to use a five-point scale where five equals "very important" and one equals "not important at all." Figure 3-11: shows that over three quarters of the distributor reps ranked energy efficiency as "very important" for their companies. The average importance rating was 4.7.

Figure 3-11:
The Importance of Offering EE Lighting Technologies
In Maintaining Companies' Competitive Positions



3.15. The Lighting Specification Process

This section describes the lighting specification process characterized by the lighting distributor reps. It discusses separately the lighting specification processes for new construction and retrofit/remodeling projects. This section also compares the lighting specification processes for these two markets including the types of market actors involved in specification and the criteria used to choose lighting. It discusses how new Title 24 requirements have affected lighting specification. Finally the section discusses to what degree life cycle costs are considered in the lighting specification process.

3.16. New Construction Lighting Specification Process

3.16.1. Key Actors

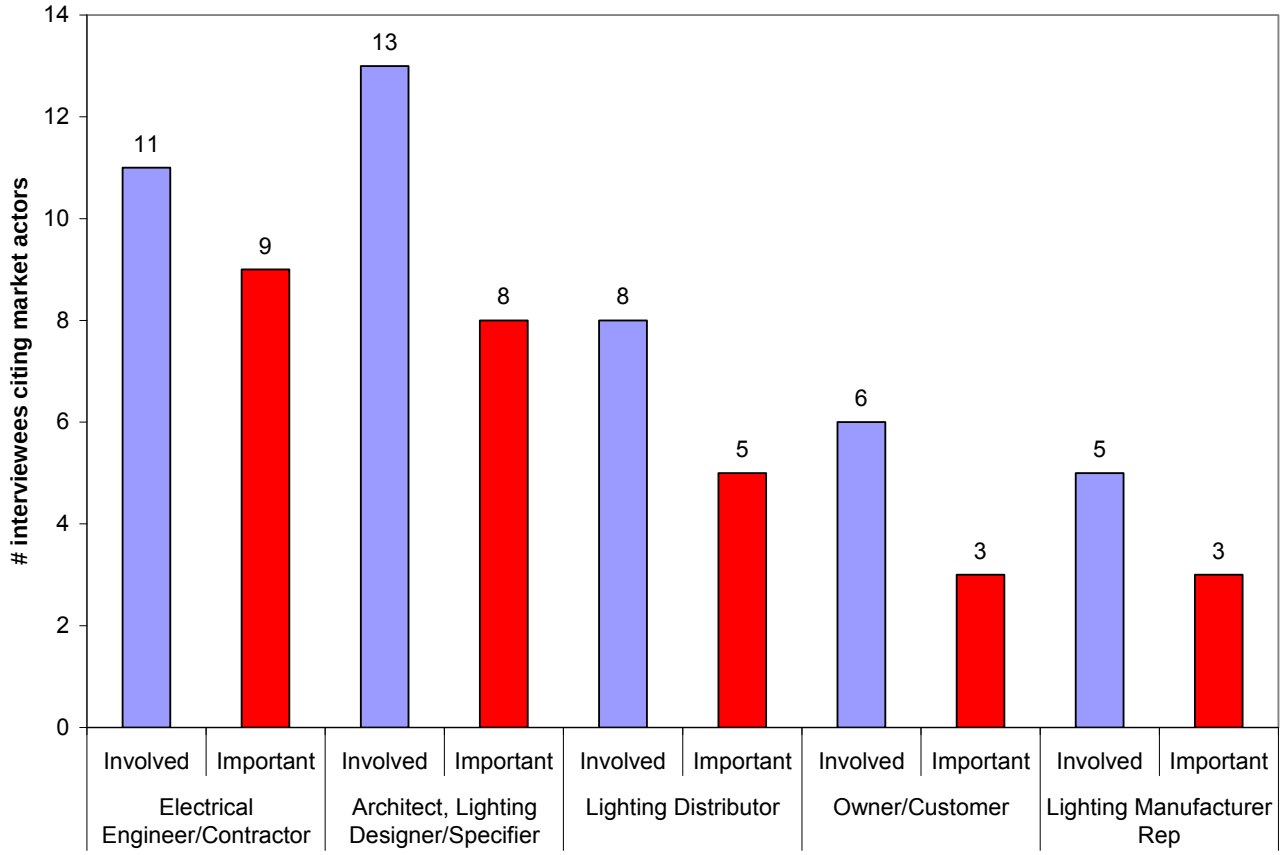
We asked the lighting distributor reps how the lighting specification process for new construction works and which actors have the most influence over which lighting products get specified. As

Figure 3-12: shows, the distributor rep considered electrical engineers and architects to be the most influential actors in this process.

Yet the lighting specification process can be very complex and there are opportunities for other actors like the lighting distributors, lighting manufacturers, and building owners to influence this process. Lighting distributor reps will have more influence over “design and build” projects and in situations where an electrical engineer wants to specify an alternative lighting package in addition to the pre-specified package. While lighting manufacturer reps were not cited as one of the more influential actors, one lighting distributor rep said that lighting manufacturers often work behind the scenes, using their relationships with architects to get their particular lighting products specified for the job. The influence of the building customer/owner is not in choosing which lighting fixtures to specify but in approving what the architects or electrical engineers have already specified. No matter how much agreement there is between the electrical engineer, architect, and lighting distributor as to what the lighting package should be, if the building owner doesn’t like it then the whole specification process must be redone.

When asked to describe the typical lighting specification process for new construction, only one lighting distributor representative named the builder or general contractor as playing a role in this process. However, when asked directly what role the builder or general contractor played in lighting specification, seven of the lighting distributor reps said that the builder or general contractor plays a role and three of them said it was an important one. “[They have a] big role,” said one interviewee. “They have the closest contact with the customer so they can influence if the job goes as specified or gets substituted, especially if the job is over budget.”

Figure 3-12:
Market Actors Involved in the New Construction Lighting Specification Process



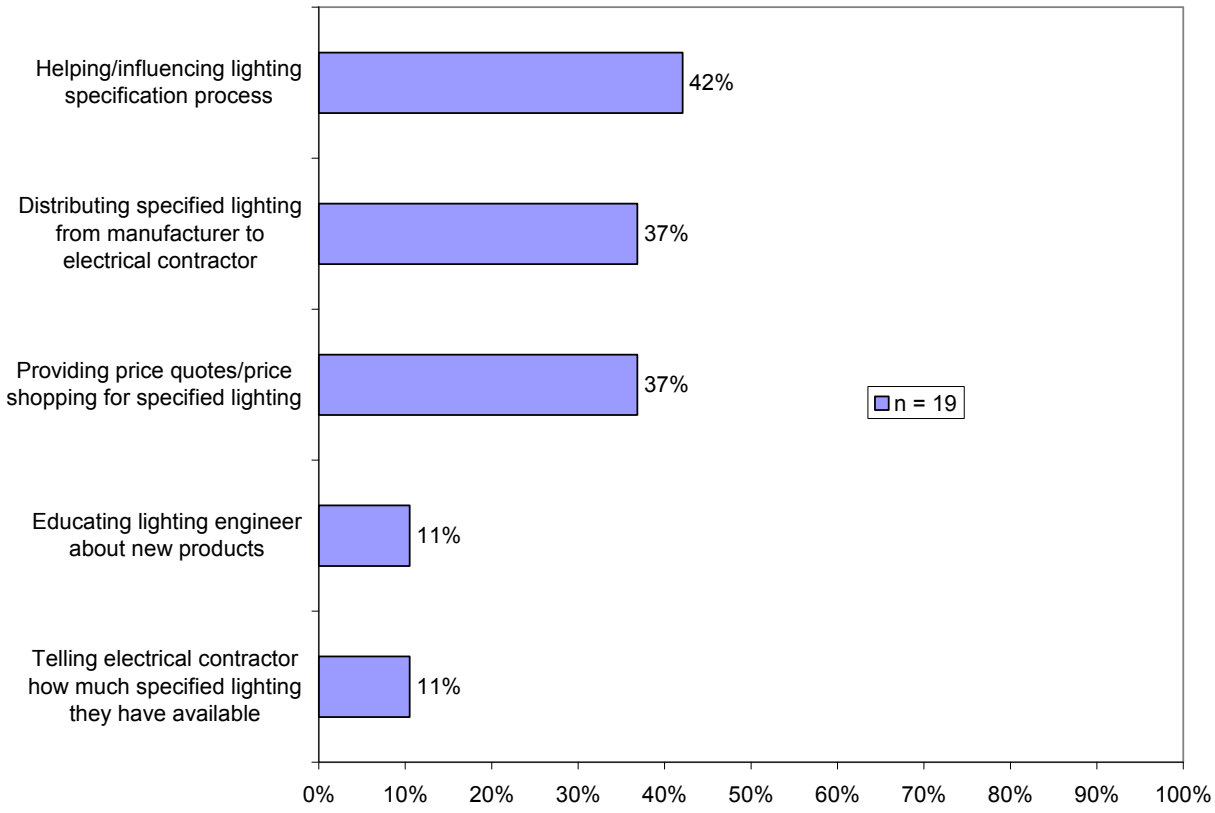
Note: n = 21, the total number of "important" market actors is > 21 because some respondents cited multiple important market actors.

We asked the 19 lighting distributor reps who did new construction work an open-ended question about what roles their own companies play in the lighting specification process. Figure 3-13: shows that the three most common roles are influencing the lighting specification process, distributing the products from the manufacturer to the contractor, and providing price quotes or price shopping services for a specific lighting package.

As noted, the lighting distributors are more likely to influence the lighting specification process for design and build projects. Their lighting specification role also depends on what lighting options are specified in the construction plans. "If the plans specify no equal, then we have no

option," said one lighting distributor representative. "If they specify a product and/or equal, then we can, at times, go out and determine if there is a more competitive product that is of equal quality that can be used at that particular job." If the construction plans specify no equal then the lighting distributor becomes a price shopper. "If we are trying to match a specification then we try to find the specified lighting at the best price," explained another lighting distributor representative.

Figure 3-13:
Role of Lighting Distributors
in New Construction Lighting Specification Process



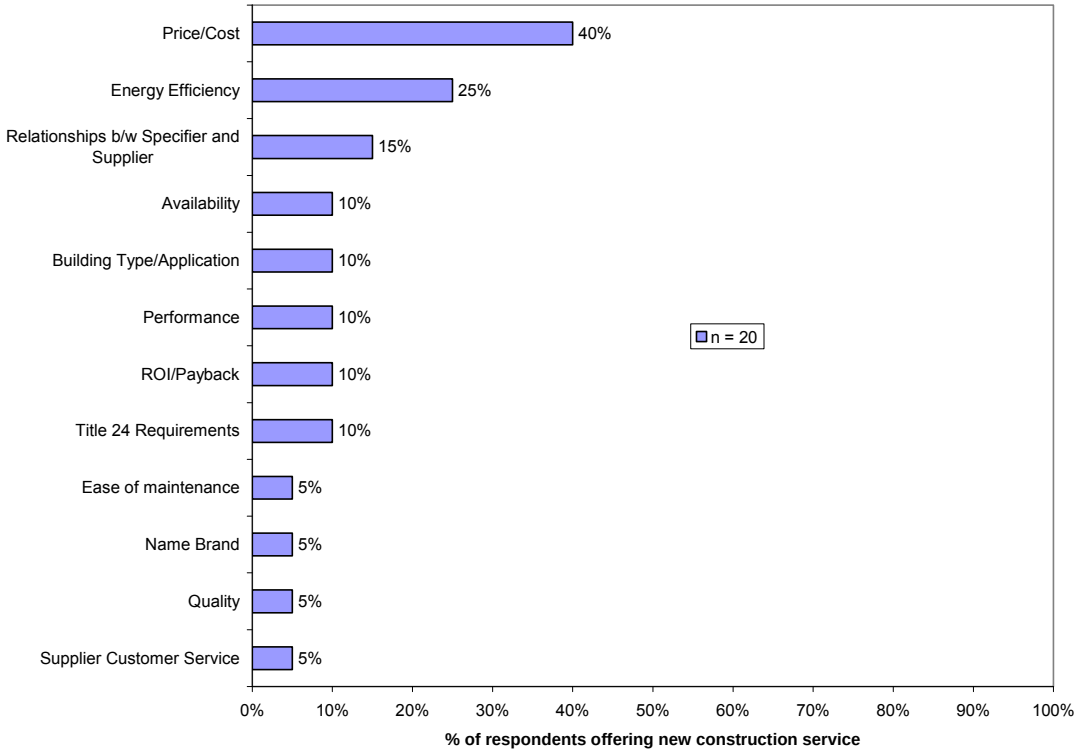
3.16.2. Key Criteria for Product Selection

We asked the lighting distributor reps who were involved in new construction about the most important criteria for deciding what types of lighting get specified for new construction projects. Figure 3-14: shows that they gave a wide range of responses with a dozen different criteria being named as important and eight criteria being named by at least two different interviewees.

Although price/cost was the most cited of these important criteria, it was named by less than half of the respondents and one of these respondents even suggested that higher costs could be a reason why lighting specifiers choose certain lighting products.[29]

Energy efficiency was the second most-cited of the important criteria, but was still only cited by a quarter of the respondents. However, one interviewee noted that Return on Investment (ROI) considerations are closely linked with energy efficiency considerations. In addition, Title 24 requirements are energy-efficiency related, although PG&E would obviously like to encourage energy-efficient lighting that goes beyond what Title 24 requires.

Figure 3-14:
Most Important Criteria in
Specifying Lighting for New Construction



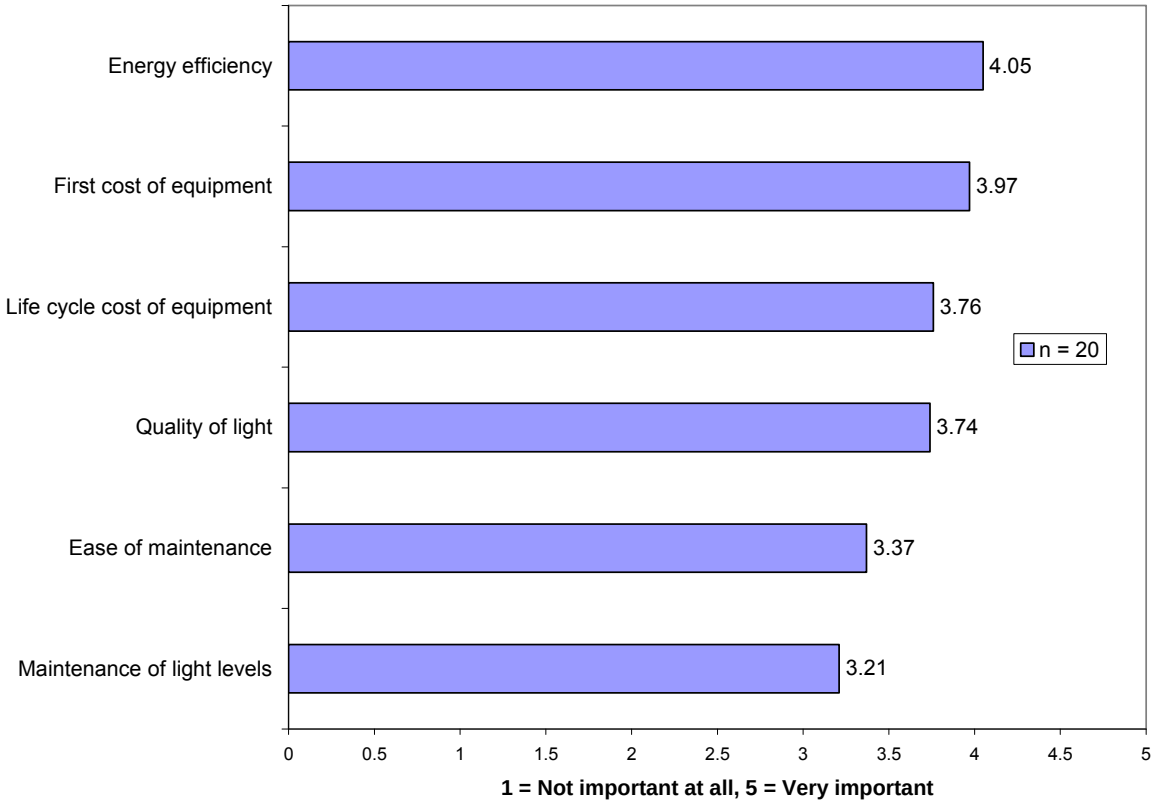
[29] "I hate to tell you this," said one lighting distributor representative, "but sometimes I think they pick out the most expensive light they can find because they get paid based on the overall cost of the project."

Many of these important criteria are things that PG&E's upstream lighting efforts should be able to influence. For example, the PG&E programs can continue to reduce the cost of energy-efficient lighting through rebates, increase the availability of energy-efficient lighting products, and educate lighting specifiers about the ROI and ease of maintenance benefits of energy-efficient lighting. However, other important criteria – such as the relationship between lighting specifiers and lighting suppliers,[30] or the level of customer service provided by the lighting suppliers -- will be more difficult for PG&E to influence.

In addition to asking the lighting distributor reps an open-ended question about the most important criteria for specifying lighting for new construction, we also asked them to rate the relative importance of various criteria that we identified. We had them use a rating scale where 5 equals "very important" and 1 equals "not important at all." Figure 3-15: shows that when the criterion question was framed in this manner, energy efficiency was as important a criterion as cost.

[30] "[The most important criterion is] the relationship of the architect to the lighting rep," said one lighting distributor representative. "You do what you're comfortable with. Who last took you out on a good golf game? Again, it's basic selling. You are selling to an engineer and an architect a specifiable piece of hardware. So how good are you? I mean, that's what it boils down to."

Figure 3-15:
Rating Importance of Criteria in
Specifying Lighting for New Construction



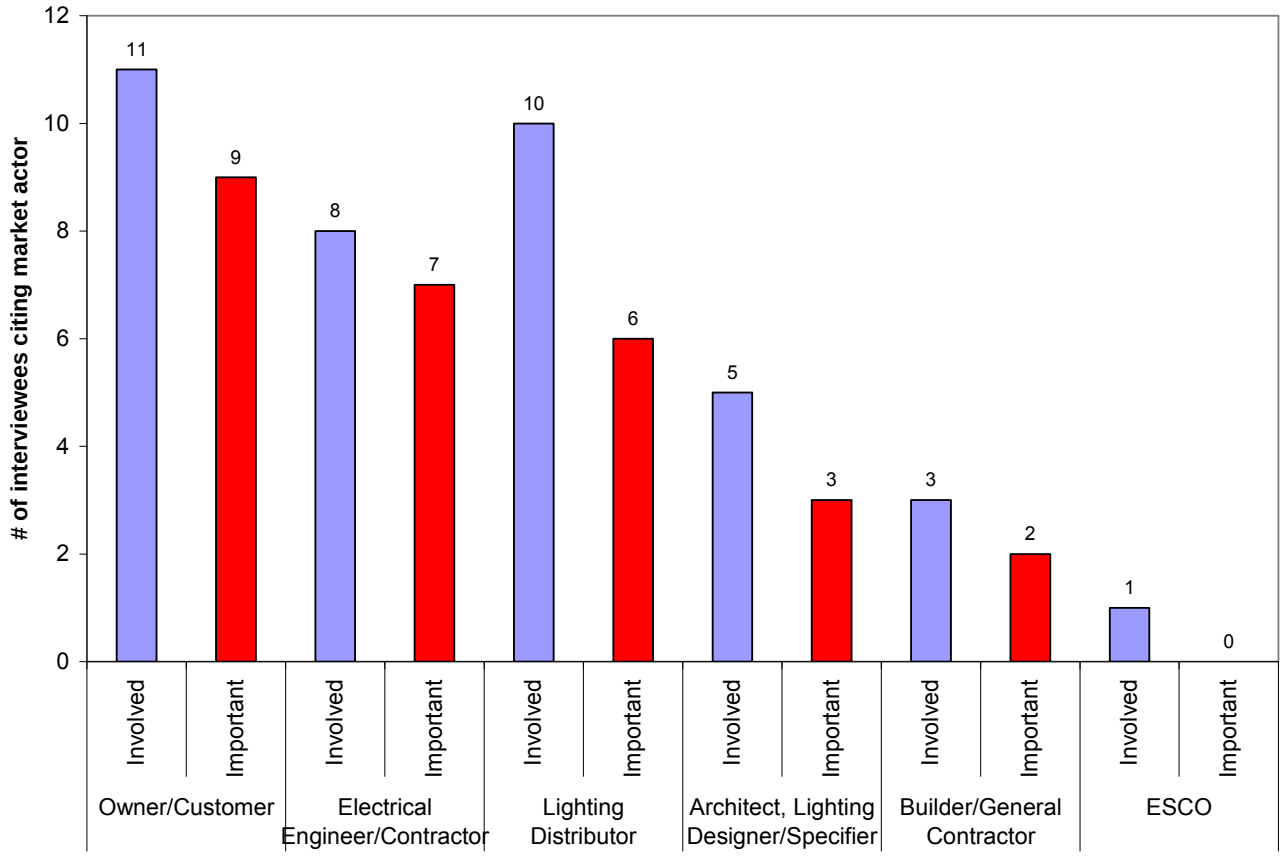
3.17. Remodeling/Retrofit Lighting Specification Process

3.17.1. Key Actors

We asked the lighting distributor reps how the lighting specification process for retrofit/remodeling jobs works and which actors have the most influence over which lighting products get specified. As Figure 3-16: shows, the lighting distributor reps considered the building owners, electrical engineers, and themselves to be the most influential actors in this process. They noted that the owners/customers had multiple layers of decision-making. While their salespeople would prefer to communicate with the owners'/customers' Chief Financial Officers or even Chief Executive Officers, they sometimes have to settle for operations managers or project managers. The lighting distributor reps also said that their influence over the lighting specification process depended a lot on whether the lighting retrofit/remodeling jobs

were ones that the owners/customers had initiated on their own, or jobs that their own salespeople had sold to the owners/customers.

Figure 3-16:
Market Actors Involved
in the Retrofit/Remodeling
Lighting Specification Process

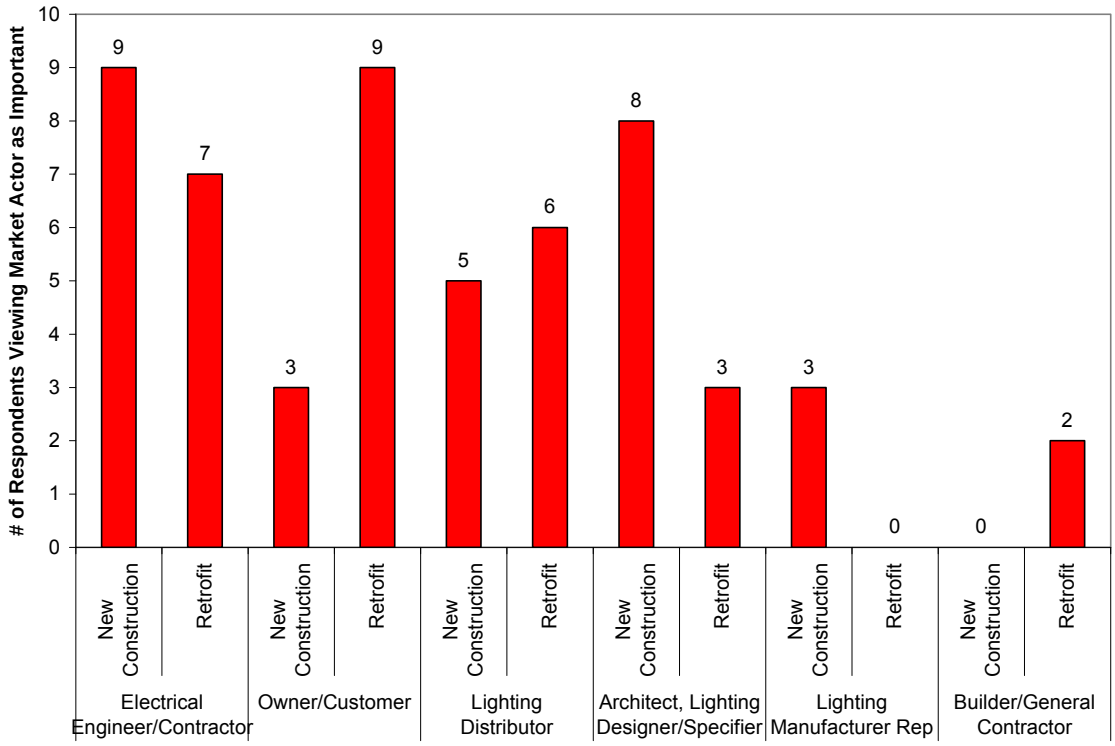


Note: n = 23, the total number of "important" market actors is > 23 because some respondents cited multiple important market actors.

Figure 3-17: compares market actors identified as important for the new construction lighting specification process with those identified as important for the retrofit/remodeling lighting specification process. It shows that while there is some overlap – namely the electrical engineers/contractors and lighting distributors – there are significant differences. Building owners/customers are much more important in specifying lights for the lighting retrofit/remodeling jobs than they are for new construction. Architects and lighting designers are

much more important for specifying lighting for new construction than they are for retrofit/remodeling jobs.

Figure 3-17:
Most Important Market Actors in
Lighting Specification Process
New Construction vs. Retrofit/Remodeling



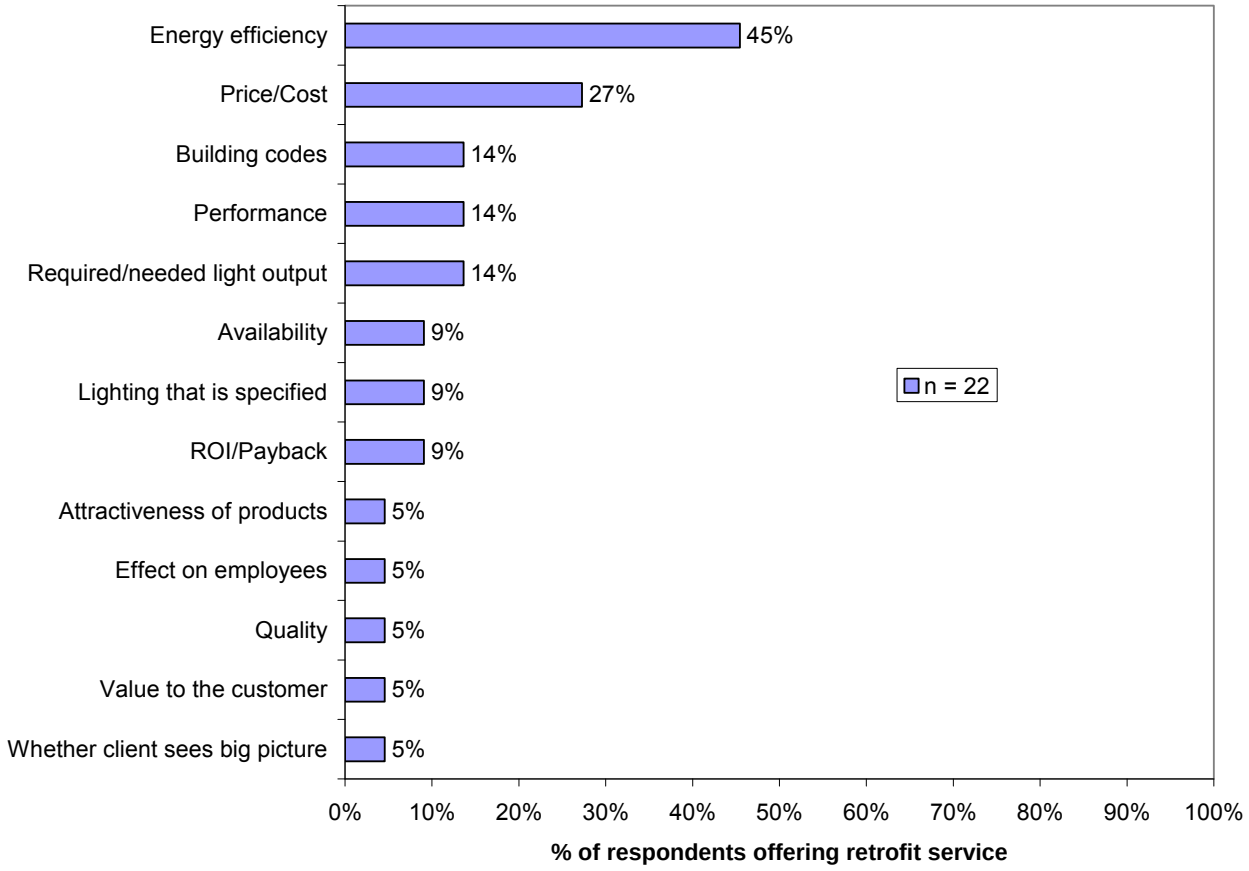
Note: n = 19 for new construction and 23 for retrofit/retrofit remodeling. The total numbers of "important" market actors are greater than 19/23 because some respondents cited multiple important market actors.

3.17.2. Key Criteria for Product Selection

We asked the lighting distributor reps who were involved in retrofit/remodeling projects about the most important criteria for deciding what types of lighting get specified for these types of projects. As they did for new construction, they gave a wide range of responses. Figure 3-18: shows that they named 13 different criteria as being important and eight of these criteria were named by at least two different interviewees. While price/cost had been the most important criterion for the new construction jobs, energy efficiency was the most important criterion for the

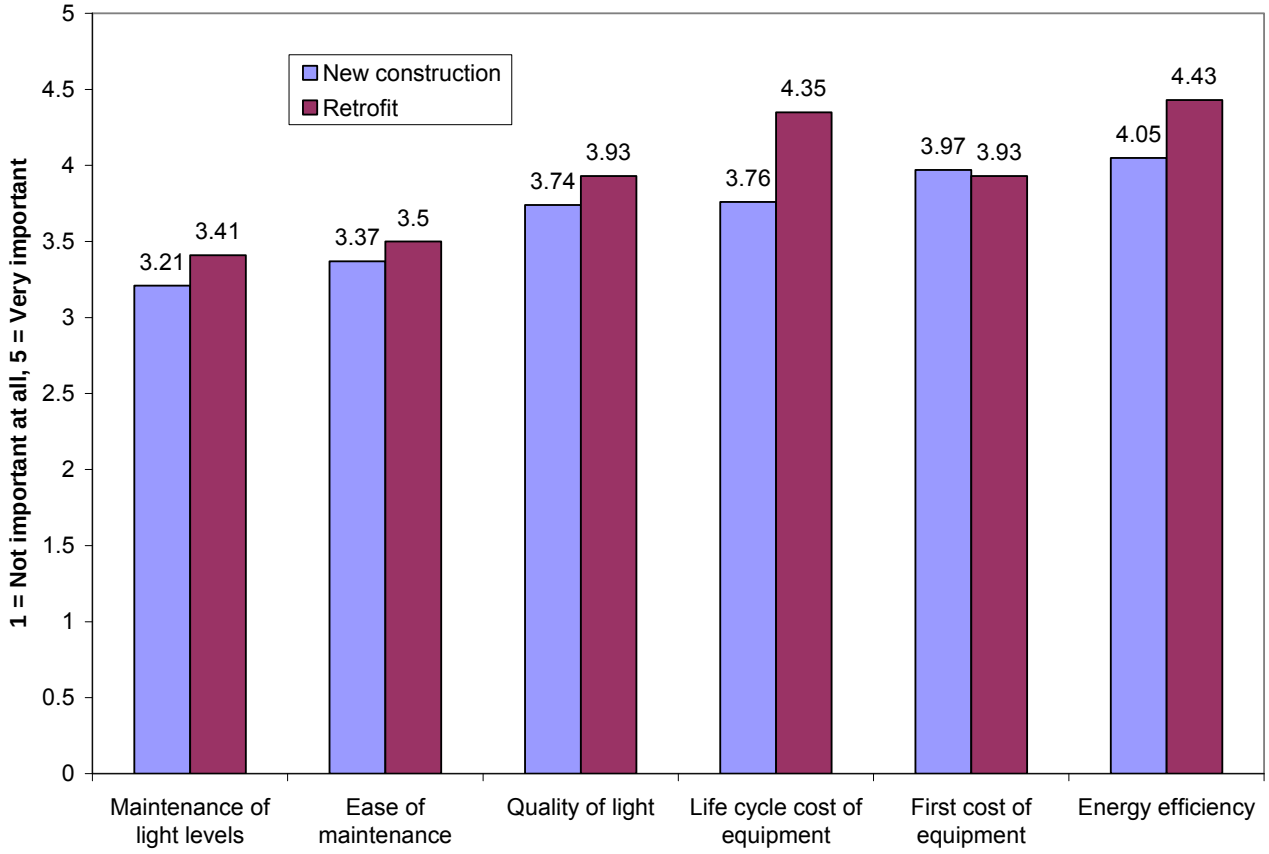
retrofit/remodeling projects. “You’re doing a retrofit for a reason,” explained one lighting distributor representative. “Either you’re not getting the quality of light you are looking for or you are spending too much on the lights you already have.”

Figure 3-18:
Most Important Criteria
In Specifying Lighting for Retrofit/Remodeling



As we did for new construction, we also asked the lighting distributor reps to rate the relative importance of various criteria for specifying lighting for retrofit/replacement projects that we identified. We had the reps use a rating scale where 5 equals “very important” and 1 equals “not important at all.” Figure 3-19: compares the importance ratings they gave for new construction with those they gave for retrofit/remodeling jobs. It shows that the ratings are fairly close except for the energy efficiency and life-cycle equipment cost criteria, which the distributor reps deemed more important for the retrofit/remodeling projects.

Figure 3-19:
Rating Importance of Criteria in Specifying Lighting
New Construction vs. Retrofit/Remodeling



Note: n = 20 for new construction and n = 23 for retrofit

3.17.3. Lighting Specification for Quick Projects

PG&E was particularly interested in how these lighting specifications practices would differ for very short tenant improvement projects or small quick-build projects, where there is a shorter-than-normal timeframe for getting the lighting installed. The lighting distributor reps described two key differences.

General/electrical contractors have more influence in quick-turnaround projects

The lighting distributor reps said that with quick projects the general contractors and their electric subcontractors often gain greater influence over the lighting specification process. For smaller projects the general/electrical contractor may be the only specifier. “If it is real small then there wouldn't be a designer,” noted one rep. “The sub electric contractor tells the general [contractor] what to do and the general contractor hopefully puts in the right stuff.” Yet even with bigger quick-turnaround projects which do involve architects and lighting designers, the general/electrical contractors can still gain more influence over the specification process. One lighting distributor rep explained how this might work:

> *The contractor is going to be much more in tune and probably carry a little bit more of a stick … because the contractor is going to be able to go back to the architect and say: ‘Hey, you specified Lithonia, but I can get Cooper quicker or Metalux quicker. They look the same, smell the same, taste the same. Their performance is virtually identical … What do you think?’ …And the architect is going to say: ‘Sure,’ because it’s timeline based. And so, the roles are the same, the people are the same, but on a tenant improvement job, there will be more horsepower available, if you will, to the contractor, because the contractor has got a short timeline to get things done.*

However, there was some disagreement among the lighting distributor reps as to whether this greater influence of the general/electrical contractors made it more likely or less likely that there would be substitutes for the lighting that was originally specified. Although the previous citation indicated that the quicker timeline made it easier for the general/electrical contractor to convince the architect/designer to change an original specification, this same time pressure could also discourage contractors from making a substitution. One lighting distributor rep said:

> *On the small projects they will specify what they want and we will give it to them. There's a lot less room for advising on energy efficient substitutes. The contractors will listen but if they know how to install an a type of fixture and are comfortable with that type of unit and its specs they will use that rather than trying something new, regardless if it's premium efficiency.*
> *“Usually the contractor will just get what he is familiar with for a quick project,” echoed another distributor rep.*

Product availability becomes more important with quick-turnaround projects

There was broad agreement among lighting distributor representatives that product availability becomes a more important factor in these smaller, quicker-turnaround projects. One distributor rep said:

> "[The lighting specification process for quick projects] is significantly impacted by local stock and cost. *A tenant improvement job, on the outside, is going to take twelve weeks. A more normal one is going to be six weeks or less. So you don't go specifying something that you can't get almost immediately and so availability drives it.*

Another distributor rep said that for quick-turnaround projects lighting specification is driven by "whatever the electrical contractor can get easily: what's available and what he can get over the counter.'"

3.18. How New Title 24 Requirements Have Affected Lighting Specification

We asked the lighting distributor reps about the impacts of the latest (2005) Title 24 requirements on how lighting is specified. Some of the impacts cited included:

- *Wider use and greater consumer acceptance of fluorescent lighting and occupancy sensors.* A number of distributor reps pointed to the proliferation of fluorescent lighting products and occupancy sensors in the California new construction market as a direct result of Title 24. Some even thought that consumer acceptance of fluorescent technology has increased. "One of the things that we've noticed is that the fluorescent technology for the residential market is far more palatable to the homeowner if the fixture is provided with a lens to hide the lamp. It's not so much the light quality as it is the look of the light bulb itself that seems to be the problem."

- *Greater competition over energy efficiency claims.* "It seems like it's a competition now that you be as energy-efficient as possible," said one distributor rep.

- *Higher upfront lighting costs but improved products.* A few of the lighting distributor reps said that compliance with the new Title 24 requirements has forced them to use more expensive lighting products and that installation costs are also higher. Yet a number of the reps also described these lighting products as improvements over what they had been using before.

- *Awareness and knowledge of energy-efficient lighting has increased among some market actors but not others.* Some distributor reps thought that the new Title 24 requirements had generally increased awareness and knowledge of energy-efficient lighting among both market actors and customers. However, others reps pointed to knowledge gaps among some market actors. "I don't think there's been the education at the contractor level that there probably should be," said on distributor rep. "There's still a lot of contractors that are unaware of all the changes, and why they're there, and how they're taking place." "I'll tell you, most architects don't know anything about [Title 24]," said another rep. "Because they're specing, like on residential, I see lots and lots of kitchens that have all low voltage. I said: 'You can't do that.'"

- *Logistical challenges for the new construction industry.* A number of distributor reps said that the Title 24 requirements have created logistical challenges for them and other new construction market actors. Some of these included:

    - "It makes it a little bit tougher for the engineer or the architect to supply the quantity of light based on the watts allowed per square foot."

    - "We've had whole lines of our lighting that have had to change due to Title 24."

    - "It has limited the choices that are available. It has basically forced us to two designs, using line voltage track and chopping it up."

    - "[It's] problematic because Title 24 specifies and demands things that do not exist yet. Or if they exist, they do not perform as well as advertised."

    - "You must have someone up to speed on regulations on the job."

We asked the lighting distributor reps under what scenarios energy-efficient lighting gets supplied for new construction or small retrofit/replacement jobs. "Is it just for Title 24 requirements?" we asked. "When do contractors or distributors design or build beyond Title 24?"

Most of the lighting distributor reps involved in new construction said that the large majority of their lighting specifications are being driven by Title 24 and they rarely see specs for lighting that exceeds Title 24. Those distributor reps who quantified the share of homes/businesses that were being built above Title 24 put the number at 10-20%. They said that when this happens in the residential sector it generally is driven by a homeowner who is environmentally-conscious and who is getting a “high-end” custom-built home. They said that when this happens in the commercial sector it is usually due to a company trying to cultivate a “green” image – for example, by demanding a LEED-certified building. Another possible driver for above-Title 24 lighting specifications would be lighting distributors seeking a competitive advantage. “We design or build beyond Title 24 when we're looking to differentiate ourselves,” said one distributor rep.

Yet while only a small minority of residential or commercial customers is demanding buildings with above-code lighting, some lighting distributor reps thought that attitudes towards energy efficiency were improving. “Right now we seem to be in a transitional phase where people are just starting to become aware of the importance of energy efficiency,” said one distributor rep. “People are becoming more savvy,” said another distributor rep. “People at higher levels are aware of things like labor costs where you can put a CFL in and not have to have a guy going around changing tubes -- they see these types of cost effective measures.”

The lighting distributor reps also noted that in the retrofit market, energy efficiency is a much more important driver. “What is driving the retrofit market is predominantly the cost of energy, supported heavily by both utility incentives and tax incentives,” said one distributor rep. “I would say every [retrofit] job I look at, I look for an efficiency option,” said another rep. One distributor rep noted that lighting distributors have an economic motivation to push more energy-efficient products. “I would say that the distributor probably would push harder for [energy efficiency] than a contractor would,” he said, “because the distributor makes more money on the fluorescent fixture than he would on an incandescent fixture.”

Finally we asked the lighting distributor reps how common it is for new construction jobs to specify lighting that do not comply with the latest Title 24 standards. Most gave responses such as “uncommon,” “not very often,” or “never.” Of those providing estimates of the incidence, one estimated it happened 30 percent of the time, another estimated that it happened 20-25 percent of the time, and a third, surprisingly, said that it occurred 95 percent of the time. A couple of distributor reps thought that compliance has recently been improving. “I haven’t seen

[noncompliance] in awhile, to be honest with you," said one. "I think that Title 24 has gotten out there to where people automatically take that into consideration."

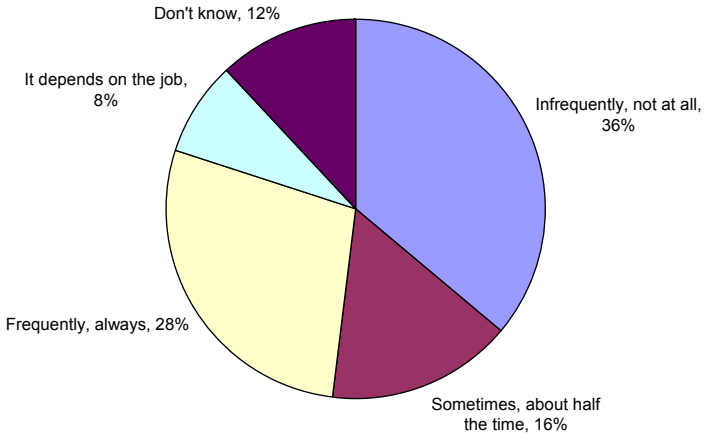
3.19. Consideration of Life-Cycle Costs in Lighting Specification

We asked the lighting distributor reps how frequently life cycle costs are considered when specifying lighting for new construction or retrofit projects. There was a broad range of opinion on this, as Figure 3-20: shows. A number of the distributor reps said that life cycle costs were more likely to be considered on retrofit jobs than on new construction jobs. Yet even in retrofit situations, a couple of distributor reps said that it is a secondary consideration compared to energy savings. "It's more energy savings than lifecycle," said one. Another elaborated on this point:

> *Lifecycle costs are definitely considered and they're part of the equation, if you will, but that's not the hook. Again, the real hook is saving energy and taking advantage, while saving energy, of rebates and tax advantages. That's really what moves a project off of dead center.*

Figure 3-20:
Frequency of Considering Life-Cycle Costs When Specifying Lighting for New Construction or Retrofit/Remodeling Jobs

n = 25



We explored this issue further by asking the lighting distributor reps about types of projects where life-cycle costs might be an important consideration for specifying lighting equipment. They cited the following projects or applications:

- Office or manufacturing buildings which are owner-occupied.
- Buildings such as warehouses that have high ceilings and high-bay fixtures and which require a boom truck or scissor lift to change lighting.
- Other hard-to-reach lighting locations such as in parking lots, stairwells, or exterior security lighting.
- Buildings owned by schools or institutions.
- Buildings where lights are on for long periods of time.
- Retrofit or remodeling projects in general.

3.20. How PG&E Can Influence Lighting Specification

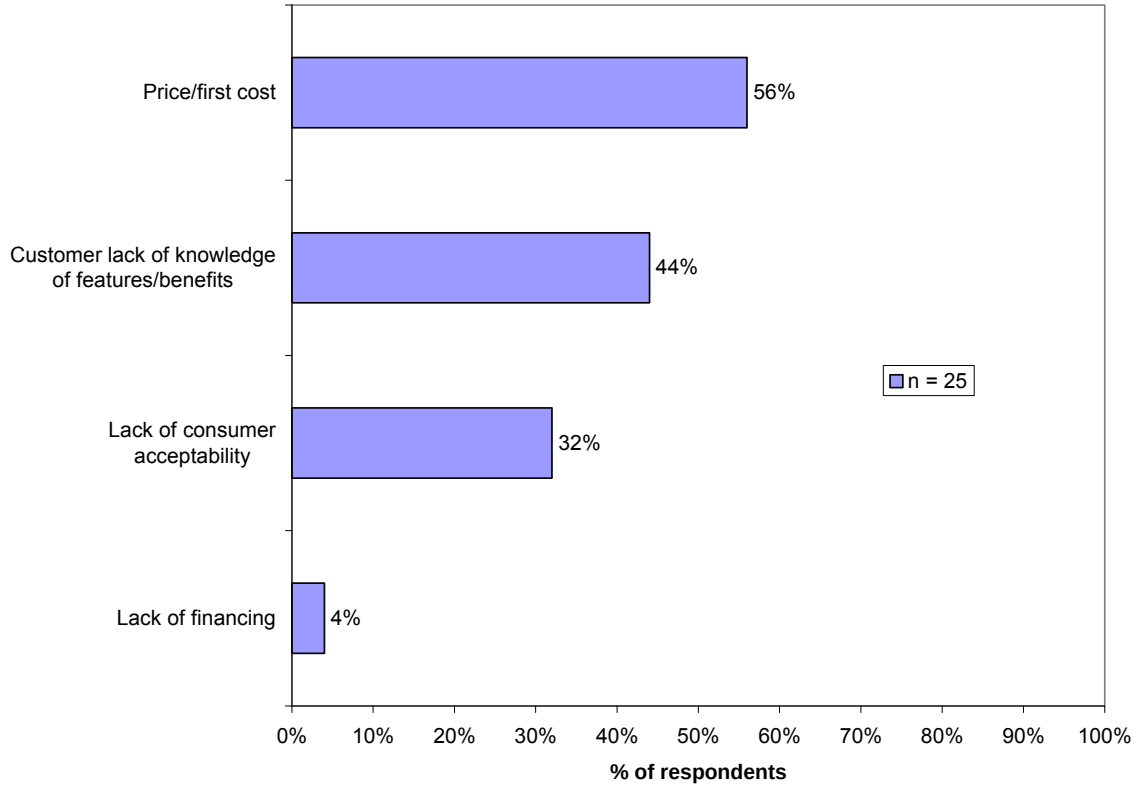
This section discusses the following topics:

- The barriers to greater use of energy-efficient lighting (as identified by the distributor reps);
- How PG&E can influence contractors to specify energy-efficient lighting;
- How PG&E can work with distributors to encourage energy-efficient lighting; and
- Which energy-efficient lighting technologies PG&E should be encouraging.

3.21. Barriers to Greater Use of Energy-Efficient Lighting

We asked the lighting distributor reps which barriers to the greater use of energy-efficient lighting were the most significant. Figure 3-21: shows that a little over half of the distributor reps said that the higher prices for energy-efficient lighting was the most significant barrier followed by customer lack of knowledge of the features and benefits of this lighting.

Figure 3-21:
Most Significant Barriers to
Greater Use of Energy-Efficient Lighting



Note: Total exceeds 100% because some interviewees provided multiple responses.

Some of the distributor reps commented on why they identified certain barriers as being significant. Some noteworthy comments included:

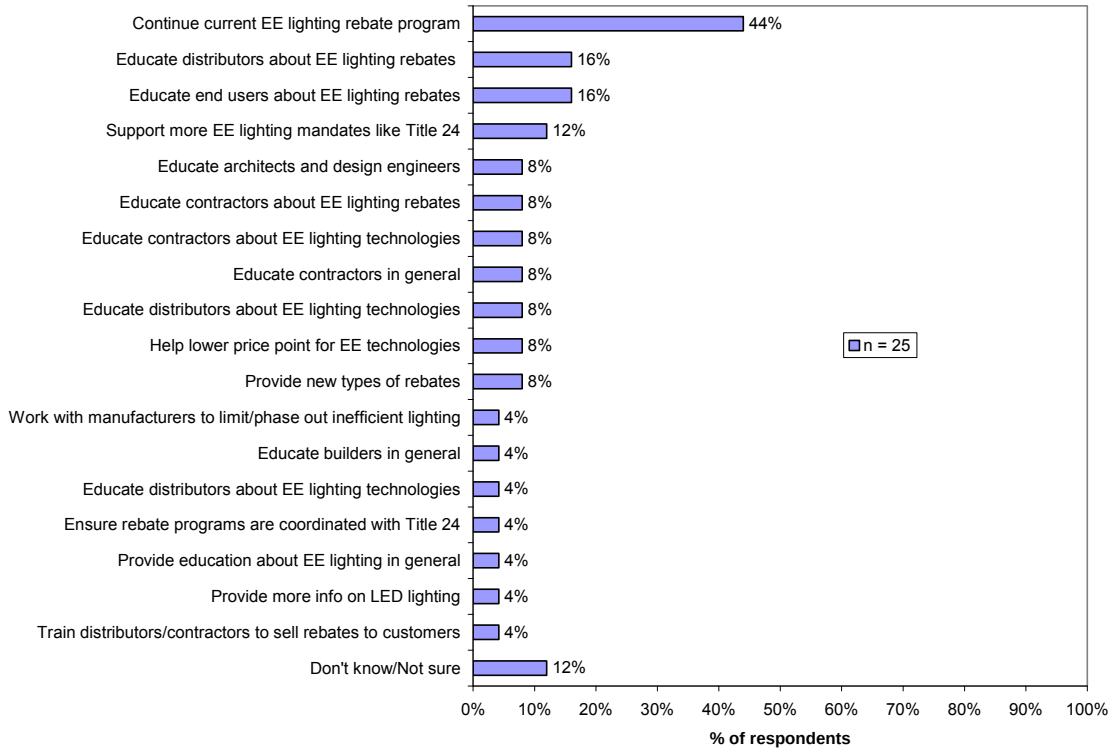
- Price/cost barriers
    - "Mostly [the most significant barrier is] higher price -- more specifically the low-bid scenario that most contractors operate in. They are not comfortable coming in with a higher price but trying to convince the customer of more value added."
    - "The prices, I think, are one of the biggest things just because we are talking about a significant price difference."

- Customer lack of knowledge/benefits
    - “I think the most significant is a lack of awareness that we have gone from first generation retrofit hardware and technologies to probably third generation. So I think that we need to do a very good job or better job of informing the public that there are alternatives over and above what they have already retrofit. That’s what we run into a lot: ‘We did a T8 retrofit five years ago.’ Well, there’s new and better. That’s one of the attention-grabbers we need to work on. This is just like going out and buying a new laptop or a new desktop computer. Yeah, I know you got one that’s three or four years old, but technology has leapfrogged. So we need to get that leapfrog message out there, and that this is kind of a continuous process, not a one off.”
    - [The most significant barrier is] customer awareness. [For example] the operations manager at a facility who thinks when you suggest energy efficient options that it is going to cost more money and the quality of light will go down. Or people who maybe had some experience with older technologies and are not aware of the advances in lamps and fixtures.”
    - “Actually, I would say that the most extreme problem is the lack of information and lack of understanding what is available in fluorescents these days. I think most people don’t realize how many different color options there are, how many different light choices there are, and what they are used to seeing. Say like an old T12 cool white that doesn’t look good and doesn’t make people look good underneath it -- that’s their image of fluorescent.”
- Lack of consumer acceptability
    - “Lack of consumer acceptability [is the most significant barrier]. Everybody's been sort of complaining about fluorescents. We've been doing some [complaining] ourselves with dimmable fluorescents and making them more appealing and [making sure] they comply with Title 24. The advertising for the [CFL] twisters helps out a lot. Because of the promotion people can purchase them for next to nothing and become familiar with what they can do. A lot of it is just getting the right color temperature and we help out. We have the fluorescents here in our office and we're happy with them.”
    - “In the consumer world [the most significant barrier] would be consumer acceptability. People don't like the color of the CFLs.”

3.22. How PG&E Can Influence Contractors to Specify EE Lighting

We asked the lighting distributor reps how PG&E can influence contractors to specify more energy-efficient lighting for new construction or retrofit jobs. Nearly half of the distributor reps suggested that PG&E should continue its current rebate programs for T5s and low-wattage T8s. While there were many other suggestions, none of these were suggested by more than a handful of distributor reps and some were suggested by only a single interviewee (Figure 3-22:).

Figure 3-22:
Ways for PG&E to Influence Contractors to Specify More EE Lighting for New Construction and Retrofit Jobs



Note: Total exceeds 100% because some interviewees provided multiple responses.

The following are clarifications and elaborations of some of the recommendations that appear in Figure 3-22: :

- Provide new types of rebates
    - Contractor rebates
        - "[Provide] rebates for the contractors … If the price is the same or a bit higher for a more efficient product, and there are possibly rebates too, then they will be specified more."
        - "[Provide[rebates. Unfortunately I think contractors are enticed by the almighty dollar. … Anything that increases business or puts more profit in their pocket they would be interested in. I guess if you had an incentive where you pay for the labor and materials so that the cost to the consumer was negligent but yet it allowed the contractor to charge more for the material or more for the labor and still keep the cost to the owner extremely low or nothing. Then that would certainly entice the contractor."
        - "The other thing I would say is a direct, and I don't know exactly how you would do it, but a direct rebate going back to the contractor for the installation. You know, that probably is one of the biggest things. A lot of the contractors … ultimately, they'll value it one way or the other because they're getting paid the same to install whatever the case may be."
    - End user rebates
        - "The rebate has to be driven to the end user level. It's hard to operationalize at the mid level targets like small contractors."
- Train distributors/contractors to sell rebates to customers
    - "I would say that the biggest issue that needs to happen is providing information and providing training, specifically a class on something that says: 'OK, this is what the rebates are, this is how they apply to what you're trying to do. " But also teaching them how to sell it to the homeowners: 'OK, this is what we're going to do, and I'm going to help you fill out the PG&E rebates that will give you.' That will make this project more palatable as far as cost because all these projects, all these retrofit

projects, are expensive. So if you can help the contractor sell it or help the distributor help the contractor to sell it, then it's much more likely to be effective."

- Provide more information on LED lighting
    - "I'm getting a lot of questions lately about LED. People are questioning me heavily on LED recessed lighting. And that's something that hasn't really been addressed yet by Title 24 and it needs to be, because it's going to be a big thing in the future. They are very expensive, right now, but, you know, like everything else, it comes down with competition. People would rather have LED than fluorescent . . . because it looks so much, it's a lot more, it's cool. It's great looking."

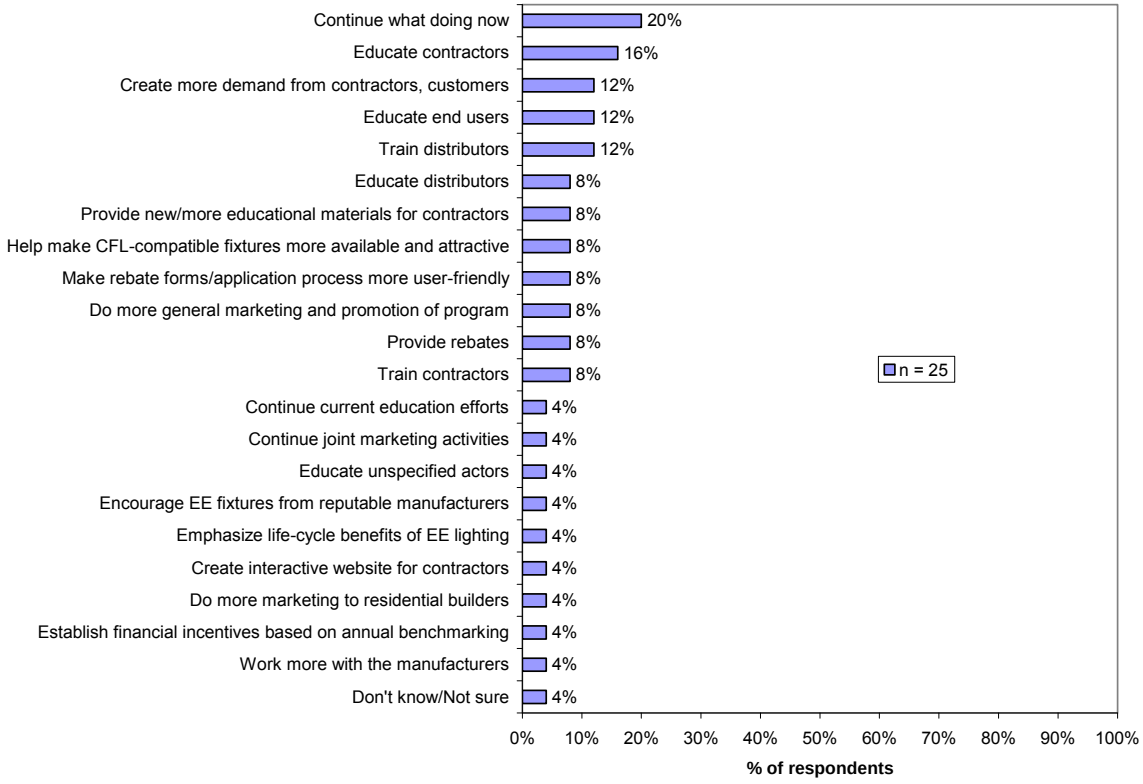
3.23. How PG&E Can Work With Distributors to Encourage EE Lighting

We then asked the lighting distributor reps what PG&E could do to help lighting distributors promote more energy-efficient lighting to these contractors. There were many different suggestions (Figure 3-23:) and not one of the suggestions was made by more than a handful of the distributor reps. However, most of the recommendations emphasized the education and training of contractors or distributors. Some of the topics that the distributors wanted PG&E to do more education about included:

- Which rebates are available;
- Which energy-efficient lighting technologies are out there;
- Why certain lighting products are being rebated;
- What lighting is required by Title 24 and other regulations; and
- Future lighting products that will be eligible for rebates.

As to the best ways to deliver this information, some distributor reps mentioned educational materials. "One of the big things would probably just be putting the information in leaflets and then getting the information out," said one distributor rep. "Contractors have an attention span of a gnat, and so if you give them something they can take and read, that's probably one of the best ways of doing it." "Our job is to let them know what's out there," said another distributor rep. "[We would like to] get our hands on more brochures about Title 24 requirements and the rebate programs."

Figure 3-23:
Ways for PG&E to Help Distributors Promote More EE Lighting To Contractors



Note: Total exceeds 100% because some interviewees provided multiple responses.

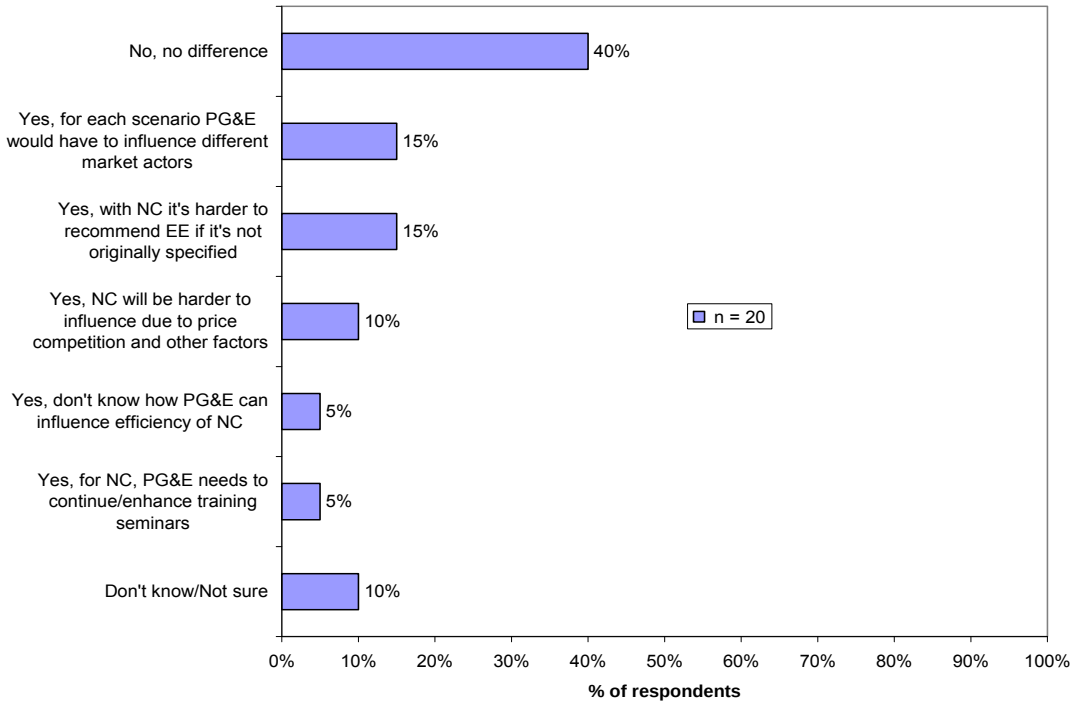
Other distributor reps recommended low-key trainings sessions like "lunch and learns" at distributor offices. One distributor rep explained:

> *I'm a big fan of training, classroom training and that kind of a thing. I just think that it works better than just sending an e-mail because there are so many, literally hundreds, of e-mails that hit a distributor's e-mail box, and most of them just get X'd out. So if there's some way of scheduling training, say, in the county or something like that where you invite all the distributors to come out or go to. For instance, in Napa County, there are only three of us. … I don't know what the financial commitment would be for PG&E, but it wouldn't seem to be a big commitment to have PG&E reps go to each of the three distributors and do a lunch-and-learn or some sort of a training.*

"Perhaps a training program or an interactive website that isn't boring that would educate using real life situations," said another distributor rep. "If I can say to my customers why they should do it, or if I have knowledge of the process, I might have more influence than if I just say to the customer: 'Hey if you buy this you'll get a $50 rebate.'"

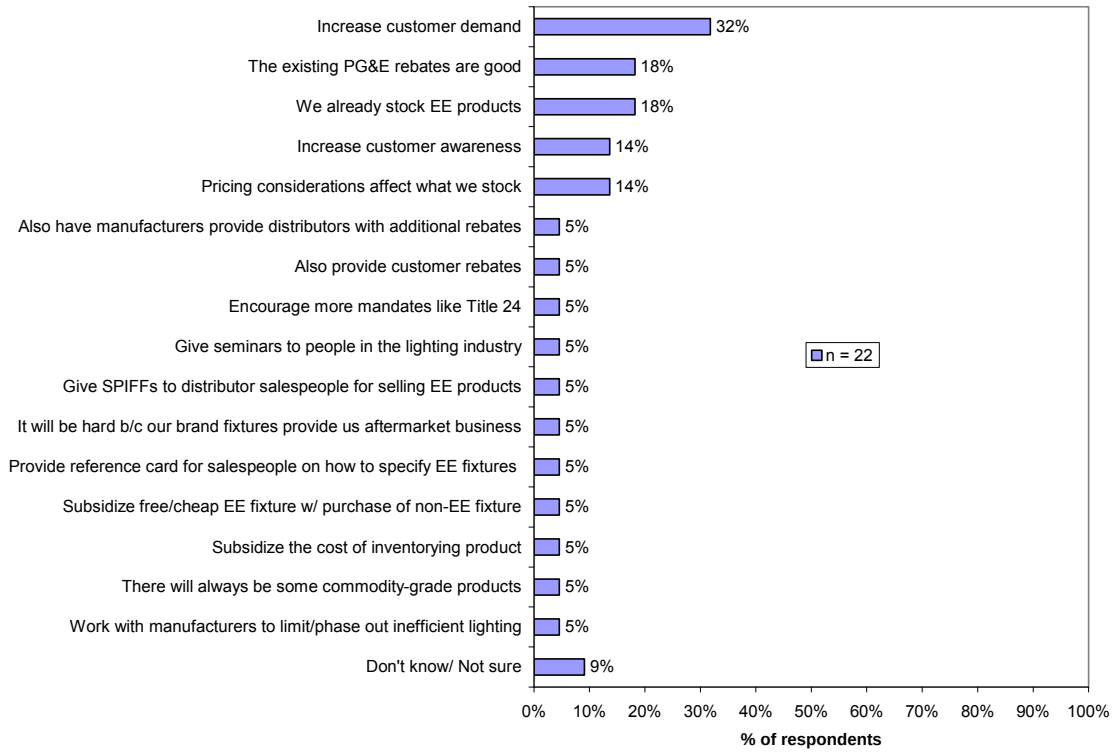
We then asked the lighting distributor reps whether their advice on what PG&E could do to help lighting distributors promote more energy-efficient lighting to contractors would vary depending on whether it was a new construction or retrofit job. Forty-percent said that their advice would be the same regardless of the scenario, while others said that PG&E would have to influence different market actors or it would be more difficult to influence the energy efficiency of new construction projects (Figure 3-24:). In terms of different market actors to affect, the distributor reps said that for new construction jobs PG&E should concentrate less on the electrical contractors or distributors and more on the builders, general contractors, architects, and specifying engineers.

Figure 3-24:
Whether Distributor Advice on What PG&E Could Do To Help Them Sell Energy-Efficient Lighting Would Vary Depending on Whether It Was New Construction or Retrofit



The lighting distributor reps were also asked how PG&E could influence their companies to stock and support energy efficient fixtures. Figure 3-25: shows that about a third of them said that they stock what their customers demand and therefore they encouraged PG&E to create more demand for the energy-efficient products. Others said that they already stock energy-efficient products or they thought that PG&E's current rebate offerings were good.

Figure 3-25:
How PG&E Can Influence Distributors
To Stock and Support Energy-Efficient Fixtures



Note: Total exceeds 100% because some interviewees provided multiple responses.

The distributor reps also had a wide variety of other ideas on how PG&E could influence their companies to stock and support energy efficient fixtures. The following are clarifications and elaborations of some of the recommendations or comments that appear in Figure 3-25: .

- *It will be hard because our brand fixtures provide us aftermarket business:* "We're going to be biased, in other words, towards manufacturers that allow us to have some aftermarket, with regards to replacement ballasts, replacement lamps, and/or sellable lamps, separate

from the fixtures so we can turn a lamp inventory," noted on distributor rep. "So there are things that PG&E really doesn't have a lot of control over. You know, if you promote something that only Ford makes and you're a Chevy dealer, what the hell good is it, you know?"

- *Provide reference cards for salespeople on how to specify EE fixtures:* "I see leaflets and things like that that from PG&E and they're great," said one distributor rep. "But I can tell you what happens with them -- in a short period of time they get thrown away. I mean, if you see something like that, it's great, but, you know, pretty soon you want to get rid of it." "What some of these guys really need is," he said, "whether it be a desk mat or a laminated card – something that shows you how, in this situation … you select the right fixtures. I think something like that, a quick reference chart, would be one of the ways. Because, salesmen for distributors are going to look for the path of least resistance and the easiest thing there is. So one of the things PG&E can do is say, you know, in this application, you'd use a T5 high bay fixture. And that would make it much easier. A lot of guys are leery of it now because they don't know what to do."

- *Subsidize free/cheap EE fixture w/ purchase of non-EE fixture:* "Maybe if they had a program where if you order the old type they'll throw in a new one for free or at a large discount," said one distributor rep, "so they can become familiar with the new product."

- *Subsidize the cost of inventorying product:* "Most electrical distributors I don't think cater to the walk-in consumer market so whether we stock a product or not depends on how fast it moves and how much does it cost to inventory the product," said one distributor rep. "Possibly PGE subsidizing us stocking it and charging us only when we sell it - consignment sales or something like that."

3.24. Which EE Lighting Technologies PG&E Should Be Encouraging

We asked the lighting distributor reps whether there were any particular types of energy-efficient lighting that they would like to see PG&E help influence. Figure 3-26: shows that LED technologies were the most cited along with support for PG&E continuing its existing rebates of T5 and low-wattage T8 technologies. The following are clarifications and elaborations of some of the suggestions:

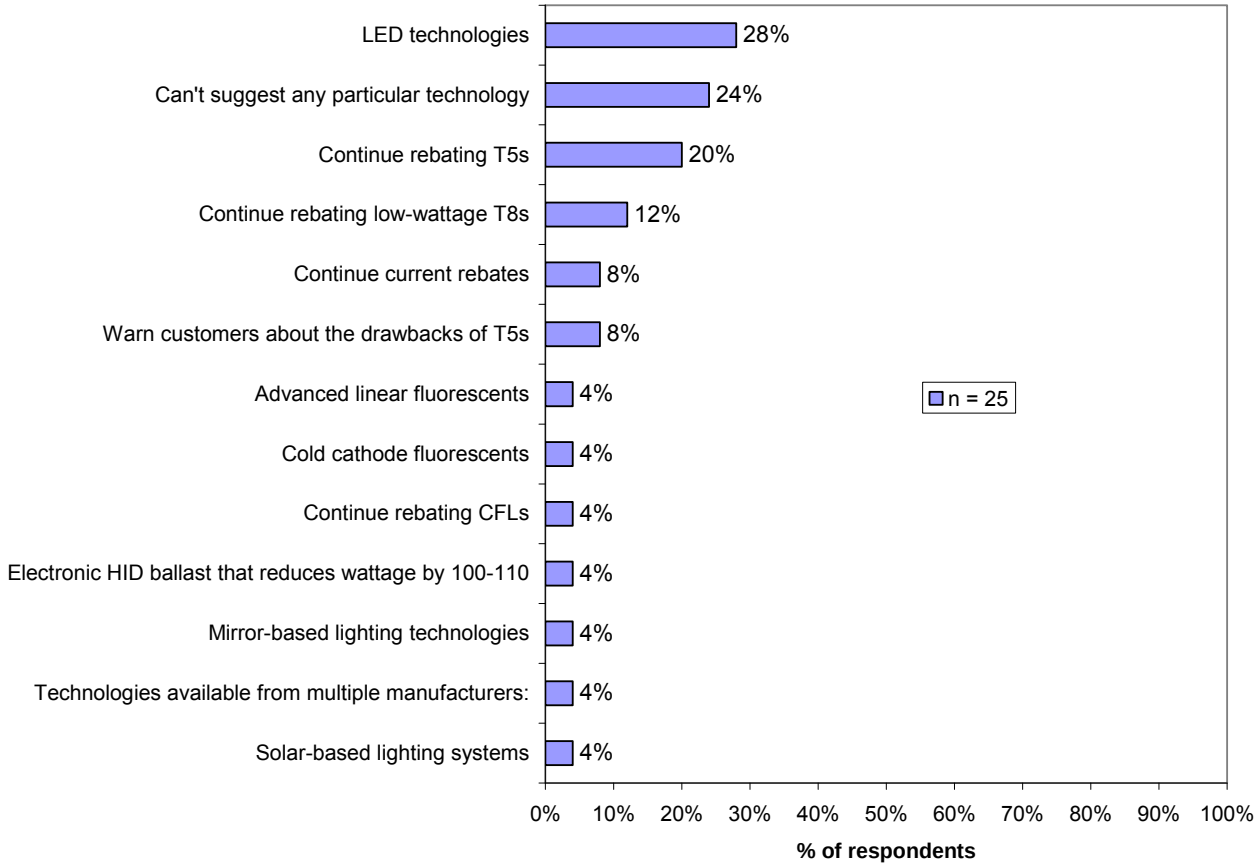
- *Warn customers about the drawbacks of T5s:* “I think too many of the utilities have jumped on the T5 bandwagon and aren't warning the customers about the effects of temperatures on the ballasts and the lamp output,” said one lighting distributor rep. “So I think there should more thought that this technology is great but there are drawbacks to it.” “Depending on the facility, sometimes going into a T5 high bay isn’t necessarily the best choice because of temperature or something like that,” said another distributor rep.

- *Electronic HID ballast that reduces wattage by 100-110:* “GE offers an electronic HID ballast that cuts the fan energy from a 400-watt metal halide down … about 100- to 110-watts per fixture. So it’s not as good as the T5 fluorescent … that goes to about 250 Watts. … But there are situations when that works better than a T5 high bay because of temperature and whatnot. So if there could be at least some rebate for [the HID ballast]. I mean it’s not the best solution as … a T5 would be, but at least it’s more energy-efficient than what they’re using.”

- *Mirror-based lighting technologies:* “Yes, buildings that harvest rays from sun off reflected mirrors,” explained one distributor rep. “Japan has some of these buildings. They focus light to a central point to light up an area whenever sunlight allows.”

- *Technologies that are available from multiple manufacturers:* “[PG&E should be promoting] the best available technology that is also available from … multiple manufacturer sources,” said one distributor rep. “There are some technologies for predominantly outdoor lighting that are proprietary -- only available from certain manufacturers. That makes it extraordinarily difficult for non-Philips or non-Sylvania distributors to compete. Which PG&E may really not care about, on the one hand, but as a GE distributor, we sure as heck care about it.”

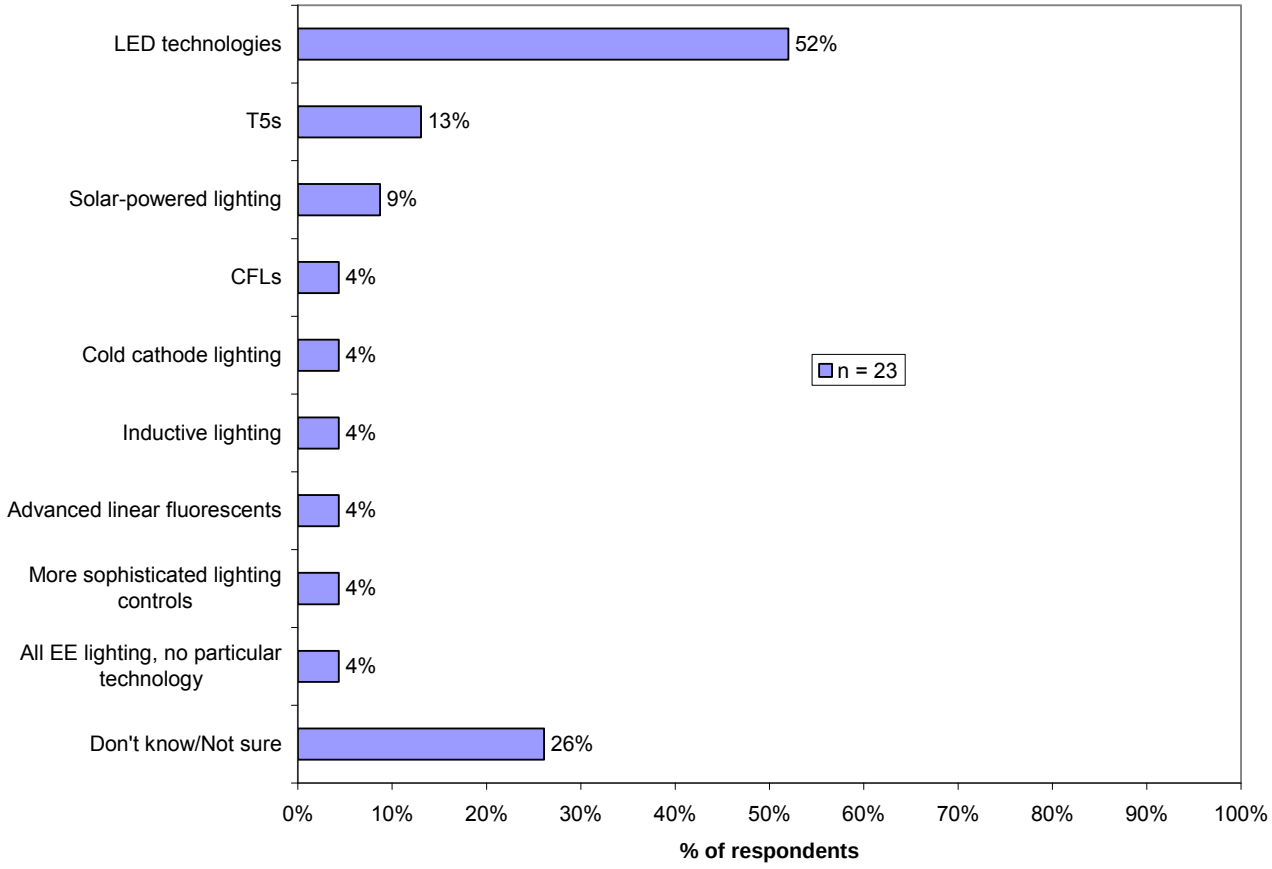
Figure 3-26:
Which EE Lighting Technologies
PG&E Should Be Encouraging



Note: Total exceeds 100% because some interviewees provided multiple responses.

We also asked the lighting distributor reps which new or emerging lighting technologies they think are the most promising. Over half of the respondents named LED technologies with T5s coming in a distant second (Figure 3-27:).

Figure 3-27:
Which EE Lighting Technologies
Are the Most Promising



Note: Total exceeds 100% because some interviewees provided multiple responses.

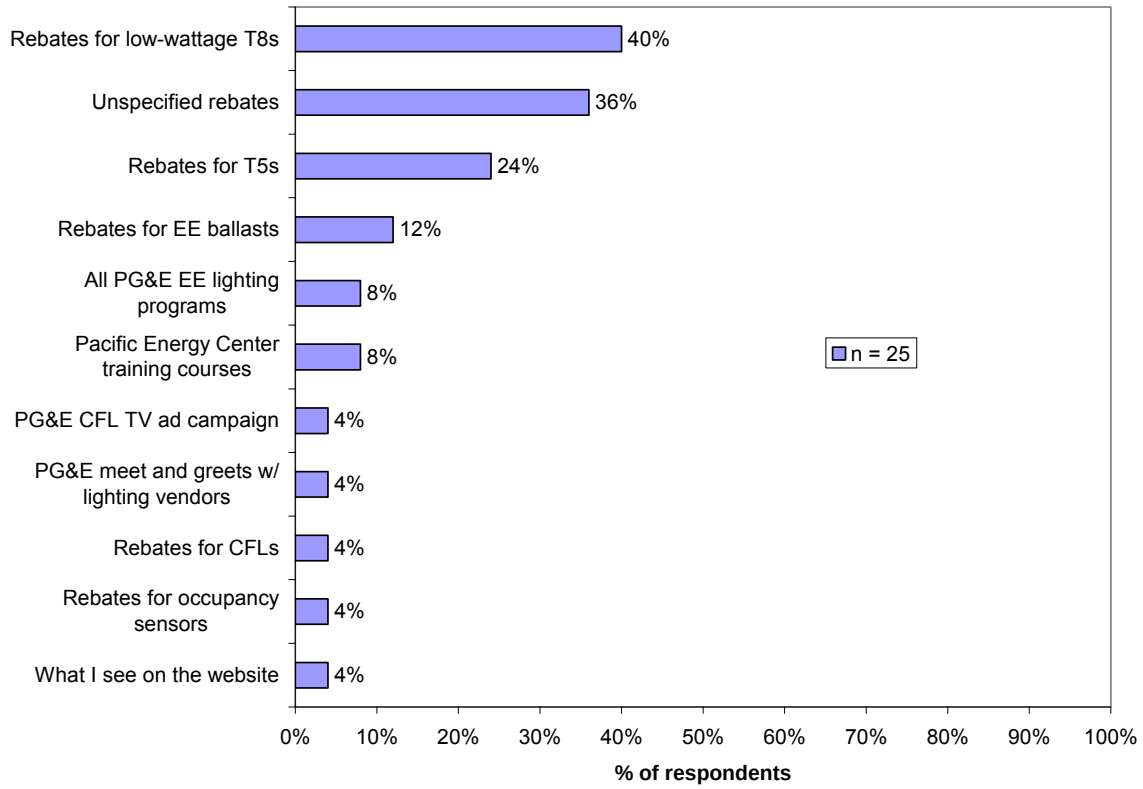
3.25. Distributor Awareness and Utilization of Energy-Efficient Lighting Programs, New Lighting Technologies

This section first discusses which PG&E energy-efficient lighting programs that lighting distributors are aware of. It then covers what sources lighting distributors typically use to keep abreast of new lighting technologies and design practices. The next subsection summarizes the degree to which these distributors are aware of some new lighting technologies and specify them in their projects. Finally the lighting distributor reps provide advice on how new energy-efficient lighting technologies can be encouraged.

3.26. Distributor Awareness of PG&E EE Lighting Programs

We asked the lighting distributor reps which programs or services offered by PG&E to help promote energy-efficient lighting they were aware of. Figure 3-28: shows that they were much more aware of the PG&E's rebate programs than they were of the utility's education or training efforts.

Figure 3-28:
Which PG&E Programs or Services To Help Promote EE Lighting Distributors Are Aware Of

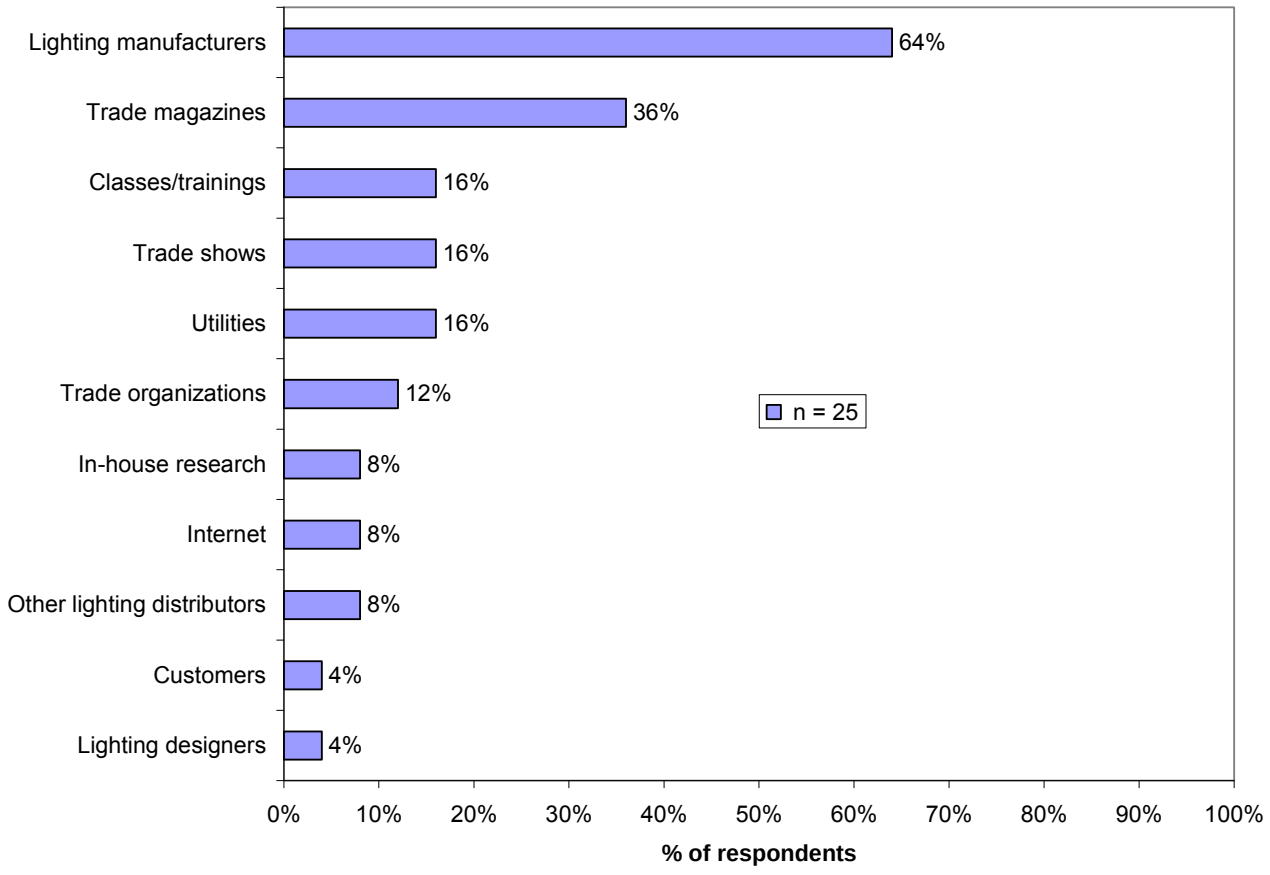


Note: Total exceeds 100% because some interviewees provided multiple responses.

3.27. Distributor Sources for Information on New Lighting Technologies

We asked the lighting distributor reps what sources they typically use to keep abreast of new lighting technologies and design practices. Nearly two-thirds cited lighting manufacturers as a source for this sort of information, with trade magazines being the second most-cited source (Figure 3-29:). Only 16 percent cited utilities as an information source.

Figure 3-29:
Distributor Sources for Information
On New Lighting Technologies and Design Practices



Note: Total exceeds 100% because some interviewees provided multiple responses.

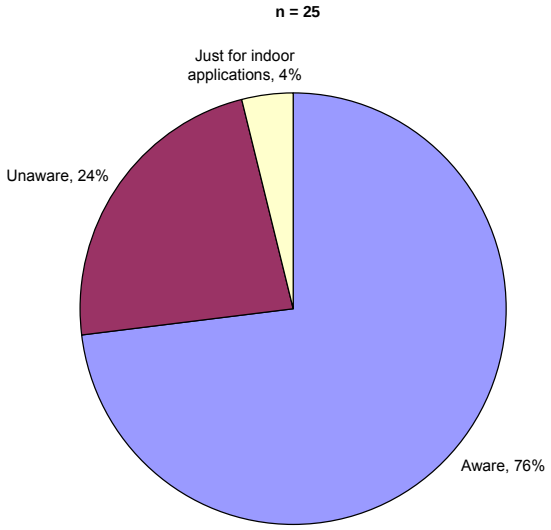
3.28. Distributor Awareness/Sales/Specification of New EE Lighting Technologies

3.28.1. Distributor Awareness/Specification of New CFL Fixture Families

The PG&E lighting staff was interested in knowing how aware the lighting distributors were that lighting manufacturers, in response to initiatives such as Lighting for Tomorrow, were now producing entire families of CFL fixtures for both indoor and outdoor residential applications. They also wanted to know how many of these lighting manufacturers were specifying these fixtures. Finally they wanted to know if the distributors receive the *Lighting Tomorrow* catalog.

Figure 3-30: shows that over three quarters of the lighting distributors were aware of these fixture families. Of those who were aware of the fixtures families, 69 percent said that they either specify or supply them. Most of the distributor reps who were aware of the fixture families but do not specify or supply them said that they simply do not work much with CFL fixtures. None of the lighting distributor reps said that they receive the *Lighting Tomorrow* catalog, although all but two of them were interested in receiving the catalog.

Figure 3-30:
Distributor Awareness
That Lighting Manufacturers Are Producing
Entire Families of CFL Fixtures for Indoor/Outdoor Residential Applications

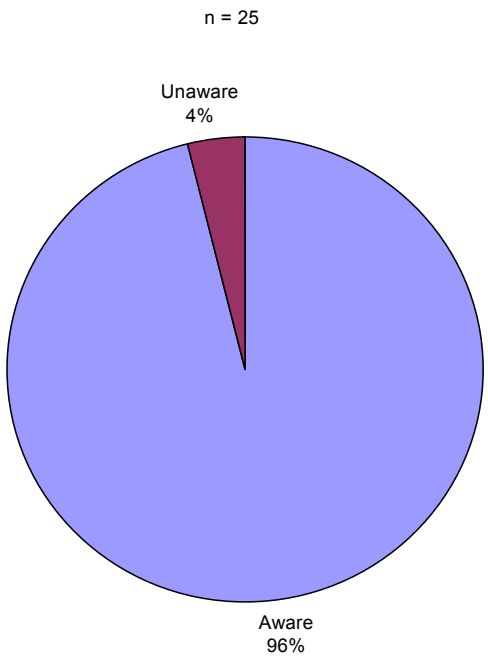


3.28.2. Distributor Awareness/Specification of High-Performance T5, T8 Recessed Fixtures

The PG&E lighting staff was also interested in knowing about how aware the lighting distributors were of high performance T5 and T8 recessed fixtures such as the Lithonia RT5 or the MetaLux Accord. They also wanted to know if the lighting distributors specified these fixtures for any of their projects.

Nearly all of the lighting distributors were familiar with these recessed fixture types (Figure 3-31:), although two acknowledged that they were familiar with the Lithonia RT5 but not the MetaLux Accord. Seventy-two percent of the lighting distributors who were aware of these fixtures said that they sold or specified them.

Figure 3-31:
Distributor Awareness
of High-Performance T5, T8 Recessed Fixtures

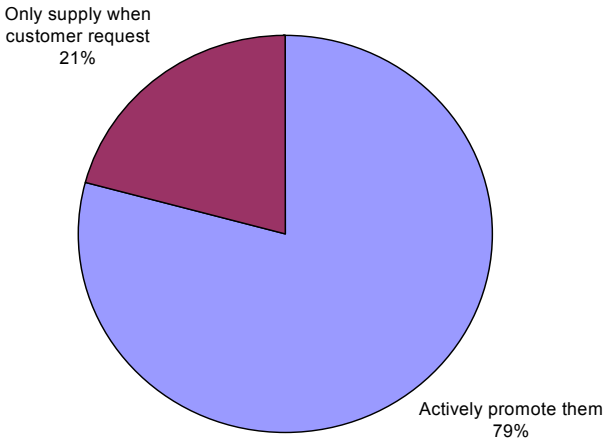


3.28.3. Sales and Promotion of Lighting Controls

The lighting distributor reps were asked whether they sell lighting controls such as occupancy sensors and automatic timers. If they did sell these, then we asked them whether they actively promote them or only supply them if a customer requests them. Figure 3-32: shows that the large majority of distributor reps claimed that their companies actively promote these controls. We asked those distributor reps who do not actively promote these lighting controls why they do not do so. Most said it was because they do not much lighting specification and they leave the decision to use lighting controllers up to the electrical contractor or other person responsible for specification.

Figure 3-32:
Distributor Promotion
of Lighting Controls

n = 24



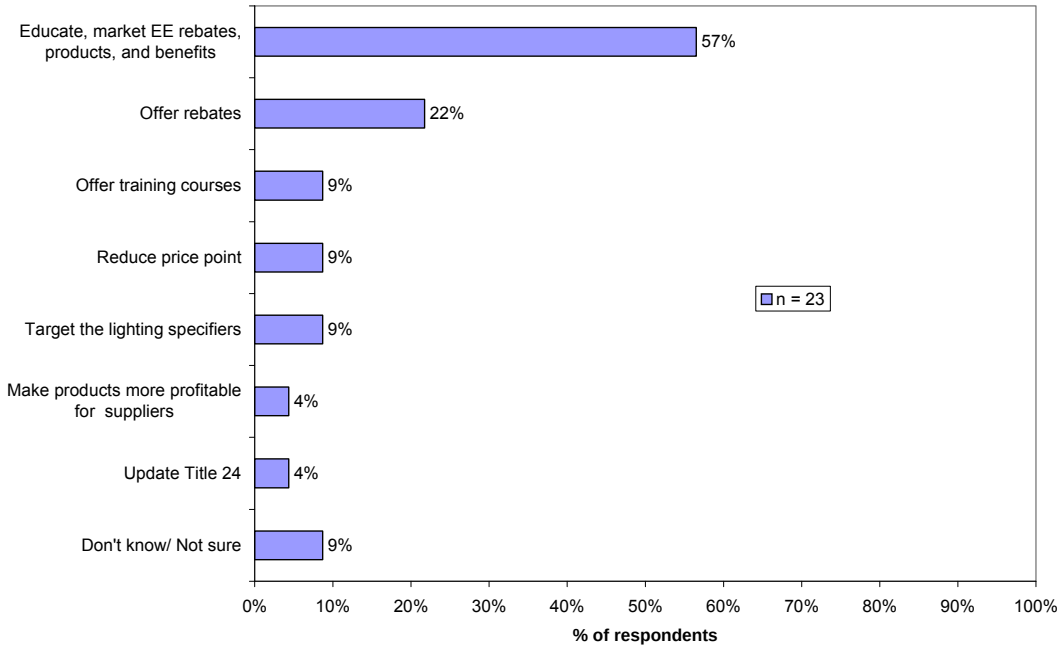
3.28.4. Variable Speed Drives

The PG&E staff was also interested in knowing how many of the lighting distributors sold variable speed drives (VSDs) and their awareness that PG&E offered rebates for VSDs. Seventeen of the twenty-five lighting distributor reps said that their companies sell VSDs, but four of them said that the quantity was very small. Of the lighting distributor reps who sold VSDs, only four (21%) were aware that PG&E offered rebates for VSDs.

3.29. Ways That New Lighting Technologies Can Be Encouraged

We asked the lighting distributor reps how new energy-efficient lighting technologies could be encouraged. Over half of them (Figure 3-33:) said that there needed to be more marketing and education to build awareness of the energy efficient lighting products that were available, their benefits, and the rebate programs that make them more affordable. The need to educate consumers about the long-term cost savings of energy-efficient lighting products was cited by a number of distributor reps. “Increase awareness of cost savings,” said one distributor rep. “People aren’t aware that paying more for a fixture or bulb will result in saving more money down the road.” Others thought that market actors in the lighting supply business also needed more education. “Making sure that all the information is there, making sure it’s easy for everyone to understand how much is available, how to get it, where to get it, how to apply for it -- I think that would go a long way,” said one distributor rep.

Figure 3-33:
How New EE Lighting Technologies
Can Be Encouraged



4. Evaluation of the Change-a-Light Campaign

4.1. Background

4.1.1. PG&E's Change a Light Campaign

According to PG&E's Mass Markets program staff, PG&E gave away approximately 1.1 million CFLs during the fourth quarter of 2007 through hundreds of giveaway events in its service territory. The giveaways were tied to the eighth annual Change a Light, Change the World national campaign sponsored by the U.S. EPA's ENERGY STAR® program.

PG&E developed the concept for the CFL giveaway events as part of a proposal to the national ENERGY STAR program. PG&E proposed to host the ENERGY STAR Change a Light bus at an event in San Francisco as part of the 2007 ENERGY STAR Change a Light bus tour. ENERGY STAR's request for proposals required event hosts to distribute free ENERGY STAR CFLs to event attendees.

The ENERGY STAR bus is an interactive mobile education center that traveled to 16 different events in 10 cities over a period of 20 days during the fall of 2007. Inside the bus, ENERGY STAR presented interactive displays to help consumers learn about energy-efficient lighting and additional steps they can take to fight global warming. The bus tour events were designed to partner with local event hosts (such as PG&E) to engage the media and the general public. ENERGY STAR's goal of was to "[inspire] Americans nationwide to join the fight against global climate change today, starting by 'changing a light'."

During the proposal process, PG&E's Mass Markets team decided to broaden the reach of Change a Light message and to keep the national bus tour's momentum going locally by launching its own campaign within PG&E's service area. The campaign involved partnerships with local organizations to distribute CFLs through a number of other giveaway events within PG&E's service territory. ENERGY STAR accepted PG&E's proposal, and PG&E hosted the ENERGY STAR Change a Light bus on October 4, 2007 as part of a 5-hour energy fair that took place outside of a Safeway store in the city's Marina district.

4.1.2. Goals

According to Mass Markets program staff, PG&E had multiple goals for the CFL giveaways associated with its 2007 Change a Light campaign:

1. **Acquire energy savings**. PG&E intends to claim savings for CFLs distributed through the giveaways.

2. **Expand the reach of Change a Light campaign messaging**. PG&E broadened the scope of its initial proposal to the ENERGY STAR program to reach communities that would not have access to the main bus tour event in San Francisco.

3. **Introduce CFLs to current non-users**. PG&E wanted to reach customers who had never tried CFLs before and give them the opportunity to do so free of charge.

4. **Associate PG&E brand with the free CFLs**. PG&E wanted CFL recipients to understand that PG&E was providing the free CFLs.

5. **Deliver high-efficacy CFLs to ensure customer satisfaction.** To address consumer dissatisfaction with CFL color and brightness, PG&E distributed free ENERGY STAR CFLs with higher efficacy levels than required by the ENERGY STAR criteria.

6. **Communicate information regarding CFL recycling to consumers.** Many giveaway events provided CFL recipients with materials explaining how to properly dispose of CFLs.

4.1.3. Change a Light Giveaways

PG&E partnered with a number of event organizers (such as local governments, the Sierra Club, and community groups) that hosted CFL giveaways as part of PG&E's Change a Light campaign. At each event, organizers asked recipients of the free CFLs to pledge to take their CFL home and install it. Event organizers also asked CFL recipients to fill out pledge forms that collected the customer's name, address, telephone number, and email address.

The giveaways took many forms. In some cases, the giveaways were one component of "energy awareness" events throughout PG&E's service territory, while others were held at senior centers, retail store parking lots, and various community events. Many CFL giveaways were part of a larger event such as a town fair, business meeting, or sporting event, and in other cases, the CFL giveaway was a stand-alone event such as special tables set up on college campuses or at hospitals. Other CFL delivery mechanisms included direct installation of CFLs in PG&E customers' homes and door-to-door giveaways (in which a CFL or CFLs were left at people's homes for them to install themselves). PG&E also made free CFLs available to its

customers at local payment offices. Additional details on event types are provided in the Sample Design section below.

4.1.4. Tracking Data

Event organizers were responsible for distributing the free CFLs at the various events and for reporting to PG&E details regarding the number of CFLs received and distributed as part of a "post-event evaluation form." PG&E asked the event organizers to return their completed post-event evaluation forms to PG&E along with the signed pledge forms.

PG&E maintained an ever-growing database of events and attempted to track the number of CFLs distributed through each event and the number of pledges received. Although PG&E attempted to obtain the post-event evaluation forms and pledge forms, they were not always successful. Additionally, there were some cases in which event organizers do not appear to have collected pledge forms, but it is difficult to judge the magnitude of these instances. As of January 2008, the events database included 1,243 events, and less than half include details regarding the number of CFLs distributed.

PG&E also maintained paper files for each of the giveaway events. Each file included (when available) the post-event evaluations and pledge forms from the event organizers as well as photos of the events. PG&E staff randomly selected a minimum number of pledge forms from each event where available and entered customer contact information from the forms into a database for submission to EPA. The pledge database included 26,451 pledges, most with details on event name and date. However, many pledges had incomplete contact information (e.g., missing name, address, city, and/or phone number).

4.2. Process Evaluation

4.2.1. Overview

PG&E hired KEMA, Inc. to conduct a process evaluation of its 2006/2008 Mass Markets programs. The CFL giveaways represent an enormous undertaking for PG&E, and also represent a new approach to distributing CFLs to consumers. Additionally, these CFLs represent significant energy-savings potential. For these reasons, PG&E's Mass Markets team expressed interest in understanding the effectiveness of these events and the rate at which the free CFLs are being installed by recipients.

To this end, KEMA proposed surveys of individuals who received free CFLs through the giveaways. The main objectives of the survey were to:

- Assess customer recall of the free CFLs and the other event materials;
- Gauge consumer recognition of PG&E as the sponsor for the free CFLs; and
- Determine installation and storage rates among recipients of the free CFLs.

4.2.2. Sample Design

KEMA staff examined PG&E's database of events to assess the range of CFL distribution methods and event types represented in PG&E's Change a Light CFL giveaway campaign. As of January 2008, the database included 1,243 separate events. KEMA staff assigned one of eight "event types" to each of the events, including the following:

- **CBO.** Events organized by community-based organizations such as Rotary Clubs.
- **Community.** Events open to the public.
- **Employee.** Events organized by employers through which CFLs were distributed to employees.
- **College.** Events at which the majority of CFL recipients were college students (such as events held on college campuses).
- **Local office giveaway.** CFL giveaways at PG&E's local payment offices.
- **Retail.** Events sponsored by retail stores such as Safeway and Lowe's. Many of these events were held in the store parking lots.
- **Scouts.** Events organized by Girl Scouts of America and Boy Scouts of America. In many cases the scouting groups partnered with other organizations within the community (e.g., church groups) to distribute the CFLs.
- **Other.** All other event types.

It is important to note that PG&E partnered with Local Government Partnership (LGP) programs within its service territory to distribute CFLs through several events. These events are not

classified as a separate event type, however, because these events took many forms (e.g., community, college, retail, and so on). PG&E also partnered with the Sierra Club to distribute a number of events, but again, these events took many forms and were thus classified into one of the eight categories described above.

In addition to assigning an event types to each event, KEMA staff also assigned a unique identification number (Event ID). We then linked each event's Event ID from the events database to the individual pledges in the pledge database, and assigned an event type to each pledge based on these linkages. In some cases, pledges in the pledge database could not be linked back to a specific event in the events database. In these cases, KEMA staff used information in the pledge database (e.g., event name) to assign an event type. Table 4-1 (below) shows the distribution of pledges by event type.

Table 4-1:
Process Evaluation Survey Sample Frame and Targeted/Completed Surveys by Event Type

Event Type	Total Number of Pledges in Pledge Database	Process Evaluation Survey Sample Frame	Targeted Number of Completed Surveys	Actual Number of Completed Surveys
Community	9,186	2,484	50	56
Scouts	3,824	1,875	50	52
Other	2,324	1,133	50	50
Employee	2,626	782	50	53
Retail	3,065	652	50	51
CBO	1,620	589	50	45
College	1,388	551	50	51
Local office giveaway	2,418	505	50	42
Total	**26,451**	**8,571**	**400**	**400**

We stratified the survey by event type to ensure that, to the extent possible; the completed surveys represent the wide range of events through which PG&E distributed the free Change a Light CFLs. Because the pledge database served as the sample frame for both the process and impact evaluations of the giveaways, the KEMA team was able to use approximately one-third of the 26,451 pledges in the database – 8,571 pledges in total – to support process evaluation efforts.

KEMA contracted with an outside survey research firm to conduct the surveys, and trained interviewers completed 400 surveys in early May 2008. We attempted to complete 50 surveys in each of the eight strata. Because of the small number of available contacts within some of the strata (e.g., CBO, local office giveaway), the actual number of completed surveys in most strata was slightly higher or lower than 50. Exhibit 1 shows the process evaluation survey sample frame as well as the targeted number of completed surveys and number of completes by event type.

4.3. Key Findings

- **Respondent demographics.** Respondent education and income levels among Change a Light survey respondents is very similar to those of recent CFL purchasers identified in 2007 as part of the evaluation of the 2004/2005 Statewide Residential Retrofit Single-Family Energy-Efficiency Rebate (SFEER) Program. Education and income distributions in both of these groups are also similar to that of the general population in PG&E's service territory as determined by the same study.

- **Giveaway sponsorship.** Nearly half of the survey respondents identified PG&E as the sponsor of the CFL giveaway (47%; n=400 respondents).

- **Source of giveaway event awareness.** Forty-five percent of survey respondents reported that they heard about PG&E's CFL giveaway as they were passing by (n=400), a significantly higher proportion than reported hearing about the event through any other source. Another 14 percent heard about the events through word of mouth (friends, family). The remaining respondents heard about the events in a variety of other ways.

- **Recall of Change a Light event promotional materials.**

    - *Event signage and information.* Fifty-three percent of survey respondents recalled having seen signs or information about CFLs, the giveaway, and/or giveaway sponsors when they received their free CFLs (n=400 respondents). Of those who recalled any promotional materials (n=195), 47 percent said they saw signs or information about CFLs, 21 percent said they saw information or signs about PG&E, and 19 percent said saw information or signs about saving energy.

    - *Giveaway materials*. Eighty-nine percent of survey respondents reported receiving something in addition to the free CFLs at from the giveaway event (n=400).

- Twenty-four percent of respondents reported receiving a brochure (about topics as varied as climate change, comparisons between CFLs and incandescent bulbs, Safeway's energy-related initiatives, and California Youth Energy Services);
- 20 percent reported receiving a plastic bag (many of the CFLs were distributed in plastic bags bearing the PG&E logo); and
- 13 percent said they received tips about saving energy (n=400).

- **Number of CFLs distributed (among survey respondents).** The 400 survey respondents reported receiving 735 CFLs through the giveaway events -- an average of 1.8 CFLs per respondent. Thirteen percent of respondents reported that more than one person in their households received CFLs at the same event.

- **CFL installation.** Of the 735 free CFLs received by survey respondents, 638 were discussed during the survey (87% of the total CFLs they received). Approximately 82 percent of these CFLs were reported as installed (n=638 CFLs). The overall installation rate from these surveys is slightly higher than is similar the 76 percent CFL installation rate determined by the 2007 evaluation of the 2004/2005 SFEER Program for recently-purchased CFLs.

  - Results suggest that installation rates decline somewhat as the number of free CFLs received by an individual increases. Reported installation rates were 85 percent for the first CFL (n=391 CFLs), 76 percent for the second (n=163 CFLs), and 73 percent for the third CFL (n=67 CFLs).

    - It is thus likely that the installation rate across all of the free CFLs is somewhat lower than the average installation rate of 82 percent obtained through the survey (because the survey asked only about the first three CFLs received by each respondent). In fact, a back-of-the-envelope calculation suggests that as recipients of the free CFLs received more and more bulbs, the overall installation rate declines and approaches the rate determined by the 2004/2005 Single Family study.

  - For the first CFL distributed to each recipient, those distributed through PG&E's local office giveaways had the highest reported installation rate of all event types (93 percent; n=42 CFLs). This was significantly higher than the installation rate for CFLs distributed through college events (76 percent; n=51 CFLs).

    - Installation rates for CFLs distributed through college events were among the lowest, presumably because many college students live in dormitories

in which they generally do not maintain their own lighting or pay electric bills (so they might be less likely to change light bulbs or be concerned about energy costs).

- The reported installation rate was significantly higher for CFLs distributed through events that recipients classified as "energy-related" (88%; n=220 CFLs) than for events that were not classified as energy-related (79%; n=317 CFLs).

- Ninety percent of the free CFLs installed by survey respondents were reported to be replacing incandescent bulbs (n=638 CFLs). Six percent reported that they replaced other CFLs. (The remainder replaced other bulb types – such as halogens – or did not know what type of bulb was replaced with the free CFL).

- Ninety-nine percent of the free CFLs installed by survey respondents were reported as installed in homes. Only one percent of the CFLs (three bulbs) were reported as installed in businesses.

- **CFL purchases:** Seventy-one percent of survey respondents report that they have purchased CFLs at some point in the past (n=400 respondents). Twenty-eight percent of respondents who received CFLs reported that they had never purchased them before. While it is possible that some fraction of these respondents have been exposed to CFLs through other mechanisms (e.g., received them for free through another giveaway program), it is likely that PG&E's Change a Light giveaways distributed CFLs to many individuals who had never before used them.

  - Roughly 1 out of 4 of the CFL recipients from PG&E's CFL giveaways reported that they had never purchased a CFL before, suggesting that PG&E introduced CFLs for the first time to roughly 250,000 of its customers.

  - The data suggest that the proportion of CFL recipients who had never before purchased CFLs was highest at CBO and local office giveaways (40 percent). These event types reached a significantly higher proportion of "new CFL users" than retail and employee events, suggesting that a focus on these types for future CFL giveaways may be the most effective way of reaching current non-users of CFLs.

- **CFL storage:** The overall CFL storage rate for CFLs discussed during the survey (n=638) is 12 percent. The storage rate is significantly lower for the first CFL (8%; n=391 CFLs) than for the second CFL (17%; n=163) or the third CFL (25%; n=67).
    - Because storage rates increase as the number of free CFLs increase, it is likely that the storage rate across all of the free CFLs is somewhat higher than the average of 12 percent obtained through the survey (because the survey asked only about the first three CFLs received by each survey respondent).
    - The CFL storage rate for recent CFL purchasers surveyed as part of the 2007 evaluation of the 2004/2005 SFEER Program was much higher (24%), but as described above, the 12 percent storage rate may be skewed somewhat low because the Change a Light process evaluation survey asked respondents about the first three CFLs received by each respondent). Again, a back-of-the-envelope calculation suggests that as recipients of the free CFLs received more and more bulbs, the overall storage rate increases and approaches the rate determined by the 2004/2005 Single Family study.
- **CFL removal:** Only one percent of CFLs received by survey respondents were reported as installed and then removed (n=621 CFLs).
- **CFL leakage:** Only one percent of the first, second, and third CFLs received by respondents were reported as given away to individuals who were not present at the giveaway events (n=638 CFLs). All but one of these recipients were reported to live within the state of California.
- **CFL satisfaction:** The survey asked respondents to rate their satisfaction with the free CFLs they received from PG&E on a scale of 1 to 10 where 1 means “not at all satisfied” and 10 means “extremely satisfied.” Fifty percent of respondents provided a rating of 10, and 79 percent provided a top 3-box rating (8, 9, or 10; n=333 respondents).
    - Satisfaction from the present survey is higher than from surveys conducted in support of the statewide evaluation of 2004/2005 SFEER program. In that study, only 26 percent of respondents provided a rating of 10, and 62 percent provided a top 3-box rating.

- Ninety-four percent of respondents who have one of more of the free CFLs installed in their homes as well as other CFLs report that they are equally or more satisfied with the free CFLs as compared to the other CFLs they have installed (n=238 respondents). Seventeen percent report that they are more satisfied with the free CFLs than with their other CFLs.

4.4. Detailed Findings

4.4.1. Respondent Demographics

We reviewed the demographic composition of respondents to our Change a Light process evaluation surveys for comparison with the demographics of recent CFL purchasers (n=756) and of the general population (n=2,511) surveyed in 2007 in support of the 2004/2005 Statewide Residential Retrofit Single-Family Energy-Efficiency Rebate (SFEER) Program evaluation. We attempted to compare these groups in terms of respondent age, education level, 2007 household income, and ethnicity. However, the 2004/2005 study did not collect data on respondent age (instead focusing on the number of people in the household of different age groups) and collected data on ethnicity in a different format. We thus compared age and income only and found that the Change a Light process evaluation survey respondents were demographically similar to recent CFL purchasers identified in the SFEER study as well as to the general population as described by that study in these respects. Table 4-2 and Table 4-3 provide additional detail.

Table 4-2:
Total Household Income Before Taxes, 2007

Income	Change a Light Campaign Process Evaluation Survey Respondents	SFEER Study Respondents	
		General Population	CFL Purchasers
Less than $20,000 per year	12%	8%	8%
$20,000-49,999	21%	19%	18%
$50,000-74,999	16%	21%	21%
$75,000-99,999	13%	12%	13%
More than 100,000	18%	19%	22%
Refused	16%	18%	16%
Don't know	4%	3%	2%
N	**400**	**2,511**	**756**

Table 4-3:
Highest Level of Education Completed by Survey Respondent
Giveaway Sponsorship

Education Level	Change a Light Campaign Process Evaluation Survey Respondents	SFEER Study Respondents	
		General Population	CFL Purchasers
High school or less	4%	4%	3%
High school graduate or GED	15%	18%	15%
Trade/technical school	3%	2%	2%
Some college	25%	26%	27%
College graduate	29%	29%	32%
Some graduate school	3%	2%	3%
Graduate degree	17%	16%	16%
Other	1%	-	-
Refused	3%	2%	2%
N	**400**	**2,511**	**756**

4.4.2. Giveaway Sponsorship

The survey asked respondents whether they recalled who sponsored the CFL giveaway. Seventy-nine percent of all respondents were able to identify at least one giveaway sponsor (Table 4-4), and thirty-one percent reported more than one. Nearly half of the respondents correctly identified PG&E as a giveaway sponsor (47%).

This proportion of respondents who identified PG&E as a sponsor may be affected by at least two factors:

1. **Varying prominence of the PG&E brand.** The extent to which PG&E's brand was advertised at the giveaways likely varied among the various event types, as did the extent to which CFL recipients noticed the PG&E brand. For example, some of the giveaways may have featured PG&E signage prominently, while such materials may have been entirely absent from other giveaways. Even if present and prominent, PG&E signs and other materials may have gone unnoticed (see "Recall of Change a Light event promotional materials" section below).

2. **Possible confusion among survey respondents regarding the "CFL giveaway sponsor" versus the "event sponsor."** As described above, some of the CFL giveaways took place as part of larger events (e.g., town fairs, club meetings) sponsored

by organizations other than PG&E. Although the phrasing of the survey question was intended to elicit responses regarding the giveaway sponsor, it is likely that some proportion of respondents reported the sponsor of the larger event (e.g., the organization responsible for the fair or meeting).

Given the first of these factors, it is difficult to determine whether the 47 percent who identified PG&E as the giveaway sponsor represents a positive, negative, or neutral finding. In other words, if we could state conclusively that every giveaway prominently featured PG&E signage and information; one might expect a higher percentage of respondents to identify PG&E as the giveaway sponsor. However, if few events prominently featured the PG&E brand, this proportion may be higher than expected. In either case, given the possible confusion between the event sponsor and giveaway sponsor, the results showing that 47 percent of respondents identified PG&E as the giveaway sponsor is likely a positive indication regarding the presence of PG&E's brand at the giveaways.

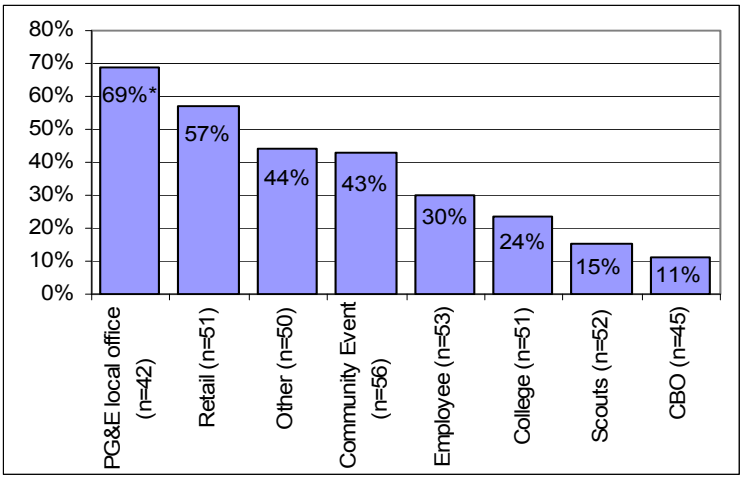
With the exception of respondents who received free CFLs at retail events, a significantly higher proportion of those who received their free CFLs through PG&E's local offices correctly identified PG&E as the giveaway sponsors (69%) than respondents who attended other event types (Exhibit 5). It is likely that the location of these giveaways in PG&E's offices aided participants in recalling the giveaway sponsor.

Table 4-4:
Reported Giveaway Sponsors

*Event Sponsor	n	%
PG&E	187	47%
School	36	9%
Girl Scouts	31	8%
Retailer	24	6%
Employer	16	4%
Church	10	3%
Community group	15	4%
Sierra Club	4	1%
Other sponsor	44	11%
Don't know	84	21%
Total respondents	**400**	*

* Multiple responses allowed. Responses may total greater than 100 percent.

Table 4-5:
Respondents Who Identified PG&E as Giveaway Sponsor by Event Type



* Difference from percentage who identified PG&E as sponsor among other event types (except retail) is statistically significant.

4.4.3. Source of giveaway event awareness

When asked how they heard about the CFL giveaway or the free CFLs, 45 percent of survey respondents' report that they were just passing by, a significantly higher proportion than reported any other source of awareness (Table 4-6). Respondents reported word of mouth as the awareness source with the second-greatest frequency (14 percent). Seven percent of respondents reported that they heard about the event from PG&E. "Other sources" include property management companies, churches, retailers, and others.

Table 4-6:
Reported Source of Awareness of CFL Giveaway Events

Source of Awareness	n	%
Just passing by	179	45%
Word of mouth (friend/colleague/family member)	56	14%
From my employer	33	8%
PG&E	29	7%
Media (newspaper, television, radio)	18	5%
School	17	4%
Girl Scouts	14	4%
Someone came to my home	12	3%
Other source	32	8%
Don't know	10	3%
Total respondents	**400**	**100%**

4.4.4. Recall of Change a Light event promotional materials

Signs and information. Overall, 53 percent of survey respondents recalled having seen signs or information about CFLs and/or event sponsors when they received their free CFLs (n=400). Of those who recalled any promotional materials (n=195), 47 percent said they saw signs or information about CFLs, 21 percent said they saw information or signs about PG&E, and 19 percent said they saw information or signs about saving energy (Table 4-7).

The process evaluation survey asked respondents whether the event at which they received their free PG&E CFLs as an “energy-related” event. A significantly higher percentage of respondents who said they attended energy-related events reported that they recall having seen signs or information about CFLs at the event than those who reported that they attended non-energy events – 63 percent (n=145) versus 48 percent (n=197), respectively. These results are somewhat intuitive, as coordinators of energy-related events may be more likely to display energy-related signage than coordinators of other event types.

Table 4-7:
Reported Content of Event Signage and Information

Content	n	% of Respondents Who Recall Any Signs/Info
CFLs	47	24%
PG&E (unspecified information)	40	21%
Saving energy	37	19%
PG&E programs/energy efficiency programs	7	4%
ENERGY STAR	6	3%
PG&E bus	6	3%
Girl Scouts/Boy Scouts	4	2%
Solar power	2	1%
Other content	40	21%
Don't know	44	23%
Total respondents	**195**	*

* Because multiple responses were allowed, responses may total greater than 100 percent.

Giveaway materials. Eighty-nine percent of survey respondents reported that they received something in addition to the free CFLs at from the giveaway event (only 11 percent report having received the CFLs only; see Table 4-8).

- Twenty-four percent of respondents reported that they received a brochure (about topics as varied as climate change, comparisons between CFLs and incandescent bulbs, Safeway's energy-related initiatives, and California Youth Energy Services);
- 20 percent report having received a plastic bag (with the CFL inside) ; and
- 13 percent report having received tips about saving energy.

Materials in the "other materials" category included magnets, wheels showing energy costs for different appliances, flashlights, pens, and so on.

Table 4-8:
Materials Distributed at CFL Giveaways

Giveaway materials	n	%
CFLs only	43	11%
Brochure (unspecified content)	94	24%
Bag	81	20%
Tips for saving energy	50	13%
Guide showing how to choose a CFL	24	6%
Rebate booklet/Smart Home rebate booklet	19	5%
ENERGY STAR brochure	11	3%
Other materials	70	18%
Don't know	84	21%
Total respondents	**400**	*

* Because multiple responses were allowed, responses may total greater than 100 percent.

4.4.5. Number of CFLs Distributed (among survey respondents)

The 400 survey respondents reported that they received 735 CFLs through the giveaway events. Forty-three percent of respondents reported that they received two or more CFLs (from one event each), and 18 percent reported that they received more than two CFLs. On average, each survey respondent received 1.8 CFLs from each of the events. Thirteen percent of respondents reported that more than one person in their households received CFLs at the same event (up to five people per household).

The PG&E Change a Light CFL Giveaway Process Evaluation Survey asked each respondent to indicate how many total CFLs he or she received through a particular giveaway event. Although survey respondents reported that they received up to 10 CFLs each, the survey elicited detailed information regarding CFL disposition for up to three CFLs per respondent (regardless of the total number of CFLs received). Of the 735 free CFLs received by survey respondents, 638 were discussed during the survey (87% of the total CFLs they said they received).

4.4.6. CFL Disposition

Installation. Of the 638 CFLs discussed during the surveys, approximately 82 percent of these CFLs were reported to be installed by survey respondents. The overall installation rate from these surveys is similar to the 76 percent CFL installation rate determined by the recent evaluation of the 2004/2005 Statewide Residential Retrofit Single Family Single-Family Energy Efficiency Rebate Program Evaluation for CFLs purchased during 2004 and 2005.

Installation rates declined as the number of free CFLs received by an individual increased. Reported installation rates were 85 percent for the first CFL, 76 percent for the second, and 73 percent for the third CFL (Exhibit 9). Thus, it is likely that the installation rate across all of the free CFLs is somewhat lower than the average installation rate of 82 percent (because the survey asked only about the first three CFLs received by each respondent).

Storage. The average storage rate across the 638 free CFLs discussed during the survey was 12 percent. Not surprisingly, the storage rate for the free CFLs increased as the number of free CFLs increased. Table 4-9 shows that the storage rate for the first free CFL received by survey participants is approximately eight percent, significantly lower than for the second and third CFLs (17% and 25%, respectively).

Removal. One percent of survey respondents reported that they installed and then removed one or more of the free CFLs they received from PG&E giveaways. The same proportion reported that they gave one or more of the free CFLs away to someone else.

Table 4-9:
CFL Disposition – Overall and by CFL Number

Disposition	CFL Number			All PG&E Giveaway CFLs
	One	Two	Three	
Installed it	85%*	79%	73%*	82%
Storing/saving it	8%†	17%	25%	12%
Gave it away	2%	1%	-	1%
Installed and then removed it	1%	1%	-	1%
Other	2%	-	-	1%
Don't know	3%	3%	2%	3%
Total CFLs	**391**	**163**	**67**	**621**

Difference between results is statistically significant.
† Storage rate for the first free CFL received by each survey respondent is significantly lower than for the second or third free CFL.

Installation rates by event type. As described above, installation rates for each of the free CFLs distributed through PG&E's CFL giveaways differ depending on the number of CFLs received by the event attendee. Results also suggest differences in installation rates by event type; Table 4-10 shows the installation rates for the first CFL distributed through each of the eight event types. As shown, CFLs distributed through PG&E's local office giveaways had the highest reported installation rate of all event types (93 percent). This is significantly higher than the installation rate for the first CFL distributed to respondents through college events (76 percent). Installation rates for CFLs distributed through college events were among the lowest,

presumably because many college students live in dormitories in which they generally do not maintain their own lighting or pay electric bills (so they thus may be less likely to change light bulbs or be concerned about energy costs).

Table 4-10:
CFL Installation Rates for First CFL by Event Type

Event Type	First CFL		All PG&E Giveaway CFLs	
	%	n CFLs	%	n CFLs
Local office	93%*	42	86%	70
Employee	91%	53	89%	65
Other	90%	50	88%	86
Retail	86%	51	86%	74
CBO	83%	40	77%	69
Scouts	83%	52	76%	104
Community	79%	52	77%	79
College	76%*	51	78%	74
Total CFLs	**85%**	**391**	**82%**	**621**

* Difference between results is statistically significant.

Installation rates by event classification (energy-related events). As noted, when asked whether the event at which they received their free PG&E CFLs was an “energy-related” event, 39 percent of respondents reported that the event was energy-related (n=373). Across all CFLs distributed through energy-related and non-energy-related events, the reported installation rate is significantly higher for CFLs distributed through events that recipients classified as "energy-related" (88%) than for events that were not classified as energy-related (79%; Table 4-11).

Table 4-11:
CFL Installation Rates by Event Classification
(Energy-Related Events vs. Non)

Event Classification	All PG&E Giveaway CFLs	
	%	n CFLs
Energy-related event	88%*	220
Non-energy-related event	79%*	317
Total CFLs	**82%**	**621†**

* Difference between results is statistically significant.

† Overall n is greater than sum of energy- and non-energy-related n’s because some respondents were unsure whether their events were energy-related.

Other CFL installation findings.

- According to respondents, 90 percent of the free CFLs installed by survey respondents replaced incandescent bulbs (n=638 CFLs). Six percent reported that they replaced other CFLs, and the remainder either replaced other bulb types (e.g., halogen) or did not know what type of bulb they replaced with the free CFL.

- Respondents report that 99 percent of the free CFLs installed by survey respondents were installed in their homes. They report that only one percent of the CFLs (three bulbs) were installed in businesses.

- Thirty-five percent of the free PG&E giveaway CFLs installed by survey respondents were installed in living/family rooms (Table 4-12). Bedrooms and kitchens were also fairly popular installation locations, with 22 percent of free CFLs reported to be installed in bedrooms and 10 percent installed in kitchens. The 2007 onsite surveys of recent CFL purchasers conducted for the 2004/2005 SFEER Program evaluation found that these three room types were among the top four rooms within a home in which CFL saturation is highest in California.

Table 4-12:
Reported Room Types in Which Free PG&E Giveaway CFLs Were Installed

Room Type	n	%
Living/Family room	177	35%
Bedroom	109	22%
Kitchen	51	10%
Hallway	34	7%
Bathroom	32	6%
Porch	28	6%
Dining room	20	4%
Garage	9	2%
Laundry room	7	1%
Home office	5	1%
Closet	4	1%
Other room	9	2%
Don't know	14	3%
Total CFLs	**499**	

4.4.7. CFL removal

Ninety-four percent of the free CFLs installed by survey respondents were reported by respondents as “still installed” at the time of the process evaluation survey (n=638). The top reason for removing the other CFLs was that the bulb had burned out, and the majority respondents report that these CFLs were thrown in the trash.

4.4.8. CFL leakage

According to respondents, only one percent of CFLs they received were given away to other individuals (n=638 CFLs). Of the eight CFLs that were given away, respondents report that all but one were given to recipients who reported to live within the state of California. The CFL leakage rate thus appears low for CFLs distributed by PG&E through giveaway events. However, caution should be taken in interpreting these data as the number of CFLs represented by these figures is very small in comparison with the total number distributed.

4.4.9. CFL purchases

Seventy-one percent of survey respondents reported that they have purchased CFLs at some point in the past (n=400 respondents). Twenty-eight percent of respondents who received free CFLs through PG&E’s Change a Light giveaways report that they had never purchased CFLs before. While it is possible that some fraction of these respondents have been exposed to CFLs through other mechanisms (e.g., received them for free through another giveaway program), it is likely that PG&E’s Change a Light giveaways distributed CFLs to many individuals who had never before used them.

Non-Purchasers. The data suggest that the proportion of CFL recipients who had never before purchased CFLs was highest at CBO and local office giveaways (40 percent; see Table 4-13). These event types reached a significantly higher proportion of “new CFL users” than retail and employee events, suggesting that a focus on these types for future CFL giveaways may be the most effective way of reaching current non-users of CFLs.

Table 4-13:
Percentage of CFL Recipients Who Had Not Purchased CFLs Before the Giveaway Event by Event Type

Event Type	%	n CFLs
Local office giveaway	40%*	42
CBO	40%*	45
College	35%	51
Scouts	31%	52
Community Event	27%	56
Other	26%	50
Employee	19%	53
Retail	12%	51

* Difference from Employee and Retail events is statistically significant.

Purchase Timing. Of respondents who reported that they purchased CFLs, forty-five percent of respondents reported that they purchased CFLs within the past 6 months (Table 4-14). The vast majority of CFL purchasers (88 percent) reported that they purchased within the past 12 months. Thirty percent of respondents report that they have purchased CFLs since they received the free CFLs through PG&E's Change a Light giveaways.

Table 4-14:
Reported Timing of CFL Purchases Among CFL Purchasers

Most Recent CFL Purchase	N	%
Within the past 3 months	78	20%
3 to 6 months ago	104	26%
6 to 12 months ago or	63	16%
More than 1 year ago	33	8%
Never	113	28%
Don't know	9	2%
Total Respondents	**499**	**100%**

4.4.10. CFL storage

Sixty-six percent of respondents report that they are storing one or more CFLs (including any free CFLs they received through the PG&E giveaway events; n=400). Of respondents who reported that they are storing CFLs, two-thirds report that they are doing so to have them on hand to replace a bulb they have installed upon burnout (Table 4-15). Twenty-two percent of respondents who are storing CFLs report that they purchased more CFLs than they need.

Table 4-15:
Reported Reasons for Storing CFLs
Among Respondents Who Are Storing CFLs

Most Recent CFL Purchase	n	%
To have them if a bulb burns out	152	67%
Have more CFLs than I need	49	22%
Bought them on sale	11	5%
Can't/won't use them in certain applications (e.g., dimmer switches)	7	3%
Can't/won't use them in certain rooms	3	1%
All lamps already have CFLs	2	1%
Other reason	14	6%
Don't know	6	3%
Total Respondents	**244**	*

* Multiple responses allowed. Responses may total greater than 100 percent.

4.4.11. CFL satisfaction

The process evaluation survey asked respondents to rate their satisfaction with the free CFLs they received from PG&E on a scale of 1 to 10 where 1 means “not at all satisfied” and 10 means “extremely satisfied.” Fifty percent of respondents provided a rating of 10, and 79 percent provided a top 3-box rating (8, 9, or 10). Only 4 percent of respondents reported that they were dissatisfied with the free CFLs (rating of 1, 2, or 3). Sixteen percent provided ratings of between 4 and 7 (neutral), and the remaining 1 percent could not provide a satisfaction rating. These results show higher satisfaction levels than those from surveys conducted in support of the statewide evaluation of 2004/2005 SFEER program. In that study, only 26 percent of respondents provided a rating of 10, and only 62 percent provided a top 3-box rating.

Seventy percent of survey respondents who installed one or more CFLs from PG&E’s free CFL giveaway events report that they have other CFLs installed in their homes (n=400). Of these, 94 percent report that they are equally or more satisfied with the free CFLs as compared to the other CFLs they have installed. Seventeen percent report that they are more satisfied with the free CFLs than with their other CFLs (Exhibit 16).

Table 4-16:
Comparative Satisfaction with Free PG&E CFLs Versus Other CFLs Among Survey Respondents Who Have Free CFLs and Other CFLs Installed in Their Homes

Comparative Satisfaction	n	%
More satisfied with the free CFLs	40	17%
Equally satisfied with the free CFLs	184	77%
Less satisfied with the free CFLs	8	3%
Don't know	6	3%
Total Respondents	**238**	**100%**

4.5. Conclusions

Our conclusions based on the research are provided below.

1. One quarter of the CFL recipients at PG&E's Change a Light giveaways had never purchased CFLs in the past. While it is possible that some fraction of these respondents have been exposed to CFLs through other mechanisms (e.g., received them for free through another giveaway program or by friends and family), it is likely that PG&E's Change a Light giveaways distributed CFLs to many individuals who had never before used them. This is a significant finding given the broad reach of PG&E's upstream lighting promotion in terms of retail store types, geography, and price points.

2. CBO and Local Office events may be the most successful in reaching customers who have never purchased CFLs. These event types reached a significantly higher proportion of "new CFL users" than retail and employee events.

3. PG&E was moderately successful in getting CFL recipients to associate the PG&E brand with the free CFLs. Nearly half of the survey respondents reported that PG&E sponsored the CFL giveaway through which they received their free CFLs. Given the varying prominence of the PG&E brand across the various events and possible confusion among survey respondents regarding the "CFL giveaway sponsor" versus the "event sponsor," these results reflect positively on PG&E's efforts to get CFL recipients to associate PG&E as the provider of the free CFLs.

4. Installation rates for the CFLs distributed through PG&E's Change a Light Giveaways appear comparable to those distributed through the 2004/2005 upstream lighting promotion. According to respondents, approximately 82 percent of the CFLs distributed

through the giveaways were installed. Because this estimate is based on up to three CFLs received by each respondent and a small number of respondents received more than 3 CFLs, the overall installation rate is likely skewed a bit toward the high end. Even so, the overall installation rate among respondents appears similar to the 76 percent CFL installation rate determined by the 2007 evaluation of the 2004/2005 SFEER Program for recently-purchased CFLs.

5. CFL installation rates appear to decline slightly as the number of free CFLs by an individual increases. Although the survey did not address all of the free CFLs received by respondents, results suggest that installation rates are significantly higher for the first CFL than the third.

6. Installation rates are higher for events classified by respondents as “energy-related events” than for non-energy-related events.

7. Installation rates differ for CFLs distributed through the various event types. For the first CFL distributed to each recipient, those distributed through PG&E’s local office giveaways had the highest reported installation rate of all event types. Installation rates for CFLs distributed through college events were among the lowest, presumably because many college students live in dormitories in which they generally do not maintain their own lighting or pay electric bills (so they thus may be less likely to change light bulbs or be concerned about energy costs).

8. CFL recipients appear highly satisfied with the free CFLs. Although the survey did not ask specifically about satisfaction with CFL color and brightness, fully half of the survey respondents gave the highest possible general satisfaction rating to the free CFLs they received. Nearly all of the respondents report that they are at least equally satisfied with the free CFLs as with others they have in their homes, and nearly one in five respondents report that they are more satisfied with the free CFLs than with their other CFLs. These results suggest that PG&E may have been successful in addressing customer satisfaction concerns related to efficacy issues for the free CFLs; however, it is difficult to state this conclusively because the fact that the CFLs were free may have contributed to overall consumer satisfaction with the bulbs.

9. CFL recipients appear demographically similar to CFL purchasers and to the general population, at least as far as education and income are concerned.

4.6. Recommendations

To maximize the effectiveness of future CFL giveaways, we recommend the following:

1. Improve enforcement of requirement forms for all CFL recipients to fill out Change a Light pledge. To ensure accurate program tracking, PG&E should make additional efforts to require pledge forms for all CFL recipients. This requirement was in place for the 2007 giveaways but proved difficult to enforce because the majority of giveaways were run by other (non-PG&E) event organizers. In the future, PG&E may wish to consider having PG&E staff present at all giveaways to ensure proper pledge collection procedures.

2. Focus on giveaways through PG&E's local payment offices. The data show that these giveaways reached the highest proportion of new CFL users; had the highest reported installation rate of all event types; and were the most effective in terms of CFL recipient recognition of PG&E as provider of the free CFLs. Because these giveaways were conducted directly by PG&E staff, they also provide an opportunity to implement additional quality control procedures regarding the data collection process (i.e., direct enforcement of the requirement for each CFL recipient to complete a pledge form) and minimize implementation costs.

3. Improve CFL tracking procedures. Although PG&E's mass markets staff requested information from event organizers regarding the number of CFLs distributed at each event, staff did not anticipate the level of noncompliance among giveaway organizers experienced in 2007. For impact evaluation purposes, it will be of critical importance for PG&E to demonstrate where each CFL was shipped, how many of these CFLs were distributed, and the fate of any remaining CFLs. Again, having PG&E staff present at all giveaways may improve compliance with these data collection requirements.

4. Limit the number of free CFLs to one or two per household. The data suggest that CFL installation rates decline as the number of free CFLs per household increases, with highest installation rates for the first CFL received by each household. PG&E should make this per-household limit on CFLs explicit to event organizers. Presence of PG&E staff at events could help enforce this limit.

5. Continue to offer high-efficacy CFLs through PG&E giveaways. PG&E focused on providing high-efficacy CFLs through its giveaway events and satisfaction with the CFLs

was very high. Although it's possible that satisfaction with the free CFLs was high simply because they were free, the high-efficacy CFLs may also have positively affected customer satisfaction.

Recommendation number two above suggests that PG&E should focus on giveaways through its local payment offices. However, if PG&E wishes to continue its partnerships with other giveaway organizers, we also make the following recommendations:

6. Assign a PG&E staff person to each giveaway. As described above, PG&E should strongly consider having a PG&E staff member present at all giveaways to ensure proper data collection procedures. This will aid PG&E in obtaining disposition information for all CFLs distributed to an event site.

7. Focus on energy-related events. If PG&E wishes to continue to partner with outside organizations to hold giveaway events, PG&E should focus on events with an "energy theme" to maximize installation rates. The study found higher installation rates for energy-related events than for "non-energy events" such as town fairs, athletic events, and the like.

5. Evaluation of Pool Rebate Program, Pool Characteristics

5.1. Executive Summary

5.1.1. Background, Purpose, and Methodology

One of the most important purposes of this research task was to collect information on the typical pool characteristics, pool equipment types, and pool maintenance practices that currently exist in the PG&E service territory. PG&E program staff was interested in this information to better inform the development of new pool-related rebate offerings. Although the California Residential Appliance Saturation Survey (RASS) will provide some information about pool equipment, this information is not expected to be available until 2010 and will not contain the level of detail that the PG&E program staff was looking for.

Another important purpose of the participating contractor/retailer surveys was to assess participant satisfaction with the PG&E and SCE pool rebate programs. The PG&E general population contractor/retailer survey also collected information about awareness of the PG&E pool rebate program. Finally all the contractor/retailer surveys also collected information on awareness of pool professional training opportunities and market practices concerning the promotion of energy-efficient pool pumps.

The findings in this report come from the following three surveys:

- *Survey of participating PG&E and SCE pool contractors/retailers:* This in-depth survey was conducted with a random sample of 29 contractors/retailers participating in the PG&E pool rebate program and 30 contractors/retailers participating in the SCE pool rebate program. Trained KEMA staff administered this survey during the September/October 2008 period.

- *Survey of the general population of PG&E pool contractors/retailers:* This in-depth survey was conducted with a random sample of 31 pool contractors/retailers drawn from a pool services professionals list and a list of C-53 licensed contractors that were both provided by PG&E. Trained KEMA staff administered this survey during the September/October 2008 period. This survey was similar to the survey of participating contractors/retailers except that it did not ask any questions about satisfaction with rebate program processes.

- *Survey of residential PG&E customers with swimming pools:* We also surveyed 300 residential swimming pool owners in the PG&E service territory. The pool owners we surveyed came from a list of a of 2,500 pool owners that had been randomly selected by PG&E from a larger list of pool owners in its service territory. This survey was a Computer-Assisted Telephone Interviewing (CATI) instrument that was administered by Opinion Search Inc. The survey was fielded in December 2008.

5.1.2. Characteristics of the Pool Contractors/Retailers

KEMA asked the contractors/retailers a series of background questions to get a basic understanding of their business structure and practices.

- *Company size:* The average number of full-time employees per contractor/retailer across all companies was 8.0. However, if one outlier (250 employees) is removed, the average drops to 5.3 full-time employees. The median number of full-time employees was only three. Across all companies the average number of pools serviced annually was 599 pools with a median of 200 pools.

- *Company services and qualifications:* Almost all the PG&E contractors/retailers installed pool pumps and the large majority offered pool maintenance and cleaning services. About three quarters were C-53 licensed contractors. Forty-one percent of the PG&E participating contractors and 68 percent of the general population contractors built pools. Yet only about a quarter of the PG&E contractors/retailers had retail stores or showrooms. There was a much larger retailer representation in the SCE participant sample. This was likely because the SCE program offers point-of-sale pool pump rebates, which causes it to recruit and attract more pool retailers. Sixty-two percent of PG&E participating contractors/retailers, 61 percent of the PG&E general population contractors/retailers, and 33 percent of the SCE participating contractors/retailers claimed to belong to a pool trade association.

- *Use of pool professionals:* Only a third of the PG&E pool owners claimed to use a pool service/maintenance contractor. However, it is likely that many interpreted this to mean someone who comes on a regular basis -- e.g. they have a regular service contract with – as opposed to contractors they might use on an as-needed basis. Of those that used such contractors, the large majority got pool chemical services, more than half got cleaning services, and almost half got equipment maintenance services.

5.1.3. Awareness of the Rebate Program and Its Marketing Efforts

- *Awareness of the rebates:* Ninety-seven percent of both the participating and general population contractors/retailers claimed awareness of PG&E's $100 customer rebate for multi-speed pumps. Claimed awareness of the two PG&E rebates for trained contractors -- the $100 rebate for two-speed pool pumps and the $200 rebate for variable-speed pool pumps – was also high, although the participating contractors were more likely to claim awareness in these cases. The most cited sources of rebate awareness included manufacturing seminars, profession pool associations, PG&E seminars, and PG&E representatives.

- *Awareness of program promotional efforts:* Sixty-two percent of the participating contractors/retailers (n=29) and 58 percent of the general population contractor/retailers (n=31) claimed to be aware of PG&E efforts to promote greater use of multi-speed pool pump motors. When asked to name the promotional efforts they were aware of, nearly three quarters (72%) of the participating contractors/retailers and nearly half (47%) of the general population contractors/retailers named mailers or flyers. However, none of the PG&E participating contractors/retailers said they knew of any point-of-purchase signage that might be available for these rebates.

5.1.4. General Promotion of Energy-Efficient Pool Pumps

- *Key factors influencing the energy efficiency of pool pumps:* For the participating contractors/retailers the most-cited factor influencing the energy efficiency of the pools pumps they installed was the energy or cost savings that customers could potentially receive by getting a multi-speed pool pump. About half (46%) of the PG&E participating contractor/retailers and nearly three quarters (72%) of the SCE participating contractor/retailers cited these as factors in their decision-making.

- *Pool pump promotional practices:* Three quarters of the PG&E participating pool retailers said that they promoted multi-speed pool pump motors differently than other pool pump motors they sell. When asked about the most effective strategies for promoting energy efficient pool pumps, the PG&E pool retailers pointed to direct mail, in-store promotions and demonstrations – especially those showing the cost/energy savings from multi-speed pumps, and conversations with customers.

5.1.5. Training Opportunities

- *Awareness of training opportunities:* A large majority (70-79%) of PG&E's participating and general population contractors/retailers said they were aware of the education and training events offered by California utilities.

- *Participation in training:* All but one of the training-aware PG&E participating contractors/retailers and about three quarters of the training-aware PG&E general population contractors/retailers said that they participated in at least one of these trainings or seminars. PG&E's requirement that that contractors must take a PG&E training course to be eligible for upstream rebates was likely a key driver of these high participation rates. The PG&E contractors/retailers reported a wide variety of locations and sponsors for the trainings that they were either aware of or had participated in.

- *The usefulness of the training:* Using a five-point scale where 5 equals "very useful" and 1 equals "not at all useful," 86% of the respondents gave usefulness ratings of 5 or 4. Eighty-percent of the trainees said they had changed their practices as a result of the training. The early 2007 survey of pool contractors/retailers participating in the SFEER program had found that many had concerns about wider use of multi-speed pool pumps. To see whether recent trainings had mitigated these concerns, in the 2008 surveys we asked the trainees whether they had any concerns or reservations about specifying multi-speed pool pump motors after taking the training courses. Only 17 percent of the 23 PG&E contractors/retailers said they had.

5.1.6. Satisfaction with Program Processes

- *Rebate applications and eligibility determination*: Of the 25 PG&E participating contractors/retailers that claimed to be working with the application forms, 84 percent found the forms to be reasonable in terms of length and level of detail. A quarter of the PG&E participating contractors/retailers said they were aware of at least one application being rejected. The two most common reasons for rejected applications included the particular pump not being listed as rebate-eligible and errors or missing information on the application forms. Most of the PG&E contractors/retailers with rejected applications said that these applications were eventually paid.

- *Keeping track of program changes:* PG&E participating contractors/retailers reported a wide variety of ways to keep track of program changes, with the most common being trade

`association or supplier sources and utility mailings or literature. Seventy-two percent of the PG&E participating pool contractors/retailers found tracking program changes to be at least somewhat easy. The seven pool contractors/retailers who found it more difficult to track program changes complained about having to find about program changes themselves rather than the program notifying them, too-frequent program changes, not having a set way to find out about program changes, and the PG&E program personnel changing to often.

- *Satisfaction with program incentives:*
    - PG&E participating contractors/retailers had concerns about the adequacy of the pool pump rebates. When asked if the $100 rebates for the installation of new qualifying multi-speed pool pump motors were sufficient to encourage greater use of these products, 52% said the $100 rebates were not sufficient. When asked what would be an adequate level of rebate, their responses ranged from $150 to $400 with an average estimate of $264.
    - However, 72 percent of the PG&E participating contractors/retailers were satisfied with rebate availability.
    - Seventy-two percent of the PG&E contractors/retailers said that the split rebate structure (introduced in 2006) motivates contractors/retailers to promote more of the multi-speed pumps.
- *Satisfaction with the program website:* Seventy-four percent of the PG&E participating contractors/retailers were satisfied with the rebate program website. However, the SCE respondents were much more likely than the PG&E respondents to say that they were very satisfied with the website.
- *Satisfaction with program marketing efforts:* Only 39 percent of the PG&E participating contractors/retailers were satisfied with the way the utility promotes and explains the rebates for energy-efficient pool pumps. This compares unfavorably with a 79 percent satisfaction level for the SCE respondents. The two most common statements of the dissatisfied PG&E respondents was that they had not seen any evidence of program marketing and that their customers were unaware of the rebates. They suggested ways to promote the program more including mailings to pool owners, mailings to installers, use of radio or television advertising -- including featuring pool pumps in Flex Your Power ad campaigns, and utility representative visits to pool stores.

- *Satisfaction with the program staff:* The PG&E participating pool contractors/retailers were generally satisfied with the program staff. The average satisfaction rating was 4.2 on a 5-point satisfaction scale where 5 equaled “very satisfied.”

- *Satisfaction with the program as a whole:* Eighty-five percent of the PG&E participating contractors/retailers were satisfied with the rebate programs a whole. The PG&E and SCE participating contractors/retailers that were less than satisfied with the rebate programs cited difficulty getting the rebates approved, difficulty with the rebate paperwork, waiting too long to receive rebate payments, customers not being aware of the rebates, and improvements needed for the program staff and marketing materials. Figure 5-1: summarizes the average satisfaction ratings for the various program processes for both the PG&E and SCE programs.

- *Recommendations for program improvements:* Figure 5-2: shows that the participating contractors/retailers provided a wide variety of suggestions for program improvements.

Figure 5-1:
Summary of Average Satisfaction Ratings
for Rebate Program Processes
PG&E and SCE

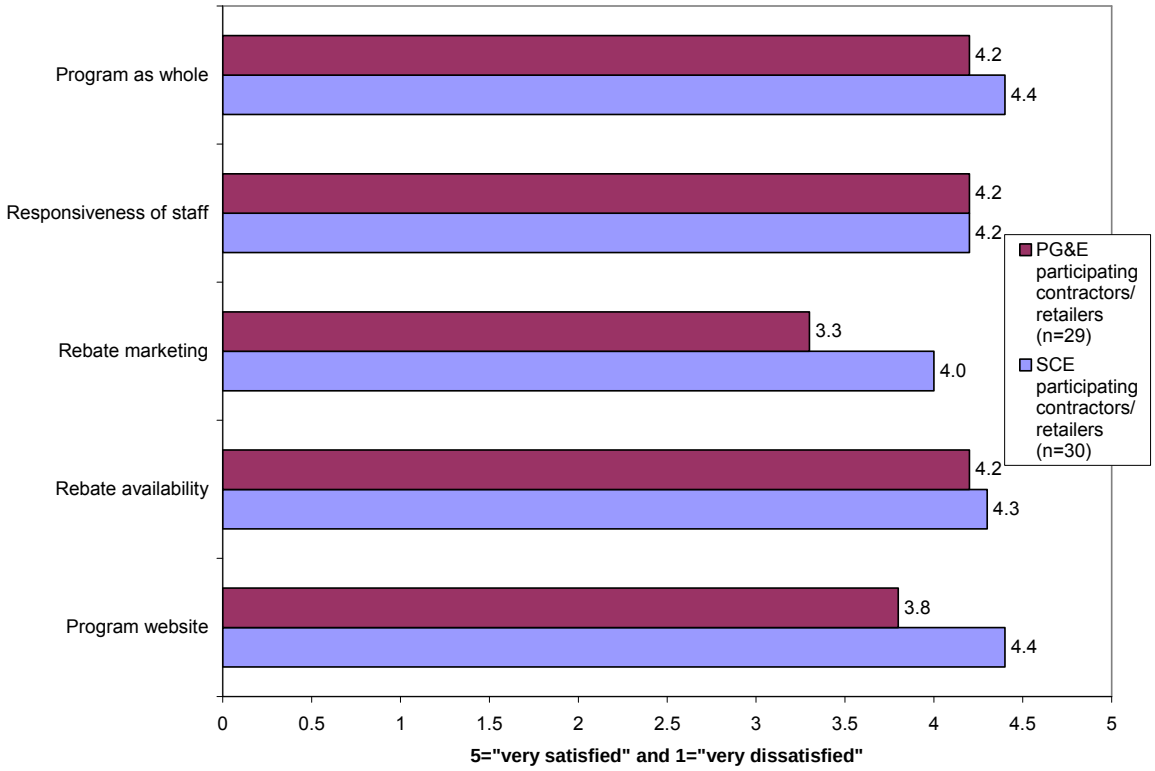
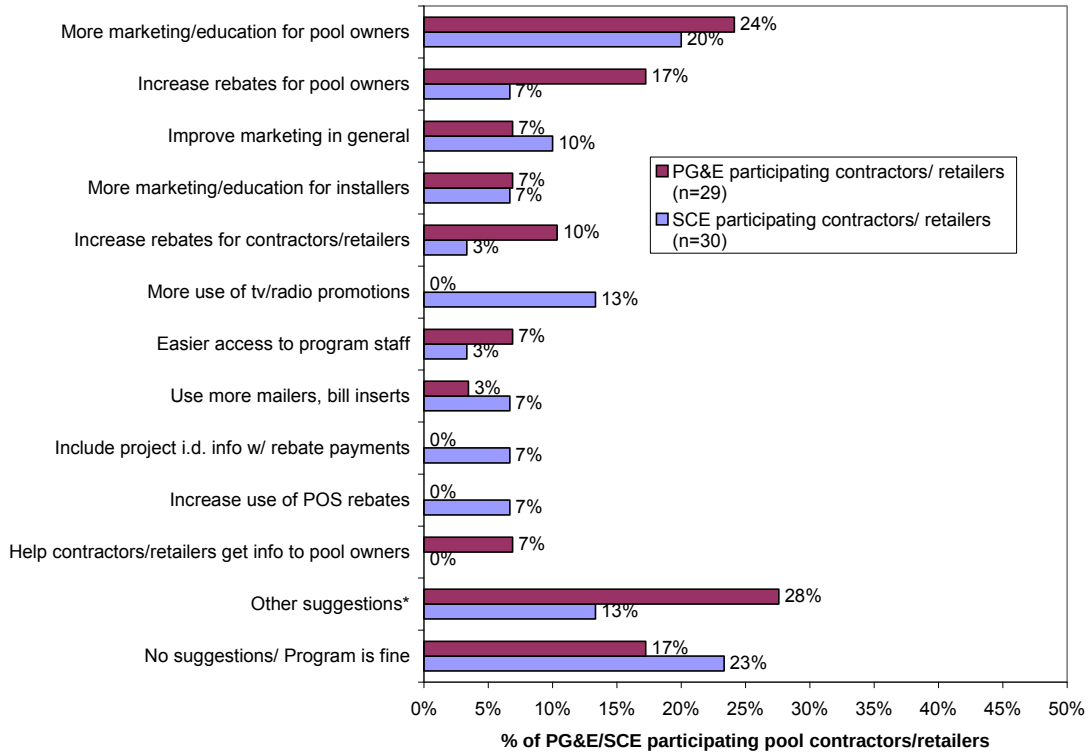


Figure 5-2:
Suggestions for Pool Rebate Program Improvements from Participating Contractors/Retailers



Note: *Other suggestions, each cited by only one respondent, include allowing above-ground pools to be eligible, listening more to the Independent Pool and Spa Service Association (IPSSA) and less to builders, providing higher rebates for remodeling vs. new construction, encouraging better multi-speed pumps and better controllers, stop requiring contractors/retailers from having to sign up every year, improving the program website, sending more flyers to pool stores, and allowing toggle switches rather than requiring electric controllers.

5.1.7. Pool Characteristics, Pool Equipment Types, and Pool Maintenance Practices in the PG&E Service Territory

The sections of the report containing PG&E pool market characteristics do not lend themselves to easy summarization. Readers are encouraged to view the detailed findings. However, the following are some brief summaries:

- *Pool sizes, ages, and features:* PG&E pool contractors/retailers reported that 84-88 percent of the pools they service are smaller than 30,000 gallons. 176 of the pool owners also estimated their pool size in gallons. The average of these estimates was 24,219 gallons and the median estimate was 20,000 gallons. The average estimated pool age was 21 years and

the median estimate was 20 years according to PG&E pool owners. Nearly 60 percent of the pool owners had pools with no special features such as waterfalls, spas or fountains.

- *Pool filtration pumps:*
    - *Speed options:* PG&E pool contractors/retailers estimated that 76 percent of the pools they service have single-speed pool pumps, 10-11% has two-speed pumps, and 12-14% has variable-speed pumps. PG&E pool owners reported a higher percentage of single-speed pumps than this.
    - *Horsepower:* All the surveys reported the most common horsepower levels for both single-speed and multi-speed pool to be in the 1-1.5 hp range.
    - *Operating periods:* The average operating periods for single-speed pumps ranged between 4.1 and 6.9 hours depending on the survey source. The survey sources also varied a lot in their estimates for average operating hours for multi-speed pumps. For pool owners with single-speed pool pumps the most common starting times were between 6 AM and noon. The most common stopping time was between noon and 3 PM. With a few small exceptions the pool owners with multi-speed pumps gave similar responses as the single-speed pump respondents had.
    - *Age:* As we would expect to see, the reported average age of the multi-speed pool filtration pumps (3.7 years) was much lower than the average age of the single-speed pumps (7.9 years). With the exception of the multi-speed pumps, the average age of all the other pool pumps and motors was between six and eight years.
- *Automatic pool cleaning systems:* The contractors/retailers in both surveys were in pretty close agreement that the majority of pool owners have presser-side systems with booster pumps and with suction-side cleaners being a distant second in terms of frequency. Both contractor/retailers surveys estimated the daily operating times for the presser side systems with booster pumps to be much shorter (2.1 – 3 hours) than those for the other pool cleaning systems (4.2 – 5.7 hours).
- *Pool filters:* Contractors/retailers reported that over half the filters were cartridge filters with the diatomaceous earth (DE) filters a distant second in terms of frequency. Use of the sand or combination DE/cartridge filters was reported to be relatively infrequent. When asked how often they clean filters or recommend that they be cleaned, the most common response of

the contractors was 2-3 times per year but there was a variety of frequencies. When asked what factors they consider in deciding whether to clean filters or recommend cleanings, all of the responding pool contractors/retailers mentioned increases in pressure. Eighty percent of the pool contractors'/retailers said that psi increases greater than 5 psi and less than 15 psi would prompt them to clean the pool filters.

- *Pool timers:* Contractors/retailers reported that only about 20 percent of the timers are controlled by indoor computer pad or wireless remote control and that pool professionals set 70-80 percent of the timers. However, a number of the pool professionals observed that while they will set the timer initially, some homeowners will change the settings after they leave. In addition the percentage of pool owners that control their own timers is also likely larger because many pool owners do not use pool professionals. Seventy-nine percent of the pool owners said that they are controlling their pool pumps with their timers and 45% are controlling their pool cleaners.

- *Pool heaters:* The three surveys indicated that incidence of heaters in residential pools is in the 41-45% range. The vast majority of these were gas or propane heaters. The contractors/retailers estimated about a fifth of these pool heaters to be solar, while the pool owners estimated the solar share to be nearly a third. Only 23 percent of the PG&E pool owners said that they use a pool cover. Two thirds of the pool owners claimed that they use their pool heaters "rarely" or "never."

- *Pool spas:* The vast majority of pool owners said that their spas were in-ground rather than portable. Only 21 percent of pool owners said they use a cover for their spa. The average and median age of the spas reported by the pool owners was 20 years. Over half of the spa owners claimed to use their spa two weeks or less per year.

5.2. Detailed Findings

This section discusses, in much more detail, the findings that are summarized in the Executive Summary above. The sections that make up these detailed findings include:

- Methodology,
- Characteristics of the Pool Contractors/Retailers,
- Awareness of the Rebate Program and Its Marketing Efforts,

- General Promotion of Energy-Efficient Pool Pumps,
- Training Opportunities,
- Satisfaction with Program Processes, and
- Pool Characteristics, Pool Equipment Types, and Pool Maintenance Practices in the PG&E Service Territory.

5.2.1. Background and Purpose

One of the most important purposes of this research task was to collect information on the typical pool characteristics, pool equipment types, and pool maintenance practices that currently exist in the PG&E service territory. PG&E program staff was interested in this information to better inform the development of new pool-related rebate offerings. Although the California Residential Appliance Saturation Survey (RASS) will provide some information about pool equipment, this information is not expected to be available until 2010 and will not contain the level of detail that the PG&E program staff was looking for.

Another important purpose of the participating contractor/retailer surveys was to assess participant satisfaction with the PG&E and SCE pool rebate programs. The PG&E pool rebate program currently:

- Pays $100 rebates to customers who have their existing single-speed filtration pumps and motors replaced with new qualifying two-speed or variable speed pool pumps and motors;
- Pays $100 rebates to contractors who have attended a PG&E training course and have installed a two-speed pool pump to replace an existing single-speed pool pump; and
- Pays $200 rebates to contractors who have attended a PG&E training course and have installed a variable-speed pool pump to replace an existing single-speed pool pump;

The PG&E general population contractor/retailer survey also collected information about awareness of the PG&E pool rebate program. Finally all the contractor/retailer surveys also collected information on awareness of pool professional training opportunities and market practices concerning the promotion of energy-efficient pool pumps.

5.2.2. Methodology

The findings in this report come from the following three surveys:

- Survey of participating PG&E and SCE pool contractors/retailers: This survey had two main purposes: 1) to gauge the satisfaction of pool contractors/retailers with PG&E's pool pump rebate program and associated training opportunities; and 2) to collect information on the types of pool equipment and pool maintenance practices that the contractors encounter in the PG&E service territory. PG&E provided KEMA with a list of participating pool contractors/retailers and we completed surveys with a random sample of 29 of these. At the same time we also completed a similar survey with a random sample of 30 participating pool contractors/retailers from the Southern California Edison (SCE) service territory. Trained KEMA analysts conducted these surveys during the September/October period.

- Survey of the general population of PG&E pool contractors/retailers: Although the survey of participating pool contractors/retailers was necessary to understand satisfaction with the PG&E pool rebate and training programs, we did not want to rely on it solely for information concerning pool equipment and pool maintenance practices in the PG&E service territory. This was because we had concerns that these participating pool contractors/retailers might be servicing pool owners that may be different – e.g., more environmentally conscious – than the larger population of PG&E pool owners. Mainly for this reason, KEMA performed an additional survey of a random sample of 31 PG&E pool retailers/contractors. Another benefit of this survey was that it allowed us to measure the level of awareness of PG&E's pool rebate and training programs among a random sample of the pool retailers/contractors who operate in the PG&E service territory. The sample frame for these contractors/retailers came from a pool services professionals list and a list of C-53 licensed contractors that were both provided by PG&E. Trained KEMA analysts conducted these surveys during the September/October period. This survey was similar to the survey of participating contractors/retailers except that it did not ask any questions about satisfaction with rebate program processes. For the sake of brevity we will refer to these pool contractors/retailers as the "PG&E general population pool contractors/retailers."

- Survey of residential PG&E customers with swimming pools: To gather additional information concerning pool equipment and pool maintenance practices in the PG&E service territory, we also surveyed 300 swimming pool owners. The pool owners we

surveyed came from a list of a of 2,500 pool owners that had been randomly selected by PG&E from a larger list of pool owners in its service territory. This pool owner survey provided some information – such as pool timer settings for pool owners who control their own pool timers or the age of pools and pool equipment – which we would not be able to reliably collect if we surveyed only pool contractors/retailers. In addition, because only a third of the PG&E pool owners claimed to use pool professionals, it was important to determine if these pools were different than those served by the professionals. However, one drawback of such a survey is that some pool users may lack the expertise to correctly identify their pool equipment. This survey was a Computer-Assisted Telephone Interviewing (CATI) instrument that was administered by Opinion Search Inc. It was fielded in December 2008.

5.2.3. Characteristics of the Pool Contractors/Retailers

KEMA asked the contractors/retailers a series of background questions to get a basic understanding of their business structure and practices.

Company Size

KEMA asked the pool contractors/retailers how many full-time employees they had. We then used these employee numbers to categorize the companies into different size groups. Table 5-1 shows that among the PG&E contractors/retailers there are larger pool companies in the participant group than there are in the general population. In the population of participating SCE pool contractors/retailers, however, there are a higher proportion of medium-sized companies. The average number of full-time employees per contractor/retailer across all companies was 8.0. However, if one outlier (250 employees) is removed, the average drops to 5.3 full-time employees. The median number of full-time employees was only three.

KEMA also asked the contractors/retailers about the number of part-time employees. Over half (52%) of the companies had no part-time employees. Overall the average number of part-time employees was 1.2 with a median of one.

Table 5-1:
Surveyed Pool Contractors/Retailers
by # Full-Time Employees

Company size by # full-time employees	PG&E participating contractors/retailers (n=29)	PG&E general population contractors/retailers (n=31)	SCE participating contractors/retailers (n=30)
Small (1)	28%	35%	17%
Medium (2-9)	41%	42%	63%
Large (10+)	31%	16%	17%
Refused/ Missing data	0%	6%	3%
Total	100%	100%	100%

Another way to measure company size is through the estimated number of pools that pool contractors/retailers service on an annual basis. Table 5-2 shows that using this measurement of company size the PG&E participating contractors/retailers are similar in their mix of company sizes as the PG&E general population contractors/retailers. However, it also shows that SCE participating contractors/retailers include a higher proportion of larger companies. Across all companies the average number of pools serviced annually was 599 pools with a median of 200 pools.

Table 5-2:
Pool Contractors/Retailers
by # Pools Service Annually

Company size by # of pools serviced annually	PG&E participating contractors/retailers (n=29)	PG&E general population contractors/retailers (n=31)	SCE participating contractors/retailers (n=30)
Small (0-99)	24%	32%	10%
Medium (100-499)	38%	42%	47%
Large (500+)	21%	19%	40%
Don't service pools	10%	6%	0%
Refused/ Don't know	7%	0%	3%
Total	100%	100%	100%

Company Services and Qualifications

To better understand the types of pool contractors/retailers we were interviewing, we also asked them a wide variety of questions about the types of pool services they offer, the types of markets they serve, and their qualifications. Table 5-3 summarizes the responses to these questions. It shows that there was a much larger retailer representation in the SCE participant sample than there was in the PG&E samples. This was likely due to the fact that the SCE program offers point-of-sale pool pump rebates while the PG&E does not. This causes the SCE

program to recruit and attract more pool retailers. Due to this higher retailer representation, the SCE participants are less likely to do in-field pool services such as regular pool service and maintenance, pool cleaning, and pool construction. Yet these SCE pool retailers do install pool pumps and perform maintenance on an as-needed basis. There was not much difference between the PG&E participating pool contractors/retailers and their counterparts in the general population except that the companies in the general population were more likely to build and clean pools.

Table 5-3:
Pool Contractors/Retailers
Company Services and Qualifications

Company services, qualifications	PG&E participating contractors/retailers (n=29)	PG&E general population contractors/retailers (n=31)	SCE participating contractors/retailers (n=30)
Do pool service, maintenance?			
Yes, on regular basis	28%	16%	7%
Yes, both on regular/as needed basis	31%	32%	33%
Yes, on as-needed basis	24%	45%	60%
No	17%	6%	0%
Total	**100%**	**100%**	**100%**
Do pool cleanings?			
Yes, on regular basis	52%	65%	27%
Yes, both on regular/as needed basis	10%	6%	10%
Yes, on as-needed basis	0%	3%	0%
No	38%	26%	63%
Total	**100%**	**100%**	**100%**
Install/replace pool pumps?			
Yes	97%	97%	100%
No	3%	3%	0%
Total	**100%**	**100%**	**100%**
Avg. estimated % of pump installations that are residential	95%	96%	92%
Build swimming pools?			
Yes	41%	68%	33%
No	59%	32%	67%
Total	**100%**	**100%**	**100%**
Are you a C53 licensed contractor?			
Yes	76%	68%	33%
No	24%	32%	67%
Total	**100%**	**100%**	**100%**
Have a retail store or showroom?			
Yes	28%	23%	70%
No	72%	77%	30%
Total	**100%**	**100%**	**100%**
Avg. estimated % of retail pump sales that are residential	99%	95%	90%

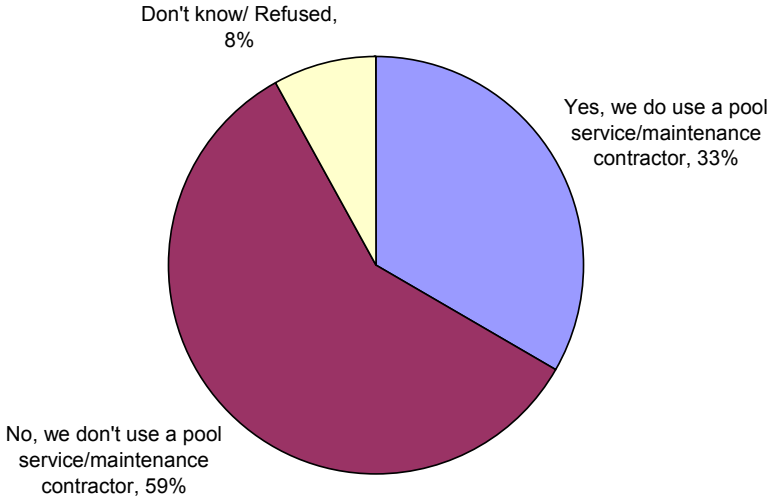
KEMA also asked these contractors/retailers if they belong to an organization of pool professionals or builders. Sixty-two percent of PG&E participating contractors/retailers, 61 percent of the PG&E general population contractors/retailers, and 33 percent of the SCE participating contractors/retailers claimed that that they do. This lower representation among the SCE contractors/retailers was once again likely due to the higher proportion of pool retailers – with many of these retailers belonging to a single chain: Leslie's Pool Supplies. When asked to name the trade organization they belonged to, the majority cited either the Independent Pool and Spa Association or the Association of Pool and Spa Professionals.

We asked the PG&E pool owners whether they used pool professionals. Figure 5-3: shows that only a third of these pool owners claimed to use a pool service/maintenance contractor. It is likely that many interpreted this to mean someone who comes on a regular basis -- e.g. they have a regular service contract with – as opposed to contractors they might use on an as-needed basis. One reason for thinking this is that when we asked those who said they used a pool professional what kind of services they used their pool professional for, 86 percent said chemicals, 59 percent said cleaning, and 47 percent said equipment maintenance.

However, even if the actual percentage of PG&E pool owners using pool professionals is greater than one third, this information still underlines the importance of the survey of PG&E pool users. If the residential pools that are not being serviced by pool professionals are very different than those being serviced by these professionals, then the PG&E pool user survey is the only survey that can shed light on this part of the residential pool market.

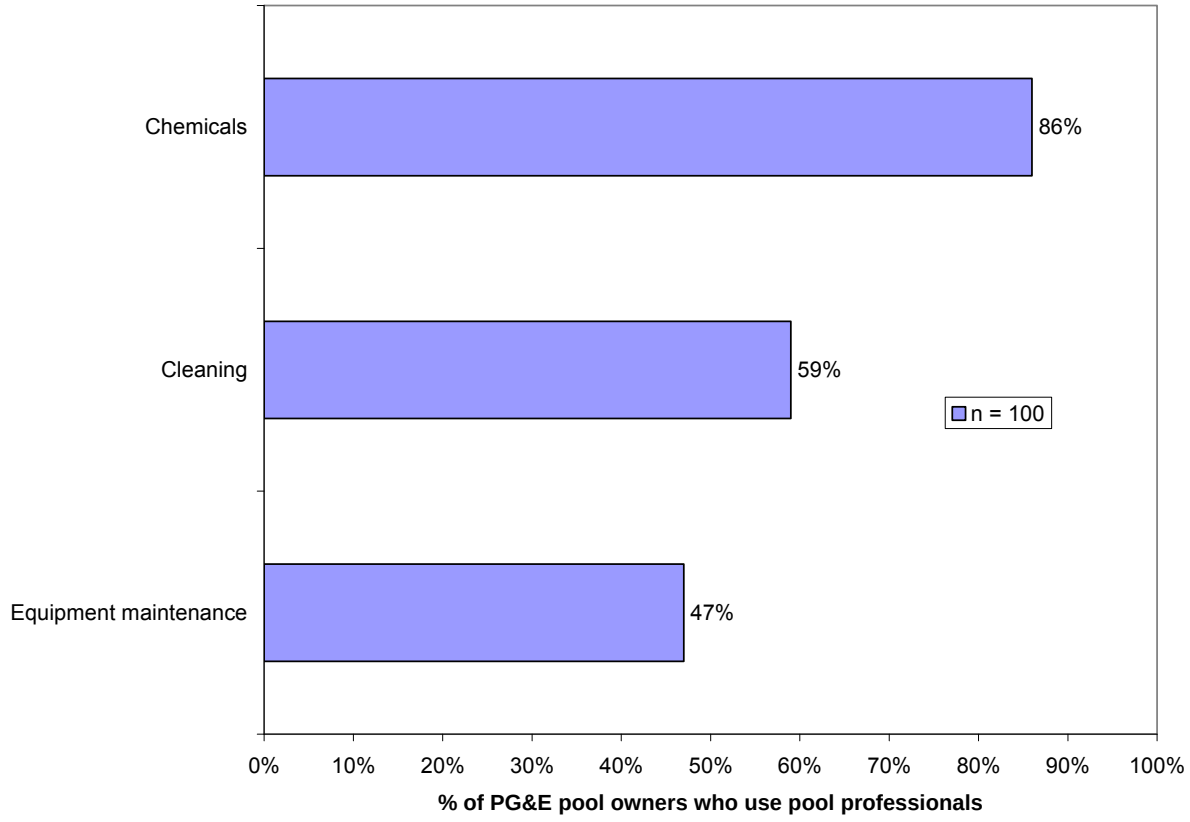
Figure 5-3:
Whether PG&E Pool Owners
Use a Pool Service/Maintenance Contractor

n = 300



We also asked the PG&E pool owners who claimed to use pool professionals what kind of services they got from these contractors. Figure 5-4: shows that the large majority get pool chemical services, more than half get cleaning services, and almost half get equipment maintenance services.

Figure 5-4:
What Services PG&E Pool Owners
Get From Their Pool Contractors



Note: Percentages add up to more than 100% because multiple responses were allowed. Also one percent of the respondents named other services.

5.2.4. Awareness of the Rebate Program and Its Marketing Efforts

This section discusses to what degree pool contractors/retailers were aware of the utility pool rebates and the rebate program's promotional efforts and resources.

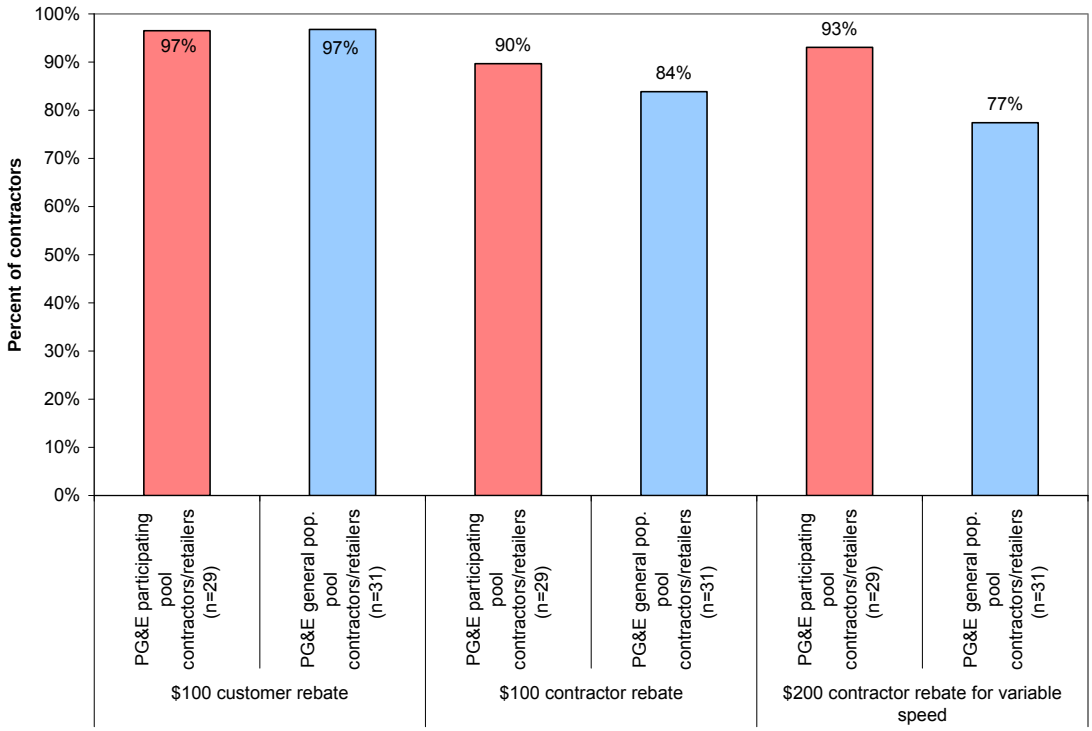
Awareness of the rebates

In both surveys of pool contractors/retailers we asked them whether they were aware of PG&E's rebates for multi-speed pool pumps. As Figure 5-5: shows, ninety-seven percent of both the participating and general population contractors/retailers claimed awareness of PG&E's $100 customer rebate for multi-speed pumps.[31] Claimed awareness of the two PG&E rebates for trained contractors -- the $100 rebate for two-speed pool pumps and the $200 rebate for variable-speed pool pumps – was also high, although the participating contractors were more likely to claim awareness in these cases.[32] KEMA asked PG&E participating contractors how they first became aware of these PG&E rebates. The most cited instances include manufacturing seminars, profession pool associations, PG&E seminars, and PG&E representatives.

[31] PG&E customers received a $100 rebate for replacing existing single-speed filtration pumps and motors with qualifying two-speed or variable speed pumps and motors.

[32] To be eligible for these rebates, the contractors must have attended a PG&E training course and replaced a single-speed pool pump with the two-speed or variable-speed pump.

Figure 5-5:
Percent of Pool Contractors/Retailers
Aware of Rebates



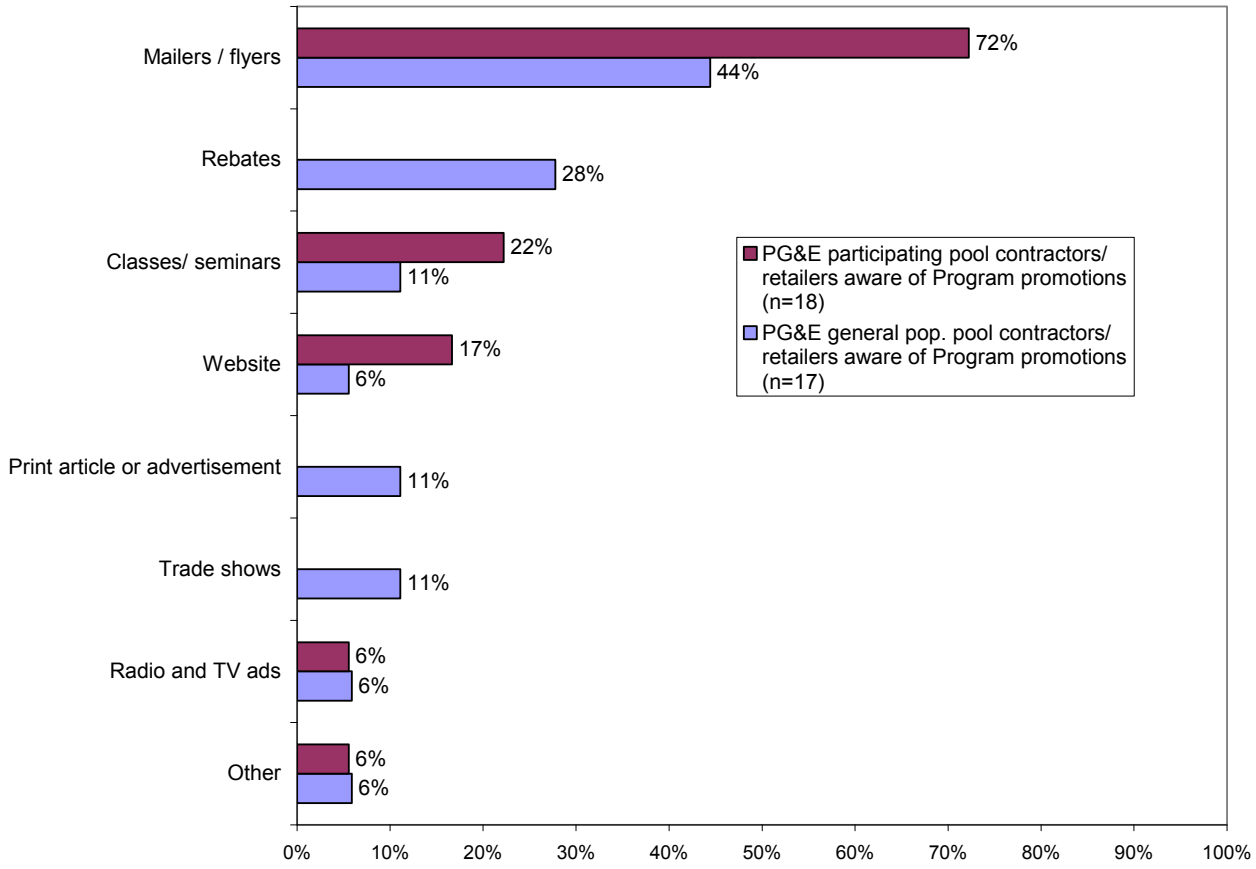
Awareness of program marketing efforts

To determine the effectiveness of program marketing for multi-speed pool pump motors, we asked both participating and general population pool contractors/retailers if they were aware of anything that PG&E was doing to promote greater use of multi-speed pool pump motors. Sixty-two percent of the participating contractors/retailers (n=29) and 58 percent of the general population contractor/retailers (n=31) claimed to be aware of such promotional efforts.

We then asked the contractors who claimed awareness to name the promotional and education activities they were aware of. Nearly three quarters (72%) of the PG&E participating contractors/retailers and nearly half (47%) of the general population contractors/retailers named mailers or flyers (Figure 5-6:). Other less-cited promotional or educational activities included rebate information (e.g., brought to the attention of the contractor by a customer), training

classes -- including those offered by equipment vendors, websites (both utility and vendor sites), print articles or advertisements, and trade shows.

Figure 5-6:
PG&E Pool Rebate Promotions
Recalled by Contractors/Retailers



KEMA inquired whether the participating contractors/retailers were aware that some utilities provide point-of-purchase signs for pool pump retailers that advertise the utility rebate for energy efficient models. None of the PG&E participating contractors/retailers said they knew of the signage. In contrast, half of the SCE participating contractors/retailers said they knew of the signage. This greater awareness in the SCE service territory was likely due to the fact that SCE has a point-of-sale rebate program for pool pumps while PG&E does not.

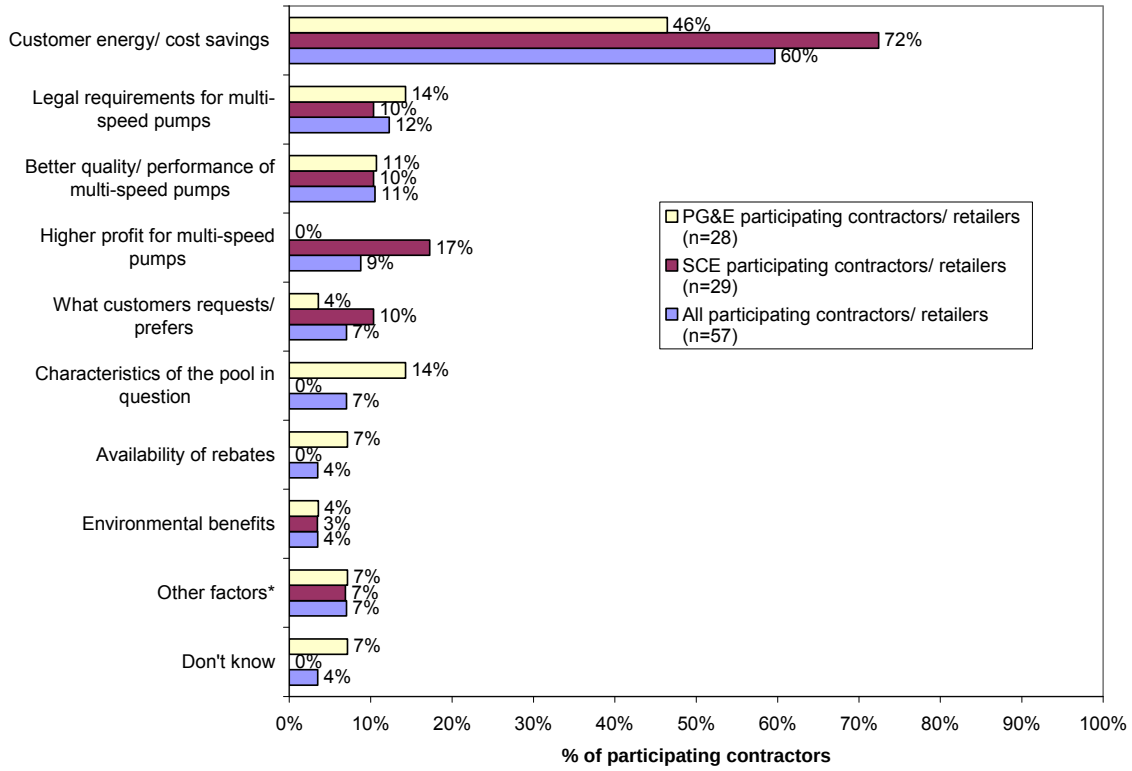
5.2.5. General Promotion of Energy-Efficient Pool Pumps

In addition to finding out how aware pool contractors/retailers were of the pool rebate program offerings, we were also interested in knowing more about how they promote energy-efficient pool pumps in general. We explored with these contractors/retailers the key factors that influenced the energy efficiency of the pool pumps they install. We also found out whether they promote multi-speed pool pumps differently than single-speed pumps and which promotional practices were more effective than others.

Key Factors Influencing the Energy Efficiency of Pool Pumps

We asked all the pool contractors/retailers what were the key factors that influenced the energy efficiency of the pools pumps they installed. For the participating contractors/retailers the most-cited factors were the energy or cost savings that customers could potentially receive by getting a multi-speed pool pump. About half (46%) of the PG&E participating contractor/retailers and nearly three quarters (72%) of the SCE participating contractor/retailers cited these as factors in their decision-making (Figure 5-7:). Other less-cited factors included legal requirements for multi-speed pumps (California's Title 20 requires multi-speeds for pump motors over 1 horsepower), claims of better quality or performance for multi-speed pumps (e.g., greater longevity, quieter performance than single-speed pumps), higher profit margins for multi-speed pumps, customer preferences, the particular characteristics of the pool in question, rebates, and environmental benefits.

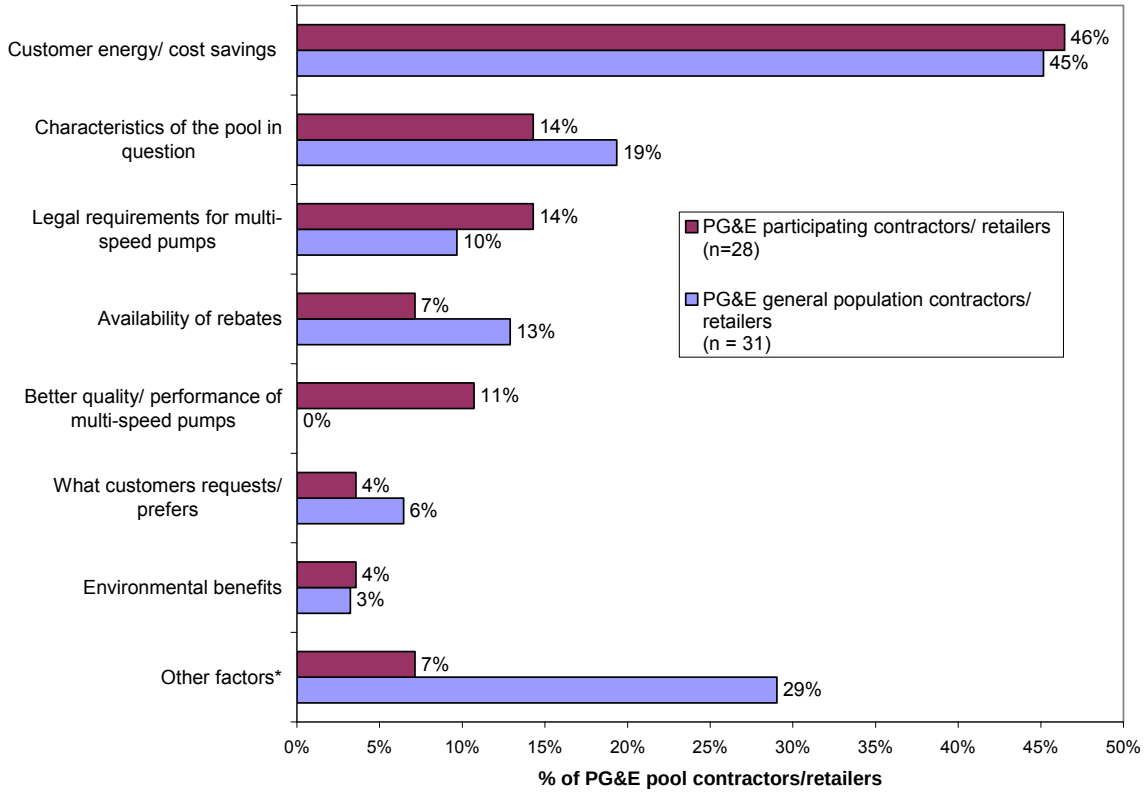
Figure 5-7:
Key Factors Influencing the Energy Efficiency of Pool Pumps Installed by Participating Contractors/Retailers



Note: *Other factors include the desire of the contractor/retailer to separate itself from its competition, the requirements of the product manufacturer, price, and the contractor's claimed knowledge of what's in the best interest of the customer.

We also asked the PG&E general population pool contractors/retailers about the key factors that influenced the energy efficiency of the pools pumps they installed. They listed fairly similar factors as the participating contractors/retailers did, as Figure 5-8: shows. This indicates that pool contractors/retailers participating in the PG&E rebate program are not very different than those in the general population in terms of the factors they consider when specifying a pool pump.

Figure 5-8:
Key Factors Influencing the Energy Efficiency of Pool Pumps Installed by PG&E Participating vs. General Population Contractors/Retailers



Note: *Other factors include price, contractor's claimed knowledge of what's in the best interest of the customer, contractor's claim that they only sell/specify energy-efficient pool pumps, and the durability/quality of the pool pump.

Pool Pump Promotional Practices

KEMA asked only those participants who had retail store or showroom a number of questions about their pool pump promotional practices. We asked all eight PG&E participating pool retailers whether multi-speed pool pump motors were marketed or promoted any differently than other pool pump motors they sell. Six of them (75%) said that they were. They mentioned pool pump demonstrations, conversations with customers, signs and displays, and brochures as ways the promoted these multi-speed pool pumps. When asked about their promotions for pool pumps in general, they cited similar methods as for the multi-speed pumps (e.g., conversations with customers and pump demonstrations), as well as some new ones (customer mailings). The similarity in the promotional methods for multi-speed pumps and single-speed pumps suggest

that the differences may lie in messaging, although the surveys did not probe for how specifically the sales pitches and point-of-purchase signs for multi-speed pumps differed from those for single-speed pumps.

To learn more about the timing of these promotions, we also asked the seven PG&E participating pool pump retailers who said they had marketing strategies for pool pumps whether their promotions were seasonal or tied to other promotions such as the availability of utility or manufacturer rebates. Three of the seven (43%) said they did seasonal promotions and four of the seven (57%) said that they tied their promotions to utility or manufacturing rebates.

We asked the eight PG&E participating pool pump retailers about the most effective strategies for promoting energy efficient pool pumps. They pointed to direct mail, in-store promotions and demonstrations – especially those showing the cost/energy savings from multi-speed pumps, and conversations with customers. Since the SCE pool pump rebate program had a point-of-sale rebate component, it had many more (20) participating pool retailers in its sample than PG&E did (8). The most effective marketing strategies that the SCE pool retailers named were very similar (e.g., mailers, in-store promotions that mention cost/energy savings, conversations with customers) to those mentioned by the PG&E pool retailers. However, the SCE pool r

We were also interested in learning which marketing strategies that pool retailers or the utilities might want to avoid. So we asked the pool pump retailers which approaches for promoting energy-efficient pool pumps had proved less effective. The most frequently-cited (four respondents) approach – although it should be more accurately described as part of the full disclosure process rather than as part of a sale pitch -- was mentioning to customers that the two-speed pool pumps required a digital timer which raised the cost of the pumps. Other less effective promotional approaches – each cited by only a single respondent -- included aggressive sales pitches, mail-in rebates (in terms of being inferior to the instant rebates), mailers, signs and displays, and utility print advertisements.

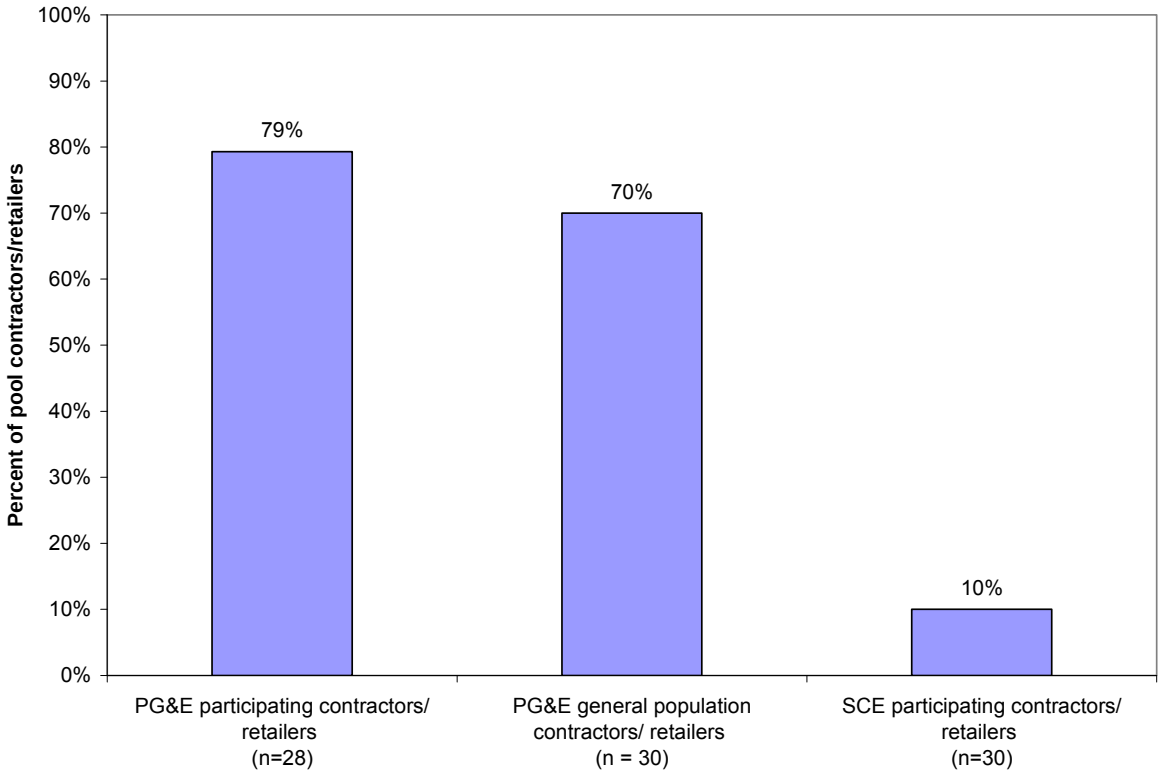
5.2.6. Training Opportunities

This section discusses how aware the contractors/retailers were of the energy-efficient pool pump training opportunities, to what extent they participated in these trainings or seminars, and whether they found these trainings useful. It also explores why certain contractors/retailers have not participated in these trainings and whether those who were unaware of these trainings have any interest in participating in them.

Awareness of Training Opportunities

We asked all the pool contractors/retailers whether they were aware of any education and training events or demonstrations that were offered by California utilities regarding high efficiency pool pumps. A large majority of PG&E's participating and general population contractors/retailers said they were aware of the education and training events offered by California utilities (Figure 5-9:). On the other end of the spectrum, only ten percent of SCE's participating contractors/retailers were aware of these offers. There are two likely explanations for this stark difference. First SCE has not offered energy-efficiency training courses for pool pumps in recent years. Second PG&E requires that contractors must take a PG&E training course to be eligible for upstream rebates so this likely increases contractor awareness of these rebates. As a historical comparison, in early 2007 we surveyed 24 participating pool contractors from the service territories of all three California IOUs and only a third of these were aware the education and training events offered by the California IOUs.

Figure 5-9:
Awareness of Utility Pool Efficiency Training Opportunities
PG&E/SCE Participating Contractors/Retailers and
PG&E General Population Contractors/Retailers



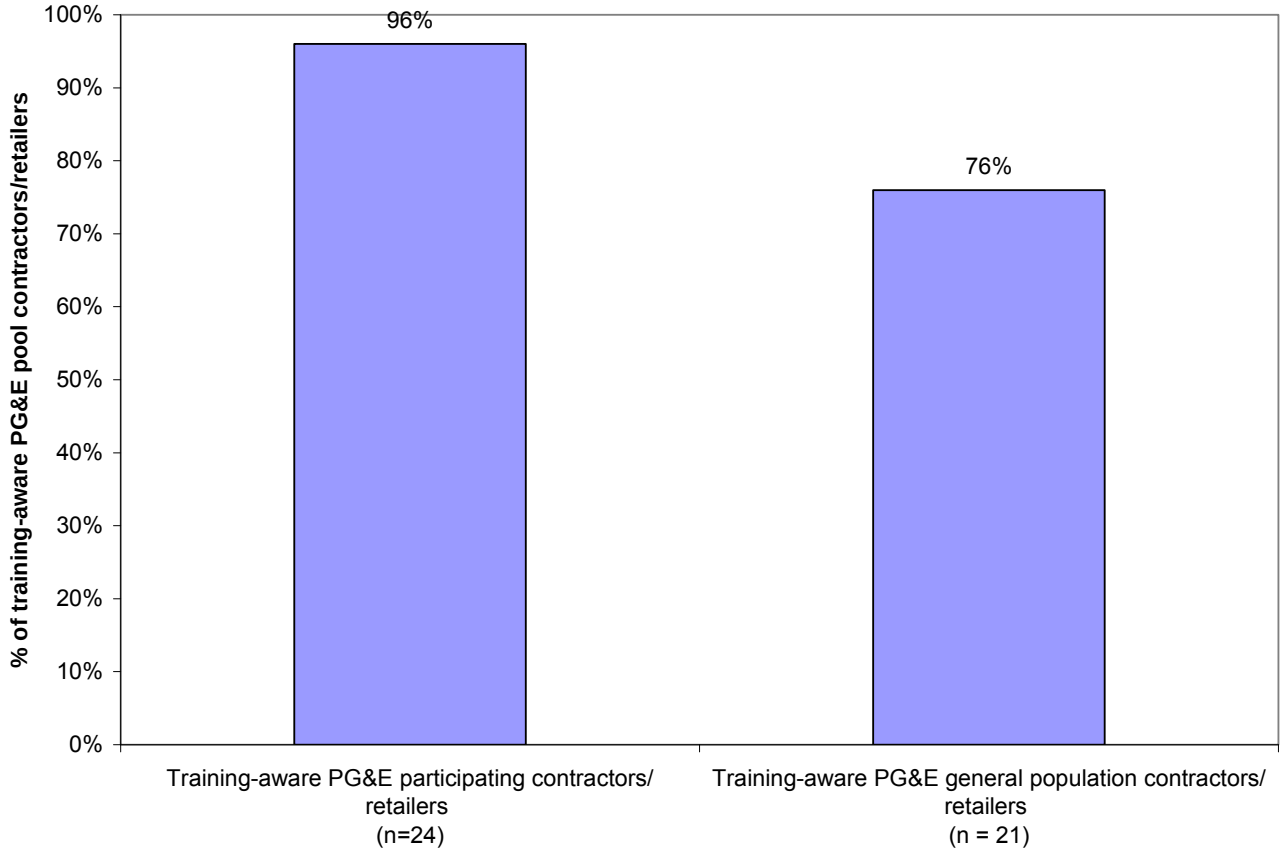
Participation in Training Opportunities

We then asked those contractors/retailers that said that they knew of the utility training, what specific utility training opportunities they were aware of and if they participated in any. All but one of the training-aware PG&E participating contractors/retailers and about three quarters of the training-aware PG&E general population contractors/retailers said that they participated in at least one of these trainings or seminars (Figure 5-10:). PG&E's requirement that that contractors must take a PG&E training course to be eligible for upstream rebates was likely a key driver of these high training participation rates.

The PG&E contractors/retailers reported a wide variety of locations and sponsors for the trainings that they were either aware of or had participated in. Reported locations for these trainings included trade shows – such as the Pool Expo and the Western Pool and Spa Show, the PG&E training center in Stockton, and a variety of other locations including Bakersfield,

Chico, Fresno, Monterey, Redwood City, the Mather Air Force Base in Sacramento, Santa Rosa, Visalia, and Walnut Creek. In addition to PG&E, other reported training sponsors included the Sacramento Municipal Utility District (SMUD), Independent Pool and Spa Service Association (IPSSA) and product manufacturers such as Hayward, Jandy and Pentair.

Figure 5-10:
Participation in Pool Efficiency Trainings
PG&E Participating and General Population Contractors/Retailers



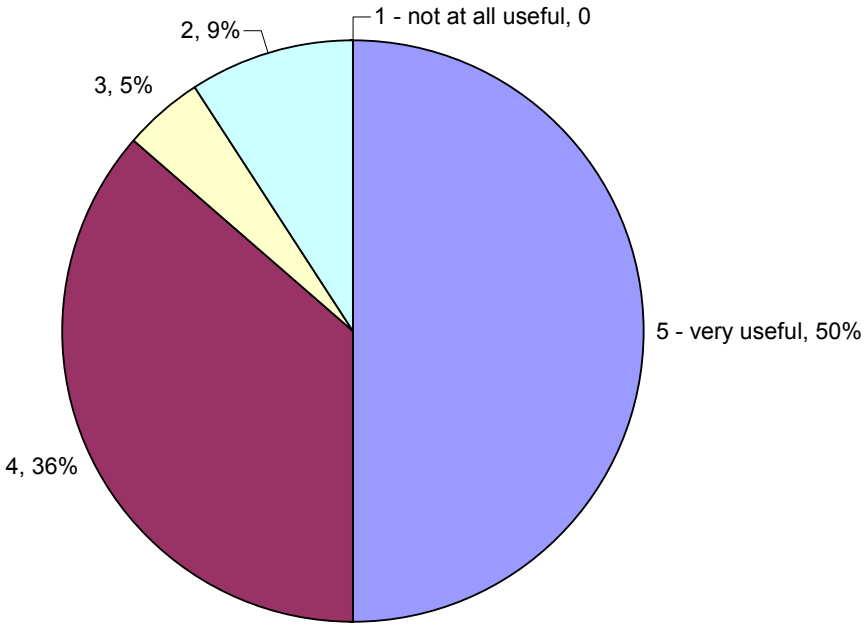
The Usefulness of the Trainings

We asked the contractors/retailers who participated in trainings whether they had found them to be useful. Using a five-point scale where 5 equals “very useful” and 1 equals “not at all useful,” Figure 5-11: shows that the large majority (86%) of the respondents gave usefulness ratings of 5 or 4. The few respondents who said that the trainings had been less than useful (ratings <= 3) said either that they did not learn anything new, they thought some of the training information

was inaccurate, or else they thought that some of the training information sounded like “sales pitches.”

Figure 5-11:
Usefulness of Training

n = 22



We queried the pool contractors/retailers who had taken the trainings whether the information they had learned there had changed their practices in any way. Eighty percent of the PG&E respondents (n=20) said that they had, but only a few of these specified how their practices had changed. Four said they were promoting more multi-speed pool pumps than they had in the past, one said that his practices had not changed but the training course had made him more “psyched up” to promote multi-speed pool pumps, and one contractor said that his company was now programming their variable-speed pool pumps differently as a result of the training course.

The early 2007 survey of pool contractors/retailers participating in the SFEER program had found that many were concerned about the 2008 Title 20 requirement that pool pumps with

capacities of one horsepower or greater must have two-speed motors. For example, 43 percent of them (n=23) claimed that the Title 20 requirement would lead to higher prices, 30 percent said it would lead to customer dissatisfaction, and 26 percent claimed it would have other negative effects, but did not specify what these were. Other concerns included reduced sales, delayed installations, and claims that the multi-speed pumps did not filter effectively.

To see whether recent trainings had mitigated these pool contractor/retailer concerns about the multi-speed pumps, in the 2008 surveys we asked the training attendees whether they had any concerns or reservations about specifying multi-speed pool pump motors after taking the training courses. Only 4 of the 23 PG&E contractors/retailers (17%) said they had concerns or reservations about multi-speed pumps. These included questions about the longevity of variable- speed pool pumps, complaints that variable-speed pool pumps required a separate controller, claims that PG&E was valuing energy efficiency above pool cleanliness, and claims that only one multi-speed pump was reliable and the rest were substandard.

Reasons for Not Participating in Training

We asked the few training-aware contractors/retailers who said they had not participated in trainings why they had not done so. Their reasons included being “too busy,” plans to retire soon, and having most of their customers in the SMUD service territory and therefore not needing a PG&E training course. We asked those that were not previously aware of the trainings if they would be interested in attending them. Of those asked, all of the PG&E participating contractors/retailers (n=6) and 78 percent of PG&E general population contractors/retailers (n=7) responded positively. When asked how the utilities should inform contractors about upcoming training, most responded that they preferred e-mail or in the mail but not in a bill. Those contractors that said they were not interested in future training cited reasons such as “already knowledgeable”, “training is offered by others”, and “training is offered through corporate office.”

5.2.7. Satisfaction with Program Processes

This section contains the findings from several questions we asked PG&E and SCE participating pool contractors/retailers about their satisfaction with program processes. The program processes we asked them about included program rebate applications and product eligibility determination, communication about program changes, incentive levels, program websites and marketing efforts, and the responsiveness of program staff to questions. We also

asked them to rate their satisfaction with the rebate programs in general and to suggest ways that the program could be improved.

Rebate Applications and Eligibility Determination

KEMA inquired if any of the participating pool contractors/retailers filled out any rebate applications on behalf of the company's residential customers during the 2006-2008 periods. Eighty-six percent of PG&E's participating contractors/retailers (n=29) and 45 percent of the SCE participating contractors/retailers (n=29) said that they did. Of the 25 PG&E participating contractors/retailers that claimed to be working with the application forms, 84 percent found the forms to be reasonable in terms of length and level of detail. As a historical comparison, the early 2007 survey found that 89 percent of the participating pool contractors/retailers (across all California IOUs) that were familiar with the rebate applications (n=18) found them reasonable in length and level of detail.

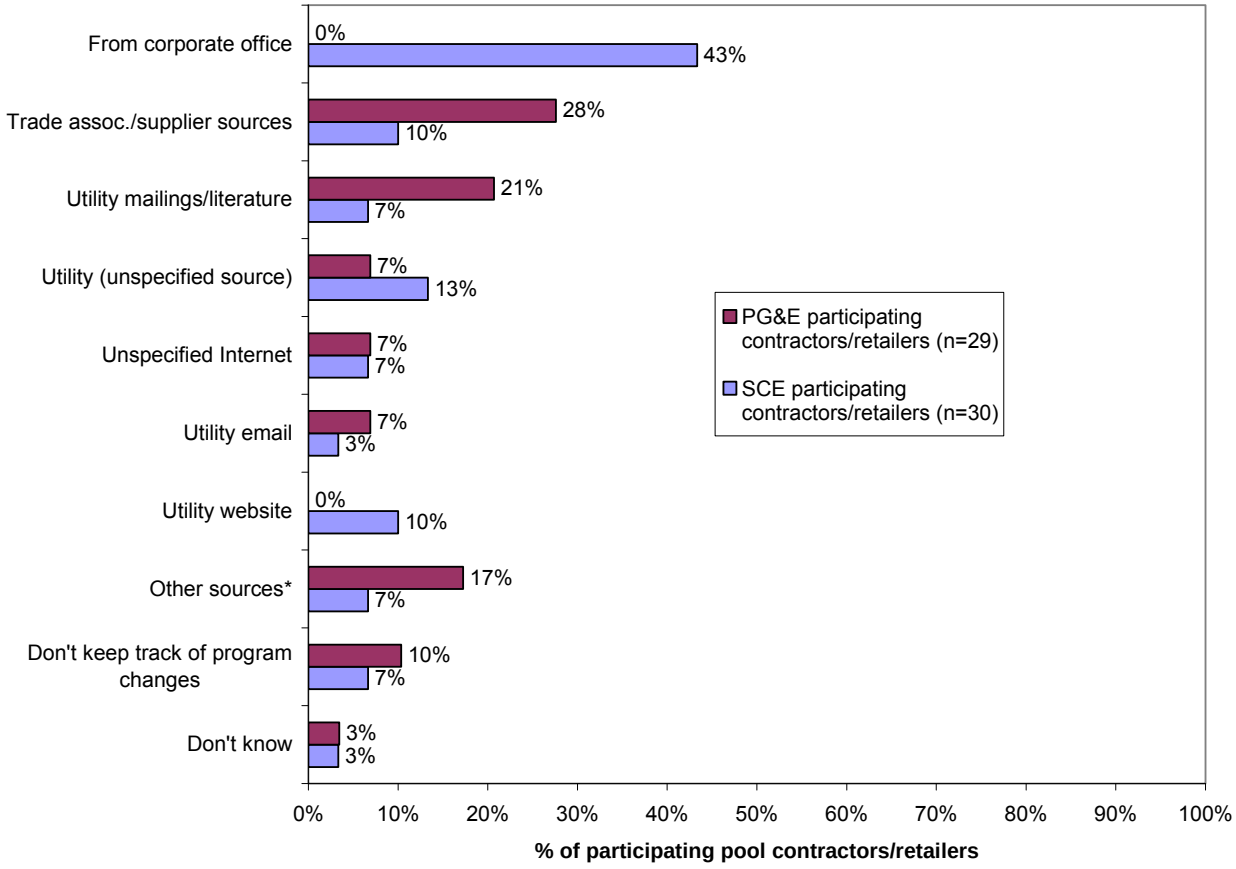
We also asked the participating contractors/retailers if they knew of any rebate applications submitted by them or their customers being rejected by the utilities. A quarter of the PG&E participating contractors/retailers (n=28) and 22 percent of the SCE participating contractors/retailers (n=27) said they were aware of at least one application being rejected. More than half of the participating contractors with rejected applications said they were for two-speed pumps while others mentioned variable-speed pumps or pumps of unspecified type. The two most common reasons for rejected applications included the particular pump not being listed as rebate-eligible and errors or missing information on the application forms. Five of the seven PG&E contractors/retailers with rejected applications said that these applications were eventually paid. Four of the six SCE contractors/retailers also reported that their rejected applications were eventually approved. When asked if it was difficult to find out whether a given pool pump was eligible for the rebates, only 3 percent of the PG&E contractors/retailers (n=29) and 4 percent of the SCE contractors/retailers (n=28) said that this was difficult.

Keeping Track of Program Changes

KEMA asked participating contractor/retailers how they keep track of changes in the rebate program. Figure 5-12: shows that there was a wide variety of methods with the most common being corporate offices, trade association or supplier sources, and utility mailings or literature. The larger number of pool retailers in the SCE sample accounts for the higher percentage of participants who rely on their corporate office to track program changes. As a comparison to these 2008 results, the early 2007 survey found that the most popular ways for participating

pool contractors/retailers (across all California IOUs, n=24) to track program changes were program mailings (25%), suppliers/industry word-of-mouth (25%), corporate offices (25%), and visits from utility representatives (17%).

Figure 5-12:
How Participating Pool Contractors/Retailers
Keep Track of Rebate Program Changes

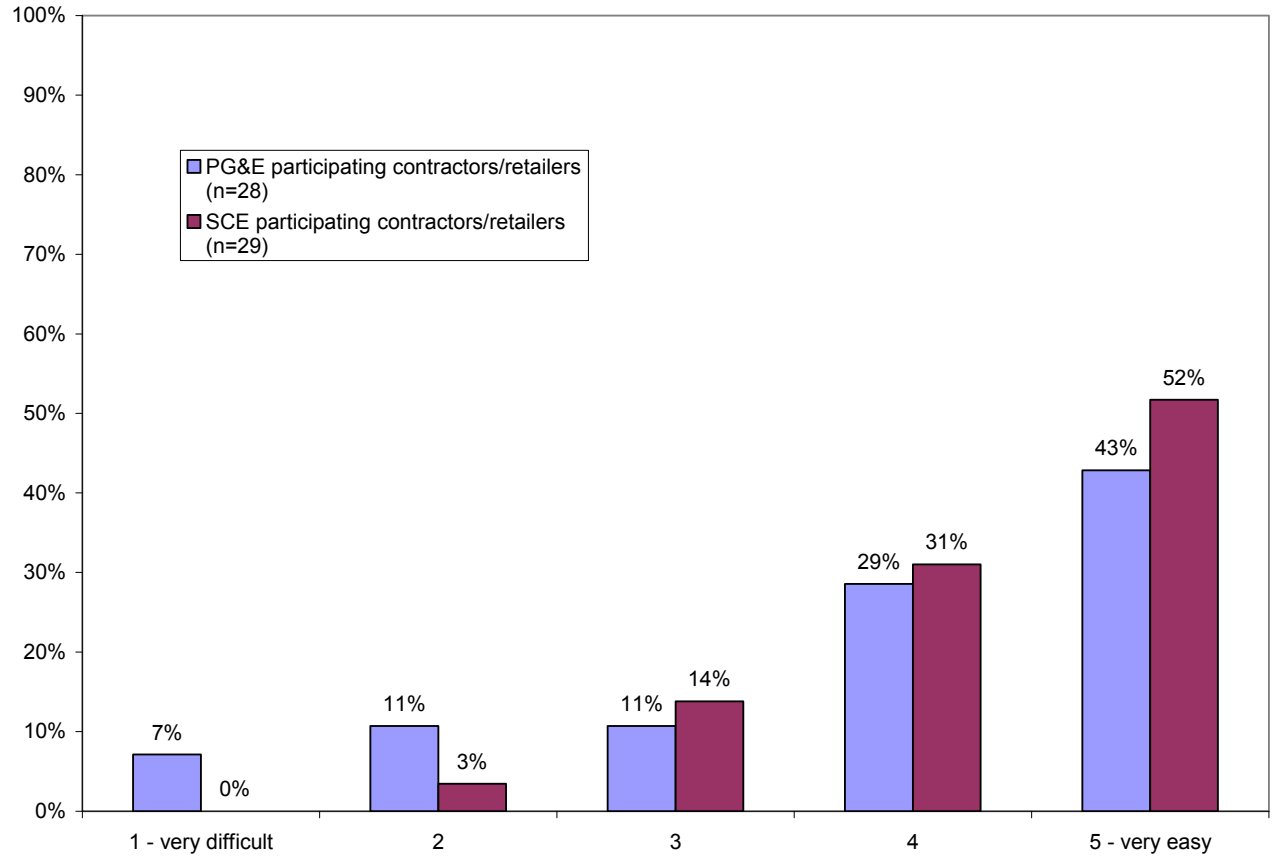


Note: *Other sources included through utility contractor meetings, utility phone calls, unspecified word of mouth, and company internal tracking systems

We asked the participating pool contractors/retailers how hard or easy it was to keep track of program changes. Figure 5-13: shows that 72 percent of the PG&E participating pool contractors/retailers and 83 percent of the SCE participating pool contractors/retailers found tracking program changes to be at least somewhat easy (4 or 5 on the 5-point scale). The seven PG&E pool contractors/retailers who found it more difficult to track program changes (1-3 on the

5-point sale) complained about having to find about program changes themselves rather than the program notifying them, too-frequent program changes, not having a set way to find out about program changes, and the PG&E program personnel changing to often. The five SCE pool contractors/retailers who found it difficult to track program changes said that the SCE website was difficult to navigate, that the SCE representatives no longer visit their stores, or that while they had good interactions with SCE representatives at trade shows, this was all the personal interaction they had with SCE.

Figure 5-13:
Easy/Difficulty of Tracking Program Changes
for Participating Pool Contractors/Retailers



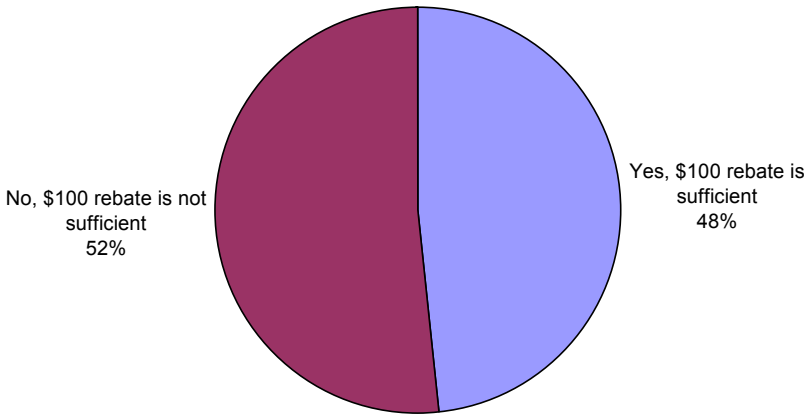
Satisfaction with Program Incentives

There were concerns among the PG&E participating contractors/retailers about the adequacy of the pool pump rebates. KEMA asked them if the $100 rebates for the installation of new qualifying multi-speed pool pump motors were sufficient to encourage greater use of these

products. Figure 5-14: shows that slightly over half (52%) of the respondents said the $100 rebates were not sufficient. We also asked those who said the $100 rebates were inadequate what they thought would be an adequate level of rebate. Their responses ranged from $150 to $400 with an average estimate of $264. In comparison, 43 percent of the SCE participating contractors/retailers were dissatisfied with the level of their multi-speed pool pump rebates ($200 for customers and $100 for retailers/installers).

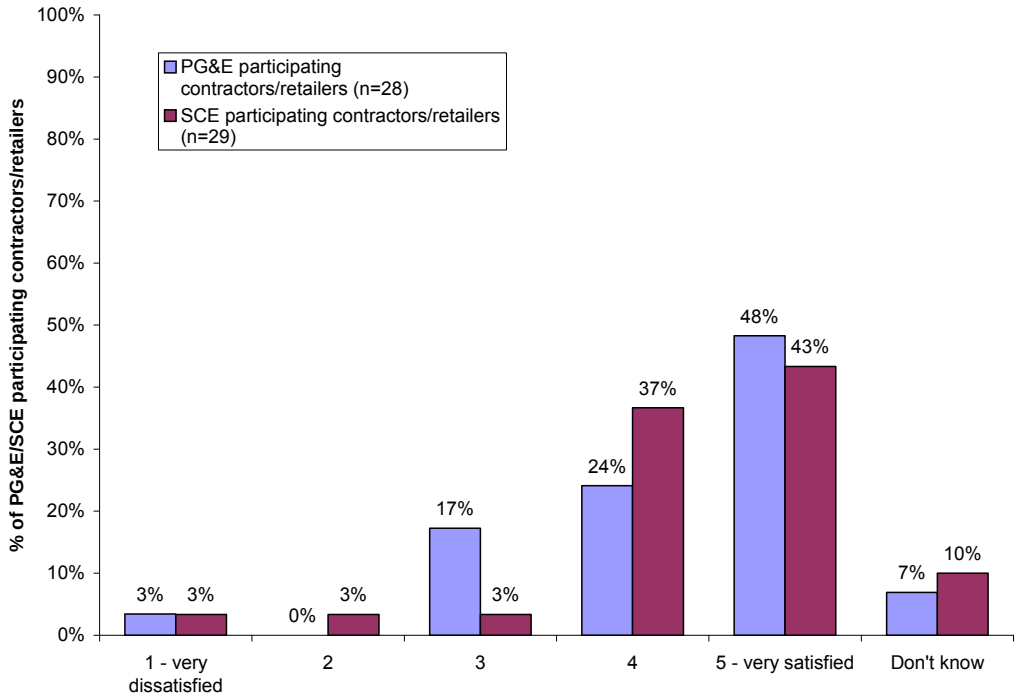
Figure 5-14:
Whether $100 PG&E Rebates Are Sufficient
To Encourage Greater Use of Multi-Speed Pool Pumps
According to PG&E Participating Pool Contractors/Retailers

n = 29



The participating contractors/retailers were more satisfied with the availability of rebates for multi-speed pool pumps. Figure 5-15: shows that 72 percent of the PG&E participating contractors/retailers and 80 percent of the SCE participating contractors/retailers were satisfied (4 or 5 on a 5-point satisfaction scale) with rebate availability.

Figure 5-15:
Satisfaction of Participating Contractors/Retailers with Rebate Availability

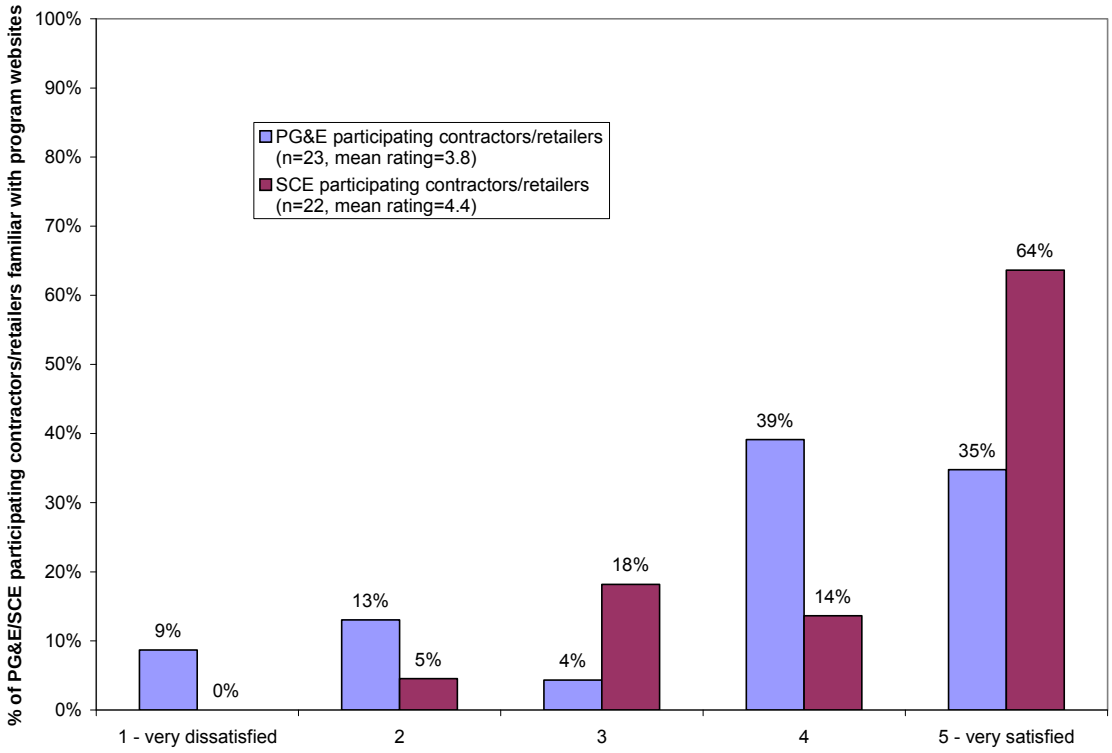


Starting in 2006 the PG&E and SCE rebates for pool pumps were split between the customer and the pump installer where before the rebates had primarily gone to the pool owners. We asked the participating pool contractors/retailers what they thought were the advantages and disadvantages of this new split rebate structure. Seventy-two percent of the PG&E contractors/retailers and 40 percent of the SCE contractors/retailers said that the new split rebate structure motivates contractors/retailers to promote more of the multi-speed pumps. Ten percent of the PG&E contractors/retailers and 13 percent of the SCE contractors/retailers thought that the whole rebate should go to the end user. They argued that the larger customer rebates would increase the chance that the pool owners would opt for the multi-speed pumps and the installers would still make money from the profit on the increased sales. Other disadvantages cited by the contractors/retailers included slow rebate processing times, cumbersome rebate tracking processes, and the rebate amounts not being as large as they used to be. About a third of the SCE contractors/retailers had no opinion on this issue.

Satisfaction with the Program Websites and Marketing Efforts

Participating contractors/retailers were generally satisfied with the program websites. We asked the PG&E and SCE participating contractors/retailers who were familiar with the pool rebate program websites how satisfied they were with these websites. Figure 5-16: shows that 74 percent of the PG&E participating contractors/retailers and 78 percent of the SCE participating contractors/retailers were satisfied (4 or 5 on a 5-point satisfaction scale) with the rebate program websites. However, the chart also shows that the SCE respondents were much more likely than the PG&E respondents to say that they were very satisfied with the website.

Figure 5-16:
Satisfaction of Participating Contractors/Retailers with the Rebate Program Websites

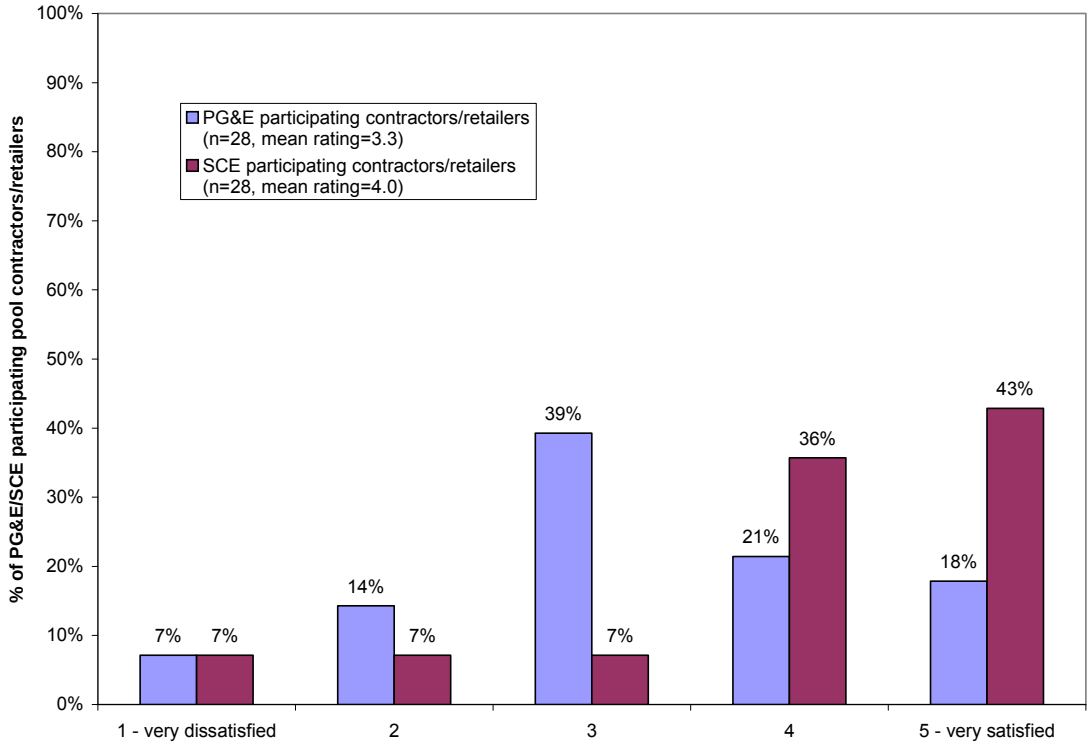


The six contractors/retailers who were dissatisfied with the PG&E website said that it was difficult to find the necessary pool pump information, the website lacked educational materials, and there was too much non-pool-related information on the website. The five contractors/retailers who were dissatisfied with the SCE website said that the layout was confusing, the content was too lengthy and confusing, and there was not enough information on

which pool pumps were eligible for the rebates. One of the SCE contractors/retailers suggested that the SCE staff look at the Pentair website as an example of a more clearly-designed website.

For the PG&E participating contractors/retailers there was a low level of satisfaction with the utility's efforts to promote the rebates for energy-efficient pool pumps. We asked these participating contractors/retailers, as well as those operating in the SCE service territory, to rate their satisfaction with the way that the utilities promote and explain the rebates for energy-efficient pool pumps. Only 39 percent of the PG&E respondents were satisfied with these promotional and educations efforts compared to 79 percent of the SCE respondents (Figure 5-17:).

Figure 5-17:
Satisfaction of Participating Contractors/Retailers with Utility Efforts to Promote and Explain the Pool Pump Rebates



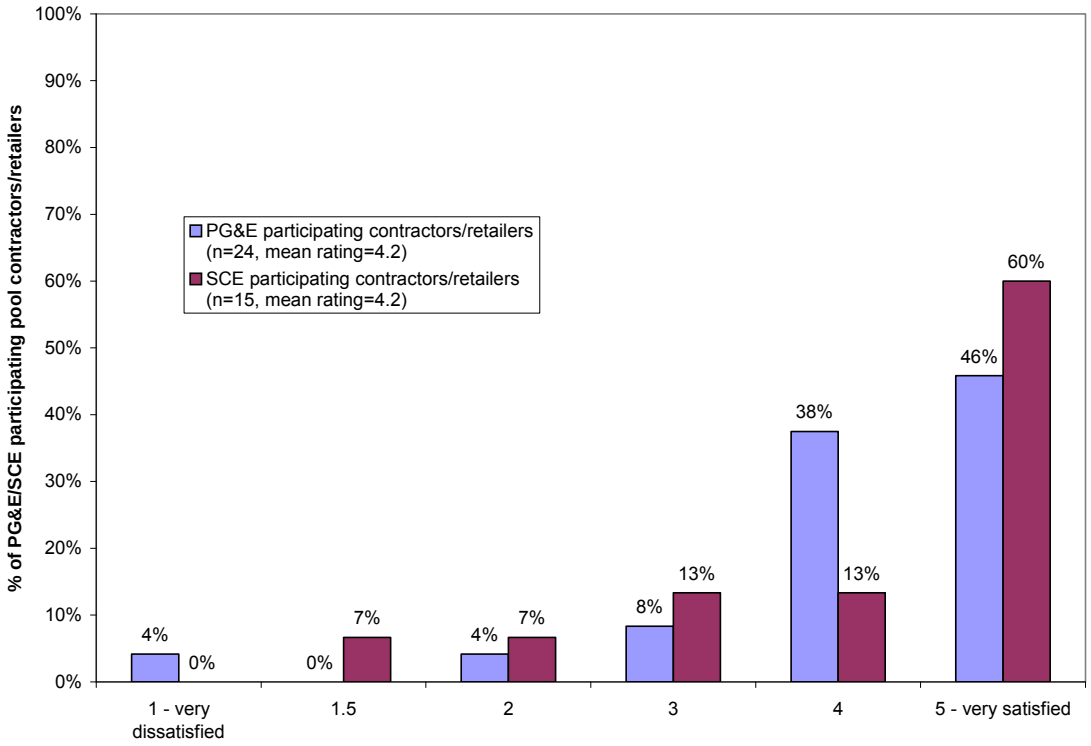
The two most common statements of the PG&E and SCE respondents who were less than satisfied with the utility promotional efforts was that they had not seen any evidence of program marketing and that their customers were unaware of the rebates. They suggested ways to

promote the programs more including mailings to pool owners, mailings to installers, use of radio or television advertising -- including featuring pool pumps in Flex Your Power ad campaigns, and utility representative visits to pool stores.

Satisfaction with Program Staff and the Programs in General

The PG&E and SCE participating pool contractors/retailers were generally satisfied with the program staff. We asked the participating pool contractors/retailers who had posed questions to program staff how satisfied they had been with the way that these questions had been handled. Figure 5-18: shows that the average satisfaction rating for both utilities was 4.2 on a 5-point satisfaction scale where 5 equaled “very satisfied.” The eight PG&E and SCE contractors/retailers who were less than satisfied with the program staff complained about getting the run-around, about utility staff not having enough expertise about the pool pumps, and with the rebate application processing rules being too strict especially concerning receipts. One of these contractors/retailers suggested that it would be helpful to have a direct phone number for reaching the staff that handles the rebates.

Figure 5-18:
Satisfaction of Participating Contractors/Retailers with How Utility Program Staff Handled Questions



We asked the participating contractors/retailers how satisfied they were with the pool rebate programs as a whole. Figure 5-19: shows that 85 percent of the PG&E participating contractors/retailers and 80 percent of the SCE participating contractors/retailers were satisfied (4, 4.5, or 5 on a 5-point satisfaction scale) with the rebate programs a whole. The ten PG&E and SCE participating contractors/retailers that were less than satisfied with the rebate programs cited a wide variety of reasons. These included difficulty getting the rebates approved, difficulty with the rebate paperwork, waiting too long to receive rebate payments, customers not being aware of the rebates, and improvements needed for the program staff and marketing materials.

Figure 5-19:
Satisfaction of Participating Contractors/Retailers with the Pool Rebate Programs as a Whole

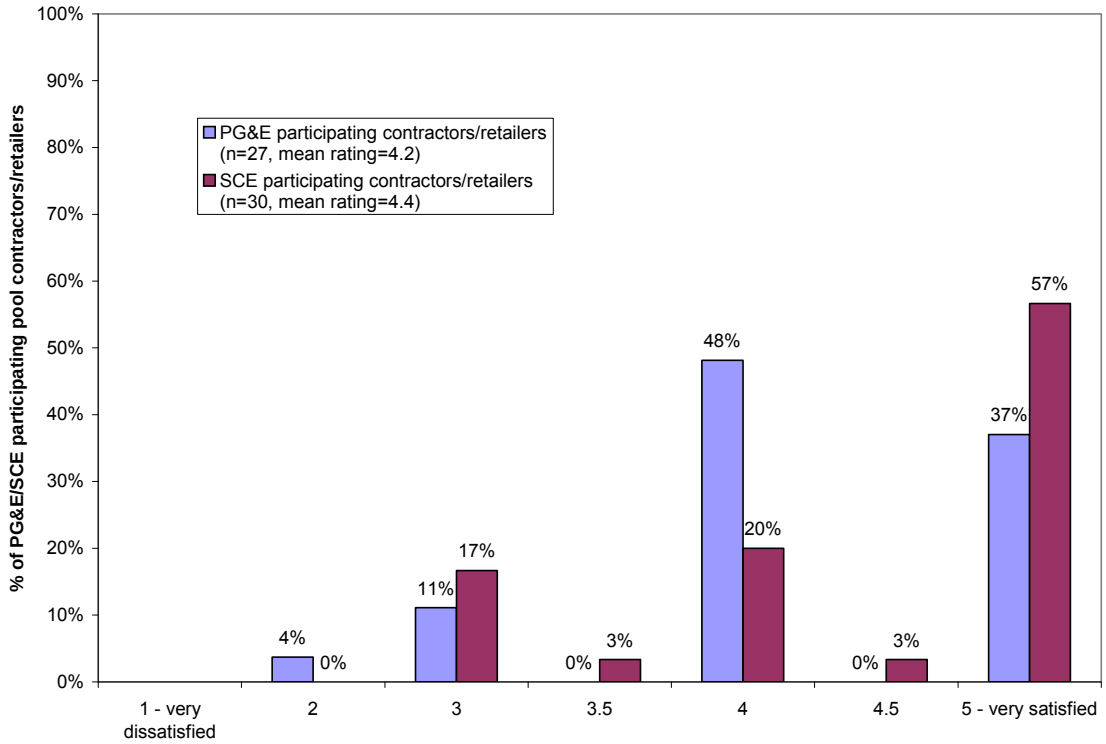
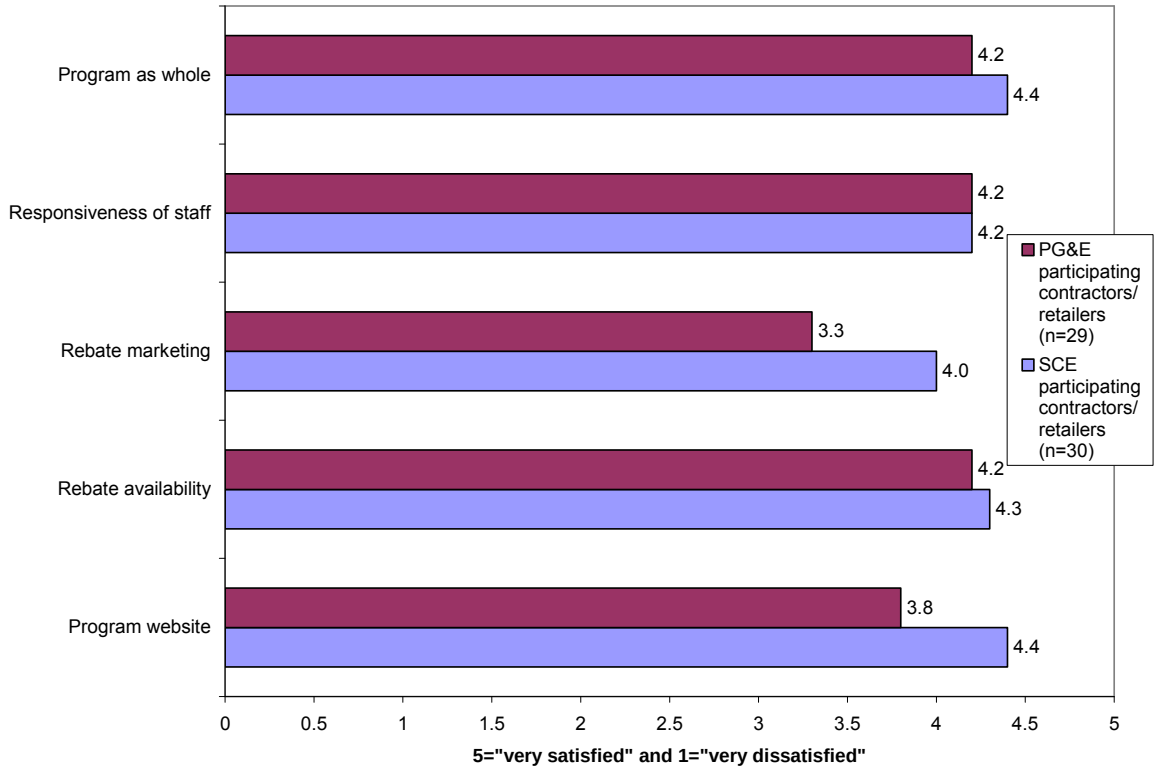


Figure 5-20: brings together the average satisfaction ratings for many of the program processes for both PG&E and SCE in one chart.

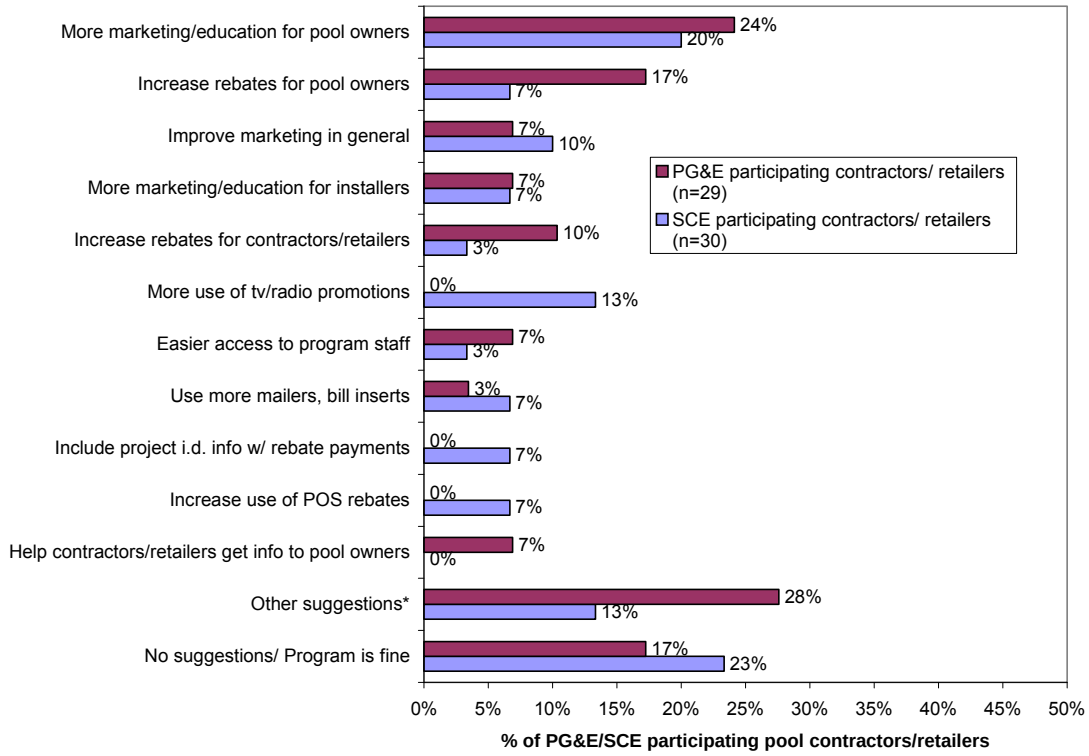
Figure 5-20:
Summary of Average Satisfaction Ratings
for Rebate Program Processes
PG&E and SCE



Suggestions for Program Improvements

We asked the participating pool contractors/retailers for suggestions as to how to improve the pool rebate programs. Figure 5-21: shows that they provided a wide variety of suggestions. The most-cited suggestions concerned increasing marketing of the program and increase the rebate levels.

Figure 5-21:
Suggestions for Pool Rebate Program Improvements from Participating Contractors/Retailers



Note: *Other suggestions, each cited by only one respondent, include allowing above-ground pools to be eligible, listening more to the Independent Pool and Spa Service Association (IPSSA) and less to builders, providing higher rebates for remodeling vs. new construction, encouraging better multi-speed pumps and better controllers, stop requiring contractors/retailers from having to sign up every year, improving the program website, sending more flyers to pool stores, and allowing toggle switches rather than requiring electric controllers.

5.2.8. Pool Characteristics, Pool Equipment Types, and Pool Maintenance Practices in the PG&E Service Territory

Introduction

One of the most important purposes of the these surveys was to collect information on the typical pool characteristics, pool equipment types, and pool maintenance practices that currently exist in the PG&E service territory. PG&E program staff was interested in this information to better inform the development of new pool-related rebate offerings. Although the California Residential Appliance Saturation Study (RASS) will provide some information about pool

equipment, this information is not expected to be available until 2010 and will not contain the level of detail that the PG&E program staff was looking for.

As discussed previously, there are advantages and disadvantages to the different surveys that provide information for this section. One advantage of the contractor/retailer surveys over the pool owner survey is that the contractors/retailers have the technical expertise to more accurately and precisely identify the pools, pool equipment, and pool maintenance practices that they encounter in the field. One disadvantage of the survey of PG&E's participating pool contractors/retailers, however, is there a possibility that these contractors/retailers might be servicing pool owners that may be different – e.g., more environmentally conscious – than the larger population of PG&E pool owners. For this reason we added the survey of a random sample of PG&E's general population contractors/retailers. One advantage of the pool owner survey over the contractor/retailer surveys is that it can provide some information – such as pool timer settings for pool owners who control their own pool timers or the age of pools and pool equipment – which we would not be able to reliably collect if we surveyed only pool contractors/retailers. In addition, because only a third of the PG&E pool owners claimed to use pool professionals, it was important to determine if these pools were different than those served by the professionals. However, one disadvantage of such a survey is that some pool users may lack the expertise to correctly identify their pool equipment.

Pool Sizes, Ages, and Features

We asked the PG&E pool contractors/retailers for the breakdown of the pools they service in terms of size. We also asked the PG&E pool owners to estimate the sizes of their own pools. Table 5-4 shows that contractors/retailers said that 84-88 percent of the pools they service are smaller than 30,000 gallons. The table also shows that the PG&E participating and general population contractors/retailers were pretty close in their estimates of the distribution of pool sizes. The PG&E pool owners estimated a higher proportion of larger pools, but otherwise their pool size estimates were not significantly different than those provided by the contractors/retailers. 176 of the pool owners also estimated their pool size in gallons. The average of these estimates was 24,219 gallons and the median estimate was 20,000 gallons.

Table 5-4:
Distribution of Pool Sizes
As Estimated by PG&E Contractors/Retailers and Pool Owners

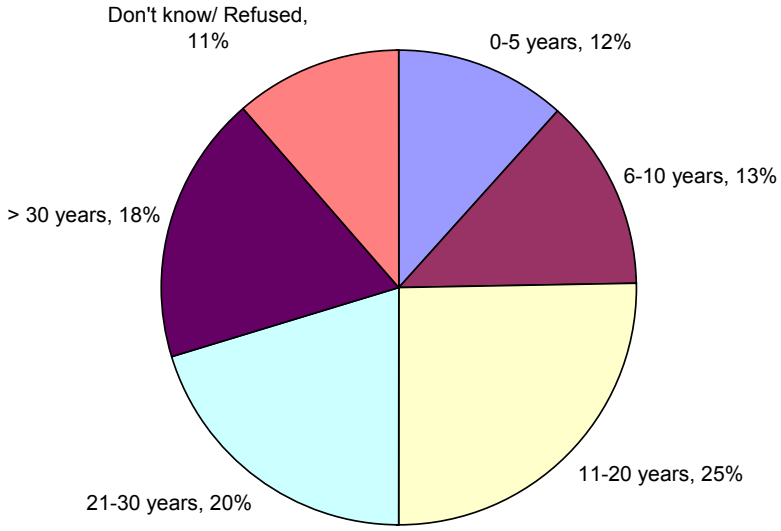
Pool size (gallons)*	PG&E participating contractors/retailers (n=29)	PG&E general population contractors/retailers (n=31)	PG&E pool owners (n=300)**
< 20,000	44%	39%	33%
20,000 - < 30,000	44%	45%	38%
30,000 - < 40,000	10%	12%	22%
> 40,000	2%	4%	7%
Total	**100%**	**100%**	**100%**

Note: * We asked the contractors/retailers the question: "Of the pools you service what % are the following sizes? …." We asked the pool owners the question: "How many gallons of water does your pool contain?" **Forty-one percent of the respondents said that they did not know. The size breakdowns presented here are from the 59 percent of pool owners who did provide size estimates. For the pool users who did not know the number of gallons in their swimming pool, we did ask them to estimate the length, width, and depth of their swimming pool. However, for this report we did not try to convert these estimates of pool dimensions into estimates of pool volume.

We asked the PG&E pool owners how old their pools were. Figure 5-22: shows the distribution of pool ages they estimated. The mean estimated pool age was 21 years and the median estimate was 20 years.

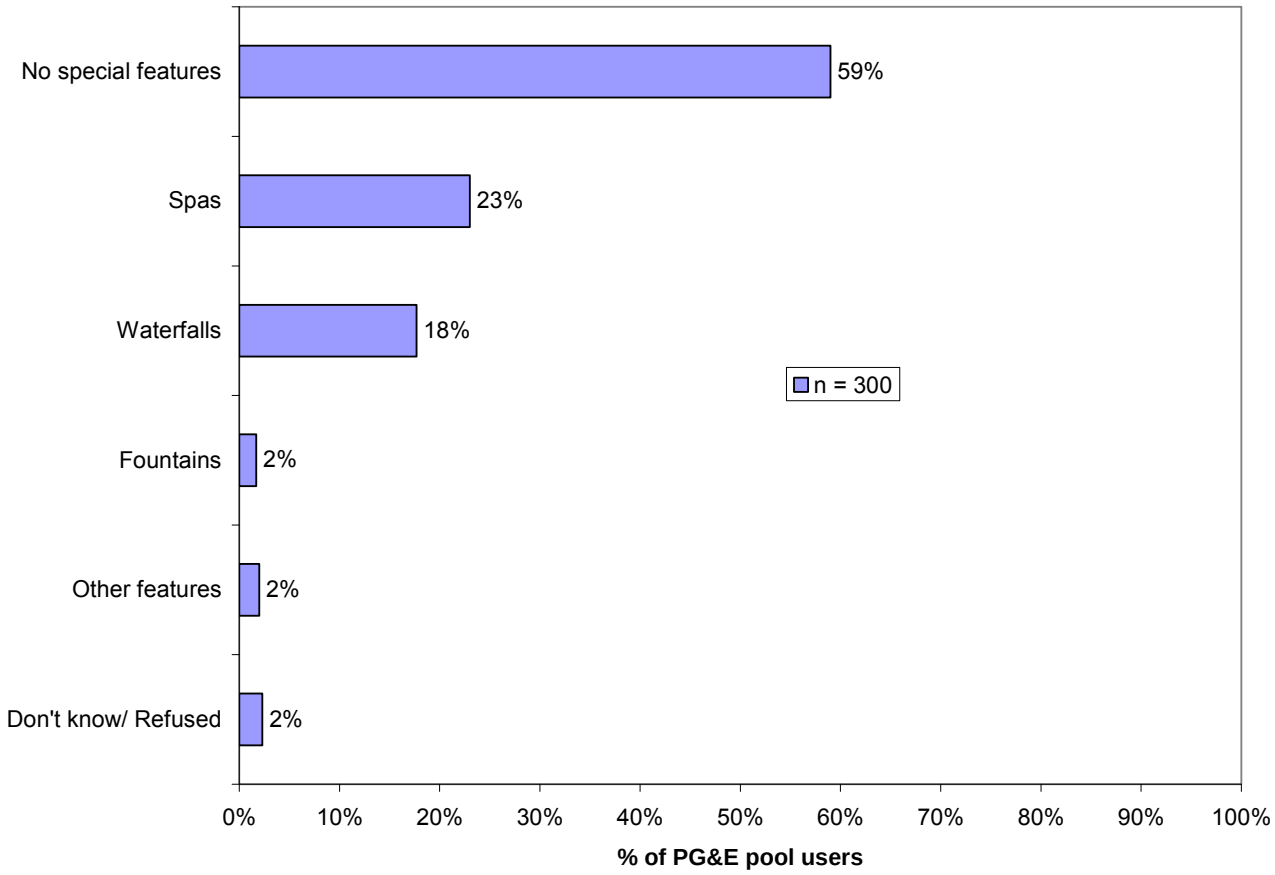
Figure 5-22:
Distribution of Pool Ages
As Estimated by PG&E Pool Owners

n=300, mean=21, median=20



Finally we asked the PG&E pool owners which special features such as waterfalls, fountains, and spas that their pools had. Figure 5-23: shows that nearly 60 percent of the pool owners had pools with no special features. For those that had pools with special features, the most common features were spas and waterfalls.

Figure 5-23:
The Prevalence of Residential Pools with Special Features Reported by PG&E Pool Owners



Pool Filtration Pumps

We asked the PG&E pool contractors/retailers and pool owners about the prevalence of pool filtration pumps, the speed options and horsepower of these pumps, and the age of this equipment. Nearly all the pools were estimated to have working filtration pumps (Table 5-5). The table also shows that the participating and general population contractors/retailers gave very similar estimates of the distribution of single-speed, two-speed and multi-speed pumps. The pool owners reported a slightly higher percentage of single-speed pumps than the pool contractors/retailers did. It is possible that some of the pool owners with multi-speed pool pumps were unable to recall whether their pumps were two-speed or variable-speed pumps and therefore their responses fell into the “don’t know” category.

Table 5-5:
Distribution of Residential Pool Filtration Pump Speed Options
As Estimated by PG&E Contractors/Retailers and Pool Owners

Pool filtration pump characteristics	PG&E participating contractors/retailers (n=19)	PG&E general population contractors/retailers (n=27)	PG&E pool owners (n=300)
% of pools w/ working pool filtration pumps?*	99.7%	97.0%	98.3%
pool filtration pump types**			
% of single-speed	76%	76%	89%
% of two-speed	11%	10%	9%
% of variable-speed	12%	14%	3%
Total	**100%**	**100%**	**100%**

Note: *We asked the contractors/retailers: "About what % of the residential pools that you service have working pool pump filtration systems?" We asked the pool owners: "Do you have a pool filtration pump?
**We asked the contractors/retailers: "Of the residential pools that you service that have working pool pump filtration systems, about what % of these systems fall into the following categories: ….?" We asked the pool owners the question: "Does your pool filtration pump have one speed setting, two speed settings, or more than two speed settings?" About 21 percent of the pool owners did not know what the speed settings of their pool pumps were. The speed setting breakdowns presented here are from the 79 percent of pool owners who reported having single-speed pool pumps and who did provide horsepower estimates.

Table 5-6 shows PG&E contractor/retailer and pool owner estimates for the proportion of residential single-speed pumps that fall into various horsepower bins. One possible explanation for the fact that the PG&E participating contractors/retailers reported larger pool pump motors than the PG&E general population contractors/retailers is that the participating contractors/retailers may be serving customers with bigger pools, as noted above. The average pool pump size (n=109) was 1.5 horsepower.

Table 5-6:
Distribution of Horsepower Levels
for Residential Single-Speed Pool Pumps
As Estimated by PG&E Contractors/Retailers and Pool Owners

Horsepower of single-speed pool pumps*	PG&E participating contractors/retailers (n=18)	PG&E general population contractors/retailers (n=27)	PG&E pool owners (n=207)**
< 1 hp	25%	43%	21%
1-1.5 hp	59%	47%	48%
2-2.5 hp	18%	5%	26%
3 hp	1%	1%	6%
Total	**103%**	**96%**	**100%**

Note: The "totals" are the sums of average proportions and inconsistent responses (e.g., missing data or surveyor did not check that total % of responses = 100%) may cause these totals to not equal 100%. *We asked the contractors/retailers: "Of the single-speed pumps that you encounter in your service work, about which % fall into the following horsepower categories ….?" We asked the pool owners: "How many horsepower is your pool filtration pump?" **54.6 percent of pool owners did not know what their pool pump horsepower were and another 3.9 percent provided non-responsive answers. The breakdowns presented her are from the 41.5 percent of pool owners who did provide estimates.

Table 5-7 shows PG&E contractor/retailer and pool owner estimates for the proportion of residential multi-speed pumps that fall into various horsepower bins. All three surveys indicated that the largest share of multi-speed pool pumps are in the 1-1.5 horsepower range. However, these horsepower estimates are generally less reliable than those for single-speed pool pumps because the surveyors did not clarify whether the horsepower estimates were for the pool pumps' maximum settings and because the sample size was so small. Only eight pool owners were willing to estimate the size of their multi-speed pumps with the average size being 1.7 horsepower.

Table 5-7:
Distribution of Horsepower Levels
for Residential Multi-Speed Pool Pumps
As Estimated by PG&E Contractors/Retailers and Pool Owners

Horsepower of multi-speed pool pumps*	PG&E participating contractors/retailers (n=16)	PG&E general population contractors/retailers (n=27)	PG&E pool owners (n=27)**
< 1 hp	3%	15%	13%
1-1.5 hp	61%	50%	63%
2-2.5 hp	3%	14%	0%
3 hp	28%	21%	25%
Total	**94%**	**100%**	**100%**

Note: The "totals" are the sums of average proportions and inconsistent responses (e.g., missing data or surveyor did not check that total % of responses = 100%) may cause these totals to not equal 100%. *We asked the contractors/retailers: "Of the multi-speed pumps that you encounter in your service work, about which % fall into the following horsepower categories ...?" We asked the pool owners: "How many horsepower is your pool filtration pump?" **70 percent of pool owners did not know what their pool pump horsepower were. The breakdowns presented her are from the 30 percent of pool owners who reported having multi-speed pool pumps and who did provide horsepower estimates.

We asked the PG&E pool contractors/retailers and pool owners about typical operating periods for pool pumps. Table 5-8 shows that the PG&E participating contractors/retailers estimated longer operating periods than the general population contractor/retailers did. This may be due to the larger average pool sizes that the participating contractors/retailers reported servicing, although, as discussed above, they are also reporting larger average pool pump horsepower levels. Another possibility is that the contractors let their pool filtration systems run longer to reduce the chance of complaints from their customers.

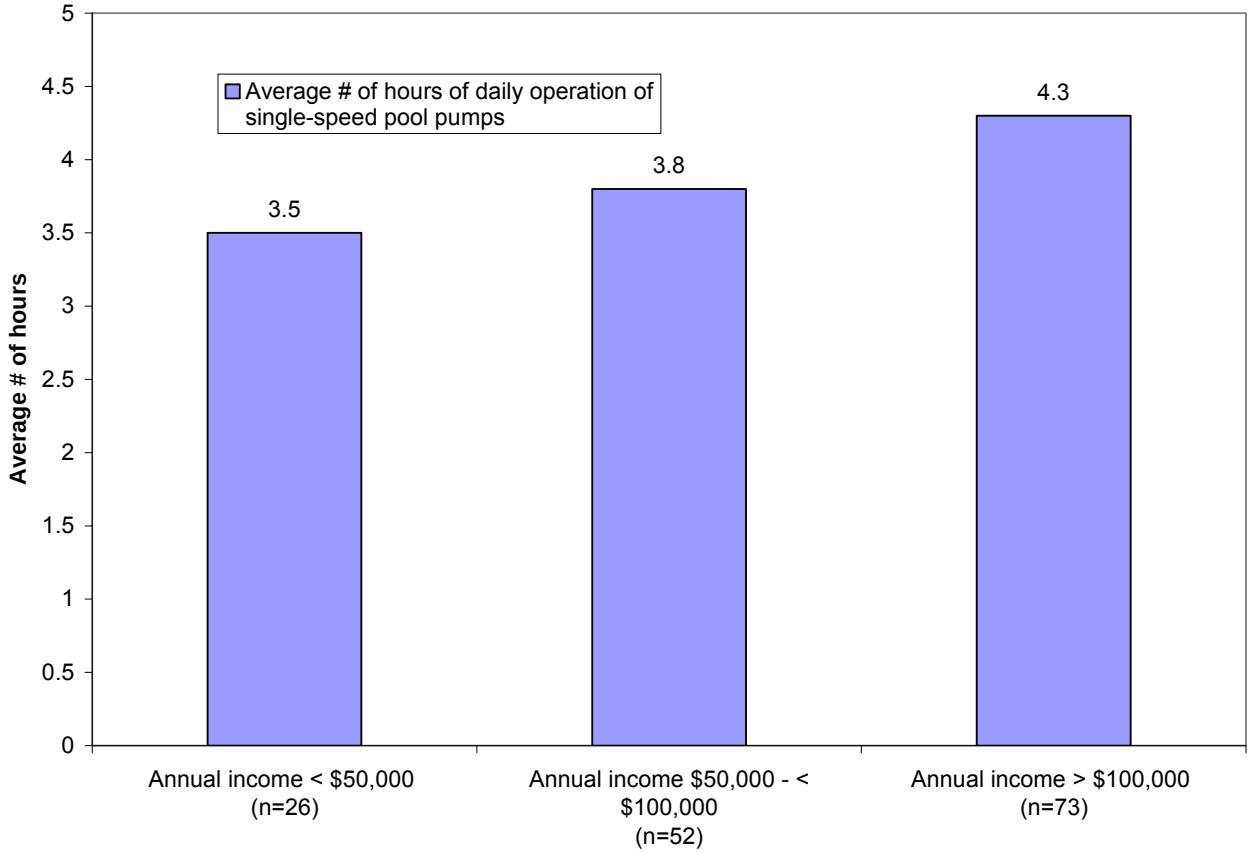
Table 5-8:
Length of Operating Period
for Residential Pool Pumps
As Estimated by PG&E Contractors/Retailers and Pool Owners

Pool pump operating periods	PG&E participating contractors/retailers (n=17,15,15)	PG&E general population contractors/retailers (n=26,18)	PG&E pool owners (n=268,20)
Average of typical single-speed pool pump operating periods (# hours)*	6.9	6.0	4.1
Average of typical multi-speed pool pump operating periods (# hours)*	9.3	6.6	3.4 at low speed 2.1 at high speed
Average % of time that multi-speed pool pumps operate at lowest speed**	83%	Question not asked	62%

Note: *We asked the contractors/retailers: "When you encounter single/multi-speed pool pumps in your service work, on average, about how many hours per day are they operating? …". We asked the pool owners: "How many hours a day do you normally run your pool filtration pump? ** For the contractors' retailers as a follow-up to the question: "When you encounter multi-speed pool pumps in your service work, on average, about how many hours per day are they operating?" we asked: "About what percentage of this time is spent on the lowest speeds?" For the pool owners the percentage is the ratio of 3.4 hours to 5.5 hours indicated in the cell above.

Since pool size is likely correlated with higher household incomes, another possibility is that the participating contractors/retailers are servicing customers who are less likely to curtail pool pump operating periods for economic reasons. The PG&E pool owner survey results did indicate a trend of longer reported pool pump operation as income increases (Figure 5-24:) although none of the differences between the means were statistically significant at the 90 percent confidence level.

Figure 5-24:
Average Hours of Daily Operation of Residential Single-Speed Pool Pumps by Pool Owner Annual Household Income

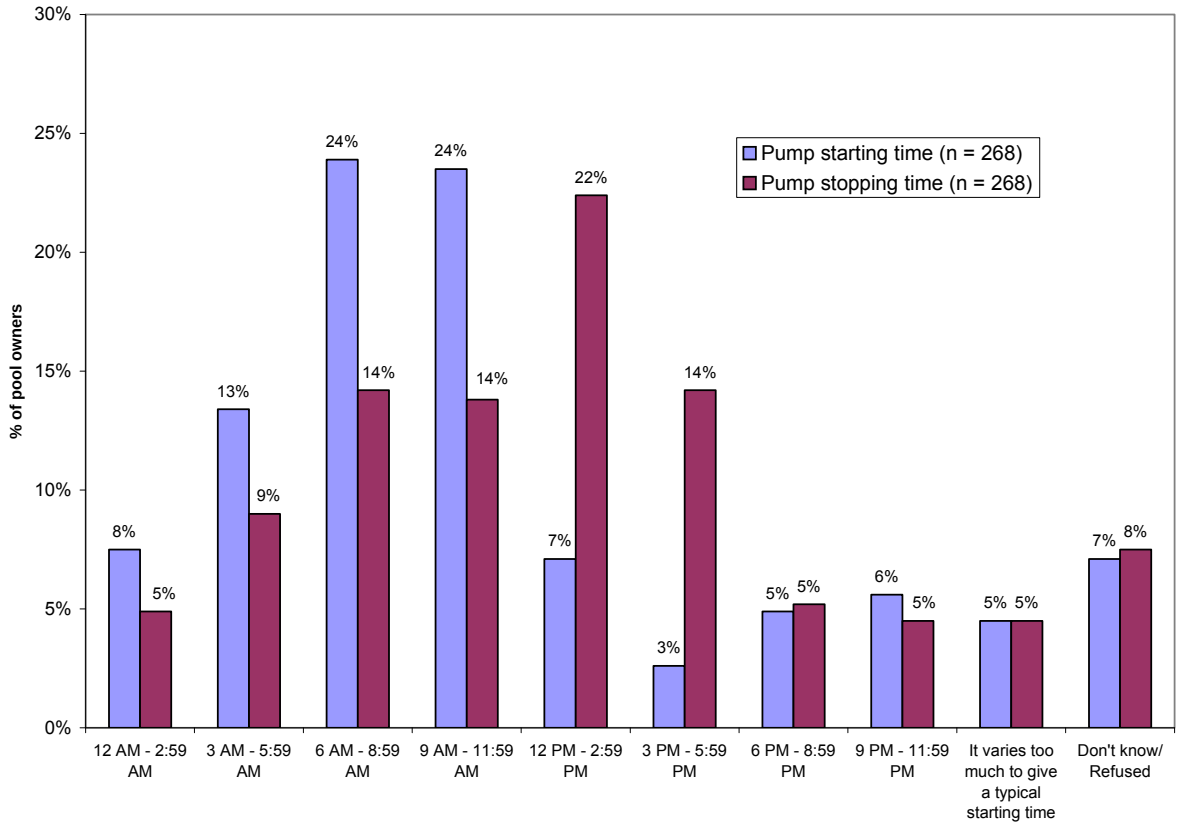


We also asked the PG&E pool owners for the typical times of the day that they normally start and stop running their pool pumps. Figure 5-25: shows that for pool owners with single-speed pool pumps the most common starting times were between 6 AM and noon. The most common stopping time was between noon and 3 PM – which would be expected since the average reported operating period was four hours, as noted above. If one excludes the respondents who did not report a stopping time, the chart shows that almost three quarters of the pool owners said that they stopped operating their pool pumps before the key system peak period of 3 to 6 PM.

We posed the same questions about pool pump stopping and starting times to the 27 PG&E pool owners with dual-speed or variable-speed pumps. With a few small exceptions they gave similar responses as the single-speed pump respondents had. We also asked these multi-speed pump owners whether they typically run their pool pumps at the high-speed setting between the

hours of noon and 6 PM. For the dual-speed pump owners, only 20 percent said that they did, 75 percent said they did not, and five percent did not know. For the variable-speed pump owners, only 29 percent said that they did and 71 percent said they did not.

Figure 5-25:
Residential Single-Speed Pool Pump Starting and Stopping Times
As Reported by PG&E Pool Owners

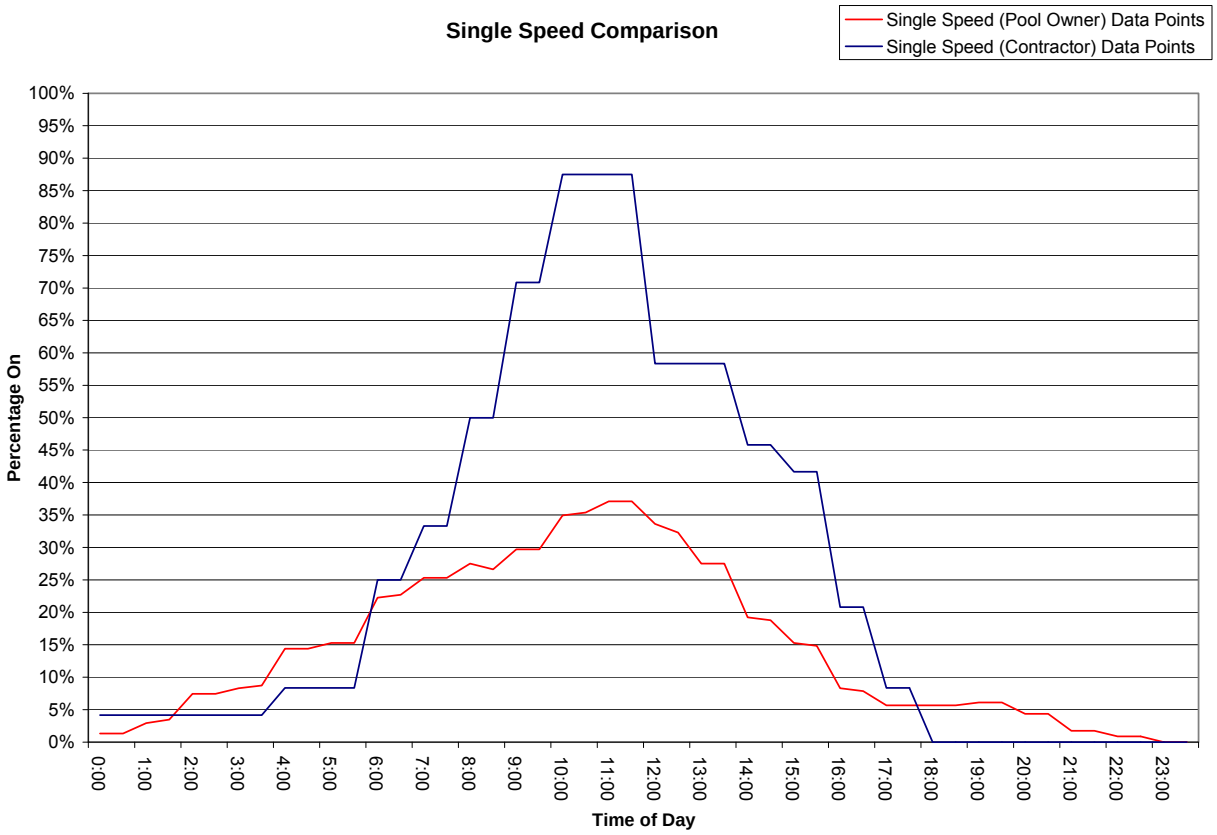


We estimated the percentage of pool pumps that were operating in a given hour by combining the pool contractor and pool owner estimates of which hours in the day pumps were typically operating.[33] Figure 5-26 shows these estimates for the single-speed pumps and Figure 5-27 shows them for the multi-speed pumps. As discussed above, contractors may be reporting more frequent pool pump operation than pool owners because: 1) they are working with larger pools

[33] The pool owners were estimating the typical operating hours for their own pool pumps while the contractors were generalizing across all the pool pumps they typically encounter in the field-

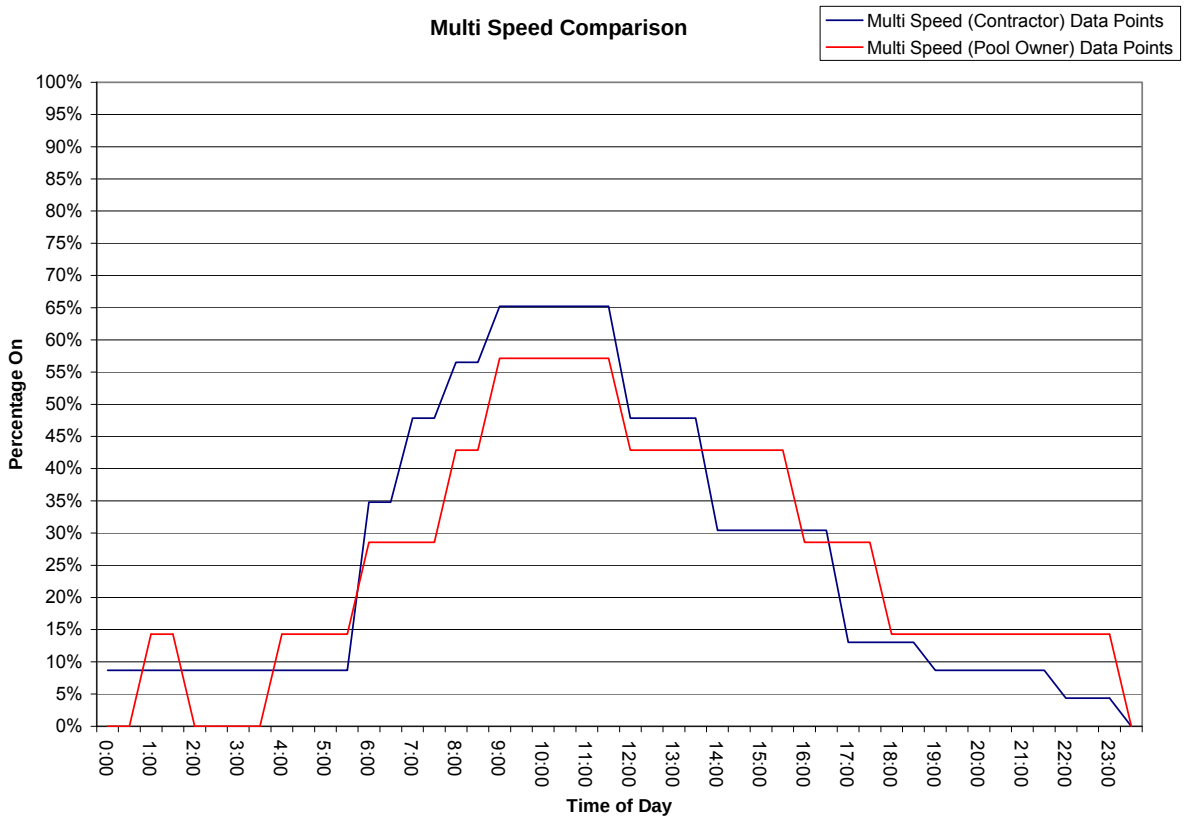
on average, 2) they may be operating their pool pumps longer to minimize customer complaints; and 3) they may be serving higher-income customers who are less likely to curtail pool pump operating periods for economic reasons.

Figure 5-26
% of Single-Speed Pool Pumps Operating by Hour as Estimated by Pool Contractors and Pool Owners



Note: 229 pool owners and 23 contractors provided hours of operation estimates.

Figure 5-27
% of Multi-Speed Pool Pumps Operating by Hour
as Estimated by Pool Contractors and Pool Owners



Note: 7 pool owners and 23 contractors provided hours of operation estimates.

We asked the PG&E pool owners about the ages of the various pumps and motors that run their pool equipment. As we would expect to see, the reported average age of the multi-speed pool filtration pumps (3.7 years) was much lower than the average age of the single-speed pumps (7.9 years). With the exception of the multi-speed pumps, the average age of all the other pool pumps and motors was between six and eight years (Table 5-9).

Table 5-9:
Average Ages of Residential Pool Pumps and Motors
As Reported by PG&E Pool Owners

Pool pump age (years)	Filtration pool pump single-speed (n=207)	Filtration pool pump multi-speed (n=27)	Motor for waterfall (n=52)	Motor for spa (n=70)	Pump for solar hot water heater (n=8)
0-2	27%	56%	15%	30%	25%
3-6	31%	33%	45%	36%	13%
7-10	19%	4%	23%	16%	38%
11-20	11%	7%	11%	4%	13%
21 years or more	8%	0%	0%	7%	0%
Don't know/ Refused	5%	0%	6%	7%	13%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
Mean	7.9	3.7	6.2	6.4	7.4
Median	5.0	2.0	4.5	4.0	7.0

Automatic Pool Cleaning Systems

The PG&E program staff expressed great interest in the types of automatic pool cleaning systems that PG&E pool owners were using. We asked both the PG&E pool contractors/retailers and the pool owners about the prevalence of automatic pool cleaning systems and which systems were more common than others. Table 5-10 shows that the contractors/retailers in both surveys were in pretty close agreement; that the majority of pool owners have presser-side systems with booster pumps and with suction-side cleaners being a distant second in terms of frequency. These contractors/retailers reported that other types of cleaners like presser-side systems without booster pumps, in-floor cleaners, and robotic cleaners were relatively uncommon.

The table also shows that the pool users said that robotic cleaners were the most common cleaners. We believe that in this case the lack of technical knowledge of the pool owner along with likely some misinterpretation by the surveyor (e.g., misinterpreting an “automatic” cleaning

system as a "robotic" system), make these results unreliable.[34] The consistency in the responses of the two contractor/retailer surveys also makes the validity of the pool owner responses doubtful.

Table 5-10:
Distribution of Residential Automatic Pool Cleaning Systems
As Estimated by PG&E Contractors/Retailers and Pool Owners

Automatic Pool Cleaning Systems	PG&E participating contractors/ retailers (n=18)	PG&E general population contractors/ retailers (n=28)	PG&E pool owners (n=254)
% of pools w/ working pool filtration pumps?*	89%	91%	85%
reported frequency of automatic cleaning system types**			
presser side w/ booster pump	64%	56%	17%
suction side	27%	29%	14%
presser side w/o booster pump	9%	9%	4%
in-floor	3%	6%	8%
robotic	0%	0%	45%
other			18%
Total	**103%**	**100%**	**106%**

Note: For the contractor/retailer responses, the "totals" are the sums of average proportions and inconsistent responses (e.g., missing data or surveyor did not check that total % of responses = 100%) may cause these totals to not equal 100%.The pool owner survey results exceed 100% because the respondents were allowed to give multiple responses.

*We asked the contractors/retailers: "About what % of the residential pools that you service have working automatic pool cleaning systems?" We asked the pool owners: "Do you have an automatic pool cleaner?"

**We asked the contractors/retailers: "Of the residential pools that you service that have working automatic pool cleaning systems, about what % of these systems fall into the following categories? …". We asked the pool owners: "What type(s) of pool cleaner do you have?" **

[34] While the survey of pool contractors/retailers was conducted by KEMA staff, the survey of pool owners was a Computer-Aided Telephone Instrument (CATI) survey that was administered by surveyors for Opinion Search Inc. who likely did not have much technical knowledge concerning pool equipment.

We also asked the pool contractors/retailers about how many hours per day these automatic pool cleaning systems typically operated. Table 5-11 shows that the both contractor/retailers surveys estimated the daily operating times for the presser side systems with booster pumps to be much shorter (2.1 – 3 hours) than those for the other pool cleaning systems (4.2 – 5.7 hours). We did not ask the PG&E pool owners how often their automatic pool cleaning systems operated.

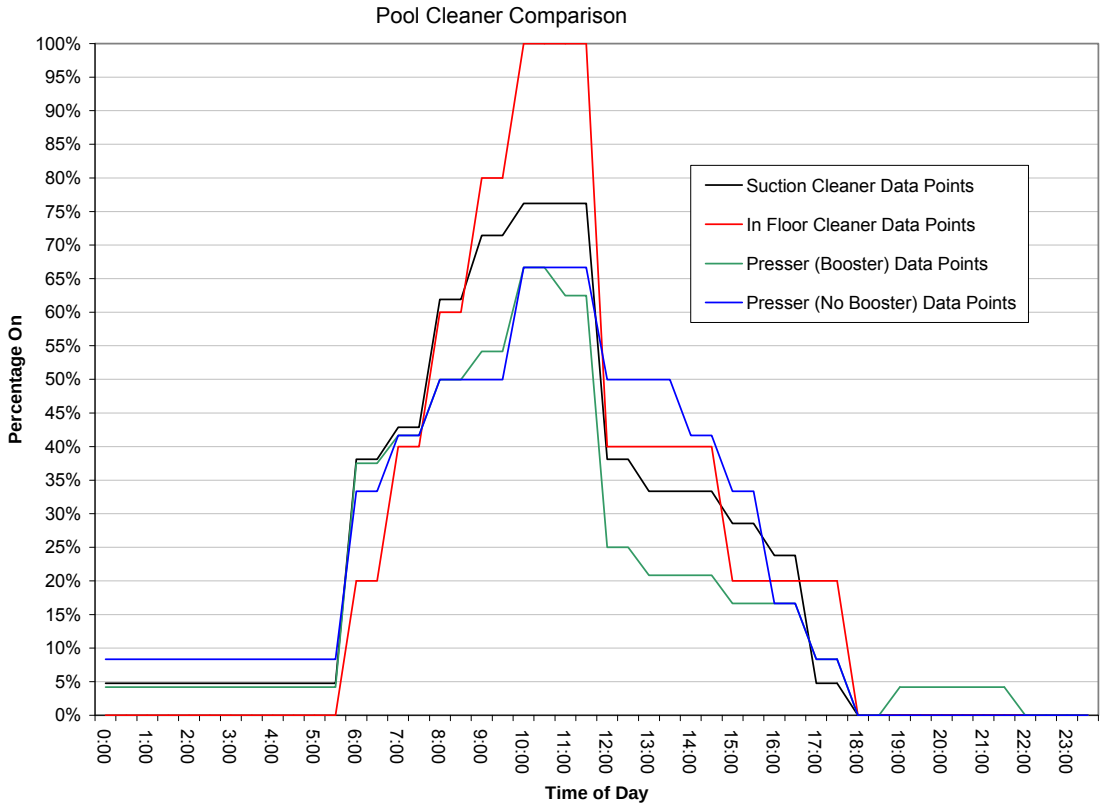
Table 5-11:
Length of Operating Period
for Residential Automatic Pool Cleaning Systems
As Estimated by PG&E Contractors/Retailers

Automatic Pool Cleaning Systems	PG&E participating contractors/ retailers	PG&E general population contractors/ retailers
average daily operating hours		
presser side w/ booster pump (n=18, 25)	3.0	2.1
suction side (n=14, 26)	5.5	5.7
presser side w/o booster pump (n=10, 8)	5.3	5.3
in-floor (n=3, 6)	4.2	5.2

Note: The contractors/retailers were only asked for average daily operating hours if the type of automatic pool cleaning system was one that they had encountered somewhat frequently. This is why the sample sizes decrease with the decreasing frequency of the cleaning systems (see previous table). Only one contractor/retailer provided an estimate for the average operating times of robotic cleaners (2 hours). For the presser side cleaners without booster pumps, four of the general population contractors/retailers said that these systems operate whenever the pool filtration pump is operating.

We estimated the percentage of automatic pool cleaning systems that were operating in a given hour by combining the pool contractor estimates of which hours in the day the cleaning systems were typically operating. Figure 5-28 shows these estimates by the type of system.

Figure 5-28
% of Automatic Pool Cleaning Systems
Operating by Hour
by System Type
as Estimated by Pool Contractors



Note: 24 contractors provided estimates for the presser booster systems, 20 provided them for suction cleaners, 12 provided them for the presser (no booster) systems, and 5 provided them for in floor cleaners.

Pool Filters

After the survey of PG&E participating pool contractors/retailers had already been fielded, PG&E staff requested that some questions concerning pool filters be added to the subsequent survey of PG&E general population contractors/retailers. First we asked these contractors/retailers population about the relative frequency of different types of pool filters they encounter in the residential pools that they service. Table 5-12 shows that these contractors/retailers reported that over half the filters were cartridge filters with the

diatomaceous earth (DE) filters a distant second in terms of frequency. Use of the sand or combination DE/cartridge filters was reported to be relatively infrequent.

Table 5-12:
Distribution of Residential Pool Filters
As Estimated by PG&E General Population Contractors/Retailers

Pool filter types	PG&E general population contractors/ retailers (n=27)
reported frequency of filter types	
cartridge	54%
diatomaceous earth (DE)	24%
sand	9%
DE/cartridge combo	1%

We also asked these PG&E general population pool contractors/retailers how often they clean these filters or recommend that they be cleaned. Figure 5-29: shows that the most common response was 2-3 times per year but there was a variety of frequencies. Some contractors/retailers noted that the frequency of filter cleanings can depend on the type of filter or the pool environment. For example, one contractor/retailer said that he cleans the sand and diatomaceous earth filters monthly but not other types. Another estimated that about 40 percent of the pool filters are undersized. He said that he cleans these undersized filters twice per year but cleans the other 60 percent of filters only once per year. A third contractor/retailer said that if the pool is located in a rural location he will do the cleanings four times per year, but if it's in town he will only do the cleanings twice per year.

When asked what factors they consider in deciding whether to clean filters or recommend cleanings, all of the responding pool contractors/retailers (n=26) also mentioned increases in pressure. We then asked them what levels of pressure increase (in pounds per square inch (psi)) they would consider sufficient to justify cleaning the pool filter. Figure 5-30: shows the about 80 percent of the pool contractors'/retailers said that psi increases greater than 5 psi and less than 15 psi would prompt them to clean the pool filters.

Figure 5-29:
Frequency of Reported/Recommended Residential Filter Cleanings As Estimated by PG&E General Population Contractors/Retailers

n=27 PG&E general population contractors/retailers
mean=3.8 times yearly
median=2.5 times yearly

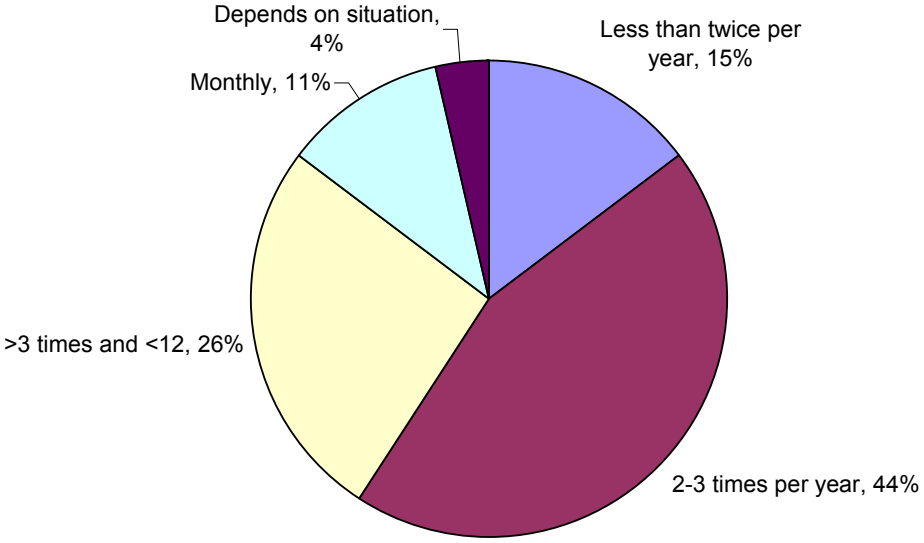
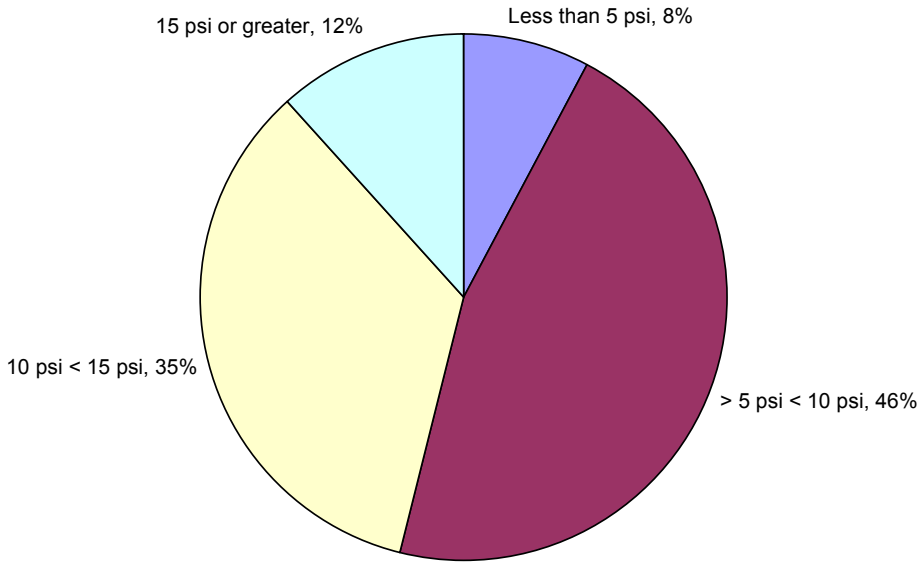


Figure 5-30:
Levels of Pressure Increase (in Pounds per Square Inch (PSI))
Which Would Prompt Filter Cleaning
As Reported by PG&E General Population Contractors/Retailers

n=26 PG&E general population contractors/ retailers



Pool Timers

We asked the PG&E pool contractors/retailers and pool owners a number of questions about pool timers including their prevalence, whether they have a digital time clock, how they are controlled, and the percentage of timers that are set by pool professionals vs. pool owners. Table 5-13 summarizes their responses. The table shows that contractors/retailers reported that only about 20 percent of the timers are controlled by indoor computer pad or wireless remote control and that pool professionals set 70-80 percent of the timers. However, a number of the pool professionals observed that while they will set the timer initially, some homeowners will change the settings after they leave.

In addition the percentage of pool owners that control their own timers is also likely larger because many pool owners do not use pool professionals. As noted, only a third of the PG&E pool owners said they use a pool service or maintenance contractor. “Keep in mind that this is

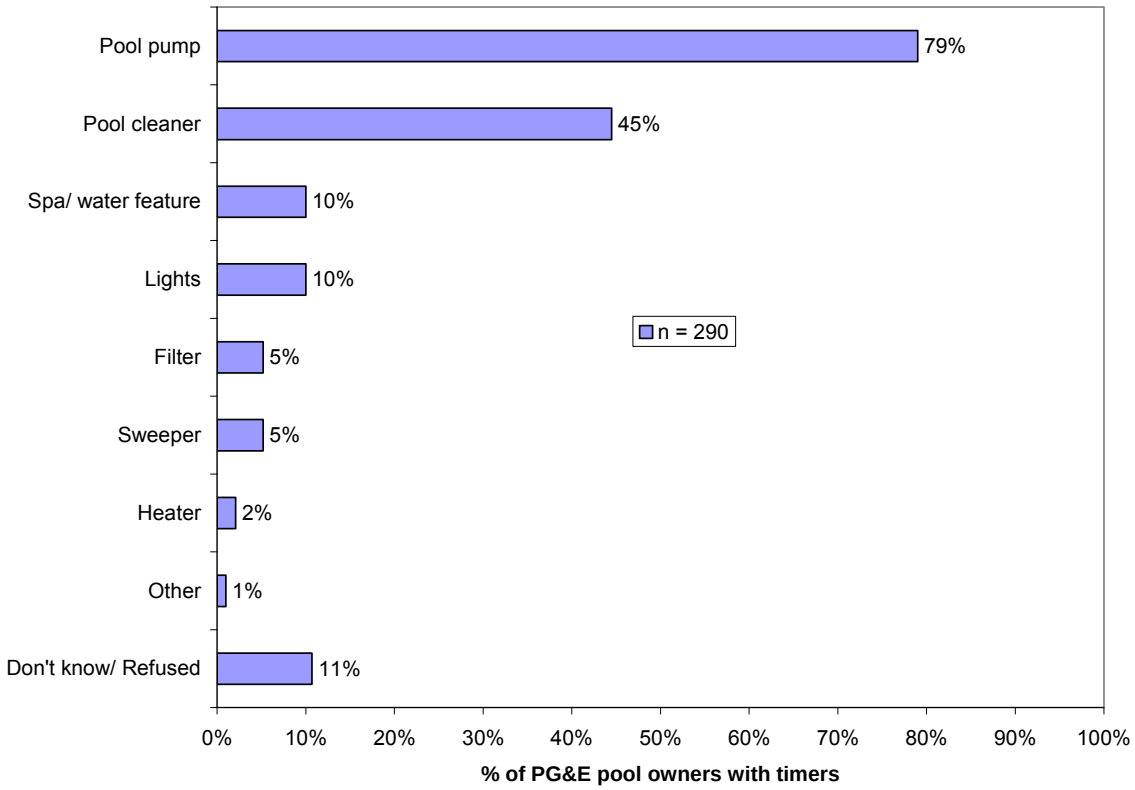
just what I see," said one contractor/retailer after estimating the proportion of timers that are set by professionals. "There are lots of people that maintain their pools entirely on their own and I, or another pool professional, would never see them." While some of these pool owners may not tamper with the default timer settings, many others probably do.

Table 5-13:
Residential Pool Timer Saturation, Control Features/Responsibilities
As Estimated by PG&E Contractors/Retailers and Pool Owners

Pool Timers	PG&E participating contractors/ retailers (n=18)	PG&E general population contractors/ retailers (n=28)	PG&E pool owners (n=300)
% of residential pools w/ pool timers	96%	98%	97%
% of timer with digital clocks	Question not asked		18%
Location of timer control?			
% of timers w/ pool equipment	79%	81%	Question not asked
% wireless or computer-controlled	19%	23%	
Total	**98%**	**104%**	
Who sets timer?			
pool professional	70%	81%	Question not asked
pool owner	30%	19%	
Total	**100%**	**100%**	

We also asked the PG&E pool owners what pool equipment is controlled by their timers. Figure 5-31: shows that over three-quarters (79%) of the pool owners said that they are controlling their pool pumps with their timers and almost half (45%) are controlling their pool cleaners.

Figure 5-31:
As Reported by PG&E Pool Owners



Pool Heaters

We asked the PG&E pool contractors/retailers and pool owners about the prevalence of pool heaters in residential pools and the fuel sources for these heaters. The three surveys indicated that incidence of heaters in residential pools is in the 41-45% range (Table 5-14). The contractors/retailers estimated about a fifth of these pool heaters to be solar, while the pool owners estimated the solar share to be nearly a third. Only 23 percent of the PG&E pool owners (n=300) said that they use a pool cover.

Table 5-14:
Residential Pool Heater Prevalence and Fuel Sources
As Estimated by PG&E Contractors/Retailers and Pool Owners

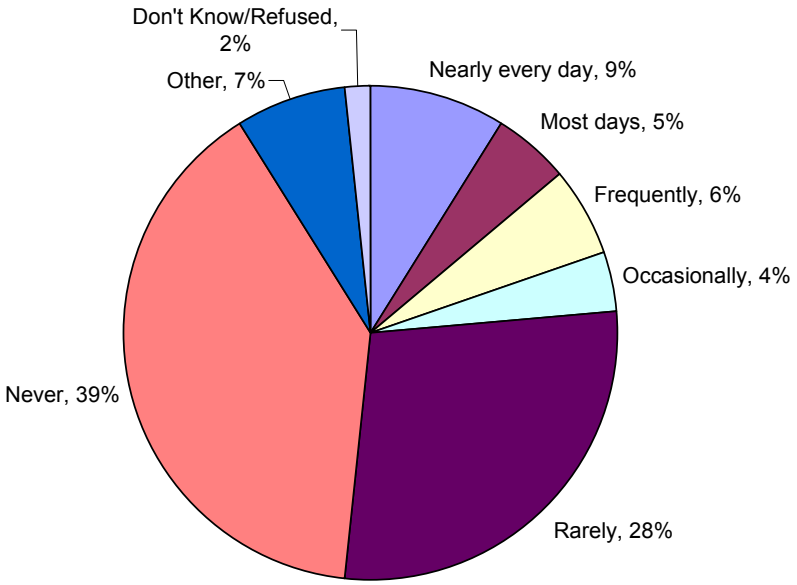
Pool Heaters	PG&E participating contractors/ retailers (n=18)	PG&E general population contractors/ retailers (n=28)	PG&E pool owners (n=300)
% of residential pools w/ pool heaters	42%	45%	41%
Residential pool heater fuel source			
% of gas/propane heaters	92%	92%	62%
% of solar heaters	20%	18%	32%

Note: The total % of pool heater fuel sources can exceed 100% because some pool owners have multiple pool heaters (e.g., the may use the solar heater as an auxiliary heater). Seven percent of the pool owners also reported that they had pool heaters that used electricity/heat pumps as a fuel source.

Finally we asked the PG&E pool owners who said that they have a pool heater how much they use this heater over the course of the year. Figure 5-32: shows that two thirds of the pool owners claimed that they use their pool heaters “rarely” or “never.”

Figure 5-32:
Frequency of Residential Pool Heater Usage
As Claimed by PG&E Pool Owners

n = 122



Pool Spas

We asked the 70 PG&E pool owners who said they had a spa a number of questions about this feature. When asked whether their spa was in-ground or portable, the vast majority of pool owners said it was in-ground (Figure 5-33). We also asked spa owners if they used a cover for their spa. Twenty-one percent said they did and the remainder said they did not. The average age of the spas reported by the pool owners was 20 years. This was also the median estimate. Finally we ask the spa owners how frequently they use their spas over the course of a year. Figure 5-34 shows that about half of the respondents claimed to use their spa two weeks or less per year.

Figure 5-33:
Residential Pool Spa Types
As Reported by PG&E Pool Owners

n = 70

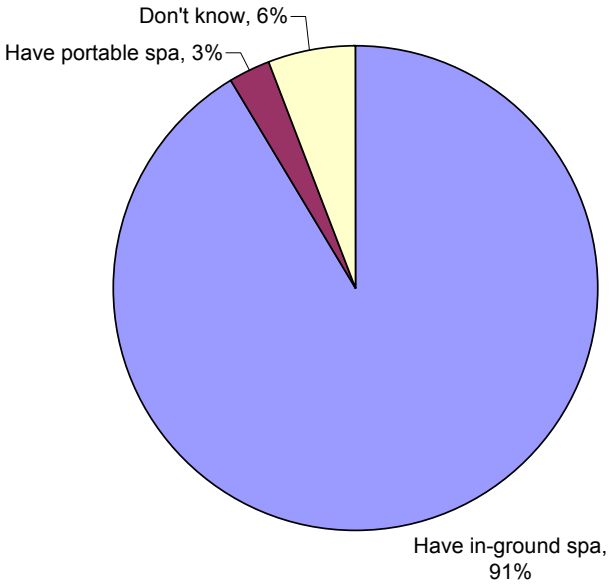
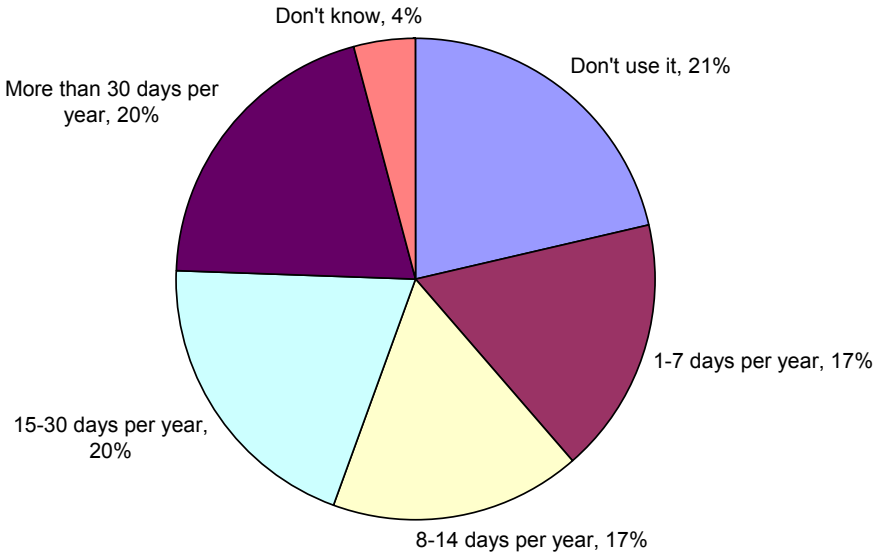


Figure 5-34:
Residential Pool Spa Usage
As Reported by PG&E Pool Owners

n = 70



6. HVAC Contractors and Quality Installations

6.1. Contractor Survey Executive Summary

This section summarizes the more detailed findings presented elsewhere in this section.

6.1.1. Purpose and Scope

This section summarizes our findings from an October/November 2007 survey of 75 HVAC contractors located in the PG&E service territory. The main purpose of this survey was to identify barriers to wider adoption of Quality Installations (QIs) of air-conditioning equipment[35] as well as duct testing and sealing practices. These practices are all encouraged by the Refrigerant Charge & Airflow Program that is part of the PG&E Mass Markets program portfolio. This program uses third-party Verification Service Providers (VSPs) to train HVAC contractors in QI methods and to confirm that the installations meet QI standards so that contractors can qualify for PG&E rebates.

More specifically, topics covered by the survey included:

- How aware HVAC contractors were of the VSPs, whether they received training in using VSP procedures, and how often they use them;
- Helpfulness of the VSPs in providing information to help the HVAC contractors sell additional services;
- Why the HVAC contractors did not have their technicians train with the VSPs;
- What financial incentives are needed to get the technicians to use the VSPs more frequently;
- The frequency with which the HVAC contractors use QI practices;
- The relative importance of various barriers to QI practices;

[35] Quality Installations are installations of air-conditioning equipment where the correct amount of refrigerant is used, air is flowing over the cooling coils at the proper rate, and the equipment is appropriately sized for the home.

- What PG&E could be doing to influence HVAC contractors to do more QIs;
- The attractiveness of free half day or full day training sessions for QI practices;
- The frequency with which the contractors perform duct testing and sealing;
- What is the best way for PG&E to market new or innovative products to HVAC contractors;
- How many of their technicians are NATE-certified;
- Whether there's a shortage of technicians in the HVAC industry and if so, how it has affected the contractors;
- Whether HVAC contractors make more profits from installations or from service;
- Whether HVAC contractors compete more on price or on quality; and
- Firmographics (business characteristics such as HVAC company size and annual revenues).

6.1.2. Summary Findings

The survey of 75 HVAC contractors led us to the following conclusions:

- *Unawareness of the VSP training opportunities remains a barrier to participation:* When asked why they have not participated in VSP training, 25 percent of the nonparticipating contractors said it was because they did not know about the training. This was the most-cited reason for nonparticipation.
- *Contractor beliefs that they already do QI or have received necessary training are other reasons for nonparticipation in VSP services:* When asked why they have not participated in VSP training, 18 percent of the nonparticipating contractors said that it was because they already do this kind of work but just use different procedures. Another nine percent said that their nonparticipation was because they had already gone through other training.
- *Not seeing the value of VSP training is another major reason for nonparticipation:* When asked why they have not participated in VSP training, 14 percent of the nonparticipating contractors said that it was because they saw no need for it, nine percent said that it was because AC was too insignificant a part of their business, nine percent said it was because

their company was too small, and nine percent said that training didn't add anything to their business.

- *Of the logistical barriers to VSP training, inconvenient timing or location were more significant than training costs:* The most-cited (43% of all contractors) suggestion for increasing the use of QI techniques was to make training sessions more local and frequent while at the same time promoting them more. When asked why they did not participate in training, only 12 percent of HVAC contractors said it was because it takes too much time and only two percent said it was due to the cost of training.

- *If VSP training can be made convenient in location and timing, there is the potential for much higher participation:* Seventy-five percent of the contractors said they would send staff to a free whole day technical training on QI services if it was offered in their area.

- *HVAC contractors believe that increasing rebates and wider promotion of QI benefits are the best ways for PG&E to help expand QI practices:* When HVAC contractors were asked how PG&E could help them sell QI services, the two most-cited reasons were increasing the size of the rebates (32% of all contractors) and more advertisement of the value of QI and maintenance (24%). Another seven percent of the contractors suggested that PG&E do more to promote the QI rebates to their customers.

- *Those who received VSP training did find value in it:* Of the contractors with VSP-trained technicians, 50 percent said that they do QI on every service call and another 33 percent said that they do QI under certain conditions (e.g., when their technicians have the time, when there is a difficult system). When asked if the information gained from the VSP techniques helped to convince customers of the value of additional services such as repairs or system replacements, 83% of the contractors with VSP-trained technicians said that it helped some of the time while 11 percent thought it helped all the time.

6.1.3. Recommendations

Based on these summary findings and other findings detailed elsewhere in this section:

- *Increase efforts to educate HVAC contractors and consumers about what QI practices are and why they are valuable:*

- *Since those who have taken the VSP training courses are finding value from them, develop case studies and testimonials from these participating HVAC contractors that can be advertised in relevant trade publications along with links to the program website.*

- *Assess the clarity of message regarding what QI services include and determine how to differentiate QI from regular practices in short, succinct phrases.* To increase knowledge of this difference, create a postcard size synthesis of these phrases and use in a targeted postcard mailing to HVAC contractors. To increase knowledge of this difference in the public, use the same phrases on the PG&E website and in any other marketing regarding this service.

- *Make the VSP training sessions more convenient:* Determine if the program can provide free QI training sessions in multiple locations within PG&E service territory. If so, include information about the free training on the targeted postcard mailing and other marketing.

- *Try to increase the financial incentives for QI services:* Differentiating the differences between QI and standard practice and making training options more convenient may bring in some contractors. However, larger changes in participation may not take place unless increases in the rebate level also occur. To enable larger incentives for QI services, PG&E should assess the ability to include demand reduction benefits into the overall incentive payment.

6.2. Detailed Findings

The remainder of this section presents more explanation and justification for the findings and recommendations summarized in the Executive Summary above.

6.2.1. Purpose and Scope

This section summarizes our findings from an October/November 2007 survey of 75 HVAC contractors located in the PG&E service territory. The main purpose of this survey was to identify barriers to wider adoption of Quality Installations (QIs) of air-conditioning equipment[36] as well as duct testing and sealing practices. These practices are all encouraged by the Refrigerant Charge & Airflow Program that is part of the PG&E Mass Markets program portfolio. This program uses third-party Verification Service Providers (VSPs) to train HVAC contractors in QI methods and to confirm that the installations meet QI standards so that contractors can qualify for PG&E rebates.

A representative sample of 498 was purchased from Dunn & Bradstreet and then randomly ordered and called for our survey. The survey was fielded the third week of October 2007. The eligible completion rate[37] was 22 percent.

Topics covered by the survey included:

- How aware HVAC contractors were of the VSPs, whether they received training in using VSP procedures, and how often they use them;
- Helpfulness of the VSPs in providing information to help the HVAC contractors sell additional services;
- Why the HVAC contractors did not have their technicians train with the VSPs;
- What financial incentives are needed to get the technicians to use the VSPs more frequently;
- The frequency with which the HVAC contractors use QI practices;
- The relative importance of various barriers to QI practices;

[36] Quality Installations are installations of air-conditioning equipment where the correct amount of refrigerant is used, air is flowing over the cooling coils at the proper rate, and the equipment is appropriately sized for the home.

[37] The number of completions divided by the number of businesses reached that were eligible. Ineligible businesses were ones in which English was not spoken, the business did not perform HVAC services (i.e., they were plumbers), the respondent was hearing impaired, there was no answer, telephones were disconnected, telephone number was blocked or was a fax machine, etc

- What PG&E could be doing to influence HVAC contractors to do more QIs;
- The attractiveness of free half day or full day training sessions for QI practices;
- The frequency with which the contractors perform duct testing and sealing;
- What is the best way for PG&E to market new or innovative products to HVAC contractors;
- How many of their technicians are NATE-certified;
- Whether there's a shortage of technicians in the HVAC industry and if so, how it has affected the contractors;
- Whether HVAC contractors make more profits from installations or from service;
- Whether HVAC contractors compete more on price or on quality; and
- Firmographics (business characteristics such as HVAC company size and annual revenues).

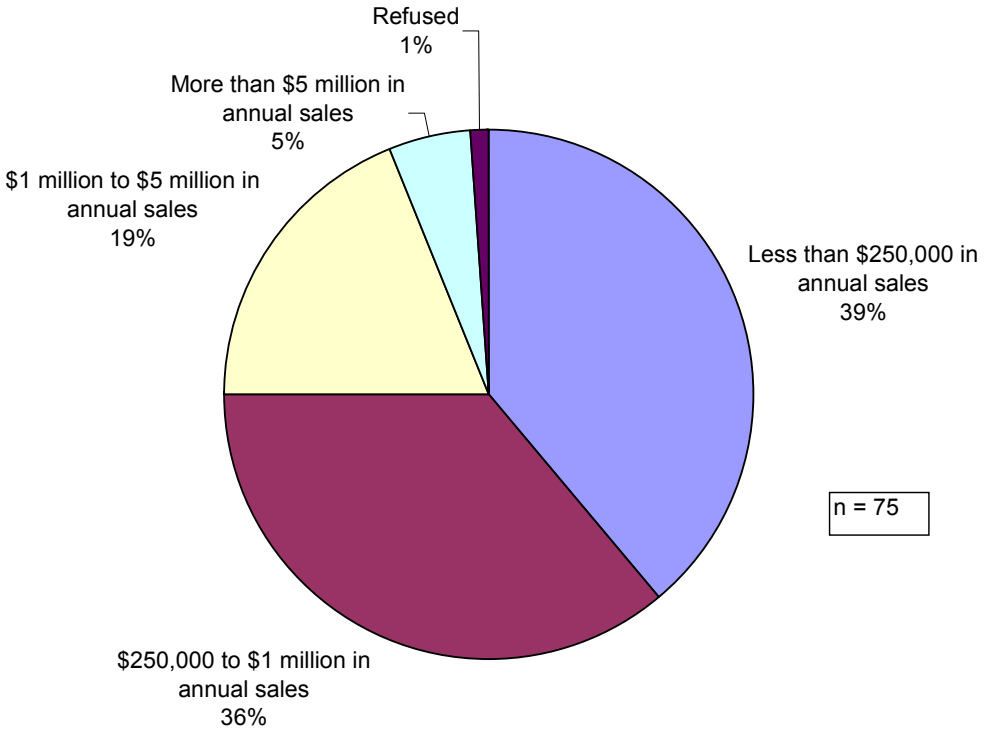
6.2.2. Characteristics of the Surveyed HVAC Contractors

To better understand the barriers that HVAC contractors might face in adopting Quality Installations, we collected information from the contractors in our sample about the size of their companies, their locations, the types of customers they serve, the nature of their projects, and their revenue and profitability drivers.

Company Size

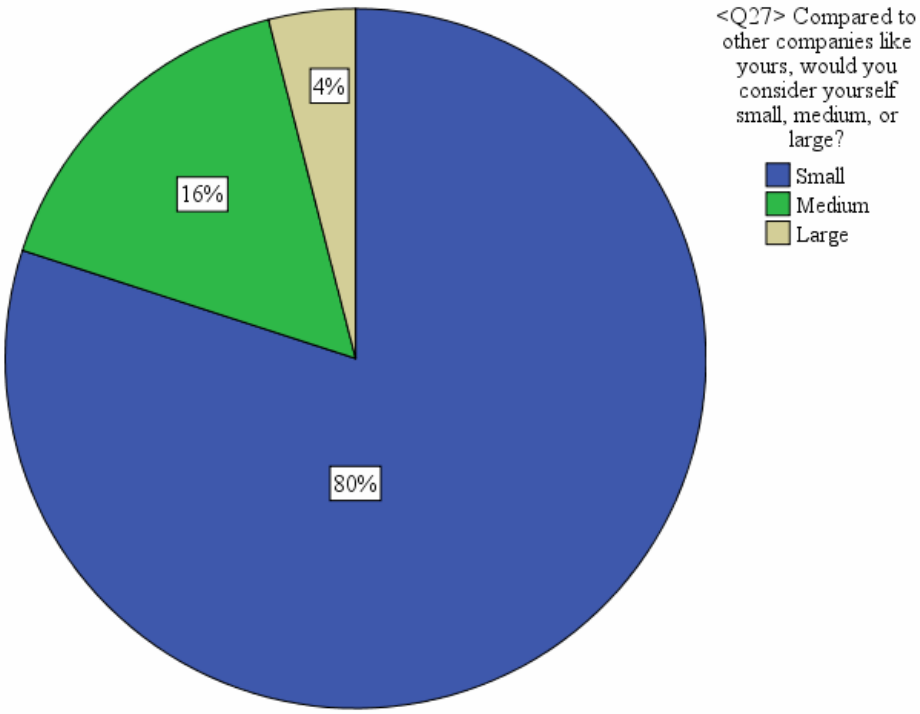
We asked the 75 HVAC contractors a number of questions about the size of their businesses and the types of customers they serve. Figure 6-1: shows that when asked to estimate their company's annual sales, three-quarters of them estimated that they made less than $1 million.

Figure 6-1:
HVAC Company Estimated Annual Sales



We also asked the contractors: "Compared to other companies like yours, would you consider yourself small, medium, or large." Figure 6-2: shows that 80 percent of the respondents considered themselves small. This self-reported size of the company matched up well with the annual revenue question.

Figure 6-2:
HVAC Contractors
Perceived Relative Company Size

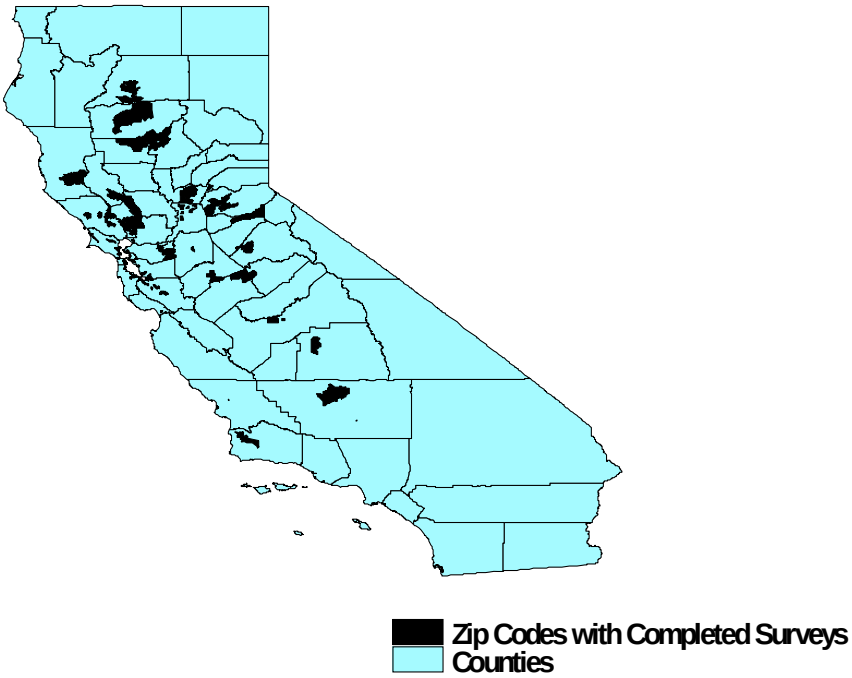


Sixty percent of the firms are one- or two-man operations. The average number of technicians working in the company is 4.5 with a range of 1 to 35. The sample was not drawn nor fielded to enable analysis by size of company, though, and any statistic that is shown by company size should be considered a tendency. Due to the small sample size of large (3) and medium (12) sized companies, the remainder of the analysis will be by sampled population only.

Location

The survey was targeted at HVAC contractors with locations in the PG&E service territory. Figure 6-3: shows how these contractors were distributed across the state.

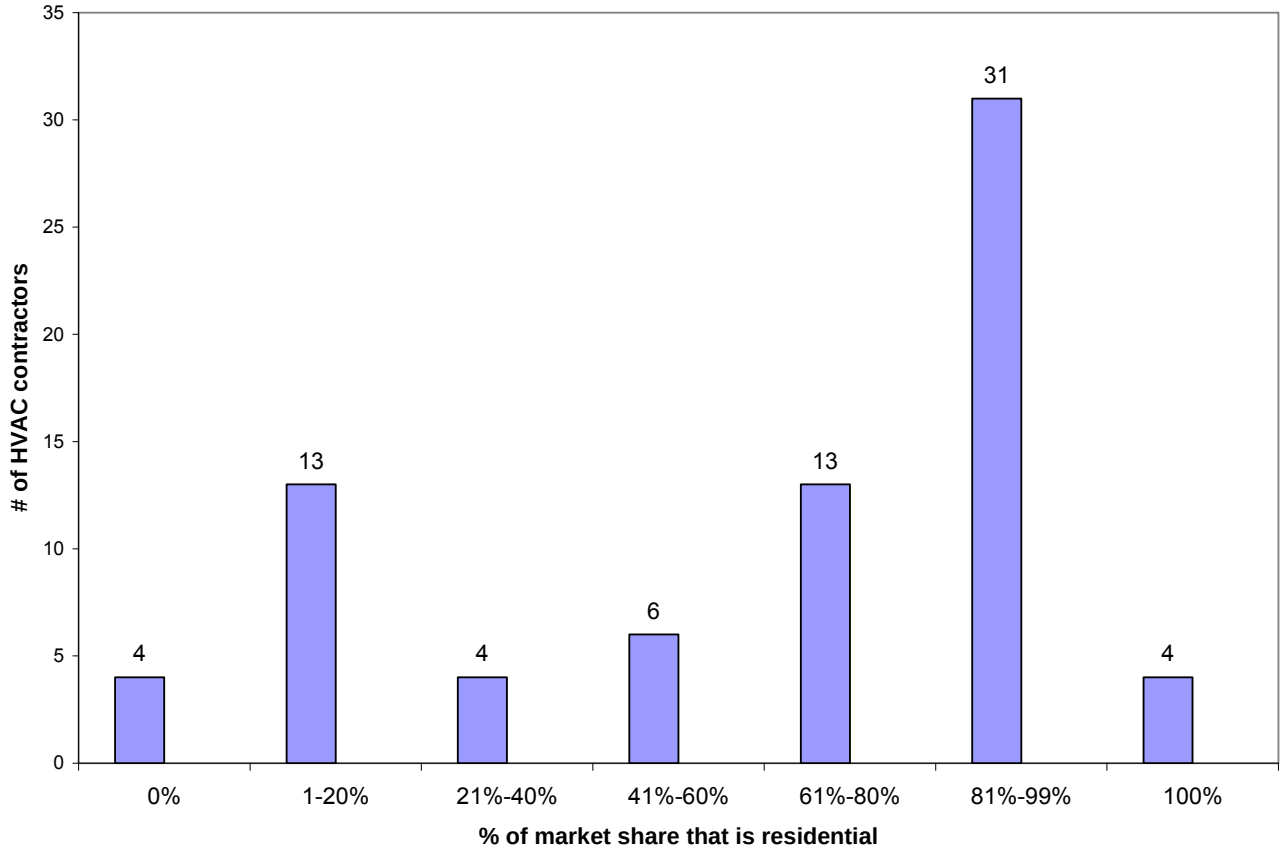
Figure 6-3:
Geographic Distribution of Surveyed HVAC Contractors



Customer Mix, Project Characterization, and Competitive Dynamics

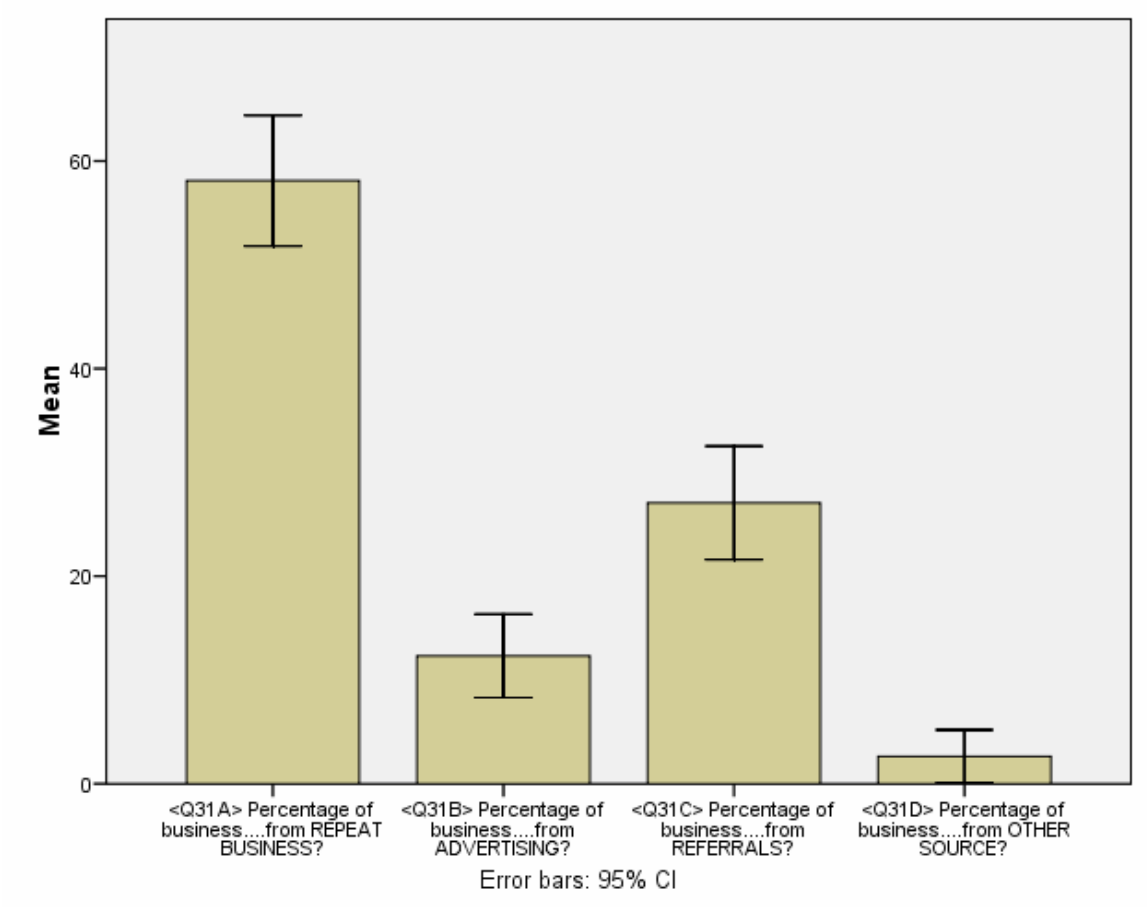
The 75 HVAC contractors that we surveyed did most of their business with residential customers. On average 65 percent of their business came from the residential sector and all but four of them had at least some residential business. Figure 6-4: shows how the HVAC contractors were distributed in terms of the percentage of their business that was from the residential sector.

Figure 6-4:
% of HVAC Business That's Residential



We also asked the HVAC contractors where they get their business from. Figure 6-5: shows that repeat customers and referral business are

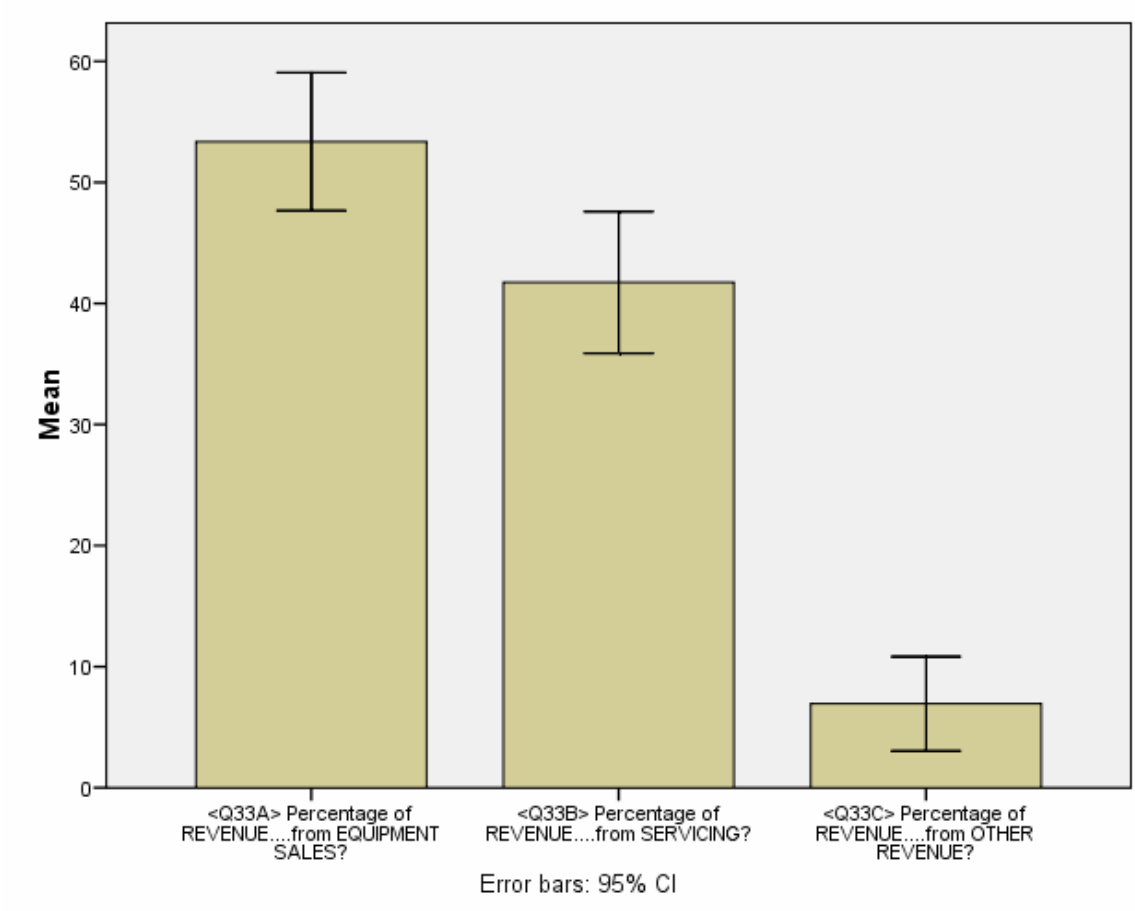
Figure 6-5:
Where Business is From



The high level of business from repeat business and referrals matches up with the self-reported way the firms compete for business. Ninety-three percent state they attempt to convince the customer their work is of higher quality most of the time or all the time. Only seven percent attempt to obtain work through providing a lower price to the prospective customer either most of the time or all of the time.

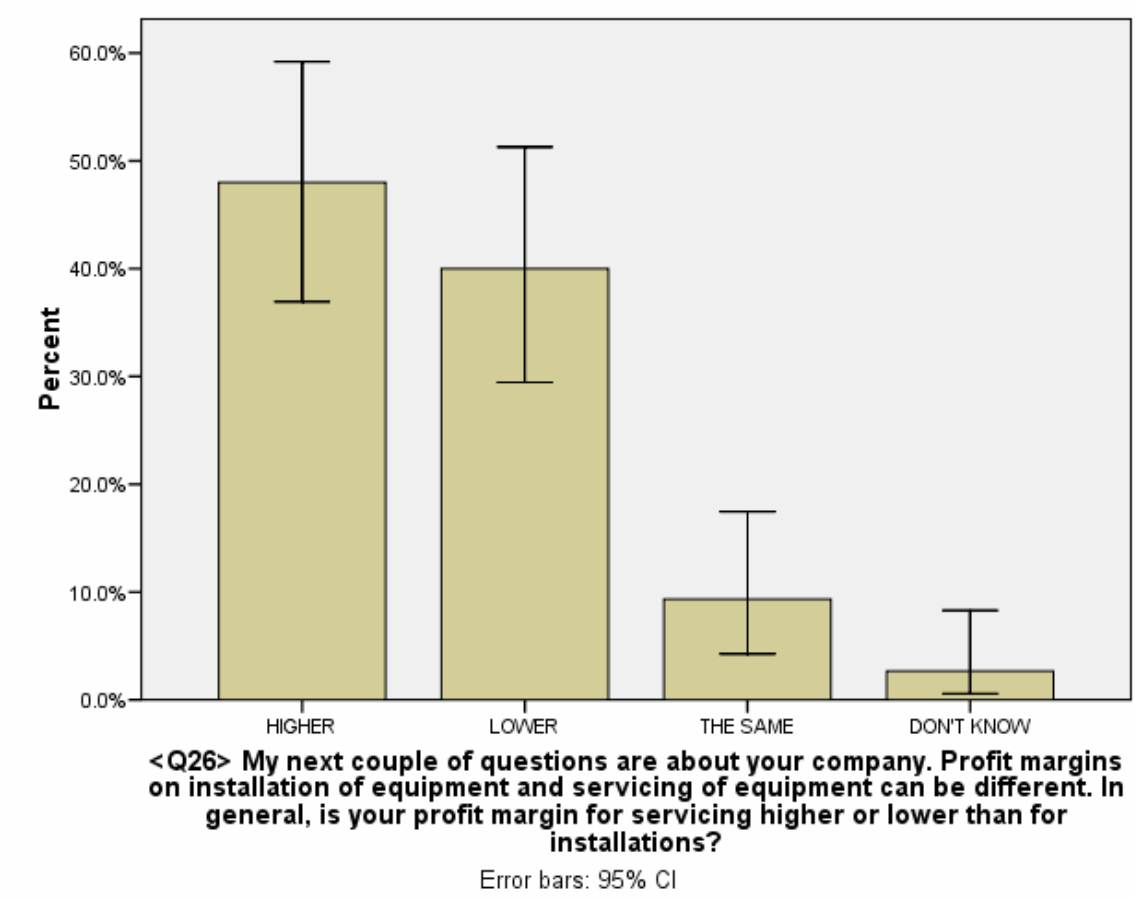
The firms tend to get a bit more than half their revenue from equipment sales and about 45 percent from servicing (Figure 6-6:). The companies get less than 10 percent of their revenue from other sources (i.e., maintenance or negotiated work, duct cleaning and replacement, installation of fireplaces, recycling old units, parts, etc).

Figure 6-6:
Percent of Revenue from Equipment, Servicing, or Other



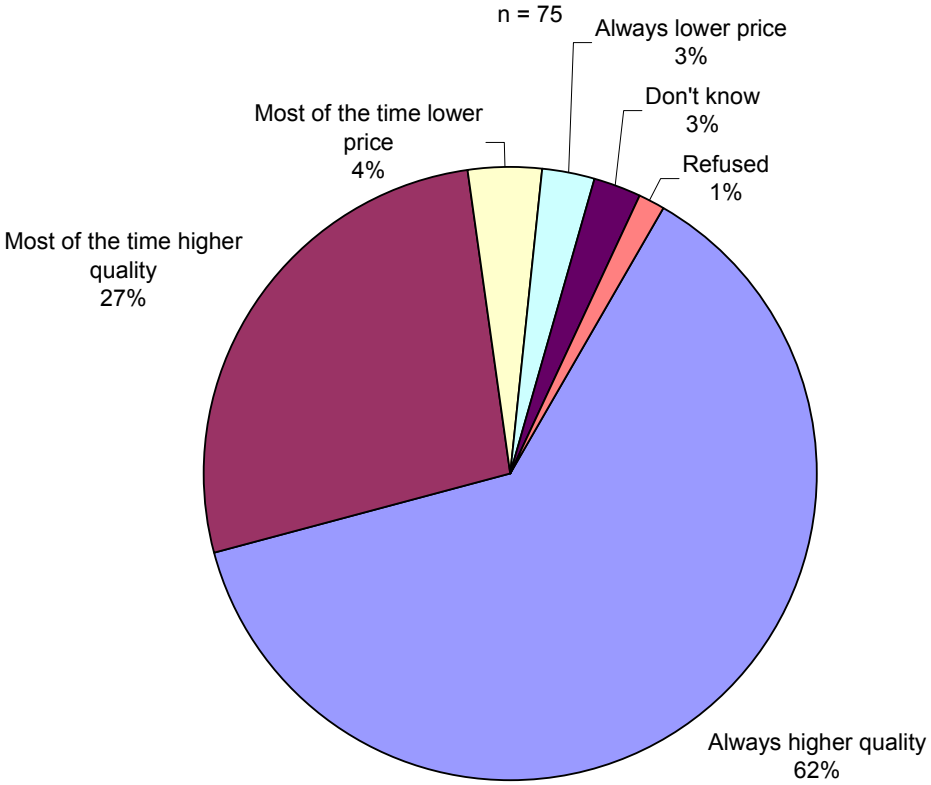
The percent of companies stating that profit from servicing was higher than from equipment installations was about equal to those stating that their profit from servicing was lower than from equipment installations (Figure 6-7:).

Figure 6-7:
Profitability – Service vs. Installation



The HVAC contractors were also asked whether they generally try to beat a competitor's offer by offering a better price or by convincing the homeowner that their bid is of higher quality or more energy efficient than their competitors. Nearly two-thirds of the respondents said that they always compete on the quality and efficiency of their offerings (Figure 6-8).

Figure 6-8:
Competing on Quality vs. Price



Twenty-seven percent of the companies have at least one NATE certified technician. Of those 27 percent, about half of the technicians at a company tend to be certified. Of note is that the few firms with 20 or more technicians did not report any of their technicians as being NATE certified.

6.3. Quality Installation and VSP Awareness and Practices

Quality Installations (QIs) are installations of air-conditioning equipment where the correct amount of refrigerant is used, air is flowing over the cooling coils at the proper rate, and the equipment is appropriately sized for the home. PG&E's Refrigerant Charge & Airflow Program works with four different Verification Service Providers (VSPs) to provide QI training and to confirm that the installations meet QI standards so that contractors can qualify for PG&E rebates. These companies included Check-Me, Enalasys, Field Diagnostics, and Verified-RCA.

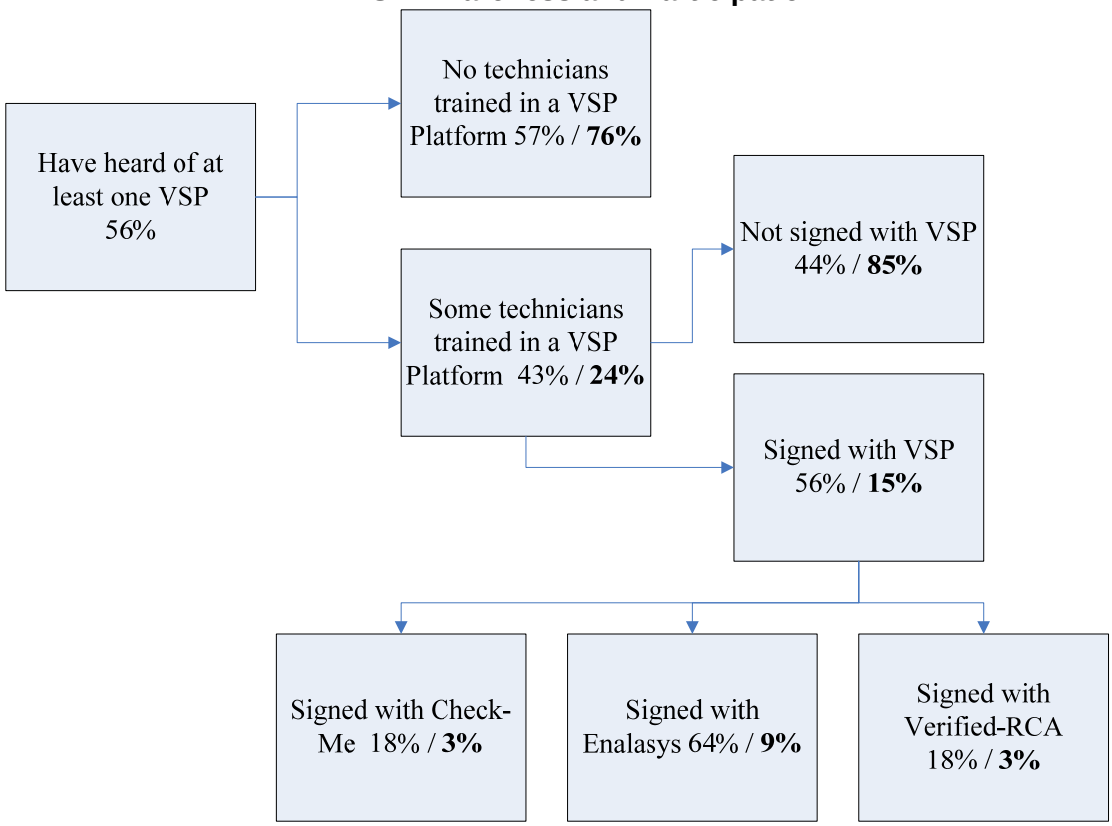
We asked the HVAC contractors several questions about the prevalence of Quality Installations in their daily practices and about the VSP platforms that facilitate these QIs. We asked the contractors about the VSP platforms to determine contractor awareness of the VSP opportunities, their level of participation, and reasons why they do not participate.

6.3.1. VSP/QI Awareness and Practices

Fifty-six percent of the contractors had heard of at least one of the four VSP platforms. Of those 56 percent, 43 percent have had anywhere from 2 to 100 percent of their technicians trained by one of the VSPs. This equates to 24 percent of the HVAC contractors across the population with at least one technician trained to use a VSP platform.

Yet when we asked the contractors how many of their trained technicians were actually signed up to use a VSP system, only half of the technicians were signed up. In summary only 15 percent of the HVAC contractors had trained technicians that were signed up. It appeared that some of the companies no longer interact with the VSPs, although they did so in the past. Enalasys was the VSP platform most cited by the contractors. Figure 6-9: provides the breakdown of HVAC contractor awareness and participation.

Figure 6-9:
VSP Awareness and Participation

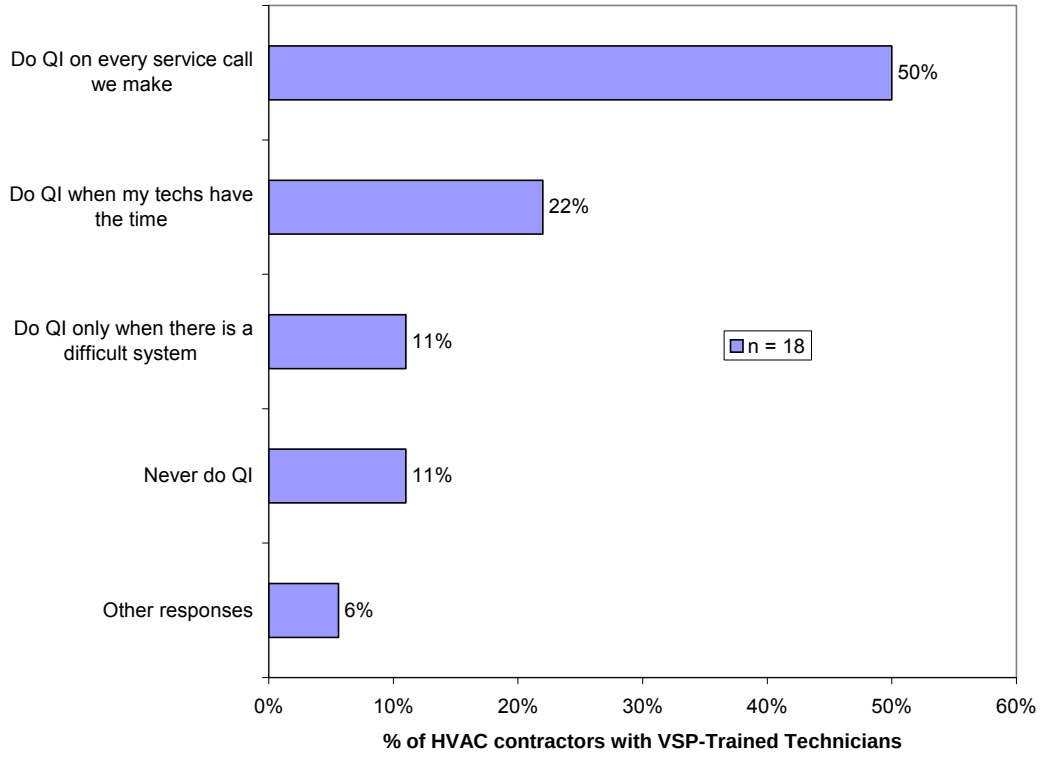


KEY
First percentage is for that grouping
Second percentage in **bold** is for the population

The 15 percent of contractors who have signed up with a VSP reported an average of 164 systems tested each year. However, there was a wide range of estimates from two systems to 1,000.

We asked the 24 percent of contractors with VSP-trained technicians (including those not signed up with a VSP system) how frequently they use QI within their general service and maintenance jobs. Figure 6-10: shows that half of the contractors claimed that they do it all the time. On average these contractors were slightly less likely to use a VSP-specific procedure to service refrigerant charge levels than a non-VSP-specific procedure.

Figure 6-10:
Frequency that HVAC Contractors with VSP-Trained Technicians Use QI for Maintenance Work



We were interested to know if the information gained from the VSP techniques helped to convince customers of the value of additional services such as repairs or system replacements. Eighty-three percent of the contractors who had VSP-trained technicians felt that the information helped some of the time while 11 percent thought that it helped all of the time.

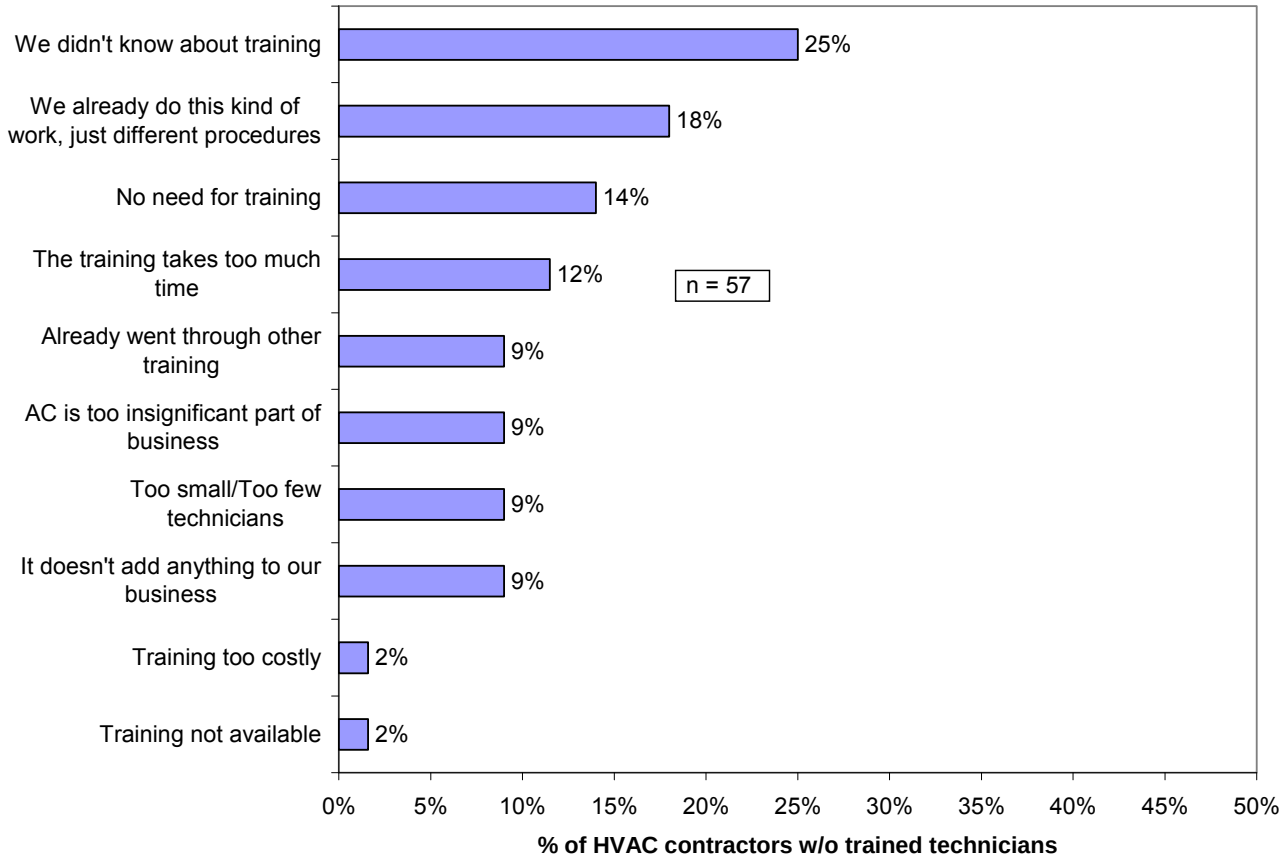
We also asked the 18 contractors with VSP-trained technicians whether they used duct blasters or similar tools when they did duct test and seal projects. About one quarter said they do not perform any duct test and seal projects, 44 percent use a Duct Blaster during the procedures, 22 percent use something similar to a Duct Blaster, and six percent said that they use an Air Flow Hood during a duct test procedure. This equates to 17 percent of the population of contractors performing duct test and seal projects to some extent.

6.3.2. Barriers to the Use of VSP Services and QI Practices in General

We asked the 57 HVAC contractors who did not have technicians with VSP training why their technicians had not received this training. Figure 6-11: shows that unawareness of the training

was the most-cited reason followed by HVAC contractors who said that they already do this kind of work but just follow different procedures than those prescribed by the VSP providers.

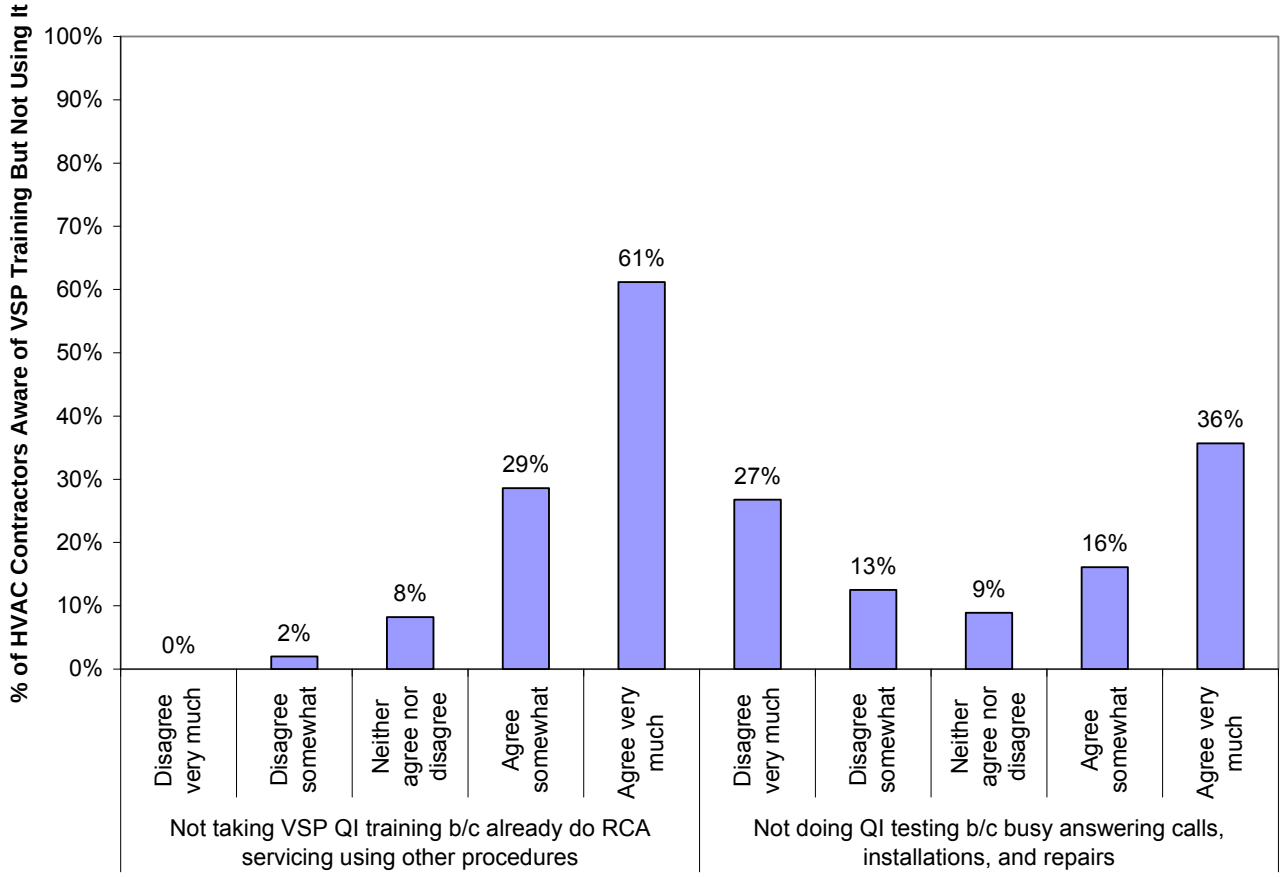
Figure 6-11:
Reasons Why HVAC Contractors Have Not Taken VSP Training



Note: Total exceeds 100% because respondents were allowed multiple responses.

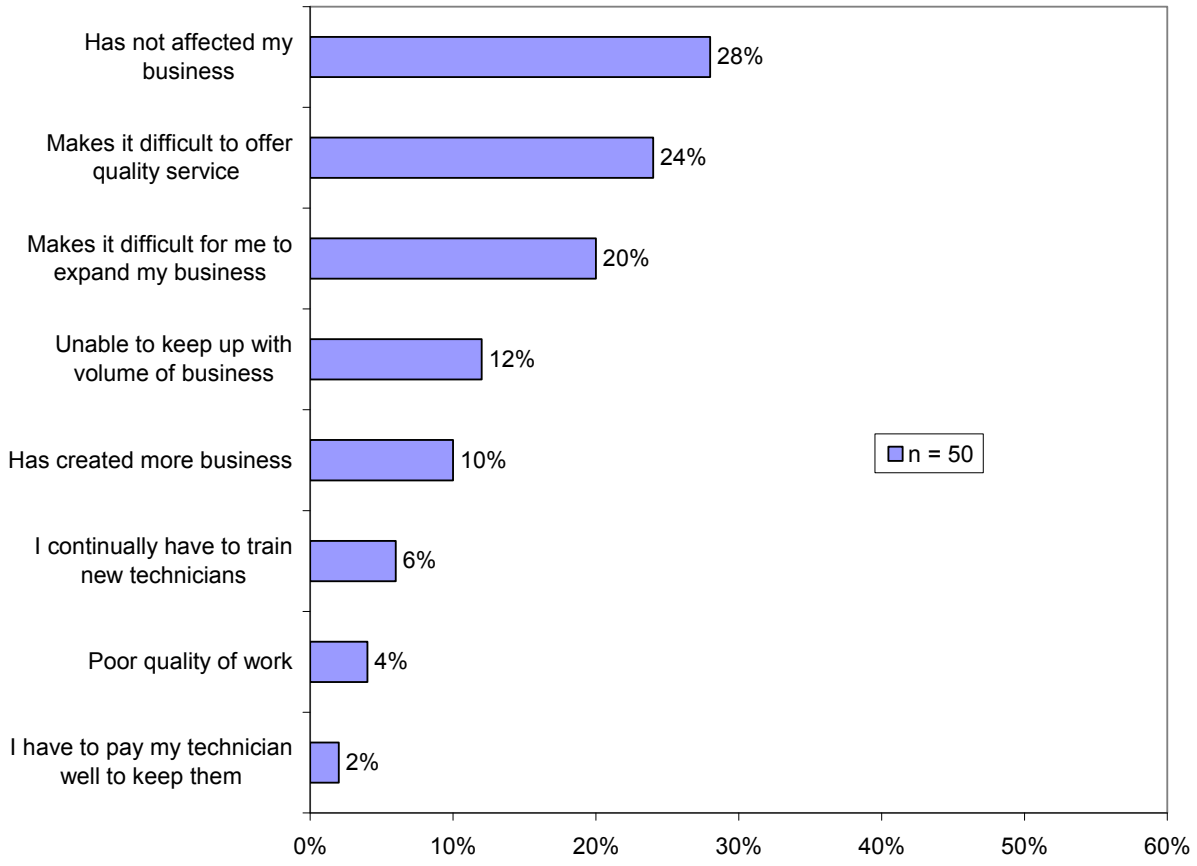
After this open-ended question about barriers to VSP training and QI practices, we posed two follow-up questions about specific barriers to the HVAC contractors who were aware of the VSP training but had not participated in it. First we asked them whether they are not participating in the VSP QI training because they already do refrigerant charge and airflow (RCA) servicing using other procedures. Second we asked them whether it was hard to do QI testing because in the summer they are "busy handling trouble calls, performing installations and fixing broken air conditioners." Figure 6-12: shows that 90 percent of these HVAC contractors had some level of agreement with the first barrier and about half had some level of agreement with the second barrier.

Figure 6-12:
HVAC Contractor Level of Agreement
With Possible Barriers to VSP Training and QI Testing



Based on anecdotal evidence we believed that there may be a technician shortage in the HVAC industry and asked the contractors about this issue. Two-thirds of the respondents indicated that there was a technician shortage. We asked these contractors how this shortage had affected their businesses. Figure 6-13 shows that while 28 percent felt that it had not affected their business, while the remainder cited a wide variety of negative effects on their businesses.

Figure 6-13:
Effects of the HVAC Technician Shortage



Note: Total exceeds 100% because respondents were allowed multiple responses.

We asked the HVAC contractors to consider a number of possible obstacles to selling QI services and asked them to rate each one using a scale where 5 indicated an extremely significant problem and 1 indicated "not a problem." The results (Table 6-1) show that the lack of customer awareness and lack of marketing materials were thought to be the two largest obstacles, followed closely by price/cost issues and the customer stating they do not need the service. The contractors gave the lowest significance ratings to the potential obstacles of not knowing who decision makers are and how to reach them.

Table 6-1:
Rating Possible Obstacles to Selling QI Services

Descriptive Statistics

	N	Mean		SD
	Statistic	Statistic	Std. Error	Statistic
<Q19G> How would you rate...Lack of customer awareness or knowledge	69	3.78	.166	1.381
<Q19I> How would you rate...Lack of marketing materials	68	3.44	.183	1.510
<Q19H> How would you rate...Price/cost issues	65	3.34	.179	1.439
<Q19C> How would you rate...Customers state they don't need the service.	67	3.31	.166	1.362
<Q19D> How would you rate...No time to market this type of service.	66	3.18	.189	1.538
<Q19F> How would you rate...Lack of staff training.	68	3.10	.180	1.488
<Q19E> How would you rate...Insufficient sales staff.	70	2.83	.193	1.615
<Q19A> How would you rate.....Reaching the decision maker?	68	2.50	.170	1.398
<Q19B> How would you rate...Not knowing who the decision maker is.	67	2.42	.166	1.361

Note: 1=not a problem, 5=extremely significant problem.

6.3.3. Overcoming Barriers to QI Practices and the Use of VSP Services

In order to try to determine solutions for the barriers discussed in the previous subsection, we asked the HVAC contractors: “If the utility wanted to have more contractors use QI techniques, what would it take to cause this to happen?” Figure 6-14 shows that the most-cited suggestion for increasing the use of these techniques is to make training sessions more local and frequent while at the same time promoting them more. Some unique comments from the HVAC contractors that could not be easily categorized included:

1. Give [the HVAC contractors] more jobs. Use as references.
2. I don't think the utility company needs to be involved in it at all./ They've allowed so many houses to be built with inefficient equipment as is.
3. Less restrictions / Less restrictions from the Title 24 [the California building code].
4. Make it simple and easy.
5. More complete system that gives an actual number. Leakage isn't only problem. It's an air flow distribution problem.

6. PG&E has made the rules so tough that people are going underground and just doing what they want to do. They need to get away from causing the customer to spend $800 per job for duct sealing. They should be able to give the customer an option.

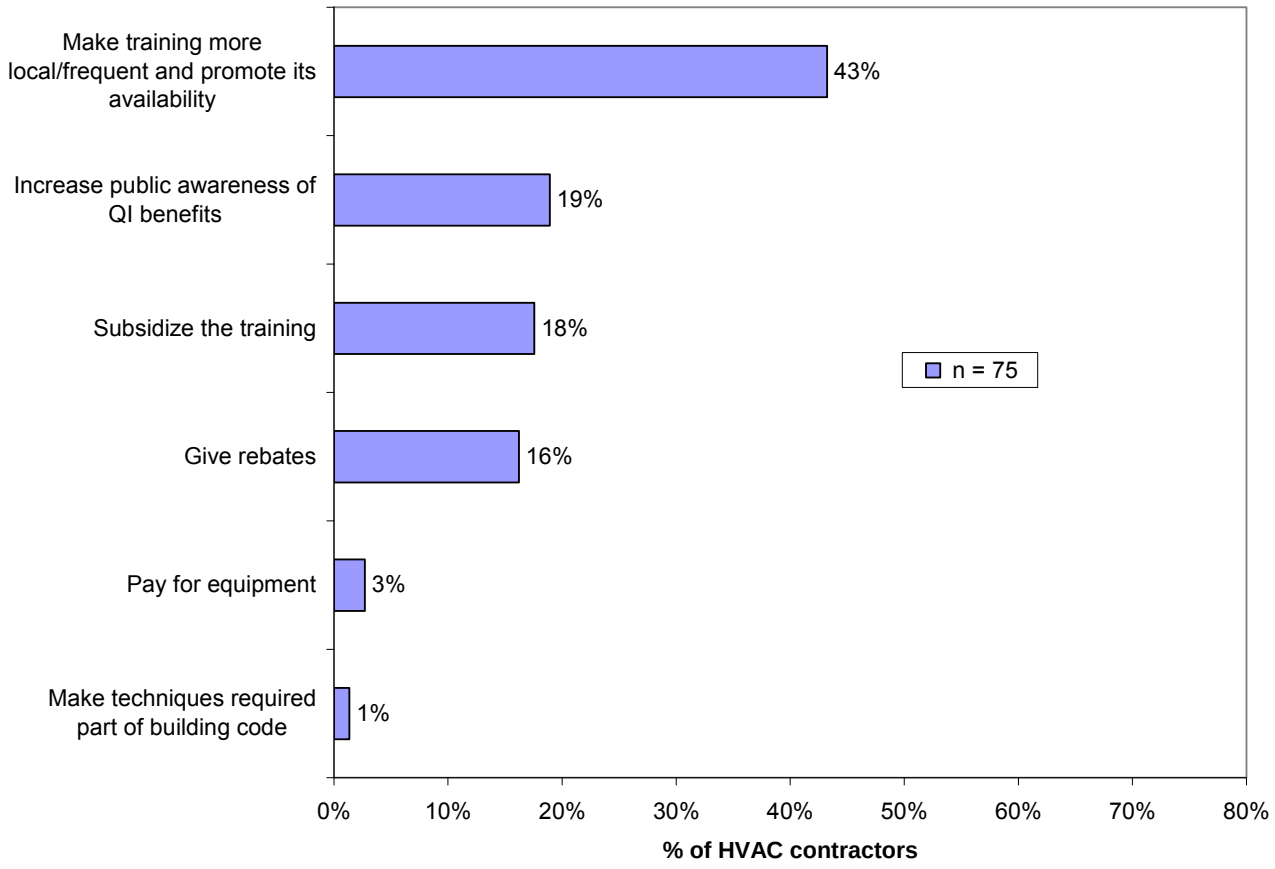
7. Provide an easier system so that you are not sitting on the phone forever / The way the system currently works it takes forever to do.

8. Streamlining the program. Send a packet out to us, so the form is filled out and sent to the utility. Or have the form on the website.

Another way that the program can influence participation is through the incentive level. While the program currently provides an incentive (~$150) to perform the Quality Installation services, we asked those 12 contractors who brought this up as a way to influence them what they felt was an appropriate incentive level per job for performing this service. Seven of them provided per job financial incentive estimates that ranged from $50 - $500 with a median of $150 and a mean of $190.[38]

[38] Other responses included $90 per hour depending on the job, 5%, "it depends on the job, $100,000 and "Don't Know."

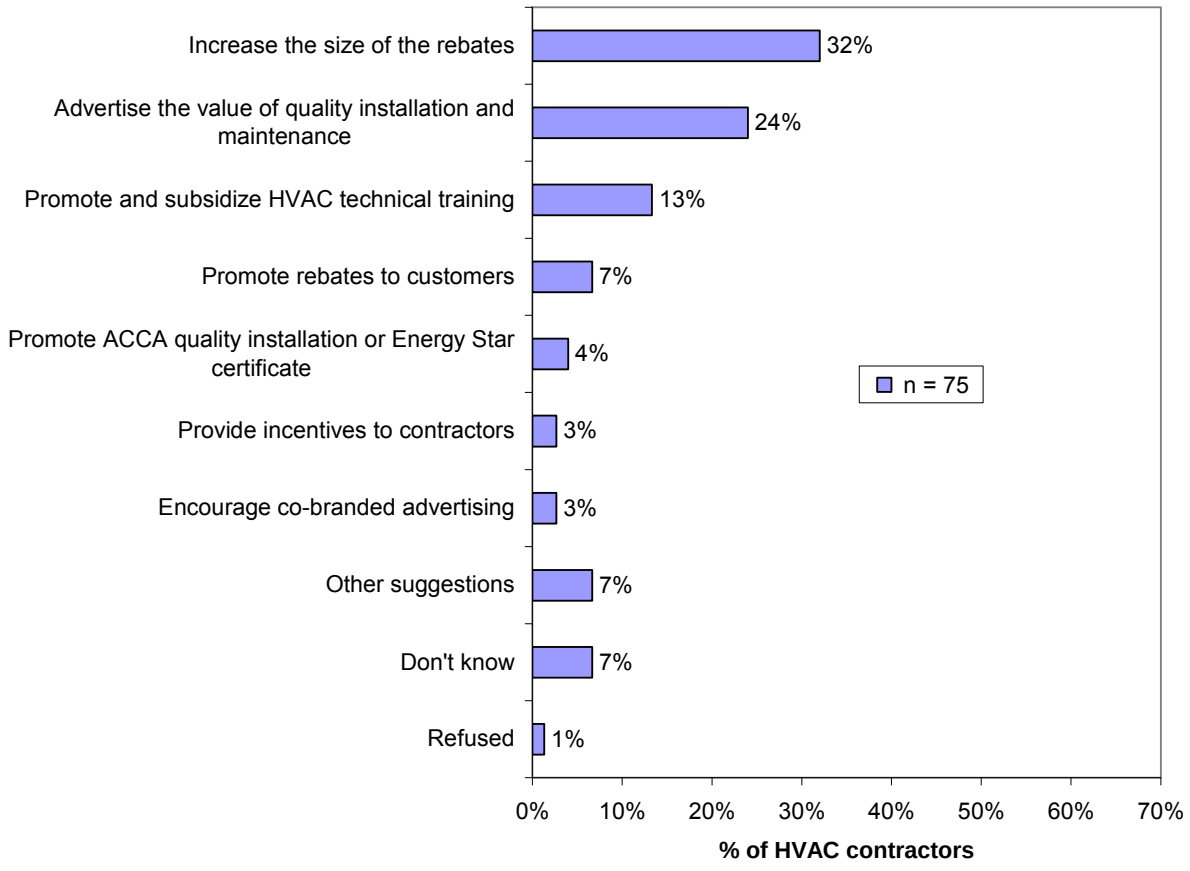
Figure 6-14:
Suggestions for Encouraging More HVAC Contractors To Use QI Techniques



We also gauged the HVAC contractors' interest in free training sessions. When asked if a free half day sales training for high efficiency equipment were offered in their area, 79 percent indicated they would send their staff. Similarly, 75 percent stated they would send staff to a free whole day technical training on Quality Installation services held in their area.

The HVAC contractors were also asked how PG&E could help them to sell QI services. The most-cited suggestion was to increase the size of the rebates, followed by greater advertising of QI services (Figure 6-15).

Figure 6-15:
Suggestions for How PG&E Could Help HVAC Contractors Sell QI Services



We also asked the HVAC contractors that if there was one thing that PG&E could do to help their firm in any way, whether it would be: 1) increasing the size of rebates, 2) promoting high efficiency AC units; 3) encouraging co-branded advertising or something else that the contractor specified. As Figure 6-16 shows, the most cited suggestions were to increase the size of rebates (29%) followed by the providing of training for technicians (17%).

Other suggestions that could not be easily categorized included:

1. Streamline the paper work side of it;
2. Competitive pricing from contractors when rebates are available;
3. Identify contractors that steer customers towards energy efficiency;

4. Stay out of my business;

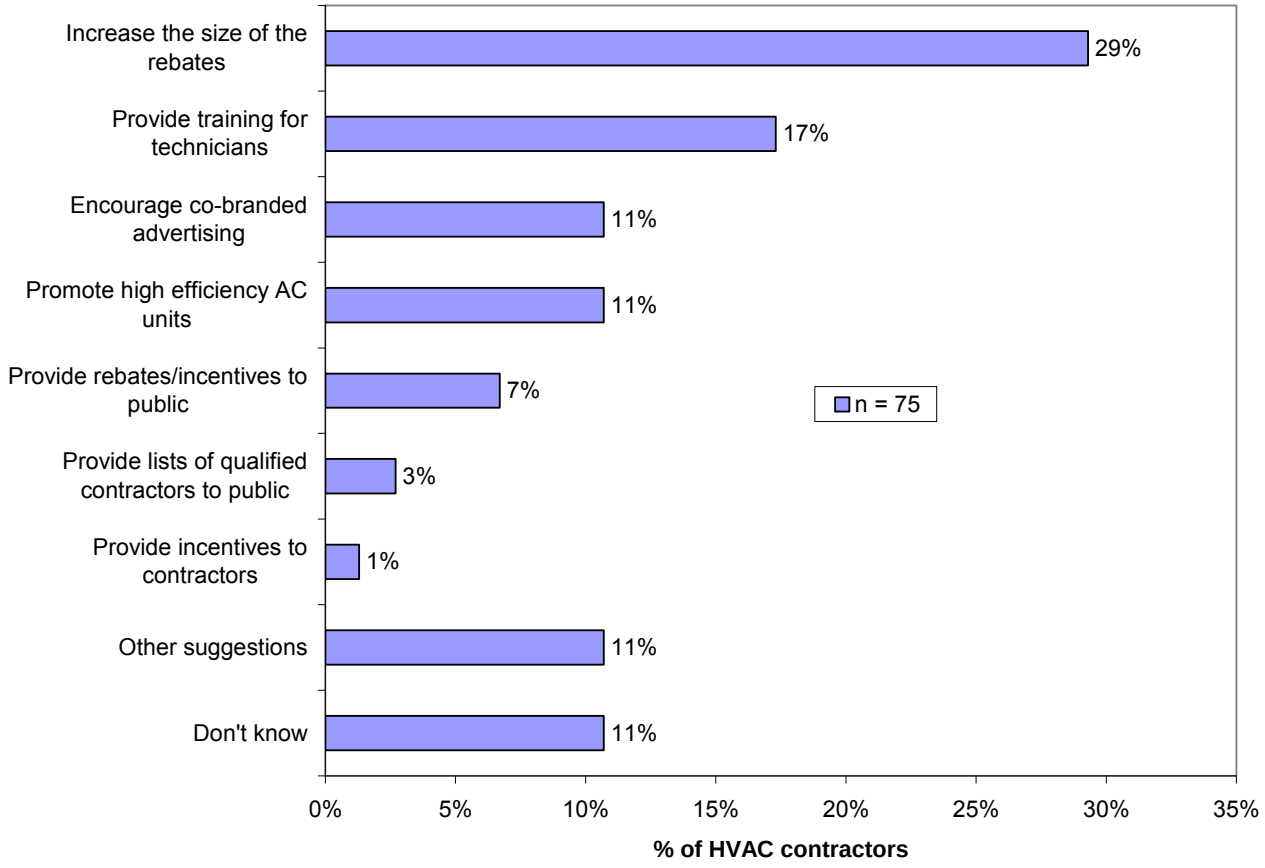
5. Inform the public of energy saving ideas;

6. Pass out my business cards on their service calls;

7. Provide us with sales leads; and

8. More customer training for customers who are not computer literate, especially senior citizens.

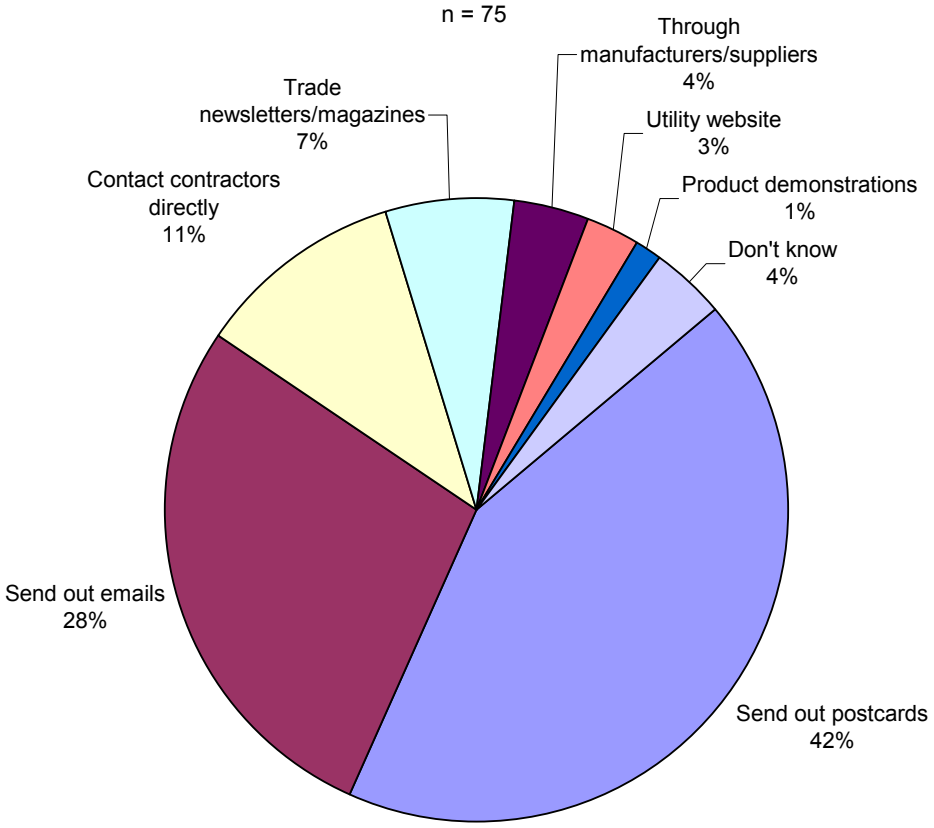
Figure 6-16:
Suggestions for How PG&E Could Help HVAC Contractors in General



Because of the multiple ways in which PG&E could reach contractors, we asked them what they felt was the best way to market new products so that the contractor could learn about the product. The top responses (Figure 6-17) included using post cards (43%) and emails (28%).

One contractor felt that demonstration of new products was a good way to let others know about their availability and two others felt that trade magazines were a positive way to reach others.

Figure 6-17:
Best Ways for PG&E
To Market New/Innovative HVAC Products



6.4. Summary Findings and Conclusions

Before fielding this survey of 75 HVAC contractors we had a number of hypotheses about why more HVAC contractors were not taking advantage of VSP training opportunities and what benefits contractors were seeing from their VSP training. Table 6-2 shows that there was survey evidence to support some of these initial hypotheses but not others.

Table 6-2:
VSP/QI Barriers and Benefits
Initial Hypotheses vs. Survey Evidence

Initial Hypotheses	Evidence From the Survey
1. Contractors do not participate in training because it is too costly or takes up too much time.	• When asked why they did not participate in training, only 12% of HVAC contractors said it was because it takes too much time and only 2% said it was due to the cost of training. • However, 75% of the contractors said they would send staff to a free whole day technical training on QI services if it was offered in their area. • Concerns about the locations or times of training session appeared to be more of a barrier to participation than costs. The most-cited (43%) suggestion for increasing the use of QI techniques was to make training sessions more local and frequent while at the same time promoting them more.
2. Contractors do not participate in training because they have high turnover and it does not make sense to train people who leave soon.	• When asked why they did not participate in training, none of the HVAC contractors mentioned this as a reason. • About two-thirds of the contractors did agree that there was a shortage of technicians in the industry. When asked about the effects of this scarcity on their business, 6% of the contractors said that this meant that they constantly have to train new technicians and 2% said that they have to pay their current technicians more to keep them.
3. Contractors do not see the advantage in spending the time being trained in QI.	▪ 75% of the HVAC contractors said they would send staff to a free whole day technical training in there area on Quality Installation services. ▪ When asked why they did not participate in training: o 18% of HVAC contractors said that they already do this kind of work using different procedures. o 14% said that there was not a need for training. o 9% said that AC was too insignificant a part of their business. o 9% said that their company was too small. o 9% said that training didn't add anything to their business. ▪ When asked what PG&E could do to help their businesses in general, the second most-cited (17%) suggestion was training their technicians.

Initial Hypotheses	Evidence From the Survey
4. Contractors do not think that the information gained by using the tools is valuable, or leads to recommendations that the customer will pay for.	▪ Only 24% of the HVAC contractors have VSP-trained technicians. ▪ When asked if the information gained from the VSP techniques helped to convince customers of the value of additional services such as repairs or system replacements, 83% of the contractors with VSP-trained technicians said that it helped some of the time while 11% thought it helped all the time. ▪ In addition, of the contractors with VSP-trained technicians 50% said that they do QI on every service call and another 33% said that they do QI under certain conditions (e.g., when their technicians have the time, when there is a difficult system). Only 11% of the HVAC contractors with VSP-trained technicians said that they never do QI. ▪ When asked how PG&E could help them sell QI services, the second-most cited suggestion (24% of respondents) was to advertise the value of quality installation and maintenance. Another 7% of the contractors suggested that PG&E should promote the QI rebates to customers.
5. Contractors do not participate because they already do the type of procedures without the VSP tools.	When asked why they did not participate in training, 18% of HVAC contractors said that they already do this kind of work using different procedures.
6. VSP tools help convince customers of the legitimacy or importance of a major overhaul of system or a replacement.	When asked if the information gained from the VSP techniques helped to convince customers of the value of additional services such as repairs or system replacements, 83% of the contractors with VSP-trained technicians said that it helped some of the time while 11% thought it helped all the time.
7. Contractors are aware of VSP opportunities and actively participate.	Although 54% of contractors had heard of at least one of the VSPs, close to 25% of the contractors did not know of any training opportunities and only 15% actively participate. Of those participating, over half use the Enalysis platform and equal amounts (18%) use either Verified or Check-Me. None stated using the Field Diagnostics platform.
8. HVAC contractors desire interaction with PG&E to help their business.	It was not clear that contractors wanted active interactions with PG&E to help with their business. Most indicated a desire for higher rebates/incentives and advertising to help stimulate demand for the contractors products. While 75% of the HVAC contractors said they would send staff to a free whole day technical training on Quality Installation services, only 17% suggested technical training as a way that PG&E could help their business.

The survey evidence led us to the following conclusions:

- *Unawareness of the VSP training opportunities remains a barrier to participation:* When asked why they have not participated in VSP training, 25 percent of the nonparticipating contractors said it was because they did not know about the training. This was the most-cited reason for nonparticipation.

- *Contractor beliefs that they already do QI or have received necessary training are other reasons for nonparticipation in VSP services:* When asked why they have not participated in VSP training, 18 percent of the nonparticipating contractors said that it was because they already do this kind of work but just use different procedures. Another nine percent said that their nonparticipation was because they had already gone through other training.

- *Not seeing the value of VSP training is another major reason for nonparticipation:* When asked why they have not participated in VSP training, 14 percent of the nonparticipating contractors said that it was because they saw no need for it, nine percent said that it was because AC was too insignificant a part of their business, nine percent said it was because their company was too small, and nine percent said that training didn't add anything to their business.

- *Of the logistical barriers to VSP training, inconvenient timing or location were more significant than training costs:* The most-cited (43% of all contractors) suggestion for increasing the use of QI techniques was to make training sessions more local and frequent while at the same time promoting them more. When asked why they did not participate in training, only 12 percent of HVAC contractors said it was because it takes too much time and only two percent said it was due to the cost of training.

- *Those who received VSP training did find value in it:* Of the contractors with VSP-trained technicians, 50 percent said that they do QI on every service call and another 33 percent said that they do QI under certain conditions (e.g., when their technicians have the time, when there is a difficult system). When asked if the information gained from the VSP techniques helped to convince customers of the value of additional services such as repairs or system replacements, 83% of the contractors with VSP-trained technicians said that it helped some of the time while 11 percent thought it helped all the time.

- *PG&E could best help promote wider adoption of QI practices by increasing rebates and greater promotion of QI benefits:* When HVAC contractors were asked how PG&E could help them sell QI services, the two most-cited reasons were increasing the size of the

rebates (32% of all contractors) and more advertisement of the value of QI and maintenance (24%). Another seven percent of the contractors suggested that PG&E do more to promote the QI rebates to their customers.

6.5. Recommendations

Based on the survey results, we make the following recommendations:

- Increase existing efforts to educate HVAC contractors and consumers about what QI practices are and why they are valuable:
  - Since those who have taken the VSP training courses are finding value from them, develop case studies and testimonials from these participating HVAC contractors that can be advertised in relevant trade publications along with links to the program website.
  - Assess the clarity of message regarding what QI services include and determine how to differentiate QI from regular practices in short, succinct phrases. To increase knowledge of this difference, create a postcard size synthesis of these phrases and use in a targeted postcard mailing to HVAC contractors.
  - To increase knowledge of this difference in the public, use the same phrases on the PG&E website and in any other marketing regarding this service.
- Make the VSP training sessions more convenient: Determine if the program can provide free QI training sessions in multiple locations within PG&E service territory. If so, include information about the free training on the targeted postcard mailing and other marketing.
- Try to increase the financial incentives for QI services: Differentiating the differences between QI and standard practice and making training options more convenient may bring in some contractors. However, larger changes in participation may not take place unless increases in the rebate level also occur. To enable larger incentives for QI services, PG&E should assess the ability to include demand reduction benefits into the overall incentive payment.

7. 2006-2008 Local Government Partnership Process Evaluation

7.1. Executive Summary

This is the executive summary for a process evaluation of Pacific Gas and Electric Company's (PG&E or utility) 2006-2008 Local Government Partnership (LGP) Program conducted by KEMA, Inc. in 2008 and early 2009.

7.1.1. Program Description

Local government partnerships are innovative, market-based, local and statewide energy efficiency efforts for cities, groups of cities, counties, and other local jurisdictions within PG&E's service territory. During the 2004-2005 program cycle, several local government agencies in PG&E's service territory implemented publicly funded energy efficiency programs either as third parties or in partnership with PG&E. The most successful of the 2004-2005 programs were continued during the 2006-2008 program cycle, and new partnerships were formed. A total of eighteen partnerships comprise PG&E's partnership portfolio for 2006-2008.

The overarching vision for this partnership effort is to achieve immediate energy and peak demand savings and establish a permanent framework for a sustainable, long-term energy management program for local governments.

To achieve this vision, PG&E's 2006-2008 LGP Program relied on a number of implementation strategies to achieve its immediate energy savings goals, including providing incentives for energy efficiency retrofits to residential and commercial buildings and local government facilities, providing outreach and direct install of energy efficiency measures (such as lighting, heating and cooling equipment) to hard-to-reach customer segments, and energy audits and technical services.

The program also provides services for which there are no immediate energy savings but will help establish an infrastructure for sustainable, long-term management of energy efficiency. These services included workshops and trainings for contractors and end-use customers, development and enforcement of building codes and standards for residents and businesses, hard-to-reach customer energy efficiency marketing and outreach (such as to non-English speaking residents), and building local governments' energy efficiency resources.

7.1.2. Evaluation Objectives and Approach

The overarching objectives of this effort were to evaluate the effectiveness of program processes and to guide PG&E's program managers in improving program processes. The evaluation also addressed a series of specific objectives over three phases of activity. The major research activities included review of program materials and relevant regulatory filings and in-depth interviews with PG&E, local government, and implementation contractor staff. Table 7-1 provides a summary of research activities by phase.

Table 7-1: Summary of Research Activities by Phase

Research Objectives	*Research Activities*	*Research Timing*	*Deliverable*
Research Phase 1			
Assess the effectiveness of implementation models and coordination between LGP and other related utility programs.	Review program materials and filings; Select 5 LGPs to study in-depth[39]; Conduct in-depth interviews with utility, local government and contractor staff associated with the 5 selected LGPs.	Program review: January 2008; Interviews: February 2008	Phase 1 Draft Report (March 2008)
Research Phase 2			
Gather information about infrastructure LGP program activities and assess their value.	Conduct follow-up in-depth interviews with utility, local government and contractor staff associated with the 5 selected LGPs.	Interviews: May 2008	Phase 1 Draft Report (July 2008)

[39] East Bay, San Francisco, AMBAG, Fresno and Silicon Valley Energy Watch LGPs were selected.

Research Objectives	Research Activities	Research Timing	Deliverable
Research Phase 3			
Combine prior 2 reports and finalize evaluation conclusions and recommendations. Indicate how PG&E is addressing recommendations in the 2009-2011 program.	Present Phase 1 and Phase 2 report findings and recommendations to PG&E; conduct follow-up interviews with PG&E program staff.	Presentations: third quarter 2008; Interviews: January 2009	Comprehensive evaluation report (this document)

7.1.3. Evaluation Conclusions and Recommendations

This section summarizes the evaluation's major conclusions and recommendations. We also indicate how PG&E plans to address the recommendations in its 2009-2011 LGP Program.

Partnership Purpose

According to program filings, the LGP Program intends to both deliver immediate energy savings and to establish a permanent framework for sustainable, long-term local government energy management. During the 2006-2008 program cycle, the California Public Utilities Commission (CPUC) evaluated PG&E's program performance based on immediate energy savings achievements and cost-effectiveness. However, due to the CPUC's emphasis on immediate savings in 2006-2008, the 2006-2008 LGP Program primarily focused on achieving immediate energy savings at the expense of making progress towards its long-term goals.

Recommendation: Going forward, the program needs to strike an appropriate balance between achieving immediate energy savings and meeting the program's long-term strategic objectives.

- ***PG&E plans to address recommendation***: PG&E has lowered its 2009-2011 LGP Program cost-effectiveness targets, and developed incentives that encourage installation of a broader mix of measures. PG&E also plans to track the types and locations of participating customers and use that information to encourage broader customer treatment both in terms of the sectors of customers and the mix of measures. Finally, PG&E, through the innovative program category in its 2009-2011 implementation plan, is

explicitly encouraging innovative program strategies for 2009-2011. These activities will not be subject to energy savings claims and are intended to meet the long-term objectives of the LGP as depicted by the state's Strategic Plan.

Recommendation: PG&E and the California Public Utilities Commission should track and monitor program strategies that are designed to yield long-term benefits and in line with the Strategic Plan.

- ***PG&E plans to address recommendations*:** PG&E is working with the CPUC to develop a tracking system for long-term energy savings accomplishments. PG&E is also using the Strategic Plan to prioritize infrastructure activities for its 2009-2011 plans. Finally, PG&E is working internally to develop evaluation strategies to quantify savings from programs with long-term strategies that may yield indirect energy savings.

Integration of Services

PG&E offers a variety of energy programs and services to local governments and their constituents, addressing energy efficiency, demand response and renewable technologies. The energy efficiency programs include LGPs; PG&E's territory-wide core programs aimed at the mass market, low-income customers, businesses and industry; and programs delivered by third-party implementers to targeted customers. In most locations within PG&E's service territory, customers are eligible for program services from several programs. However, during the 2006-2008 Program period, PG&E did not effectively integrate its energy efficiency programs, which led to customer confusion and dissatisfaction and inefficiencies in program implementation. Additionally, PG&E did not provide access to its broader energy services to local government partners. This inhibited progress towards fully engaging local governments in achieving the state's long-term, strategic energy goals.

Recommendation: Develop a tracking system to monitor implementation traffic for utility third-party, LGP, core, and low-income program coordination and cross-referrals to be shared by local governments and PG&E.

- ***PG&E plans to address recommendations*:** PG&E has developed a coordinated model for LGP, low-income, core and third-party programs that are being pilot tested in 2009 in some locations in PG&E's service territory. It will likely be rolled out full-scale later in the program cycle to cover PG&E's territory.

***Recommendation*:** Integrate PG&E's energy services that are applicable to local governments.

- ***PG&E plans to address recommendations:*** PG&E has taken measures to integrate its service offerings for 2009-2011 and has explicitly described these efforts in its 2009-2011 LGP Program implementation plan submitted to the CPUC. PG&E has also held regular market segment strategy meetings, which assess its program offerings by market segment (including local government). This initiative is intended to ultimately integrate program offerings for each market segment, which will inform an integrated outreach strategy to local governments.

Implementation Model

Two key characteristics that distinguished LGPs were:

- The type of implementer (i.e., local government staff or third-party contractor) and
- The degree to which the local government is engaged in the partnership.

These characteristics varied among PG&E's LGPs depending on the unique context of each local area and produced varying results. Using a third-party is more efficient in meeting short-term energy savings goals, and an engaged local government is most effective in meeting long-term LGP goals. Each characteristic is needed to meet both short and long-term goals.

***Recommendation*:** Balance the program's objectives when establishing new partnerships and determining how they will be implemented, to ensure that the program meets its short-term energy savings goals while effectively engaging the local government to achieve its long-term strategic objectives.

- ***PG&E plans to address recommendation*:** When considering new partnerships, PG&E will assess the level of engagement of the local government on energy efficiency issues, and its ability to take on administrative functions. These considerations in turn inform the partnership's implementation model and geographic coverage.

Contract and Program Administration

PG&E manages each individual LGP Program contract, which is either with the local government or a third-party implementer. PG&E designates a program manager for each partnership, who oversees the contract and monitors program accomplishments. Other PG&E staff (e.g., from the contracts and information technology groups) also provide administrative support for the LGP Program as needed. However, even with the support the overall contract

program administrative process had gaps that delayed making important changes to the program, paying customer rebates and fulfilling data requests. The contracting process proved to be:

- too lengthy,
- complex and inflexible,
- had a negative impact on customer and partner satisfaction, and
- reduced program cost-effectiveness.

The process for tracking program accomplishments and responding to data requests was also very cumbersome and was perceived to create a heavy burden on partners. Finally, PG&E systems, processes, and staffing levels were constrained during the 2006-2008 program, which hindered LGP Program progress.

***Recommendations*:** Ensure that the 2009-2011 contract process does not adversely affect delivery of program services due to lengthy delays and excessive administrative requirements on implementers. Set up 2009-2011 contracts to provide flexibility to make mid-course corrections in program implementation to maximize program success.

- ***PG&E plans to address recommendation:*** PG&E plans to improve the contracting process for 2009-2011 programs by allowing greater flexibility for implementers to make mid-course changes to improve programs.

***Recommendations*:** Add progress reporting (beyond counting of energy savings by measure) to the 2009-2011 contracts to monitor the successes and challenges of each program strategy. Determine whether PG&E's administrative infrastructure that supports the LGP Program is sufficient to accomplish its priorities and make improvements if warranted (e.g., add staff, update IT systems, etc.).

- ***PG&E plans to address recommendation:*** As mentioned previously, PG&E will track measures and customers more closely in the 2009-2011 program period in order to ensure broader customer and measure treatment. PG&E has added some strategic senior staff to the LGP group, as well as some program support staff. PG&E has also been working on process improvements to streamline operations, which should help improve program implementation. And finally, PG&E has streamlined its data request

process, assigning one individual to process external requests and standardizing its process for addressing data requests.

7.2. Detailed Findings

7.2.1. Introduction

In 2008, Pacific Gas and Electric Company (PG&E or utility) contracted KEMA to conduct a process evaluation of PG&E's 2006-2008 Local Government Partnership (LGP) Program. Executed through early 2009, the evaluation was carried out during three discrete phases. To determine the effectiveness of LGP Program, KEMA reviewed program material and regulatory filing documents and conducted in-depth interviews with PG&E, local government, and implementation contractor staff to ascertain the effectiveness of the program.

Program Description

According to 2006-2008 program filings, local government partnerships are innovative, market-based, local and statewide energy efficiency efforts for cities, groups of cities, counties, and other local jurisdictions within PG&E's service territory. These partnerships are intended to capitalize on the vast resources and expertise of local governments and utilities to meet objectives of the California Public Utilities Commission[40], the goals of the state Energy Action Plan[41] and the Governor's Green Building Action Plan goals[42]. The partnerships are also designed to focus on projects that serve as alternatives to supply-side resource options, to pursue the most cost-effective energy efficiency options first, and meet the call for deploying new products and services. The 2009-2011 programs are being designed in line with the statewide energy efficiency Strategic Plan for the period 2009-2020.[43]

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[40] As outlined in California Public Utilities Commission Decision 05-01-055 on January 27, 2005, which addresses the threshold issues for designing an administrative structure for energy efficiency programs beyond 2005.

[41] The State of California Energy Action Plan was approved in 2003, and a second Energy Action Plan was adopted by both the California Energy Commission and the California Public Utilities Commission to reflect the policy changes and actions of the ensuing two years. The state's energy policies have been significantly influenced by the passage of Assembly Bill 32, the California Global Warming Solutions Act of 2006..

[42] The detailed direction that accompanies Governor's Executive Order S-20-04.

[43] California Energy Efficiency Strategic Plan, Rulemaking 06-04-010, June 2, 2008, www.californiaenergyefficiency.com.

During the 2004-2005 program cycle, several local government agencies in PG&E's service territory implemented publicly funded energy efficiency programs either as third parties or in partnership with PG&E. The most successful of the 2004-2005 programs were continued during the 2006-2008 program cycle and new partnerships were formed. A total of eighteen partnerships comprise PG&E's partnership portfolio for 2006-2008[44]:

- East Bay Partnership
- Fresno Energy Savings Alliance
- Silicon Valley Energy Program
- San Francisco Peak Energy Program
- Bakersfield and Kern County Energy Watch
- Stockton Smart Energy Program
- Motherlode Energy Partnership
- Association of Bay Area Governments
- Association of Monterey Bay Area Governments
- Madera Energy Alliance
- Merced/Atwater Energy Partnership
- San Joaquin Energy Intelligence Quotient
- Santa Barbara County Partnership
- Silicon Valley Leadership Group
- Marin Public Facilities Energy Management Team
- Sonoma Energy Partnership Program
- Redwood Coast Energy Watch
- Local Government Energy Action Resources (Various locations)

According to program planning documents, the overarching vision for the partnership effort is to achieve of immediate, energy and peak demand savings and the establish a permanent framework for sustainable, long-term energy management for the LGPs.

PG&E's stated objectives are:

- To garner greater energy savings than would otherwise be possible through traditional DSM programs. This could be achieved through a mass market approach located within economic development zones, rented or leased spaces, rural areas or areas where the

[44] Note there are also Statewide Government Partnerships (SGPs) with the California Department of Corrections, the General Services Department, the University of California, California State University and Community Colleges that are managed by the California IOUs, which are not included in this evaluation.

primary language may be other than English, and city, county, and state governments that occupy and operate public facilities. This would also apply to special utility districts and large institutions such as state college and university systems, community colleges, and school districts.

- To extend the reach and effectiveness of PG&E's DSM programs by using local government organizations, communication and outreach channels to achieve broad penetration of energy efficiency services in the local community. In addition, program co-sponsoring of education and training for customers and working technicians in the refrigeration/HVAC services and installation trades, duct testing and sealing, energy code requirements and compliance, lighting retrofits, and others.
- Position LGPs to be strategic partners that help PG&E reach additional customers and impact their energy decisions. This could be achieved through the engagement of the LGPs to deliver energy savings and demand reduction both through partnership activities and as channels in identified use market segments that can produce viable energy savings for PG&E's other energy efficiency and demand response programs.

The local governments' objectives, according to utility planning documents, are to:

- Provide comprehensive energy efficiency programs to their local communities and for their municipal facilities
- Inform their local communities about a wide variety of energy efficiency and demand response programs available to them and encourage participation
- Test innovative programs.

To achieve this vision, PG&E's 2006-2008 LGP Program relied on a number of implementation strategies to achieve its immediate energy savings goals, including providing incentives for energy efficiency retrofits to residential and commercial buildings and local government facilities, providing outreach and direct install of energy efficiency measures (such as lighting, heating and cooling equipment) to hard-to-reach customer segments, and energy audits and technical services.

The LGP programs provide some services for which there are no immediate energy savings but will help establish an infrastructure for sustainable, long-term management of energy efficiency. These services included workshops and trainings for contractors and end-use customers, development and enforcement of building codes and standards for residents and businesses, hard-to-reach customer energy efficiency marketing and outreach (such as to non-English speaking residents), and building local governments' energy efficiency resources. These

services contribute to the LGP's goal toward establishing a framework for sustainable and long-term energy efficiency management. These services are not expected to deliver direct energy savings.

Table 7-2 shows the program's three year energy savings goals (demand reduction, energy savings, and gas savings) and claimed accomplishments based on the program's quarterly reports. The first column indicates the goal for the three year program period, the second column the cumulative energy savings claimed for the three-year program period, and the third column the percentage of the cumulative energy savings claims of the total energy savings claims to-date.

Table 7-2: 2006-2008 LGP Program
Energy Savings Goals and Claimed Accomplishments

Demand Reduction (kW)		
Program Goal	Claimed Reduction	Accomplishments as a % of Goal
59,081	36,349	62%
Energy Savings (kWh)		
Program Goal	Claimed Savings	Accomplishments as a % of Goal
307,695,553	204,780,934	67%
Gas Savings (Therms)		
Program Goal	Claimed Savings	Accomplishments as a % of Goal
2,382,908	1,023,378	43%

The program achieved sixty percent of its demand reduction goals, sixty-six percent of its energy savings goals, and forty-three percent of its gas savings goals. The average demand reduction goal and claimed savings for each partnership was 3,282 kW and 2,019 kW, respectively. The average energy savings reduction goal and claimed savings for each partnership was 17,094,197 kWh and 11,376,718 kWh, respectively. Finally, the average gas savings reduction goal and claimed savings for each partnership was 132,383 Therms and 5,592 Therms, respectively.

The East Bay Energy Watch & Association of Monterey Bay Area Governments partnerships claimed the largest demand and energy savings. The East Bay Energy Watch partnership claimed to have exceeded its energy savings goal by close to one hundred fifteen percent and the Association of Monterey Bay Area governments by thirty-three percent.

7.2.2. Evaluation Objectives and Approach

The overarching objective of this effort was to evaluate the effectiveness of program processes. The evaluation also addressed a series of specific objectives over three phases of activity. The major research activities included review of program materials and relevant regulatory filings and in-depth interviews with PG&E, local government, and implementation contractor staff.

Phase 1

Initiated in January 2008, the first phase addressed specific issues that were identified during the scoping phase of the evaluation by PG&E LGP managers. These issues included:

- Investigating and articulating the theories underlying the partnerships and the benefits of this approach to delivering energy savings
- Examining the benefits and drawbacks of energy efficiency direct installation compared to other program delivery mechanisms
- Determining the impact on 2004-2005 partnerships from the transition of program implementation phases in 2004-2005 to the 2006-2008 program cycle
- Examining the 2006-2008 contracting process and identifying ways to improve the process going forward
- Assessing how the LGP Program coordinates with other overlapping energy efficiency programs
- Identifying the program's target market and determining whether the target is appropriate and if strategies to locate and serve that market are effective.

KEMA staff reviewed prior PG&E LGP Program evaluation reports and regulatory filings. Next, we selected five LGPs as case studies, based on a review of all eighteen partnerships. Five of those partnerships, described below, were selected as a sample representing many of the key differences in partnership models.

- The East Bay Energy Watch Partnership – included Alameda and Contra Costa Counties, with the cities of Oakland and Berkeley being the most active partners. A third-party contractor implemented the program, contracting with several organizations who canvassed, conducted audits and installed energy efficiency measures to eligible customers in the East Bay. The government partners, who are relatively sophisticated in terms of energy efficiency policy, were actively engaged to help market the program and identify appropriate target markets. The Association of Bay Area Governments Energy Watch Program provided services for East Bay municipal buildings.

- The San Francisco Energy Watch Partnership – included the City and County of San Francisco. The city's Department of the Environment implemented the program, managing two subcontractors who provided direct installation of energy efficiency measures such as lighting, heating and cooling equipment for small commercial and residential customers. Municipal buildings were not eligible under this program, since they do not receive electricity from PG&E. City staff were actively engaged to identify the appropriate target markets, provide audits and other technical services to customers, and to conduct technical analysis in support of updated energy efficiency codes and standards.
- The Association of Monterey Bay Area Governments (AMBAG) Energy Watch Partnership – included the Counties of Monterey, Santa Cruz and San Benito. AMBAG implemented the program by managing subcontracts with small commercial and residential direct installers, facilitating energy clinics and classes, and identifying eligible municipal energy efficiency retrofit projects. Within this partnership, PG&E also had a turn-key direct install contract that operated in the AMBAG area.
- The Fresno Energy Watch Partnership – began as a City of Fresno-only project, then expanded to include the rest of Fresno County. PG&E utilized two contractors under this partnership: one for turn-key residential and small commercial direct install services, and the other for municipal building retrofits. Because maintenance staff were thoroughly familiar with the city's municipal buildings, two City of Fresno full-time maintenance staff helped identify and seek city approval for municipal building projects.
- Silicon Valley Energy Watch Partnership – included the City of San Jose and the County of Santa Clara. This partnership was unique in that it did not have energy savings goals; rather, its activities were referred to as "non-resource" or "marketing and outreach-only." PG&E contracted with the City of San Jose's Environmental Services Department to promote energy efficiency by increasing consumer awareness and participation in energy efficiency and demand response programs. The partnership worked closely with PG&E's two energy centers to offer local energy efficiency training classes to local businesses and consumers, and supported codes and standards work throughout Santa Clara County.

In February 2008, KEMA conducted an initial round of thirteen in-depth interviews (via telephone or in-person) with staff from the five selected partnerships, including PG&E program managers, local government project managers/directors, and third-party implementation contractor staff.

Phase 2

In the second quarter of 2008, KEMA began the second phase of research gathering detailed information on the program's non-resource activities, which are services for which there are no direct energy savings. In particular, the following issues were investigated.

- The value of non-resource activities and their immediate and long-term effects
- The target markets for LGP's non-resource activities
- The relationship of LGP activities to other energy efficiency program-related activities and identification of opportunities for better coordination and leveraging of resources across programs;
- The opportunities for and barriers to expanding valuable activities
- The effectiveness of activity tracking and reporting and ways to improve oversight and evaluation functions.

For these activities, KEMA conducted in-depth interviews, mostly in person, with program staff from the five selected LGPs during May 2008.

Phase 3

The final phase of research began in the last quarter of 2008. Phase three objectives were to:

- Determine and document whether and how PG&E would incorporate evaluation recommendations through its 2009-2011 program plans
- Generate a comprehensive process evaluation report documenting the results of all three phases of research.

The research activities included reviewing PG&E's 2009-2011 program implementation plans and interviewing PG&E program managers.

7.2.3. Evaluation Findings and Conclusions

This section provides a summary of key evaluation findings and conclusions. The prior two reports, provided in the appendices, contain more detailed evaluation findings.

Partnership Purpose

According to program filings, the LGP Program intends to both deliver immediate energy savings and to establish a permanent framework for sustainable, long-term local government

energy management. During the 2006-2008 program cycle, the primary focus of the CPUC was to assess the performance of PG&E's program based on immediate energy savings and cost-effectiveness. Therefore, *the 2006-2008 program was primarily focused on achieving its short-term objective of producing immediate savings at the expense of making progress towards its long-term goals.* Previous LGP program cycles had lower cost-effectiveness targets and had a greater emphasis on investment activities (such as development of local building codes and enforcement of statewide building standards) that would lead to mid- and long-term energy savings.

Higher cost-effectiveness targets under the 2006-2008 program led to the majority of LGP Program energy savings coming from direct installation of lighting measures for small commercial facilities with long operating hours. Most LGPs significantly scaled back other activities, such as building local government energy efficiency capacity or developing improved local standards that were aligned with the vision outlined in the statewide energy efficiency Strategic Plan for 2009-2020. Also, in targeting a narrow customer base and measure mix the LGPs were not achieving their full potential for broad and deep energy savings.

Integration of Services

PG&E offers a variety of energy programs and services to local governments and their constituents, addressing energy efficiency, demand response and renewable technologies. The energy efficiency programs include LGPs; PG&E's territory-wide core programs aimed at the mass market, low-income customers, businesses and industry; and programs delivered by third-party implementers to targeted customers. In most locations within PG&E's service territory, customers are eligible for program services from several programs.

During the 2006-2008 program period, PG&E did not effectively coordinate its energy efficiency programs, which led to customer confusion and dissatisfaction and inefficiencies in program implementation. Our interview results indicated that LGP, core, and third-party programs typically offered many of the same measures and targeted many of the same customers. The programs were competing for customers even though the LGP Program was intended to reach customers who were not being served by core and third-party programs.

PG&E also did not provide its local government partners access to its broader energy services related to sustainability, Demand Response, distributed generation and solar. This inhibited progress towards fully engaging local governments in achieving the state's long-term, strategic energy goals. Our interview results indicated that some local governments were interested in receiving services from PG&E related to sustainability and demand response. PG&E program

staff were able to provide basic information about PG&E's broader energy service offerings, but they were unable to link their local government contacts to the services within PG&E because the service offerings were not internally integrated or well-coordinated.

Implementation Model

Two key characteristics of an LGP are the type of implementer (i.e., local government staff or third-party contractor) and the degree to which the local government is engaged in the partnership. There were a variety of models used by PG&E's LGPs, depending on the unique context of each local area.

Third-party implemented LGPs were more efficient in meeting short-term energy savings goals, while an engaged local government was most effective in meeting long-term LGP goals. Our interview results and review of program filings indicated that third-party implemented LGPs were more efficient than local government agencies at setting up contracts, launching the program and delivering short-term energy savings over the course of the program cycle. Local government agencies that implemented LGPs were less efficient at achieving immediate energy savings because they had broader objectives than third parties which were reflected by a more extensive contractual process (e.g., requiring the use of local contractors), broader customer targets, and measure mixes. Often those objectives were aligned with the LGP Program's long-term goals, such as offering services to hard-to-reach customer segments, developing local building codes and adding local energy efficiency resources. However, we observed third-party implemented partnerships were successful at meeting short-term energy savings goals while also making very meaningful long-term progress; the key factor was that the local government was very engaged in the program.

Contract and Program Administration

PG&E manages each individual LGP Program contract, which is either with the local government or a third-party implementer. PG&E designates a program manager for each partnership, who oversees the contract and monitors program accomplishments. Other PG&E staff (e.g., contracts and information technology groups) also support the LGP Program as needed.

The 2006-2008 LGP Program contract process contributed to customer and partner dissatisfaction and reduced program cost-effectiveness. The process of getting contracts in place for 2006-2008 was very lengthy and time-consuming for PG&E and its partners. Even though many partnerships were being carried over from the previous cycle, PG&E developed

new contracts.[45] During this period, the program was still operating though rebates were not paid and energy savings were not claimed. This caused customer and partner dissatisfaction and impacted energy savings claims.

The contracts themselves were very complex, lacked flexibility to make mid-course changes to improve success and did not specify tracking of measures of success besides immediate energy savings claims.

PG&E systems, processes, and staffing levels were constrained during the 2006-2008 Program, which hindered LGP Program progress. Our interview results revealed that partners believed PG&E was too constrained in terms of managing and supporting LGP Program implementation. Most partners felt that the program managers were dedicated and worked very hard, yet the Customer Energy Efficiency group, in general, was understaffed. Moreover, the systems and support staff were constrained such that there were lengthy delays in facilitating program changes, data requests, rebate payments, and other day-to-day administrative processing.

7.2.4. Evaluation Recommendations

This section presents the major evaluation recommendations. Following each recommendation we describe any plans that PG&E has to address the recommendation. This additional assessment was based on follow-up interviews with PG&E program staff in January 2009.

The 2009-2011 PG&E LGP Program process evaluation will provide an opportunity to assess whether PG&E was successful in making the necessary changes to address this evaluation's recommendations.

Partnership Intent

Recommendation: *The program should strike an appropriate balance between achieving immediate energy savings and meeting the program's long-term strategic objectives****.*** As part of the state's aggressive energy savings program portfolio, most of the 2006-2008 LGP Program strategies were focused on delivering a narrow mix of lighting measures to small commercial customers with long operating hours. The vast majority of LGPs were unable to meaningfully address other program objectives in 2006-2008, such as reaching broader customer segments

[45] PG&E was responsible only for administering contracts during 2004-2005, whereas for 2006-2008 PG&E was additionally responsible for program success.

and developing a permanent local government infrastructure, because they had to use their limited program resources to meet aggressive immediate energy savings goals.

The state's energy efficiency policymakers need to decide the appropriate balance of activities focused on immediate energy savings versus addressing long-term strategic goals, such as building local government energy efficiency capacity through energy efficiency training and information transfer. Obviously, there are tradeoffs to reducing the emphasis on achieving cost-effective immediate energy savings. However, investments made today will likely realize longer term benefits.

PG&E plans to address recommendation:

- PG&E has lowered its cost-effectiveness targets for 2009-2011 LGP Programs. PG&E has also encouraged a broader measure mix for 2009-2011 by packaging measures and offering higher incentives for the installation of three or more measures at an individual site. PG&E has expanded its geographic coverage for 2009-2011 by adding new LGPs and expanding the coverage of existing LGPs. PG&E has also encouraged LGPs to address a wider customer mix, which lower cost-effectiveness targets should make possible.

- PG&E is also encouraging LGPs to offer the most innovative non-resource activities via its innovative pilot programs that are part of its 2009-2011 portfolio. These programs are not subject to energy savings goals, and will have more flexibility to pursue activities that are aligned with long-term, broad impacts. The green communities programs will also include important non-resource activities that are focused on achieving goals in the Strategic Plan.

- PG&E plans to strategically assess measure and customer coverage on an on-going basis during the 2009-2011 program cycle and engage with PG&E account representatives and LGPs to develop appropriate customer targets.

Recommendation: *PG&E and the CPUC should track and monitor program strategies that are designed to yield long-term benefits and are in line with the Strategic Plan*. The 2006-2008 LGP Program included activities that likely made important progress towards the goals for local government outlined in the state's long-term Strategic Plan. However, these activities were not

effectively monitored or evaluated.[46] The CPUC-sponsored impact evaluations for 2006-2008 were intended to assess the program's direct energy savings claims. Going forward, the evaluation framework should be broadened to address important activities that may provide indirect energy savings and that may be key to meeting the state's long-term energy goals.

PG&E plans to address recommendation:

- PG&E is working with the other California IOUs and the CPUC on an initiative to develop a tracking database that includes long-term savings, which could help create more emphasis on program strategies intended to achieve long-term goals.
- PG&E is using the state's strategic plan to prioritize and track LGP non-resource activities. For example, training on Title 24 is a priority in the strategic plan, so PG&E is emphasizing this activity in its 2009-2011 LGP implementation plan. During the 2009-2011 period, PG&E LGP program managers will be tracking non-resource program activities and outcomes by the various elements contained in the strategic plan.
- PG&E is working internally to develop evaluation strategies for programs aimed at long-term energy savings.

[46] The Statewide 2006-2008 LGP program impact evaluation may have covered non-resource activities, but it has not yet been released. We assume the major focus of the impact evaluation was on program activities associated with claimed energy savings.

Integration of Services

Recommendation: *Develop a tracking system to monitor implementation traffic for utility third-party, LGP, core, and low-income program coordination and cross-referrals to be shared by local governments and PG&E*. This recommendation would lead to a substantial increase in efficiency and the number of participants reached. However, it would probably take a lot of resources, commitment, and coordination across the diverse set of partnership staff to develop and implement an effective system. Note that PG&E had proposed building such a clearinghouse in its 2006-2008 program application. This type of system is still needed since PG&E will continue in 2009 and beyond to have multiple delivery channels serving the same customer base.

PG&E plans to address recommendation:

- PG&E has launched a coordinated model pilot program, where LGP, low-income energy efficiency, core and third-party programs will be coordinated by contractors across a geographic area, so each customer will be assigned one contractor who can provide all program services at once. PG&E will be evaluating the pilot and considering rolling it out full-scale during the 2009-2011 program cycle.

Recommendation: *Integrate PG&E's energy services that are applicable to local governments.* PG&E should coordinate its service offerings related to energy efficiency, demand response, carbon reduction, and sustainability. Ideally, PG&E should create an integrated service offering in which local governments could take advantage and include in their programs to meet various community sustainability goals.

PG&E plans to address recommendation:

- PG&E has taken measures to integrate its service offerings for 2009-2011 and has explicitly described these efforts in its 2009-2011 LGP Program implementation plan. There are a variety of initiatives planned concerning low-income markets, codes and standards, green communities, and demand response programs, all of which are documented in the 2009-2011 program implementation plans. The scope and content of integration plans for each partnership varies depending on local characteristics. For example, LGPs with in-house energy efficiency capacity are doing more with energy efficiency training and code compliance and providing support to other LGPs. Likewise, LGPs that do retrofits of municipal buildings are more involved with demand response integration activities.

- PG&E has also convened regular market segment strategy meetings, which assess its program offerings by market segment (including local government). This initiative is intended to ultimately integrate program offerings for each market segment, which will inform an integrated outreach strategy to local governments.

Implementation Model

Recommendation: *Balance the program's short- and long-term objectives when establishing new partnerships and determining how they will be implemented.* While third parties are typically more efficient at implementing energy efficiency programs than local governments, the partnership will not be successful at meeting its long-term goals unless the local government is engaged. PG&E should examine each potential partnership to determine the appropriate implementation model, such that the program can meet its immediate energy savings goals in a timely manner and the local government is effectively engaged.

PG&E plans to address recommendation:

- In general, when considering adding a new LGP, PG&E staff seek to determine a local government's engagement on energy efficiency issues and whether they have the bandwidth to perform the administrative functions. PG&E also looks at opportunities to broaden new and existing LGPs where appropriate. For example, a recently added LGP, implemented by the Great Valley Center, covers a broad area of the Central Valley. Finally, PG&E looks to the more seasoned LGPs to share information with new LGPs and facilitate information sharing.

Contract and Program Administration

Recommendation: *Ensure that the 2009-2011 contract process does not adversely affect delivery of program services.* The lengthy 2006-2008 contract process caused a gap in program delivery and a loss of goodwill among both customers and partners.

PG&E plans to address recommendation:

- PG&E is in the process of contracting with its local government partners to cover the bridge period from the end of 2008 to the launch of the 2009-2011 programs, and has initiated change orders for LGPs.

Recommendation: *Set up 2009-2011 contracts to provide flexibility to make mid-course corrections.* This will encourage programs to innovate and adapt to changing external conditions, and decrease the administrative costs associated with making changes to the programs.

PG&E plans to address recommendation:

- PG&E plans to improve the contracting process for 2009-2011 programs by allowing greater flexibility for implementers to make mid-course changes for program improvement.

Recommendation: *Add progress reporting and documentation processes (beyond counting of energy savings by measure) to the 2009-2011 contracts to monitor the successes and challenges of each program strategy*. This will give PG&E and the CPUC more information and control over implementation decisions that effect energy savings in the near term. Likewise, additional control could provide the opportunity to help shape strategies aimed at building a local government energy efficiency infrastructure and to refine appropriate customer targets and measure mixes.

PG&E plans to address recommendation:

- As mentioned previously, PG&E will be tracking measures and customers more closely in the 2009-2011 program period in order to ensure broader customer and measure treatment. PG&E is also working with the CPUC to develop a tracking system for program strategies aimed at achieving long-term goals.

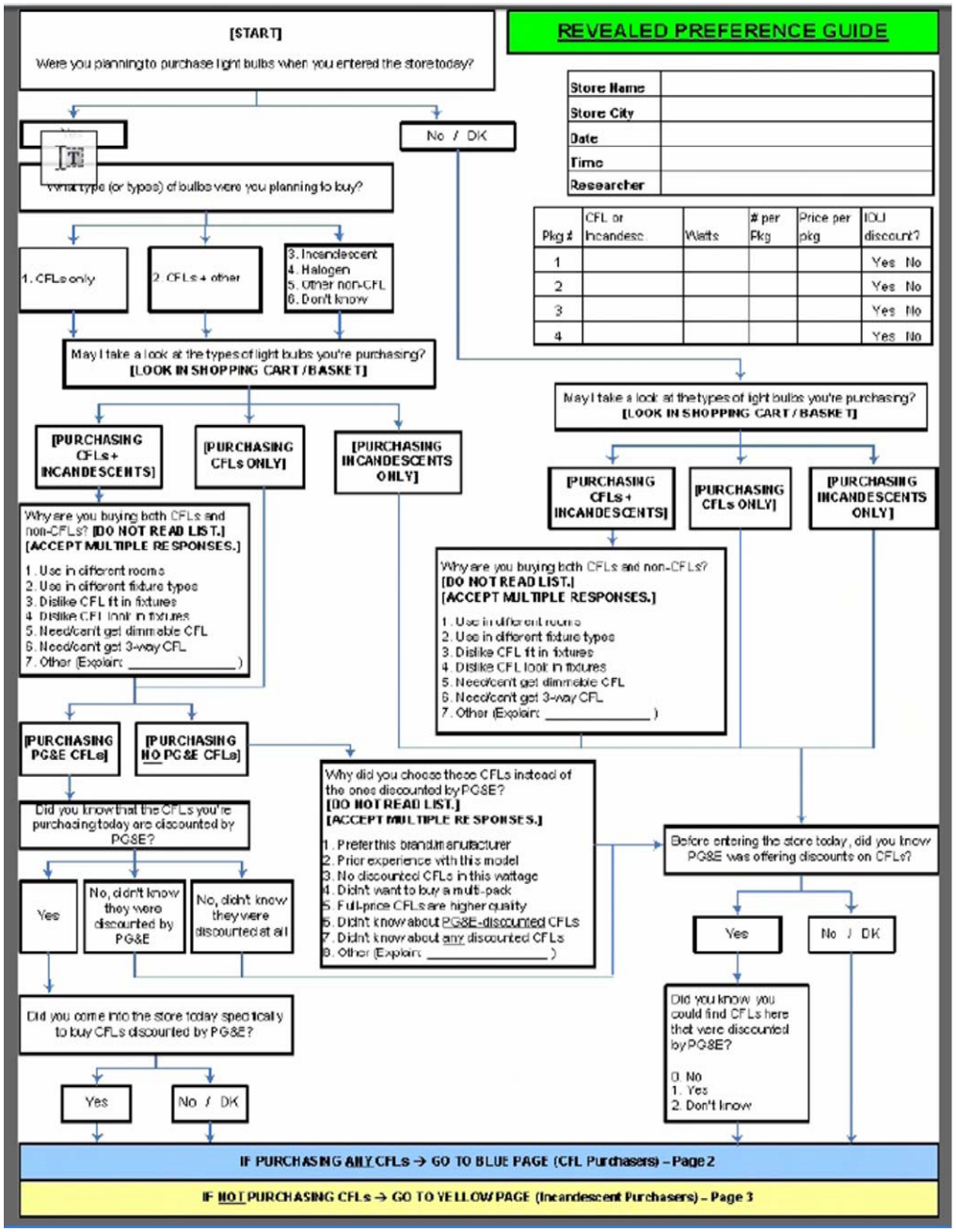
Recommendation: *Determine whether PG&E's administrative infrastructure that supports the LGP Program is sufficient to accomplish its priorities and make improvements if warranted (e.g., add staff, update IT systems, etc.)*. While difficult to implement, addressing PG&E resource constraints would lead to improvements in efficiency, reduced administrative costs, quicker turn-around on program changes, and administrative processing.

PG&E plans to address recommendation:

- PG&E has added several strategic senior staff members to the LGP group, as well as program support staff. There has not been major staff turn-over recently. PG&E has been working on process improvements to streamline operations, which are intended to improve program implementation. In particular, PG&E has streamlined its data request process, assigning one individual to process external requests and standardizing its process for addressing data requests.

Appendix A: Revealed/Stated Preference Survey Instruments

Revealed Preference Survey Instrument



BLUE PAGE -- CFL PURCHASERS -- PAGE 2

[COLUMN A]
What influenced your decision to purchase these particular CFLs today?
[DO NOT READ LIST. ACCEPT MULTIPLE RESPONSES.]

Anything else? **[RECORD OTHER INFLUENCES.]**

[COLUMN B -- FOR ALL IDENTIFIED IN COLUMN A]
Which of these factors was most influential on your decision? Second most? Third most? **[ETC.]**

[ENTER RANKINGS. USE EACH RANK ONLY ONCE AND ENTER "N/A" IF NOT APPLICABLE.]

Reason [DO NOT READ LIST.]	A Check if Mentioned	B Rank
1. CFL price is low / affordable		
2. To save money		
3. To save energy		
4. Saw signs or displays in store		
5. Environmental reasons		
6. Recommended by friends/family		
7. Saw advertisement outside store		
8. CFLs work better/higher quality than incandescent		
9. Prior experience with CFLs		
10. CFL location in store (caught my attention)		
11. Other (Specify: _____)		

How many CFLs would you have purchased today if they cost twice as much? Would you say...
1. none,
2. fewer,
3. the same number, or
4. more CFLs?
5. [Don't know]

What if they cost half as much? Would you have purchased...
1. none,
2. fewer,
3. the same number, or
4. more CFLs?
5. [Don't know]

[IF APPLICABLE]
Would you still have purchased CFLs today if...
[ENTER "N/A" IF NOT APPLICABLE. DK = "Don't Know"]

Question	Circle one
1. ...you hadn't seen advertising outside the store?	Yes No DK N/A
2. ...you had no prior experiences with CFLs?	Yes No DK N/A
3. ...there were no CFL signs/displays in the store?	Yes No DK N/A
4. ...the CFLs were located with the rest of the lighting products?	Yes No DK N/A

Are you planning to install the CFLs you're purchasing today in your home, a business, or both?

[IF NEEDED: Business could be your own or your employer's.]

1. Home
2. Business (Type: _____)
3. Both (Bus.Type: _____)
4. Other (Explain: _____)
5. Don't know

[IF BOTH/OTHER]

# in home	
# in business	
(# other)	

Of the CFLs you are purchasing today, how how many are you planning to install in the next month?

# in home	
# in business	
(# other)	

Have you ever purchased or been given any CFLs (before today)?

Yes → Do you have any CFLs installed right now in your [home/business]?

Home	[if relevant] Business
0. No	0. No
1. Yes	1. Yes
2. Don't know	2. Don't know

No / DK → Do you have any CFLs in storage (to install later) in your [home/business]?

Home	[if relevant] Business
0. No	0. No
1. Yes	1. Yes
2. Don't know	2. Don't know

Does PG&E provide electricity to your home **[IF RELEVANT]** or business?

Yes ____home ____business → **[PHONE RECRUIT]**
Those are all of the questions I have for you today; thank you for your time.

Could we give you a call in about 3 months to talk with you a little more about these CFLs? In appreciation for your participation in that phase of the study, we'll send you a $20 gift certificate for Amazon.com.

No / DK → **[CLOSE.]**
Thank you for your time today! May I have your name and zip code for our records? **[GIVE GIFT CARD.]**

Name		Zip	
Respondent gender (circle one):	MALE	FEMALE	

No / DK → **[CLOSE.]**
Excellent; thank you. May I please have your contact information?
[GIVE GIFT CARD.]

Name			
Phone		Zip	
Respondent gender (circle one):	MALE	FEMALE	

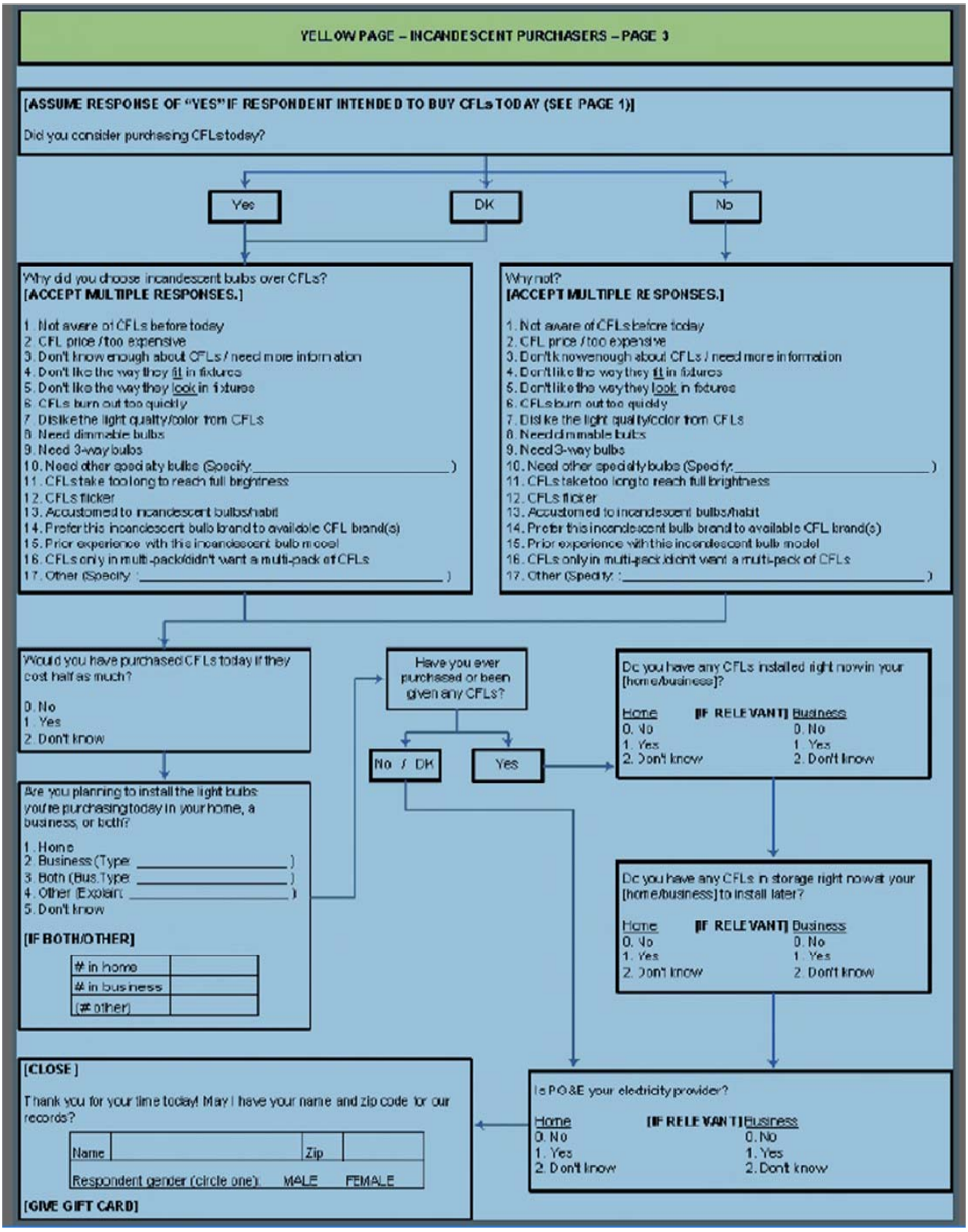
Yes → **[IF PURCHASING MULTI-PACK(S)]**

RECORD # IN LARGEST MULTI-PACK: _____

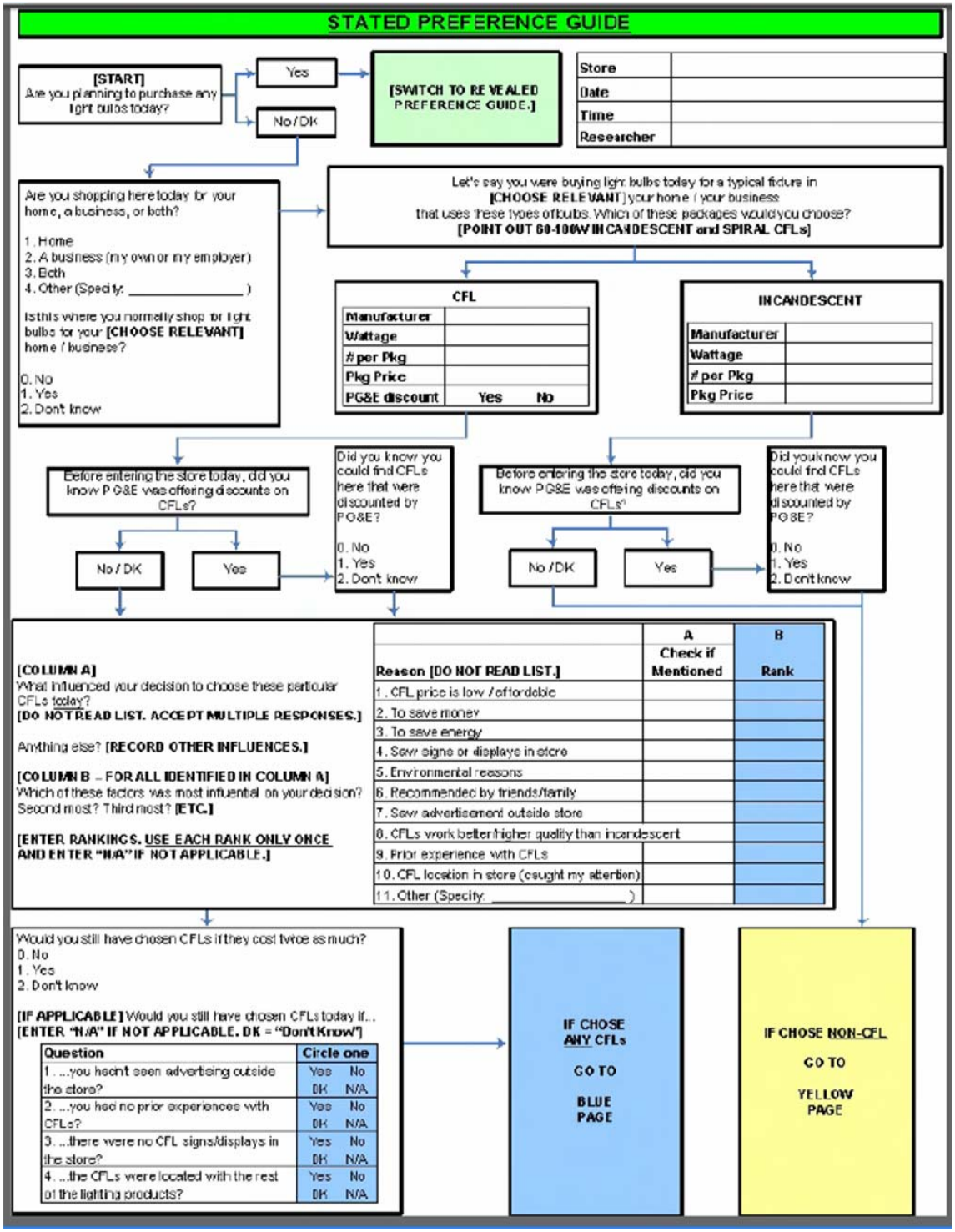
If the CFLs were sold individually but at the same price you're paying per bulb, do you think you'd have purchased the same number, more, or fewer bulbs?

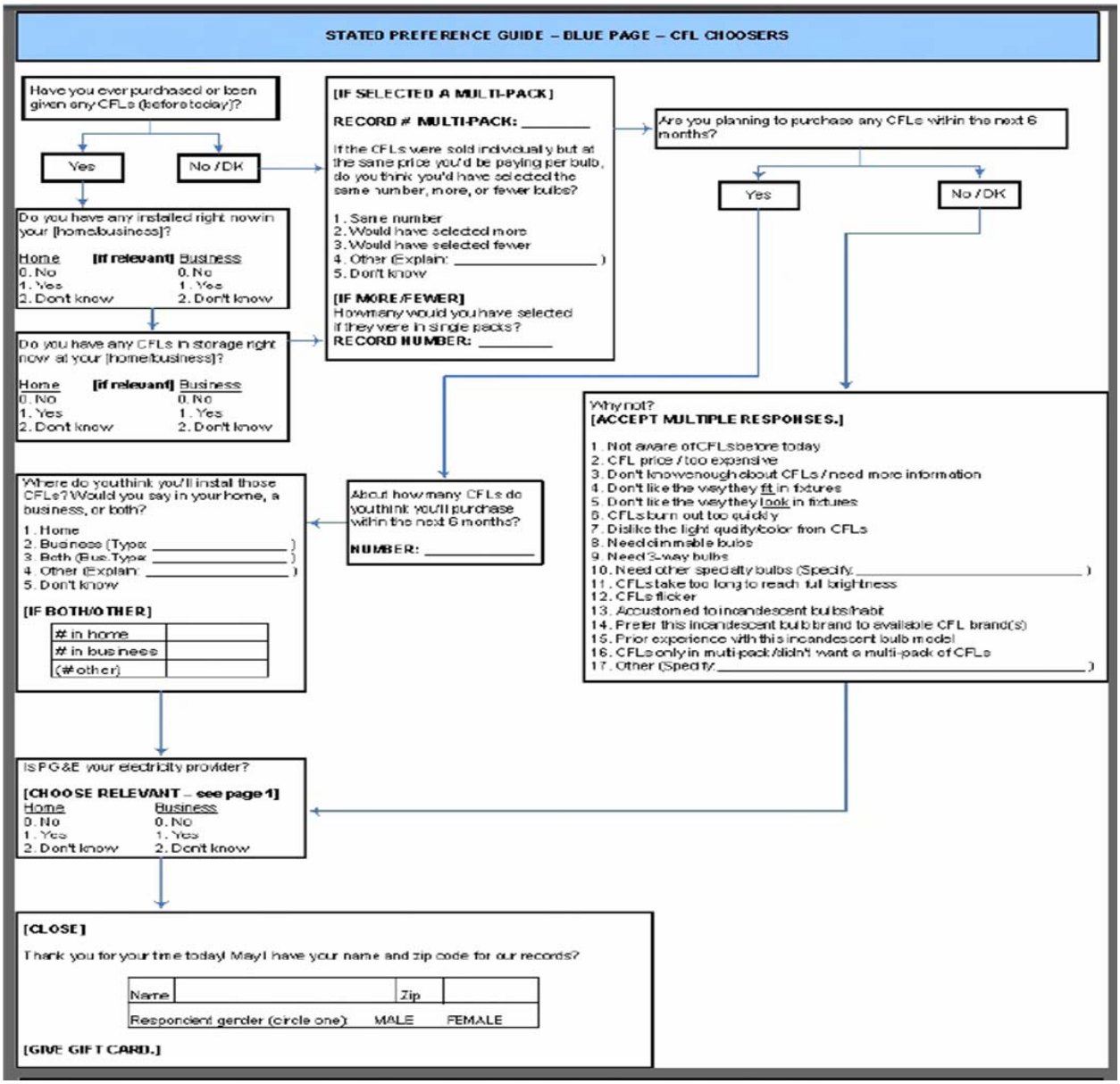
1. Same number
2. Would have purchased more
3. Would have purchased fewer
4. Other (Explain: _____)
5. Don't know

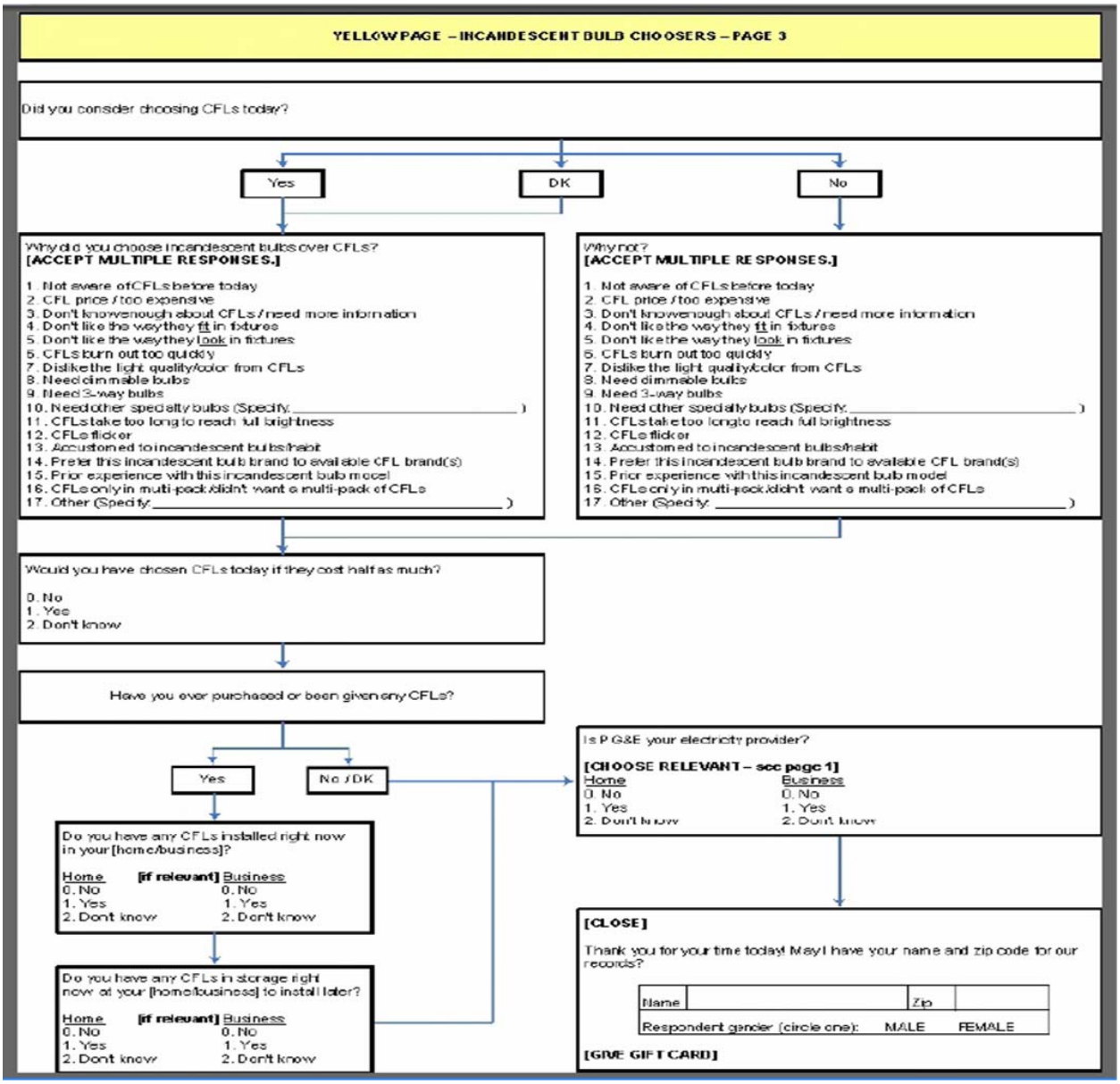
[IF MORE/FEWER]
How many would you have purchased if they were in single packs?
RECORD NUMBER: _____


YELLOW PAGE – INCANDESCENT PURCHASERS – PAGE 3
[ASSUME RESPONSE OF "YES" IF RESPONDENT INTENDED TO BUY CFLs TODAY (SEE PAGE 1)]
Did you consider purchasing CFLs today?
Yes
DK
No
Why did you choose incandescent bulbs over CFLs?
[ACCEPT MULTIPLE RESPONSES.]
1. Not aware of CFLs before today
2. CFL price / too expensive
3. Don't know enough about CFLs / need more information
4. Don't like the way they fit in fixtures
5. Don't like the way they look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color from CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulbs (Specify: _____)
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs/habit
14. Prefer this incandescent bulb brand to available CFL brand(s)
15. Prior experience with this incandescent bulb model
16. CFLs only in multi-pack/didn't want a multi-pack of CFLs
17. Other (Specify: _____)
Why not?
[ACCEPT MULTIPLE RESPONSES.]
1. Not aware of CFLs before today
2. CFL price / too expensive
3. Don't know enough about CFLs / need more information
4. Don't like the way they fit in fixtures
5. Don't like the way they look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color from CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulbs (Specify: _____)
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs/habit
14. Prefer this incandescent bulb brand to available CFL brand(s)
15. Prior experience with this incandescent bulb model
16. CFLs only in multi-pack/didn't want a multi-pack of CFLs
17. Other (Specify: _____)
Would you have purchased CFLs today if they cost half as much?
0. No
1. Yes
2. Don't know
Have you ever purchased or been given any CFLs?
No / DK
Yes
Do you have any CFLs installed right now in your [home/business]?
Home [IF RELEVANT] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
Are you planning to install the light bulbs you're purchasing today in your home, a business, or both?
1. Home
2. Business (Type: _____)
3. Both (Bus. Type: _____)
4. Other (Explain: _____)
5. Don't know
[IF BOTH/OTHER]
in home
in business
(# other)
Do you have any CFLs in storage right now at your [home/business] to install later?
Home [IF RELEVANT] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
[CLOSE]
Thank you for your time today! May I have your name and zip code for our records?
Name
Zip
Respondent gender (circle one): MALE FEMALE
[GIVE GIFT CARD]
Is PG&E your electricity provider?
Home [IF RELEVANT] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know

Stated Preference Survey Instrument




STATED PREFERENCE GUIDE – BLUE PAGE – CFL CHOOSERS
Have you ever purchased or been given any CFLs (before today)?
Yes
No / DK
Do you have any installed right now in your [home/business]?
Home [if relevant] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
Do you have any CFLs in storage right now at your [home/business]?
Home [if relevant] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
[IF SELECTED A MULTI-PACK]
RECORD # MULTI-PACK: _____
If the CFLs were sold individually but at the same price you'd be paying per bulb, do you think you'd have selected the same number, more, or fewer bulbs?
1. Same number
2. Would have selected more
3. Would have selected fewer
4. Other (Explain: _____)
5. Don't know
[IF MORE/FEWER]
How many would you have selected if they were in single packs?
RECORD NUMBER: _____
Are you planning to purchase any CFLs within the next 6 months?
Yes
No / DK
Why not?
[ACCEPT MULTIPLE RESPONSES.]
1. Not aware of CFLs before today
2. CFL price / too expensive
3. Don't know enough about CFLs / need more information
4. Don't like the way they fit in fixtures
5. Don't like the way they look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color from CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulbs (Specify: _____)
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs/habit
14. Prefer this incandescent bulb brand to available CFL brand(s)
15. Prior experience with this incandescent bulb model
16. CFLs only in multi-pack/didn't want a multi-pack of CFLs
17. Other (Specify: _____)
About how many CFLs do you think you'll purchase within the next 6 months?
NUMBER: _____
Where do you think you'll install those CFLs? Would you say in your home, a business, or both?
1. Home
2. Business (Type: _____)
3. Both (Bus. Type: _____)
4. Other (Explain: _____)
5. Don't know
[IF BOTH/OTHER]
in home
in business
(# other)
Is PG&E your electricity provider?
[CHOOSE RELEVANT – see page 1]
Home Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
[CLOSE]
Thank you for your time today! May I have your name and zip code for our records?
Name
Zip
Respondent gender (circle one) MALE FEMALE
[GIVE GIFT CARD.]


YELLOW PAGE – INCANDESCENT BULB CHOOSERS – PAGE 3
Did you consider choosing CFLs today?
Yes
DK
No
Why did you choose incandescent bulbs over CFLs?
[ACCEPT MULTIPLE RESPONSES.]
1. Not aware of CFLs before today
2. CFL price / too expensive
3. Don't know enough about CFLs / need more information
4. Don't like the way they fit in fixtures
5. Don't like the way they look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color from CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulbs (Specify: _____)
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs/habit
14. Prefer this incandescent bulb brand to available CFL brand(s)
15. Prior experience with this incandescent bulb model
16. CFLs only in multi-pack/didn't want a multi-pack of CFLs
17. Other (Specify: _____)
Why not?
[ACCEPT MULTIPLE RESPONSES.]
1. Not aware of CFLs before today
2. CFL price / too expensive
3. Don't know enough about CFLs / need more information
4. Don't like the way they fit in fixtures
5. Don't like the way they look in fixtures
6. CFLs burn out too quickly
7. Dislike the light quality/color from CFLs
8. Need dimmable bulbs
9. Need 3-way bulbs
10. Need other specialty bulbs (Specify: _____)
11. CFLs take too long to reach full brightness
12. CFLs flicker
13. Accustomed to incandescent bulbs/habit
14. Prefer this incandescent bulb brand to available CFL brand(s)
15. Prior experience with this incandescent bulb model
16. CFLs only in multi-pack/didn't want a multi-pack of CFLs
17. Other (Specify: _____)
Would you have chosen CFLs today if they cost half as much?
0. No
1. Yes
2. Don't know
Have you ever purchased or been given any CFLs?
Yes
No / DK
Do you have any CFLs installed right now in your [home/business]?
Home [if relevant] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
Do you have any CFLs in storage right now at your [home/business] to install later?
Home [if relevant] Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
Is PG&E your electricity provider?
[CHOOSE RELEVANT – see page 1]
Home Business
0. No 0. No
1. Yes 1. Yes
2. Don't know 2. Don't know
[CLOSE]
Thank you for your time today! May I have your name and zip code for our records?
Name
Zip
Respondent gender (circle one): MALE FEMALE
[GIVE GIFT CARD]

Appendix B: Intercept Survey Implementation Considerations, Challenges and Keys to Success

Excerpt from 2008 ACEEE Summer Study Conference Paper, "Walking the Aisles: Designing Research to Understand CFL Purchase Motivations at the Time of Sale," Jennifer E. Canseco, Kathleen Gaffney, and Kevin Price, KEMA, Inc.

Implementation Considerations

There are a number of important survey implementation considerations that need to be carefully planned and executed to minimize bias and ensure representativeness across the full range of both consumer and retail segments. These considerations are discussed below.

Survey Timing

There are several issues related to survey timing that are important to consider. First, how long can the study afford to have researchers in any one store conducting surveys? For some high-traffic stores, researchers will meet their survey quotas within a very reasonable timeframe and in others, where foot-traffic is low, and researchers may not achieve their targets even after spending several hours in the store. This study was designed to set a limit of four hours in any one store. Researchers are instructed to attempt to meet their target of revealed preference surveys in the first three hours and, if they are unable to meet that target, they are to spend the last hour conducting stated preference surveys.

Another important issue to consider is the actual times of day and days of the week in which the research is conducted. For some stores, foot-traffic is highest on the weekends. For others, especially home improvement and hardware stores, foot-traffic can be high in the early weekday mornings. Just like telephone survey research, it is important to conduct in-store intercept research at various times of day and days of the week in order to ensure that no particular segment of shoppers is being systematically excluded.[47]

[47] In addition, this study includes an extra step when the researcher encounters contractors who are purchasing IOU discounted CFLs to install in their clients' businesses or homes. In these cases, the researcher attempts to collect contact information (e.g., business card) so that researchers can contact the contractor to conduct a brief follow-up telephone survey. The purpose of this survey is

Surveys should also be fairly well-timed to coincide with periods during which the IOU's discounted product is being promoted and sold with sufficient volume. We also attempted to place researchers in stores where the discounted CFLs were not being sold (or only sold in very low volume). In the early study phases, this was provided an important opportunity to gain insight into how well the survey questions were working. Additionally, the absence of discounted CFLs in stores reduces the overall likelihood that researchers will meet their minimum targets for revealed preference surveys. Non-discounted CFLs are still fairly expensive relative to the discounted CFLs and not sold as frequently in large multi-packs. As such, observed purchase patterns are very different when the product is discounted, making it very important to ensure that the stores are selling the product prior to placing researchers in the store.

Language

Any research conducted in California must be able to include respondents for whom English is not their first or native language. This study has capabilities in both Spanish and Chinese (Mandarin and Cantonese). Not only is there potential bias in the data collected if surveys are not conducted in consumers' preferred language, but it makes recruitment far more difficult, especially given the other challenges associated with low foot-traffic and in-store "interference" (discussed below).

Eligible Product Types

As mentioned above, the modified lighting shelf survey included in the study design is limited to comparable medium screw-base incandescent lamps and CFLs. It is important to set these limits throughout the study in order to focus the researcher (as well as the data collection) on a specific and narrow set of factors that could be influencing consumer purchasing decisions. As such, in this study the researcher is required to conduct revealed preference surveys only with purchasers of medium screw-base CFLs or equivalent incandescent lamps. Stated preference surveys are administered after consumers make a hypothetical purchase decision between a screw-base CFL and a comparable incandescent lamp.

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more over-arching and not necessarily tied to the contractor's specific CFL purchases that day. The follow-up survey is designed to understand the volume of contractor purchases of IOU-discounted CFLs and the influence of the discount on the volume purchased in a given time period (i.e., annually), as well as contractor estimates as to where (business versus residential) the bulbs are ultimately being installed.

Introducing other types of lighting product purchases into the research would present many challenges, not least of which would have been the need to expand the survey questions to cover the technical applicability considerations of these products. Products such as linear fluorescent tubes, candelabra-based CFLs, halogens, LEDs, and lighting fixtures are excluded from the research design because they have very different applicability considerations than the more universal screw-base light bulb. Specialty CFLs, such as reflectors, dimmable and three-way CFLs, are not explicitly excluded but are also not very likely to be present in many of the retail stores in which researchers are placed (particularly discount and grocery stores). Therefore, data collected on these types of specialty lamp purchases would be fairly unreliable and have limited value in this study given the likely very low incidence of researchers encountering purchasers of these products in any given store, as well as the relatively low volume of actual purchases of these types of products in the current retail market.[48]

Sample Design

A critical consideration in the implementation of the in-store intercept research involves the sample design. Obviously, it was important to design a sample that could adequately represent the broad ranges of retail stores that are actually participating in the upstream lighting program and selling discounted CFLs to consumers in the IOU's service territory. It is also equally important to consider the geographic distribution of these participating stores across the IOU's service territory. Consumer purchase decisions related to lighting products are influenced not only by the sales conditions they face once they enter a particular store, but also by the options they have when considering which store to go to when they need to make lighting purchases. Some consumers have many options because they live in relatively urban environments, but certain mass merchandisers and big box retailers may not be as easily accessible to the urban consumer. Consumers who live in suburbs may have the most diverse range of options, whereas rural consumers must often consider purchase location more carefully since their options are the most limited.

In this study, therefore, the sample design needed to account for these very different urban/suburban/rural retail setting realities and it needed to adequately represent more than 50

[48] As a follow-up to this research, focus groups are planned to explore consumer decision-making factors that are influencing the next generation of efficient lighting products. In this more controlled environment, researchers can conduct a more thoughtful and probing exploration of consumer reactions these emerging products.

participating retail chains and hundreds of independent stores (representing more than a thousand unique storefronts[49]) throughout the state.

Implementation Challenges

Researchers interested in replicating this study should be aware of the many additional implementation challenges posed by this type of in-store intercept research. These challenges can be broadly classified into two groups: those encountered before researchers are actually placed in stores, and those that arise in the stores after the researchers have been deployed. Additional analytic challenges are likely to be identified after the data has been collected, but since this study is currently being fielded and has yet to enter the analysis phase, the discussion below centers only on the specific implementation challenges we have experienced to date.

Before the Research Begins

Obtaining permission for entry into stores. The first challenge posed by the in-store intercept research is obtaining permission to enter the stores. This challenge cannot be underestimated because the overall success of the study is very much contingent upon obtaining permission from the full range of participating retailers. If one major retail chain refuses or otherwise introduces conditions that cannot be accommodated within the study design, the overall applicability and ultimate reliability of the study results can be called into question.

In some cases, a retail chain may have an internal policy forbidding in-store research; in other cases, a retail chain may insist on using their own staff to carry out the intercept research. While there is little one can do to overcome the first barrier if there truly is a corporate policy in effect, often times a call from the program manager and/or the manufacturer supplying the discounted product to the stores can help open up the lines of communication such that stores that might have initially refused to support the study eventually agree to participate.

In the cases where a chain insists on using its own personnel to conduct the surveys, one has to consider the potential bias and other logistical challenges that this approach might introduce. Staff who work for the chain (or for a research firm hired by the chain) will not approach the research with the same degree of independence as an independent research firm not hired by the retail chain. This raises some concerns about at least the perception of bias and also

[49] Based on November 2007 program tracking data from PG&E; see footnote 7.

suggests that results from other stores may not be completely comparable to this chain. Additionally, there are logistical challenges that will inevitably arise if a retail chain insists on using its own staff: additional and potentially different training requirements, less control over the survey implementation process, more emphasis needed on quality control and verification, and so on. These concerns are heightened even further if the chain is a major player in the retail market.

Further, obtaining permission is a fairly sensitive and time consuming process that begins with identifying the appropriate individual or individuals with whom to have the initial discussions about the study sponsor and scope. For this study, the utility program managers sent emails to their key contacts at each of the participating manufacturers and large retail chains. As mentioned above, manufacturers were often crucial to opening the appropriate doors at the retail level. Researchers followed-up with in-person meetings, telephone calls and emails to the corporate-level contact at each individual retail chain. For the largest chains, this process varied from roughly two weeks to two months. For smaller chains and independent stores, store-level contacts (such as the store owner or manager) were responsible for granting permission for their own storefronts. As such, the process of obtaining permission was much more straight-forward for smaller chains and independent stores, ranging from a single telephone call or email to about a week or so of back-and-forth.

Another challenge faced in this study is that retailers often grant different forms of permission. For example, some indicated that researchers could “show up at any time” without advance notice to the individual store manager or regional representative. In many of these cases, the corporate contact sent emails or letters to the individual store managers alerting them to the purpose of the study and asking them to allow researchers to enter the stores at any time to conduct the research. Initially, this was viewed as a significant advantage as it provided the greatest scheduling flexibility (as one such store could easily be substituted for another if needed). However, this approach often resulted in a number of “turn-aways” – situations in which a researcher would arrive at a store to find that no one was aware of the study and the researcher was not permitted to conduct the surveys. Other retail chains wanted to know the specific day and time researchers would be placed in their store, which generally provided greater assurance that the researcher would be permitted to conduct the surveys, but also required more upfront coordination.

Scheduling. Because the study focused on CFLs that were discounted by the IOU upstream lighting program, it was important to time the research to coincide with the promotion. Therefore, as discussed above, it was important to know in advance which stores would be selling

discounted product during what timeframes so as to ensure researchers were placed in stores when the discounted CFLs were being sold in sufficient volume. This proved challenging, as a number of manufacturers supply the various chains involved in the promotion, and product shipment schedules varied by manufacturer and chain. Although program staff provided detailed information on the timing of shipments from manufacturers to retailers, it was not always a good predictor of when the discounted product would be physically available on the retail sales floor. Not being able to reliably predict product availability presented another challenge in planning and coordinating field activities.

Additional scheduling challenges involved having to deal with last-minute changes in planned shipments and/or cancellations. In a few cases, scheduled store visits had to be canceled or postponed because a shipment of promotional CFLs was delayed. In another case, a store manager cancelled the store visit so as not to interfere with other promotions that were taking place during the scheduled weekend. While these types of logistical challenges are not necessarily unique to this study, last minute changes or cancellations can prove difficult if not impossible to handle once the researchers have been deployed. This is primarily because of the need to obtain permission in advance and to schedule store visits on specific days and times. In addition, because of the need to select stores within reasonable proximity to one another to control study costs, finding replacement stores to fit the scheduled locations was rarely a straightforward process.

Similarly, as described above, researchers were also occasionally turned away when they arrived at a particular store to conduct the surveys. In many of these cases, the local store staff had not received the advance notice of the study as promised by the corporate-level contacts. In other cases, the store manager had received notice but was simply uncomfortable with allowing a non-employee of the store out on the sales floor. In some cases, back-up stores were available for these situations (e.g., a store for which permission had been granted to visit the store at any time), but in other cases, the researcher had no backup store available.

Sample management. Because of variations in when permission was granted to enter a specific chain and when each chain received its allocation of promotional CFLs, store "availability" for visits was contingent not only on permission to enter the stores but also on product availability. Because of these variations, the number of individual storefronts available to researchers changed over time, resulting in a constantly-evolving sample design. Researchers thus needed to reassess the sampling strategy frequently and make adjustments based on store recruitment efforts and product availability.

Training. Before entering the stores, researchers were trained on how to administer the revealed preference, stated preference, and shelf surveys and also on how to interact with store staff and consumers. Researchers also participated in at least one day of in-store training, led by the study manager and other experienced team members. Because conditions in the stores are always difficult to predict, it was necessary to conduct ongoing training and "debriefings" throughout the course of the study. Researchers gathered together for these debriefing meetings within one week of the field activities and discussed their experiences and sought advice from the study team regarding how to deal with different situations that arose in the field.

In-store Challenges

Finding the appropriate contact. As described above, the study faced challenges related to identifying the appropriate corporate-level contact within a retail chain to grant permission for the study. Once researchers were placed in stores, a similar challenge presented itself but on somewhat of a different level. Researchers were often instructed to make contact with the store manager, who was identified by the corporate-level contact as the individual who would grant local access to conduct the study. However, these individuals were not always available when the researchers arrived at the stores, so often obtaining permission at the local store level was often a separate, delicate and time-consuming process.

Positioning in the stores. Once permission was granted at the local level to enter the store and administer the surveys, researchers were then faced with the challenge of determining the best position in which to conduct the research in the store. Ideally, researchers were to stand in the aisle in which discounted CFLs were positioned, or at least close enough to be able to observe and recruit purchasers. However, researchers quickly reported variations in how lighting products are merchandised from store to store – in many stores, all of the light bulbs are positioned in the same aisle, but in other stores (particularly larger home improvement stores), light bulbs may be displayed in several different locations throughout the store. In one home improvement store, the researcher found promotional CFLs in seven different locations including aisles, end-caps, and stand-alone floor displays. In such situations, researchers must determine the best position in which to maximize their view of the available light bulbs and shoppers. Not only do multiple locations make it difficult to recruit purchasers to conduct the survey, but these variations present challenges in interpreting the actual range of choices consumers considered before making (or not making) a particular purchase.

Limited time to conduct intercept. As mentioned above, the in-store intercept approach limits the amount of time a researcher can engage a respondent in the survey process. In this study,

most surveys were completed within two to four minutes. During telephone surveys, respondents can typically "multi-task" and, as a result, may be more willing to complete a lengthier survey. Face-to-face interviews, however, require the respondent's full attention – participants must stop what they are doing to take part in the study. To keep the survey length within acceptable limits, a carefully planned, focused, and tightly scripted survey instrument is essential.

Managing "help" from store staff. At the store level, researchers typically encountered very helpful and friendly store staff. Such staff helped facilitate the research process by showing the researcher all of the different locations in which light bulbs were displayed in the store and providing advice as to the best place to stand to maximize the view of these products. In some cases, however, store staff were a little *too* helpful – for example, "helping" the researcher get a high number of completed surveys by informing shoppers that they could obtain gift cards if they purchased light bulbs. Training researchers on how to gently refuse such "assistance" without alienating the store staff helped to avoid these situations.

Offering incentives. As mentioned above, the study was designed to offer consumers a $5 or $10 gift card or gift certificate to the store in which the survey took place as an enticement to and reward for participating in the research. The gift cards also proved to be an added enticement to retailers who were initially somewhat hesitant in agreeing to support the research. However, some stores (such as local hardware stores) do not offer gift cards (or gift certificates) for their specific stores. In these cases, researchers needed to purchase gift cards from other local stores (e.g., coffee shops), which were ultimately less effective and met with mixed reviews from consumers. In other cases, store staff had problems "activating" the gift cards, which resulted in time-consuming delays in initiating research in a particular store.

Even if stores had their own gift cards available and store staff were able to activate them successfully, it was difficult to predict the precise number of gift cards that would be needed in a particular store. Because of substantial variations in the volume of shoppers from store to store and a concern about over-purchasing unneeded gift cards, researchers often under-estimated the number of cards they needed and had to go back to the counter and purchase additional cards. In some cases, the researchers over-estimated and purchased more gift cards than they needed. In many cases, the stores offered refunds for unused gift cards. In those cases where stores would not provide refunds, the study was left to absorb the cost of these extra gift cards unless researchers were planning to visit the same store in another region.

Introducing bias. Because the research takes place at the time of purchase, the in-store intercept approach raises some concerns relating to the possible introduction of bias in consumer purchase decisions (e.g., researchers influencing consumers' decisions). Proper and ongoing training of researchers is critical to minimizing this potential bias. For example, researchers must be trained to wait until *after* customers make their purchasing decisions to approach them to take part in the survey. Waiting for the consumer to make the actual purchase (i.e., approaching them at the front of the store after they have shopped, or near the cash register) is the most effective means through which to reduce this bias. However, this positioning diminishes the ability of customers to view the other product choices when describing their decision-making process.

Researchers must be also trained to understand that they cannot offer their own opinions regarding a particular lighting product or provide suggestions regarding particular products to purchase. While it is tempting to engage the consumer in this type of discussion, it is important that the researcher remain neutral throughout the process to avoid introducing any bias.

In addition, it is important to understand that even when the researcher follows these protocols and remains as neutral as possible, bias could still be introduced as a result of the attention the researcher is attracting – standing in the lighting aisle, offering gift cards, asking questions about CFLs, and so on. In one case, there was a line of consumers waiting to conduct the survey because they wanted free gift cards. Researchers took quick action to "close down" the survey effort, but not before a few consumers had participated who clearly made a decision to purchase a CFL because they thought it was the only way to get the free gift card.

Keys to Success

The implementation considerations and challenges described above highlight the most critical "lessons learned" from conducting this research effort. Anyone interested in implementing similar in-store consumer intercept surveys should keep the following in mind:

Start planning early. Because the process of obtaining permission may require several weeks' to months' worth of lead-time, it is beneficial to initiate the process far in advance of when the store visits are planned. This approach will provide researchers with a full slate of retail chains from which to select when scheduling store visits and lessen the number of changes to the sample frame that occur after the study is underway.

Leverage existing relationships. The study's overall success is contingent upon obtaining permission from retail chains participating in the promotion. One particularly successful method for obtaining permission involved leveraging relationships between the program manager and/or CFL manufacturers with corporate-level decision-makers within the retail chains. When the program manager or manufacturer was able to establish initial contact with the chain's decision-makers and introduce them to the researchers, the researchers achieved far greater cooperation from the retailers than when attempts were made without such introductions.

Enable store-level staff to verify permission. To lessen the obstacles potentially faced by field staff when they arrive to conduct surveys at a store, researchers should attempt to obtain letters of permission from the retail chains. Researchers found that when they were able to present such a letter to store staff, the process of gaining entry into the stores was greatly simplified. Wherever possible, these letters should be signed by someone within the chain who is well-known to store managers (e.g., a regional manager). In one particular chain, researchers had the name and cellular telephone number of a corporate merchandising assistant whom the store managers could call to verify that permission for the study had been granted at the corporate level.

Be flexible. Because of the challenges associated with scheduling the surveys (e.g., knowing when the promotion was active in a particular store, dealing with CFL shipment delays, *et al.*), plans to visit specific chains or individual stores must be flexible. In some cases, it may be possible for researchers to visit a different store than the one scheduled (e.g., a store for which permission had been granted to visit the store at any time), but in other cases, the research may need to be postponed until a later date. Because some delays of this nature are unavoidable, the study schedule should reflect this reality.

In addition, field staff should be flexible in their interactions with retail staff in the stores, particularly with regard to their positioning in the stores. As described, the ideal position for the researcher is in the lighting aisle, but in some stores (e.g., small hardware and drug stores), the aisles are too narrow to permit such positioning. Because researchers must not get in the way of the shoppers or the store staff, they must be flexible in terms of their positioning.

The study's incentives also required flexibility. At the study's outset, the researchers planned to offer a $5 gift card to each shopper who completed the customer intercept survey for the store in which they were shopping. As explained above, some chains offered gift cards starting at $10, some did not offer gift cards at all, and other chains offered gift cards that their staff could not activate (and could thus not be used as incentives). Instead of implementing a uniform

incentive policy across all chains in the study, the researchers dealt with incentives on a store-by-store basis.

Limit bias. Bias may be introduced into an in-store study at several different levels, thus efforts to avoid or limit bias must be undertaken on several fronts. First of all, the survey should be conducted in multiple languages that reflect the languages spoken by the target population to enable individuals with diverse backgrounds to participate.

Bias can also be controlled through the sample design process. The sample design should also include multiple regions and store types to represent shoppers with different socio-demographics and access to particular retail channels. It should also incorporate multiple retail channels and several chains within any given channel, again to represent the broad range of shoppers in the target population. Additionally, store visits should be planned on different days of the week at different times of the day to capture different categories of shoppers (e.g., those who work during the day versus those who work during the evening). Incorporating in day-of-week and time-of-day variations into the sample design may also enable researchers to intercept shoppers purchasing light bulbs for residential and nonresidential applications as well as contractors shopping for light bulbs to install in their customers' homes or businesses.

Finally, researchers should be trained on the importance of avoiding any influence on consumers' purchasing decisions by waiting until after customers make their purchasing decisions to approach them to take part in the survey. Despite the possible temptation to assist customers, researchers must remain neutral.

Conduct ongoing field staff training. Ongoing training with field staff is critical to ensure accurate data collection and reporting. Although training can (and should) take place before the study begins, field staff will frequently encounter situations that could not have been predicted. Discussions between field staff and other members of the research team are extremely beneficial for both groups in understanding how to manage unforeseen circumstances (such as the unwanted "assistance" from store staff described above). Ongoing training also enables researchers to continually underscore the importance of sound data collection practices.

Appendix C: Steam Trap Impact Assessment

Executive Summary

As part of their 2006-2008 Mass Markets Program, PG&E has offered financial incentives to customers for the installation of steam traps. Installations occur in both industrial and commercial facilities. For the commercial facilities, dry cleaning operations account for the bulk of the installations. Ex ante savings for this measure are deemed, on a per unit basis, and do not take into account site-specific operating conditions. Findings from an initial review by PG&E did not provide significant evidence to support the ex ante impact estimates.

KEMA was contracted by PG&E to conduct a more rigorous analysis of customer bills to better assess steam trap impacts, particularly in dry cleaning/laundry facilities. The study utilized a billing analysis approach that consisted of both simple pre-retrofit/post-retrofit bill comparisons and a regression-based billing analysis. For both types of analyses, we utilized all available participants with adequate billing histories, as well as a subset of participants who bills showed declines between the pre-retrofit and post-retrofit periods. The subset of participants was used in order to filter out sites where there was a strong likelihood that non-program factors were occurring that could obscure the energy-saving effects of the steam trap installations (and hence causing increases rather than decreases in bills).

Overall, there were 490 participants in the tracking dataset provided by PG&E. Commercial dry cleaning/laundry facilities account for 458 of these applications. Table C-1 summarizes the tracking system data. While the dry cleaning/laundry facilities account for most of the applications, units installed and rebate expenditures, they account for less that half the ex ante program savings. This results because a limited number of large industrial projects are associated with much of the program savings. These larger projects were are not suited to the billing analysis savings methodology and are not a focus of this study.

Table C-1:
Summary of Program Tracking Data

Facility Type	Applications	Units Installed	Expected Savings	Rebate
All Facilities	490	11,657	2,837,450	$1,195,626
Commercial Dry Cleaning/Laundry Facilities	458	8,275	1,103,995	$815,773

Focusing on the commercial dry cleaning/laundry facilities, the different billing analysis models explored in the study provided a range of possible savings. Regression equations that modeled natural gas usage as a function of tracking system savings and facility electricity use (in addition to other variables) provided the best statistical fit to the data. These models did not use all 458 commercial dry cleaning/laundry participants due to billing data limitations. Results of the better fitting regression models are provided in Table C-2. The results are shown for an equation that utilized all available participants and for an equation that included only participants whose bills declined from the pre-retrofit to post-retrofit period.

Table C-2:
Billing Analysis Results – Preferred Models

Model	# Participants	Tracking Savings	Bill Savings	Realization Rate	RR2*
Model using all participants	310	720,962	77,838	0.11	
Model using participants with bill declines	175	411,314	137,715	0.33	0.19

* RR2 = Realization rate for all participants, assuming participants with bill increases have zero savings.

As Table C-2 shows, bill savings range from a total of 77,838 therms for the model using all participants up to 137,715 therms for the model that included only participants with bill declines. The second model shows higher total savings although it utilizes only 175 of the 310 participants with adequate billing histories. This results because the first model includes customers with unexplained bill increases that confound the overall savings estimates, making it difficult for the bill analysis models to correlate bill declines with expected savings from the tracking system.

Ultimately, the billing analysis model that utilizes all participants provides a realization rate of 0.11 meaning only 11% of tracking system savings could be realized in billing, using the billing analysis methods employed in this study (77,838 therms compared to 720,962 therms in Table C-2). The realization rate for the model utilizing only participants with bill declines is estimated to be 0.33 (137,715 therms compared to 411,314 therms in Table C-2). However, since this model excludes participants with bill increases, the realization rate could be recalculated to include these customers with a savings assumed to be zero. Assuming the excluded sites had zero savings, the adjusted realization rate (RR2 in Table C-2) is 0.19, indicating 19% of expected savings are realized in bills (137,715 therms compared to 720,962 therms). This is a conservative approach since savings could be masked by other unknown factors, and it may be reasonable to exclude these customers from the billing analysis but still apply the 0.33 realization rate to all participants.

Depending on the choice of model, the evaluated annual savings for all commercial dry cleaning/laundry participants ranges from 119, 192 therms to 369,637 therms compared to tracking system ex ante estimates of 1,103,995 therms. These results are summarized in Table C-3.

Table C-3:
Billing Analysis Savings Summary, Commercial Dry Cleaning/Laundry Participants

Model	Realization Rate	Tracking System Savings	Evaluation Savings
Model using all participants	0.11	1,103,995	119,192
Model using participants with bill declines, assuming participants with bill increases have zero savings	0.19	1,103,995	210,880
Model using participants with bill declines, assuming participants will bill increases have savings that are masked by other factors	0.33	1,103,995	369,637

Introduction

As part of their 2006-2008 Mass Markets Program, PG&E has offered financial incentives to customers for the installation of steam traps. Installations occur in both industrial and commercial facilities. For the commercial facilities, dry cleaning operations account for the bulk of the installations. Ex ante savings for this measure are deemed, on a per unit basis, and do not take into account site-specific operating conditions. These savings are based on a study, prepared for Southern California Gas Company, which evaluated impacts for over 30,000 steam traps.

As an interim check on measure performance, PG&E reviewed bills of a sample of facilities. Findings from this initial review did not provide significant evidence to support the ex ante impact estimates. KEMA was contracted by PG&E to conduct a more rigorous analysis of customer bills to better assess steam trap impacts, particularly in Dry Cleaning/Laundry facilities.

Study Approach

The approach used for this study is a regression-based billing analysis utilizing time-series/cross-sectional billing analysis models. A preliminary bill comparison was performed to identify sites that were most likely to be saving natural gas as a result of the steam trap measures versus sites where savings achievements were not as identifiable. The preliminary results were integrated into the regression analysis. Data for the project included tracking system and billing system data provided by PG&E.

Report Organization

The remainder of this report is organized as follows:

- Section 3 presents the study methodology
- Section 4 discusses data development activities, and
- Section 5 presents the results of the analysis.
- Appendix C provides the billing analysis model details

Methodology

This section provides a discussion of the approach used to assess natural gas savings from installation of steam traps. This discussion addresses:

- the preliminary billing data analysis used to identify useful and problematic billing histories for the program participant sites; and
- the regression-based billing analysis that was used to improve upon the preliminary assessment by controlling for factors such as seasonality and trends in energy usage.

Preliminary Billing Data Analysis

The preliminary billing data analysis consisted of annualizing and comparing pre-retrofit bills to post-retrofit bills. The pre-retrofit period was considered the 12-month period prior to the measure install date. The post-retrofit period was the period starting with read dates that were at least 30 days past the measure install date. The billing data for the period near the install date were “blacked out” and not used in the analysis. Annualized usage for the each of the pre- and post-retrofit periods was calculated as:

$$annualized\ therms = 365 \times \frac{\sum therms}{\sum billing\ days}$$

where the *therms* and *billing days* are summed across all the reads in the pre- and post-retrofit periods.

Preliminary bill savings for a given site were then calculated as:

$$preliminary\ savings = annualized\ therms_{pre} - annualized\ therms_{post}$$

Once annualized therms and preliminary savings were developed for each site, they were aggregated across measure groups and market segments to provide an initial indication of how tracking system ex ante savings were comparing to changes in bills.

Regression-Based Billing Analysis

For the regression-based billing analysis models, we utilized pooled time series/cross-sectional models that make use of monthly consumption. The basic models investigated were:

Model 1: $Therms_{it} = \mu_i + \tau_t + \beta_1 \times PART_{it} + \sum_{j=2}^{n} \beta_j X_{itj} + \varepsilon_{it}$, and

Model 2: $Therms_{it} = \mu_i + \tau_t + \beta_1 \times THMSAV_{it} + \sum_{j=2}^{n} \beta_j X_{itj} + \varepsilon_{it}$

where:

$Therms_{it}$	=	Average daily gas use for customer *i* in time period *t*
$PART_{it}$	=	Program participation for customer *i* in time period *t,* zero prior to implementation
$THMSAV_{it}$	=	Expected program savings from the tracking system (in therms per day) for customer *i* in time period *t,* zero prior to implementation
X_{itj}	=	Other explanatory variables that could affect energy use (mainly electricity consumption, which serves as a proxy for changes in facility activity)
μ_i	=	Dummy variable, 1 for customer *i*, 0 otherwise
τ_t	=	Dummy variable, 1 for time period *t*, 0 otherwise
β's	=	Estimated parameters
ε_{it}	=	Error term

The parameter of interest in Model 1 is β_1, the coefficient for the $PART_{it}$ variable, reflecting impacts of program participation and installing measures. This coefficient reflects the average therms per day savings for the customers included in the billing analysis.

For Model 2, β_1 is the coefficient for the $THMSAV_{it}$ variable. In this case, the billing analysis model becomes an SAE (statistically adjusted engineering) model, and the estimated parameter, β_1, is interpreted as the realization rate, the fraction of tracking system savings that is reflected in the customer bills.

The customer-specific level variables, μ_i, and the time-specific level variables, τ_t, are included to control for "fixed-effects," the stable but unmeasured characteristics of each customer and time period. The fitting of these two sets of fixed effects eliminates two important potential sources of intercorrelation among the model residuals. The customer-specific variables adjust for each customer's base use facilitating the calibration to customer bills.

Overall, we estimated 2 sets of models. One set included all dry cleaning/laundry participants who had adequate billing histories to support the analysis. The second set of models utilized the same structure as the first set of models, but they we only estimated for the subset of dry cleaning/laundry participants who had bill declines subsequent to measure implementation, as determined by the preliminary bill screening analysis. Each set of models included 4 model variations:

1. Model 1 using the *PART* variable and an electricity consumption explanatory variable
2. Model 1 using the *PART* variable without the electricity consumption explanatory variable
3. Model 2 using the *THMSAV* variable and an electricity consumption explanatory variable
4. Model 2 using the *THMSAV* variable without the electricity consumption explanatory variable

Data Development

Data from the PG&E program tracking system and data from the PG&E billing system were required for the analysis. Both sets of data were provided by PG&E.

Program Tracking Data

An initial tracking system data extract was received on July 31, 2007. The dataset contained 683 records and included paid and some unpaid projects. KEMA identified some problems with

this dataset, such as inconsistencies between the number of units installed at a site and the expected therm savings for that site.

A second tracking data extract was received on August 14, 2007. This dataset contains 519 records for projects that have been paid. KEMA identified 29 duplicate records that were removed from this dataset, and a total of 490 records were included in further analysis. The following table summarizes key tracking data:

Table C-4:
Tracking Data Summary by Measure and Facility Type

Measure Code	Facility Type	Applications	Units Installed	Expected Savings	Rebate
H201	Mushroom Production	1	2	1,224	$200
	Nursery	1	5	3,062	$357
	Subtotal	2	7	4,286	$557
H202	Sewage Treatment	1	2	4,496	$400
	Steam and AC Supply	1	21	47,214	$2,910
	Manufacturing (excl. Refineries)	8	79	177,613	$14,295
	Petroleum Refineries	5	522	1,173,621	$84,149
	Dry Cleaning/Laundry	4	28	62,951	$5,395
	Subtotal	19	652	1,465,895	$107,149
H221	Nursery	4	2,638	251,934	$263,800
	Manufacturing	2	13	1,734	$1,298
	Commercial (excl. Laundry)	5	72	9,606	$7,049
	Dry Cleaning/Laundry	458	8,275	1,103,995	$815,773
	Subtotal	469	10,998	1,367,269	$1,087,920
Total		490	11,657	2,837,450	$1,195,626

Measure code definitions[50]:

H201 - Steam Trap - Industrial Low Pressure Steam (< 15 psig)
H202 - Steam Trap - Industrial High Pressure Steam (> 15 psig)
H221 - Steam Trap - Commercial - Any Pressure

[50] PG&E has used incorrect measure code definitions in some tracking data workbooks due to changes in underlying workpapers that weren't adjusted for. Incorrect measure descriptions that should not be relied on are: H201: Steam Trap – Commercial 24 hours/day operation; H202: Steam Trap - Industrial 24 hours/day operation; and H221: Steam Trap – Commercial < 24 hours/day operation

Table C-5 summarizes the tracking system data by install date. Note that most of the program participation occurred between March and May of 2007. Hence most of the projects did not a complete 12 months of post-retrofit billing histories.

Table C-5:
Tracking Data Summary by Install Date

Install Date	Applications	Units Installed	Expected Savings	Rebate
Oct 2006	2	65	135,566	$6,475
Nov 2006	2	14	4,262	$1,059
Dec 2006	13	336	347,258	$25,864
Jan 2007	17	244	131,949	$27,337
Feb 2007	112	3,500	659,722	$363,148
Mar 2007	173	3,078	423,330	$307,554
Apr 2007	64	1,074	179,237	$109,100
May 2007	65	2,530	794,387	$271,000
Jun 2007	35	658	140,659	$68,289
Jul 2007	7	158	21,080	$15,800
Total	490	11,657	2,837,450	$1,195,626

Billing Data

Two rounds of billing data were delivered by PG&E. In the first round, it was discovered that many of the steam trap sites did not have electric usage data associated with the same account as for the natural gas data. Hence a second data pull was made that took all of the accounts associated with the same “Person ID” as for the account linked to the tracking data. Accounts were then matched to the steam trap sites based on service address.

The initial billing dataset contained 29,069 records (one record for each account for each month of billing data). Thirty duplicate records for one account were removed. Of the remaining 29,039 records, 13,085 were matched to tracking data. The remaining 15,954 records were excluded from the analysis. There were a total of 26 service accounts from the tracking data that were not matched to customer bills.

In the second billing extract, 40,883 records were received. These were compressed to 25,170 records by aggregating over service addresses. Of the 25,145 compressed records, 13,117 were matched to tracking data, and the remaining 12,027 were excluded from the analysis. This second data extract did a much better job of pulling in billing data appropriate for the analysis, as shown in Table C-6.

Table C-6:
Summary of Billing Data Availability

	Billing Data Extract 1	Billing Data Extract 2
Unique Accounts in Tracking Data	476	476
Accounts Matched to Billing Data	450	450
Matched Accounts with Gas Data	418	448
Matched Accounts with Electric Data	31	353

Results

This section presents results of the preliminary billing data analysis and results of the regression-based billing analysis.

Preliminary Billing Data Analysis Results

Results are presented in Table C-7. Overall, 232 sites saw decreases in bills between the pre- and post-retrofit periods (averaging 102,498 therms per year), and 175 sites saw increases in bills (averaging 230,885 therms, as shown by the negative savings figure). While the average changes are obscured by the large sites, it is clear that a large number of sites (43%) still had higher usage in the post retrofit period. Overall, bill increases outweighed bill decreases, as shown by negative savings of 40,849 in the total row of the overall analysis group results.

Table C-7:
Preliminary Bill Screening Results - Therms

Analysis Group	Bill Direction	Number of Sites	Average Annual Pre-retrofit bill	Average Annual Post-retrofit bill	Average Annual Bill Savings	Tracking System Savings	Realization Rate
Overall	Sites with bill decreases	232	1,787,131	1,684,633	102,498	3,417	30.00
	Sites with bill increases	175	718,762	949,702	-230,885	5,153	-44.81
	Total	407	1,327,759	1,368,631	-40,849	4,163	-9.81
H201 (Com 24 Hr.)	Sites with bill decreases	1	117,049	106,706	10,343	1,224	8.45
	Sites with bill increases	1	1,101,961	1,305,494	-203,533	3,062	-66.47
	Total	2	609,505	706,100	-96,595	2,143	-45.07
H202 (Ind 24 Hr.)	Sites with bill decreases	7	58,912,809	55,550,979	3,361,830	35,009	96.03
	Sites with bill increases	2	59,591,140	79,476,661	-19,885,521	245,067	-81.14
	Total	9	59,063,549	60,867,797	-1,804,248	81,688	-22.09
H221 (Com <24 Hr.) Total	Sites with bill decreases	224	9,409	8,354	1,055	2,440	0.43
	Sites with bill increases	172	31,972	34,529	-2,502	2,375	-1.05
	Total	396	19,209	19,723	-490	2,412	-0.20
H221 (Com <24 Hr.) Non Dry Cleaning/ Laundry	Sites with bill decreases	2	17,685	13,741	3,944	767	0.89
	Sites with bill increases	3	468,733	501,771	-33,038	400	-17.20
	Total	5	171,573	182,836	-11,263	267	-6.80
H221 (Com <24 Hr.) Dry Cleaning/ Laundry	Sites with bill decreases	222	9,175	8,182	994	2,448	0.41
	Sites with bill increases	169	7,577	8,421	-787	2,396	-0.33
	Total	391	8,485	8,285	224	2,425	0.09

Measure code definitions:

H201 - Steam Trap - Industrial Low Pressure Steam (< 15 psig)
H202 - Steam Trap - Industrial High Pressure Steam (> 15 psig)
H221 - Steam Trap - Commercial - Any Pressure

For measure H201 (for industrial low pressure steam), one customer's bills declined, while the second customer's bills increased. For measure H202 (for industrial high pressure steam), 7 customers' bills declined, while 2 customers' bills increased. The bill increases for these last 2 customers more than offset the bill declines of the other 7 customers. Note, that with the many operations changes that are likely at larger industrial facilities, a billing analysis is not an appropriate impact estimation technique for this group. Also note that the measure H202 customers are considerably larger that customers in other measure categories.

Finally, for measure H221 (for commercial customers) the total results are dominated by the dry cleaning/laundry facilities, with the exception of several large non-dry cleaning/laundry sites that experienced bill increases. For the dry cleaning/laundry group (the last set of figures in Table Table C-7), 222 sites (57%) saw decreases in bills. These decreases average 994 therms per year, which is only 41% of the amount estimated by PG&E in the tracking system. The remaining 169 sites saw bill increases averaging 787 therms per year. This second group of sites tended to offset the apparent savings from the first group. Overall, for the H221 dry cleaning/laundry group, average savings of 224 therms per year are only about 9% of the initial PG&E estimates.

Regression-Based Billing Analysis Results

Model Results

Error! Reference source not found. summarizes modeling results as they pertain to savings estimates. Complete modeling results are provided in Appendix C. See Section 3.2 above for a description of the models.

Error! Reference source not found. shows the estimated coefficient and t-statistic for the key savings variables (PART and THMSAV) for the various models that were estimated. The number of participants included in each model is also shown. The models with the electric usage variable have less participants because some sites were missing electric data – either because they were served by another electric utility or because we were not able to match electric data to the gas data at their site.

For Model 1, which includes the PART (0/1) savings variable and electric usage, estimated savings average 0.407 therms per day over all modeled participants and 1.467 therms per day for the subset of participants who saw declines in their gas bills. Results did not vary much for the models without the electric use variable. Statistical significance is marginal for the models that include all participants.

Table C-8:
Billing Analysis Parameter Summary

		All Participants		Participants with Bill Declines	
Model	**Statistic**	**PART**	**THMSAV**	**PART**	**THMSAV**
Model 1	Savings Parameter Estimate	-0.407		-1.467	
with Electric	t-Statistic	-1.4		-3.5	
Use Variable	R^2	0.9808		0.9853	
	# Participants	310		175	
Model 1	Savings Parameter Estimate	-0.371		-1.489	
without Electric	t-Statistic	-1.3		-4.1	
Use Variable	R^2	0.9748		0.9832	
	# Participants	391		222	
Model 2	Savings Parameter Estimate		-0.108		-0.335
with Electric	t-Statistic		-3.1		-6.9
Use Variable	R^2		0.9808		0.9855
	# Participants		310		175
Model 2	Savings Parameter Estimate		0.036		-0.268
without Electric	t-Statistic		1.2		-6.7
Use Variable	R^2		0.9748		0.9833
	# Participants		391		222

For Model 2, which includes the THMSAV savings variable and electric usage, the estimated realization rate is about 11% for the model that includes all 310 participants who have adequate gas and electric bills. The realization rate increased to 34% for the subset of 175 participants whose bill decline from the pre-retrofit to the post-retrofit period. Both realization rates are statistically significant. For the Model 2 runs without the electric usage variable, realization rates were lower. For the all-participant model, savings were essentially zero. For the model that only included customers with bill declines, the estimated realization rate is 27%, and is statistically significant.

In reviewing the various billing analysis models that were estimated in the analysis, it appears that the “Model 2 with Electric Use Variable” models did the best job at explaining bills. They tend to show the higher R^2 statistics, which reflect the percent of variation in the therm-per-day usage variable that is explained in the model. In addition, the t-statistics on the savings variables (THMSAV and PART variables) are highest with these models, showing they have the best fit for these variables. The fact that these models perform the best is not unexpected. They utilize the most information in that they include tracking system savings that should better track

savings across participants versus a simple 0/1 variable (PART), and they include the electric use variable which can help explain variations at a site that occurs over time.

The billing analysis models that include only participants with bill declines from the pre-retrofit to post-retrofit also tend to perform best. The model fit statistics (t-statistics and R^2) are higher and the savings parameters are higher. These results can also be expected, since customers with bill increases are likely to have things going on at the site that cannot be explained with the variables available for the analysis. These other effects can also serve to obscure the savings parameter estimates. Given that it is unlikely that the steam trap retrofits would lead to increases in bills, is reasonable to believe that the participants with bill increases either had zero or little savings from the new steam traps or that the savings were totally masked by other factors that occurred at these sites over the model estimation period.

Savings Estimates

Using results of the billing analysis models we calculated estimated program savings as compare to tracking system savings. These results are shown in Table C-9. Realization rates are shown in the last two columns of the table. In order to calculate overall realization rates for the models that excluded participants with bill increases, we assumed that savings at these facilities were zero. Even with this conservative assumption, the models that exclude the participants with bill increase still provide for the largest estimates of savings.

Overall, realization rates, the fraction of savings realized in the bills range from -0.04 for the “All Participant, Model 2 without Electric Use” equation to 0.19 for the “Participant with Bill Decline, Model 2 with Electric Use” equation. The analysis reveals that, even with the model that shows the most savings, bills for the dry cleaning/laundry participants are showing decline that are less than 20% of what PG&E’s initial tracking system estimates would predict.

Table C-9:
Savings Estimates for Participants in the Bill Analysis

Model	# Participants	Parameter	Tracking Savings	Bill Savings	Realization Rate	RR2*
All Participant Models						
Model 1 with Electric Use Variable	310	-0.407	720,962	45,996	0.06	
Model 1 without Electric Use Variable	391	-0.371	948,304	52,922	0.06	
Model 2 with Electric Use Variable	310	-0.108	720,962	77,838	0.11	
Model 2 without Electric Use Variable	391	0.036	948,304	-33,988	-0.04	
Participant with Bill Decline Models						
Model 1 with Electric Use Variable	175	-1.467	411,314	93,676	0.23	0.13
Model 1 without Electric Use Variable	222	-1.489	543,395	120,691	0.22	0.13
Model 2 with Electric Use Variable	175	-0.335	411,314	137,715	0.33	0.19
Model 2 without Electric Use Variable	222	-0.268	543,395	145,374	0.27	0.15

* RR2 = Realization rate for all participants, assuming participants with bill increases have zero savings.

This appendix presents statistics for the eight billing analysis models that were estimated for this project:

Table C-10 shows models estimated over all dry cleaning/laundry participants that had adequate billing histories. Table C-11 shows models estimated of a subset of these participants that saw bill declines between the pre-retrofit and post-retrofit periods. See Section 7.2 above for a discussion of the models.

Table C-10
Billing Analysis Results – Models with All Participants

Variable	Model 1 with Electric Use		Model 1 without Electric Use		Model 2 with Electric Use		Model 2 without Electric Use	
	Parameter Estimate	t-Statistic	Parameter Estimate	t-Statistic	Parameter Estimate	t-Statistic	Parameter Estimate	t-Statistic
PART	-0.407	-1.4	-0.371	-1.3				
THMSAV					-0.108	-3.1	0.036	1.2
kWh per day	0.031	7.8			0.030	7.6		
Monthly Dummy Variables:								
D2005_11	0.046	0.0	-0.233	-0.1	-0.171	-0.1	0.489	0.1
D2005_12	13.658	7.2	10.440	5.7	13.245	7.1	11.205	6.1
D2006_1	2.733	2.1	1.317	1.0	2.345	1.8	2.047	1.6
D2006_2	2.425	3.3	2.083	2.8	2.100	3.0	2.763	4.0
D2006_3	0.963	2.1	0.661	1.5	0.666	1.6	1.309	3.3
D2006_4	1.848	4.1	1.529	3.5	1.555	3.9	2.163	5.7
D2006_5	1.650	3.9	1.410	3.4	1.365	3.7	2.035	5.8
D2006_6	1.232	3.0	1.481	3.8	0.956	2.7	2.092	6.2
D2006_7	-0.029	-0.1	-0.204	-0.5	-0.307	-0.9	0.403	1.2
D2006_8	0.409	1.0	0.245	0.6	0.129	0.4	0.854	2.6
D2006_9	0.232	0.6	-0.064	-0.2	-0.048	-0.1	0.543	1.6
D2006_10	1.533	3.8	1.376	3.5	1.254	3.6	1.983	6.0
D2006_11	1.411	3.4	1.246	3.1	1.130	3.2	1.855	5.4
D2006_12	0.773	1.9	0.513	1.3	0.492	1.4	1.118	3.3
D2007_1	-0.246	-0.6	-0.529	-1.4	-0.519	-1.5	0.066	0.2
D2007_2	0.809	2.0	0.553	1.4	0.548	1.6	1.127	3.3
D2007_3	0.767	2.2	0.759	2.3	0.565	1.8	1.192	4.0
D2007_4	1.195	4.0	1.147	4.0	1.104	3.8	1.365	4.9
D2007_5	1.333	4.8	1.447	5.4	1.279	4.6	1.572	5.9
D2007_6	0.661	2.4	0.634	2.4	0.648	2.4	0.682	2.6
R-Square		0.9808		0.9748		0.9808		0.9748
Customer Dummy F-stat		755.2		577.9		756.5		577.8
Number of Participants		310		391		310		391
Number of Observations		4,912		6,239		4,912		6,239

Table C-11:
Billing Analysis Results – Models Using Participants with Bill Declines

Variable	Model 1 with Electric Use		Model 1 without Electric Use		Model 2 with Electric Use		Model 2 without Electric Use	
	Parameter Estimate	t-Statistic	Parameter Estimate	t-Statistic	Parameter Estimate	t-Statistic	Parameter Estimate	t-Statistic
PART	-1.467	-3.5	-1.489	-4.1				
THMSAV					-0.335	-6.9	-0.268	-6.7
kWh per day	0.011	1.9			0.008	1.5		
Monthly Dummy Variables:								
D2005_12	18.319	7.5	13.467	6.6	17.033	7.1	12.768	6.3
D2006_1	3.822	2.1	2.329	1.5	2.702	1.6	1.776	1.1
D2006_2	5.275	4.5	4.583	4.6	4.397	3.9	4.194	4.4
D2006_3	1.856	2.6	1.828	3.0	1.126	1.8	1.519	2.8
D2006_4	3.225	4.9	3.002	5.3	2.509	4.3	2.697	5.4
D2006_5	2.571	4.1	2.384	4.5	1.874	3.5	2.083	4.5
D2006_6	2.242	3.8	2.403	4.7	1.576	3.1	2.109	4.8
D2006_7	0.748	1.3	0.570	1.1	0.075	0.1	0.279	0.6
D2006_8	1.198	2.1	0.988	2.0	0.518	1.0	0.694	1.6
D2006_9	0.847	1.4	0.646	1.3	0.161	0.3	0.348	0.8
D2006_10	2.292	3.9	2.131	4.2	1.610	3.2	1.834	4.2
D2006_11	2.320	3.9	2.166	4.2	1.635	3.2	1.868	4.2
D2006_12	1.420	2.4	1.163	2.3	0.737	1.4	0.872	2.0
D2007_1	0.132	0.2	-0.019	0.0	-0.522	-1.0	-0.287	-0.7
D2007_2	0.954	1.6	0.846	1.7	0.314	0.6	0.580	1.3
D2007_3	0.811	1.6	0.666	1.5	0.298	0.7	0.447	1.1
D2007_4	1.223	2.7	1.137	3.0	0.973	2.3	1.028	2.8
D2007_5	1.148	2.7	1.200	3.4	0.976	2.4	1.136	3.3
D2007_6	0.185	0.5	0.184	0.5	0.146	0.4	0.173	0.5
R-Square		0.9853		0.9832		0.9855		0.9833
Customer Dummy F-stat		993.0		872.5		1,006.6		880.1
Number of Participants		175		222		175		222
Number of Observations		2,780		3,352		2,780		3,352

Appendix D: 2006-2008 Local Government Partnership Program Process Evaluation Phase 1 Draft Report

Introduction

This report describes research activities conducted during the first quarter of 2008 on Pacific Gas & Electric Company's (PG&E's) 2006-2008 Local Government Partnership (LGP) program. This section of the report provides a description of the program and the evaluation objectives and approach. The program description is based on several sources: PG&E's 2006-2008 program implementation plans[51]; program monthly and quarterly reports to the California Public Utilities' Commission (CPUC)[52]; CPUC planning documents[53]; and evaluation reports on PG&E's 2004-2005 LGP program[54].

Program Overview

According to The American Heritage Dictionary, a partnership is a relationship between individuals or groups that is characterized by mutual cooperation and responsibility, as for the achievement of a specified goal.[55]

According to program filings, local government partnerships are innovative, market-based, local and statewide energy efficiency efforts for cities, groups of cities, counties and other local jurisdictions within PG&E's service territory. These partnerships are intended to capitalize on the vast resources and expertise of local governments and utilities to meet objectives of the

[51] LGP program implementation plan (PG&E April 2006) downloaded from www.californiaenergyefficiency.com.
[52] Monthly and quarterly reports through January 2008 for each PG&E LGP program downloaded from www.californiaenergyefficiency.com.
[53] Achieving Aggressive Energy Efficiency Goals in Local Communities and Statewide – Steps Towards A Strategic and Coordinated Approach (Draft Strawman) January 2008.
[54] Final Report for Northern California Local Government Energy Partnership Program (Equipoise Consulting 2006) and PG&E 2004-2005 Local Government Partnership Programs (ECONorthwest 2006).
[55] The American Heritage® Dictionary of the English Language, Fourth Edition Copyright © 2006 by Houghton Mifflin Company.

California Public Utilities Commission[56], the goals of the state Energy Action Plan[57] and the Governor's Green Building Action Plan goals[58]. The partnerships are also designed to focus on projects that serve as alternatives to supply-side resource options, to pursue the most cost-effective energy efficiency options first, and meet the call for deploying new products and services.

During the 2004-2005 program cycle, several local government agencies in PG&E's service territory implemented publicly-funded energy efficiency programs either as third parties or in partnership with PG&E. The most successful of the 2004-2005 programs were continued during the 2006-2008 program cycle and new partnerships were formed. A total of 18 partnerships comprise PG&E's partnership portfolio for 2006-2008[59]:

- East Bay Partnership
- Fresno Energy Savings Alliance
- Silicon Valley Energy Program
- San Francisco Peak Energy Program
- Bakersfield and Kern County Energy Watch
- Stockton Smart Energy Program
- Motherlode Energy Partnership
- Association of Bay Area Governments
- Association of Monterey Bay Area Governments
- Madera Energy Alliance
- Merced/Atwater Energy Partnership
- San Joaquin Energy Intelligence Quotient
- Santa Barbara County Partnership
- Silicon Valley Leadership Group
- Marin Public Facilities Energy Management Team
- Sonoma Energy Partnership Program
- Redwood Coast Energy Watch
- Local Government Energy Action Resources (Various locations)

[56] As outlined in California Public Utilities Commission Decision 05-01-055 on January 27, 2005, which addresses the threshold issues for designing an administrative structure for energy efficiency programs beyond 2005.

57 The State of California Energy Action Plan was approved in 2003, and a second Energy Action Plan was adopted by both the California Energy Commission and the California Public Utilities Commission to reflect the policy changes and actions of the ensuing two years. The state's energy policies have been significantly influenced by the passage of Assembly Bill 32, the California Global Warming Solutions Act of 2006 .

[58] The detailed direction that accompanies Governor's Executive Order S-20-04.

[59] Note there are also Statewide Government Partnerships (SGPs) with the California Department of Corrections, the General Services Department, the University of California, California State University and Community Colleges that are managed by the California IOUs, which are not included in this evaluation.

Program Objectives

According to program planning documents, the overarching vision for the partnership effort is the achievement of immediate, long-term energy and peak demand savings and the establishment of a permanent framework for a sustainable, long-term energy management program for the LGPs.

PG&E's stated objectives are:

- **To garner greater energy savings than would otherwise be possible through traditional DSM programs**. This could be achieved through a mass market approach located within economic development zones, rented or leased spaces, rural areas or areas where the primary language may be other than English, city, county, and state governments that occupy and operate public facilities. This would also apply to special utility districts and large institutions such as state college and university systems, community colleges and school districts.

- **To extend the reach and effectiveness of PG&E's DSM programs** by using local government organizations, communication and outreach channels to achieve broad penetration of energy efficiency services in the local community. In addition, program co-sponsoring of education and training for customers and working technicians in the refrigeration/HVAC services and installation trades, duct testing and sealing, energy code requirements and compliance, lighting retrofits, and others.

- **Position LGPs to be strategic partners that help PG&E reach additional customers and impact their energy decisions**. This could be achieved through the engagement of the LGPs to deliver energy savings and demand reduction both through partnership activities and as channels for PG&E's other energy efficiency and demand response programs.

The local governments' objectives, according to utility planning documents, are to:

- Provide comprehensive energy efficiency programs to their local communities and for their municipal facilities.

- Inform their local communities about a wide variety of energy efficiency and demand response programs available to them and encourage participation.

- Test innovative programs.

Implementation Strategies

According to the program implementation plan, the 2006-2008 LGP program relies on a number of implementation strategies to achieve its goals including providing incentives for energy efficiency retrofits, conducting workshops and trainings, providing outreach and direct install of energy efficiency measures to hard-to-reach customer segments, and energy audits and technical services.

Energy efficiency retrofits. Some programs that were operating in 2004-2005 already had an inventory of projects that may be eligible for rebates from either a specific LGP or from a PG&E sponsored program such as Express Efficiency. New projects may also be identified by partnership staff or initiated by a customer.

Education and training. Various LGPs offer locally based training sessions and workshops covering energy efficiency, demand response, technology and energy efficiency design. These services draw from the extensive training curriculum available at the utilities' energy centers (Pacific Energy Center, Energy Training Center at Stockton and the Food Service Technology Center), partner facilities and state agencies.

Residential and small business direct install. Many LGPs offer direct installation of energy efficiency measures to targeted communities such as those that predominantly speak a language other than English.

Marketing and outreach. Local governments are well positioned to perform outreach to residential and business customers to promote program services locally.

Codes and standards. LGPs may include training classes specifically on code and standards enforcement for code officials and local builders and developers. Other LGPs may be interested in developing or augmenting existing residential or commercial energy conservation ordinances. PG&E provides technical support and analysis as well as sample ordinances.

Home buyer services. Some LGPs provide specialized services to home buyers that may include an energy audit of the recently purchased home and free energy efficiency measures such as CFLs.

Energy audits and technical services. Energy audits may be available for both residential and commercial customers. Technical services are also offered to both government facilities and larger commercial/industrial customers within targeted geographic or economic development

zones where needed to allow those customers to move forward with energy efficient investments.

Program Energy Savings Goals and Accomplishments

Tables 1 through 3 show the program's three year energy savings goals (demand reduction, energy savings and gas savings) and accomplishments to-date based on the program's quarterly reports. The first column indicates the goal for the three year program period; the second column the cumulative energy savings claimed to-date (i.e., for 2006, 2007 and January of 2008); the third column the percentage of the cumulative energy savings claims of the goal; and the fourth column the percentage of the cumulative energy savings claims of the total energy savings claims to-date.

Note that the program had a slow start and has only achieved about one-quarter of its energy savings goals even though two-thirds of the program period has elapsed. However, many of the partnerships expect to meet their goals by the end of 2008. The program has struggled to meet gas savings goals in particular due to difficulty in moving through retrofit projects in general. The program has had more success with direct installation of lighting measures.

As shown in Table D-1 below, the program has claimed savings to-date of 15,000 kW in peak demand, which is about one-quarter of its goal.

Table D-1:
2006-2008 LGP Program Demand Reduction Goals and Accomplishments through January 2008

	Demand Reduction (Summer Peak kW)			
LGP Program	Program Goal	% of Total Goal	Accomplished	Accomplishments as a % of Goal
Association of Bay Area Governments (ABAG) Energy Watch	4,623	7.8%	162	3.5%
Association of Monterey Bay Area Governments (AMBAG) Energy Watch	5,679	9.6%	3,184	56.1%
Bakersfield and Kern County Energy Watch	3,887	6.6%	1,675	43.1%
East Bay Energy Watch (EBEW)	4,567	7.7%	4,040	88.4%
Fresno Energy Watch (FEW)	5,009	8.5%	1,388	27.7%
Local Government Energy Action Resources (LGEAR)	14,157	24.0%	-	0.0%
Madera Energy Watch	378	0.6%	212	56.2%
Marin County Energy Watch	899	1.5%	507	56.4%
Merced/Atwater Energy Watch	455	0.8%	129	28.3%
Motherlode Energy Watch	4,791	8.1%	598	12.5%
Redwood Coast Energy Watch	783	1.3%	306	39.1%
San Francisco Energy Watch (SFEW)	4,258	7.2%	1,371	32.2%
South San Joaquin (SSJ) Energy Watch	2,252	3.8%	587	26.1%
Santa Barbara County Energy Watch	363	0.6%	98	26.9%
Sonoma County Energy Watch (SCEW)	1,393	2.4%	251	18.0%
Stockton Energy Watch	2,310	3.9%	414	17.9%
Silicon Valley Energy Watch (SVEW)	0	0.0%	0	-
Silicon Valley Leadership Group Energy Watch	3,277	5.6%	161	4.9%
Total:	59,081	100.0%	15,082	25.5%

As shown in Table D-2 below, the program has claimed savings to-date of 91 MWh of energy savings, which is nearly 30 percent of its goal.

Table D-2:
2006-2008 LGP Program Energy Savings Goals and Accomplishments through January 2008

	Energy Savings (Net Annual kWh)			
LGP Program	**Program Goal**	**% of Total Goal**	**Accomplished**	**Accomplishments as a % of Goal**
Association of Bay Area Governments (ABAG) Energy Watch	20,022,657	6.5%	1,589,196	7.9%
Association of Monterey Bay Area Governments (AMBAG) Energy Watch	19,689,231	6.4%	17,039,581	86.5%
Bakersfield and Kern County Energy Watch	24,121,724	7.8%	10,461,438	43.4%
East Bay Energy Watch (EBEW)	25,167,870	8.2%	21,320,350	84.7%
Fresno Energy Watch (FEW)	26,110,456	8.5%	9,765,008	37.4%
Local Government Energy Action Resources (LGEAR)	60,595,834	19.7%	-	0.0%
Madera Energy Watch	2,094,896	0.7%	954,382	45.6%
Marin County Energy Watch	7,363,097	2.4%	2,524,791	34.3%
Merced/Atwater Energy Watch	2,539,335	0.8%	705,966	27.8%
Motherlode Energy Watch	25,582,733	8.3%	4,400,357	17.2%
Redwood Coast Energy Watch	5,185,275	1.7%	1,928,175	37.2%
San Francisco Energy Watch (SFEW)	33,695,539	11.0%	8,940,548	26.5%
South San Joaquin (SSJ) Energy Watch	12,801,920	4.2%	4,242,227	33.1%
Santa Barbara County Energy Watch	1,583,565	0.5%	1,283,605	81.1%
Sonoma County Energy Watch (SCEW)	8,892,542	2.9%	1,248,708	14.0%
Stockton Energy Watch	11,389,302	3.7%	2,398,051	21.1%
Silicon Valley Energy Watch (SVEW)	-	0.0%	-	-
Silicon Valley Leadership Group Energy Watch	20,859,580	6.8%	2,549,326	12.2%
Total:	307,695,553	100.0%	91,351,709	29.7%

As shown in Table D-3 below, the program has claimed savings to-date of 196,000 therms, which is about 8 percent of its goal.

Table D-3:
2006-2008 LGP Program Gas Savings Goals and Accomplishments through January 2008

	Gas Savings (Net Annual Therms)			
LGP Program	Program Goal	% of Goal	Accomplished	Accomplishments as a % of Goal
Association of Bay Area Governments (ABAG) Energy Watch	274,888	11.5%	79,038	28.8%
Association of Monterey Bay Area Governments (AMBAG) Energy Watch	404,350	17.0%	3,963	1.0%
Bakersfield and Kern County Energy Watch	80,854	3.4%	-	0.0%
East Bay Energy Watch (EBEW)	476,722	20.0%	52,028	10.9%
Fresno Energy Watch (FEW)	133,048	5.6%	-	0.0%
Local Government Energy Action Resources (LGEAR)	23,328	1.0%	-	0.0%
Madera Energy Watch	6,976	0.3%	-	0.0%
Marin County Energy Watch	69,340	2.9%	1,394	2.0%
Merced/Atwater Energy Watch	7,640	0.3%	-	0.0%
Motherlode Energy Watch	126,704	5.3%	(11)	-
Redwood Coast Energy Watch	79,756	3.4%	-	0.0%
San Francisco Energy Watch (SFEW)	263,477	11.1%	565	0.2%
South San Joaquin (SSJ) Energy Watch	145,192	6.1%	(15)	-
Santa Barbara County Energy Watch	-	-	-	-
Sonoma County Energy Watch (SCEW)	150,928	6.3%	19,575	13.0%
Stockton Energy Watch	75,896	3.2%	(7)	-
Silicon Valley Energy Watch (SVEW)	-	-	-	-
Silicon Valley Leadership Group Energy Watch	63809.53	2.7%	39079.2	61.2%
Total:	2,382,908	100.0%	195,609	8.2%

Regulatory Context

Local government partnerships were formally added as a program delivery channel to the California investor-owned utilities' (IOUs) portfolio during the 2004-2005 program cycle. Prior to that point, the LGP program was a pilot program with the city of San Francisco. During 2004-2005, the CPUC set aside 20 percent of the portfolio budget for LGP and third party energy efficiency programs, with the remainder earmarked for statewide IOU programs. LGPs and third party implementers submitted bids to the CPUC, who evaluated and selected bids based on

cost-effective short-term energy savings as well as meeting other objectives such as serving the hard-to-reach and creating long-term market effects.[60] The utilities were the contract administrators for the 2004-05 LGP and third party contracts, which essentially involved paying CPUC-approved invoices with funds collected via the public benefits charge.

The state's Energy Action Plan (EAP) determined that energy efficiency should be the first resource in the energy procurement loading order. In line with the EAP, the CPUC determined that the IOUs are accountable for energy procurement, placing them back in the role as energy efficiency program administrators for all programs, including third party and LGP[61]. The CPUC then set energy efficiency savings targets for the 2006-2008 program portfolio that were nearly double the savings achieved in the previous cycle. This change in regulatory context had implications on the management of LGP programs. Developing a portfolio that delivered quantifiable cost-effective energy savings was now the utilities' priority. This priority resulted in more stringent criteria for selecting and managing LGP programs. Programs that offered only soft targets such as addressing hard-to-reach customer segments or providing long-term benefits that are not easily measured were no longer a priority.

Long-Term Strategic Goals

The CPUC and the state's investor-owned utilities (PG&E, Southern California Edison and Sempra Utilities) as part of a long-term strategic planning working group have met on a routine basis to develop a strategic and coordinated approach whose efforts are aimed at maximizing the effectiveness of Local Government Energy partnerships. One of the working documents that has come out of numerous local government meeting discussions, written inputs, sector working group inputs, and comments submitted to a SharePoint discussion at www.CaliforniaEnergyEfficiency.com is a Draft Strawman titled, *Achieving Aggressive Energy Efficiency Goals in Local Communities and Statewide ~ Steps Toward a Strategic and Coordinated Approach.* Although the draft was developed with input from many local government stakeholders over the course of several weeks, the process did not allow sufficient time to prioritize the strategies and action steps outlined in the Draft Strawman. Moving forward local government stakeholders, representatives from utilities and the CPUC/CEC want to

[60] CPUC Energy Efficiency Policy Manual Version 2, August 2003.

[61] Decision 05-01-055 January 27, 2005, Interim Opinion on the Administrative Structure for Energy Efficiency: Threshold Issues.

continue to work toward building the components of the Draft Strawman into a strategic and actionable framework.

Vision

According to the Draft Strawman, the overarching vision for the state's long-term strategic plan for local government partnerships is comprised of effectively coordinating efforts to support the development of an effective relationship between the state of California and its local governments to work cooperatively to address the state's aggressive energy efficiency goals. The partnership seeks to capitalize upon local government's abilities to provide unique insights in aiding statewide efforts as a means realize the aggressive energy efficiency goals laid forth by the CEC and the CPUC.

Goals

The Draft Strawman outlines a number of long-term strategic goals that lay out aggressive energy efficiency targets. We have summarized these below:

- **Energy Savings Targets and Actions at a Local Level:** By 2020 one-hundred percent of local governments will achieve a fifty percent energy savings in their own facilities and seventy-five percent will have taken meaningful steps toward energy savings in the broader community by adopting policies for new and existing construction, helping to set community wide targets, reaching out to owners of high use buildings, and piloting work with commercial buildings that take integrated and cutting-edge approaches.

- **Local Adoption of Integrated Demand Side Management (DSM) Approaches:** By 2020 one-hundred percent of cities and counties will participate is DSM programs that have a long-term orientation to capture building life cycle costs and supports innovation. Efforts will target reducing peak electric loads relative to the baseload for increased utility operating efficiency. State agencies and utilities will have coordinated policies, funding and programs to facilitate the adoption of local integrated DSM programs including energy efficiency, peak demand reduction and onsite generation by 2009.

- **Widespread Work to Reduce Green House Gas (GHG) Emissions:** By 2020 eighty percent of all cities and counties will have reduced GHG emissions; early adopter cities and counties have will have achieved significant GHG reductions by 2015. Similarly eighty percent of cities and counties will have achieved one-half of their GHG-reduction targets by 2015.

Implementation Strategies

The working group used Local Government meeting discussion notes, written inputs, sector working group inputs, and comments submitted to the California Energy Efficiency SharePoint to come up with numerous strategies that are intended to realize the goals described above. Each strategy is associated with a series of action that would be taken by Local Government Partnerships and related efforts. Below we summarize these strategies.

- **Simplify and Standardize Relevant Policies and Codes at Statewide Level**: Implement a strategic approach for all local governments that is uniform/harmonized and allows local customization of "third tier" code levels to maximize the potential for local governments to use their unique positioning to tailor programs to meet their community needs.

  Develop model local level ordinances and/or programs to assist cities and counties that wish to participate in regional, coordinated efforts for efficiency, renewables, green buildings, zoning etc. Developing model local level ordinances and/or programs is especially important in assisting local governments that do not have the resources to manage the implementation of ordinances and/or programs on their own.

- **Build Capacity for Local Governments to Lead by Doing:** Accelerate statewide green building initiatives that provide the capacity and funding to upgrade government buildings to be model energy efficiency buildings.

- **Maximize Energy Efficiency in New and Existing Construction through Local Government Policy**: Adopt energy elements in general plans or incorporate energy efficiency elements of the general plan. Examine the potential to use some PGC (Public Goods Charge) funding to develop or update general plan energy elements.

- **Rapidly Upgrade and Expand Energy Efficiency Training and Information for Local Governments**: Create tools (i.e. web portal, etc) to foster the coordination between local governments to share effective strategies and approaches in promoting energy efficiency in their communities.

  Create workshops, summits, and other means to provide spaces for leading local governments to provide technical assistance and share models and best practices to local governments with less capacity.

- **Increase Financial Incentives for Local Governments to Adopt Energy Efficiency and other Sustainability Measures**: Lower the interest of the California Energy Commissions low interest loan fund for public agencies to finance energy efficiency initiatives to encourage greater participation of local governments.

  Work with IOU's to restructure tariffs on demand charges that create barriers for the privatization of small electrical generation using sustainable energy developments and alternative energy resources such as solar photovoltaics.

- **Local Governments Mobilize Community and Set Community-wide Goals and Strategies:** Communities members need to take the lead to address climate change and other greenhouse gas reduction issues. It is imperative that local leaders are the drivers in helping community members understand the severity of the need to address climate change by reducing greenhouse gas emissions.

- **Pilot Projects:** In order to spur the strategic innovation needed to help meet goals laid out by the CEC and CPUC it is essential that research and development go beyond laboratories and testing phases. Local governments are in a unique position to provide a venue for testing energy efficiency innovations that could potentially be scaled up across the state.

- **State Agency Coordination:** Implementing a mandated mechanism to assist the CPUC/CEC, utilities, regional air and water boards, state water agencies, and local governments to have better communication and coordination could help develop energy efficiency in numerous areas such as: water treatment, delivery and supply processes, etc. This strategy has the potential to play a valuable role in coordinating the efforts between statewide energy and water management.

- **Prioritizing Work in the Local Government Section of the Strategic Energy Plan:** To continue to most efficiently take advantage of the Local Government Partnership it is essential to build off of existing partnerships, focus on scaling up strategies and innovations if and when it makes sense, target efforts around strategies that have the most impact in terms of energy savings, and create greater engagement across the state while considering initiatives to build these components into a strategic actionable framework.

Evaluation Objectives and Approach

In general, the process evaluation was intended to evaluate the effectiveness of PG&E's 2006-2008 LGP Program. More specifically, the evaluation focused on several issues that were identified by the LGP program managers during the scoping phase of this study. These issues included:

- Investigating and articulating the theory underlying the partnerships and the benefits of this approach to delivering energy savings
- Examining the benefits and drawbacks of direct installation of energy efficiency measures as a program delivery mechanism compared to other mechanisms
- Determining the impact of the gap of program implementation between the 2004-2005 and 2006-2008 program cycles for partnerships that were continued from 2004-2005
- Examining the 2006-2008 contracting process and identify ways to improve the process going forward
- Assessing how the LGP program is coordinated with other overlapping energy efficiency programs
- Identifying the program's target market and determine whether the target is appropriate and whether strategies to locate and serve that market are effective

The evaluation approach was to review program materials and regulatory filings; select a sample of partnerships to study in-depth; and conduct in-depth interviews with government, utility and implementation contractor staff.

KEMA staff conducted a review of prior PG&E LGP program evaluations and regulatory filings in January 2008. Next we selected 5 LGPs as case studies based on a review of all partnerships. The 5 partnerships, which are introduced below, were chosen as a sample to represent most of the key differences in partnership models.

- **East Bay Energy Watch Partnership** - ***third party implementation model***: includes Alameda and Contra Costa Counties, with the cities of Oakland and Berkeley being the most active partners. A third party contractor implements the program, contracting with several organizations who canvass, conduct audits and install energy efficiency measures to eligible customers in the East Bay. The government partners, who are

relatively sophisticated in terms of energy efficiency policy, are actively engaged to help market the program and identify appropriate target markets. The Association of Bay Area Governments (ABAG) Energy Watch Program provides services for East Bay municipal buildings.

- **San Francisco Energy Watch Partnership - *government implementation model***: includes the city and county of San Francisco. The city's Department of the Environment implements the program, managing two subcontractors who provide direct installation of energy efficiency measures for small commercial and residential customers. Municipal buildings are not eligible under this program since they do not receive electricity from PG&E. City staff are actively engaged to identify the appropriate target markets, provide audits and other technical services to customers, and to conduct technical analysis in support of updated energy efficiency codes and standards.

- **The Association of Monterey Bay Area Governments (AMBAG) Energy Watch Partnership – *hybrid implementation model***: includes the counties of Monterey, Santa Cruz and San Benito. AMBAG serves as the implementer, managing subcontracts with small commercial and residential direct installers; facilitating energy clinics and classes; and identifying eligible municipal energy efficiency retrofit projects. Within this partnership PG&E also has a turn-key direct install contract that operates in the AMBAG area.

- **Fresno Energy Watch Partnership – *third party implementation model***: started with the City of Fresno, and has recently expanded to encompass Fresno county. PG&E has two contracts with implementers for this partnership – one is for turn-key residential and small commercial direct install services and the other is for municipal building retrofits. There are 2 city maintenance staff who are engaged to help identify and seek city approval for municipal building projects.

- **Silicon Valley Energy Watch Partnership – *non-resource model***: includes the City of San Jose and Santa Clara County. This partnership is unique in that it does not have energy savings goals; its activities are referred to as "non-resource" or "marketing and outreach". PG&E has a contract with the City of San Jose's Environmental Services Department for promoting energy efficiency through increasing awareness and participation in energy efficiency and demand response programs. The partnership works closely with PG&E's two energy centers to offer local energy efficiency training classes to market actors, and supports codes and standards work throughout Santa Clara County.

KEMA conducted an initial round of 13 in-depth interviews with staff from the 5 selected partnerships. The topics addressed during the interviews include (see Appendix A for the interview guide):

- Partnership objectives and rationale
- Partnership roles and responsibilities, strengths and weaknesses
- Partnership accomplishments, challenges, target markets
- Marketing and outreach activities, value and tracking of participants
- Contract process and content
- Coordination of LGP program with other energy efficiency programs
- Future program design and scope

[Placeholder for follow-up interviews addressing program theories.]

Report Organization

The remainder of the report is organized as follows:

- Section 3: Program Theory
- Section 4: Findings
- Section 5: Recommendations
- Appendix A: Interview Guides

Program Theory

PG&E presented a generic 2006-2008 LGP program theory in its April 2006 program implementation plan. We developed a logic model, shown below in Table D-4 and Table D-5, based on the program theory. Table D-4 describes the range of program activities and indicates the expected outputs resulting from the activities. Table D-5 describes the expected short- and long-term outcomes. In practice, each individual LGPs operates from a unique perspective depending on their jurisdiction's goals, impetus for engaging in the partnership and implementation model. The remainder of this section will explore how the LGPs differ in terms of the range and emphasis of their program services; the degree to which various government, utility and market actors are engaged; and the customer segments that are targeted.

Table D-4:
Generic LGP Program Theory – Activities and Outputs

Program Activities	Outputs
Marketing and outreach:	
o Coordination with the IOUs' low-income weatherization and rate assistance programs to identify potential participants o Partner w/ local governments to establish partnerships that promote energy efficiency programs to customers that typically are not aware or do not participate in other energy efficiency programs o Partner with local planning and building organizations to identify potential commercial participants o Develop marketing and website material to promote the LGPs programs to the targeted audiences o Door-to-door canvassing to recruit participants o Case studies o Referrals to other energy efficiency programs	o Partnerships established with the IOUs' low-income weatherization and rate assistance program implementers in the local government partnership territories o Partnerships with local governments, planning organizations and building organizations established o Potential participants identified o Marketing materials and website content created o Houses canvassed o Referrals made
Incentives, direct installs and other energy services for end-use customers:	
o Direct installs o incentives for energy efficiency measures o Energy audits o Workshops on energy use and financial management for res customers o Training to private building owners on financial packaging to incorporate energy efficiency into capital improvement projects o Provide design and construction management support	o Free measures, financial incentives and audits available o Design and construction support available o Energy use and financial management workshops held o Training provided to building owners on financial packaging to incorporate energy efficiency into capital improvement projects
Training activities for mid-market actors:	
o Title 24 training relating to improving compliance with building codes o Technical training seminars designed for building owners, designers, engineers and architects	o Title 24 and technical training seminars provided

Table D-5:
Generic LGP Program Theory – Expected Outcomes

Expected Outcomes	
Short-Term	**Long-Term**
o Local governments promote the partnerships o Increased awareness of the partnerships o energy efficiency measures installed o Technical assistance provided during energy stages of building processes o Referrals made to other energy efficiency programs o Increased participation in other energy efficiency programs resulting from referrals o Electricity, peak demand and gas savings	o Larger commercial projects completed o More efficient building stock o Increased awareness of energy efficiency, greater recognition of the benefits of investing in energy efficiency technology o Increased demand for energy efficiency products and services o Increased availability of energy efficiency products and services o Market participants incorporate energy efficiency products and practices as standard practice o Sustained and equitable electricity, peak demand and gas reductions

[Placeholder for the program theory and logic model work with the case study partnerships]

Findings

This section describes the evaluation findings, which KEMA developed based on review of program documents and analysis of the interview results. The findings are organized by topic.

Partnership Intent

As presented in Section 2.2, the program's overarching vision is to deliver immediate energy savings and to establish a permanent framework for a sustainable, long-term energy management program for the LGPs. The program's near-term objectives are to achieve greater energy savings than traditional DSM programs by reaching under-served markets such as non-English speakers, rented or leased spaces and public facilities; to extend the reach of PG&E's other energy efficiency programs by using local government channels to achieve broad penetration throughout the community; to co-sponsor education and training for customers and trade allies; and to position LGPs to be strategic partners to help PG&E reach additional customers and impact their energy decisions.

The CPUC and the IOUs are also working to develop a long-term strategic plan for maximizing the effectiveness of the LGPs. The strategic plan, described in Section 2.6, includes several goals for LGPs to be reached by 2020. These goals encompass reducing energy use in government facilities and the broader community, participation in DSM programs that have a long-term orientation, and widespread progress in reducing green house gas emissions.

There is a disconnect between how the program is currently being implemented and many of its objectives. The program intent is to reach broader segments than traditional DSM and to develop strategic partnerships with local governments in order to achieve very aggressive, deep and broad energy efficiency goals over the next 10 to 15 years. In actuality, the core of the program is similar to other DSM programs since it is delivering mostly lighting measures to small commercial customers with long operating hours, which allows it to meet its energy savings goals. Most LGPs do spend a small amount of resources on meeting other objectives through providing local education and training classes, identifying and treating municipal buildings, and serving hard-to-reach customer segments. However, LGPs may fail to realize their long-term strategic goals without a reduced focus on immediate energy savings. LGPs are a promising energy efficiency program delivery mechanism, but it will take some time and investment of resources to realize their potential. Since IOU energy efficiency programs have been operating throughout the state for more than two decades, it is unreasonable to expect that LGPs will be able to achieve broader and deeper energy savings with the same

cost-effectiveness as traditional DSM. Likewise, to build energy efficiency capacity within local governments will require investment of time and resources that are not tied to immediate energy savings. However, at present LGPs are viewed as simply another delivery mechanism within the IOUs' energy efficiency program portfolio, which has very aggressive energy savings targets in line with the state's Energy Action Plan.

Integration of Services

PG&E's overlapping energy efficiency programs are not centrally coordinated. Our interview results indicated that PG&E energy efficiency program implementation activities are not centrally coordinated. Instead, LGP and the other PG&E energy efficiency programs that operate across its service territory are coordinated on an ad hoc basis. In some cases this has lead to competition between LGP program implementers and PG&E core and third party programs. With the increased emphasis on cost-effective and immediate energy savings, it is not surprising that all of these programs would be colliding in the marketplace as they target customers that offer the most energy savings potential.

There are synergies between the LGPs broader goals and PG&E's full portfolio offerings, and these synergies are not being realized. We observed during our interviews that local governments often approach energy efficiency from a broad perspective, because energy efficiency is increasingly viewed as a means to achieve goals relating to carbon reduction or sustainability. Many local government partners could benefit from taking advantage of the full range of services that PG&E has to offer. We found that local governments typically think of the LGP program manager as a trusted resource who they are in contact with on a fairly routine basis with whom they can engage the utility for needs beyond the LGP program. However, program managers are often unable to meet needs beyond what the LGP program can offer such as demand response, solar or sustainability. They can refer the local government to another department within PG&E, whose staff may or may not provide a timely response. We were told that at least in some cases this causes lost ground in terms of the trusted relationship that the LGP program staff has built with the local government, as well as dissatisfaction on the part of the local government. Likewise it leads to lost energy savings opportunities in terms of PG&E fully engaging the local government and linking utility resources to government needs.

Implementation Model

While there is no explicit classification of LGP program implementation models, there are at least three important distinctions that characterize the partnerships:

- **Implementer**: which organization is in charge of implementation,
- **Government engagement**: the degree to which the local government is engaged in the partnership, and
- **Resource goals**: whether the partnership is responsible for achieving measurable energy savings or is resource-only.

Table D-6 maps the five partnerships that were studied closely by this evaluation in terms of their implementation characteristics.

Table D-6:
Partnership Implementation Characteristics

Partnership	Partnership Characterization		
	Implementer	Government Engagement	Resource Goals
East Bay	Third party contractor	High	Yes
City of San Francisco	Local government	High	Yes
AMBAG	Local government and utility	High	Yes
Fresno	Third party contractor	Low	Yes
City of San Jose	Local government	High	No

Use of a third party contractor to implement partnerships is more efficient and probably more effective in realizing energy savings. However, some local governments realize important benefits as a result of fulfilling the implementer role. Based on our interviews, we learned that third party contractors were most efficient in implementing the partnerships as compared to local governments. Experienced energy efficiency third party contractors are much more efficient and effective in implementing IOU programs since they typically have off the shelf procedures and systems and qualified staff. For local governments to implement energy efficiency programs there is a substantial learning curve since most governments do not have experience as implementers.

We assessed that local governments as implementers have another distinct disadvantage due to their lengthy and restrictive contractual processes compared to third party contractors. This disadvantage is even more relevant when LGP's rely on subcontractors to deliver many LGP program services. However, local government implementer subcontracts may meet local government needs better than third party subcontracts since the government processes and restrictions are intended to meet broader objectives that might be very important to the government partner. For example, implementing the program for some local governments may be crucial because they may prefer direct control over energy efficiency program service delivery in their jurisdiction. To adhere to the spirit of the partnerships, PG&E should attempt to understand and address its partner's needs wherever possible.

***Not all local governments are actively engaged through the partnerships. Truly engaging the local government in partnership activities is important for maximizing energy savings in both the near- and long-term*.** Through our review of the case studies we observed that there is a continuum for the level of engagement of the local government in partnership activities (a simplified interpretation was shown above in Table D-6). Some local governments are actively engaged participants and as a result receive and provide tangible energy efficiency benefits. Engaged local governments exchange information with the utility to learn more about their respective customers and programs; from this exchange they can benefit from: learning (more) about energy efficient technologies, markets, products and services; helping to market the LGP program as well as other utility programs; identifying and effectively reaching appropriate target markets; helping to identify municipal building targets and moving those projects through to completion; providing education and training to government staff, end-use customers and trade allies; and engaging in codes and standards development.

Other local governments are not involved in the day-to-day operations of the program, and conversely receive fewer benefits. There are lost opportunities where government partners are not actively engaged – in terms of meeting immediate energy savings goals (e.g., through identification of potential customers, municipal buildings, and marketing of the program) and laying the groundwork for longer term energy savings (e.g., through energy efficiency and customer information transfer and linkage of programs with customer needs). Where local governments are not meaningfully engaged, it begs the question what makes the program a partnership, which implies mutual cooperation and responsibility, rather than a localized third party program.

There is little oversight in terms of monitoring and controls of non-resource activities. There is one LGP for the 2006-2008 program cycle that does not have resource goals. But

almost all the LGPs engage in some activities that do not directly lead to immediate energy savings. These are either marketing and outreach activities or other activities that may lead to energy savings that are not directly measurable under the current regulatory and evaluation environment such as local education and training classes and codes and standards development.

Through our review of the program filings and plans and our interviews with partnership staff, we observed that there is very little oversight of these activities. While there is a generic program theory that addresses some of the activities through mapping expected outputs and outcomes (presented in Section 3), there are no systems for collecting, monitoring and reporting accomplishments towards achieving these activities. The partnership contracts for the most part focus on accounting for achieved energy savings. The program theory is not updated to reflect the reality of program implementation, nor is it used to guide the deployment and evaluation of new implementation strategies.

During our interviews we asked about non-resource activities, their expected outcomes and whether any information was collected that might be useful in assessing their effectiveness. We found that there was a variety of non-resource activities taking place such as local education and training classes, codes and standards development, program marketing and outreach and referrals to other energy efficiency programs. However, little information was collected and reported that could be used to measure their outcomes. [placeholder to refer to later findings related to program theory.]

Contract Administration

Local government and third party contractor partners were dissatisfied with PY2006-2008 contract process and contract complexity. Almost everyone we interviewed agreed that the 2006-2008 program contracting process was lengthy and the resulting contracts were unsatisfactory. Even for partnerships that were essentially carried over from the 2004-2005 program cycle, the process was difficult as we were told that PG&E did not build off the prior contracts. The rationale for new contracts was that in 2006-2008 the utilities were responsible for program performance, whereas in 2004-2005 the utilities were strictly contract administrators.

One reason for the lengthy contractual process was working out the legal issues between PG&E and local governments. This process apparently took several months. However, the contract process for third party contracts (which are much easier) was also very lengthy.

The most problematic issue with the 2006-2008 contracting process for carry-over programs was there was a gap in program delivery during the time that contracts were being negotiated. This was unforeseen and directly impacted program energy savings accomplishments because program activity continued in some cases during the gap and no rebates were paid and savings were not claimed. As such, the program left energy savings on the table and also caused dissatisfaction among program implementers, program participants and other market actors.

According to program partners, the issues with the contracts themselves as working guidance documents during the program cycle included: too many irrelevant sections, a great deal of complexity in most sections, lack of flexibility for making mid-course program implementation corrections, and little to no tracking of program success beyond accounting for energy savings.

Many partners feel that PG&E systems, processes and staffing levels are constrained, which has hindered program progress. Our interview results revealed that partners believe PG&E is too constrained in terms of managing and supporting LGP program implementation. Most partners felt that the program managers are dedicated and work very hard, yet the Customer Energy Efficiency group in general is understaffed. Moreover, the systems and support staff are constrained such that there may be lengthy delays in facilitating program changes, data requests, rebate payments and other day to day administrative processing.

Another issue is frequent program manager staff turn-over. Since there is a fairly steep learning curve for LGP program managers, there is a loss of efficiency and increased administrative time and resources to bring new managers up to speed. We were told that program manager turnover has been less of an issue as of late (since PG&E has hired many LGP program staff from local governments), but some LGPs have had several program managers during the 2006-2008 program cycle.

Delays associated with drawn out contractual processes and lags in processing program changes have contributed to the program's lag in meeting its energy savings goals. Many of the partners we spoke with said that they were likely to meet their three-year energy savings goals, but most have had to play catch-up and have had their hands tied over the last two years.

TBD

[Placeholder for findings related to the program theory and logic model work with the case study partnerships]

Recommendations

This section presents our recommendations for improving the effectiveness of the LGP program to deliver immediate energy savings and to meet its long-term strategic goals. Recommendations related to immediate energy savings goals are presented first in order of priority, which are most relevant for the current and 2009-2011 program cycle. Then we present recommendations related to achieving the program's long-term strategic goals, which are for the years 2015 and beyond.

Near-term Recommendations

As new partnerships are formed, use the East Bay implementation model, which utilizes a third party contractor implementer, to increase efficiency and effectiveness. New partnerships using the third party contractor implementer model will be able to hit the ground running much faster, since third party contractors have experience in delivering energy efficiency programs and typically have systems and staff in place that adhere to the CPUC's and PG&E's overarching policies and procedures. However, it is important to actively engage the local government in order to realize the benefits of the partnerships as envisioned by the program theory and the long-term strategic plan. This point is discussed further below in Section 5.2.

Use a regional approach to partnerships where possible in order to expand existing partnerships' reach and to increase efficiency of new partnerships. Create and continually support the development of a clearinghouse for LGPs across the state. Current partnerships that stop at the city or county limits could achieve more energy savings by extending their reach to the county (for cities) and to a region (such as the Central Valley). New partnerships should be able to leverage existing partnerships that are in close proximity so they may reduce start-up resources and realize energy savings sooner. In general, newer partnerships should be able to learn from those already in place through sharing of information and resources. PG&E (and the other IOUs) is a in a unique position to facilitate that information exchange.

For new partnerships, develop a user-friendly contract and shorten the contracting process. This will lead to decreased administrative costs and allow programs to hit the street sooner.

For existing partnerships that are continuing to the next program cycle, where possible use contract amendments instead of starting a new contract process. This will keep things consistent for current partnerships and increase goodwill, helping to increase partnership cooperation in both the short and long-term. It also should help minimize a gap in program implementation during the transition time from one cycle to the other, maximizing energy savings in the near-term. However, this may not be possible for partnerships that are making substantial changes from 2006-2008 to 2009-2011.

Build in flexibility to all contracts for making mid-course corrections. This will encourage programs to innovate and adapt to changing external conditions, and hopefully decrease the administrative costs associated with making changes to the programs. However, PG&E systems and support staff that handle the processing of changes also need to be responsive, which is addressed below. This recommendation could potentially lead to large benefits in terms of increasing energy savings in the near-term.

Develop a tracking system to monitor implementation "traffic" for utility third party, LGP, core and low-income program coordination and cross-referrals to be shared by local governments and PG&E. This recommendation would lead to a substantial increase in efficiency and the number of participants reached. However, it would probably take a lot of resources, commitment and coordination across the diverse set of partnership staff to develop and implement an effective system. Note that PG&E had proposed building such a clearinghouse in its 2006-2008 program application. This type of system is still needed since PG&E will continue in 2009 and beyond to have multiple delivery channels serving the same customer base.

Develop a data sharing protocol that indicates what data may be requested by LGPs and how data requests should be processed internally. This might be difficult to implement because it requires a high level decision on what information may be shared with local governments. However, it will lead to some modest improvements in energy savings achievements in the near-term due to increased ability of partners to target customers. This could also have substantial long-term implications, too, by increasing the effectiveness of information and knowledge transfer between the utility and local governments.

Build in progress reporting (beyond counting of energy savings by measure) to the contracts to monitor the successes and challenges of each program strategy. This will give PG&E and the CPUC more information and more control over implementation decisions that impact energy savings in the near-term. Likewise, additional control could be used to help

shape strategies aimed at building a local government energy efficiency infrastructure and to refine the appropriate customer targets and measure mixes. This recommendation should be fairly easy to implement and should lead to at least a modest increase in energy savings achievements in the near-term by giving the utility and the CPUC more control over how program dollars are being spent in each local government.

Determine whether PG&E's internal infrastructure that supports LGP is sufficient given its priority and make improvements if warranted (e.g., add staff, update IT systems, etc.). While difficult to implement, addressing PG&E resource constraints would lead to improvements in efficiency, reduced administrative costs, quicker turn-around on program changes and administrative processing. These improvements would have a direct effect on energy savings accomplishments in the near-term.

Long-term Recommendations

Striking an appropriate balance between achieving immediate energy savings and meeting the program's broader near-term and long-term strategic objectives. As part of the state's aggressive energy savings program portfolio, most of the LGP program strategies are focused on delivering a narrow mix of lighting measures to small commercial customers with long operating hours. In many cases the LGPs are directly competing with other utility programs, since they all have the same overarching objective to achieve the most energy savings as cost-effectively as possible. The vast majority of LGPs are unable to meaningfully address other program objectives such as reaching broader customer segments and developing a permanent local government infrastructure since they are viewed as one of many delivery mechanisms to achieve immediate cost-effective energy savings.

The state's energy efficiency policymakers need to decide the appropriate balance of activities focused on immediate energy savings versus addressing long-term strategic goals such as building local government energy efficiency capacity through energy efficiency training and information transfer. Obviously there are tradeoffs to reducing the emphasis on achieving cost-effective immediate energy savings. However, investments made today will likely realize longer term benefits.

Transitioning the program to achieve the longer term vision. PG&E currently has relatively high cost-effectiveness targets (e.g., near 3.0) for the LGP program because LGPs posed a greater risk relative to other delivery mechanisms due to uncertainty they could achieve their savings targets. It may make sense for the 2009-2011 program cycle to lower the cost-

effectiveness targets (while keeping them above 1) to allow the programs to allocate more resources towards building local government energy efficiency infrastructure, which will help to transition the program towards its longer term vision. The risk associated with LGPs meeting their energy savings targets may be slightly reduced in 2009-2011 since PG&E will be able to evaluate the energy savings achievements of 2006-2008 programs and select the most successful programs and strategies for 2009-2011.

***Building local government energy efficiency capacity*.** One of the goals of the long-term strategic plan for LGPs is to build energy efficiency capacity within the local government. While some local governments already have such capacity and are very sophisticated in regards to energy efficiency policy, other governments (particularly those that are new to LGP or do not yet have a partnership) lack energy efficiency resources. PG&E is well-positioned to help transfer energy efficiency knowledge and information to these less sophisticated local governments through the course of managing the LGP program and also by developing a clearinghouse for all LGPs to share information and resources.

However, if PG&E uses the third party implementation contractor approach for newer LGPs who do not yet have energy efficiency capacity, there may be lost opportunities where the local government does not actively engage in the partnership and begin to build capacity. In such a case, it may be beneficial for PG&E to issue a non-resource contract to those local governments, which they could use to hire staff specifically focused on energy efficiency.

The benefits of non-resource activities and the need for oversight. There is a wide range of so-called non-resource or marketing and outreach activities currently underway via the LGP program where no energy savings are being claimed. Some of these activities are listed as outcomes in the generic program theory presented in the program implementation plan. However, there is very little utility and CPUC oversight of these activities. Some may be leading to very real energy savings benefits, while others may be redundant or leading to minimal benefits. There are efforts underway to try to broaden the types of activities from which energy savings may be claimed, such as for codes and standards development and education and training classes. However, these efforts will probably not include the full range of LGP activities, which also include information transfer between utilities and local governments and the building of energy efficiency infrastructure within government.

In absence of a formal method for evaluating LGP non-resource activities, PG&E and the CPUC should examine and prioritize the range of benefits being accrued by these LGP activities. Those benefits that are deemed important should be emphasized in future LGP programs, and

those that are not beneficial should be eliminated or deemphasized. Non-resource activities should be monitored and real oversight should take place, with ongoing testing and refinement of the program theory. [placeholder for more recommendations after the program theory/logic model exercise]

Realizing the benefits of the partnerships. If the LGP program is to meet its long-term strategic goals as envisioned by program planners and policymakers, there is generally a need for all organizations involved in the partnership to come together as partners. This is difficult under the current regulatory environment where PG&E alone is responsible for the success and failure of the partnerships. While PG&E program managers attempt in most cases to understand and try to address the partners' needs, local governments are typically viewed as one of many program delivery channels within its energy efficiency program portfolio. This view has evolved with the recent additions of PG&E program managers with government background who have a greater appreciation of the long-term benefits partnering with local governments may provide.

PG&E should try not to mandate major changes in how existing LGPs are implemented for the 2009-2011 program cycle, as long as they are meeting their energy savings goals. While it may be tempting to streamline all the partnerships to ease administration, the existing partnerships have evolved over time due to their unique context. Some of the existing LGPs have entrenched energy efficiency policy positions and it is important to take into account their perspectives and try to address their needs in order to realize the long-term benefits of the partnerships.

Integrating energy efficiency-related services. PG&E should coordinate its service offerings related to energy efficiency, demand response, carbon reduction and sustainability. Ideally, PG&E should create an integrated service offering that local governments could take advantage of and include in their programs to meet their community's various sustainability goals.

[Placeholder for recommendations on the program theory and logic model work]

Appendix A: Partnership Staff Interview Guide

Interview Topics

Introduction

- [I'll introduce myself and explain the evaluation and KEMA's role]
- What organization do you work for? What does your organization do?
- What is your position at that organization? How long have you been at this organization? [If less than 5 years:] What is your background?

Partnership Objectives and Rationale

- What do you see as the overall objectives for the partnership? And specifically what are your [PG&E/local government/implementation contractor's] objectives?
- What are the benefits of local government partnering with utilities to deliver energy efficiency programs? Are there any drawbacks to this approach?

Partnership Organization

- Describe your entity's [PG&E/local government/implementation contractor's] role and responsibilities in the partnership. What is your individual role and responsibilities?
- Describe how this partnership is managed – what are the roles and responsibilities of the other entities that are in the partnership?
- What are the strengths and weaknesses of each of the partners?
- Is the partnership effectively designed in terms of the division of responsibilities? Are contractors used effectively?
- Are the strengths of the local government emphasized? And are their weaknesses minimized? What about the strengths and weaknesses of PG&E? Of contractors?
- In your opinion what would the optimal partnership design be? How would local government, utility and implementation contractor staff be best utilized?

Energy Efficiency Program Services – AMBAG

- [Explain that we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions. So we're up to speed with regard to program plans and program accomplishments to-date.]
- Direct install – residential customers:
    - What types of residential customers are targeted by the program for direct installation services? How was that target selected (e.g., if they are an under-served group how did you know they were under-served)?

  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – small hotels and motels:
  - How was the small business direct install target selected (e.g., if they are an under-served group how did you know they were under-served; were other business types considered)?
  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Home buyers:
  - How is this component of the program progressing?
  - Is this component of the program effectively designed to reach home buyers and the market actors that serve them? How could it be improved?
  - What % of the program's energy savings to-date is from this component?
  - Were there any other non-energy savings goals for this program component? Are they being met?
- Municipalities:
  - The program has identified and committed some muni projects but none have been completed (as of 2007:Q3) due to the complexity of the projects. Was this a surprise that these types of projects would take so long to complete?
  - What are the specific barriers that municipal customers face in terms of installing EE measures? Is the program effectively designed to address these?
  - The program is expanding its direct install services to address this sector. How will the direct install approach work on this market? How will it address the specific needs of this market?
- Energy clinics and classes:
  - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
  - How are these trainings coordinated with the PG&E energy centers?
  - What benefits do training participants receive (both energy and non-energy)?

  - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
  - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
  - How might these services be improved going forward?
- General
  - Is the program doing any work with respect to codes and standards?
  - Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
  - Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Energy Efficiency Program Services – City of San Francisco

- Note that as part of the evaluation, we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions.
- Direct install – residential customers:
  - What types of residential customers are targeted by the program for direct installation services – all multi-family dwellers? How was that target selected (e.g., if they are an under-served group how did you know they were under-served)?
  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?) Will the program be able to catch up and meet its energy savings goals by end of 2008?
- Direct install – small business:
  - How was the small business direct install target selected (e.g., if they are an under-served group how did you know they were under-served; were other business types considered)?
  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?

    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?) Will the program be able to catch up and meet its energy savings goals by end of 2008?
- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?
    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
- General
    - Is the program doing any work with respect to codes and standards?
    - Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
    - Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Energy Efficiency Program Services –City of Fresno

- Note that as part of the evaluation, we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions.
- Direct install – residential customers:
    - What types of residential customers are targeted by the program for direct installation services? How was that target selected (e.g., if they are an under-served group how did you know they were under-served)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?

    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – small business:
    - How was the small business direct install target selected (e.g., if they are an under-served group how did you know they were under-served; were other business types considered)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Municipalities:
    - The program has identified and committed some municipal projects but none have been completed (as of 2007:Q3). What have been the constraints to getting more municipal projects? And getting any completed?
    - What are the specific barriers that municipal customers face in terms of installing EE measures? Is the program effectively designed to address these?
    - Do you expect to get more projects completed by the end of the project? What new strategies are being tested?
    - Does the partnership have the right local government contacts engaged? Is there a dedicated staff person you work with? Does the government have enough resources with the right skills to help get projects identified and followed through?
    - What other barriers exist at the local government level to implementing these projects? How might the program (or other programs/strategies) better address those?
- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?
    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
- General
    - Is the program doing any work with respect to codes and standards?

- Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
- Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Energy Efficiency Program Services – East Bay

- Note that as part of the evaluation, we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions.
- Direct install – residential customers:
  - Describe what CYES does to target residential customers to provide program services. What is the target market and how was that target determined? What services are provided?
  - Based on the program's experience, is this market truly under-served? Is this the right target market for the program?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – BEST:
  - Describe what KEMA/BEST does to target small business customers to provide program services. What is the target market and how was that target determined? What services are provided?
  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – Smart Lights:
  - Describe what Smart Lights does to target small business customers to provide program services. What is the target market and how was that target determined? What services are provided?

  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Municipalities:
  - Does this partnership target city and county facilities? If so, has any progress been made in terms of identifying projects and installing EE measures?
  - What are the specific barriers that municipal customers face in terms of installing EE measures? Is the program effectively designed to address these?
  - Do you expect to get more projects completed by the end of the project? What new strategies are being tested?
  - Does the partnership have the right local government contacts engaged? Is there a dedicated staff person you work with? Does the government have enough resources with the right skills to help get projects identified and followed through?
  - What other barriers exist at the local government level to implementing these projects? How might the program (or other programs/strategies) better address those?
- Energy clinics and classes:
  - Does this partnership offer any energy training courses (like other partnerships)? If not, why not? Might the partnership benefit from adding this component?
- Home buyers:
  - How is this component of the partnership working? Has any progress been made? What are the constraints to making this component work?
  - What are the long-term goals of this component? Are the program services being offered now going to help reach these long-term goals? What needs to happen to meet the long-term goals?
- General
  - Is the program doing any work with respect to codes and standards?
  - Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
  - Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Direct Install

- How much does the program rely on direct install to meet energy savings goals?

- How is the program doing in terms of meeting goals - and how do the direct install services factor into program success or failure?
- What are the benefits and drawbacks of direct install versus other services provided by LG partnerships?
- How do direct install services compare to other services in terms of cost-effectiveness? What other non-energy benefits does direct install provide? Do the programs have the right amount of direct install or should they have less or more? Why?
- Should the LGPs continue to include direct install going forward? Why? Should there be any changes made with respect to how the programs use the direct install approach?

Market and Outreach – City of San Jose only

- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?
    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
    - What type of information is collected from training attendees? May we survey training participants?
- Marketing and outreach
    - What value does the program provide to Santa Clara residents, business and municipalities? What are the outcomes?
        - Do you feel that the program is effective in increasing participation in other EE programs? What are its most effective strategies for doing so?
        - What barriers exist for participating in an EE rebate program? How does the program help overcome these barriers? What barriers does it not address?
    - Does the program collect any information on its marketing and outreach targets so that its success could be measured? What information could it collect in the future to improve its ability to track its impacts?
        - We'd like to attempt to survey PG&E customers that were likely targets of the program's marketing and outreach to measure program outcomes and determine whether any energy savings occurred. [Discuss what information is available to assist this effort.]
    - Would the program (and Santa Clara constituents) benefit from including EE rebates? Would there be any drawbacks? How would such a program be designed (e.g., use of an implementation contractor)?
- General
    - Is the program doing any work with respect to codes and standards?

- Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
- Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Contracts and Management

- How would you describe the contracting process [between PG&E and the local government agency] for PY2006-2008?
- Were you satisfied with the amount of time the process took? How could the process be improved going forward? What are the constraints to improving this process?
- Were you satisfied with the terms of the contract (e.g., its specificity, flexibility, progress measurements, ability to measure and track success or failure)? How could the terms (or scope of work) be improved going forward? What are the constraints to improving it?
- Was this partnership continued from 2004-2005? If so:
  - Were there any major changes from 2004-2005 to 2006-2008? What were they?
  - The CPUC instituted new requirements for 2006-2008 contracts. Are those new rules being addressed by the 2006-2008 contract? If not, why not? And how can the program correct the problem now and going forward?
  - There was a 3 month gap between 2004-2005 and 2006-2008 contracts. How did this gap affect the program? How can these issues be minimized in the future?
- How would you characterize the amount of regulatory reporting your organization (and the partnership in general) has to do? How could the reporting aspect be improved?

Coordination

- Other PGC-funded energy efficiency programs operate in this jurisdiction including PG&E core programs. What are the main programs besides PG&E's core programs operate in your area?
- What are the benefits to having more than 1 program in place in your area? The drawbacks?
- How is this program coordinated with those other programs? I.e., do you routinely refer customers to the other programs and vice versa, are there specific procedures in place (in your program and the others) to prevent double dipping?
- Is coordination of programs being handled effectively both by your program and the others? How might coordination be improved? Are there any constraints to improving coordination?

Future Planning

- Do you think it makes sense to broaden the partnership's objectives to include demand response, sustainability/carbon reduction and renewable energy? Are there any potential drawbacks from expanding beyond energy efficiency?
- What other issues should policymakers consider as future programs like these are being planned?

Appendix E: 2006-2008 Local Government Partnership Program Process Evaluation Phase 2 Draft Report

Introduction

This report describes the results of a second phase of research on PG&E's 2006-2008 Local Government Partnership (LGP) Program, and is an addendum to the first phase report. The first phase consisted of a literature review and 13 in-depth interviews with staff from 5 LGPs that were selected as case studies.[62] KEMA delivered a draft report documenting our approach and results from the first phase of research on March 25, 2008. After PG&E reviews this report addendum, we will combine these results with the Phase 1 draft report and submit a comprehensive report that addresses both phases of research to PG&E.

Research Objectives

The second phase of research intended to gather detailed information on program activities where immediate energy savings are not claimed, which are referred to as non-resource activities. This report addendum provides PG&E with a deeper understanding of:

- The value of non-resource activities in terms of immediate and long-term impacts;
- The target markets for LGPs' non-resource activities;
- The relationship of LGP activities to other related energy efficiency program activities and identification of opportunities for better coordination and leveraging;
- Opportunities for and barriers to expanding those activities that are deemed valuable;
- The extent to which these activities are tracked and reported on and opportunities for improving oversight and evaluation.

[62] The case studies were selected to represent a variety of important LGP characteristics such as implementation model and local government energy expertise.

Research Activities

The research consisted of in-depth interviews with program staff with an explicit focus on non-resource activities from the 5 LGPs that were selected as case studies during the first phase of research. Where possible we interviewed program staff in person.

KEMA completed interviews with LGP staff from the 5 case study LGPs in May 2008:

- **City of San Jose** – 2 local government staff in person
- **The Association of Monterey Bay Area Governments** – 2 local government staff by telephone
- **The East Bay Partnership** – 3 local government staff from 2 East Bay cities; 5 staff from subcontractors; and 1 staff person from the third party implementation firm in person
- **City of San Francisco** – 2 local government staff in person
- **County of Fresno Partnership** – 4 staff from the third party implementation firm by telephone.

Strategic Program Planning

On October 18, 2007, CPUC Commissioners adopted a decision mandating California's investor owned utilities (IOUs), working in collaboration with publicly-owned utilities, state agencies, and other stakeholders, to prepare a statewide energy efficiency Strategic Plan for the period 2009-2020. This plan is intended to:

- address all end use sectors for gas and electricity – residential, commercial, industrial, and agricultural;
- give special attention to several ambitious long-range Big Bold Programmatic Initiatives with specific suggested performance targets;
- indicate how these plans will better integrate delivery to customers of the full range of demand side management (DSM) options (energy efficiency, distributed generation and solar, and demand response); and
- ensure effective use of and support for funds for marketing, outreach, training and education.

The PG&E 2006-2008 LGP Program Process Evaluation Phase 1 report provided a summary of a Draft Strawman that was developed by the Local Government working group, which was incorporated into the IOUs' Strategic Plan that was submitted on June 2, 2008. In the Plan, the IOUs dedicated a section to the roles of local government, describing the vision and presenting four strategies intended to address that vision:

Vision: "By 2020, California's local governments will be leaders of community-based initiatives to reduce energy use and carbon dioxide emissions. Local governments will be using their authorities and resources – regulatory, legal and educational – to promote energy efficiency technologies and practices within their communities, in their own facilities and with their peers."

Strategies:

- "Tap local government authority over planning and development policy to maximize energy efficiency in privately owned new construction and existing buildings;
- Lead by example with local governments' facilities achieving economic energy efficiency, reducing CO2 emissions, and showcasing promising energy efficiency, DSM and renewables products and practices;
- Local governments should lead their communities to support clean energy goals; and
- Local governments should rapidly upgrade and expand energy efficiency knowledge and skills among their staff and officials to support the success of above strategies."[63]

PG&E is currently in the process of preparing its 2009-2011 program plans, and has already solicited and reviewed proposals from local government partnership program implementers. [*We plan to update this section in the final combined report after we conduct follow-up interviews with the PG&E LGP program managers as directed by the PG&E study manager*.]

Results

This section presents the results of the second phase of LGP program research. First, we present descriptions of the various types of non-resource activities in which the PG&E LGPs are

[63] *California Energy Efficiency Strategic Plan*, Rulemaking 06-04-010, June 2, 2008, www.californiaenergyefficiency.com, Section 12 pages 12-1 and 12-3.

engaged.[64] Next, we assess each type of activity. Finally, we present a logic model that illustrates the theory underlying the non-resource activities described in this section. Note that each LGP has a unique context, and as such its mix of non-resource activities is tailored to its needs. These results are intended to provide a generic overview and assessment, with which PG&E and LGPs can use as a point of departure to examine individual LGPs and/or other energy efficiency programs that interact with the LGP program.

All of the activities that are described below are excluded from energy savings reporting for the LGP program. Many of these activities would be classified as marketing and outreach or informational programs if they were stand-alone programs, and would not be subject to energy savings requirements. However, these activities are rolled into LGP along with several energy savings delivery mechanisms such as direct install and retrofit rebates. LGPs spend their time and budget on non-resource activities so long as their individual LGP program meets its cost-effectiveness target. For the 2006-2008 program cycle, LGP program cost-effectiveness targets were set similar to third party and core program targets, which means that for LGPs to spend their resources on non-energy savings activities, they would have to be even more cost-effective on their energy-savings activities than third-party and core programs. As reported in the Phase 1 draft report, LGPs have either narrowed their measure and customer mix or scaled back non-resource activities in response to these conditions.

Non-Resource Program Activity Description

We have broadly categorized non-resource activities in which most LGPs are engaged:

- Energy education
- Marketing and outreach
- Codes and standards
- Energy efficiency capacity building

Below we provide a brief description of the types of program strategies that are used by category.

[64] Note that these descriptions were developed based on interviews with 5 case study LGPs, which were selected to reflect the diversity of offerings across PG&E's portfolio of LGPs.

Energy Education

Each LGP offers one or more services related to energy education. At a minimum, LGPs provide feedback to PG&E's energy training centers (the Pacific Energy Center or PEC in San Francisco and the Energy Training Center or ETC in Stockton) on course offerings based on their knowledge of their local residents' and businesses' needs. LGPs that are not located in close proximity to either center typically hold local training classes,[65] either modeled after an existing PG&E center course or tailored to a specific local need. Most LGPs engage in informal peer to peer energy education within the partnership (i.e., PG&E, local government and implementation contractor program managers and technical staff), across local government staff and across partnerships. Some LGPs provide energy audits to residential and/or commercial customers during the course of identifying energy efficiency retrofit opportunities and marketing their other service offerings. All LGPs engage their communities through the attendance of local events (discussed more below in Marketing and Outreach), whereby they deliver energy education to community members by passing out informational materials and discussing energy efficiency topics with event attendees.

Marketing and Outreach

All LGPs engage in marketing and outreach to raise awareness of their program and attract participants. They have a wide array of printed materials such as flyers and brochures, and most LGPs place advertisements in a variety of media typically in more than one language.[66] Notably, LGPs market not just their own programs, but all available energy efficiency programs in their area. They tailor their marketing materials based on the target market (such as residential versus non-residential, and among non-residential customers by measure type). As mentioned above, LGPs leverage their existing community relationships by attending all manner of local events. Again, LGP staff tailor their message depending on the community likely to be targeted by the event. LGPs leverage existing PG&E materials on general energy efficiency, PG&E programs, third-party programs and other energy efficiency program information in both English and other languages. LGPs also develop their own customized materials where needed to address local needs and to market their specific program services.

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[65] The exception is for LGPs that did not include training classes in their contract.

[66] The exception is LGPs that do not have mass market program services, and consequently do not engage in mass market advertising.

LGP marketing and outreach is typically grass-roots based on local government and their partners' communication channels. Often the local government partners are community-based and bring their own name recognition and existing community ties and leverage points. Other partners consist of third party program implementers, who are often based locally and have an intimate knowledge of the communities they are targeting and have developed strategic marketing methods and materials.

Codes and Standards

There are two distinct areas where LGPs engage in codes and standards activities.

Existing code compliance and enforcement: where LGPs have the expertise and are able to devote non-resource budget to it, they engage in a range of activities directed at increasing existing code compliance and enforcement. First, they offer training to local government staff who are charged with enforcing code. They may offer training classes to plumbers, for instance, or encourage staff to attend PEC and/or ETC classes on code updates. They also address compliance by raising awareness among and encouraging business and residential customers to comply with current codes. Local governments have access to constituents through existing relationships and use those routes to raise awareness and encourage compliance.

Local standards development: The LGPs that have in-house energy efficiency expertise within the local government engage in local standards development. They see local standards work as one more tool in the toolbox, not necessarily the last step in achieving mass adoption of a targeted energy efficiency measure. They start with early innovative customers and pilot new measures. Then they may offer incentives to raise awareness of the measure and to develop the infrastructure to support it. Then they develop local standards through a process that usually involves a wide range of community stakeholders and local government departments. That process is beneficial in raising awareness of the issues and helping to address barriers to enacting and complying with a new standard.

Once a standard is approved locally, local government staff use it as a tool to train local government staff on compliance and to raise awareness in the broader market – among contractors who can do the work, and customers who will need to install the measures. They offer rebates prior to the standard going into effect to help residents and businesses proactively meet it.

Once the standard goes into effect, they understand that compliance will be well less than 100%, and local governments continue to focus on raising awareness among those who enforce

and comply with the standard. Some LGPs would still like to be able to offer customer rebates, though they must use their marketing budget since they cannot claim energy savings on a measure once a local standard has gone into effect.

Later, the standard may be adopted more widely (such as to the greater geographic region), and the market changes that have started locally will spread regionally and possibly statewide. Some examples of measures that have been addressed or are currently being addressed through local standards that exceed existing codes are LED traffic lights, home performance, commercial lighting and HAC and exceeding Title 24 building code standards.

Energy Efficiency Capacity Building

One of the strategies described in the IOUs' California Energy Efficiency Strategic Plan (see Section 1.3) identifies the need for building energy efficiency capacity within local government to achieve their potential:

> *"Many local governments don't have adequate dedicated staff or resources to move proactively on energy efficiency in their own or community buildings. They also often lack capacity or awareness to promote building and zoning codes that would dramatically accelerate green, efficient buildings within their jurisdictions."*[67]

There is a wide range of existing local government energy efficiency capacity across PG&E's LGPs. Some local governments have existing energy or environmental services departments where there is a natural place for staff to be working on energy efficiency projects. Other local governments have little to no energy efficiency capacity, where a city staff facility manager may be the only local government staff engaged in the program (e.g., to identify municipal buildings to be treated by the LGP program). The types of activities that LGPs conduct to build capacity are to:

- hire new local government staff with energy efficiency expertise;
- train existing local government staff through peer to peer networking and attendance at energy efficiency training classes;
- work with local government partners such as utility program managers and account representatives and third party implementers;

[67] *California Energy Efficiency Strategic Plan*.

- peer to peer exchanges with other local governments that are participating in the LGP program;
- LGPs that are regional entities provide a forum and act as a convener for local governments to develop energy efficiency policies and build their energy efficiency capacity.

Assessment of Activities

Below we assess each category of non-resource activity in terms of the following:

- The target market
- How the activity relates to other energy efficiency programs and whether and how it is coordinated with other programs
- Its expected outcomes and impacts
- How it is currently being evaluated and identification of gaps and/or opportunities for improving oversight and evaluation, and
- Opportunities for and barriers to increasing desired impacts.

Energy Education

We discuss the following specific energy education services in this section:

- Energy education classes
- Peer to peer exchange
- Energy audits
- General energy efficiency education.

Energy Education Classes

PG&E's LGPs provide energy education to customers in their area in a formal classroom setting by:

- Marketing PG&E's ETC and PEC classes to customers and providing input on customer needs and wants to ETC and PEC program managers.
- Holding local versions of existing ETC and PEC classes.
- Developing local classes for specific customer segments based on their needs, where ETC and PEC do not already fill the need.

The target market for these classes is non-residential end-use customers and market actors and trade allies that serve both residential and non-residential customers. LGPs leverage the existing PG&E program that has provided energy efficiency classroom training for decades, the Energy Training Center in Stockton (ETC) and the Pacific Energy Center in San Francisco (PEC). Essentially the LGPs help to raise awareness of ETC and PEC classes, and they work closely with ETC and PEC staff to offer local versions of existing center classes. The LGPs also gather input from the community on their training needs and communicate those needs to the centers' staff to help refine training offerings and increase participation and improve satisfaction.

Where LGPs have discovered a local need that is not already met by an existing center class, the LGPs may develop a training class and offer it locally to a business or trade ally group or another customer segment.

The expected outcomes from energy education through formal training classes are increased participation in ETC and PEC classes (both at the centers and locally), higher satisfaction with ETC and PEC classes, the development of new training classes that are designed to address unmet needs in the local community, and attendance by targeted segments in new classes.

Evaluations of the Statewide Education and Training Program have assessed the impacts from energy training classes, which include increased awareness, confidence, capabilities and implementation of energy efficiency projects (either on their own or through participation in another utility program).[68]

The LGP program currently tracks and reports attendance in local center classes and for new classes that they develop. However, they do not track and report the marketing they do for the centers and the guidance they provide with respect to refining course activities to meet the market needs. The Statewide Education and Training Program evaluations have in the past included assessments of program marketing, which could in theory determine the effectiveness of LGP program marketing. Process evaluations of the Statewide program could also address how LGPs help to refine course offerings through interviews with center managers. Additionally, there could be efficiencies and an increase in evaluation effectiveness if the LGP and Statewide Education and Training Program evaluations were coordinated.

[68] 2004-2005 Statewide Education, Training and Services Program Evaluation, KEMA Inc., November 2007, prepared for the CPUC and the California IOUs, managed by SCE.

Statewide LGP program evaluations will likely include customer surveys, which may specifically address training attendee satisfaction and outcomes and impacts of training.

The extent to which LGPs engage in leveraging ETC and PEC classes and offering their own local classes depends on their contract, location and non-resource budget. Some LGP contracts were very explicit about the types of activities that they could engage in, and did not include energy efficiency training. Other LGPs that are very close to one of the centers do less of these activities because the need is not very great. Finally, all LGPs are constrained by their budget, since they need to meet a high cost-effectiveness target. Energy education activities do not count towards their energy savings goals, so they must use budget that is leftover.

Peer to Peer Exchange

LGP peer to peer exchange occurs within each partnership (across the partnership members), across local government staff and across the partnerships. The target market is most often local government staff – those already working in energy efficiency or related areas such as environment, climate or sustainability and those whose primary function is not directly related to energy efficiency such as building inspectors, maintenance staff and city council members. LGPs provide an opportunity to raise awareness among local government staff and create connections across departments to lay the groundwork for the long-term change that is laid out in the IOUs' strategic plan. Peer to peer exchange is one method for building local government energy efficiency knowledge and capability. LGP peer to peer exchange also may benefit utility and third party implementation staff, where local government staff provide information about their local community needs and about the workings of their local government. These benefits may translate into increased effectiveness of third party and core energy efficiency programs.

There is also peer to peer exchange across LGPs, with the more sophisticated LGPs in terms of energy efficiency knowledge and capacity sharing information with new LGPs.

The IOUs' Statewide Education and Training program that was described in the previous section offers classes on a variety of subjects that city staff could attend to learn more about energy codes and standards, energy efficiency programs and measures. LGP program staff leverage existing resources to provide information to local government staff, such as PG&E customer data, PG&E account representative knowledge, utility program informational materials and PG&E program manager expertise. The LGP also leverages the knowledge of third party program implementers. Local government staff may also be knowledgeable about energy efficiency, and specifically about the needs of their community and the local context and

governmental issues and barriers, and they provide this information to other local government staff and also to PG&E and third party implementation staff.

The expected outcomes are the exchange of information within partnerships, across partnerships, and from partnerships to broader local government staff. The range of expected impacts are consistent with elements of the IOUs' strategic plan and include:

- Increased knowledge and awareness of energy efficiency and programs among partnership members and local government staff;
- Changes in local government behaviors related to energy efficiency such as identification of municipal projects for energy efficiency retrofits and increased ability to enforce energy codes;
- Increased ability of PG&E and third party implementer staff to implement energy efficiency projects within local government areas; and
- Creation of linkages across local government staff and added resources that maximize the government's ability to develop goals and implement strategies around energy efficiency and carbon reduction.

While peer to peer exchange is a key program strategy that will help meet the CPUC's long-term strategic energy efficiency goals, there is no formal tracking and reporting of these activities. The CPUC is planning market assessment studies in addition to its statewide impact evaluations, so these evaluations may cover LGP peer to peer exchange. The LGPs themselves may be best suited to characterize their local market and government in terms of energy efficiency, assess local needs and gaps in services, and to develop a program theory for peer to peer exchange and energy efficiency capacity building (discussed in a subsequent section).

There are substantial opportunities to expand LGP program peer to peer exchange – within partnerships and local governments and across LGPs. There are a few LGPs that are very sophisticated in terms of energy efficiency, and their local governments have dedicated departments dealing with energy efficiency and/or related issues such as sustainability or the environment. Even those LGPs say that there are more opportunities to expand the knowledge of city staff that are in related departments. For example, local governments may have several departments dealing with issues related to energy efficiency, and LGPs can be tapped to be sure each department is leveraging existing resources and coordinating with each other.

There exists additional opportunities among the many local governments that do not have substantial energy efficiency expertise – with the potential for LGPs in those areas and other LGPs that are up further up the learning curve to transfer information. The major barriers to taking advantage of these opportunities are budget, local government institutional barriers and lack of opportunities for LGPs to exchange information with each other. The budget barrier is pervasive across all non-resource activities, because as explained previously the programs goals are around energy savings. The institutional barriers are also significant, but LGPs are probably the best suited to address them as compared to other energy efficiency programs. LGPs also have limited opportunities to formally engage in peer exchange with each other.

Energy Audits for End-Use Customers

LGPs may provide energy audits to end-use customers, typically as a mechanism that will lead to the installation of energy efficiency measures. They try to target residential and non-residential segments that they feel are not being reached by the statewide audit programs, which are marketed to the residential mass market and to business customers in various ways. Other utility and third party programs offer audits to business customers, and the extent to which these programs overlap and are coordinated with similar LGP services depends on the location. As described in the Phase 1 report findings (Section 4.2), PG&E's programs are often coordinated on an ad hoc basis.

The expected outcome of this activity is residential and non-residential customer participation in an audit, which typically collects information about the customer's home or business, provides information about how their energy usage is allocated across end-uses, and recommend taking measures to save energy through changes in behavior and installation of higher efficiency equipment. Along with an audit report, the LGP may also provide and/or install free energy efficiency measures such as CFLs.

The expected impacts from providing home energy audits to residential customers, based on results of an evaluation of the Statewide 2004-2005 Home Energy Efficiency Survey program[69] are:

- Customers increasing their understanding of energy efficiency
- Customers inquiring about, and participating in, other energy efficiency programs
- Customers increasing their satisfaction with their energy bills
- Customers adopting measures and practices as a result of the report
- Customers reducing their energy and demand usage.

The expected impacts from providing home energy audits to non-residential customers, based on results from the 2002 Statewide Nonresidential Audit Program Evaluation[70] are moving participants towards greater energy efficiency knowledge, increasing participant awareness of opportunities and intentions to invest in energy efficiency, and increasing participant measure adoption rates.

LGPs report on the number of audits they conduct in their regular CPUC reports, much as they report on marketing activities. They do not claim energy savings for them, except in the case that a customer received a rebate for a measure they installed or they installed CFLs in conjunction with the audit. It is likely that LGP audits will be evaluated through the statewide CPUC-managed impact evaluations, which should include customer surveys. There is an opportunity for these evaluations to leverage the Statewide residential and non-residential audit program evaluations, which have been conducted for many years and provide context and information about program and market characteristics that will be important to include in any future evaluation.

LGPs tend to use audits to sell other program services. Some LGPs also see the residential audits as a way to reach the mass market and provide them with a basic service, and they may provide CFLs after the audit. There are opportunities to provide more audits in both sectors, however other overlapping programs also offer the same service. For example, the Statewide

[69] Process Evaluation of the 2004-2005 Statewide Home Energy Efficiency Survey Program, Opinion Dynamics, Megdal and Associates, EPRI Solutions, January 2007, prepared for the CPUC and the California CPUC, managed by SCE.

[70] 2002 Statewide Nonresidential Audit Program Evaluation, Quantum Consulting, March 2004, prepared for the California IOUs, managed by PG&E.

residential audit service is available for free to any IOU customer. To determine whether LGPs should do more or less audits would require an assessment of each geographical area in terms of participation in statewide and third party programs and LGPs. The major barrier to expanding LGP audits is budget, since they do not claim savings for this activity.

General Energy Efficiency Education through Marketing and Outreach

The target market for the LGPs' general energy efficiency education is all residents and businesses – but mostly specific community groups are targeted based on the types of events being held in the area. Often the segment is a hard-to-reach group based on income, ethnicity and/or language (for residential customers) and small businesses. There is overlap with other energy efficiency programs, to the extent that staff from other programs attend the same event. LGPs do attempt to coordinate event attendance with staff from the other programs they know about, but in some areas there are so many overlapping programs that coordination is not always possible.

The expected outcomes are providing some verbal and/or written information to community members on energy efficiency and programs for which they might be eligible. The expected impacts are increased awareness and knowledge of energy efficiency, and possibly changes in behaviors related to energy efficiency.

LGPs track and report on the community events that they attend as well as the marketing materials that they disseminate. It is uncertain how this activity will be evaluated since it does not directly lead to energy savings and will not likely be a focus of the CPUC impact evaluation. The Statewide Marketing and Outreach program evaluation may implicitly include it due to the overlap of activities.

LGPs tend to prioritize the attendance of community events to disseminate marketing materials and provide energy education to various customer segments. This mechanism is a primary delivery strategy for LGP due to its ability to leverage its community ties and easy access to events. The main constraint to expanding LGPs coverage in this area is budget.

Marketing and Outreach

The objective of marketing and outreach activities that are conducted by LGPs is increasing residential and business customer awareness of energy efficiency in general and of energy efficiency programs – LGP and others – for which they are likely to be eligible. LGPs utilize their existing community relationships and communication channels to perform outreach and market

their program. LGPs also market the other energy efficiency programs that are available in the area, including PG&E core and third party programs. The value that the LGPs bring is being able to leverage their community relationships and target specific communities with a tailored message. LGPs are also well suited to outreach to communities that are hard-to-reach by the Statewide programs, since they typically have partnership members that serve hard-to-reach customers such as non-English speakers, renters and small businesses. They also have additional direct communication channels with residents and businesses.

The target market for LGP marketing and outreach is typically all residential and business customers in the geographic area covered by the LGP. The programs are intended to emphasize areas and/or segments that the LGP program services are designed to serve, which typically are areas and segments that the Statewide programs may miss. LGPs coordinate with other energy efficiency program marketing and outreach. For example, LGPs obtain other energy efficiency program collateral as well as brochures on energy efficiency (English and other languages) and hand those out at community events. Most LGPs have spent a considerable amount of time coming up to speed on the overlapping programs in their area so that they can make all resources available to their customers, so marketing and outreach activities are typically very coordinated and leveraged with few redundancies.

It is difficult to tell how effective LGPs are in expanding participation in other energy efficiency programs through their marketing and outreach activities. This could be an activity that could be expanded in some or all areas, but should be tracked to allow for oversight. LGPs already report on the events their staff attend, the target segments and the materials handed out. They could expand their tracking and reporting to attempt to capture referrals to other programs. (We recommended that PG&E develop a program implementation tracking system in the Phase 1 report.)

Evaluation of LGP marketing and outreach should be coordinated with evaluation of the Statewide Marketing and Outreach program, as well as other Statewide IOU program evaluations that address program marketing. Currently, the IOU LGP process evaluations are the only studies that will address these activities since the CPUC impact evaluations will focus on resource activities.

Codes and Standards

The codes and standards activities conducted by PG&E's LGPs include:

- Increasing enforcement of existing energy codes
- Increasing compliance of existing energy codes
- Developing local standards that exceed existing statewide and/or federal energy codes.

The target market for codes and standards is broad – addressing code enforcement (such as city or county building inspectors), standards development (which may include a broad range of local government staff), code compliance (residential and business customers) and marketing and outreach to customers who will be effected by new local standards. LGP codes and standards activities overlap with and leverage the Statewide Codes and Standards program because LGP activities are designed to use the existing statewide codes as a point of departure. A recent study determined that code compliance is very low across the state, ranging from 72% for residential hard-wired lighting to 0% for non-residential duct testing and sealing[71] and so LGP work in that area is of great value in terms of realizing the potential savings from existing state codes and standards (i.e., Title 20 for appliances and Title 24 for buildings). Local standards are typically designed to reach beyond state (or federal) standards, with the intention to lead the market and disseminate successful standards to nearby regions and eventually statewide.

LGP work on codes and standards may lead to several possible outcomes and impacts:

- Increasing enforcement leads to higher compliance, which leads to energy savings
- Increasing compliance leads to more energy savings
- Methods to increase both enforcement and compliance also generate broad market effects by raising awareness and knowledge and addressing attitudes and changing behaviors related to energy efficiency
- Developing tighter local standards leads to energy savings and market development.

These outcomes are valuable in terms of both immediate energy savings and long-term market change.

[71] Statewide codes and standards Market Adoption and Noncompliance Rates, Quantec LLC and The Benningfield Group , 5/21/2007, prepared for Southern California Edison Company.

LGPs that have existing energy efficiency expertise are the most likely to engage in codes and standards activities. There are major opportunities for expanding codes and standards activities. Few LGPs engage in this work and those that do would like to do more. As mentioned above, compliance with existing codes is far below 100%. Likewise, there are opportunities to expand local work in developing standards that reach beyond code. LGPs provide a unique combination of skills and access to local government data and local communication channels that can be tapped to do a lot more work in this area. There are also great opportunities for the more sophisticated LGPs to share their knowledge and experience with respect to code compliance and standards development with new LGPs.

The major constraint for LGPs that have the capability to advance code compliance and enforcement and develop new local standards is budget. Since no savings are claimed for this type of activity, LGPs who want to do this work have to use a combination of LGP program non-resource funding (such as marketing and outreach budget) and local government resources while still maintaining their target cost-effectiveness. Another constraint is the LGP contract – at least one LGP has the capability and is well-suited to advance code compliance and local and regional standard development, but their 2006-2008 contract excludes these activities. Another constraint is the current regulatory context, which implicitly assumes that once a standard is put in place there is no further opportunity for energy savings through energy efficiency programs. LGPs are not allowed to offer rebates for measures addressed by local standards, and they may not get credit for energy savings once a local standard is put into place – even though local code compliance is expected to be very low at first.

There also exist local government institutional barriers such as building inspectors lacking awareness and not prioritizing energy efficiency codes. There are also market barriers, with lack of customer awareness and market infrastructure to support widespread code compliance.

Codes and standards work is not currently tracked or reported. These activities may be evaluated as part of the CPUC impact evaluation and/or market effects studies. In order to assess LGP progress in this area, it would be most useful to establish local baseline conditions and measure progress against those.

Energy Efficiency Capacity Building

The energy efficiency capacity building activities conducted by PG&E's LGPs include both building capacity within the local government and transferring capacity across local governments. Like local codes and standards work, local government energy efficiency capacity building adds value in terms of long-term market change that supports the ability to make

substantial changes that will lead to deep, broad and sustainable energy savings. The expected outcomes and impacts include:

- Raising awareness of general energy efficiency and energy efficiency programs among local government staff leads to increased program participation, energy savings and broad market change
- Building capacity creates linkages and relationships between local government departments and staff that deal with areas related to sustainability that leads to broad market change
- Training and adding energy-experienced local government staff helps make more effective market change
- More resources increases the local government's ability to set an example for the community by implementing energy efficiency and sustainable practices.

The target market for this type of activity is mostly local government staff – where there already exist staff that deal with energy efficiency or related topics such as sustainability, carbon reduction/global warming, environment or water; building operators and inspectors; and other government staff working in related areas.

Clearly there are major opportunities to expanding LGP efforts to build capacity since little of this work is occurring and we already identified that most local governments are lacking in energy efficiency staff and capabilities. The barriers to building energy efficiency capacity at the local government are lack of funding and the fact that this effort requires a commitment of substantial resources, coordination at the local government level and a clear mandate. Finally, most of the expected outcomes from these activities are long-term and do not lead to immediate, measurable energy savings.

Energy efficiency capacity building is not currently tracked or reported. As with codes and standards work, these activities may be evaluated as part of the CPUC impact evaluation and/or market effects studies. In order to assess LGP progress in this area, it would be most useful to establish local baseline conditions and measure progress against those.

Logic Model

Figure 1 below presents a visual representation of a generic program theory for LGP non-resource activities. Each individual LGP in actuality has its own unique local program theory that

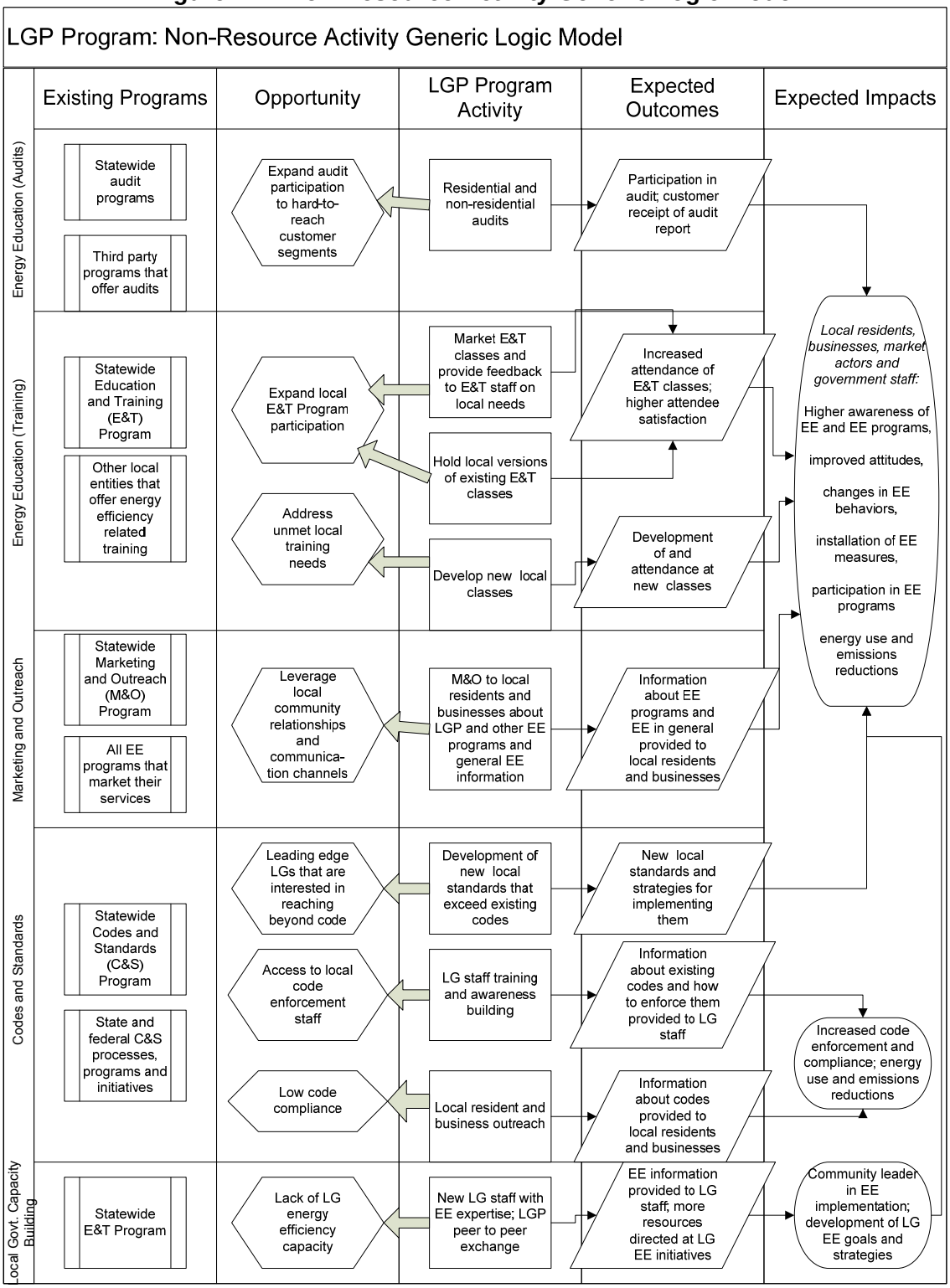
emphasizes certain activities based on their unique context, local needs and partnership characteristics.

The columns from left to right are as follows:

- **Existing Programs**: the boxes indicate existing IOU or programs or activities that address the subject area at left
- **Opportunity**: the shapes indicate a gap in program offerings or opportunity that the LGP program could address
- **LGP Program Activity**: a description of the activity that the LGP program engages in to take advantage of the opportunity listed in the prior column
- **Expected Outcomes**: what is expected to follow directly as a result of the LGP program activity
- **Expected Impacts**: what types of effects are expected as a result of the outcomes listed in the prior column.

In Figure E-1 below, we abbreviated local government as “LG” and energy efficiency as “EE”. And “Statewide programs” refer to programs that are implemented by the state’s IOUs – PG&E, SCE, SDG&E and SoCalGas.

Figure E-1: Non-Resource Activity Generic Logic Model



Conclusions and Recommendations

There are a broad range of non-resource activities that are conducted by LGPs including the following:

- *Energy education:*
    - Marketing PG&E's Education and Training classes that are offered through its two energy centers to customers and providing input on customer needs and wants to the centers' program managers.
    - Holding local versions of existing training center classes.
    - Developing local classes for specific customer segments based on their needs, where PG&E's energy centers and other local training resources do not already fill the need.
- *Marketing and outreach*: mass and target marketing of LGP and other energy efficiency programs and services.
- *Codes and standards:*
    - Increasing enforcement of and compliance with existing codes.
    - Development of local standards that exceed existing statewide and/or federal codes.
- *Energy efficiency capacity building:*
    - Building capacity within the local government.
    - Transferring capacity across local governments.

Many non-resource activities that LGPs engage in are very important for local governments to meet their goals of serving the community and achieving broad, deep and lasting energy savings. These activities are also important to achieving the vision for local governments outlined in the state's long-term strategic plan. However, the 2006-2008 LGP program is evaluated (and the IOUs are incentivized) based on immediate, measurable energy savings, which are not claimed for non-resource activities. The CPUC and IOUs are making steps to change this by encouraging innovation and emphasizing market-based programs and net impacts in the 2009-2011 programs.

Even though non-resource activities are not associated with direct savings claims, most of these activities are generating impacts that are likely to lead to energy savings in the short- and long-term. Some examples of the expected impacts from LGP program non-resource activities are:

- Increased participation in LGP, IOU and third party program resource components that lead to immediate, measurable energy savings
- Increased awareness, improved attitudes and changes in behaviors related to energy efficiency among end-use customer and market actors – particularly those that have not been reached by the Statewide IOU programs
- Increased awareness of energy efficiency and improved ability for local government staff to lead the community in energy efficiency project adoptions
- More effective local energy code enforcement and increased code compliance
- Development of local standards that exceed existing codes and dissemination of those standards regionally and statewide
- Additional energy efficiency capacity within local government and transfer of capacity across local governments, providing increased ability to develop local goals and implement strategies around energy efficiency and related areas.

Most LGP program non-resource activities are closely coordinated with and leverage existing energy efficiency programs. As identified in the first phase report, the LGPs spend substantial resources:

- figuring out the overlapping programs in their area,
- effectively leveraging those resources,
- raising awareness about the other programs and
- designing their service offerings to complement the existing ones.

There are substantial opportunities for expanding LGP program non-resource activities to achieve greater impacts in the short- and long-term. Some examples follow, organized by type of activity:

- *Energy education:*
    - Hold additional local energy efficiency classes and informal training events
    - More effective coordination with the Statewide Education and Training program to enhance existing course offerings and expand them to better meet customer needs
    - More peer to peer exchange within and across LGPs
- *Marketing and outreach*: more effective leveraging of community relationships and communication channels to raise awareness of and increase participation in LGP and other energy efficiency program services
- *Codes and standards:*
    - More training for local government staff involved in enforcing existing energy codes
    - More community outreach to increase residential and business energy code compliance
    - Creation of more local standards that exceed existing energy codes and dissemination of these standards regionally and statewide
- *Energy efficiency capacity*: expansion of energy efficiency capacity within and across local governments.

The primary barrier impeding the expansion of all non-resource activities is lack of budget, given that in the 2006-2008 program cycle non-resource activities are deemphasized compared with prior program cycles. Going forward, PG&E is encouraging innovation in their 2009-2011 LGP program solicitations, which addresses most if not all of the non-resource activities described in this report.

Whether and to what extent individual LGPs should initiate, expand or contract specific non-resource activities depends on the conditions in their local area such as the level of awareness and adoption of energy efficiency measures among residents, businesses and local government staff; the level of participation in other energy efficiency programs; and the awareness and availability of local resources for the community and local government staff. There is a lot of variation in these conditions across the state due to varying geographic location, socioeconomic conditions, population density, climate and existing energy efficiency program-related infrastructure to name a few of the relevant factors.

Some non-resource activities are tracked in the regular IOU and CPUC reports, but not all. Evaluation of these activities may happen during the CPUC sponsored Statewide impact evaluations and market effects studies. However, **LGP program non-resource activities should be evaluated in a market effects framework, which would benefit from the development of local program theories and logic models.**

There are opportunities to expand the level of coordination of LGP program evaluation with Statewide evaluations of related programs such as Codes and Standards, Marketing and Outreach and Education and Training.

In addition to the recommendations we already provided in our Phase 1 report, we suggest that PG&E consider the following recommendations:

- ***Work with each LGP to develop a local program theory*** – which will assess:
  - Penetration of energy efficiency measures (and/or historic participation in IOU programs)
  - Availability of and ease of access to existing energy efficiency resources including energy efficiency programs (such as availability of local training classes and contractors) across sectors and subsectors (such as moderate income residents and small businesses)
  - Unique local advantages, opportunities and resources
  - Local unmet needs
  - Theory of how the LGP program will address local unmet needs, including leveraging of and coordinating with existing resources.
- ***Use the local program theories to inform 2009-2011 program strategies and as a tool to help evaluate the LGP program***.
- ***Collaborate with the other Statewide programs*** and make sure activities are as coordinated and leveraged as possible***.***
- ***Coordinate LGP program evaluation with the Statewide IOU program evaluations.***
- ***Create more opportunities for LGPs to formally exchange*** information including in-person meetings and/or an electronic clearinghouse.

- ***Ensure that the 2009-2011 LGP program contracts do not explicitly limit LGPs abilities to engage in non-resource activities*** such as energy efficiency training and codes and standards work.
- ***Continue in the 2009-2011 program planning process to encourage LGPs to offer innovative and market-based program strategies*** that will lead to deep, broad and lasting energy savings and market change as outlined in the state's strategic energy efficiency plan.
- ***Continue working with the CPUC to ensure that the evaluation framework is supportive of LGP programs that are designed to realize the strategic plan's vision for local governments.***

Partnership Staff Interview Guide

Introduction

Overview of Phase II portion of the evaluation and KEMA's role. This second phase of research intends to gather more detailed information on program activities where immediate energy savings are not claimed. We intend to provide PG&E and the CPUC with a deeper understanding of:

- The range of non-resource LGP program activities that are currently being implemented, the amount of resources spent on each activity, and their expected outcomes in terms of immediate energy savings and long-term local government energy efficiency capacity building;
- What information is being collected to help monitor and evaluate each non-resource activity's effectiveness, and opportunities for expanding measurement activities;
- Which customer segments are being targeted and the rationale for selected customer targets; and
- How non-resource program activities relate to similar PG&E core or third party program offerings (e.g., are they overlapping, coordinated, redundant, and/or leveraged).

Codes and Standards

- What types of activities (if any) does this LGP do towards supporting local government codes and standards development?

  [If there are C&S activities]

  - What resources are used across the LGP – the utility, contractors and local government (staff and other resources)? Approximately what fraction of LGP labor hours are devoted to these activities, by partner?
  - What expertise does LGP staff bring to this activity?
  - Are all the LGP staff strengths being utilized? Are all the utility, contractor and local government resources being tapped? If not, why not?
  - What are the expected benefits in terms of short-term energy savings, long-term energy savings and other from codes and standards support? Are these benefits claimed by any other programs?
  - How might these benefits be quantified and tracked?
  - If the LGP was not doing work in this area, what would happen? Would other local government or other program resources be used to fill the gap?

- Could the LGP do more in this area? If yes, what additional activities could it be doing? What are the expected benefits? What are the barriers to doing more?

[If there are no C&S activities]

- Is there a need for this LGP to support codes and standards development for this local government? What types of benefits might be accrued? How much energy savings? Would these energy savings overlap with any other programs?

Energy Education

- What types of activities (if any) does this LGP do relating to energy education, e.g., offering local training classes? [*We can obtain the # of classes offered, name of classes and # of attendees from program filings – so we just need a generalization of the types of classes offered, the target audience and the volume of classes and attendees.*]

  [If there are energy education activities]

  - What resources are used across the LGP – the utility, contractors and local government (staff and other resources)? Approximately what fraction of LGP labor hours are devoted to these activities, by partner?
  - What expertise does LGP staff bring to this activity?
  - Are all the LGP staff strengths being utilized? Are all the utility, contractor and local government resources being tapped? If not, why not?
  - What are the expected benefits in terms of short-term energy savings, long-term energy savings and other from energy education training? Are these benefits claimed by any other programs?
  - How might these benefits be quantified and tracked?
  - If the LGP was not doing work in this area, what would happen? Would other local government or other program resources be used to fill the gap?
  - Could the LGP do more in this area? If yes, what additional activities could it be doing? What are the expected benefits? What are the barriers to doing more?

  [If there are no energy education activities]

  - Is there a need for this LGP to provide energy education in this jurisdiction? What types of benefits might be accrued? How much energy savings? Would these energy savings overlap with any other programs?

Marketing and Outreach

- What types of marketing and outreach (M&O) activities (if any) does this LGP do?

  [If there are M&O activities]

  - What resources are used across the LGP – the utility, contractors and local government (staff and other resources)? Approximately what fraction of LGP labor hours are devoted to these activities, by partner?
  - What expertise and resources do the various partners bring to this activity?
  - Are all the partners' M&O capabilities being taken advantage of? Are all the utility, contractor and local government resources being tapped? If not, why not?
  - What are the expected outcomes from M&O activities? What are the expected benefits in terms of short-term energy savings, long-term energy savings and other? Are these benefits claimed by any other programs?
  - How might these benefits be quantified and tracked?
  - If the LGP was not doing M&O, what would happen? Would other local government or other program resources be used to fill the gap?
  - Could the LGP do more in this area? If yes, what additional activities could it be doing? What are the expected benefits? What are the barriers to doing more?

  [If there are no M&O activities]

  - Is there a need for this LGP to provide M&O in this jurisdiction? What types of benefits might be accrued? How much energy savings? Would these energy savings overlap with any other programs?

Local Government Energy Efficiency Capacity

- What is the existing energy efficiency capacity at this local government? (E.g., are there staff dedicated to energy efficiency, does the government have goals related to energy efficiency.) What is the driver of energy efficiency efforts for this local government? E.g., greenhouse gas reduction, sustainability, urban planning/green building, waste management, water resource management, etc.
- What types of activities (if any) does this LGP do to add to the existing capacity (such as educating staff, making them aware of utility or other resources, linking to existing programs, helping develop goals relating to energy efficiency, etc.)?

[If there are EE capacity-building activities]

- What resources are used across the LGP – the utility, contractors and local government (staff and other resources)? Approximately what fraction of LGP labor hours are devoted to these activities, by partner?
- What expertise does LGP staff bring to this activity?
- Are all the LGP staff strengths being utilized? Are all the utility, contractor and local government resources being tapped? If not, why not?
- What are the expected benefits in terms of short-term energy savings, long-term energy savings and other from EE capacity building? Are these benefits claimed by any other programs?
- How might these benefits be quantified and tracked?
- If the LGP was not doing work in this area, what would happen? Would other local government or other program resources be used to fill the gap?
- Could the LGP do more in this area? If yes, what additional activities could it be doing? What are the expected benefits? What are the barriers to doing more?

[If there are no EE capacity-building activities]

- Is there a need for this LGP to support EE capacity building for this local government? What types of benefits might be accrued? How much energy savings? Would these energy savings overlap with any other programs?

Customer Targets for Resource Activities

- What are the residential customer targets for resource activities (e.g., direct install, retrofit, energy audits) conducted by this LGP? (E.g., moderate income, rural) How are these targets implemented? (E.g., viewing income documents, zip codes for rural, etc.) Are these targets tracked and reported?
- Does this LGP overlap with core, third party, low-income or other energy efficiency programs for residential customers? If yes:
  - How do the programs overlap?
  - How are the programs coordinated? Are the service offerings the same? If different, how so?
- What are the non-residential customer targets for resource activities (e.g., direct install, retrofit, energy audits) conducted by this LGP? (E.g., size, segment, geographic area) How are these targets implemented? (E.g., self-reporting of size, geographic targeting such as zip codes, etc.) Are these targets tracked and reported?
- Does this LGP overlap with core or third party programs for non-residential customers? If yes:

- How do the programs overlap?
- How are the programs coordinated? Are the service offerings the same? If different, how so?

Appendix F: Partnership Staff Interview Guide

Interview Topics

Introduction

- [I'll introduce myself and explain the evaluation and KEMA's role]
- What organization do you work for? What does your organization do?
- What is your position at that organization? How long have you been at this organization? [If less than 5 years:] What is your background?

Partnership Objectives and Rationale

- What do you see as the overall objectives for the partnership? And specifically what are your [PG&E/local government/implementation contractor's] objectives?
- What are the benefits of local government partnering with utilities to deliver energy efficiency programs? Are there any drawbacks to this approach?

Partnership Organization

- Describe your entity's [PG&E/local government/implementation contractor's] role and responsibilities in the partnership. What is your individual role and responsibilities?
- Describe how this partnership is managed – what are the roles and responsibilities of the other entities that are in the partnership?
- What are the strengths and weaknesses of each of the partners?
- Is the partnership effectively designed in terms of the division of responsibilities? Are contractors used effectively?
- Are the strengths of the local government emphasized? And are their weaknesses minimized? What about the strengths and weaknesses of PG&E? Of contractors?
- In your opinion what would the optimal partnership design be? How would local government, utility and implementation contractor staff be best utilized?

Energy Efficiency Program Services – AMBAG

- [Explain that we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions. So we're up to speed with regard to program plans and program accomplishments to-date.]
- Direct install – residential customers:
    - What types of residential customers are targeted by the program for direct installation services? How was that target selected (e.g., if they are an under-served group how did you know they were under-served)?

    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – small hotels and motels:
    - How was the small business direct install target selected (e.g., if they are an under-served group how did you know they were under-served; were other business types considered)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Home buyers:
    - How is this component of the program progressing?
    - Is this component of the program effectively designed to reach home buyers and the market actors that serve them? How could it be improved?
    - What % of the program's energy savings to-date is from this component?
    - Were there any other non-energy savings goals for this program component? Are they being met?
- Municipalities:
    - The program has identified and committed some muni projects but none have been completed (as of 2007:Q3) due to the complexity of the projects. Was this a surprise that these types of projects would take so long to complete?
    - What are the specific barriers that municipal customers face in terms of installing EE measures? Is the program effectively designed to address these?
    - The program is expanding its direct install services to address this sector. How will the direct install approach work on this market? How will it address the specific needs of this market?
- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?

    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
- General
    - Is the program doing any work with respect to codes and standards?
    - Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
    - Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Energy Efficiency Program Services – City of San Francisco

- Note that as part of the evaluation, we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions.
- Direct install – residential customers:
    - What types of residential customers are targeted by the program for direct installation services – all multi-family dwellers? How was that target selected (e.g., if they are an under-served group how did you know they were under-served)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?) Will the program be able to catch up and meet its energy savings goals by end of 2008?
- Direct install – small business:
    - How was the small business direct install target selected (e.g., if they are an under-served group how did you know they were under-served; were other business types considered)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?

    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?) Will the program be able to catch up and meet its energy savings goals by end of 2008?
- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?
    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
- General
    - Is the program doing any work with respect to codes and standards?
    - Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
    - Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Energy Efficiency Program Services –City of Fresno

- Note that as part of the evaluation, we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions.
- Direct install – residential customers:
    - What types of residential customers are targeted by the program for direct installation services? How was that target selected (e.g., if they are an under-served group how did you know they were under-served)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?

    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – small business:
    - How was the small business direct install target selected (e.g., if they are an under-served group how did you know they were under-served; were other business types considered)?
    - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
    - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
    - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
    - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Municipalities:
    - The program has identified and committed some municipal projects but none have been completed (as of 2007:Q3). What have been the constraints to getting more municipal projects? And getting any completed?
    - What are the specific barriers that municipal customers face in terms of installing EE measures? Is the program effectively designed to address these?
    - Do you expect to get more projects completed by the end of the project? What new strategies are being tested?
    - Does the partnership have the right local government contacts engaged? Is there a dedicated staff person you work with? Does the government have enough resources with the right skills to help get projects identified and followed through?
    - What other barriers exist at the local government level to implementing these projects? How might the program (or other programs/strategies) better address those?
- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?
    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
- General
    - Is the program doing any work with respect to codes and standards?

- Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
- Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Energy Efficiency Program Services – East Bay

- Note that as part of the evaluation, we reviewed the partnership's monthly and quarterly filings to the CPUC as well as the program descriptions.
- Direct install – residential customers:
  - Describe what CYES does to target residential customers to provide program services. What is the target market and how was that target determined? What services are provided?
  - Based on the program's experience, is this market truly under-served? Is this the right target market for the program?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – BEST:
  - Describe what KEMA/BEST does to target small business customers to provide program services. What is the target market and how was that target determined? What services are provided?
  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Direct install – Smart Lights:
  - Describe what Smart Lights does to target small business customers to provide program services. What is the target market and how was that target determined? What services are provided?

  - Based on the program's experience, is this audience truly under-served? Is this the right target market for the program (e.g., should it be expanded)?
  - Is the program effectively reaching the target market? Are there barriers to identifying or reaching them? How about barriers in getting them to participate in the program?
  - How might this component of the program be improved to better reach the target market and entice them to participate? Are there external constraints that exist that inhibit program success?
  - Is the program achieving what it expected in terms of energy savings from this component? (What % of energy savings achieved by the program to-date is from this component?)
- Municipalities:
  - Does this partnership target city and county facilities? If so, has any progress been made in terms of identifying projects and installing EE measures?
  - What are the specific barriers that municipal customers face in terms of installing EE measures? Is the program effectively designed to address these?
  - Do you expect to get more projects completed by the end of the project? What new strategies are being tested?
  - Does the partnership have the right local government contacts engaged? Is there a dedicated staff person you work with? Does the government have enough resources with the right skills to help get projects identified and followed through?
  - What other barriers exist at the local government level to implementing these projects? How might the program (or other programs/strategies) better address those?
- Energy clinics and classes:
  - Does this partnership offer any energy training courses (like other partnerships)? If not, why not? Might the partnership benefit from adding this component?
- Home buyers:
  - How is this component of the partnership working? Has any progress been made? What are the constraints to making this component work?
  - What are the long-term goals of this component? Are the program services being offered now going to help reach these long-term goals? What needs to happen to meet the long-term goals?
- General
  - Is the program doing any work with respect to codes and standards?
  - Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
  - Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Direct Install

- How much does the program rely on direct install to meet energy savings goals?

- How is the program doing in terms of meeting goals - and how do the direct install services factor into program success or failure?
- What are the benefits and drawbacks of direct install versus other services provided by LG partnerships?
- How do direct install services compare to other services in terms of cost-effectiveness? What other non-energy benefits does direct install provide? Do the programs have the right amount of direct install or should they have less or more? Why?
- Should the LGPs continue to include direct install going forward? Why? Should there be any changes made with respect to how the programs use the direct install approach?

Market and Outreach – City of San Jose only

- Energy clinics and classes:
    - Describe the training classes that the program offers – the topics covered, target market, typical level of attendance.
    - How are these trainings coordinated with the PG&E energy centers?
    - What benefits do training participants receive (both energy and non-energy)?
    - What short and long term effects do the courses have? Are these effects measured? If not, could they be and how might they be?
    - How important are training activities as part of a broader energy efficiency programs? Does it make sense to spend limited resources on trainings (versus other activities that lead to short-term energy savings)? How should these activities be justified?
    - How might these services be improved going forward?
    - What type of information is collected from training attendees? May we survey training participants?
- Marketing and outreach
    - What value does the program provide to Santa Clara residents, business and municipalities? What are the outcomes?
        - Do you feel that the program is effective in increasing participation in other EE programs? What are its most effective strategies for doing so?
        - What barriers exist for participating in an EE rebate program? How does the program help overcome these barriers? What barriers does it not address?
    - Does the program collect any information on its marketing and outreach targets so that its success could be measured? What information could it collect in the future to improve its ability to track its impacts?
        - We'd like to attempt to survey PG&E customers that were likely targets of the program's marketing and outreach to measure program outcomes and determine whether any energy savings occurred. [Discuss what information is available to assist this effort.]
    - Would the program (and Santa Clara constituents) benefit from including EE rebates? Would there be any drawbacks? How would such a program be designed (e.g., use of an implementation contractor)?
- General
    - Is the program doing any work with respect to codes and standards?

- Are there other opportunities for energy savings (both short- and long-term) that the program could take advantage of?
- Is the program capturing the benefits it is supposed to based on its partnership approach? Is it effectively utilizing the strengths of all of its partners to go above and beyond PG&E's core offerings? Is it offering the right mix of services to achieve the partnership goals?

Contracts and Management

- How would you describe the contracting process [between PG&E and the local government agency] for PY2006-2008?
- Were you satisfied with the amount of time the process took? How could the process be improved going forward? What are the constraints to improving this process?
- Were you satisfied with the terms of the contract (e.g., its specificity, flexibility, progress measurements, ability to measure and track success or failure)? How could the terms (or scope of work) be improved going forward? What are the constraints to improving it?
- Was this partnership continued from 2004-2005? If so:
  - Were there any major changes from 2004-2005 to 2006-2008? What were they?
  - The CPUC instituted new requirements for 2006-2008 contracts. Are those new rules being addressed by the 2006-2008 contract? If not, why not? And how can the program correct the problem now and going forward?
  - There was a 3 month gap between 2004-2005 and 2006-2008 contracts. How did this gap affect the program? How can these issues be minimized in the future?
- How would you characterize the amount of regulatory reporting your organization (and the partnership in general) has to do? How could the reporting aspect be improved?

Coordination

- Other PGC-funded energy efficiency programs operate in this jurisdiction including PG&E core programs. What are the main programs besides PG&E's core programs operate in your area?
- What are the benefits to having more than 1 program in place in your area? The drawbacks?
- How is this program coordinated with those other programs? I.e., do you routinely refer customers to the other programs and vice versa, are there specific procedures in place (in your program and the others) to prevent double dipping?
- Is coordination of programs being handled effectively both by your program and the others? How might coordination be improved? Are there any constraints to improving coordination?

Future Planning

- Do you think it makes sense to broaden the partnership's objectives to include demand response, sustainability/carbon reduction and renewable energy? Are there any potential drawbacks from expanding beyond energy efficiency?
- What other issues should policymakers consider as future programs like these are being planned?

Appendix G: PG&E RCA Savings Estimates

KEMA has been asked to review the data assembled from applications submitted by the Verified Service Providers (VSPs) that conducted refrigerant charge and airflow (RCA) adjustments to air conditioning (AC) units during 2006 and 2007. One of our tasks was to assess the viability of estimating the energy savings that were realized from these submissions regarding RCA adjustments made to residential and commercial air conditioning units. To this end, a preliminary literature search was conducted that included PG&E's current draft work papers regarding RCA adjustments. Furthermore, we reviewed one technical paper presenting "a methodology for estimating the range of uncertainty on savings from residential AC efficiency programs."[72] This review has led to our conclusion that the data provided thus far are not sufficient to estimate the energy savings with moderate certainty without considerably more effort. A more detailed discussion of this finding and our ensuing recommendations and work plan options follow.

Commercial RCA Savings

In PG&E's work paper[73] regarding energy savings at commercial sites, a method for estimating aggregate savings is provided for both existing and newly retrofitted air conditioning units. The change in energy consumption is based on the following factors:

- Cooling capacity of the AC unit,
- The energy efficiency ratio (EER) and
- An assumed reduction of 7% in diversified system demand.

In this work paper, climate zone is not taken into consideration. Instead, equivalent full load cooling hours (EFLH) are used assuming an average of 880 and range from 600 to 1,300 for various market sectors. The base case assumes an EER of 8 for existing commercial units and an EER of 9 for new units. The corresponding peak and annual savings are estimated to be as shown in the following table:

[72] Freeman, MS, Rachel, 2007. "Savings Uncertainties in Residential Air Conditioning Rebate Programs," Proceedings of the 2007 Energy Program Evaluation Conference. Chicago, IL.
[73] Pacific Gas & Electric Company (PG&E). *Commercial Refrigerant Charge & Airflow*. Work Paper PGE(3-HVC) S470 and T340. November 2007, Revision #1.

Table G-1:
Commercial Aggregate Savings per Cooling Tons

AC Unit	EER	Baseline kW/ton	Peak Savings Rate	Peak Savings, kW/ton	Sector Average EFLH	Annual Savings, kWh/ton
Existing	8	1.5	7%	0.105	880	92.4
New	9	1.3	7%	0.093	880	81.8

Residential RCA Savings

In PG&E's work paper regarding energy savings at residential sites[74], the savings method provided relies heavily on data provided by the DEER and RASS databases. The savings for the residential sector differ from the commercial in several important ways: the baseline is selected using the current California building code requirements set forth in Title 24; five different climate zones are accounted for, building type and vintage weightings are included, EER weightings are included based on California distributions, and refrigerant charge adjustments were weighted by dividing into two categories (<=20% adjustments and >20% adjustments).

[74] Pacific Gas & Electric Company (PG&E). *Residential Refrigerant Charge & Airflow*. Work Paper PGE(3-HVC) S470 and T304. November 2007, Revision #1.

Table G-2:
Residential Aggregate Savings per Cooling Tons

Climate Zone	Peak Savings, kW/ton	Annual Savings, kWh/ton
2	0.13	51.5
4	0.12	49.3
11	0.13	87.6
12	0.12	65.6
13	0.11	120.0

A paper by an independent consultant[75] calculates the demand savings using the predicted improvement to the EER as follows:

$$kW_{Savings,\ Unit} = kW_{Peak,\ Unit} \times (EER_{,\ Rated} - EER_{,\ pre\text{-}RCA})$$

The EER, pre-RCA, is often estimated using the "Normalized EER versus Charge and Outside Temperature" graph from an earlier report for PG&E76. This graph provides different curves depending upon whether the air conditioning unit has an orifice valve or a thermostatic expansion valve (TXV). Although it doesn't provide any means to distinguish between the two types of refrigerant valves, the following equation is sometimes used to estimate the EER, pre-RCA using the EER, Rated and the amount of refrigerant added/removed as follows77:

$$EER,_{pre-RCA} = \left[4.716 \left(\frac{Charge,_{Rated} + \Delta Charge}{Charge,_{Rated}} \right) - 4.704\, ln \left(\frac{Charge,_{Rated} + \Delta Charge}{Charge,_{Rated}} \right) - 4.175 \right] \times EER,_{Rated}$$

[75] Residential Air Conditioner Charge and Air Flow Verification Study Final Report, Architectural Energy Corporation, Prepared for Pacific Gas & Electric, August 2004.
[76] Influence of the Expansion Device on the Performance of a Residential Split-System Air Conditioner, January 2001, PG&E Report No. 491-01.1
[77] BEST Program AC Diagnostic and Duct Seal Final Report, KEMA Services, Inc., Prepared for PG&E, June 2005.

Regardless of which method is used to determine the $EER_{, pre\text{-}RCA}$ for a given air conditioning unit, the $EER_{, Rated}$ of the equipment at hand is needed to estimate the demand and annual savings. A previously cited paper (Freeman, 2007) was written about the building of a Crystal Ball model that included all of the performance and data uncertainties that can affect actual savings gained by energy efficiency measures for residential AC units. The model revealed the following major findings:

- Uncertainty in EER and operating conditions mean that demand savings could be anywhere from 2.5 times lower to 2 times higher than typically predicted;
- Not knowing the EER contributes the most variance in demand savings;
- Not knowing the EFLH contributes the most variance in energy savings; and
- Uncertainty in energy savings is much lower than uncertainty in demand savings.

Verified Service Provider Data

The data that have been provided to KEMA to estimate the energy savings for PG&E's RCA program in 2006 and 2007 include the following variables:

- AC Unit Cooling Capacity, tons
- AC Model Number
- Stamped Refrigerant Charge, psi.
- Refrigerant Charge Adjustment, psi.
- Airflow Adjustment, Yes or No
- Outside Temperature, °F
- Building Type
- Vintage Code
- Climate Zone.

Using only the above provided information, it is only possible to estimate the aggregate savings provided by the refrigerant charge adjustment based upon the two previously cited work papers. An estimate of the aggregate savings would include a high degree of uncertainty since only the rated capacity of the AC unit and the percent of refrigerant charge added would be taken into consideration. Such an effort would take approximately 6 hours to complete.

Enhanced Verified Service Provider Data

Given the findings presented earlier regarding energy savings uncertainties and industry best practices[78], determining the following information for each AC unit is recommended:

- Published EER value (collected from nameplate or product literature)
- Published SEER value (collected from nameplate or product literature)
- Name of AC Manufacturer
- Thermostatic Valve, TXV (Yes/No)

Unless it is possible to capture the above information from the rebate applications or other means available to PG&E, it will likely be necessary to search the Air-Conditioning and Refrigeration Institute (ARI) database or manufacturer websites/catalogs to learn the above information regarding each air conditioning unit. Doing so would make it possible to estimate the demand and annual savings for each of the AC units that received the RCA measure. If PG&E can provide the data listed above, then we estimate that performing the savings calculations for each air conditioning unit would take 12 hours.

If KEMA is given the task of gathering the above information from the ARI database and/or manufacturer literature, then considerably more effort will be required. Since there are more than 700 unique model numbers contained in the current data set, we estimate that collecting the above information for each of the unique AC units would take 120 hours. Again, once these data have been collected, we estimate that performing the savings calculations would take an additional 12 hours.

[78] Residential Air Conditioner Charge and Air Flow Verification Study, Task 4 Report, Technical Specifications and Best Practices for Charge and Air Flow Verification Services, Prepared for PG&E, August 2004.

Appendix H: PG&E Ad Tracking Study

Excerpt from 2008 ACEEE Summer Study Conference Paper, "Impacts of Advertising on Market Transformation: A Case Study of PG&E's 2007 CFL Marketing Campaign," Barbara Wingate, PG&E, Jennifer E. Canseco KEMA, Inc.

Ad campaign background

Much has been written about the sequential stages of persuasion, or a "hierarchy" of advertising effects. Attitude researchers Lavidge and Steiner (1961) illustrated how communications act to impact consumers, first via a cognitive stage (awareness or knowledge of the advertising and product), then an affective stage (when attitudes are formed and convictions established), then finally a behavioral stage (when action is taken). Pacific Gas & Electric Company (PG&E) conducted research in early 2007 that found a clear need for consumer education around compact fluorescent lamp (CFL) quality (Swirl Integrated Marketing, 2007). The challenge was that consumers perceived CFLs as having poor light quality compared to conventional incandescent bulbs, particularly among consumers who had never purchased CFLs and among infrequent purchasers of CFLs (as these consumers are unaware that CFL quality has improved over time). PG&E identified an opportunity to communicate that product quality has improved appreciably, thus affecting consumer attitudes and driving consumers to purchase PGE-discounted CFLs in retail stores.

The key to reaching PG&E's goal of increased retail sales of CFLs was *to make CFLs become more "mainstream."* Thus, a marketing strategy was devised to overcome negative light quality perceptions, as well as underscore the positive financial and environmental benefits of CFLs. In 2007, PG&E launched a four-month marketing campaign to promote CFLs using television, radio, and Internet advertisements. The ultimate goal of the campaign was to educate consumers about the benefits of CFLs and to drive them to purchase CFLs by looking for the PG&E discount sticker on products in retail stores.

The marketing campaign consisted of an integrated media plan (television, radio, online advertising and microsite) as well as a retail approach (collaboration with key CFL retailers) directing consumers to purchase CFLs bearing a PG&E discount sticker. The television and online ads featured a CFL and an incandescent lamp side-by-side talking with one another, and the television ads featured three executions in rotation with messaging concentrated on CFL light quality, environmental benefits, and money savings associated with CFLs. The campaign

ran from July through mid-November 2007, with ongoing events throughout October around the national Energy Star® "Change a Light, Change the World" campaign.

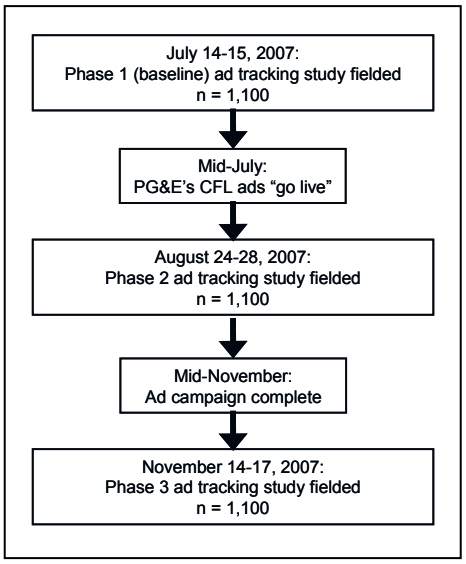
Study Background

PG&E commissioned a study tracking consumer awareness of the utility's CFL advertisements with three main objectives:

1. Track awareness of CFL ads over time (focusing primarily on PG&E's television ads);
2. Provide evidence that the CFL ads changed consumer perceptions of CFLs; and
3. Explore possible links between PG&E's CFL ads and PGE's in-store CFL promotions.

The study consisted of three phases. The first was conducted prior to the campaign's launch, the second approximately one month after the campaign went "live", and the third immediately following the end of the campaign. Figure H-1 provides an overview of the timing for the CFL ad campaign and the three phases of the tracking study.

Figure H-1. Timing of PG&E's 2007 CFL Ad Campaign and Tracking Study



Methods

The market research firm MarketTools fielded a web-based survey to gauge awareness of PG&E's television ads for CFLs. MarketTools has a panel of more than 90,000 customers in PG&E's service territory who are eligible to complete the online study. Each phase of the study was completed with a random selection of 1,100 PG&E customers, and phases 2 and 3 of the study excluded participants from prior phases.

For this study, MarketTools emailed an invitation to participate in the survey to panel members registered in zip codes within PG&E's service territory.[79] The e-mail invitation provided a link to the online study, which presented the respondent with one question at a time. Each question was followed by radio buttons (check boxes) on which respondents could click to indicate their response(s) to each question. Based on a respondent's answer selection for a particular question, the survey program skipped to the next relevant question (with the next question appearing on the screen in place of the previous question).

Web-based research is becoming increasingly popular, as it offers an economical approach for gathering data from a large number of respondents very quickly (Ritter and Sue, 2007). For the purposes of this study, however, the key advantage of web-based surveys over telephone surveys is that survey participants have the ability to view images of the advertisements on screen. For questions of this nature, the web-based method will likely generate more accurate responses than a telephone survey (in which the interviewer would have to describe the advertisement to the survey respondent).

Web-based survey respondent panels tend to be somewhat skewed toward consumers with higher income and higher levels of education than the general population, and panels also tend to over-represent Caucasians while under-representing African Americans and Hispanics (Market Concepts, 2006). Results are thus not entirely representative of PG&E's residential customer base, and caution should thus be taken when interpreting the results. However, because the primary purpose of the research was to track changes over time, and respondents were drawn from the same population group for all three phases of the study, the results are meaningful.

[79] Note that the survey also included a screener question to verify that each respondent was a PG&E electric customer. Surveys were terminated with respondents who could not confirm that their homes received electricity from PG&E.

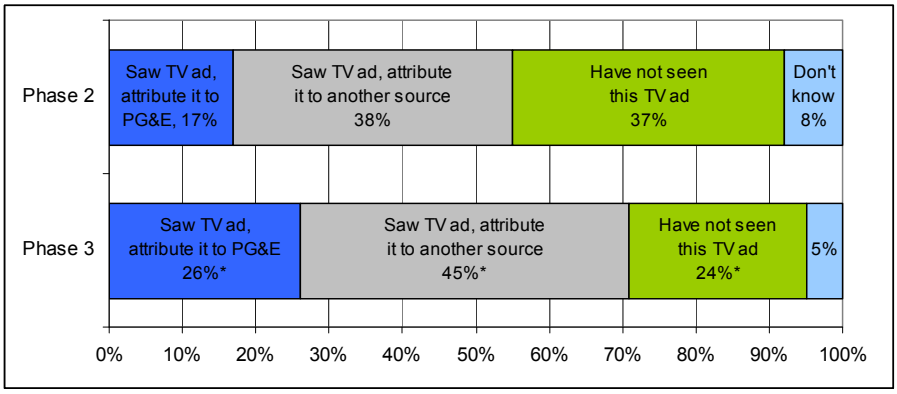
Key findings

This section presents key findings with regard to awareness of PG&E's CFL ads; changing consumer perceptions regarding CFL light quality, product quality, and light color; satisfaction with CFLs; and possible links between PG&E's ads and their in-store CFL promotions.

Awareness of PG&E's CFL ads

The web-based surveys showed a still image from one of PG&E's television ads during the second study phase, and based on this, approximately 55 percent of respondents reported having seen the ads. In phase 3, this proportion increased to 71 percent of the study participants (a statistically significant change at the 90 percent level of confidence).80 The proportion who reported that the ad was sponsored by PG&E (versus some other sponsor) also increased significantly between phases (Figure H-2). There were no other significant increases in attribution of CFL ads to other sources, indicating that PG&E ads may be the reason for increased awareness of CFL ads. Additionally, the longer the ads ran, the higher the proportion of respondents who correctly attributed the ads to PG&E.

Figure H-2: Prompted Awareness of PG&E Television CFL Ad and Attribution of Ad



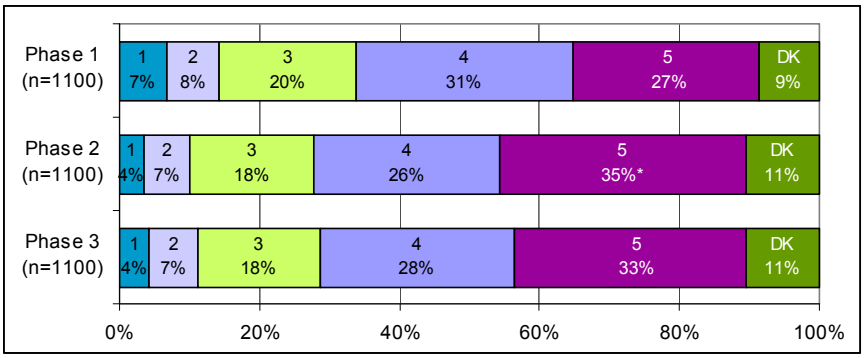
n=1,100. * Difference from Phase 2 is statistically significant.

[80] All statistically significant results are reported at the 90 percent level of confidence.

Consumer perceptions of CFLs

Quality of light from CFLs. Study results showed a significant increase in the proportion of survey respondents who “strongly agreed” with the positive statement, “CFLs provide good light quality” between study phases 1 and 2. This level of agreement was maintained in phase 3 (see Figure H-3).

Figure H-3: Agreement with the Statement, "CFLs Provide Good Light Quality" by Study Phase (Responses on a 5-point scale where 1 = "Strongly Disagree," 5 = "Strongly Agree")



* Difference from Phase 1 is statistically significant.

With regard to CFL light quality in particular, results show a significant difference in agreement with the statement "CFLs provide good light quality" among those who have seen CFL ads and those who have not seen any CFL ads (Table 1). As shown in the table, the proportion who of respondents who saw <u>any</u> CFL ad and "strongly agree" with the statement is 35 percent, compared with only 22 percent of respondents who saw reported that they saw <u>no</u> CFL ads (a statistically significant difference).

The table also demonstrates that significantly higher proportion of study participants who reported that they saw PG&E's television ad strongly agree with the statement than among participants who saw other television ads, but not PG&E's. These results suggest that the change may be attributable to PG&E's television ads.

Table H-1: Agreement with the statement, "CFLs Provide Good Light Quality" Among Phase 3 Respondent Groups (Responses on a 5-point scale where 1 = "Strongly Disagree," 5 = "Strongly Agree")

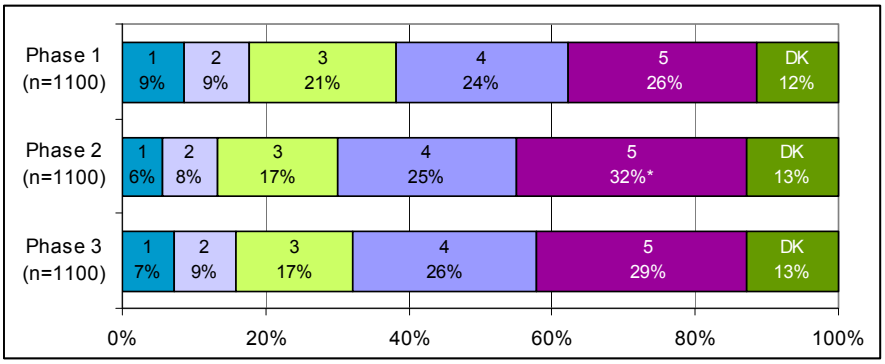
Phase 3 respondent group	% of Phase 3 respondents Who "strongly agree" (rating = 5)	
	%	n
Saw no CFL ads	22%*	140‡
Saw any CFL ad (unaided)	35%*	828
Saw PG&E television ad (aided w/ad image)	37%†	773
Saw television ad, but not PG&E ad	23%†	132

‡ These respondents were <u>not</u> excluded from subsequent aided awareness questions regarding PG&E's CFL ads; thus, the sum of respondents who have seen PG&E's ads plus those who have seen other ads is greater than the unprompted total reported ad viewers.

* † Difference between groups is statistically significant.

CFL quality. Study results show a significant increase in the proportion of survey respondents who "strongly agreed" with the positive statement "the quality of CFLs is just as good as regular light bulbs" between study phases 1 and 2. This level of agreement was maintained between phases 2 and 3 (see Figure H-4).

Figure H-4: Agreement with the Statement, "the Quality of CFLs is Just as Good as Regular Light Bulbs" by Study Phase
(Responses on a 5-point scale where 1 = "Strongly Disagree," 5 = "Strongly Agree")



* Difference from Phase 1 is statistically significant.

There was less clarity regarding the influence of PG&E's CFL ads on consumer perceptions of CFL quality than on perceptions of the quality of light from CFLs as described above. Although there is a significant difference in the proportion of respondents who "strongly agree" with the positive statement regarding CFL quality among those who saw no CFL ads (21%) and those who saw any CFL ads (31%), the difference between respondents who reportedly saw PG&E's ads (32% strongly agree) versus other CFL ads (26% strongly agree) is not statistically significant.

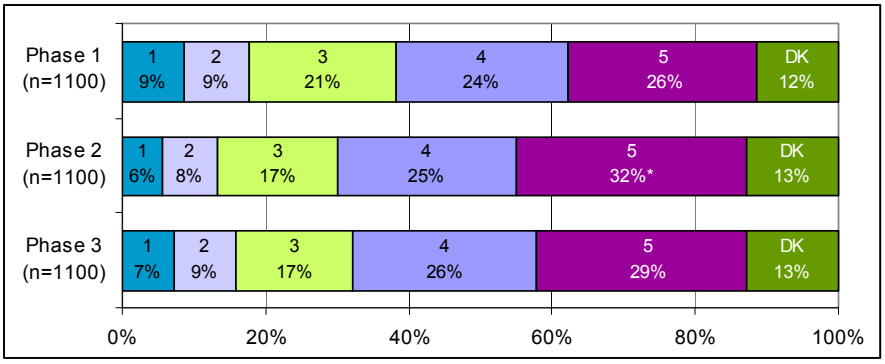
Table H-2: Agreement with "the Quality of CFLs is Just as Good as Regular Light Bulbs" Among Phase 3 Respondent Groups
(Responses on a 5-point scale where 1 = "Strongly Disagree," 5 = "Strongly Agree")

Phase 3 respondent group	% of Phase 3 respondents Who "strongly agree" (rating = 5)	
	%	n
Saw no CFL ads	21%*	140‡
Saw any CFL ad (unaided)	31%*	828
Saw PG&E television ad (aided w/ad image)	32%	773
Saw television ad, but not PG&E ad	26%	132

‡ These respondents were not excluded from subsequent aided awareness questions regarding PG&E's CFL ads; thus, the sum of respondents who have seen PG&E's ads plus those who have seen other ads is greater than the unprompted total reported ad viewers.
* Difference between groups is statistically significant.

CFLs give off a different color light than regular light bulbs. Study results show a significant decrease in the proportion of survey respondents who "strongly agreed" with the negative statement, "CFLs give off a different color light than regular light bulbs" between study phases 1 and 2. This level of agreement was maintained between study phases (see Figure H-5). However, results show no significant difference in agreement with the statement among those who have seen CFL ads (28%) and those who have not seen any CFL ads (24%), so it is unlikely that PG&E's ads are responsible for these changes in consumer perceptions of color of light.

Figure H-5: Agreement with "CFLs Give off a Different Color Light than Regular Light Bulbs" by Study Phase
(Responses on a 5-point scale where 1 = "Strongly Disagree," 5 = "Strongly Agree")

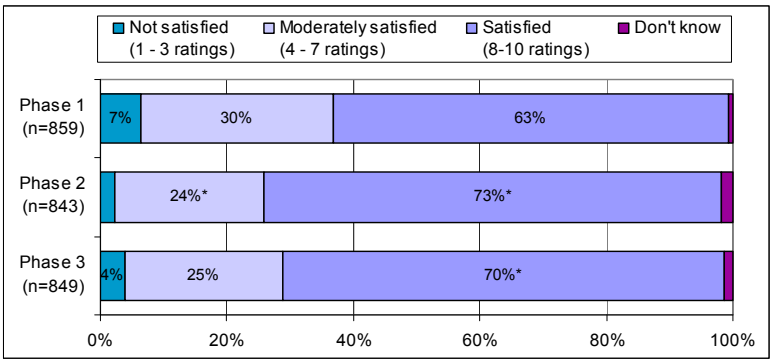


* Difference from Phase 1 is statistically significant.

Satisfaction with CFLs

General Satisfaction. The web-based surveys asked prior CFL purchasers were asked to rate their general satisfaction with CFLs 10-point scale where 1 means "not at all satisfied" and 10 means "very satisfied" (Figure H-6). Between the first and second phases, ratings between 8 and 10 increased from 63 percent to 73 percent (a statistically significant increase) and remained high in phase 3. However, the proportion of phase 3 respondents who are “very satisfied” with CFLs (rating = 10) is not significantly different among those who have seen any CFL ads and those who have not, suggesting the change in satisfaction is not attributable to CFL ads. Some proportion of this change may be attributable to continuing improvements in the CFL products over time rather than to perceptions of higher quality driven by advertising.

Figure H-6: Satisfaction with CFLs Among Prior CFL Purchasers by Study Phase
Ratings on a 10-point scale where 1 = “Not at all satisfied” and 10 = “Very satisfied”



* Difference from Phase 1 is statistically significant.

Likelihood of recommending CFLs to friends and family. The web-based survey asked study participants to rate their likelihood of recommending CFLs to friends and family on a 5 point scale where 1 means, “very unlikely” and 5 means, “very likely.” The proportion of respondents who reported that they were “very likely” (rating = 5) increased significantly between the baseline (phase 1) and Phase 3 (see Table H-3) Phase 3 results show that the proportion of respondents who are “very likely” to recommend CFLs to friends is significantly higher among those who have seen CFL ads (62%; see Table H-4) than among those who have not seen CFL ads (44%), suggesting that the difference may be attributable to CFL ads in general. However, there is no significant difference between respondents who have seen PG&E CFL ads and those have not seen PG&E ads, indicating that PG&E’s ads are not solely responsible for the shift in likelihood of recommending CFLs to friends and family.

Table H-3: Likelihood of Recommending CFLs to Friends and Family by Study Phase (Among Prior CFL Purchasers)

Likelihood	Study Phase		
	Phase 1 (n=859)	Phase 2 (n=843)	Phase 3 (n=849)
1 – very unlikely	4%	1%	2%
2	3%	2%	3%
3	15%	11%	12%
4	23%	26%	22%
5 – very likely	52%	57%	60%*
Don't know	4%	3%	2%
Top-2 box likelihood (rating = 4 or 5)	76%	83%*	82%*

* Difference from Phase 1 is statistically significant.

Table H-4: Likelihood of Recommending CFLs to Friends and Family Among Phase 3 Respondent Groups (Responses on a 5-point scale where 1 = "Very Unlikely," 5 = "Very Likely")

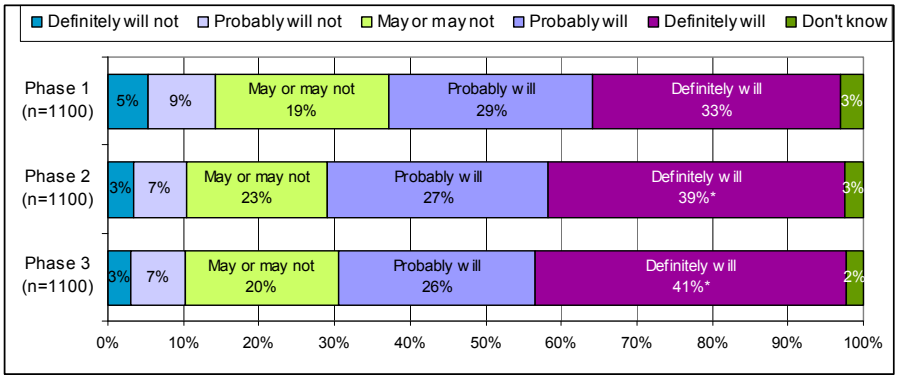
Phase 3 respondent group	% of Phase 3 respondents Who are "very likely" (rating = 5)	
	%	N
Saw no CFL ads	62%*	79‡
Saw any CFL ad (unaided)	44%*	671
Saw PG&E television ad (aided w/ad image)	64%	608
Saw television ad, but not PG&E ad	55%	100

‡ These respondents were included in subsequent aided awareness questions regarding PG&E's CFL ads; thus, the sum of respondents who have seen PG&E's ads plus those who have seen other ads is greater than the unprompted total reported ad viewers.

* Difference between groups is statistically significant.

Likelihood of purchasing CFLs within the next year. The proportion of consumers who report that they "definitely will" purchase CFLs within the next year increased significantly between phases 1 and 2 (see Figure H-7). This high likelihood was sustained in phase 3, but the proportion of respondents who report that they "definitely will" buy CFLs within the next year is not significantly different among those who have seen (any) CFL ads (46%) and those who have not seen any CFL ads (41%). It is thus unlikely that the change between phases 2 and 3 is attributable to CFL ads alone.

Figure H-7: Likelihood of Purchasing CFLs in the Next Year by Study Phase

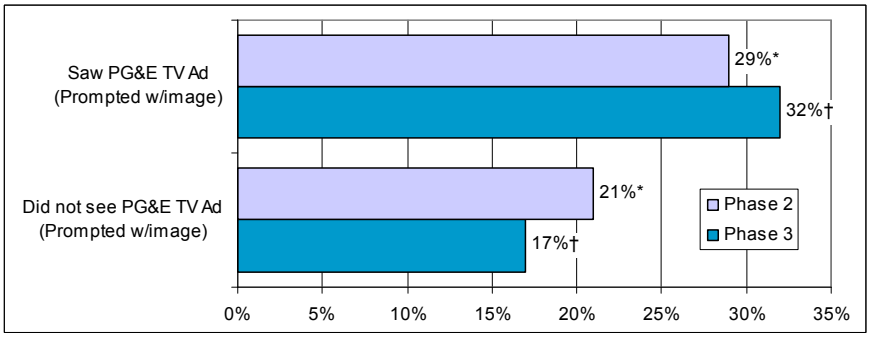


* Difference from phase 1 is statistically significant.

Links between PG&E's CFL ads and PGE's in-store CFL promotions

PG&E was interested in exploring whether consumers who viewed their CFL ads on television were more likely to have purchased PG&E-discounted CFLs than consumers who have not seen the ads. Although study results show that the proportion of CFL purchasers who report that they have seen the PG&E stickers on discounted CFLs is significantly greater among respondents who have seen PG&E television ads (32%; see Figure H-8) than among those who have not seen the ads (17%), additional research will be required to determine whether the television ads drove consumers to purchase CFLs or other factors are at work. For example, respondents who recall having seen PG&E's television ads may be more likely to recall having seen the discount stickers than respondents who have not seen the ads.

Figure H-8: CFL Purchasers Who Report Having Seen PG&E Discount Stickers on CFLs in Stores, Phase 2 and 3



Phase 3: did not see ad (n = 266); saw ad (n = 799). Phase 2: did not see ad (n = 277); saw ad (n = 438).
* † Difference between results is statistically significant.

Conclusions

Awareness of CFL advertisements

More than three-quarters of the phase 3 study participants reported having seen one or more CFL ads (from any sponsor). When prompted with an image of PG&E's CFL ads, 71 percent of respondents reported having seen the ad. This fraction increased significantly between phases 2 (55%) and 3 of the study.

It is likely that some proportion of the consumers who have seen television ads for CFLs recently have seen PG&E's television ads – whether or not they correctly attribute the ads to PG&E. The proportion who report that the TV ad they saw/heard was sponsored by PG&E increased significantly between study phases (unprompted w/ad image), and there were no other significant increases in attribution of CFL ads to other sources. These results indicate that PG&E ads may be the reason for increased awareness of CFL ads between phases 2 and 3 of the study. Additionally, the longer the ads ran, the larger the proportion who correctly attributed PG&E's ads to PG&E.

Consumer perceptions of CFLs

Prior research (e.g., LRC, 2003) has demonstrated that consumers may be unable to distinguish between the light emitted by CFLs and incandescent lamps in controlled environments, but consumers who have not used CFLs may expect that the quality of light from CFLs will be worse or different from that of incandescent lamps. This perception has been cited by consumers as a barrier to first purchase of CFLs (KEMA Inc., 2005), so overcoming this perception may be an important step in increasing consumer adoption of CFLs. Results of this study suggest that CFL ads in general may have contributed to improved consumer perceptions regarding CFL quality, light quality, and color of light, and that PG&E's ads in particular may have positively influenced consumer perceptions of CFL light quality.

Consumer satisfaction with CFLs

It appears unlikely that ads (PG&E's or others) are solely responsible for increased general satisfaction with CFLs or likelihood of purchasing CFLs, as changes are evident both in those who report that they have seen (any) CFL ads and those who have not. It is likely that awareness and purchasing likelihood with the general population have been affected by the high level of media saturation with energy conservation and climate change messages – for

example, the 2007 film about global warming presented by former vice-president Al Gore (*An Inconvenient Truth*) and Wal-Mart's much-publicized goal of selling 100 million CFLs before the end of 2007 (Wal-Mart Stores Inc., 2007) – have likely raised the general awareness and purchasing likelihood with the general population. However, study results suggest that CFL ads in general have contributed to an increase in respondents who are "very likely" to recommend CFLs to friends and family.

Implications

While linking changes in consumer perceptions of CFLs to a specific advertising campaign is challenging, results of the study suggest that CFL advertisements that reached PG&E customers in the summer and fall of 2007 had positive effects on their perceptions of CFL product quality, light quality, and light color. It thus appears that television marketing campaigns for CFLs may be an effective means of positively affecting consumer perceptions of CFLs.

However, because there are numerous sources in the market that are currently providing messaging regarding CFLs, establishing a direct connection between a particular brand (e.g., PG&E) and CFL advertisements is more challenging. Nonetheless, results of this study are encouraging, as they suggest that some consumers who had seen CFL TV advertising had seen PG&E's even if they did not directly attribute it to PG&E, and recognition of the CFL advertising from PG&E increased over time despite other active CFL campaigns. Results also suggest some synergistic effects between awareness of PG&E's television advertisements for CFLs and its in-store promotional campaign for CFLs.