EVERGREEN ECONOMICS

Evaluation of the Southern California Edison Commercial Midstream LED Lighting Distributor Pilot Program

Final Report

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Prepared for: Southern California Edison

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Executive Summary

Introduction

Southern California Edison (SCE) contracted Evergreen Economics, Inc. ("Evergreen") in February 2014 to conduct an assessment of SCE's Lighting Innovation Midstream Pilot Trial Program.

The Pilot Program provides reimbursement to distributor-level suppliers for the sale of LED replacement lamps and LED fixtures to commercial customers in the SCE service territory. SCE has offered rebates since May 2013. The distributors typically pass along most or the entire rebate to the commercial customer (in the form of reduced purchase prices). According to SCE's research proposal,[1] the purpose of the Pilot Program is to test a midstream incentive program theory for increasing the rate of LED lamp and fixture adoption in the commercial sector.

Evergreen designed this study to coordinate with and complement the Pacific Gas and Electric Company's Midstream LED Pilot Program Evaluation.

Researchable Issues

The main objectives of this study include the following:

1. Study the feasibility of the Pilot Program's design;
2. Determine the effectiveness of offering midstream incentives; and,
3. Compare the midstream Pilot Program to the downstream commercial lighting incentive program.

There are many additional, specific research objectives identified by SCE and Evergreen. These detailed objectives are described in section 1.2 of the report.

Data Collection and Analysis Methods

To inform the research objectives, Evergreen analyzed Pilot Program sales data, compared the sales data with SCE downstream program sales data, conducted in-depth interviews with LED market actors (distributors and contractors), conducted end user telephone surveys with Pilot Program LED lamp and fixture recipients, and developed recommendations for likely market indicators.

[1] "Midstream Trial_EMV_Study_Proposal 09_27_13_V04.doc"

Summary of Results

Many projects did not involve contractors, but rather were direct to consumer sales from distributors. This does not align with the initial program theory. However, end users reported that their decision to install LEDs resulted from market actor recommendations (primarily distributors) and that the Pilot Program was very easy to participate in compared to other incentive programs (where they are more involved in filling out paperwork, etc.), which suggests that the overall theory – at least from the perspective of the end user – is valid.

Furthermore, the Pilot Program appears to be reaching commercial customers that have not participated in SCE rebate programs in the past. Only 11 percent of respondent firms (representing 8.5 percent of incentivized units) stated that they have participated in another SCE rebate program (mostly lighting). According to end users, the incentives were important in the decision to install LEDs. Despite the importance of the incentive, the research found that paperwork might not be a barrier to participating in other incentive programs for all end users, but that for 21 percent of end user firms the paperwork requirements of a downstream program would have led to fewer or no LED replacement lamp or fixtures purchased by the respondent firm. Both market actors and end users reported that the Pilot Program was easy to participate in (compared to other programs).

Market actors and end users were very satisfied with the Pilot Program. Most participating distributors and contractors reported that the Pilot Program was superior to the existing downstream programs because of the ease of implementation (others believe it is complementary).

All seven of the distributors we spoke with had LED lamps in stock at the time of our interview (this includes two non-participating distributors). However, they all expressed some reluctance to stocking LED products, as they view them as high-risk and expensive.

Sales through the Pilot Program were capped, but distributors reported no problems in achieving sales that met – or exceeded – the limits of the Pilot Program budget.[2] It is encouraging that distributors were able to meet their incentive allocations, as this signifies that distributor and other market actor outreach resulting from the Pilot Program led customers to participate in the program. Outreach from market actors included messaging about the Pilot Program, as well, with nearly three-quarters of end users reporting that they were aware of the incentives.

The Pilot Program served a high number of extremely small projects and particularly large projects. In comparison, projects receiving downstream incentives during the same period were more evenly distributed by project size. The majority of both midstream and

[2] Note that replacement lamp incentives in the Pilot Program typically slightly higher than those through the downstream programs.

downstream incentives are for LED replacement A-lamps, and the midstream incentivized LED replacement lamps typically replaced CFLs and incandescent lamps (in roughly equal shares).

Recommendations

The preponderance of evidence suggests that the midstream incentive mechanism would be an effective tool for a full-scale SCE energy efficiency incentive program. **Thus, the primary recommendation from this early EM&V assessment is to continue offering midstream incentives at the distributor level for LED replacement lamps.**

Additional recommendations include:

1. **Revise the program theory and logic model** to reflect that contractors are less involved than anticipated and participation is driven by very large and very small purchases (as opposed to primarily small projects) direct from distributor firms.
2. **Develop systems to track market indicators outlined in section 5.2.** These indicators will help assess the effectiveness of the Pilot Program and conditions in the overall commercial LED replacement lamp and fixture market.
3. **Capture end use facility type data in program tracking (ensure that this is required of distributors) and monitor changes in participating end use business types.** Tracking this metric – which is also described as an option in section 5.2 **–** will ensure that SCE better understands what types of end users purchase LED replacement lamps and fixtures with midstream incentives.
4. **Ensure that end user contact information is captured for all facilities receiving midstream incentivized LED replacement lamps and/or fixtures.** Not capturing this information would open a future program up to significant challenges during EM&V.

1 Introduction

Southern California Edison (SCE) contracted Evergreen Economics, Inc. ("Evergreen") in February 2014 to conduct an assessment of SCE's Lighting Innovation Midstream Pilot Trial Program. The Lighting Innovation Midstream Pilot Program was initially called a trial, but was reclassified as a Pilot Program by SCE, and is referred to as the "Pilot Program" throughout this report.

The Pilot Program provides reimbursement to distributor-level suppliers for the sale of LED replacement lamps to commercial customers in the SCE service territory. SCE has offered rebates since May 2013. The distributors typically pass along most or the entire rebate to the commercial customer (in the form of reduced purchase prices). According to SCE's research proposal,[3] the purpose of the Pilot Program is to test a midstream incentive program theory for increasing the rate of LED lamp and fixture adoption in the commercial sector.

For years, the downstream delivery approach – with rebates paid directly to customers – has been the preferred intervention method in the promotion of energy efficient lighting products for the commercial market. Recent reductions on claimable savings, downward adjustments to the total resource costs (TRC) cost effectiveness calculations, and recent research suggesting that distributors offered a consolidated audience for IOU outreach[4] – and that their aversion to stocking expensive new products[5] – all contributed to the decision to test a midstream incentive program structure. The prior research identified a number of key reasons why the distributor population presents a unique opportunity among market actors in the commercial lighting market, including their:

- Awareness of new product developments from manufacturers;
- Ability to reach other commercial customer populations than downstream solutions;
- Ability to reach other types of projects (e.g., different size, lamp replacement vs. fixture retrofits); and
- Existing relationships with commercial customers.[6]

Furthermore, prior research conducted by Evergreen suggests that the risk associated with stocking new, untested, and expensive products – especially in a market with fast product

[3] "Midstream Trial_EMV_Study_Proposal 09_27_13_V04.doc"
[4] Energy Solutions, 2012. *Midstream Commercial Incentives for LED Replacement Lamps: Emerging Technology and Channel Assessment Projects*. Prepared for Pacific Gas and Electric Company.
[5] Evergreen Economics, 2013. *SCE/PG&E Basic/Advanced/LMT Program Process Evaluation: Commercial Lighting Retrofits – Targeted Research, Final Report*. Prepared for SCE and PG&E.
[6] Energy Solutions, 2012. *Midstream Commercial Incentives for LED Replacement Lamps: Emerging Technology and Channel Assessment Projects*. Prepared for Pacific Gas and Electric Company.

turnover such as the current LED market – presents a large barrier to commercial customer adoption of advanced lighting solutions such as LEDs.[7]

Evergreen designed this study to coordinate with and complement the Pacific Gas and Electric Company's Midstream LED Trial Evaluation.

1.1 Market Barriers and Pilot Program Theory

In this section we explain the market barriers that the Pilot Program aims to address, as well as the Pilot Program theory.

1.1.1 Market Barriers

The Pilot Program aims to address numerous market barriers to adoption of LEDs among nonresidential customers. These barriers include:

- High initial cost;
- Longer payback period (than incumbent efficient technology);
- Low end user and contractor awareness;
- Low end user and contractor knowledge; and,
- Existing market structure and relationships ("status quo").

In order to overcome the barriers listed above and have a significant, cost effective impact on the LED market, SCE developed an initial program theory for the Pilot Program.

1.1.2 Pilot Program Theory

The hypothesis of the Pilot Program's theory was that "incentives provided to distributors as part of a buy-down program can influence contractors and customers to adopt LED lights."[8] This theory was based on five key assumptions regarding the commercial lighting market:

1) Commercial building owners rely on contractors for product purchase decisions, and building owners are typically not well-educated about LED products;
2) Contractors are the primary source of influence for commercial building owners, and contractors currently know little about LEDs and tend to focus on first cost;
3) Contractors may be unwilling to adopt LEDs because sales of LEDs may reduce their amount of work due to long product life;

[7] Evergreen Economics, 2013. *SCE/PG&E Basic/Advanced/LMT Program Process Evaluation: Commercial Lighting Retrofits – Targeted Research, Final Report*. Prepared for SCE and PG&E.
[8] "Midstream LED Directional Lamp Pilot Program v2.1.doc"

4) Contractors will be motivated by the availability of training and incentives for LED products to learn more about them and to promote them more actively to their clients (the commercial building owners); and,
5) Lighting distributors are a source of information for contractors.

Lastly, the Pilot Program theory posited that market actors at the distribution/wholesaler level of the commercial lighting market offer a consolidated target for the Pilot Program – there are fewer distributors than contractors serving the same overall number of commercial building owners.

Through the course of the pilot, it became clear that this program theory did not reflect the full extent of the distributor incentive approach. Additionally, our research findings confirm some of the key assumptions but reject others, primarily due to the finding from the SCE program team – confirmed by Evergreen – that contractors were not as heavily involved in the replacement lamp market as assumed (this is discussed in detail throughout the remaining sections of the report).

Therefore, while the original program theory may be accurate for cases in which contractors are involved (such as larger scale retrofits and/or fixture installations), the theory does not capture the majority of program activities (LED replacement lamp installations by non-contractors). Thus, the program theory discussed above requires revision to accurately reflect the reality experienced through implementation of the midstream LED Pilot.

1.2 Research Objectives and Overview of Approach

The main objectives of this assessment include the following:

- Study the feasibility of the Pilot Program's design;
- Determine the effectiveness of offering midstream incentives; and,
- Compare the midstream Pilot Program to the downstream commercial lighting incentive program.

In addition to the research objectives listed above, the evaluation set out to inform the following key areas of interest:

- How do sales trends for LEDs during the Pilot Program compare against historical sales trends?
- How does the midstream delivery mechanism compare to downstream programs (e.g., Types of customers? Size and types of projects?)
- Is this an effective delivery mechanism (e.g., uptake, satisfaction; ease of participation) that SCE should consider scaling up?

- What is the degree of overlap with downstream programs? Does this cannibalize or optimize/supplement the downstream program?
- How satisfied are contractors and end users participating in the Pilot Program with their experience? What is the relative level of satisfaction with LED light quality (compared to pre-existing equipment) amongst end-users?
- How satisfied are midstream distributors participating in the Pilot Program with their experience?
- Are current participating distributors and contractors unique from the general pool of distributors and contractors that sell lighting products to SCE businesses?
- What types of pre-existing equipment are being replaced (i.e., age of replaced lamps/fixtures, replaced on burnout or early replacement, percent of lamps/fixtures changed/retrofitted and locations of lamps/fixtures)?
- What are end-user motivations for doing the lighting retrofit and what is the importance of the Pilot and incentives in their decision (i.e., is code compliance influencing their decision)? Are end-users aware of the Pilot and incentives?
- What is the square footage and business types of end-user businesses that are participating in the Pilot?
- Are end-users receiving incentivized products from their normal sources?
- How likely are additional (i.e., non-participating) distributors and contractors to participate in a midstream incentive program (i.e., if the Pilot Program is expanded)?

We developed a research plan to inform most of these research objectives. Evergreen analyzed Pilot Program sales data, compared the Pilot Program sales data with SCE downstream data, conducted in-depth interviews with LED market actors (distributors and contractors), and conducted end user telephone surveys with Midstream Pilot Program LED recipients. In addition, we developed recommendations for likely market indicators to assist the program team in evaluating the future successes of a full-scale midstream LED incentive program.

1.3 Research Approach

In this section we describe the approaches for each of the key research tasks.

1.3.1 Tracking Data Analysis and Program Comparisons

Evergreen analyzed sales data from SCE's Midstream Pilot Program and SCE's commercial downstream rebate program using SPSS. The analyzed data included Standard Program Tracking Database (SPTDB) records for 2013 and 2014 (through August 2014) for both rebate programs.

One goal of this comparison is to determine if the midstream financial incentive to lighting distributors is increasing the speed of LED adoption compared to the downstream program.

To accomplish this, we analyzed the monthly sales volume for each delivery channel and provide comparisons. Another goal of this research task was to assess differences between firms that participate in the downstream program and the Pilot Program (e.g., typical project size, types of LEDs installed).

Lastly, this analysis task is designed to inform an assessment of program overlap and cannibalization (from existing rebate program offerings) along with the end user survey and market actor in-depth interviews. Research questions identified by SCE regarding overlap and cannibalization include the following:

- Are there contractors that have participated in both the midstream Pilot Program and the downstream program, or is there little overlap between the two?
- Are the types of lighting measures different or similar between the midstream Pilot Program and the downstream program?
- Are there end users that have participated in both the midstream Pilot Program and the downstream program or is there little overlap between the two?
- Are the projects (e.g., size, building type) similar or different between the midstream Pilot Program and the downstream program?

Due to limitations of the data, we were unable to assess contractor overlap across the downstream program and Pilot Program, or conduct analysis by business or building type.

1.3.2 In-Depth Interviews with Market Actors

This section describes the contractor and distributor in-depth interview guide development, sample design, and research implementation.

1.3.2.1 In-depth Interview Guide Development

Evergreen Economics designed two distinct interview guides that covered the four unique groups of participating and non-participating market actors.

- **Participating Distributors:** Lighting distributors that participated in both the Midstream LED Distributor Pilot Program and the Trade Professional Alliance.
- **Non-participating Distributors:** Lighting distributors that did not participate in the Midstream Pilot Program.
- **Participating Contractors:** Contractors who purchased incentivized LED lighting through distributors that participated in the Midstream LED Distributor Pilot Program.
- **Non-Participating Contractors:** Contractors who did not purchase incentivized LED lighting through distributors that participated in the Midstream LED Distributor Pilot Program.

Evergreen developed in-depth interview guides with assistance and review from SCE evaluation, measurement and verification (EM&V) staff, program implementation staff, and other stakeholders (including review from the California Public Utilities Energy Division staff).

1.3.2.2 In-depth Interview Sample Allocations

With help from SCE, Evergreen developed a list of 321 participating and nonparticipating market actors (shown by market actor type in Table 1, below). We had an initial target of 23 completed in-depth interviews across the four market actor groups, as shown in the Target column, below.

Table 1: Market Actor Population and Interview Targets

Market Actor Type	Population	Target
Distributors – Participating	5	5
Distributors – Non-participating	41	3
Contractors – Participating	211	10
Contractors – Non-participating	64	5

Below we describe the way we stratified targets within each market actor type.

Distributors (Participating)

Evergreen targeted all five distributors who participated in the midstream Pilot Program by receiving one or more rebates through the midstream Pilot Program.

Distributors (Non-Participating)

We assigned a random number to each of the 41 companies identified as non-participants. We dialed according to the assigned random number. We ensured that the distributors sell LED replacement lamps and/or LED fixtures to the commercial lighting market in Southern California Edison territory.

Contractors (Participating)

We sampled participating contractors based on two key variables – LED product type and sales. We started by weighting each LED product type equally. This allowed us to make sure that contractors who sold a diverse selection of LED products were represented. We then divided this group into two strata, with one strata comprised of contractors who sell a larger volume and a larger diversity of LED products, and the other comprised of contractors who sell a lower volume and a lower diversity of LED products.

Contractors (Non-Participating)

For non-participating contractors, we started our sampling approach by weighting each LED product (Fixtures, A-lamps, MR16s and PARs) equally. This ensured that a diversity of LED products are represented in the first strata by the contractors responsible for selling the most

LED products within a given LED product category,[9] even if their overall volume may be lower than other contractors. We then divided this group into three strata that each represent approximately one third of cumulative lamp sales each. The first stratum was comprised of contractors that sell a large distribution of LED products and relatively high volumes of all LED products. Contractors in the second strata sell a substantial number of LED products within the different lamp products, but not necessarily a very diverse selection of lamp products. The third group were contractors that sell only a couple LED products and in small volumes.

1.3.2.3 In-depth Interview Implementation

Evergreen staff completed a total of 16 in-depth interviews between August 26 and November 13, 2014. Interviews averaged 47 minutes for distributors and 30 minutes for contractors. Researchers called the market actors at different times of day to increase the probability of contact. Staff attempted interviews with potential respondents up to four times each. After the third unanswered telephone call the interviewer left a short message, including their name and telephone number, and indicated that the contact would be called again in two days for follow-up.

The total number of completed interviews and the original targets are shown in Table 2, below, by market actor type.

Table 2: Market Actor Completed Interviews

Market Actor	Target	Completed Interviews
Distributors – Participating	5	5
Distributors – Non-participating	3	2
Contractors – Participating	10	7
Contractors – Non-participating	5	2

1.3.3 Commercial End User Midstream Pilot Program LED Recipient Telephone Survey

This section describes the commercial end user telephone survey guide development, sample design, and research implementation.

[9] LED fixtures make up a very small proportion of overall sales and thus did not factor in to the stratification as much as the other lamp types.

1.3.3.1 End User CATI Guide Development

The Evergreen team developed a commercial end user Pilot Program LED recipient telephone survey with guidance and review from SCE evaluation, measurement and verification (EM&V) staff, program implementation staff, and other stakeholders (including review from the California Public Utilities Energy Division staff). The survey was designed to collect data to inform the overall objective of determining the effectiveness of the Pilot Program compared to existing commercial lighting rebate programs. Specific goals of the telephone survey are described below:

- Collect firmographic information on participating end users by confirming business type and inquiring about square footage;
- Gauge awareness of end users with regards to the Pilot Program and incentives;
- Understand end user motivations for doing the lighting retrofit and the importance of the Pilot Program/pilot and incentives in that decision;
- Understand the influence of triggered codes on installation decisions;
- Understand the Pilot Program experience from the end user perspective including where they are receiving incentivized products, their satisfaction with said products, and the Pilot Program overall;
- Understand detail about the pre-existing equipment including: age of lamps (replaced on burnout or early replacement), percent of lamps/fixtures changed/retrofitted, and locations of lamps/fixtures;
- Gauge the relative satisfaction with LED light quality (compared to pre-existing equipment); and,
- Understand participant experience with other rebate programs and the comparative experience (ease or lack thereof) of the midstream Pilot Program.

1.3.3.2 End User CATI Sample Allocations

Evergreen Economics received Pilot Program sales data from SCE that contained 1,169 unique installation sites after the removal of sites with sales totals less than zero or no identifiable address or business name. The data do not contain phone numbers. In order to facilitate the telephone survey, we delivered the address information to a lookup firm, which was able to match 417 of the addresses to phone numbers, which accounted for approximately 78 percent of the units delivered through the Pilot (although some additional inaccuracies were encountered during survey implementation).

We segmented end users based on two variables – quantity installed and measure type. The specific units purchased bins were selected by analyzing both the proportion of sales and the proportion of projects within a number of potential bins. In addition to the units purchased we stratified by measure type: fixtures or lamps. The sites in the fixtures strata purchased one or more fixtures and may have also purchased lamps. The lamps only category includes sites that did not purchase any fixtures.

The units purchased bins are shown by measure type in Table 3 along with the number of sites in each group, percent of total sites represented in each group, the total unit sales (quantity), and the percent of total sales.

Table 3: Product Sales and Quantity Installed by End User Site

Units Purchased	Fixtures				Lamps Only			
	# of Sites	% of Total Sites	Fixture Sales	% of Total Fixture Sales	# of Sites	% of Total Sites	Lamp Sales	% of Total Lamp Sales
1 to 20	33	42%	297	6%	351	32%	3,686	2%
21 to 40	18	23%	534	12%	244	22%	7,192	4%
41 to 60	8	10%	392	8%	136	12%	6,935	4%
61 to 100	13	16%	1,099	24%	116	11%	9,305	6%
101 to 200	3	4%	367	8%	74	7%	10,603	7%
201-500	3	4%	849	18%	79	7%	27,397	17%
More than 500	1	1%	1,089	24%	90	8%	97,465	60%
Total	79	100%	4,627	100%	1,090	100%	162,583	100%

Table 4 contains the 14 strata and the total number of participating end user sites targeted within each stratum. In order to represent those who purchased fixtures, we allocated 22 sample point targets to the fixtures strata, and allocated the remaining 53 sample points to the lamps only category. We allocated slightly more targets to the smaller project groups since these contained the most sites.

Table 4: End User Interview Targets by Strata

Units Purchased	Fixtures	Lamps Only
1 to 20	4	10
21 to 40	4	8
41 to 60	4	7
61 to 100	3	7
101 to 200	3	7
201-500	3	7
More than 500	1	7
Total	22	53

1.3.3.3 End User CATI Implementation

During the execution of the CATI survey, when there were no more available sites in a stratum, the CATI firm was instructed to complete the interview from the next lowest units

purchased group within the same measure type. If the entire measure category sample was exhausted, the CATI survey was instructed to complete the interview from the same size group in the other measure category.

CIC Research conducted the Computer Assisted Telephone Survey (CATI) between February 3, 2015, and March 4, 2015. CIC Research completed 56 of the 75 targeted end user surveys. We were unable to meet the target of 75 surveys due to limited projects, limited contact data, and inaccuracies in the provided and purchased contact data. We achieved a survey response rate of approximately 13 percent.

The total number of completed surveys with end user Pilot Program LED recipients is shown in Table 5, below.

Table 5: End User Interview Completes by Strata

Units Purchased	Fixtures*	Lamps Only
1 to 20	0	4
21 to 40	0	4
41 to 60	1	4
61 to 100	0	7
101 to 200	0	11
201-500	1	9
More than 500	0	15
Total	2	54

*Both also received LED replacement lamps

1.3.4 Likely Market Indicators

This task aims to develop a better understanding of likely market indicators for future market transformation efforts for a full-fledged midstream incentive program. Evergreen conducted secondary research and relied on discussions with program staff and expert opinion to develop recommendations on market indicators for the midstream incentive mechanism for increasing commercial LED adoption.

2 Tracking Data Analysis and Program Comparisons

This section summarizes key findings from the program tracking data analysis, described previously in section 1.3.1.

2.1 Midstream Pilot Program Characterization

Table 6 below presents overall statistics for the Pilot Program for the period May 2013 through August 2014. As shown, seven distributors participated in the Pilot Program during this period, with 108,788 units (lamps and fixtures) sold across 326 projects.[10]

Table 6: Overall Midstream Pilot Program Statistics

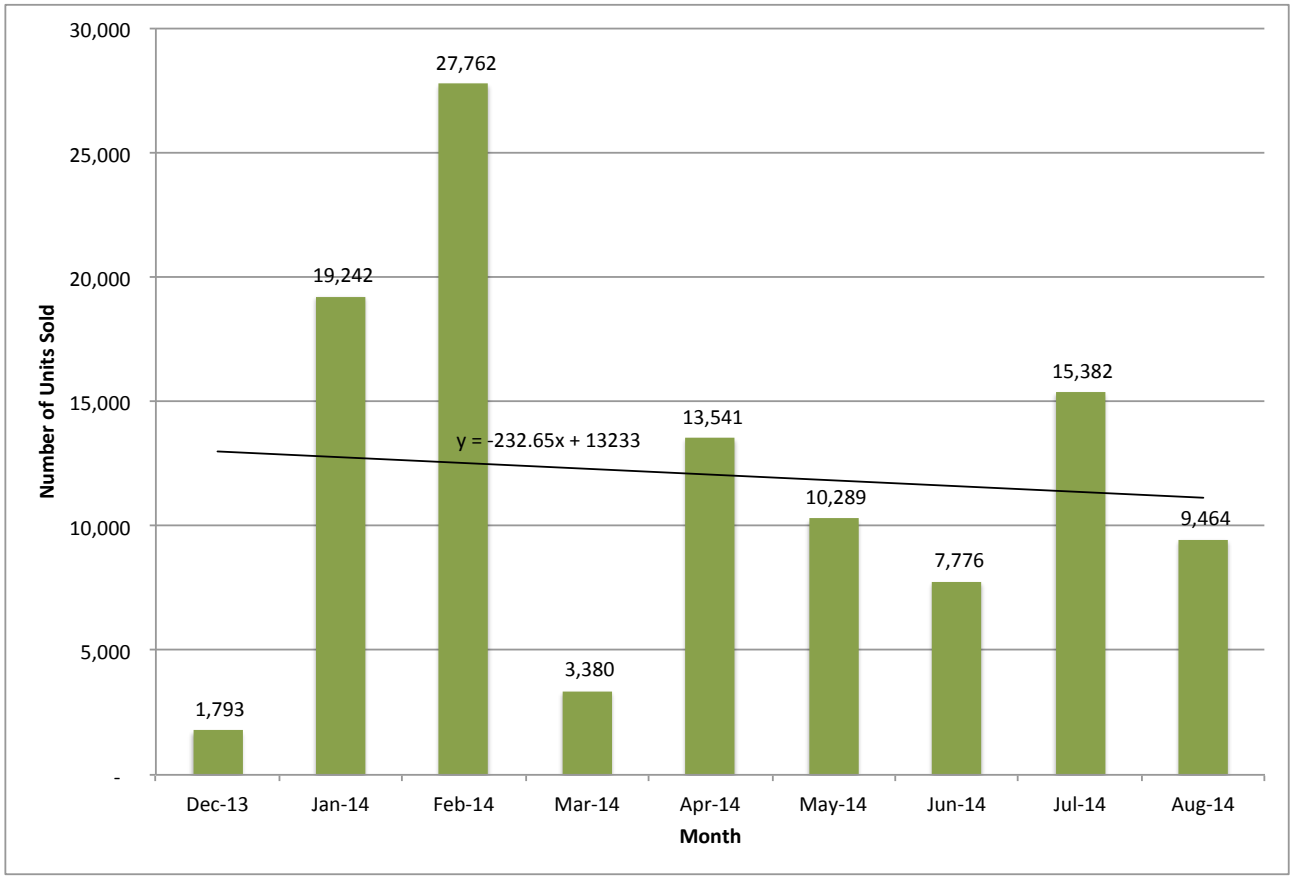
Number of Units Sold	108,788
Total Number of Distributors	5
Mean Units per Distributor	21,758
Minimum Units / Distributor (Smallest Distributor)	4952
Maximum Units / Distributor (Largest Distributor)	59,179
Total Number of Projects	326

Over the course of the Pilot Program, the number of units sold per month varied largely from month to month. Figure 1, below, shows that monthly LED replacement lamp and fixture sales receiving midstream incentives trends slightly downward over the course of the Pilot Program. However, sales have remained more consistent since April 2014, following large volumes in January and February 2014. Large sales in January and February 2014 were due to sales process momentum that began with encouragement from SCE at the end of 2013, when incentive volumes were very low. Distributors surpassed their allocated volumes so SCE directed them to scale back in order to remain within overall Pilot budget constraints.

This artificial cap in the number of incentives available through the Pilot is an important consideration when making comparisons across incentive programs (i.e., with the Downstream program, which effectively has no cap on LED replacement lamp or fixture incentives). However, it is also an encouraging finding that distributors were able to meet their allocations.

[10] The tracking data analysis and program comparisons relied on an updated Standard Program Tracking Database (SPTDB) that SCE filed with the CPUC to claim energy savings impacts. The data used for sampling was a preliminary database obtained by Evergreen prior to the release of the SPTDB records, and thus the data and resulting summary statistics are different.

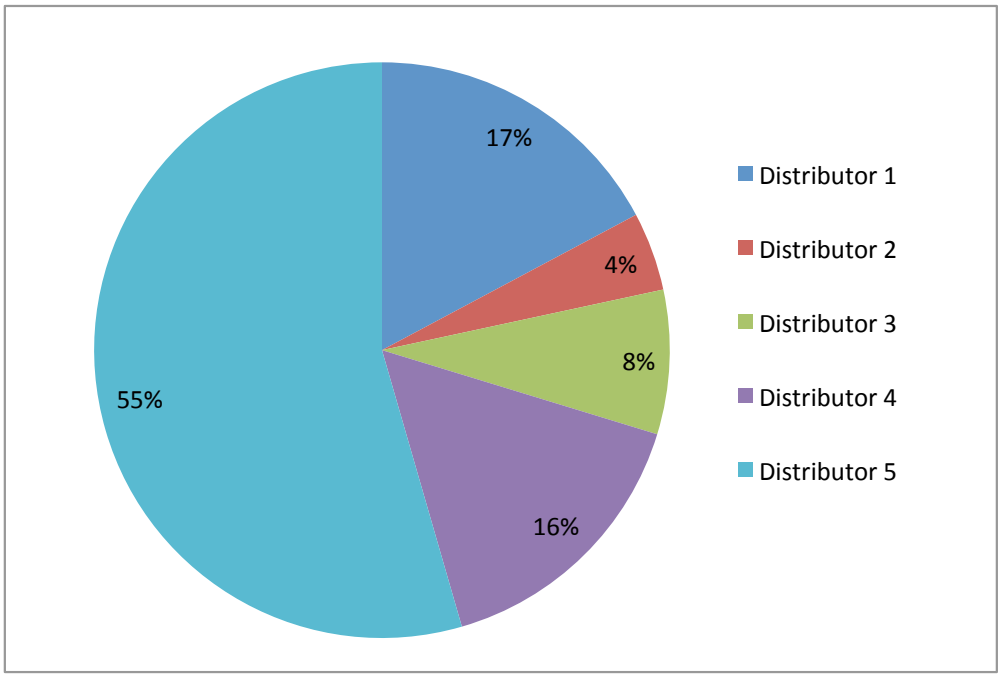
Figure 1: Total Pilot Program Units Sold, by Month*



*We excluded sales in May, June and July 2013 from this analysis because the patchwork nature of the data did not lend itself to analysis of the program over a continuous period of time.

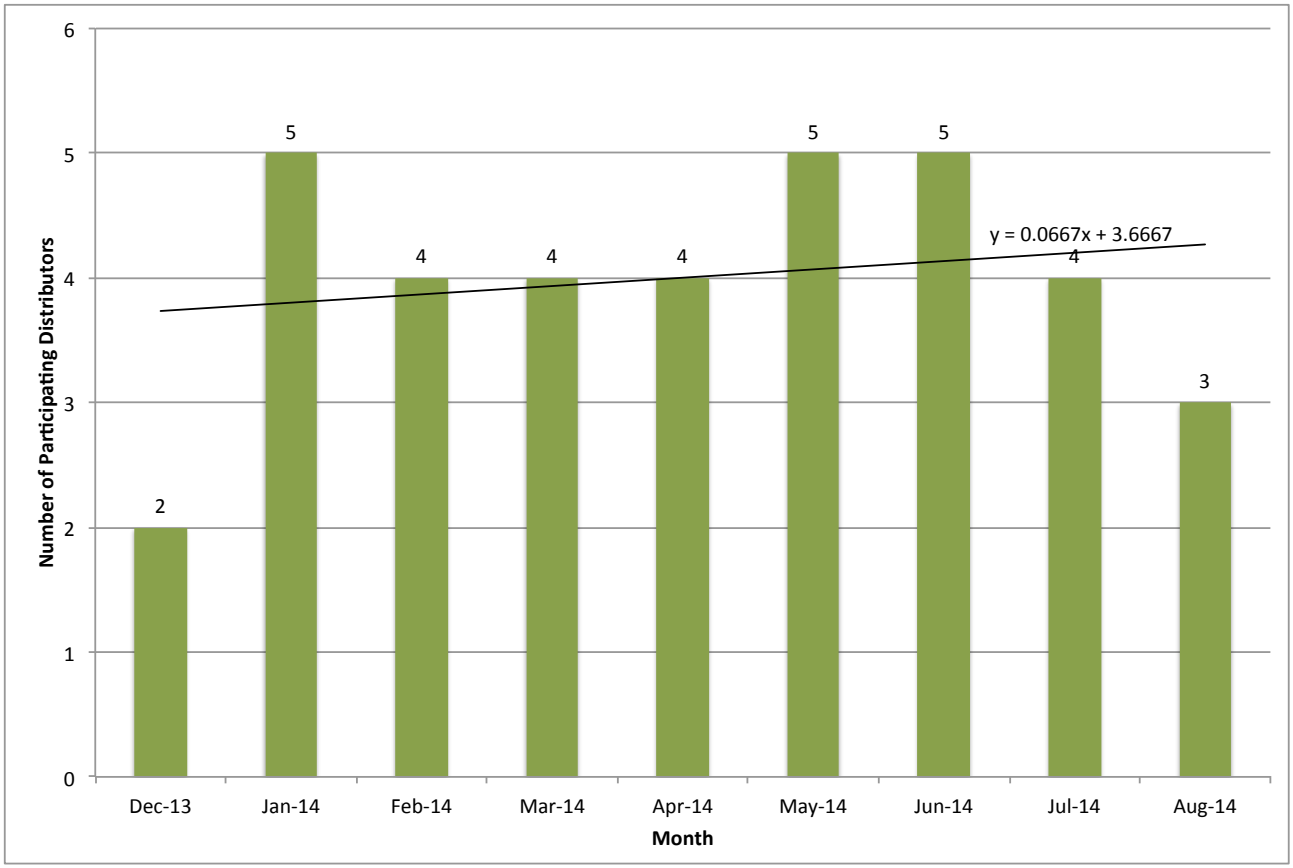
Figure 2 shows that one of the five participating lighting distributors was responsible for over half (55 percent) of the total unit sales, and that just three of the distributors are responsible for almost 90 percent of incentives through the Pilot Program. Incentive volumes were pre-allocated early in the Pilot based on forecasts provided by distributor firms, and nearly all distributors reportedly achieved their maximum budget allocation.

Figure 2: Percent of Total Pilot Program Sales, by Distributor



The number of distributors selling LED replacement lamps and fixtures with Pilot Program incentives remained fairly consistent month to month, as shown below in Figure 3. We investigated individual distributor participation over the study period and found that there were three distributors who participated every month from January to August. At the onset of the Pilot, SCE contracted with three distributor firms. By January 2014, SCE had contracted with an additional two firms.

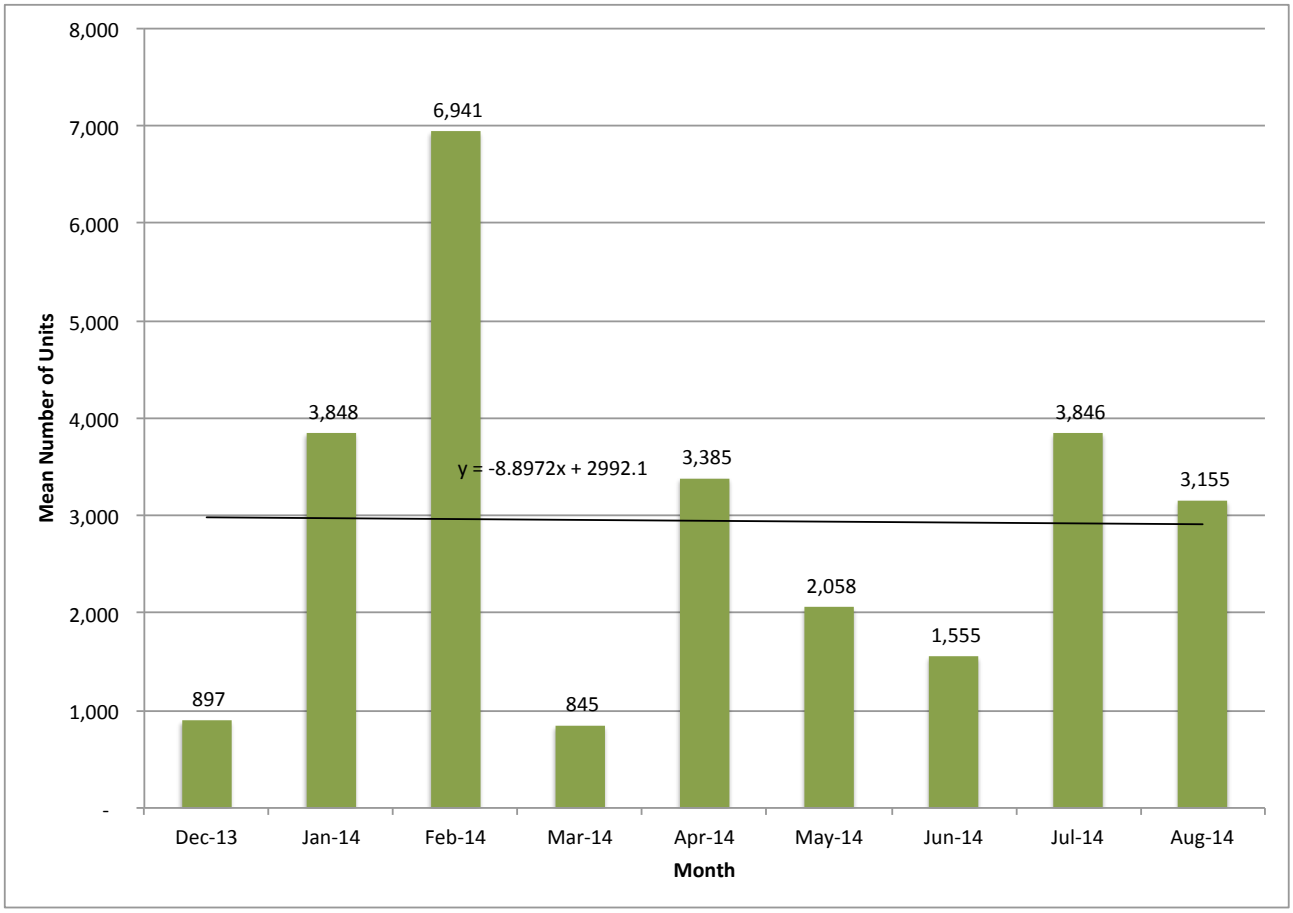
Figure 3: Total Participating Distributors, by Month*



*We excluded sales in May, June and July 2013 from this analysis because the patchwork nature of the data did not lend itself to analysis of the program over a continuous period of time.

In Figure 4 we show the mean sales per distributor by month. The mean monthly incentivized sales volume varies from month to month, with peaks in early 2014 and late Summer 2014, but the trend is relatively flat over the Pilot period.

Figure 4: Mean Pilot Program Sales per Distributor, by Month*



*We excluded sales in May, June and July 2013 from this analysis because the patchwork nature of the data did not lend itself to analysis of the program over a continuous period of time.

2.1.1 Project Level Analysis

For the purposes of this analysis, we defined projects as all lamp and/or fixture installations at a unique project site identified by street address. This means that lamps or fixtures sold in December 2013 and August 2014 for the same site would be considered part of the same project (in December 2013).

Table 7, below, presents an overview of the number and characteristics of projects in the Midstream Pilot Program. There were 326 projects in total over the Pilot Program period. [11]

[11] The tracking data analysis and program comparisons relied on an updated Standard Program Tracking Database (SPTDB) that SCE filed with the CPUC to claim energy savings impacts. The data used for sampling was

The average size of a project was 334 units. The standard deviation of 526 units indicates that there was significant variation in the size of projects.

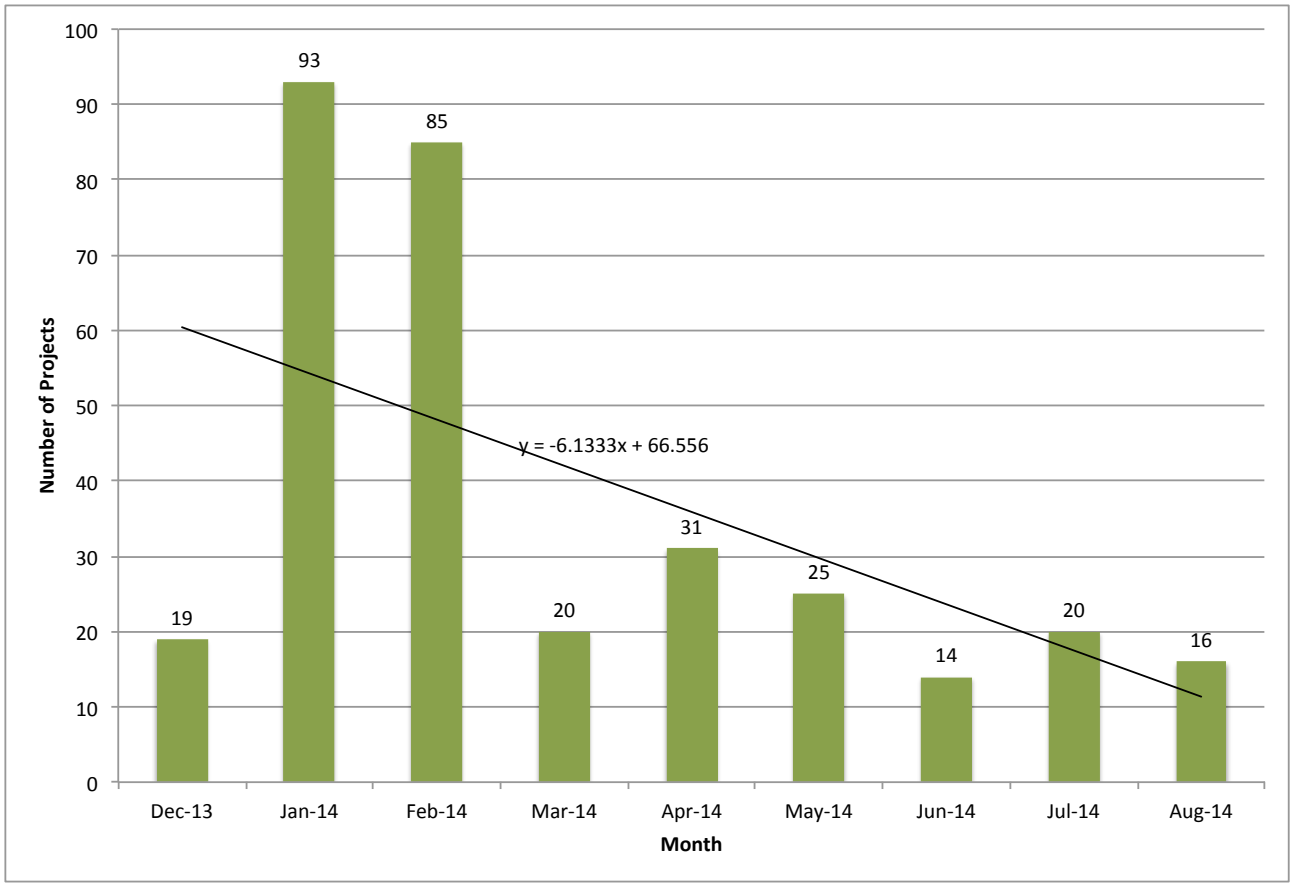
Table 7: Overall Pilot Program Project Descriptive Statistics

Total # Projects	326
Number of Distributors	5
Mean Size of Project	334
Std. Deviation	526
Minimum Project Size	1
Maximum Project Size	3,352

Figure 5 below presents the total number of projects by month. If a project occurs across multiple months, as described above, it is assigned to the first month that a lamp or fixture was sold to the site with a midstream incentive. Similar to total sales, there is significant variation in the number of projects from month to month, but the overall trend is decreasing over the Pilot Program period. Again, this is due to distributors selling beyond their allocation in January and February; the numbers of projects from March onward are relatively consistent.

a preliminary database obtained by Evergreen prior to the release of the SPTDB records, and thus the data and resulting summary statistics are different.

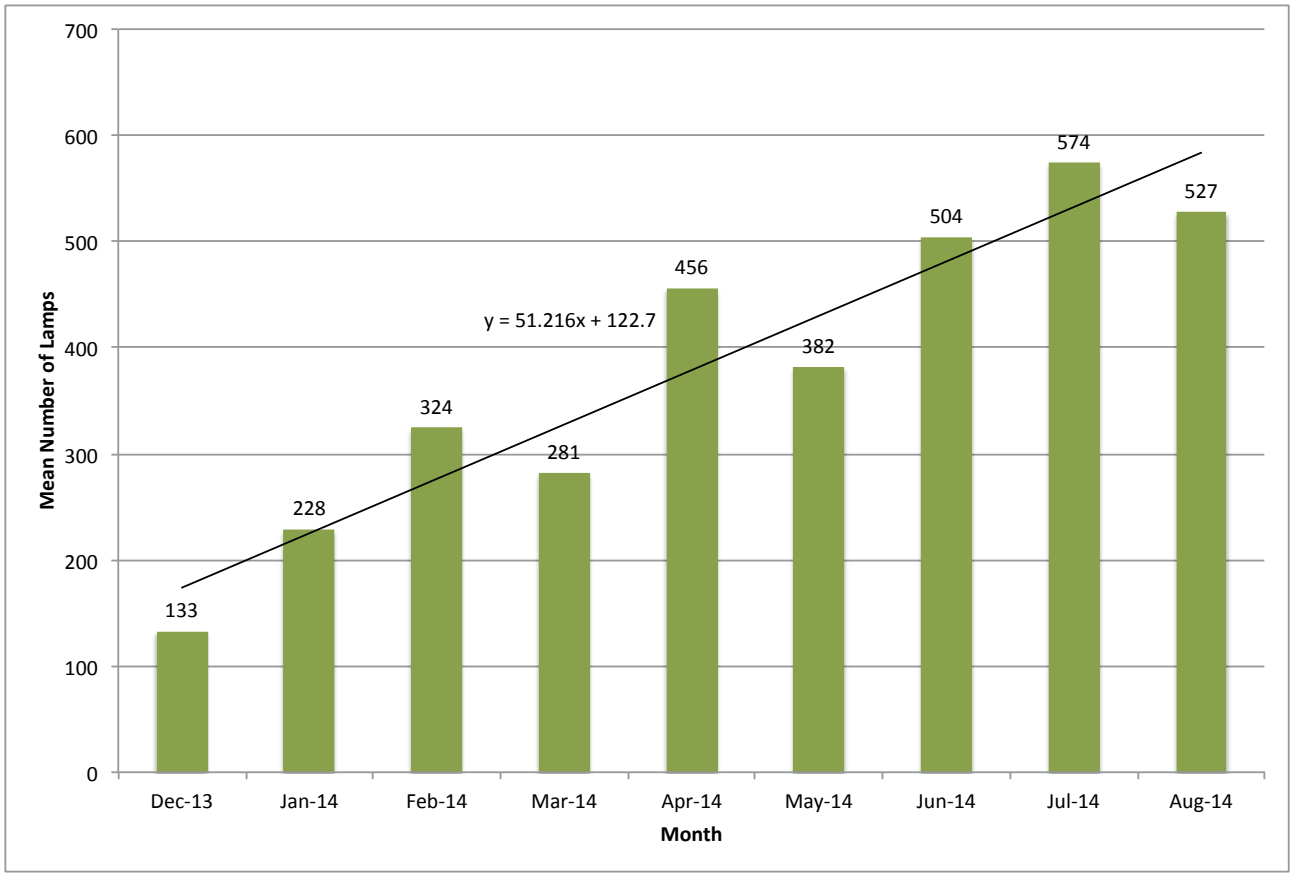
Figure 5: Number of Pilot Program Projects, by Month*



*We excluded sales in May, June and July 2013 from this analysis because the patchwork nature of the data did not lend itself to analysis of the program over a continuous period of time.

Figure 6, below, presents the average size of a project during each month. As shown, the average project size has increased significantly over the course of the Pilot Program. The downward trend in overall monthly Pilot Program incentives – shown in Figure 1, above – is the result of fewer overall projects, despite larger average project sizes over the same period.

Figure 6: Mean Pilot Program Project Size, by Month*

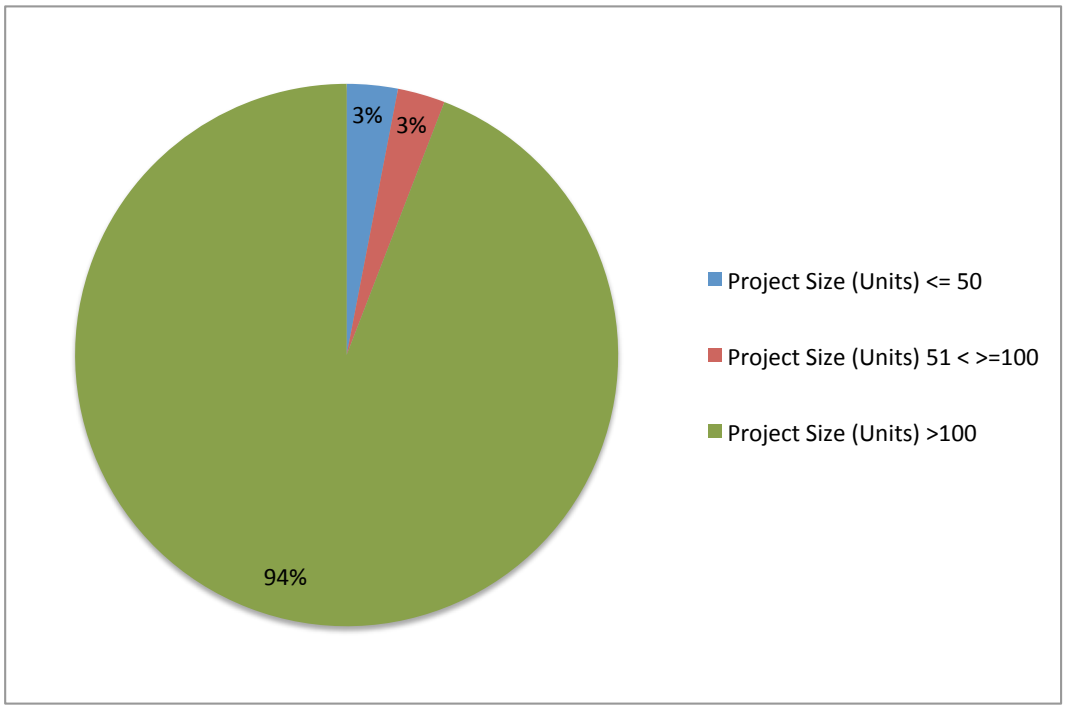


*We excluded sales in May, June and July 2013 from this analysis because the patchwork nature of the data did not lend itself to analysis of the program over a continuous period of time.

2.1.2 Disposition of Projects by Size

Figure 7 presents the proportion of total units sold by three project size groups; projects of less than 50 units, 50 to 100 units, and projects of over 100 units. As shown, projects of less than 100 units in size account for six percent of total sales while projects over 100 units account for 94 percent of total sales. Larger projects will always account for a relatively larger proportion of unit sales (relative to project counts), but the evidence presented below suggests that the Pilot Program served many large projects.

Figure 7: Proportion of Total Pilot Program Units Sold, by Project Size



When looking at the number of Pilot Program projects rather than projects size, as shown in Figure 8, projects of more than 100 units account for 45 percent of projects, while projects of less than 100 units make up 55 percent of projects.

Figure 8: Proportion of Pilot Program Projects, by Project Size

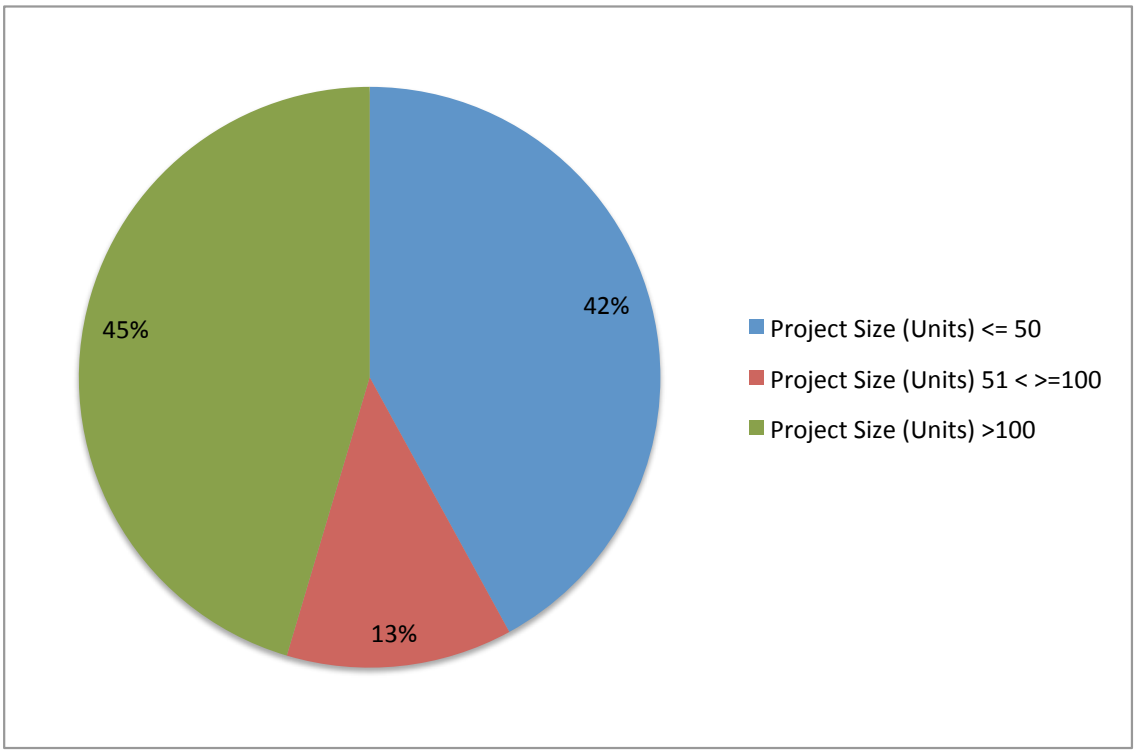
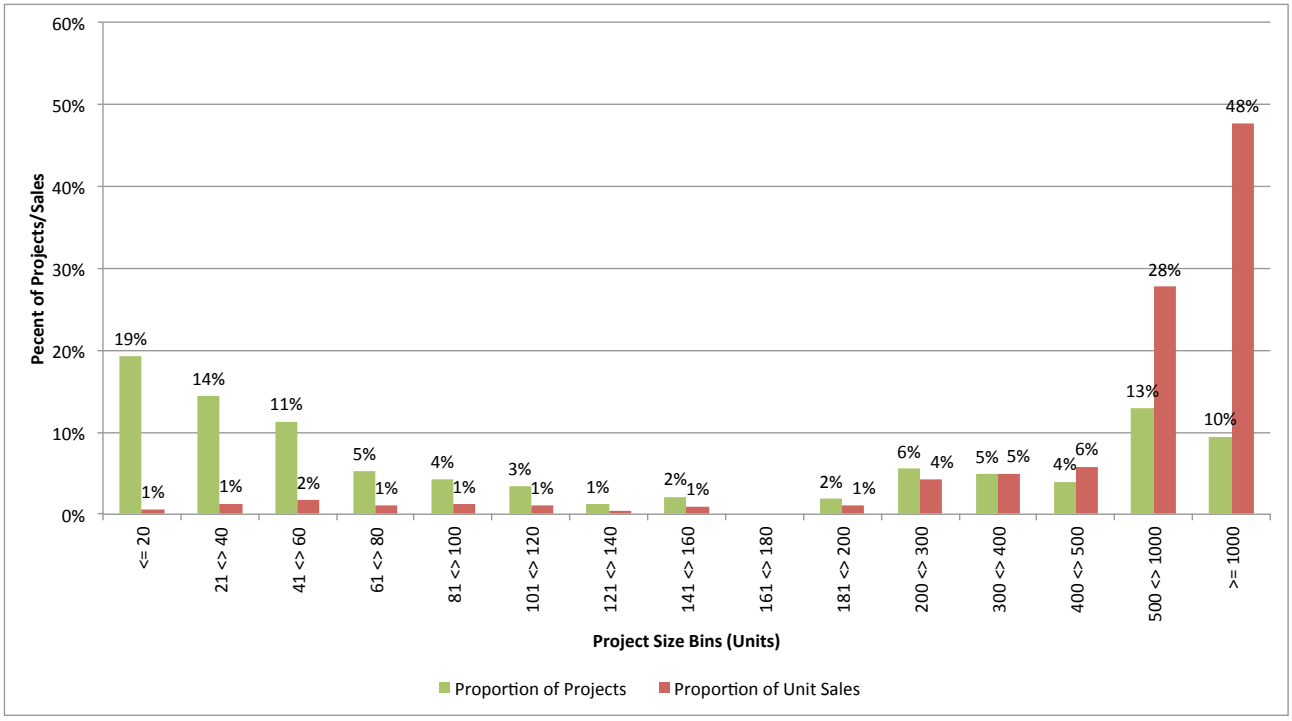


Figure 9 presents the distribution of projects and sales volume (for LED replacement lamps and fixtures combined) by project size in increments of 20 units. These figures illustrate that the Pilot Program is serving both small projects and large projects. One-third of projects are 40 units or less (33%) and nearly the same proportion are 200 units or more (32%). Nearly one quarter of projects (23%) were greater than 500 units, accounting for more than three-quarters of total sales (76%). SCE's Pilot Program serves relatively equal proportions of large and small projects, but the vast majority of incentivized units are installed in larger projects.

Figure 9: Proportion of Pilot Program Projects, by Project Size Bin



2.1.3 Total Units by Unit Type

The following series of figures investigates Pilot Program sales in terms of lamp or fixture types sold. Figure 10, below, shows the proportion of total unit sales by unit type. The most common unit type sold through the program was LED replacement A-lamps, which accounted for 90 percent of sales. The next two most commonly sold unit types included LED replacement PAR38s and PAR30s which each accounted for close to four percent of total unit sales, each. LED fixtures accounted for less than two percent of Pilot Program sales.

Figure 10: Percent of Total Pilot Program Sales, by Unit Type

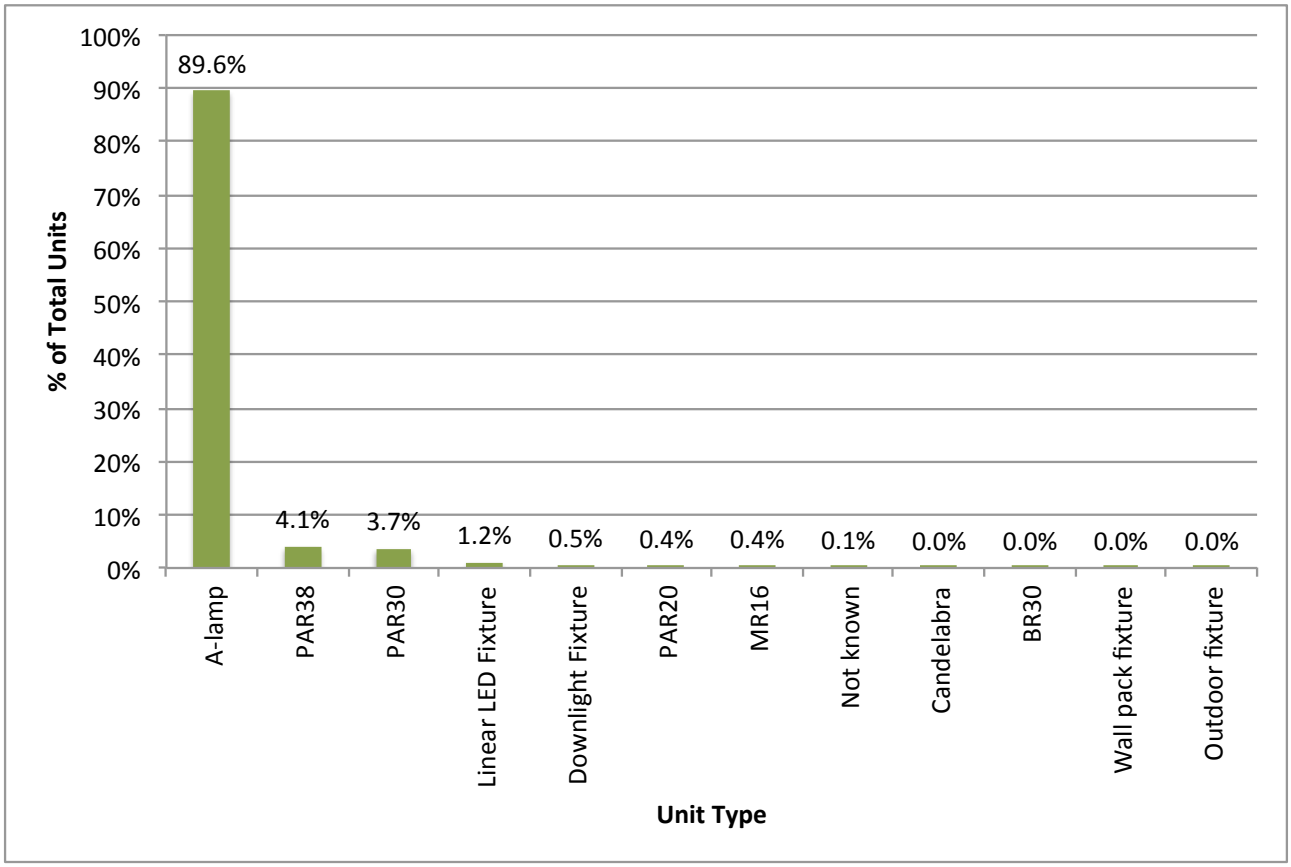
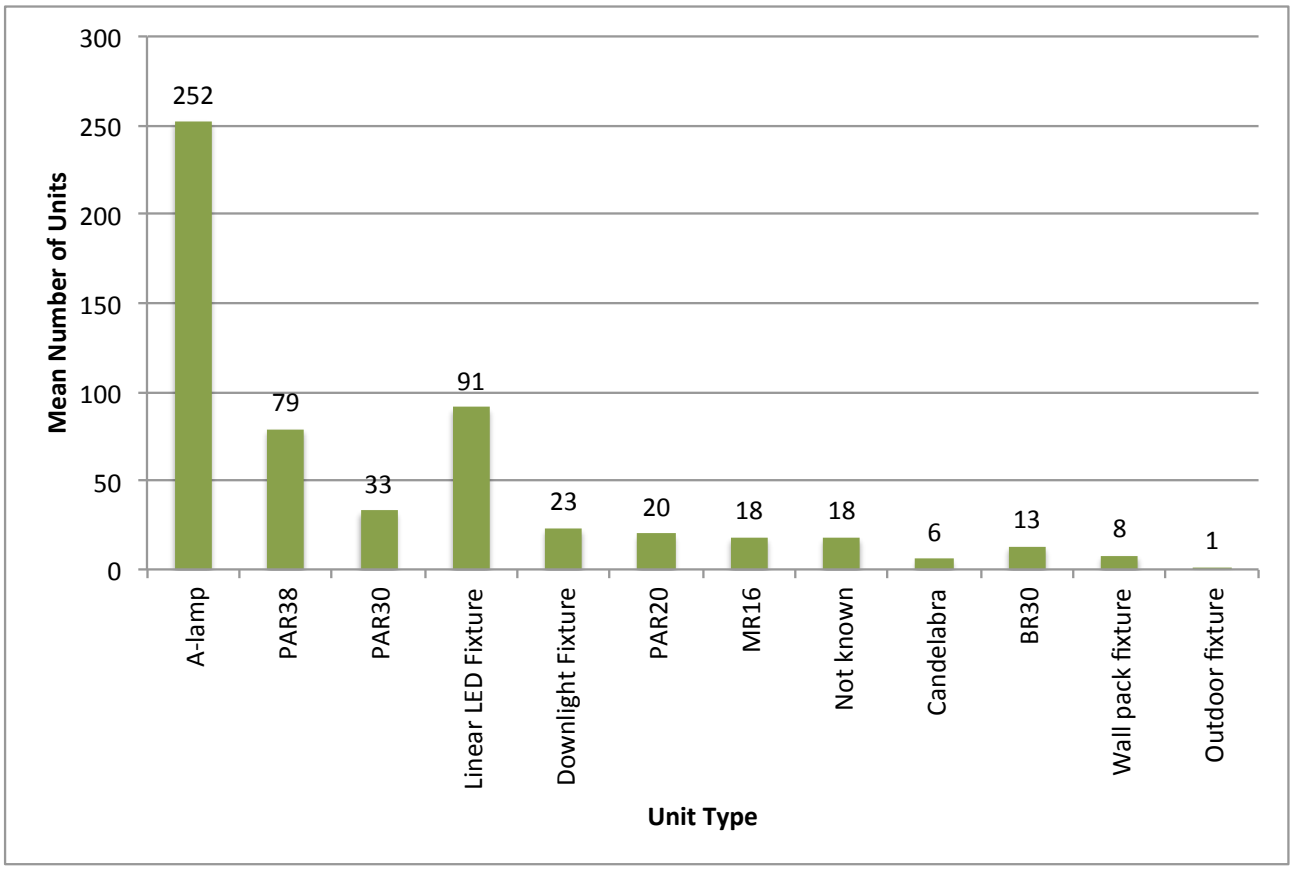


Figure 11, below, presents the average purchase volume for each unit type. As shown, customers purchased an average of 252 LED replacement A-lamps, per project. Linear LED fixtures and PAR38s were also purchased in large quantities, on average (91 and 79 units per sale, respectively). A-lamps are widely applicable in hospitality applications (e.g., hotel rooms), and while we were unable to conduct analysis by business or building type (as this variable was not reported in the Pilot Program tracking data), names of businesses in the Pilot Program tracking data indicate that hotel projects may be responsible for the high proportion of LED replacement A-lamp sales.

Figure 11: Mean Purchase Volume, by Unit Type



2.2 Downstream Comparison

In this section we compare key statistics of the Midstream Pilot Program with the downstream program. Table 8, below, shows key overall program statistics for both the Pilot Program and the downstream program from May 2013 to August 2014. It is important to note that the incentives were not aligned (in terms of dollars per unit) across programs, with replacement lamp incentives in the Pilot Program typically slightly higher than those through the downstream programs. Furthermore, as previously mentioned, the volume of incentives through the Pilot Program were capped and typically met monthly quotas, whereas this was not the case for downstream LED incentives. Lastly, the Pilot ended in August 2014, so sales in that month likely reflect ramping down of the incentives.

Table 8: Overall Comparison Statistics: Downstream and Midstream (May 2013 through August 2014)

	Downstream	Midstream
Number of Projects	1,344	326
Number Lamps / Fixtures Sold	247,677	108,788
Mean Units per Project	184	334
Minimum Units / Project	1	1
Maximum Units / Project	8,869	3,352

Figure 12 compares LED replacement lamp and fixture incentive volumes (based on the number of lamp and fixtures sold with incentives) across both the downstream program and the Pilot Program from January 2013 to August 2014. Since the beginning of 2013, incentivized volumes (of LED replacement lamps and fixtures, combined) are trending upwards for both downstream and midstream channels. SCE's downstream incentives far outpaced midstream incentives in 2013 as the Pilot Program slowly ramped up distributor participation. However, at the start of 2014 midstream incentives overtook downstream incentive volumes for LED products (recall that the momentum that began at the end of 2013 led to Distributors surpassing their allocated incentive volumes, and that SCE directed participating distributors to scale back in subsequent months). From January 2014 through August 2014 the Pilot incentivized 106,836 lamps and fixtures, combined, compared to 160,696 lamps and fixtures sold with downstream incentives during the same time period.

Figure 12: Total Lamps and Fixtures Sold by Month, by Incentive Channel (January 2013 through August 2014)

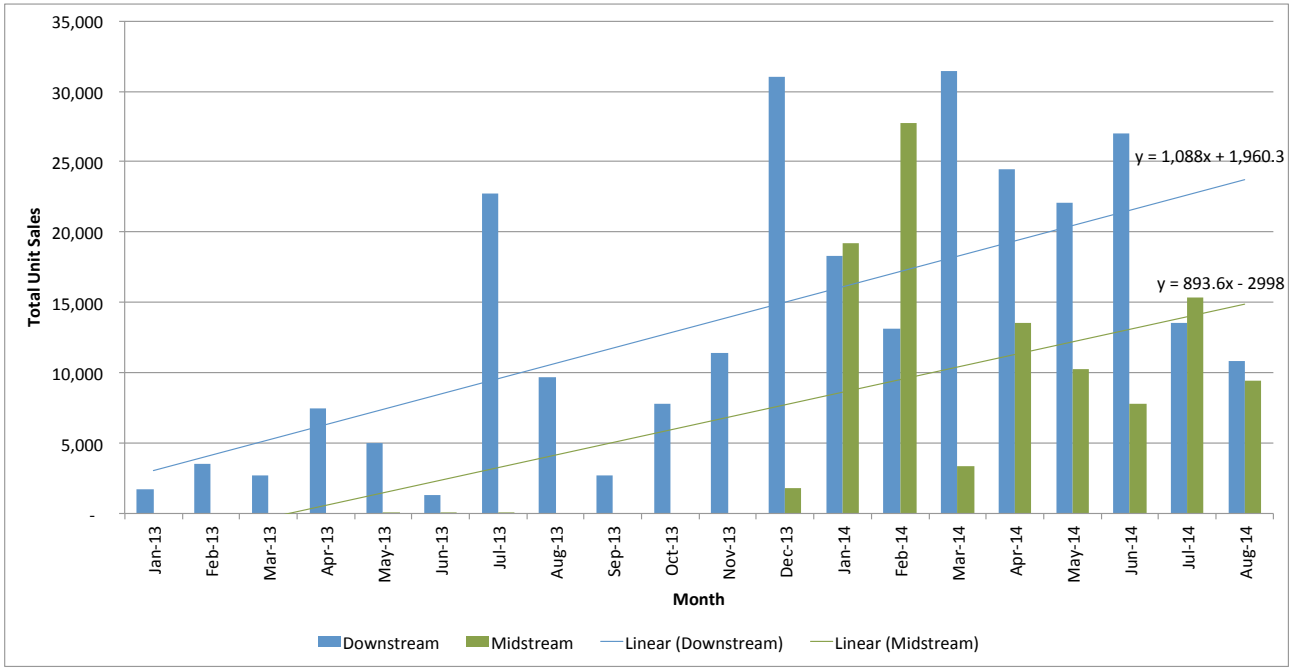
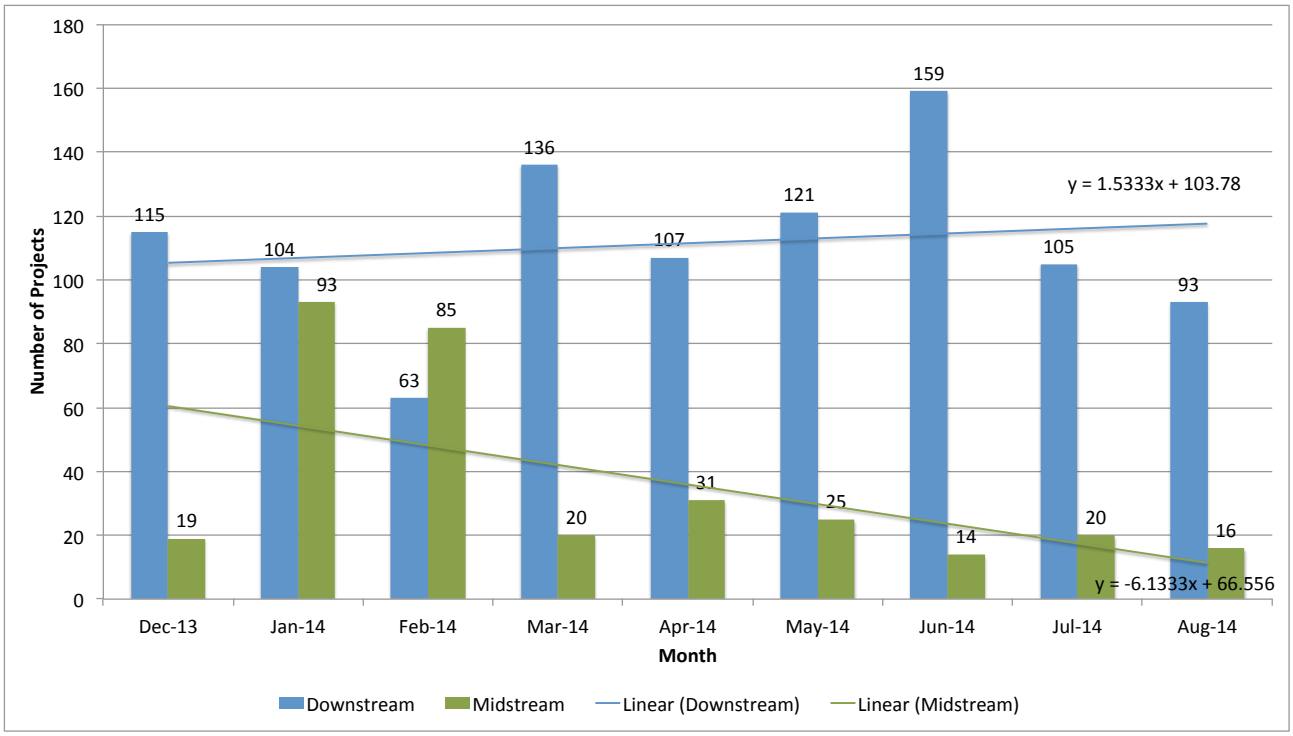


Figure 13 compares the total projects by month for the same period. The trend lines show that the number of projects through the Midstream Pilot Program decreased over time whereas the Downstream Program was more consistent month to month. However, this is the result of sales exceeding the budget allocation in January and February, with incentives being brought in line with reserved amounts again in the following months.

Figure 13: Total Projects, by Month, by Incentive Channel (December 2013 through August 2014)



On average, the Pilot Program seems to attract customers seeking larger quantities of LED products than the downstream programs. As shown in Figure 14, in all but two of the nine months the average number of units per project in the Pilot Program is larger than the number of units per project with downstream incentives. Furthermore, the average downstream project size declined steadily between February 2014 and August 2014, while Pilot Program project size trends noticeably in the other direction. Over the Pilot period, as shown later in Figure 16, there were many large and small projects that received Pilot incentives, with Downstream projects more evenly distributed by size.

Figure 14: Average Number of Units per Project, by Month, by Incentive Channel (December 2013 through August 2014)

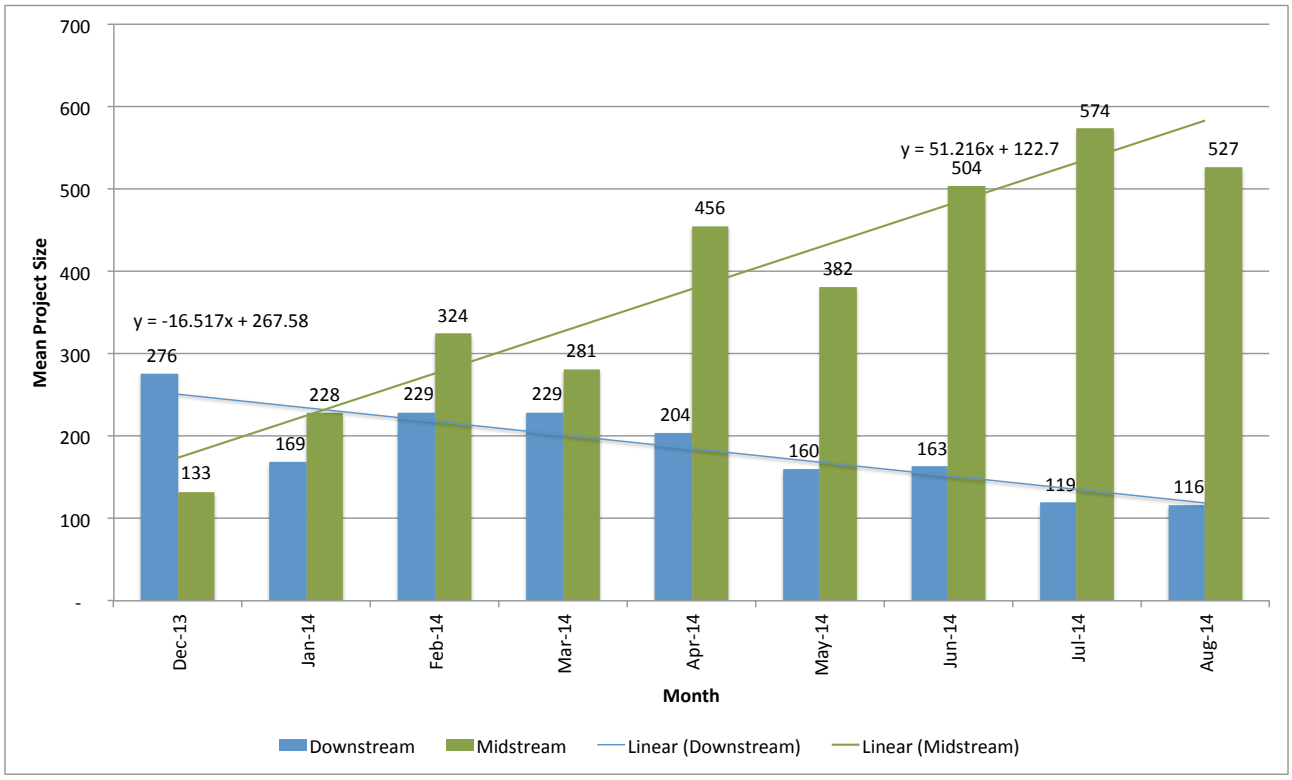
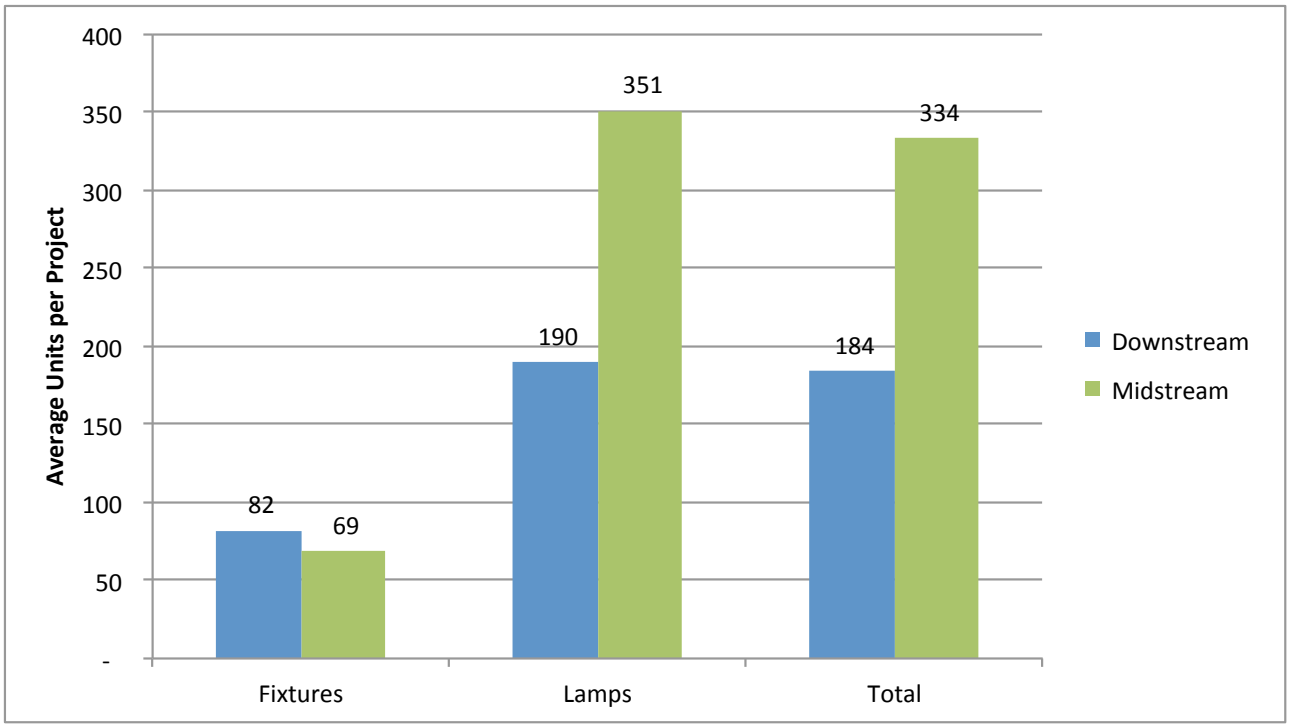


Figure 15 compares the mean downstream and midstream incentivized sales volumes, per project, for LED replacement lamps, LED fixtures, and overall. As shown, the average volume of LED replacement lamps (for projects that included LED replacement lamps) purchased with midstream incentives was nearly 161 units greater than the average volume through downstream incentive channels. The average volume of fixtures purchased with incentives was more similar across programs.

Figure 15: Average Number of Units per Project by Unit Type – Comparison with Midstream (December 2013 through August 2014)



2.2.1 Project Size Comparisons

Figure 16 compares the Pilot Program with the downstream programs in terms of the percent of projects of various sizes. As noted in Figure 9, the Pilot Program served a high number of extremely small projects (19% of projects were less than or equal to 20 units in size) and particularly large projects (23% of projects were greater than 500 units in size). In comparison, projects receiving downstream incentives were slightly more evenly distributed by project size. Only 15 percent of projects were 20 units or smaller, and only seven percent of projects were greater than 500 units in volume.

Figure 16: Percent of Projects by Project Size Bin – Comparison with Midstream (May 2013 through August 2014)

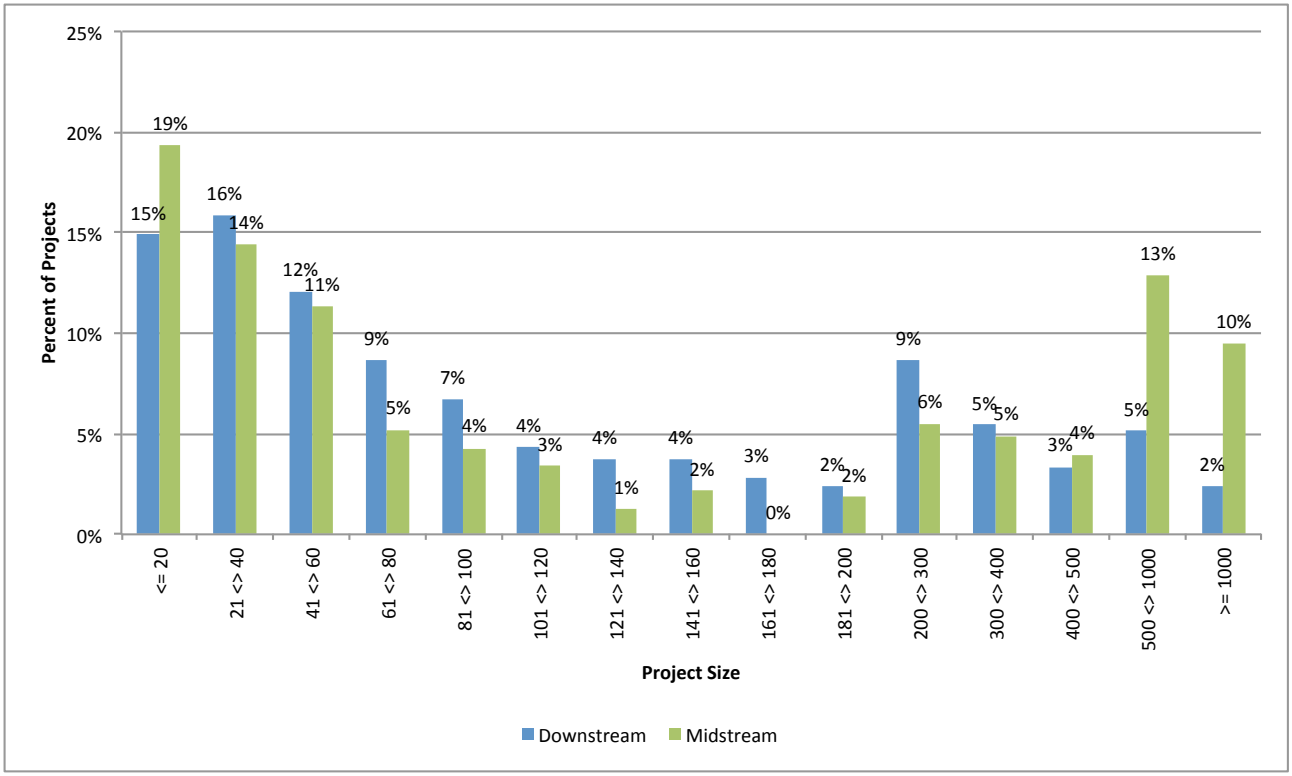


Figure 17 compares the percent of downstream and Pilot Program units by project size bin (using the same bins as above). The majority of incentives through each incentive channel are for larger projects. However, the Pilot is more skewed towards the largest projects, with nearly half of the units receiving midstream incentives for projects greater than 1,000 units in size, compared to less than a quarter of units through downstream-incentivized projects.

Figure 17: Percent of Units by Project Size Bin – Comparison with Midstream (May 2013 through August 2014)

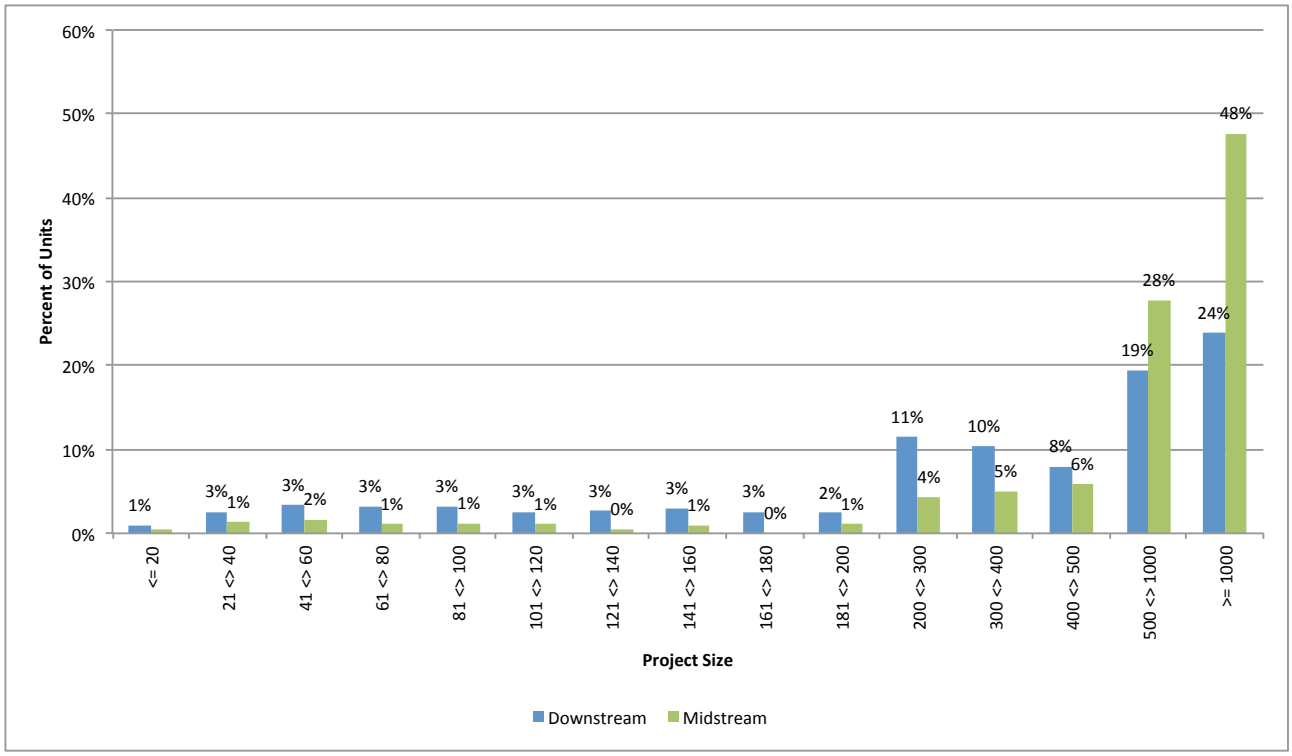
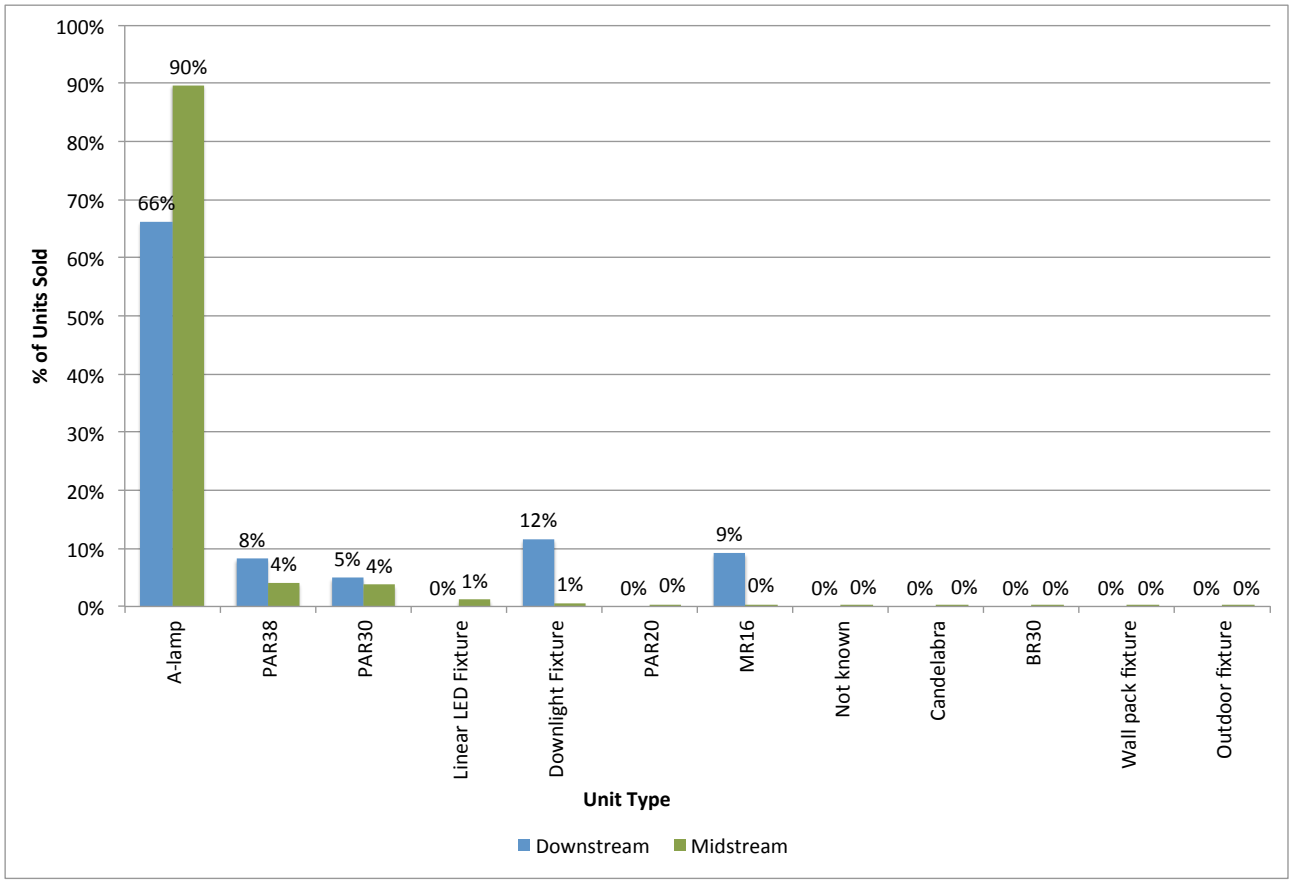


Figure 18 compares the average purchase volume for each unit type between the Pilot Program and downstream programs. As shown, the majority of both midstream and downstream incentives are for LED replacement A-lamps (90% and 66%, respectively). Downstream incentives were provided in greater volumes for other LED replacement lamp and fixture types, including LED replacement PAR38s (8%), PAR30s (5%), and MR16s (9%), as well as downlight fixtures (12%).

Figure 18: Proportion of Sales by Lighting Type – Comparison with Midstream (May 2013 through August 2014)



2.2.2 Customer Participation in Both Midstream and Downstream Programs

We also investigated evidence of customer participation in both the Pilot Program and the downstream programs. We matched sales records between the Pilot Program database and the downstream program database using utility Service Account Identification Number (SAID) and street address. If there was a match on either of these variables then the customer was considered to have participated in both programs. There were a total of 20 customers that overlapped, or approximately five percent of the Pilot Program end users (representing 7.7 percent of Pilot sales) .

Table 9 below presents some of the characteristics of these customers. As shown, there are many instances in which a customer received incentives for similar measures through both channels. There are cases where a customer first participated in a downstream program and later received Pilot Program incentivized products, but there is no indication whatsoever that this is double dipping. There are cases where the opposite is true, as well. It is unclear why customers participated in multiple programs over short periods of time for similar (or the

same) measures, however among customers who participated in both, many received fixtures from the downstream programs and LED replacement lamps from the Pilot.

Table 9: Characteristics of Participants of Midstream Pilot Program and Other Lighting Programs

Site	Business Type*	Midstream Pilot Program		Downstream Program	
		Measure Type (Quantity)	Install Date	Measure Type (Quantity)	Install Date
1	Lodging - Hotel	A-lamp (306)	Jan-14	A-lamp (533)	Sep-13
2	Lodging - Hotel	A-lamp (336)	Feb-14	A-lamp (362)	Jun-14
3	Office - Small	A-lamp (15)	Jun-14	PAR30 (218)	Mar-14
4	Lodging - Hotel	A-lamp (32)	Feb-14	A-lamp (1,650)	Apr-13
5	Office - Small	A-lamp (150)	Mar-14	MR16 (55)	Jan-13
6	Lodging - Hotel	A-lamp (350)	Mar-14	Downlight fixture (250)	May-14
7	Retail - Single-Story Large	A-lamp (13) PAR30 (3)	Jan-14	Downlight fixture (396) MR16 (47)	Jul-14
8	Lodging - Hotel	A-lamp (336)	Jan-14	Downlight fixture (263)	Mar-14
9	Lodging - Hotel	A-lamp (247)	Jan-14	A-lamp (225) Downlight fixture (42)	Apr-14
10	Lodging - Hotel	A-lamp (1,024) MR16 (30)	May-14	A-lamp (74) PAR30 (94)	Dec-13
11	Assembly	A-lamp (158) Candelabra (3) MR16 (39) PAR30 (25) PAR38 (48)	Apr-14	PAR30 (22) PAR38 (48)	Mar-14
12	Lodging - Hotel	A-lamp (1,000)	Apr-14	MR16 (88) PAR38 (98)	Aug-12
13	Lodging - Hotel	A-lamp (700)	Feb-14	MR16 (146)	Jun-14
14	Restaurant - Sit-Down	A-lamp (40)	May-14	Downlight fixture (64)	May-14
15	Lodging - Hotel	A-lamp (459)	Feb-14	A-lamp (310)	Jul-14
16	Lodging - Hotel	A-lamp (2,000)	Feb-14	Downlight fixture (97)	Apr-14
17	Education - Secondary School	A-lamp (24)	Feb-14	Downlight fixture (6) MR16 (14) PAR30 (109) PAR38 (6)	May-14
18	Lodging - Hotel	A-lamp (500)	Mar-14	Downlight fixture (27)	Nov-12
19	Lodging - Hotel	A-lamp (492)	Feb-14	Downlight fixture (12)	Jan-14
20	Office - Small	A-lamp (18)	Jan-14	MR16 (160)	Nov-13

* Business type was available for downstream records only.

3 Commercial Lighting Market Actor Interview Findings

In this section we present findings from in-depth interviews with lighting distributors and installation contractors.

3.1 Distributor In-Depth Interview Findings

We interviewed two groups of lighting distributors – those who have participated in the Midstream LED Distributor Pilot (and have received incentives for LED replacement lamps or fixtures through the Pilot Program), and distributors who have not participated in the Pilot Program. The overall objective of this research task was to elicit information from distributors as part of a larger assessment aimed at determining if a direct midstream approach is a better or complementary way to engage the lighting supply community to increase market penetration of LED replacement lamps and fixtures in the commercial sector.

3.1.1 Respondent and Firm Background

We spoke with a total of seven distributors that serve commercial end users in Southern California Edison territory. Of the seven distributors we spoke with, five participated in the Pilot Program and two did not. Across both groups there was a nearly even split between distributors who are electrical distributors (including lighting) and those who are lighting distributors only (Table 10). All of the distributors sell LED replacement lamps and all but one participating distributor sells LED fixtures and lighting products *other* than LEDs.

Table 10: Type of Distributor Interviewed

Type of Distributor Interviewed	Lighting Distributor	Electrical Distributor
Participant	2	3
Non Participant	1	1

We asked participating distributors about the percentage of their lighting and fixture sales that had gone through *any* rebate program since July of 2013 (when the Pilot Program started[12]). With the exception of one business whose model is to run all products through rebate programs, respondents that could answer this question, estimated that between eight and 28 percent of their sales received rebates. Another participating distributor estimated that 20 percent of their energy efficient lighting sales received rebates (they were not able to estimate the proportion of all lighting sales).

[12] Despite officially starting in July 2013, the sales data analysis component of this project includes Pilot Program sales from May 2013.

3.1.2 The LED Market

In this section we discuss and compare stocking practices and LED sales across both participating and non-participating distributors.

3.1.2.1 Distributor's Customers

Four out of five participating distributors serve both contractors and end users, while one only serves end users (although they did sell to contractors when it was a program requirement). Among the four that sell to both groups, two estimated that half of their sales were to contractors and half to end users.[13] One participating distributor estimated that 80 percent of their sales were to contractors, and the remaining distributor estimated that 85 percent of their sales were direct to end users. Reportedly, fixtures are much more likely to go through contractors due to the complexity and technical expertise needed to install fixtures.

3.1.2.2 Stocking Practices

Participating and non-participating distributors were asked a series of questions about their stocking practices for LED replacement lamps and fixtures and lighting in general, and the effects their stocking has on the lighting market.

Two of three participating distributors said that the relative availability of LED products could affect what is installed in commercial locations (two were unable to answer). This was partially attributed to the way that contractors do business. One participant stated that, "the way contractors are, they drag on for six to nine months and then need something immediately, so I think having it on the shelf or from a manufacturer locally does make a difference, especially to contractors." Another participating distributor handles this concern by working with multiple vendors to avoid running out of stock.

Despite the potential negative effect on the market, distributors expressed some reluctance to stocking high-risk, expensive LED products. According to two distributors, the quick advancements in LED technology can lead to unsold – and un-returnable – products. This concern is highlighted in the following quotes from the distributors:

> *"Because the technology is shifting so fast, if I stock things that I may not sell for four to six months they are likely to be out of date by the time I sell and I'll have to write them off."*
>
> *"It is difficult to stock LED lamps because it takes eight weeks to receive a new product, and then they've already come out with a new version of that lamp. Once you buy it you own it and they won't let you return it… It is hard to invest in a technology that is changing so rapidly that you can't return."*

[13] One of the participants who noted that 50 percent of their sales came from contractors said that this number would be higher if it were not for a large hotel project that received the Midstream LED Distributor Pilot incentives.

Even though some of the distributors are reluctant to risk stocking LED products, all seven of the distributors we spoke with had LED lamps in stock at the time of our interview. Participating distributors report that their LED replacement lamp and fixture stocking decisions are made for various reasons, including:

- **Customer demand**. Four distributors (two participating distributors and two non-participating distributors) noted that customer demand drives LED replacement lamp stocking practices (including contractors and end users). Because there is a longer lead-time for LED fixture purchases, customer demand for those products doesn't drive stocking practices.
- **Price**. Two distributors reported that price has a direct impact on LED stocking practices.
- **Manufacturer/brand**. Three participating distributors mentioned the importance of the manufacturer or brand in their decision to recommend lighting products. One mentioned the need for a good working relationship with manufacturers, noting that for the higher end or mid-range LEDs it is important to "realign with those manufacturers who are willing to take returns and support you."
- **Delivery requirements**. One participating distributor reported that if a manufacturer can deliver products in a timely manner, they would not stock the products. However, if demand is outpacing the ability of the manufacturer to quickly supply their customers, they will consider maintaining stock of the products.

Participating and non-participating distributors reported that customer demand (n=4), manufacturer/brand (n=2), and price (n=1) impact their stocking practices for lighting products in general. Every distributor reported that they currently stock screw-in lamps (Table 11). Other LED products stocked by the respondents included wall packs, flood linear fluorescent replacements, high bays, and floodlights.

Table 11: Number of Participating and Non-Participating Distributors with Various LED Lamps and Fixtures in Stock

Type of LED Lamps in Stock	Participant	Non-Participant
Screw-in lamps	5	2
Wall packs	2	1
Flood lights	1	1
Linear fluorescent replacement	2	1
High bay	2	1
Fixtures	2	1

3.1.2.3 LED Replacement Lamp Sales

In this section we present findings related to LED replacement lamp sales among participating and non-participating distributors. Both groups were asked a series of questions focused on changes in LED replacement lamp sales since July of 2013, and all respondents – both participating and non-participating distributors – indicated that the LED replacement market has grown regardless of whether they participated in the Pilot.

While all participating distributors reported that there has been an increase in LED replacement lamp sales since July of 2013, only one was able to provide an estimated increase. This participating distributor estimated that sales had increased 300 percent since July of 2013.[14] Both non-participating distributors reported that there has been an increase in LED replacement lamp sales since July of 2013. One of the non-participating distributors estimated a five to ten percent increase due to an increase in customer interest and improvements in product quality. The second non-participating distributor estimated ten to 15 percent growth, but believed the growth to be natural replacement of older technologies.

Four of the participating distributors attributed their LED lamp sales increase to the Pilot Program. One also credited the downstream program due to higher rebate levels for certain products (such as lamps that are used 24/7 in a common area of a hotel). In addition to that, two participating distributors (and both non-participating distributors) credited the increase in sales to an overall decrease in price of LEDs and one participating distributor cited a general increase in awareness.

3.1.2.4 LED Fixture Sales

While all distributors saw an increase in LED replacement lamp sales since July 2013, only three out of four participating distributors who sell LED fixtures noticed an increase in LED fixture sales over the same time period (one does not sell fixtures, and thus was unable to provide an estimate). One of the non-participating distributors also noticed an increase in fixture sales since July 2013.

Four out of the seven total distributors attributed the sales increase to decreases in the price of LED fixtures in general. One added that the rebates serve to increase the effect of already declining prices, saying, "the numbers are finally making sense, so with the rebate on top of that it isn't quite a 'no brainer,' but it is close." Two respondents also attributed the increase in fixture sales to a general increase in customer demand, with one reporting that many of their fixture sales fulfill specifications in blueprints (likely from lighting designers or architects).

Three participating distributors believe that the Pilot Program may be in part responsible for LED fixture sales increases. One participating distributor noted that it increased awareness among a group that is not usually targeted otherwise. Two participating distributors said the

[14] The distributors who were not able to give a percentage estimate described change in LED sales as "significant growth," "[a] definite increase," and "greatly increased."

sales increase was not due to the Midstream LED Distributor Pilot because the incentive was too small.

3.1.3 Participating Distributor Pilot Program Experience and Interactions

In this section we present findings related to the distributor participation experience in the Pilot Program, as well as their interactions with their customers – lighting contractors and end users.

3.1.3.1 Pilot Program Experience

Overall, participating distributors were very satisfied with the Midstream LED Distributor Pilot (average satisfaction of 4.5 out of five, with "1" being very dissatisfied and "5" being very satisfied). One participating distributor praised Southern California Edison's ability to think innovatively: "Usually, utilities don't think outside the box and because they figure it out two to three years down the line they have missed the boat… it is encouraging to see the IOUs try different things – whether there is success or failure, they are showing that they are not afraid to think outside of the box." When participating distributors were asked about the likelihood that they encouraged LED fixtures to commercial customers due to the Pilot Program, the majority (three of five) responded that it was very likely and two reported that it was somewhat likely.

Despite reporting some challenges setting up the necessary reporting systems for participation, many distributors were pleased once the initial set up was complete. Participants rated their ease of participation an average of 4.4 (out of five) with "1" being very difficult and "5" being very easy. Two participating distributors highlighted the simple process outlined by the SCE program staff noting that the program had "Excellent people servicing it, fast response, and a very simple project process." Another respondent noted, "The tracking that we had to do was pretty simple for us to implement." Participating distributors also reported that collecting and reporting contractor or installer contact information was relatively easy (the four distributors who rated ease of collecting this information reported an average rating of 4.8 out of 5, with "1" being very difficult and "5" being very easy; one distributor was unable to provide a rating).

In general, program requirements were met with understanding from participating distributors. One respondent complained that the policies and formatting kept changing but that they understand that these types of changes happen with new programs. Two other participants noted "we knew what we needed going in" and "from my perspective it was really clear." One participant expressed that they are glad that the data collection is in place because they "are very concerned about how other people in the marketplace implement this type of program," and expressed concern about the honesty of other firms should requirements be reduced. One respondent expressed gratitude that they did not have to collect the commercial utility account numbers of the end use customers, and would not have participated if that were the case as their systems are not setup to collect this information.

All participating distributors were very content with the rebate processing time, rating it a five out of five (on a scale of one to five, with "1" being very dissatisfied and "5" being very satisfied). Respondents attributed their high level of satisfaction with rebate processing to both the responsiveness of the staff and the speed at which they would fulfill rebate applications. One respondent noted that:

> *"[SCE was] interested in us getting money, which is typically unusual. Typically they could care less when or if they get paid. They realized they were trying to encourage our participation they paid us very quickly."*

Participating distributors were also satisfied with the qualifying products list, rating it an average of 4.8 out of five (with "1" being very dissatisfied and "5" being very satisfied). The high ratings were attributed to the clarity of the list (one participant), the way it was based on lumens (one participant), and the flexibility of the list (one participant). Two respondents suggested that candelabra base lamps should be considered for inclusion on the qualified products list.

3.1.3.2 Communication with Contractors and End Users

All five interviewees told purchasing contractors (four of five serve contractors) and end users about the Pilot Program rebates. The participating distributors reported that the Pilot Program had a fairly significant effect on their interactions with both contractors and end users. Select quotes from our interviews highlight distributor actions induced by the Pilot Program:

> *"Because of this program we actually aggressively went into an outbound marketing mode and recommended products to people we normally wouldn't have."*

> *"We knocked on their [end user] doors more vigorously and then we presented the program… We actively marketed and sold the program. That is the reason they made the decision."*

> *"We spent thousands of dollars on posters and window clings in store locations. We printed 10,000 flyers. All my sales people were handing them out. We sent mailers to over 5,000 contractors a month, for two months. We worked very hard to market…"*

We also asked distributors to consider program preference specifically from the perspective of contractors. All four participating distributors that work with contractors said that they believe that contractors would prefer to work through the Midstream LED Distributor Pilot. The same was true for end users.

In general, participating distributors saw value in being able to better serve their customers. Three out of four participating distributors that worked with contractors said with certainty that the Pilot Program improved their relationships with contractors. One distributor added that the Pilot Program "…worked better to enhance relationships with end users because they were pleased with what the distributor could provide them."

3.1.4 Non-Participating Distributor Pilot Program Perceptions

Both of the non-participating distributors we spoke with have not participated in the Pilot Program because they had not heard about it, but they did both see value in a distributor incentive mechanism. They cited that it would give them competitive advantage to get a job and that better pricing "is key." On a scale of one to five, with five being very likely to participate, one non-participant rated their interest at a five and the other rated their interest at a three because they are not sure what the owners of the company would say or do.

Non-participating distributors are split in their experience levels with other utility rebates. One firm had end users that received rebates (likely from PG&E) in the past year, and the other did not. The firm that received rebates reported that the rebate covered 10 percent of their lighting sales overall and represented 100 percent of their LED product sales.

3.1.5 Cannibalization and Attribution

We asked each of the participating distributors a series of questions to inform our assessment of the effectiveness of the midstream incentive approach. Specifically, we asked them to compare the midstream and downstream incentive mechanisms on LED replacement lamp and fixture sales, the influence of Title 24 requirements, and overlap with other incentive programs.

3.1.5.1 Midstream versus Downstream

We asked participating distributors to compare the Pilot Program to SCE's downstream rebate programs. Four participating distributors reported that the immediate discount of the Pilot Program was the most significant difference from the downstream rebate programs. One distributor explained the importance of the immediate discount:

> *"Having those instant incentives made it so easy for someone to engage immediately. There are customers who are conditioned not to spend money. You can walk in there with the greatest investment proposal of all time and customers don't buy."*

In addition, participating distributors mentioned a decrease in paperwork for the end user as a major difference between programs. One distributor mentioned that, "[the Pilot Program] makes our jobs as distributors a little more difficult, but… for end users and contractors it is a blessing."

The majority (four of five) of the participating distributors we spoke with reported that end use customers are the same for the downstream programs and the Pilot Program. The fifth distributor reported that direct install programs had essentially cornered the small commercial market, and thus they typically worked on larger projects.

We asked respondents to consider whether the Pilot Program was superior, complementary, or inferior to the existing downstream rebate programs. The majority (three of five) of distributors reported that the Pilot Program was superior because of the ease of implementation (one mentioned that this would remain true as long as the rebate amounts

are equal). Two of these distributors noted that if incentive amounts were equal, clients would utilize the Midstream LED Distributor Pilot. The two remaining participating distributors believe that the Pilot Program is complementary because it attracts different end users or contractors to participate (each mentioned by one of the respondents). However, one distributor cautioned that if a customer is looking for more than just lighting, they might select to apply for downstream rebates as part of a larger rebate application.

We also asked participating distributors which products – LED replacement lamps or LED fixtures – would be best suited to the downstream programs, and which would be best suited to a midstream rebate approach. All but one distributor thought that all LED products (lamps and fixtures) are best supported by a midstream incentive (assuming equal incentive levels). This distributor believes that fixtures are better served by a downstream structure "because fixtures are more complicated and will get more so with Title 24." They believe that items that require more design work – e.g., specifying fixtures – would be better served in a custom incentive program.

One of the distributors who supported midstream incentives for both LED replacement lamps and LED fixtures was particularly averse to splitting fixture and lamp rebates across programs, saying that, "if you put some in one and some in the other that would mean for the same building you'd have to do two separate programs and that would be insane."

3.1.5.2 Effects of Title 24

Three of four participating distributors who sell LED fixtures reported that Title 24 did not affect LED fixture sales that received support through the Pilot Program. This was in part due to the timing of the Pilot Program (according to two of four distributors) and in part due to the low sales of fixtures through the program. One participating distributor did see an impact of the building code – many of their clients tried to get their projects completed before the new Title 24 rules came into place.

Two participants predicted that Title 24 would affect LED sales in the future (particularly for LED fixtures and in the new construction market).

3.1.5.3 Other Incentive Programs

In addition, we asked participating distributors to estimate what proportion of their sales through the Pilot Program would have received incentives through another rebate program in the absence of the midstream incentives. Three of the participating distributors thought that some (ranging from five percent to 60 percent) of their customers would have conducted similar retrofits and applied for (and received) incentives through another program. Two participating distributors believe that none of their projects that received midstream incentive support would have received rebates through other programs.

While non-participating distributors did not have experience with the Pilot Program, we asked them to estimate if the Pilot Program would affect participation in the downstream programs. One did not know how it would affect the downstream programs and the other

thinks that if the pricing was lower it will definitely affect consumer's ultimate participation decision.

3.1.6 Impact of Midstream Approach

All participating and non-participating distributors we spoke with agree that the Pilot Program is a beneficial addition to the portfolio. In this section we discuss the impact of the midstream approach on the stocking practices and sales of LED replacement lamps and LED fixtures among participating distributors.

3.1.6.1 Changes in Stocking

Since July 2013, two participating distributors stock more LEDs, one stocks the same, and one says they stock less since they are relying more on their manufacturers to stock both fixtures and lamps (one was unable to answer). The two participating distributors who increased LED stock attribute the change in part to the Pilot Program, but also in part to other incentive programs, increases in customer demand, and the general declining price.

3.1.6.2 Changes in Sales

We asked participating distributors about the influence of the Pilot Program on LED replacement lamp and LED fixtures sales. All five participating distributors said that it increased LED replacement lamp sales, but only one believed it increase LED fixture sales. Nobody was confident in reporting a percentage increase attributable to the Pilot Program.

The Pilot Program lowered the upfront cost of LED replacement lamps, and distributors reported that this was very helpful in motivating clients to purchase LED replacement lamps. However, two respondents noted that the fixture incentives did not cover a sufficient proportion of the overall cost to make much of a difference in customer adoption.

3.2 Contractor In-Depth Interview Findings

We interviewed two groups of lighting contractors – those who have installed LED replacement lamps or fixtures purchased from distributors that received Pilot Program incentives ("participating" contractors), and those that have not. The overall objective of this research task was to elicit information from contractors as part of a larger assessment aimed at determining if a direct midstream approach is a better or complementary way to engage the lighting supply community to increase market penetration of LED replacement lamps and fixtures in the commercial sector.

3.2.1 Respondent and Firm Background

We spoke with a total of nine contractors that serve commercial end users[15] in Southern California Edison territory. Of the nine contractors we spoke with, seven participated in the Pilot Program and two had not.

3.2.1.1 Participating Contractors

The participating contractors we spoke with have been with their companies for three to 35 years (average of 18 years). Four are electrical contractors, two are lighting contractors only, and one focuses on energy efficiency retrofit/upgrade projects (including lighting and other technologies). Almost all (six of seven) of the participating contractors do fixture installations.

We asked participating contractors if they participated in any utility programs other than the Midstream Pilot since July 2013. Three respondents specified that they had only participated in the Pilot Program. Only one other utility rebate program was mentioned by name (SCE's Express program), but one respondent mentioned that they help customers with programs all over the country.

3.2.1.2 Non-Participating Contractors

Both of the two people we spoke with as part of our non-participating contractor interviews were aware of Midstream Pilot and had experience with other utility programs. Both work with LED lamps but only one of the contractors worked with LED fixtures. For one non-participating contractor, 80 percent of their products since July 2013 have received utility rebates. For the other non-participating contractor all of their sales have received utility incentives, as their firm specializes in connecting commercial customers with utility energy efficiency incentive programs.

3.2.2 The LED Market

All but one of the participating contractors noticed an increase in LED lamp sales over the past two years. The three most frequently cited reasons for the sales increase include lower cost, improvements to LED lamp quality and increased acceptance among consumers. Lower cost of LED products was cited by five of the seven participating contractors. Typically, including in this case, the lower cost affects the payback period for end users. In addition, one contractor also noted that the lower cost has been particularly important because it has allowed for distributors to buy and stock larger quantities of LED products. Lamp improvements were mentioned by three of the seven participating contractors. These improvements include broader applicability (including the ability to dim), longer lifespans, improved beam spread, better color rendering, and improvements to physical LED aesthetics in general. In addition to lower cost and quality improvements, three participating contractors cited increased

[15] One additional participating contractor who we interviewed relied on the program for incentives for two residential retrofits (only). They were excluded from our analysis.

acceptance among consumers. Two contractors believe that wider availability is the reason for this increase and another noted that building code (Title 24) is partially responsible.

Three respondents reported that 100 percent of LED sales are installed in early replacement situations. Another three claimed that between 75 and 90 percent replaced functioning equipment, and one believes early replacement installations account for one-quarter of their sales.

Five of seven participating contractors reported that the most common application for LED lighting is exterior lighting, which, according to two of the contractors, is due to the relatively high return on investment (due to generally high operating hours for exterior lighting). Second to exterior lighting were down lights (three of seven participating contractors) and track lighting (two of seven participating contractors). Troffers and high bay lighting were mentioned by one participating contractor each.

Two contractors (one participating and one non-participating) reported that they have noticed an increase in LED fixture sales. The participating contractor reported that they have seen an increase in outdoor fixtures (specifically in parking lots) and the non-participating contractor reported that they have seen a 20 to 30 percent increase in fixture sales over the past two years. One participating contractor reported that LED fixtures have increased in quality and another mentioned that fixture retrofits are more common among higher end properties.

3.2.3 Participating Contractor Pilot Program Experience and Interactions

In this section we present findings related to the contractor participation experience in the Pilot Program, as well as their interactions with their suppliers (distributors) and their customers (end users).

3.2.3.1 Pilot Program Experience

Overall, participating contractors were very satisfied with the Pilot Program. Participating contractors rated their level of satisfaction 4.5 out of five, on a scale of one to five, with "1" being very dissatisfied and "5" being very satisfied. Contractors reported that their high level of satisfaction stemmed from positive views on the quality of qualifying products, high rebate amounts, and high end user satisfaction.

Participating contractors were also generally satisfied with the qualified products list, albeit less so than with the overall Pilot Program. On a scale of one to five, with "1" being very dissatisfied and "5" being very satisfied, an average satisfaction rating of 4.1 indicates that there may be room for improvement. To improve the list, contractors mentioned specific products that they thought should be included, such as retrofit kits, additional wall packs, lighting polls, and candelabra based lamps. However, it is unclear if the list's exclusion of certain products is problematic from a program implementation standpoint, or whether contractors would always recommend adding more products that they sell to the qualified list.

Despite the desire for additional LED products on the list, respondents also had positive feedback. One reported that when they discussed what they wanted with distributors, the message would get to SCE and the product would eventually show up on the list.

Four of seven participating contractors report that they were very likely to encourage LEDs to customers due to the Pilot Program. For all four contractors, the availability of the rebate was the primary factor in their decision to encourage LED adoption among their customers. The impact of the incentive is clear in the following two quotes from participating contractors:

> *"Once I found out about [the Pilot Program incentives] I pretty much called every one of my customers that I knew could benefit from it. With the incentive it made it low cost or almost no cost to get the LEDs installed."*
>
> *"[With the rebate] it was close enough to what the replacement cost would have been for another lamp type."*

Two participating contractors said that they were somewhat likely to encourage LEDs to customers due to the Pilot Program (one thought that interior LEDs were still too expensive). The last contractor said they were not very likely to recommend LEDs due to the Pilot Program, explaining that they just presented what was best for their client and that it did not necessarily include information about the rebate.

3.2.3.2 Communication with Distributors and End Users

All participating contractors said that their involvement in the Pilot Program did not require much additional effort from their normal business practices, including maintaining similar relationships with supplying distributors. However, one participating contractor expressed concern about increasing competition from distributors who are doing direct-to-consumer sales and installation work in-house: "Distributors are now going after my clients."

Three participating contractors reported on their perception that their customers were satisfied with the LED replacement lamps and LED fixtures installed through the program. One reported that their customers were very excited about the LEDs because it improved the light quality in their facilities. Another mentioned that they had one particularly large client who received incentives for several thousand LED replacement lamps, and that the speed of the process led to a very satisfied customer. One other contractor mentioned that they had many return customers due to their high satisfaction with the rebates and the LED products themselves.

All but one of the participating contractors we spoke with said that they told their customers about the Pilot Program rebates. Two respondents said that they only told some of their customers (those that they work with often or that are interested in being on the leading edge of technology adoption). Six of seven participating contractors changed what they presented to customers due to the discounted price (focusing more attention on the price of the products than before). Participating distributors reported presenting information related to the ROI,

the price reduction/incentive, shorter payback period, and one developed a spreadsheet with price comparisons.

3.2.4 Non-Participating Contractor Pilot Program Perceptions

One non-participating contractor explained that they had not participated in the Pilot Program because they did not know about it (but they had heard about the PG&E Midstream Trial). The same contractor added that they believe that the Pilot Program would have increased their sales, but not necessarily for good reasons: they believe that the Pilot Program's less stringent rules (than other incentive programs) regarding replaced equipment would have driven sales through the midstream channel (e.g., customers wanting to replace CFLs).

3.2.5 Cannibalization and Attribution

We asked each of the participating contractors a series of questions to inform our assessment of the effectiveness of the midstream incentive approach. Specifically, we asked them to compare the midstream and downstream incentive mechanisms on LED replacement lamp and fixture sales, the influence of Title 24 requirements, and overlap with other incentive programs.

3.2.5.1 Midstream versus Downstream

In addition to speaking to participating contractors about their general experience with the Pilot Program, we asked them about their experience in comparison to SCE's other incentive programs (one contractor was unable to provide insight because they had no experience with other programs).

The majority of participating contractors (four of six) believe that the customer types are similar across the midstream Pilot Program and other SCE programs. Two participating contractors reported that the Pilot Program lends itself to smaller sized customers and that the other programs lend themselves to larger customers. One of these contractors claimed that the incentive structure was important, noting that certain larger projects may receive higher incentives for the same retrofit through a customized incentive program.

We asked participating contractors what they liked more or less about the Pilot Program compared to the other SCE programs. Only two respondents had traits that they liked more about the downstream programs: the measures selection and the fixture rebate amount. Participating contractors valued the lower amount of paperwork (three participating contractors), the streamlined delivery (two participating contractors), and the ability to receive the incentive immediately (one participating contractor), in comparison to the other SCE programs.

We asked participating contractors what factors determined whether a project would move through a downstream program or would be sold with midstream incentives. Three contractors cited the lighting application as important in determining the appropriate incentive program (two of whom specifically mentioned that they would use midstream

incentives if a project was comprised of screw-in lamps). Two contractors reported that the time to receive a rebate directly affects which programs they use, and that the distributor program was particularly effective for them because of the instantaneous nature of the incentive.

When asked if the Pilot Program design was superior, complementary or inferior to the downstream programs, three of the four participating contractors that responded said that it was superior. One person noted that it was complementary because it works well for small customers.

We also asked participating contractors whether LED replacement lamps or LED fixtures are best suited to the downstream programs or a midstream rebate approach. Four of seven participating contractors believe that all LED products would benefit most from the Pilot Program (if they could only qualify for one type of rebate).

Three participating contractors believe that screw-in replacement lamps would be best served by midstream incentives, but that fixtures and other more complicated lighting retrofits should instead go through downstream channels.

3.2.5.2 Effects of Title 24

None of the participants believe that their sales through the Pilot Program were due to Title 24 although all are aware of the requirements. One contractor believed that Title 24 had increased their sales (not through the Pilot Program) but two contractors said that it is having a negative effect on the market. One contractor reported potential for non-compliance.

3.2.5.3 Other Incentive Programs

Five of six participating contractors reported that without the Pilot Program customers would not have received incentives for LEDs through other programs (one was unable to provide input) due to the more time intensive nature of participation in the other programs.

One participating contractor appreciated the ability to present the case for LEDs to their customers (made much stronger by the Pilot Program incentives). Another contractor thought that customers would have eventually participated in other programs but that the Pilot Program allowed them to do it sooner. Two added that without the Pilot Program they believe that some of their customers would possibly buy non-incented LEDs. One contractor did believe that their customers would have definitely purchased LEDs outside of the Pilot Program, but noted that the Pilot Program was responsible for increasing the quantities purchased by their customers.

3.2.6 Impact of Midstream Approach

All seven participating distributors think that the midstream Pilot Program would be beneficial as a permanent addition to SCE's portfolio. Six of the seven participating contractors believed that the Pilot Program was impacting the volume of LED lamp sales in the commercial sector. Two of the contractors we spoke with were comfortable estimating that

the Pilot Program was responsible for a 50 percent increase in the volume of LED replacement lamps in the commercial sector.

Two participating distributors report that the Pilot Program informs people who would not normally have participated in lighting retrofit programs.

Another participating contractor predicted success if the program was continued in the future:

> *"If it were to roll out into a major program I'd say that within 12 months of this thing being fully funded… I'd say the impact would be enormous. No one in their right mind would buy a CFL or fluorescent again if they knew they could get 70% off of an LED replacement lamp."*

All but one of the six participating contractors we spoke with about LED fixtures believed that the Pilot Program was impacting the volume of LED fixture sales in the commercial sector. They reported that fixture sales lag behind replacement sales for two reasons. The first is that fixture incentives through the pilot program were too low to have a significant impact on the market. The second is that installing replacement lamps is less invasive than a fixture retrofit.

4 Commercial End User Midstream Pilot Program LED Recipient Telephone Survey Results

Evergreen completed 56 surveys of end use commercial customers who received LED products incentivized through the Pilot Program.

4.1 Profile of Participating Customers and Projects

In this section we present an overview of the 56 responding firms that received LED products incentivized through the Pilot Program. Of the 56 respondent firms, 54 had installed LED replacement lamps only and two firms had installed LED replacement lamps and LED fixtures. We were unable to conduct surveys with firms that only installed LED fixtures.

Table 12: Measures Installed Through the Pilot Program

Type	# of Interviewees (n=56)
LED Replacement Lamps	54 (96.4%)
LED Replacement Lamps and LED Fixtures	2 (3.6%)
LED Fixtures Only	0 (0%)

Ten business segments were represented among the respondent firms, as shown in Table 13 below. Lodging facilities, including hotels and motels, made up 45 percent of responding business types. It is unclear if the distribution of the population of sites that received Pilot Program incentivized LED replacement lamps and fixtures is similar or dissimilar, as business type was not collected by the Pilot Program (data in the table below are self reported).

Table 13: Respondent Business Type

Business Type	# of Interviewees	% of Interviewees
Lodging (Hotels, Motels)	25	45%
Retail	6	11%
Offices	5	9%
Education	5	9%
Industrial	5	9%
Healthcare	4	7%
Restaurants	2	4%
Condominiums	2	4%
Agricultural	1	2%
Warehouses	1	2%
Total	**56**	**100%**

Almost three-quarters of respondents own the facility in which they conduct business (73 percent). Sixteen percent of respondent firms lease their facility and seven percent manage

the facility under an agreement with the building owner (the specific structure of the agreements is unknown). Four percent of respondents did not know whether their company owned or leased their facility. Across all segments, nearly every respondent firm reported that they are responsibly for paying the electricity bill at their facility (98 percent).

4.2 Motivations for Lighting Retrofits and Pilot Program Awareness

This section explores the respondent firms motivations for conducting lighting retrofits, the influence of market actors on the decision to conduct lighting retrofits, their level of awareness of the Pilot Program incentives and the impact of the Pilot Program incentives on their decision to conduct lighting retrofits.

4.2.1 Motivation to Conduct Lighting Retrofits

The evaluation team asked respondent firms to name the reasons they decided to retrofit their lighting equipment.[16] As shown in Table 14 below, the primary, unprompted reasons respondent firms engaged in lighting retrofits was to save energy (38%) and to lower their energy bill to save money (36%). The most commonly mentioned secondary reason for lighting retrofits was equipment cost savings (21%). This does not mean that the Pilot was not influential – the incentive reducing the first cost barrier is also very important (see section 4.2.3, below).

Table 14: Motivations for Conducting Lighting Retrofit

Reasons for Installing Controls	Primary Reason (n=56)	Secondary Reasons* (n=56)
Saving energy	21 (38%)	10 (18%)
Lower energy bill / saving money	20 (36%)	11 (20%)
Better lighting	6 (11%)	8 (14%)
Equipment cost savings	2 (4%)	12 (21%)
Longer measure life	1 (2%)	9 (16%)
LED pilot program influence	2 (4%)	2 (4%)
Previous equipment failed	1 (2%)	-
Help the environment	1 (2%)	6 (11%)
Corporate practice / scheduled upgrade	1 (2%)	1 (2%)
LED emit less heat	-	5 (9%)
Other**	-	3 (6%)

* Multiple responses permitted

** "Other" includes the following responses: "to be high tech", "they work in my old fixtures", and "recommended by my electrical contractor".

[16] This question was open-ended with unprompted responses.

The updated version of California Title 24 Code mandates that lighting systems will be required to meet all code requirements whenever 10 percent or more of the luminaires in an enclosed space are impacted by a retrofit. Evergreen asked respondent firms if the updated version of California Title 24 Code was an influencing factor in the retrofit decision. As shown in Table 15 below, Title 24 building code appears to have little impact on the retrofit decision with only 5 percent (3 respondents) stating that it was influential. All three respondents who stated Title 24 was influential installed LED replacement bulbs only. Note that none of these firms mentioned Title 24 in their overall motivations to install the LED replacement lamps (shown above in Table 14).

Table 15: Proportion of Projects Impacted by Title 24 Code

Type	# of Interviewees (n=56)
Yes	3 (5%)
No	32 (57%)
Don't Know	21 (38%)

4.2.2 Role and Influence of Market Actors on Retrofit Decision

As shown in Table 16 below, over half of the respondents (63%) stated that someone outside of their firm approached them to recommend an upgrade to their facility's lighting.

Table 16: Proportion of Respondents Approached by Outside Company to Upgrade Lighting

Type	# of Interviewees (n=56)
Approached	35 (63%)
Not approached	16 (29%)
Don't Know	5 (9%)

Among the 63 percent of respondent firms that were approached by an outside market actor about upgrading their lighting system, distributors[17] were the most commonly mentioned market actor (40%; shown in Table 17 below). This aligns with the finding from section 3.1.3.2 that distributors scaled their marketing efforts in response to the Pilot. Fourteen percent of respondents reported that a contractor[18] had approached them about upgrading their facility's lighting, and two respondents (6%) were approached by a local Rotary Club (the meeting place for the Rotary Club received LED replacement lamps through the Pilot Program as well, although they were not surveyed for this evaluation; this response should be considered a form of word of mouth).

[17] Includes responses for lighting distributor and electrical wholesaler.
[18] Includes responses for lighting contractors and electrical contractors.

Table 17: Business or Individual Who Approached Respondents

Type	# of Interviewees (n=35)
Distributor	14 (40%)
Contractor (Lighting or Electrical)	5 (14%)
Rotary club	2 (6%)
Corporate headquarters	1 (3%)
Colleague	1 (3%)
SCE Representative	1 (3%)
Don't Know	11 (31%)

The survey also asked about sources of recommendations for specific equipment, as the business or individual who approached the respondent may not have been the only source of information or recommendations, and many businesses were not approached but rather sought out recommendations from market actors (see Table 16, above). Again, distributors (30%) and contractors (13%) were the most frequent market actors involved in recommending and specifying lighting equipment mentioned by end-users. As shown in the "Most Important" column in Table 18, below, respondents reported that the most important market actor involved in their decision to install LEDs were typically the only ones involved in making the recommendation in the first place (one respondent reported that both distributors and contractors had recommended LED equipment, but that the contractor was more influential in their decision).

Prior end user research conducted on behalf of SCE before the Pilot Program showed a similar trend (that the most important market actor was also the first market actor – likely the result of only one market actor involved in the decision), but also provides a stark contrast: in the previous study, contractors were mentioned by more than half of survey respondents, while distributors were only mentioned by three percent of respondents (this survey was conducted of downstream program participants who received advanced lighting, including LEDs and lighting controls).[19] Despite the initial Pilot Program theory's second assumption that contractors are the most influential market actor (section 1.1.2) it appears that with distributor incentives the primary source of influence has become distributors, among end users who received LEDs through the Pilot.

[19] Evergreen Economics, 2013. *SCE/PG&E Basic/Advanced/LMT Program Process Evaluation: Commercial Lighting Retrofits – Targeted Research, Final Report*. Prepared for SCE and PG&E.

Table 18: Business or Individual Who Recommended Advanced Lighting Equipment

Type	Mentioned* (n=56)	Most Important (n=56)
Distributor	17 (30%)	16 (27%)
Contractor (Lighting or Electrical)	7 (13%)	7 (13%)
Friend / Family Member / Colleague	3 (5%)	3 (5%)
In-house facility manager(s)	3 (5%)	3 (5%)
Corporate headquarters	2 (4%)	2 (4%)
Rotary program	2 (4%)	2 (4%)
SCE Representative	2 (4%)	2 (4%)
Other**	2 (4%)	2 (4%)
Don't Know	14 (25%)	14 (25%)
None	6 (11%)	6 (11%)

* Multiple responses permitted
** "Other" includes architects, and home improvement stores.

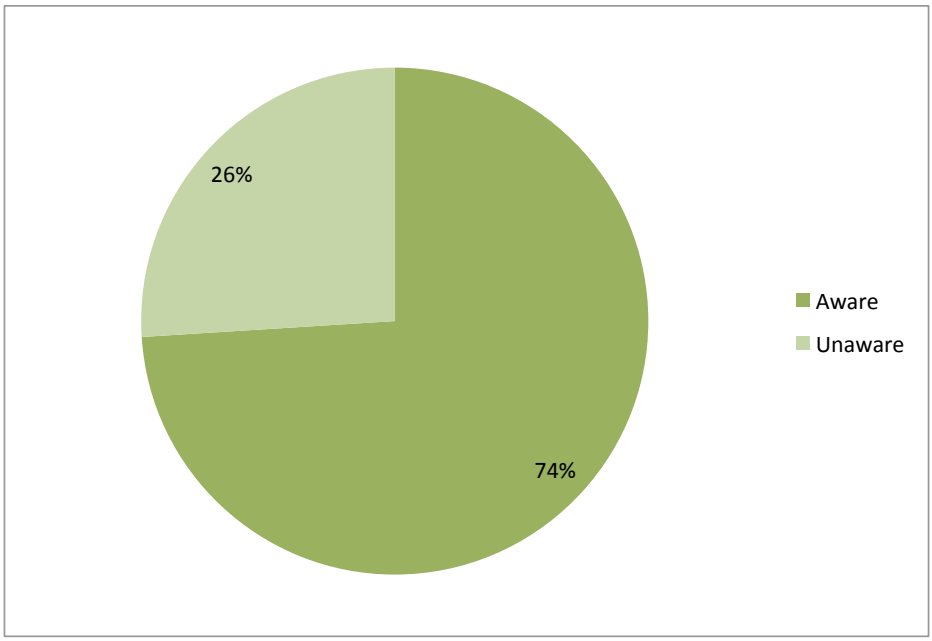
We asked respondent firms who reported that one or more market actors had recommended installing LED equipment at their facility to provide an assessment of the importance of market actor input in their lighting equipment choice. On a ten-point scale, with "1" being "not at all important" and "10" being "extremely important", respondents reported a mean rating of 7.8 out of 10, with 80 percent of respondents reporting an importance rating of seven or greater.

The findings from this section indicate that market actors such as lighting distributors and contractors provide outreach and information that is influential in their customer's decisions to upgrade lighting technology.

4.2.3 Incentives to Distributors

Since the Pilot Program approach provides incentives directly to distributors of LED lighting products rather than to end-users, end-users may be unaware that the equipment they purchase is incentivized by SCE. The evaluation team asked respondents whether they were aware that the lighting distributor who supplied them with their lighting equipment received financial assistance to lower the cost of the products. As shown in Figure 19, 74 percent of respondent firms were aware that the products they purchased received an incentive from SCE that lowered their final purchase price.

Figure 19: Proportion of Firms Aware that Distributors Receive Incentive (n=56)



As shown in Table 19, the primary source of incentive awareness was distributors (44%) followed by SCE representatives (17%). Contractors were mentioned by only six percent of respondents as a source of Pilot Program incentive awareness (among aware firms).

Table 19: Channel Through Which Customer Became Aware of Incentive

Type	# of Interviewees (n=36)
Distributor	17 (47%)
SCE representative	6 (17%)
Colleague	3 (8%)
Rotary program	2 (6%)
Contractor (Lighting or Electrical)	2 (6%)
In-house facility manager(s)	1 (3%)
Property management company	1 (3%)
Other	1 (3%)
Don't Know	3 (8%)

We asked the 36 interviewees who were aware of incentives if the incentives were important in their decision to install new lighting equipment. On a ten-point scale, with "1" being "not at all important" and "10" being "extremely important", respondents reported a mean rating of 7.8 out of 10, with 81 percent of respondents reporting an importance rating of seven or greater.

More than 65 percent of respondents who were aware of the incentive stated that they would have installed the same number or more lamps or fixtures if they were required to submit the rebate application (in order to purchase the same lighting equipment at the same cost), rather than receiving the discounted price through the distributor (shown in Table 20, below). We investigated whether this varied by project size and found no notable trends.

Of the respondents who reported that they would install the same number through a downstream channel, three general reasons were mentioned: planning to upgrade to LEDs; importance of incentive more important than source of incentive; energy and cost savings are worth time spent on paperwork. This suggests that completing rebate applications may not be a barrier to LED purchases for the majority of respondent firms. However, for 21 percent of end user firms the paperwork requirements of a downstream program would have led to fewer or no LED replacement lamp or fixtures purchased by the respondent firm (with 13% not sure of the impact of paperwork on their decision). This suggests that the benefit of a distributor handling the paperwork may be somewhat more important to contractors than end users, as discussed in section 3.2.5.1.

Of the four respondents who reported that they would purchase *more* if they were required to complete a rebate application form, we believe that they may have misinterpreted the question[20], as three of them reported the highest level of satisfaction with the Pilot Program (one did not report overall satisfaction). Furthermore, they reported similar reasoning as customers who would have purchased the same amount despite paperwork requirements.

Table 20: Impact on Retrofit if Firm Had to Complete Rebate Application

Number of Lamps Installed	# of Interviewees (n=56)
Same Number	33 (59%)
More	4 (7%)
Fewer	8 (14%)
None	4 (7%)
Don't Know	7 (13%)

4.3 Pilot Program Experience

This section explores the respondent firms experience with the Pilot Program, including where firm's purchased their equipment, the size of the retrofit and what equipment was installed, and what equipment was replaced.

[20] Question 25 contained a hypothetical scenario, which can lead to misunderstandings. It read: "If you were required to submit a rebate application in order to receive the <MEASURE> at the same cost, instead of receiving the discounted price directly through the distributor, would you have installed the same number, more, fewer, or no <MEASURE>?"

4.3.1 Equipment Purchasing

Of the 37 respondents who could recall the supplier who sold them LED replacement lamps through the Pilot Program, the majority (60%) stated that they made the purchase directly from a lighting distributor, while 14 percent purchased from a lighting contractor, as shown in Table 21, below (19 respondents could not recall the type of business or individual). Five percent purchased the LED replacement lamps from electrical contractors and electrical wholesalers, respectively. Reportedly, another five percent purchased their Pilot Program LED replacement lamps directly from a home improvement store.[21]

Table 21: End User Source for Pilot Program LED Replacement Lamps

Type	% of Interviewees (n=37)
Distributor	24 (65%)
Contractor (Lighting and Electrical)	7 (19%)
SCE	3 (8%)
Home improvement store	2 (5%)
Energy services firm	1 (3%)

More than half of respondents who could recall the type of supplier reported that they typically purchased replacement lamps from the same source (57%), with 64 percent of respondents with project size of less than 100 lamps reporting they used their typical source and 52 percent of respondents with over 100 lamps in their project reporting they used their typical source. For those that typically purchase from a different source, Table 22, below, shows the typical and Pilot Program sources. As shown, of the 24 respondents who reported receiving LED replacement lamps from distributors, more than half typically source lamps from distributors, but the remainder typically source lamps via retail channels (home improvement, hardware, and online stores). Of those that received Pilot Program LED replacement lamps from contractors, the majority (71%) reported that they typically source lamps from contractors, with the two respondents typically sourcing via retail channels.

[21] It is unclear if they purchased them from a distributor whose store was mistaken for a home improvement store or if they are recalling a different purchase (not through the Pilot Program).

Table 22: Pilot Program Purchase Sources Compared to Typical Purchase Sources

Pilot Program Source	Typical Source	#
Distributor (n=24)	Distributor	14 (58%)
	Home improvement store	8 (33%)
	Hardware Store	1 (4%)
	Online	1 (4%)
	Total	24 (100%)
Contractor (n=7)	Contractor	5 (71%)
	Home improvement store	1 (14%)
	Hardware Store	1 (14%)
	Total	7 (100%)
SCE Representative (n=3)	Distributor	1 (33%)
	Home improvement store	1 (33%)
	SCE Representative	1 (33%)
	Total	3 (100%)

While many respondents report that they typically source lamps from lighting professionals (distributors or contractors), the findings in this section suggest that the Pilot Program is influencing a significant portion of firm's to move their purchasing habits from retail channels (home improvement, hardware, and online stores), to lighting distributors and contractors.

The two respondent firms that purchased LED fixtures (as well as LED replacement lamps) purchased them through an electrical contractor and a lighting contractor, respectively. One of these firms stated that this was a different source from which they normally purchase their lighting equipment, however, they were unable to tell us where they typically purchase their lighting equipment.

4.3.2 Equipment Installation

As Table 23 shows, more than three in four respondents reported that an in-house facility manager, custodian, colleague, or they personally had installed the LED replacement lamps (77%). Contractors (either electrical or lighting) were responsible for conducting 11 percent of LED replacement lamp installations, with the remainder of installations being performed by lighting distributors, energy service firms, engineers, and an SCE representative. This makes sense in light of the finding that the vast majority of measures incentivized through the pilot program were LED A-lamps.

Table 23: LED Replacement Lamp Installer

Type	% of Interviewees (n=56)
Respondent; "me", "I did"	24 (43%)
In-house facility managers/custodian/staff	19 (34%)
Contractor	6 (11%)
Lighting distributor	2 (4%)
Energy services firm	2 (4%)
Engineer	1 (2%)
SCE representative	1 (2%)
Don't Know	1 (2%)

Evergreen asked respondents if the installer of the Pilot Program LED replacement lamps was the same person or company that typically installs lighting equipment in their facility. Nearly all respondents (86%) reported that the same person or type of installer usually installs lamps at their facilities (shown in Table 24 below). Also shown, 78 percent of respondents reported that their firm handled the installation in-house. These respondents noted that they were capable of installing replacement lamps and some noted that it is also less costly to install lamps themselves. Of the 10 respondents who relied on an external party to install their replacement lamps, the installation was either part of a larger project, install services were included in the sale, or they lacked requisite expertise (only mentioned by two respondents).

Table 24: Characteristics of Pilot Program Installer

	Typical Installer		Total*
	Yes	No	
In-house Installer**	40 (73%)	3 (5%)	45 (78%)
External Installer	7 (13%)	5 (9%)	10 (22%)
Total	47 (86%)	8 (14%)	55

* One respondent did not know if the Pilot Program installer was the typical installer.
** In-house installer includes respondent, in-house facilities manager, custodian or staff.

Both firms that installed LED fixtures stated that they hired a lighting or electrical contractor to install the equipment because the firm's staff lacked adequate training to perform the task.

4.3.3 Scope of Installation

More than half of the respondents reported that they had replaced 80 percent or more of their facility's lamps with Pilot Program LED replacement lamps (54%, as shown below in Table 25). Nearly the same proportion of respondents (53%) reported that lamp replacement

impacted more than 80 percent of their facility area (see Table 26, below). However, the breadth of projects ranged significantly, with many respondents reporting that less than 20 percent of their lamps were replaced or facility area impacted (14% and 17%, respectively). It is unclear why some respondents replaced a small proportion of their existing lamps while others replaced most or all of theirs.

Table 25: Proportion of Bulbs Replaced

% of Bulbs replaced	# of Interviewees (n=52)
Less than 20%	7 (14%)
20% to 40%	3 (6%)
40% to 60%	9 (17%)
60% to 80%	5 (10%)
80% to 100%	12 (23%)
100%	16 (31%)

Table 26: Percent of Facility Area Impacted

% of Facility Area Impacted	# of Interviewees (n=53)
Less than 20%	9 (17%)
20% to 40%	3 (6%)
40% to 60%	9 (17%)
60% to 80%	4 (8%)
80% to 100%	10 (19%)
100%	18 (34%)

4.3.4 Pre-Existing Equipment

Across the 56 respondent firm sites, LED replacement lamp upgrades were replacing existing equipment in 82 percent of sites, with the remaining 18 percent of projects including both installing replacement lamps in existing equipment and the installation of LED lamps in new areas. No respondents reported installing equipment in new lighting areas only.

In order to gauge the volume of replaced equipment based on our end-user survey, we weighted self-reported replaced equipment by the Pilot purchase volume for each participant. In cases where multiple lamp types were reportedly replaced, we assume that equal proportions each reported lamp type were removed and replaced with Pilot supported LED replacement lamps. Based on this analysis, 46 percent of Pilot incentivized products replaced incandescent lamps, and 45 percent replaced screw-in CFLs, as shown in Table 27, below. This

is different from the *LED Impact Evaluation Report*[22] (that found LEDs were replacing higher wattage incandescent and halogen lamps) but is similar to the CPUC Workpaper Disposition for Integral LED Lamp Replacements (which uses a 50/50 split between CFLs and incandescent lamps as the base case; the impact evaluation consisted of a certain disposition of commercial building types and spaces that may not be consistent with Pilot program end user building types and spaces).[23]

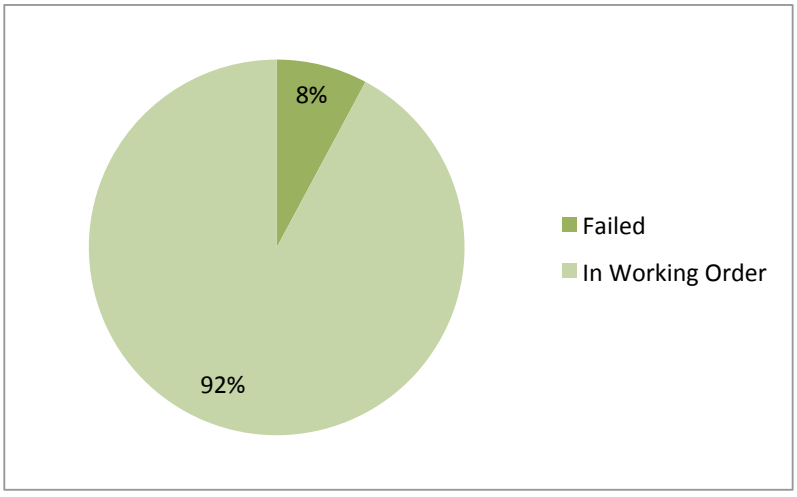
Table 27: Lamp Types Replaced by Pilot Program LED Lamps*

Type	% of Interviewees (n=44)
Incandescent Lamps	46%
Screw-in CFLs	45%
Other**	9%

*Multiple response question; 12 respondents did not know what equipment was replaced.
** "Other" includes: T12 and T8 fluorescents, HIDs, Hardwired CFLs, LEDs, floodlights, halogens, and other fluorescents

In most cases, replacement lamps were replacing equipment that was still in working order. As shown in Figure 20 below, 92 percent of Pilot LED replacement lamps were installed in locations with functioning existing equipment, and 8 percent were installed in places where equipment had failed. In two cases the respondents stated that all the equipment had failed.

Figure 20: Operational Status of Pre-Existing Equipment



[22] Itron, 2014. *LED Impact Evaluation Report: Final Report*. Prepared for California Public Utilities Commission. Available here: http://www.calmac.org/publications/LED_Impact_Evaluation_Report.pdf (see page 1-6).
[23] California Public Utilities Commission, Energy Division, 2012. *Workpaper Disposition for Integral LED Lamp Replacements.*

The two firms that also retrofitted LED fixtures with equipment incented through the Pilot Program reported that the replaced equipment consisted of the following types of fixtures: standard screw in CFL fixtures, hardwired CFL fixtures, high intensity discharge fixtures, and LED fixtures. Both firms said that some of the fixtures had failed, but in both cases this was less than 20 percent of fixtures being replaced.

4.3.5 Satisfaction with New LED Equipment

In general, respondent firms expressed high levels of satisfaction with the installed LED equipment. Respondents provided their level of satisfaction with the light quality, reliability, light output and physical appearance of the LEDs on a ten-point scale, with "10" being "extremely satisfied" and "1" being "not at all satisfied". The results are presented in Table 28, below. As shown, light quality, light output, and physical appearance all received mean satisfaction ratings higher than nine out of 10, while reliability scored 8.7 out of ten. A single respondent who provided a rating of one out of ten for reliability is largely responsible for the low average reliability score. This respondent noted that of the approximately 100 LED lamps they installed, one-quarter of them had failed within the first eight months.

Table 28: End User Satisfaction with LED Characteristics

LED Characteristic	Mean Satisfaction (1-10) scale	Min Satisfaction (1-10) scale	Max Satisfaction (1-10) scale
Light Quality (n=56)	9.4	4	10 (76%)
Reliability (n=56)	8.7	1	10 (70%)
Light Output (n=56)	9.3	3	10 (70%)
Physical Appearance (n=56)	9.4	5	10 (71%)

The same satisfaction questions were asked of the two firms that installed LED fixtures. These two firms expressed the highest level of satisfaction with the products (10 out of 10) in all four categories.

4.4 Experience with Other Programs

The Pilot Program appears to be reaching commercial customers that have not participated in other SCE rebate programs in the past (many of whom reported that they typically purchase lamps from distributors or home improvement stores). As shown in Table 29 below, only 11 percent of respondent firms (representing 8.5 percent of lamp sales in the sample) stated that they have participated in another SCE rebate program, with 61 percent saying they have not participated in another program (29 percent were unsure).

Table 29: Firm Participated in Another SCE Rebate Program

Response	% of Interviewees (n=56)
Yes	6 (11%)
No	34 (61%)
Don't Know	16 (29%)

Among the six companies that had received rebates or incentives through another program, five had received rebates for lighting, three for HVAC, and one had received rebates for solar panels. Among the five who had received a lighting rebate, two had submitted the application themselves and three reported that someone else handled the rebate (either a contractor or other supplier).

We asked the six respondents if they thought participation in the other programs was easier or more difficult than participation in the Pilot Program. Four of the five respondents that participated in another lighting program and all three respondents that participated in another HVAC program stated the Pilot Program was easier to participate in; all mentioned that the most important difference was that someone else handled the paperwork in the Pilot Program. One respondent that participated in a lighting program stated that the Pilot Program was about the same in terms of ease of participation, explaining that they had to perform a similar amount of paperwork (although it is unclear if the paperwork required for their installation through the Pilot Program was related to the incentives). One respondent also participated in a solar program and explained that the ease of participation was similar, because, like the Pilot Program, the solar company did most of the paperwork.

4.5 Overall Satisfaction with Pilot Program

Overall, respondent firms expressed high levels of satisfaction with the Pilot Program. Respondents provided their level of overall satisfaction on a ten-point scale, with "10" being "extremely satisfied" and "1" being "not at all satisfied". The results are presented in Table 30, below. As shown, the mean satisfaction score was 9.3 out of ten, with 79% of respondents providing a score of ten out of ten.

Table 30: Overall Program Satisfaction

	Mean Satisfaction (1-10) scale	Min Satisfaction (1-10) scale	Max Satisfaction (1-10) scale
Overall Satisfaction	9.3	2	10 (79%)

One respondent was dissatisfied, giving the program a score of two out of ten. This respondent explained that they planned to replace approximately 100 lamps with Pilot Program LEDs, but since dimmer switches controlled most of the lamps, ultimately only one LED replacement lamp was installed.

5 Likely Market Indicators

The identification of indicators of market transformation is required in order to assess Pilot and program successes. To identify market indicators, Evergreen reviewed key sources of literature and historical program performance metrics previously adopted by the California IOUs (SCE included).

5.1 Defining Market Indicators

Market indicators, by definition, are tools to assess the overall market; the performance of one program among many (and many external factors) is very difficult to ascertain.[24] Thus, tracking many of the metrics discussed in this section will not allow SCE to directly determine the specific source of market transformation in the commercial lighting market. However, we have noted a few instances in which the proposed market indicators may inform assessment of the Pilot Program specifically.

Below, in Table 31 and Table 32, are key market indicators for the commercial LED market. The indicators are classified based on a key finding from our literature review that there are two types of market indicators: proximate and ultimate. Proximate indicators – shown in Table 31 – *relate* to the transformation of a market, whereas ultimate indicators – shown in Table 32 – are absolute measures of transformation.[25]

The proximate indicators include measureable categories of indicators of market transformation, including:

- Awareness
- Knowledge
- Attitudes
- Beliefs
- Availability
- Trade Ally Promotional Effort
- Incremental Cost

Many of these categories contain numerous specific proximate and ultimate indicators, such as awareness of LEDs in general or awareness of distributor-level incentives for LEDs. In the following section we highlight which specific indicators the SCE commercial lighting

[24] CPUC (2011). *Guidelines for Selecting Market Transformation Indicators (MTIs)*. Available here: ftp://ftp2.cpuc.ca.gov/PG&E20150130ResponseToA1312012Ruling/2011/10/SB_GT&S_0821661.pdf

[25] Rosenberg, M. and Hoefgen, L. (2009). *Market Effects and Market Transformation: Their Role in Energy Efficiency Program Design and Evaluation*. Prepared for CIEE.

Table 31: Proximate LED Market Transformation Indicators

Proximate Indicators	Specific Indicators		Source(s)
Awareness	Distributors	Awareness of midstream rebates for LEDs	In-depth interviews or CATI surveys
		Awareness of LED replacement lamps	
	Contractors	Awareness of midstream rebates for LEDs	
		Awareness of LED replacement lamps	
	End-users	Awareness of midstream rebates for LEDs	General population surveys; participant surveys
		Awareness of LED replacement lamps	General population surveys
Knowledge	Distributor knowledge of LED replacement lamp attributes		In-depth interviews or CATI surveys
	Contractors knowledge of LED replacement lamp attributes		
	End-user knowledge of LED replacement lamp attributes		General population surveys
Attitudes / Beliefs	Distributors	Satisfaction with LED replacement lamps (and specific qualities)	In-depth interviews or CATI surveys
		Willingness to stock LED replacement lamps	
	Contractors	Satisfaction with LED replacement lamps (and specific qualities)	
		Willingness to recommend/specify LED replacement lamps	
	End-users	Satisfaction with LED replacement lamps (and specific qualities)	General population surveys; participant surveys
		Willingness to try LED replacement lamps	General population surveys
Availability	Distributor stocking	Overall quantities (or %)	In-depth interviews or CATI surveys with distributors (hard data likely unobtainable)
		Diversity (brand, style, application, wattage, lumens, etc.)	
	Purchase to receipt duration		End-user participant surveys
	Retail availability	Overall quantities (or %)	Retail shelf surveys (not applicable for midstream Pilot; part of LED market transformation overall)
		Diversity (brand, style, application, wattage, lumens, etc.)	
Market Actor Promotional Effort	Manufacturer level of promotion		Marketing collateral review; in-depth interviews
	Distributor level of promotion		Marketing collateral review; in-depth interviews or CATI surveys
	Contractor level of promotion		
	End-user perception of promotion by manufacturer, distributor, and contractor		General population surveys; participant surveys
Incremental Cost	Costs of LEDs (by style, application, wattage, lumens, etc.)		Web crawler; in-depth interviews with market actors; tracking data analysis; invoice documentation review
	Costs of baseline technologies (by technology, style, application, wattage, lumens, etc.)		

Table 32: Ultimate LED Market Transformation Indicators

Ultimate Indicators	Specific Indicators		Source(s)
Market Share / Sales / Saturation	Adoption	Percent of businesses with 1+ LED installed	General population surveys
	Saturation	Percent of commercial lighting consisting of LED technologies	General population surveys; on-sites
	Lighting power density	Watts per square foot, over time (indicative of transformation)	On-sites or review of site-level information; extrapolated to population
	Total market share / sales	Number of products sold within region (or market share)	Difficult to obtain. Typically extrapolated or based on market level assumptions.
	Baseline market share / sales	Number of products sold within region that would have sold in absence of the program (or market share)	Net to gross assessment typically required.
Changes in Codes and Standards	Updates to Title 24; State and Federal legislation		C&S program.

program team should consider tracking in order to ensure that the successes and failures or challenges of their market transformation efforts are accounted for in a systematic way.

5.2 Recommended Indicators to Track

As noted above, assessing an incentive program based on market-level indicators poses significant challenges. However, to best ensure that program performance is accounted for (in terms of transforming the commercial lighting market) we propose a list of likely market transformation indicators, below:

1. **Program incentivized LED replacement lamp and fixture sales volumes.** This indicator is not an ultimate indicator of market transformation, but one component of SCE commercial LED market transformation. Measuring the volume of midstream incentivized LED replacement lamps and fixtures along with the volume of similar products through other rebate channels is important to ensure that the market is moving in the preferred direction.[26] These data, when compared with data regarding the overall commercial lighting market, can be used to better understand the impact of midstream incentives and other incentive programs on the ultimate indicator of LED market share.

   Tracking the number of commercial facilities that purchase LED replacement lamps or fixtures through distributors, by business type, would be a beneficial addition to the tracking of overall sales volumes. Currently the downstream program is comprised of many retail, restaurant, and office commercial customers, whereas the Pilot Program data indicated that a large share of midstream incentives went to large hotels.

2. **LED Price** is an important metric to track for market transformation purposes. This program design is particularly well suited for tracking LED price to commercial customers, as it is a required field in the distributor application. It will be difficult to attribute changes in price to any particular commercial program, including a midstream incentive program, but it would be a wasted opportunity as this data is already collected as part of the normal program implementation.

   LED price data collected via a midstream incentive program could supply the Lighting Market Transformation Program with valuable data related to the overall commercial LED market.

3. **Distributor purchase and stocking practices,** LED technologies versus incumbent/other lighting technologies.

[26] CPUC (2011). *Guidelines for Selecting Market Transformation Indicators (MTIs)*. Available here: ftp://ftp2.cpuc.ca.gov/PG&E20150130ResponseToA1312012Ruling/2011/10/SB_GT&S_0821661.pdf

LED lamp and fixture availability is rapidly becoming less of a *barrier* for consumers, but the availability of other products still means that consumers can select less expensive, less efficient alternatives. Distributors promote what they have in stock, and thus tracking the relative stock of different technologies would support identification of market transformation. What they stock, reportedly, is also directly affected by demand and their inability to return products to the manufacturer (thus they are hesitant at this time to stock relatively expensive LEDs that have fast product cycles). This indicator, however, may be easily affected by factors external to the Pilot Program, including other IOU incentive programs or non-related market changes. Despite this, since this program is actively aiming to affect what distributors sell to their customers – contractors and commercial end users – it is important to assess stocking practices as they are so intimately tied to what a distributor wants to sell.[27]

Distributor stocking is very dynamic as products move through their facilities in large quantities – sometimes contractor or end user orders are in the hundreds or thousands of lamps, as opposed to retail in which customers purchase smaller quantities at a time. Due to the variability and dynamic nature of distributor stocking, we would not recommend collecting this data through detailed shelf surveys, but rather through in-depth interviews or fostering partnerships made through the Pilot and with future participating distributors to obtain stocking data from distributors over time.

Product purchase and sell through at a distributor is also closely related to stocking, and should be considered for tracking if a low cost approach is possible (such as partnering with a number of distributors and obtaining sales data – even in aggregate – or conducting detailed in-depth interviews).

It may be possible to utilize an attribution survey battery to understand the degree to which changes in purchasing and stocking practices among distributors were affected by midstream incentives (versus other factors).

4. **Market Actor promotional effort**, which is, potentially, causally related to distributor stocking practices (above).

   This proximate indicator of market transformation is especially important for a midstream or upstream program to track. It is also linked to the first indicator (where customers purchase their lighting) because the promotional efforts of commercial lighting market actors can affect the decisions of consumers in the market towards increasing market actor involvement. As shown in Table 31, above, this indicator can be tracked through the monitoring of market actor promotional collateral as well as interviews or surveys of market actors or consumer research regarding their

[27] *Ibid.*

perceptions of trade ally promotional efforts. Furthermore, defining quantitative metrics for level of promotion – such as dollars spent on marketing per month, number of campaigns or mailings per month, frequency of LED or SCE promotion in monthly newsletters, etc. – will best position SCE to track this indicator in support of claiming market transformation successes.

This indicator is also directly related to the willingness of market actors to promote LEDs to their customers.

6 Conclusions and Recommendations

Overall the midstream incentives have proven effective, with 2014 sales lower but comparable to existing downstream incentive volumes (106,836 units with Pilot incentives from January 2014 to August 2014, compared to 160,696 units through existing downstream program over the same period). Cannibalization may be occurring at low levels based on qualitative findings (a more rigorous assessment could not be made), which is only problematic if the Pilot Program is more expensive to administer (per kWh saved) or at a greater risk of lower ex-post realization rates (resulting from EM&V).[28]

The Pilot Program design is feasible, although the evaluation findings suggest that the program logic and theory should be revised. Contractors are less involved than anticipated and participation is driven by very large and very small purchases (as opposed to primarily small projects) many of which are direct sales from distributors.

6.1 Conclusions

Conclusions related to the detailed research questions identified by the SCE team include the following:

- **How do sales trends for LEDs during the Pilot Program compare against historical sales trends?**

Historical overall sales of LED products through SCE's downstream commercial lighting incentive programs were generally low prior to the start of the Pilot Program. Incentives for LED products through the Pilot Program and downstream incentive programs peaked in the winter of 2013-2014, at the beginning of the Pilot Program, but remain strong through August 2014. Furthermore, the volume of incentives through the Pilot Program was capped and Distributors typically met monthly quotas, whereas this was not the case for downstream LED incentives (while there is technically a cap on downstream incentives, this cap is rarely if ever met by SCE). Considering a future program, it is encouraging that distributors were able to meet their incentive allocations.

We were unable to conduct pre-post analysis for distributors who participated in the Pilot Program.

- **How does the midstream delivery mechanism compare to downstream programs (e.g., Types of customers? Size and types of projects?) Are end-users receiving incentivized products from their normal sources?**

[28] The Pilot evaluation did not include an assessment of administration costs, overall program savings, or savings realization rates.

The Pilot Program served a high number of extremely small projects (31% of projects were less than or equal to 20 Pilot incentivized LED replacement lamps and/or LED fixtures in size) and particularly large projects (19% of projects were greater than 500 units in size). In comparison, projects receiving downstream incentives were more evenly distributed by project size. Only 15 percent of projects were 20 units or smaller, and only seven percent of projects were greater than 500 units in volume.

The majority of both midstream and downstream incentives are for LED replacement A-lamps (90% and 66%, respectively). Downstream incentives were provided in greater volumes for other LED replacement lamp and fixture types, including LED replacement PAR38s (8%), PAR30s (5%), and MR16s (9%), as well as downlight fixtures (12%). LED fixtures accounted for less than two percent of Pilot Program sales.

Over half of the end user survey respondents (63%) stated that someone outside of their firm approached them to recommend an upgrade to their facility's lighting. Among these firms, distributors were the most commonly mentioned source of outreach (40%). According to end user survey respondents, 60 percent of sales were direct to consumer (from a distributor). More than half of respondents reported that they purchased Pilot Program LED products from their typical source for lighting-related products (57%), with 64 percent of respondents with project size of less than 100 lamps reporting they used their typical source and 52 percent of respondents with over 100 lamps in their project reporting they used their typical source.

We were unable to conduct analysis by type of customer.

- **Is this an effective delivery mechanism (e.g., uptake, satisfaction; ease of participation) that SCE should consider scaling up?**

Uptake

The number of distributors selling LED replacement lamps and fixtures with Pilot Program incentives remained fairly consistent month to month. However, despite the relatively stable trend over the course of the Pilot Program, it should be noted that fewer distributors participated in August 2014 than any of the previous seven months. There is no indication from distributors that program processes or market conditions have contributed to this slight decline in participation. Rather, since the Pilot was ended in August 2014, it is more likely that this reflects SCE ramping down incentives during that month.

Satisfaction

Overall, participating distributors and contractors were very satisfied with the Midstream LED Distributor Pilot (average satisfaction of 4.5 out of five for both market actor types, with "1" being very dissatisfied and "5" being very satisfied).

Overall, end users were also very satisfied with the Pilot Program (average satisfaction of 9.3 out of ten, with "1" being very dissatisfied and "10" being very satisfied). Nearly 80 percent of end users reported a 10/10 satisfaction with the Pilot.

Ease of Participation

Despite reporting some challenges setting up the necessary reporting systems for participation, many distributors were pleased once the initial set up was complete. Participating distributors rated their ease of participation an average of 4.4 (out of five) with "1" being very difficult and "5" being very easy. Participating distributors also reported that collecting and reporting contractor or installer contact information was relatively easy (the four participating distributors who rated ease of collecting this information reported an average rating of 4.8 out of 5, with "1" being very difficult and "5" being very easy; one distributor was unable to provide a rating).

Participating contractors reported that their involvement in the Pilot Program did not require much additional effort from their normal business practices.

End users reported that the Pilot Program was very easy to participate in compared to other incentive programs (where they are more involved in filling out paperwork, etc.).

- **What is the degree of overlap with downstream programs? Does this cannibalize or optimize/supplement the downstream program?**

There were a total of 20 customers that received incentivized LED products through midstream and downstream incentive channels over the study period (approximately five percent of the Pilot Program end users). Notably, there are many instances in which a customer received incentives for similar measures through both channels. There are cases where a customer first participated in a downstream program and later received Pilot Program incentivized products. There are cases where the opposite is true, as well. It is unclear why customers participated in multiple programs over short periods of time for similar (or the same) measures.

Participating distributors and contractors were asked whether the Pilot was a complementary, superior, or inferior program design, compared to existing downstream programs. Most participating distributors and contractors reported that the Pilot Program was superior (and they all noted the ease of implementation as the reason the design is superior). Two distributors and one contractor believe that the Pilot Program's design is complementary (these interviewees noted that the Pilot attracts different end users or contractors to participate, and thus complements the existing program).

One distributor and three contractors believe that fixtures are more appropriate in a downstream program as they are more complicated to install (than replacement lamps). All other market actors believe that adoption of both LED replacement lamps and LED fixtures would be best supported via midstream incentives.

The Pilot Program appears to be reaching commercial customers that have not participated in other SCE rebate programs in the past. Only 11 percent of respondent firms stated that they have participated in another SCE rebate program (mostly lighting).

- **How satisfied are distributors, contractors, and end users participating in the Pilot Program with their experience? What is the relative level of satisfaction with LED light quality (compared to pre-existing equipment) amongst end-users?**

Overall, participating distributors and contractors were very satisfied with the Midstream LED Distributor Pilot (average satisfaction of 4.5 out of five for both market actor types, with "1" being very dissatisfied and "5" being very satisfied). Overall, end users were also very satisfied with the Pilot Program (average satisfaction of 9.3 out of ten, with "1" being very dissatisfied and "10" being very satisfied). Nearly 80 percent of end users reported a 10/10 satisfaction with the Pilot.

Participating distributors were very content with the rebate processing time, rating it a five out of five (on a scale of one to five, with "1" being very dissatisfied and "5" being very satisfied). Participating distributors were also satisfied with the qualifying products list, rating it an average of 4.8 out of five (with "1" being very dissatisfied and "5" being very satisfied).

Participating contractors were also generally satisfied with the qualified products list, albeit less so than the distributors (or the overall Pilot Program). On a scale of one to five, with "1" being very dissatisfied and "5" being very satisfied, an average satisfaction rating of 4.1 indicates that there may be room for improvement. However, it is unclear if the list's exclusion of certain products is problematic from a program implementation or compliance standpoint, or whether contractors would always recommend adding more products that they sell to the qualified list.

End users expressed high levels of satisfaction with the installed LED equipment. They rated LED characteristics on a scale of "1" to "10" with "1" being very dissatisfied and "10" being very satisfied. Light quality received an average rating of 9.4/10, reliability received a rating of 8.7/10, light output received an average rating of 9.3/10, and physical appearance received a rating of 9.4/10.

- **Are current participating distributors and contractors unique from the general pool of distributors and contractors that sell lighting products to SCE businesses?**

All participating distributors estimated that at least some of their LED replacement lamp or fixture sales received incentives through other SCE energy efficiency incentive programs (note that they may not always know if a contractor or end user applies for a rebate). They are not a unique pool of distributors.

Three participating contractors have not – to their knowledge – installed LED replacement lamps or fixtures through any other SCE energy efficiency incentive program. One contractor reported that they focus on energy efficiency retrofit/upgrade projects (including lighting and other technologies), but are not a traditional lighting or electrical contractor.

- **What types of pre-existing equipment are being replaced through the Pilot Program?**

In order to gauge the volume of replaced equipment based on our end-user survey, we weighted self-reported replaced equipment by the Pilot purchase volume for each participant. In cases where multiple lamp types were reportedly replaced, we assume that equal proportions each reported lamp type were removed and replaced with Pilot supported LED replacement lamps. Based on this analysis, 46 percent of Pilot incentivized products replaced incandescent lamps, and 45 percent replaced screw-in CFLs. In most cases, replacement lamps were replacing equipment that was still in working order. Approximately 92 percent of Pilot LED replacement lamps were installed in locations with functioning existing equipment, and 8 percent were installed in places where equipment had failed. In two cases the respondents stated that all the equipment had failed.

It is not possible to draw conclusions related to existing fixtures (replaced) based on our limited survey of firms that had purchased LED fixtures in addition to LED replacement lamps (n=2). Both firms noted that less than 20 percent of the existing fixtures had failed.

- **What are end-user motivations for doing the lighting retrofit and what is the importance of the Pilot and incentives in their decision (i.e., is code compliance influencing their decision)? Are end-users aware of the Pilot and incentives?**

The primary, unprompted reasons respondent firms engaged in lighting retrofits was to save energy (38%) and to lower their energy bill to save money (36%). The most commonly mentioned secondary reason for lighting retrofits was equipment cost savings (21%).

Nearly three-quarters of end users were aware that the LED products installed at their facilities received an incentive from SCE to lower the price – this indicates that distributors and other market actors use the Pilot Program in their sales pitch to customers.

The incentives were important in the decision to install LEDs. On a ten-point scale, with "1" being "not at all important" and "10" being "extremely important", end users reported a mean rating of 7.8 out of 10. Despite the importance of the incentive, it appears that paperwork may not be a *barrier* to participating in other incentive programs – more than 65 percent of end users who were aware of the incentive stated that they would have installed the same number or more lamps or fixtures, even if they were required to submit the rebate application. However, for 21 percent of end user firms, paperwork would have led to fewer or no LED replacement lamp or fixture installs, so the barrier exists for some customers.

- **How likely are additional (i.e., non-participating) distributors and contractors to participate in a midstream incentive program (i.e., if the Pilot Program is expanded)?**

Both of the non-participating distributors we spoke with have not participated in the Pilot Program because they had not heard about it, but they did both see value in a distributor incentive mechanism. They cited that it would give them competitive advantage to get a job

and that better pricing "is key." On a scale of one to five, with five being very likely to participate, one non-participant rated their interest at a five and the other rated their interest at a three because they are not sure what the owners of the company would say or do.

One non-participating contractor explained that they had not participated in the Pilot Program because they did not know about it (but they had heard about the PG&E Midstream Trial). The same contractor added that they believe that the Pilot Program would have increased their sales, but not necessarily for good reasons: they believe that the Pilot Program's less stringent rules (than other incentive programs) regarding replaced equipment would have driven sales through the midstream channel (e.g., customers wanting to replace CFLs).

6.2 Recommendations

The preponderance of evidence suggests that the midstream incentive mechanism would be an effective tool for a full-scale SCE energy efficiency incentive program. **Thus, the primary recommendation from this early EM&V assessment is to continue offering midstream incentives at the distributor level for LED replacement lamps.**

Additional recommendations include:

1. **Revise the program theory and logic model** to reflect that contractors are less involved than anticipated and participation is driven by very large and very small purchases (as opposed to primarily small projects) direct from distributor firms.

   It is important that the program theory and logic model reflect the operationalized program, as best practice evaluation requires testing the key elements of the theory to ensure that market transformation activities are adequately defined and leading to the desired outcomes.

2. **Develop systems to track market indicators outlined in section 5.2.** These indicators will help assess the effectiveness of the Pilot Program and conditions in the overall commercial LED replacement lamp and fixture market. Tracking should balance the cost of additional precision with the need for additional precision (for example, we do not necessarily recommend conducting distributor shelf surveys to assess changes in distributor stocking practices).

3. **Capture end use facility type data in program tracking (ensure that this is required of distributors) and monitor changes in participating end use business types.** Tracking this metric – which is also described as an option in section 5.2 **–** will ensure that SCE better understands what types of end users purchase LED replacement lamps and fixtures with midstream incentives. This is very important for understanding changes to other incentive program participation – for example, if fewer retail customers were participating in the downstream program, it would be informative to know whether retail customers purchasing products with midstream incentives offset that decrease.

4. **Ensure that end user contact information is captured for all facilities receiving midstream incentivized LED replacement lamps and/or fixtures.** Not capturing this information would open a future program up to significant challenges during EM&V. There is a lot of risk to SCE associated with not capturing this information, and thus effort should be made to ensure program-tracking data includes end use facility location and contact information. SCE should consider matching end use customer location and business name information with utility account numbers in the CIS as part of quality insurance protocols.

Appendix A – Survey and Interview Guides

This appendix contains the survey and interview guides developed and used as part of this evaluation.

Commercial End-user Interview Guide:
PG&E and SCE LED Midstream Trial/Pilot Evaluations

Background:

Data from market actors and commercial end-user customers are expected to inform the lighting innovation midstream trial/pilot evaluations and assist with interpretation of the comparison analysis that is also being done as part of the evaluations. The PG&E trial and the SCE pilot rely on midstream incentives through participating electrical distributors to increase the sales of LED retrofit lighting products.

Purpose:

The target audience for this interview guide is end-users who installed (or hired someone to install) LEDs that were incentivized through the midstream trial/pilot in their commercial facilities in the PG&E and SCE service territories. The overall objective of this research task is to elicit information from end-users as part of a larger assessment aimed at determining if a direct midstream approach is a better or complementary way to engage the lighting supply community to increase market penetration of LED replacement lamps (and fixtures, in the case of SCE) in the commercial sector (compared to the downstream rebate program and Trade Professional Alliance at PG&E).

Sample Frame Variables:

IOU: Either "SCE" or "PG&E".
Contact Name: The first and last name of the contact for the rebate.
Business Name: The name of the business.
Contact Address: The address where the retrofit took place.
MEASURE: LED Replacement Lamps, LED Replacement Lamps and LED Fixtures, LED Fixtures
Month/Year of Install: Installation month and year, from IOU midstream tracking data

Introduction

Int. 1. [If **< CONTACT NAME >** is available, ask] Hello, my name is _____ and I am calling from CIC Research on behalf of **<IOU>**. This is not a sales call. May I please speak with **<CONTACT NAME>**?

Int. 1.a. [If **<Contact Name>** is *not* available, ask] Hello, my name is _____ and I am calling from CIC Research on behalf of **<IOU>**. This is not a sales call. May I please speak with the person at **<BUSINESS NAME>** who is most knowledgeable about your recent lighting upgrade in **<Month/Year of Install>** at **<CONTACT ADDRESS>**?
[RECORD NAME: _____]
[If "No", Thank and Terminate]

Int. 2. [If contact not available, say] Is there a good time to call back in order to speak with **<CONTACT NAME>**? When?
[RECORD TIME; SCHEDULE CALL BACK]

Int. 3. [If Int. 2 = no / not available / no good time] Is there someone else at your business who is knowledgeable about your company's lighting retrofit at **<CONTACT ADDRESS>** that I may be able to speak with? May I please speak with them?
[RECORD NAME: _____]
[If "No", Thank and Terminate]

Int. 4. Hello, my name is _____ and I am calling from CIC Research on behalf of **<IOU>**. I'm calling because our records show that your business recently installed new LED light bulb(s) [or fixture(s) if SCE] through the **<IOU>** LED Distributor [If PG&E: Trial; if SCE: Pilot Program] at **<CONTACT ADDRESS>**. Do you recall this?

1. Yes
2. No [Return to **Int. 3.**]
88. Don't Know [Return to **Int. 3.**]
99. Refused [Return to **Int. 3.**]

Int. 5. [If **Int. 4.** = 1] Are you the best person to speak with about your business' experience specifically related to this installation?

1. Yes
2. No [Return to **Int. 3.**]
88. Don't Know [Return to **Int. 3.**]
99. Refused [Return to **Int. 3.**]

[IF NEEDED] **<IOU>**, would like to better understand how businesses like yours make decisions about LED products to help **<IOU>** to understand what type of rebate programs they should offer in the future. Your input is very important to help improve the energy efficiency programs offered by **<IOU>**.

[IF **Int. 5.** = 1] Great! I want to ensure you that this is not a sales call and we will keep everything you say confidential. Nothing you say will be attributed to yourself or your company, and all results will be reported in aggregate. The purpose of this interview is to improve **<IOU>**'s LED rebates to better serve customers in the future. We appreciate your participation and assistance with this research! The interview will take approximately 15 minutes to complete.

Midstream Trial/Pilot Experiences

Let's start by talking about your decision to install **<MEASURE>**…

Q 1. What was the single main reason you decided to install **<MEASURE>** at your facility? [DO NOT READ CHOICES; ONE ANSWER ONLY; PROBE TO CODE]

1. Equipment cost savings
2. Saving energy
3. Lower energy bill
4. Previous equipment failed
5. Better lighting
6. To be "high-tech"
7. To be "green" / help the environment
8. Corporate practice / direction from corporate / planned renovation
9. The LED trial / pilot program
10. The rebate
11. To comply with building codes (Title 24)
12. Past participation in similar program
13. Recommended by general contractor
14. Recommended by electrical contractor
15. Recommended by lighting contractor
16. Recommended by lighting designer
17. Recommended by in-house facility manager(s)
18. Recommended by property management company
19. Recommended by lighting distributor
20. Recommended by manufacturer representative
21. Recommended by lighting showroom / fixture showroom staff
22. Recommended by architect
23. Recommended by engineer
24. Recommended by friend
25. Recommended by family member
26. Recommended by colleague
27. Recommended by energy services firm
28. Recommended by energy services firm staff
29. Recommended by home improvement store staff
30. Recommended by grocery store staff
31. Recommended by drug store staff
32. Recommended by hardware store staff
33. Recommended by trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 2. Are there any other reasons you decided to install **<MEASURE>** at your facility? [DO NOT READ CHOICES; ACCEPT MULTIPLES]

1. Equipment cost savings
2. Saving energy
3. Lower energy bill
4. Previous equipment failed
5. Better lighting
6. To be "high-tech"
7. To be "green" / help the environment
8. Corporate practice / direction from corporate / planned renovation
9. The LED trial / pilot program
10. The rebate
11. To comply with building codes (Title 24)
12. Past participation in similar program
13. Recommended by general contractor
14. Recommended by electrical contractor
15. Recommended by lighting contractor
16. Recommended by lighting designer
17. Recommended by in-house facility manager(s)
18. Recommended by property management company
19. Recommended by lighting distributor
20. Recommended by manufacturer representative
21. Recommended by lighting showroom / fixture showroom staff
22. Recommended by architect
23. Recommended by engineer
24. Recommended by friend
25. Recommended by family member
26. Recommended by colleague
27. Recommended by energy services firm staff
28. Recommended by home improvement store staff
29. Recommended by grocery store staff
30. Recommended by drug store staff
31. Recommended by hardware store staff
32. Recommended by trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 3 Thinking about your recent **<MEASURE>** purchase in **<MONTH/YEAR OF INSTALL>** at **<CONTACT ADDRESS>**, did someone outside of your company approach you to upgrade your facility's lighting?

1. Yes

No
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 4. [If **Q 3**= 1] What type of business or individual approached you about upgrading your facility's lighting? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN; ACCEPT ONE; IF MORE THAN 1 ANSWER GIVEN, ASK WHICH ONE WAS FIRST]

1. Lighting designer
2. Architect
3. General contractor
4. Electrical contractor
5. Engineer
6. Lighting contractor
7. Lighting distributor
8. Lighting manufacturer representative
9. Lighting showroom / fixture showroom
10. Corporate headquarters
11. In-house facility manager(s)
12. Property management company
13. Friend
14. Family member
15. Colleague
16. Energy services firm
17. Home improvement store
18. Grocery store
19. Drug store
20. Hardware store
21. Online / Internet
22. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 5. Now thinking of the specific **<MEASURE>** that you recently purchased, what types of businesses or individuals were involved in specifying or recommending the specific types of **<MEASURE>** you installed? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN; ACCEPT MULTIPLES] (PROBE WELL:) Any others?

1. None
2. Lighting designer
3. Architect
4. General contractor

5. Electrical contractor
6. Engineer
7. Lighting contractor
8. Lighting distributor
9. Lighting manufacturer representative
10. Lighting showroom / fixture showroom
11. Corporate headquarters
12. In-house facility manager(s)
13. Property management company
14. Friend
15. Family member
16. Colleague
17. Energy services firm
18. Home improvement store
19. Grocery store
20. Drug store
21. Hardware store
22. Online / Internet
23. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

[If more than one type mentioned in **Q 5**, ask **Q 6**. If only one mentioned in **Q 5**, populate **Q 6** with the response from **Q 5**]

Q 6. Which type of company or individual had the greatest influence on your organization's selection of the specific **<MEASURE>** you installed? Was it …(READ ANSWERS GIVEN IN **Q 5**) [ACCEPT ONE]

1. None
2. Lighting designer
3. Architect
4. General contractor
5. Electrical contractor
6. Engineer
7. Lighting contractor
8. Lighting distributor
9. Lighting manufacturer representative
10. Lighting showroom / fixture showroom
11. Corporate headquarters
12. In-house facility manager(s)
13. Property management company

14. Friend
15. Family member
16. Colleague
17. Energy services firm
18. Home improvement store
19. Grocery store
20. Drug store
21. Hardware store
22. Online / Internet
23. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 7. [If **Q 6** = 2 to 77]Now, considering the influence from **<Q 6>** on your decision to install **<MEASURE>**. On a scale of 1 to 10, where "1" is "not at all important" and "10" is "extremely important", how important was the influence from **<Q 6>** in your decision to install **<MEASURE>**?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 8. [If **<MEASURE>** = "LED Replacement Lamps" or "LED Replacement Lamps and LED Fixtures"] What type of company or individual sold the **LED replacement light bulbs** to your business? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN]

1. Lighting designer
2. Architect
3. General contractor
4. Electrical contractor
5. Engineer
6. Lighting contractor
7. Lighting distributor
8. Lighting manufacturer representative
9. Lighting showroom / fixture showroom
10. Corporate headquarters
11. In-house facility manager(s)
12. Property management company
13. Friend
14. Family member
15. Colleague
16. Energy services firm
17. Home improvement store

18. Grocery store
19. Drug store
20. Hardware store
21. Online / Internet
22. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 9. [If **<MEASURE>** = "LED Replacement Lamps" or "LED Replacement Lamps and LED Fixtures" and If **Q 8** < 88] Does your business typically buy replacement light bulbs from a **<Q 8>**?

1. Yes
2. No
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 10. [If **Q 9** >/= 2] From what type of company or individual does your business typically purchase replacement light bulbs? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN]

1. Lighting designer
2. Architect
3. General contractor
4. Electrical contractor
5. Engineer
6. Lighting contractor
7. Lighting distributor
8. Lighting manufacturer representative
9. Lighting showroom / fixture showroom
10. Corporate headquarters
11. In-house facility manager(s)
12. Property management company
13. Friend
14. Family member
15. Colleague
16. Energy services firm
17. Home improvement store
18. Grocery store
19. Drug store
20. Hardware store
21. Online / Internet

22. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 11. [If **<MEASURE>** = "LED Replacement Lamps" or "LED Replacement Lamps and LED Fixtures"] Who physically installed the **LED replacement light bulbs** at your facility? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN]

1. [Respondent; "me", "I did"]
2. Lighting designer
3. Architect
4. General contractor
5. Electrical contractor
6. Engineer
7. Lighting contractor
8. Lighting distributor
9. Lighting manufacturer representative
10. Lighting showroom / fixture showroom staff
11. Corporate headquarters
12. In-house facility manager(s)
13. Property management company
14. Friend
15. Family member
16. Colleague
17. Energy services firm
18. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 12. [If **Q 11**=1 say "Do you"; otherwise say "Does a/an **<Q 11>**"] typically handle the installation of replacement light bulbs at your facility?

1. Yes
2. No
3. Sometimes
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 13. [If **Q 11**=1] Why did you, rather than someone else, install the LED replacement light bulbs for your recent upgrade? [ACCEPT MULTIPLE]

1. Company protocol
2. Property manager protocol
3. Purchased direct from distributor
4. Ease of installation
5. Only employee
6. Part of my job description
7. Insurance requirement
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 14. [If **Q 11**= 2 through 77] Why did a/an **<Q 11>** install the LED replacement light bulbs for your recent upgrade, as opposed to doing it yourself? [ACCEPT MULTIPLE]

1. Company protocol
2. Property manager protocol
3. Difficulty of installation
4. Part of larger project that required <**Q 11**>
5. Approached by <**Q 11**>
6. Have trained staff / in-house facilities manager
7. Part of their job description
8. Not comfortable with electrical work
9. Insurance requirement
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 15. [If **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures"] What type of company or individual sold the **LED fixtures** to your business? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN]

1. Lighting designer
2. Architect
3. General contractor
4. Electrical contractor
5. Engineer
6. Lighting contractor
7. Lighting distributor
8. Lighting manufacturer representative
9. Lighting showroom / fixture showroom
10. Corporate headquarters
11. In-house facility manager(s)
12. Property management company
13. Friend

14. Family member
15. Colleague
16. Energy services firm
17. Home improvement store
18. Grocery store
19. Drug store
20. Hardware store
21. Online / Internet
22. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 16. [If **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures" and If **Q 15**< 88] Does your business typically buy new fixtures from a **<Q 15>**?

1. Yes
2. No
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 17. [If **Q 15** > 2] From what type of company or individual does your business typically purchase fixtures? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN]

1. Lighting designer
2. Architect
3. General contractor
4. Electrical contractor
5. Engineer
6. Lighting contractor
7. Lighting distributor
8. Lighting manufacturer representative
9. Lighting showroom / fixture showroom
10. Corporate headquarters
11. In-house facility manager(s)
12. Property management company
13. Friend
14. Family member
15. Colleague
16. Energy services firm
17. Home improvement store
18. Grocery store
19. Drug store

20. Hardware store
21. Online / Internet
22. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 18. [If **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures"] Who physically installed the **LED fixtures** at your facility? [DO NOT READ LIST BUT PROBE TO CODE ANSWER GIVEN]

1. [Respondent; "me", "I did"]
2. Lighting designer
3. Architect
4. General contractor
5. Electrical contractor
6. Engineer
7. Lighting contractor
8. Lighting distributor
9. Lighting manufacturer representative
10. Lighting showroom / fixture showroom staff
11. Corporate headquarters
12. In-house facility manager(s)
13. Property management company
14. Friend
15. Family member
16. Colleague
17. Energy services firm
18. Trade association (Specify: _____)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 19. [If **Q 18**=1 say "Do you"; otherwise say "Does a/an **<Q 18>**"] typically handle the installation of electrical equipment, such as lighting fixtures, at your facility?

1. Yes
2. No
3. Sometimes
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 20. Why did [If **Q 18**=1 say "you"; otherwise say "a/an **<Q 18>**"], rather than someone else, install the LED fixtures for your recent upgrade, as opposed to someone else? [ACCEPT MULTIPLE]

1. Company protocol
4. Property manager protocol
5. Purchased direct from distributor
6. Ease of installation
7. Difficulty of installation
8. Part of larger project that required <**Q 18**>
9. Approached by <**Q 18**>
10. Have trained staff / in-house facilities manager
11. Not comfortable with electrical work
12. Insurance requirement
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 21. Were you aware that the lighting distributor who supplied **<MEASURE>** received financial assistance from **<IOU>** in order to provide lower priced **<MEASURE>** to commercial customers like yourself?

1. Yes
2. No
77. Other (Specify: _____)
88. Don't Know
99. Refused

[IF NEEDED TO SATISFY RESPONDENT: *TRIAL/PILOT DESCRIPTION:* In the <IOU> program, financial assistance is provided to distributors who stock and sell LED replacement light bulbs to either contractors or other professional installers, or directly to businesses like yours.]

Q 22. [If **Q 21** = 1] How did you become aware that the lighting distributor who supplied **<MEASURE>** received financial assistance from **<IOU>**? [DO NOT READ; ACCEPT ONE; PROBE TO CODE]

1. Lighting designer
2. Architect
3. General contractor
4. Electrical contractor
5. Engineer
6. Lighting contractor
7. Lighting distributor
8. Lighting manufacturer representative

9. Corporate headquarters
10. In-house facility manager(s)
11. Property management company
12. Friend
13. Family member
14. Colleague
15. Trade association (Specify: _____)
16. Promotional event
17. Distributor event
18. Email
19. Flier
20. Participation at other company facility / location
21. <IOU>Website
22. Invoice documentation
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 23. [If **Q 21** = 1] Now, considering the importance of the financial assistance that **<IOU>** provided to the lighting distributor in order to reduce the cost of the **<MEASURE>**. On a scale of 1 to 10, where "1" is "not at all important" and "10" is "extremely important", how important was the financial assistance from **<IOU>** in your decision to install **<MEASURE>**?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 24. [If **Q 23** = 1-10] Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Q 25. If you were required to submit a rebate application in order to receive the **<MEASURE>** at the same cost, instead of receiving the discounted price directly through the distributor, would you have installed the same number, more, fewer, or no **<MEASURE>**?

1. Same number
2. More
3. Fewer
4. No / none
77. Other (Specify: _____)
88. Don't Know

99. Refused

Q 26. Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Q 27. [If **Q 1** and **Q 2**≠11] Did California's Title 24 building code impact what lighting equipment you selected to install at your facility?

1. Yes
2. No
77. Other (Specify: _____)
88. Don't Know
99. Refused

[IF NEEDED FOR CLARIFICATION, *NOT IF THEY DO NOT KNOW ABOUT TITLE 24 AT ALL*: California's Title 24 building code has certain requirements regarding the efficiency levels of retrofitted lighting fixtures in commercial and residential buildings throughout California]

Q 28. [If **Q 1** and **Q 2**= 11 or if **Q 27** = 1] How did California's Title 24 building code impact what lighting equipment you selected to install? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Equipment Choice

Q 29. Did your lighting upgrade in **<MONTH/YEAR OF INSTALL>** at **<CONTACT ADDRESS>** involve replacing existing equipment, providing lighting to new areas of your facility, or a mixture of both?

1. Replacing existing equipment (only)
2. Lighting new areas (only)
3. Both
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 30. [If **<MEASURE>** = "LED Replacement Lamps" or "LED Replacement Lamps and LED Fixtures"] What types of light bulbs were ***replaced*** during your recent lighting upgrade? [DO NOT READ; ACCEPT MULTIPLES]

1. Screw-in CFLs
2. Hardwired CFLs
3. Incandescents
4. LEDs
5. High performance T8 fluorescent lamps
6. T8 fluorescent lamps
7. T10 fluorescent lamps
8. T12 fluorescent lamps
9. T5 fluorescent lamps
10. Cold Cathodes
11. Halogens
12. HIDs (High Intensity Discharge)
13. Induction lighting
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 31. [If **<MEASURE>** = "LED Replacement Lamps" or "LED Replacement Lamps and LED Fixtures"] Were the light bulbs that you replaced in working order, or had some or all of them failed (burned out)?

1. All in working order
2. Some had failed / burned out
3. All had failed / burned out
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 32. [If **Q 31** = 2] Approximately what percent of the replaced light bulbs had failed prior to installing LED replacement light bulbs?

___ [Enter %]
88. Don't Know
99. Refused

Q 33. [If **<IOU>** = SCE and **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures"] What types of light fixtures were ***replaced*** during your lighting upgrade in **<MONTH/YEAR OF INSTALL>** at **<CONTACT ADDRESS>**? [DO NOT READ; ACCEPT MULTIPLE]

1. Standard screw-in fixtures
2. Hardwired CFL fixtures
3. LED fixtures
4. High performance T8 fixtures
5. T8 fluorescent fixtures
6. T10 fluorescent fixtures
7. T12 fluorescent fixtures
8. T5 fluorescent fixtures
9. Electronic Ballast
10. Magnetic Ballast
11. Cold Cathode fixtures
12. Hardwired Halogen fixtures
13. HIDs (High Intensity Discharge) fixtures
14. Induction lighting fixtures
77. Other (Specify: _____)
88. Don't Know
99. Refused

[Ask **Q 34** and **Q 35** (if applicable) for each answer to **Q 33**]

Q 34. [If **<IOU>** = SCE and **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures"] Approximately how old were the replaced **<Q 33>**?

___ [Enter years]
88. Don't Know
99. Refused

Q 35. [If **<IOU>** = SCE and **Q 34**= 88] Would you say the replaced fixtures were… [READ ANSWERS; ACCEPT ONE]

1. Less than 1 year old?
2. 1 – 2 years old?
3. 2 – 3 years old?
4. 3 – 4 years old?
5. 4 – 5 years old?
6. 5 – 10 years old?
7. 10 years old or older?
88. Don't Know
99. Refused

Q 36. [If **<IOU>** = SCE and **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures"] Were the light fixtures that you replaced in working order, or had some or all of them failed (burned out)?

1. All in working order
2. Some had failed / burned out
3. All had failed / burned out
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 37. [If **<IOU>** = SCE and **Q 36**= 2] Approximately what percent of the replaced light fixtures had failed prior to installing LED fixtures?

___ [Enter %]
88. Don't Know
99. Refused

Q 38. Approximately what percent of your facility's existing light bulbs were replaced as part of your lighting upgrade in **<MONTH/YEAR OF INSTALL>** at **<CONTACT ADDRESS>**?

___ [Enter %]
88. Don't Know
99. Refused

Q 39. [If **<IOU>** = SCE and **<MEASURE>** = "LED Replacement Lamps and LED Fixtures" or "LED Fixtures"] Approximately what percent of your facility's lighting fixtures were retrofitted or replaced as part of your lighting upgrade in **<MONTH/YEAR OF INSTALL>** at **<CONTACT ADDRESS>**?

___ [Enter %]
88. Don't Know
99. Refused

Q 40. Approximately what percent of your facility's area was impacted by your lighting upgrade?

___ [Enter %]
88. Don't Know
99. Refused

Q 41. In what locations in your facility were the **<MEASURES>** installed? [DO NOT READ; ACCEPT MULTIPLE]

1. Entryway / front desk / waiting room / lobby
2. Offices
3. Hallways / walkways
4. Stairways / stairwells / stairs

5. Open offices / cubicles
6. Bathrooms
7. Meeting / conference rooms
8. Kitchen / break room
9. Copy room
10. Mail room
11. Dining room
12. Classrooms
13. Warehouse
14. Storage / closets
15. Retail floor
16. Changing rooms
17. Product displays
18. Gym
19. Pool room
20. Garage
21. Locker room
22. Patient rooms
23. Utility room / boiler room
24. Refrigeration / walk in refrigerator
25. Outside
77. Other (Specify: _____)
88. Don't Know
99. Refused

[IF MEASURE = "LED REPLACEMENT LAMPS AND LED FIXTURES", ASK **Q 42** – **Q 49**FIRST FOR "LED REPLACEMENT LAMPS" THEN FOR "LED FIXTURES"; ELSE GO THROUGH QUESTIONS ONCE FOR WHICHEVER MEASURE THEY HAVE (LAMPS OR FIXTURES)]

Q 42. On a scale of 1 to 10, where "1" is "not at all satisfied" and "10" is "extremely satisfied", how satisfied are you with the *light quality* of the **<MEASURE>** installed at your facility?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 43. [ASK If **Q 42** < 4] Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Q 44. On a scale of 1 to 10, where "1" is "not at all satisfied" and "10" is "extremely satisfied", how satisfied are you with the *light output – the amount of light* – of the **<MEASURE>** installed at your facility?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 45. [ASK If **Q 44** < 4] Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Q 46. On a scale of 1 to 10, where "1" is "not at all satisfied" and "10" is "extremely satisfied", how satisfied are you with the *physical appearance* of the **<MEASURE>** installed at your facility?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 47. [ASK If **Q 46**< 4] Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Q 48. On a scale of 1 to 10, where "1" is "not at all satisfied" and "10" is "extremely satisfied", how satisfied are you with the *reliability* of the **<MEASURE>** installed at your facility?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 49. [ASK If **Q 48**< 4] Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Participation in Other Programs

Q 50. Aside from the recent lighting upgrade that we have talked about today, has your company received any **<IOU>** rebates or incentives for the purchase and installation of other energy efficiency equipment?

1. Yes

2. No
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 51. [If **Q 50**=1] For what other types of equipment? [DO NOT READ; ACCEPT MULTIPLE]

1. Lighting
2. HVAC / Air Conditioning / Heating
3. Boilers
4. Water Heating
5. Steam Traps
6. Refrigeration
7. Food Services / Cooking
8. Business Computing
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 52. [If **Q 51**=1] When you participated in these other lighting programs, did you submit a rebate application in order to obtain a rebate for the lighting installation, or did a contractor handle the paperwork on your behalf?

1. Respondent firm submitted rebate
2. Contractor
77. Other (Specify: _____)
88. Don't Know
99. Refused

[Ask **Q 53** and **Q 55** (if applicable) for all answers to **Q 51**]

Q 53. Thinking about your participation in **<IOU>**'s **<Q 51>** program, was it part of the [If **<IOU>** = PG&E, say: "PG&E Customized Retrofit Incentive Program"; If **<IOU>** = SCE, say: "SCE Energy Efficiency Customized Solutions Program"] ?

1. Yes
2. No
3. Maybe
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 54. [If **Q 50**=1] Please think about your participation in **<IOU>**'s **<Q 51>** program compared to your recent lighting upgrade that included **<MEASURE>** through the LED

Distributor [If PG&E: Trial; if SCE: Pilot Program]. Overall, would you say it was easier, about the same, or more difficult to participate in the LED Distributor [If PG&E: Trial; if SCE: Pilot Program]?

1. Easier
2. The same
3. More difficult
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 55. Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Q 56. On a scale of 1 to 10, where "1" is "not at all satisfied" and "10" is "extremely satisfied", how satisfied are you with the distributor LED trial overall?

___ [Enter 1 – 10]
88. Don't Know
99. Refused

Q 57. [ASK If **Q 56**< 4] Why do you say that? [OPEN-ENDED; RECORD RESPONSE VERBATIM]

_____

Respondent and Firm Background Information

We are almost done, I just have a few questions about you and your facility for statistical purposes.

Q 58. What is your job title?

1. Plant Manager
2. Facility Manager
3. Energy Manager
4. President/CEO
5. Owner/Co-owner/Partner/Member of LLP
6. General Manager
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 59. What is the main business activity at this facility? [Do not read list]

1. Offices (non-medical)
2. Restaurant/Food Service
3. Retail Stores
4. Food Stores (grocery/liquor/convenience)
5. Agricultural (farms, greenhouses)
6. Warehouse
7. Health Care
8. Education
9. Lodging (hotel/rooms)
10. Public Assembly (church/fitness/theater/library/museum/convention)
11. Services (hair/nail/massage/spa/gas/repair)
12. Industrial (food processing plant/manufacturing)
13. Laundry (coin-operated/commercial laundry facility/dry cleaning)
14. Condo Association/Apartment Manager (garden style/mobile home park/high-rise/townhouse)
15. Public Service (fire/police/postal/military)
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 60. Does your organization own, lease, or manage your space?

1. Own
2. Lease
3. Manage
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 61. [If **Q 60**= 2] How long is the remaining term of your lease?

1. 1 year
2. 2 years
3. 3 years
4. 4 years
5. 5 years
6. 6 years
7. 7 years
8. 8 years
9. 9 years
10. 10 years

11. More than 10 years
12. Month to month
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 62. Does your organization pay the electric utility bill at this location?

1. Yes
2. No
77. Other (Specify: _____)
88. Don't Know
99. Refused

Q 63. What is the approximate total square footage at your location?

___ [Enter #]
88. Don't Know
99. Refused

Q 64. [If **Q 63**= 88] Would you say the floor area is…

1. < 1,500 square feet?
2. 1,500 - 5,000 square feet?
3. 5,000 - 10,000 square feet?
4. 10,000 - 25,000 square feet?
5. 25,000 - 50,000 square feet?
6. 50,000 - 75,000 square feet?
7. 75,000 - 100,000 square feet?
8. Over 100,000 square feet?
88. Don't Know
99. Refused

Those are all my questions. Before I let you go, is there anything you'd like to add, anything that you think I should have asked about or that we should keep in mind as we conduct this research into LEDs in California?

_____

_____

_____

Thank you very much for your time on the phone today!

Lighting Distributor Interview Guide
PG&E and SCE LED Midstream Trial Evaluations

Background:

Data from two (SCE) to three (PG&E) groups of market actors are expected to inform the lighting innovation midstream trial evaluations and assist with interpretation of the comparison analysis that is also being done as part of the evaluations. The trials rely on midstream incentives through participating electrical distributors to increase the sales of LED retrofit lighting products.

Purpose

The target audience for this interview guide is lighting distributors who stock and supply LEDs to contractors or end-users in the PG&E and SCE service territories. We will interview two groups of lighting distributors – those who have participated in the midstream trial (and have received incentives for LED replacement lamps through the trial), and distributors who have not participated in the trial. The overall objective of this research task is to elicit information from distributors as part of a larger assessment aimed at determining if a direct midstream approach is a better or complementary way to engage the lighting supply community to increase market penetration of LED replacement lamps (and fixtures, in the case of SCE) in the commercial sector (compared to the downstream rebate program and Trade Professional Alliance at PG&E). We would also like to determine if the differences in measures and demand for measures offered by each program can account for any differences in sales volumes, or if the rebate process/program design is responsible.

Introduction

Hi, my name is _____, and I'm calling from Evergreen Economics on behalf of (Pacific Gas and Electric/Southern California Edison) (PG&E/SCE). We are an independent firm hired to help (PG&E/SCE) to improve their programs for customers seeking lighting upgrades. (PG&E/SCE) recently started providing incentives to distributors who stock and sell LED replacement lamps (if SCE=1, and fixtures) to the commercial sector. Throughout this questionnaire we will be calling this program the distributor LED trial.

[If PG&E distributor, say "and we are offering you a $100 incentive, no strings attached, if you complete the survey"].

[Participating Distributors]

Are you aware of the (PG&E/SCE) distributor LED trial that I just described? [If not, describe program and confirm that they are aware – if not, ask if someone else would be better to talk with; If no knowledge of program, and nobody else to talk with, Thank and Terminate]

Have you received incentives from (PG&E/SCE) through the distributor LED trial (where incentives are provided to distributors who stock and sell LED replacement lamps (if SCE=1,

and fixtures) to the commercial sector? [If "no", say that our records show their firm has, and ask if someone else would be better to talk with; If no knowledge of program, and nobody else to talk with, Thank and Terminate]

[Non-participating Distributors]

Are you aware of the (PG&E/SCE) distributor LED trial? [If not, describe program and confirm that they are aware – if not, ask if someone else would be better to talk with; continue survey with person most knowledgeable about (PG&E/SCE) distributor LED trial or (PG&E/SCE) rebate programs in general]

[If Agreed to Participate] Great. The purpose of this research is to solicit feedback from your firm and other firms distributing LED replacement lamps (if SCE=1, and fixtures) to the commercial sector. My questions should take [If participating distributor say: 30-45 minutes; if non-participating distributor say: 20 minutes].

Can you discuss this now, or would it be better to schedule a time to talk?

[Screen for correct person – person who knows most about lighting equipment]

[Get contact's full name, email address and telephone number.]

[If scheduled, immediately send an email with the date and time of the call and an Outlook appointment (with reminder set for ½ hour before call).]

[Send reminder email one day prior to call if scheduled more than 3 days in advance. (Text for email will be provided.)]

TRIAL=1 for participating distributors

Respondent and Firm Background Information

I'd like to start by finding out a bit about you, your company, and your job.

Q1. What does [company name] do? Anything else?

Q2. [If not mentioned in Q1] Just to confirm, [company name] does distribute (stock and sell) LED replacement lamps [If SCE read: and/or LED fixtures] for the commercial sector, correct? [If not, thank and terminate.]

Q3. [If not mentioned in Q1 or Q2] Do you distribute LED fixtures for the commercial sector?

Q4. [If not mentioned in Q1] Do you distribute non-LED products? What types of products?

Q5. What is your position at [company name]? [Probe for: Title, and responsibilities/description]

Q6. How long have you been at [company name]?

Q7. Since [If PG&E=1 read "January"; If SCE=1 read "July"] 2013, has [company name] sold lighting products that received incentives through any utility rebate programs besides (PG&E's/SCE's) distributor LED trial? [If yes, probe on which (PG&E/SCE) rebate programs]

Q8. [If Q7=Yes] Since [If PG&E=1 read "January"; If SCE=1 read "July"] 2013, approximately what percent of your lighting or fixture sales received a rebate in one form or another? [Probe on overall and specific to (PG&E/SCE) if known; Probe for differences between LEDs and other technologies.]

General Market Questions

Now I would like to ask a few questions about the market for LED replacement lamps and fixtures in general.

Q9. [If PG&E=1 and Q2=Yes and Q3 or Q4=Yes] What percent of commercial end-use customers that are replacing or retrofitting their lighting systems are installing LED replacement lamps as opposed to other lighting technologies (including LED fixtures)?

Q10. [If PG&E=1 and Q3=Yes and Q2 or Q4=Yes] And what percent are installing LED fixtures as opposed to other lighting technologies (including LED lamps)?

Q11. [If PG&E=1 and Q2=Yes and Q3=Yes] Are commercial end-use customers more interested in LED replacement lamps or in LED fixtures? Why do you say that? [Probe for differences in applicability, ease of installation, cost, ROI, etc.]

Q12. [If PG&E=1] Are there any segments of the commercial market that purchase LED replacement lamps or LED fixtures more frequently than other segments? [Probe on business type, business size, own/lease, going through remodel] Are there any segments that are particularly resistant to LED replacement lamps or LED fixtures?

Q13. [If PG&E=1] Are there any differences between customers who prefer LED lamps versus LED fixtures?

Q14. Approximately what percent of your LED replacement lamp sales go through a contractor?

Q15. And what percent go directly to an end-use customer or facilities manager? [If Q14 + Q15 < 100%, ask about remaining replacement lamps]

Q16. And approximately what percent of your LED fixture sales go through a contractor?

Q17. And what percent go directly to an end-use customer or facilities manager? [If Q16 + Q17 < 100%, ask about remaining replacement lamps]

Q18. [If Q14 ≠ Q16] Why is there a difference in the percent of LED replacement lamp sales versus LED fixture sales that go through contractors? [Probe for differences in installation complexity]

Q19. When replacing existing equipment with LEDs, what product specifications or performance-related factors are considered most when selecting the LED products:

a) Lumen equivalency?

b) Wattage equivalency?

c) Other factors? Like what? [Probe for influence of code requirements]

With our next two questions we're trying to gather your initial reaction regarding which part of the market is being most affected by LEDs.

Q20. In which application type (for example: recessed downlighting, high bay, exterior flood) are LEDs causing the greatest amount of displacement of non-LED technologies?

Q21. Within that application, which type of lighting equipment (for example: halogen, linear fluorescent, CFL) is being displaced the most by LEDs?

Stocking

I'd like to ask you about some specific products and whether you stock them, and if your customers are asking for them.

Q22. What influences which types of commercial lighting products you stock (including LEDs and all other lighting technologies)? [Probe for product types and negotiations with manufacturer representatives.]

Thinking about LED lighting products…

Q23. How does your company determine what LED products to stock? [Probe for LED lamps vs. fixtures (interior and exterior), LED vs. traditional technologies (e.g., fluorescents and incandescent/halogens), high-end vs. mid-range vs. budget products, negotiations with manufacturer reps; what do they want to carry, how does it show up on their shelf]

Q24. Do you currently have any LED lighting products (besides exit signs) in stock? Which types? [If no] Why not?

Q25. Does the relative availability of LED products affect what is installed in commercial applications (if something is in stock versus special order)? [If yes] in what ways? [Probes: other technologies, lamps vs. fixtures, quantity, and manufacturer]

Participation and Trial Experience

Midstream Trial

[If TRIAL=1] Now I have some questions about your experience with the (PG&E/SCE) distributor LED trial (where distributors are given rebates directly for LED lamps (if SCE=1 and fixtures)).

Q26. [If TRIAL=1] How likely are you to encourage LED (if PG&E=1: lamps, if SCE=1: lamps and fixtures) to commercial customers due to the (PG&E/SCE) distributor LED trial? Very likely, somewhat likely, or not very likely? Tell me more about that.

Q27. [If TRIAL=1] How satisfied were you with the (PG&E/SCE) distributor LED trial overall, on a scale of one to five with one being very dissatisfied and five being very satisfied? Why do you give it that rating?

Q28. [If TRIAL=1] How would you rate your ease of participation in the (PG&E/SCE) distributor LED trial on a scale of one to five with one being very difficult and five being very easy? Why do you give it that rating?

Q29. [If TRIAL=1] How satisfied were you with the rebate processing time in the distributor LED trial on a scale of one to five with one being very dissatisfied and five being very satisfied? Why do you give it that rating?

Q30. [If TRIAL=1] How satisfied were you with the qualified products list in the distributor LED trial on a scale of one to five with one being very dissatisfied and five being very satisfied? Why do you give it that rating? [Probe for LEDs (and fixtures if SCE=1) that should be added/removed from Trial; concerns about specific qualifying products, etc.]

Q31. [If TRIAL=1] How would you rate the ease of collecting and reporting contractor or installer contact information to (PG&E/SCE), on a scale of one to five with one being very difficult and five being very easy? Why do you give it that rating?

Q32. [If TRIAL=1] If reporting installer or contractor information were required for all distributor LED trial projects where an installer or contractor installed the lighting equipment, would this affect your participation in any way? How so?

Q33. [If TRIAL=1] Do you think any other types of commercial energy efficiency equipment – lighting or otherwise – would benefit from a distributor incentive approach? What types? Why?

Q34. [If TRIAL=1] Do you tell purchasing contractors about the (PG&E/SCE) distributor LED trial rebates?

Q35. [If TRIAL=1] Does the discounted price affect what you present to contractors? How so? [Probe on pricing, options, brand, comparisons, payback period, ROI]

Q36. [If TRIAL=1] Do you think that contractors would prefer to receive a rebate directly from the utility, as opposed to through a distributor (via the distributor LED trial)?

Q37. [If TRIAL=1] Has the (PG&E/SCE) distributor LED trial affected your relationships with any of the contractors that you work with? How so?

Q38. [If TRIAL = 1 and Q15 or Q17 > 0%] Do you tell end use customers and/or facilities managers about the (PG&E/SCE) distributor LED trial rebates?

Q39. [If TRIAL = 1 and Q15 or Q17 > 0%] Does the discounted price affect what you present to end use customers and/or facilities managers? How so? [Probe on pricing, options, brand, comparisons, payback period, ROI]

Q40. [If TRIAL = 1 and Q15 or Q17 > 0%] Do you think that end use customers and/or facilities managers would prefer to receive a rebate directly from the utility as opposed to through a distributor (via the distributor LED trial)?

Questions for Midstream Trial Non-participants:

Q41. [If TRIAL=0] Have you made any changes to your lighting stocking practices over the past two years? What changes have you made and when did they occur? What caused the change [Probe for effect of general market changes and other programs]

Q42. [If PG&E=1 and TRIAL=0] We would like to understand the reasons that your company has not yet participated in the PG&E distributor LED trial. Are there any reasons why your company hasn't participated yet? Like what? [Haven't had interest, haven't discussed, haven't had opportunity, probe for additional reasons…]

Q43. [If TRIAL=0] Do you see value in LED rebates being offered directly to distributors or not? [If yes] Like what? [If no] Why not?

Q44. [If TRIAL=0] Do you have any concerns related to LED rebates offered directly to distributors or not? Like what?

Q45. [If TRIAL=0] How likely or unlikely are you to participate in the (PG&E/SCE) distributor LED trial in the future [If SCE=1: if it is expanded to all distributors]? Please rate your likelihood to participate on a scale of one to five, with one being very unlikely and five being very likely. Why do you give that rating?

[PG&E ONLY] Trade Professional Alliance

Now I have some questions about your experience with PG&E's Trade Professional Alliance (which is part of their end-user rebate program in which distributors and contractors can receive rebates for LED fixtures directly from PG&E on behalf of commercial end-users, with permission from the end-user).

Q46. [If PG&E=1 and TPA=1] According to PG&E's records, you participated in their Trade Professional Alliance… Is this correct? [If needed: this is an alliance of trade professionals where you can receive rebate updates, rebate payments, and event invitations from PG&E]

Q47. [If PG&E=1 and Q46=1] Since January 2013, has your company applied for or received rebates for LED fixtures through PG&E's Trade Professional Alliance by getting customer permission?

Q48. [If PG&E=1 and Q47=Yes] Please describe the influence that the Trade Professional Alliance has had on your sales of LED fixtures. Have LED fixture sales increased, decreased or not changed since January 2013? [If increased or decreased ask:] By how much?

[PG&E ONLY] Trial and Trade Professional Alliance Overlap:

[If PG&E=1, TRIAL=1 and Q47=Yes] Now I'd like to discuss any overlap between the PG&E distributor LED trial and the PG&E Trade Professional Alliance incentives.

Q49. [If PG&E=1, TRIAL=1 and Q47=Yes] How does the Trade Professional Alliance rebate approach vary from that of the distributor LED trial rebates? Please explain. [Probe for differences in measures and program processes]

Q50. [If PG&E=1, TRIAL=1 and Q47=Yes] Are the commercial end-use customers for both PG&E rebate programs (distributor LED trial and Trade Professional Alliance fixtures) the same? [If not the same, probe for differences]

Q51. [If PG&E=1, TRIAL=1 and Q47=Yes] What factors influence whether sales go through the distributor LED trial or the Trade Professional Alliance LED fixtures program? [Probe for differences in program structure].

Q52. [If PG&E=1, TRIAL=1 and Q47=Yes] Is the distributor LED trial a complementary, superior, or inferior program design than the Trade Professional Alliance structure (where you can receive an incentive for a specific project on behalf of a customer, with their approval)? Why do you say that? Do you prefer one to the other?

[PG&E ONLY] Trial and Direct Install overlap

[If PG&E=1 and TRIAL=1] Now I'd like to discuss any overlap between the PG&E distributor LED trial and PG&E commercial lighting direct install programs, where installers typically go door-to-door to sell lighting installations.

Q53. [If PG&E=1 and TRIAL=1] Do any of the LED fixtures or lamps you distribute get installed by contractors through one of PG&E's direct install programs?

Q54. [If PG&E=1, TRIAL=1 and Q53="Yes"] Are the commercial end-use customers for both rebate programs (distributor LED trial and direct install) the same? [If not the same, probe for differences]

Q55. [If PG&E=1, TRIAL=1 and Q53="Yes"] What factors influence whether sales go through the distributor LED trial or the direct install program? [Probe for differences in program structure].

Q56. [If PG&E=1, TRIAL=1 and Q53=Yes] Is the distributor LED trial a complementary, superior, or inferior program design than the direct install program structure? Why do you say that? Do you prefer one over the other?

[SCE ONLY] Trial and Downstream overlap:

[If TRIAL=1] Now I'd like to discuss any overlap with SCE's downstream programs where commercial end-use customers receive rebates directly from SCE for the installation of efficient technologies such as lighting and LEDs. These programs are commonly known as express, calculated, deemed, or prescriptive. To make things simpler, we will refer to these programs collectively as downstream programs going forward.

Q57. [If SCE=1, TRIAL=1] How does the downstream rebate approach vary from that of the distributor LED rebates? Please explain. [Probe for differences in measures and program processes]

Q58. [If SCE=1 and TRIAL=1] Are the commercial end-use customers for both SCE rebate programs (distributor LED trial and downstream programs) the same? [If not the same, probe for differences]

Q59. [If SCE=1, TRIAL=Yes] What factors influence whether you access rebates through the distributor LED trial or whether commercial end use customers access rebates through the downstream programs? [Probe for differences in program structure]

Q60. [If SCE=1, TRIAL=Yes] Do customers ever receive downstream rebates for products that were rebated by SCE at the distributor level (to you)? Please explain. [Probe for frequency, program rules/requirements]

Q61. [If SCE=1, TRIAL=1] Is the distributor LED trial a complementary, superior, or inferior program design than the downstream rebate program structures? Why do you say that? Do you prefer one over the other?

LED Sales

Now I have a few questions about recent changes you may or may not have seen in the LED market… [If SCE=1 First I am going to ask about LED replacement lamps and then I'll ask about LED fixtures specifically.]

Q62. Have you noticed any changes in your company's sales of LED replacement lamps since [If PG&E=1 read "January"; If SCE=1 read "July"] 2013? [Probe for % increase/decrease] Are any types of LED replacement lamp sales increasing or decreasing more than others? Which types?

Q63. [If Q62=Yes] What factors do you think have contributed to this change in your company's LED replacement lamp sales? Which of the factors have had the largest impact? [Probe for effect of distributor LED trial as well as other effects, such as general market changes and other programs]

Q64. [If SCE=1] Have you noticed any changes in your company's sales of LED fixtures since July 2013? [Probe for % increase/decrease] Are any types of LED fixture sales increasing or decreasing more than others? Which types?

Q65. [If Q64=Yes and SCE=1] What factors do you think have contributed to this change in your company's LED fixture sales? Which of the factors have had the largest impact? [Probe for effect of distributor LED trial as well as other effects, such as general market changes and other programs]

Q66. Have you made any changes to your lighting stocking practices since [If PG&E=1 read "January"; If SCE=1 read "July"] of 2013? What changes have you made? [If SCE=1 have respondent specify fixtures or lamps]

Q67. [If Q64=Yes] What factors do you think have contributed to this change in your company's stocking? Which of the factors have had the largest impact? [Probe for effect of distributor LED trial as well as other effects, such as general market changes and other programs. If SCE=1 have respondent specify fixtures or lamps]

Cannibalization and Attribution:

I would like to ask you a few questions related to your sales through the distributor trial, and code requirements in California.

[IF NEEDED: In the updated version of Title 24, lighting systems will be required to meet all code requirements, including both maximum allowable lighting power density (LPD) and required control functionality, whenever 10% or more of the luminaires (i.e. fixtures) in an enclosed space are impacted by a retrofit. There is an exception for modifications in place that allows 10% of luminaires to be modified per year, per enclosed space in a building of more than 40 luminaires without triggering the requirement that all luminaires and controls in the impacted enclosed spaces be brought up to code.]

Q68. Were any of your sales through the distributor LED trial required of the customer to comply with California Title 24 building code? Please explain.

Q69. [IF Q68=YES] Approximately what percent of your LED replacement lamp (if SCE=1 and fixture) sales through the distributor LED trial occurred to comply with California Title 24 building code?

Q70. [IF Q68=YES] Thinking *only* about the sales that were made to comply with California Title 24 building code… Would sales of the same or similar LED replacement lamps (if SCE=1 and/or fixtures) have occurred in absence of the code requirements? Approximately what percent?

Now I want to continue our conversation about sales by talking a bit more about the different available rebate options.

Q71. [If TRIAL=1] In absence of the (PG&E/SCE) distributor LED trial, would any of the retrofits that received distributor LED trial incentives have received rebates via another incentive program?

Q72. [If Q68=Yes] Approximately what percent of retrofits would have received rebates through another incentive program [in absence of the (PG&E/SCE) distributor LED trial incentives]? Through which programs? What are the reasons that they would go through the (PG&E/SCE) distributor LED trial as opposed to another incentive program?

Q73. [If Q68=No or Q72<100%/all] What is it about the (PG&E/SCE) distributor LED trial that led to some sales that would not have occurred otherwise? [Probe for differences in program design/format; product types]

Q74. [If TRIAL=0] Do you think distributor LED trial rebates (rebates provided to you, rather than the end user) would overlap with other incentive programs? If yes, how do they help or hinder any efforts to increase LED product sales? [Probe on sales, customer wants and needs]]

[If TRIAL=1 and PG&E=1] Now we are going to talk a bit about the PG&E downstream rebate program – which provides incentives to the commercial customers for purchasing LED fixtures, but not LED replacement lamps – as compared to the PG&E distributor LED trial – which provides incentives to distributors for selling LED replacement lamps, but not fixtures. I am going to present you with a couple of hypothetical situations, followed by questions…

Q75. [If TRIAL=1 and PG&E=1] If PG&E made a change, and LED replacement lamps qualified for ONLY the downstream rebate – to the end-user – as opposed to ONLY the distributor LED trial rebate, what impact would that have on your volume of sales of LED replacement lamps? Would you expect your:

d) Sales to remain about the same?

e) Sales to increase?

f) Sales to decrease?

Why do you say that? [Probe for importance of program design aspects]

Q76. [If TRIAL=1 and PG&E=1] Now, If PG&E made a different change, and LED fixtures qualified for ONLY the distributor LED trial rebate – to distributors – as opposed to ONLY the downstream rebate – to end-users – what impact would that have on the volume of sales of LED fixtures? Would you expect your:

a) Sales to remain about the same?

b) Sales to increase?

c) Sales to decrease?

Why do you say that? [Probe for importance of program design aspects]

Q77. [If TRIAL=1 and SCE=1] In the future SCE may not be able to offer the same LED products in two separate programs (like the distributor LED trial and the downstream program) and SCE would like us to solicit feedback regarding the best way to divide LED products into the two programs. Which LED products do you think would work best in which program? [Probe for fixtures vs. lamps and sub types (e.g. A-lamp, candelabra, MR-16, Par20, Par30, Par38, R-BR)]

Q78. Overall, do you believe the (PG&E/SCE) distributor LED trial incentives are impacting the volume of LED replacement lamp sales into the commercial sector? How so? [Probe for % increase/decrease, reasons for change]

Q79. [If SCE=1] Overall, do you believe the SCE distributor LED trial incentives are impacting the volume of LED fixture sales into the commercial sector? How so? [Probe for % increase/decrease, reasons for change]

Q80. Do you think that overall, the distributor LED incentive approach is beneficial as an addition to the (PG&E/SCE) program portfolio for lighting or not? Why do you say that?

Wrap Up

Those are all my questions. Before I let you go, is there anything you'd like to add, anything that you think I should have asked about or that we should keep in mind as we conduct this research into LEDs in California?

Thank you very much for your time on the phone today!

Contractor Interview Guide:

PG&E and SCE LED Midstream Trial Evaluations
August 13 2014

Background:

Data from two (SCE) to three (PG&E) groups of market actors are expected to inform the lighting innovation midstream trial evaluations and assist with interpretation of the comparison analysis that is also being done as part of the evaluations. The trials rely on midstream incentives through participating electrical distributors to increase the sales of LED retrofit lighting products.

Purpose

The target audience for this interview guide is contractors who install LEDs in commercial facilities in the PG&E and SCE service territories. For PG&E, we will only conduct interviews with contractors who have purchased incentivized LED replacement lamps from distributors who participated in the lighting innovation midstream trial. For SCE we will interview contractors who have not installed midstream-rebated LED products in addition to contractors who have installed midstream-rebated LED lamps and fixtures. The overall objective of this research task is to elicit information from contractors as part of a larger assessment aimed at determining if a direct midstream approach is a better or complementary way to engage the lighting supply community to increase market penetration of LED replacement lamps (and fixtures, in the case of SCE) in the commercial sector (compared to the downstream rebate program and Trade Professional Alliance at PG&E). We would also like to determine if the differences in measures and demand for measures offered by each program can account for any differences in sales volumes, or if the rebate process/program design is responsible.

Introduction

Hi, my name is _____, and I'm calling from Evergreen Economics on behalf of (Pacific Gas and Electric/Southern California Edison) (PG&E/SCE). We are an independent firm hired to help (PG&E/SCE) to improve their programs for customers seeking lighting upgrades. (PG&E/SCE) recently started providing incentives to distributors who stock and sell LED replacement lamps (if SCE=1, and fixtures) for installation in the commercial sector. Throughout this questionnaire we will be calling this program the distributor LED trial.

[If PG&E contractor, say "and we are offering you a $100 incentive, no strings attached, if you complete the survey"].

[Participating Contractors]

Are you aware of this distributor LED trial that I just described? [If not, describe program again and confirm that they are aware – if not, ask if someone else would be better to talk

with; If no knowledge of the distributor LED trial, and nobody else to talk with, Thank and Terminate]

Have any of the distributors you work with offered you a utility incentive through the (PG&E/SCE) distributor LED trial for any of the LED replacement lamps (if SCE=1, or fixtures) you've installed?

[If "no", say that our records show their firm has, and ask if someone else would be better to talk with; If no knowledge of program, and nobody else to talk with, Thank and Terminate]

[Non-participating Contractors]

Are you aware of this distributor LED trial? [If not, describe program again and confirm that they are aware – if not, ask if someone else would be better to talk with. Continue interview with most knowledgeable person]

[If Agreed to Participate] Great. The purpose of this research is to solicit feedback from your firm and other firms installing LED products to the commercial sector. My questions should take [If participating contractor say: 30-40 minutes; if non-participating contractor say: 20 minutes].

Can you discuss this now, or would it be better to schedule a time to talk?

[Screen for correct person – person who knows most about lighting equipment]

[Get contact's full name, email address and telephone number.]

[If scheduled, immediately send an email with the date and time of the call and an Outlook appointment (with reminder set for ½ hour before call).]

[Send reminder email one day prior to call if scheduled more than 3 days in advance. (Text for email will be provided.)]

TRIAL=1 for participating contractors

Respondent and Firm Background Information

I'd like to start by finding out a bit about you, your company, and your job.

We are interested in talking to contractors that have experience with LED lighting.

Q1. What does (company name) do? Anything else?

Q2. [If not mentioned in Q1] Just to confirm, [company name] does install LED replacement lamps [If SCE read: and/or LED fixtures] in commercial sector spaces, correct? [If not, thank and terminate.]

Q3. [If not mentioned in Q1 or Q2] Do you install LED fixtures in the commercial sector?

Q4. [If not mentioned in Q1] Do you install non-LED products in the commercial sector? What types of products?

Q5. What is your position at [company name]? [Probe on: Title, and responsibilities/description]

Q6. How long have you been at [company name]?

Q7. Since [If PG&E=1 read "January"; If SCE=1 read "July"] 2013, has [company name] installed lighting products for projects that received incentives through a utility rebate program? [If yes, probe on which utility rebate programs with a focus on (PG&E/SCE)]

Q8. [If Q7=Yes] Since [If PG&E=1 read "January"; If SCE=1 read "July"] 2013, approximately what percent of your lighting sales receive a rebate in one form or another? [Probe on overall and specific to (PG&E/SCE) if known; Probe for differences between LEDs and other technologies.]

General Market Questions

Now I would like to ask a few questions about the market for LED replacement lamps in general.

Q9. [If PG&E=1 and Q2=Yes and Q3 or Q4=Yes] What percent of your commercial end-use customers that are replacing or retrofitting their lighting systems are installing LED replacement lamps as opposed to other lighting technologies (including LED fixtures)?

Q10. [If PG&E=1 and Q3=Yes and Q2 or Q4=Yes] And what percent of your commercial end-use customers are installing LED fixtures as opposed to other lighting technologies (including LED lamps)?

Q11. [If PG&E=1 and Q2=Yes and Q3=Yes] Are your commercial end-use customers more interested in LED replacement lamps or in LED fixtures? Why do you say that? (Probe for differences in applicability, ease of installation, cost, ROI, etc.)

Q12. [If PG&E=1] Based on your installations, would you say that there are any segments of the commercial market that purchase LEDs or LED fixtures more frequently than other segments? [Probe on business type, business size, own/lease, going through remodel] Are there any segments that are particularly resistant to LEDs or LED fixtures?

Q13. [If PG&E=1] Are there any differences between your customers who prefer LED lamps versus your customers who prefer LED fixtures?

Q14. What percent of your LED sales are replace-on-burnout vs. early replacement? Does this vary significantly by customer type or application?

Q15. When replacing existing equipment with LEDs, what product specifications or performance-related factors are considered most when selecting the LED products:

a) Lumen equivalency?

b) Wattage equivalency?

c) Other factors? Like what? [Probe for influence of code requirements]

With our next two questions we're trying to gather your initial reaction regarding which part of the market is being most affected by LEDs.

Q16. In which application type (for example: recessed downlighting, high bay, exterior flood) are LEDs causing the greatest amount of displacement of non-LED technologies?

Q17. Within that application, which type of lighting equipment (for example: halogen, linear fluorescent, CFL) is being displaced the most by LEDs?

Participation and Trial Experience

Midstream Trial

[If TRIAL = 1] Now I have some questions about your experience with the (PG&E/SCE) distributor LED trial (where contractors receive LED (if PG&E=1: lamps, if SCE=1, lamps and/or fixtures) at discounted prices through distributors who receive an incentive through the utility to cover the discounted price).

Q18. [If TRIAL=1] How likely are you to encourage LED (if PG&E=1: lamps, if SCE=1: lamps and fixtures) to commercial customers due to the (PG&E/SCE) distributor LED trial? Very likely, somewhat likely, or not very likely? Tell me more about that.

Q19. [If TRIAL=1] How satisfied were you with the (PG&E/SCE) distributor LED lamp trial overall, on a scale of one to five with one being very dissatisfied and five being very satisfied? Why do you give it that rating?

Q20. [If TRIAL=1] How satisfied were you with the qualified products list in the distributor LED trial on a scale of one to five with one being very dissatisfied and five being very satisfied? Why do you give it that rating? [Probe for LEDs that should be added/removed from the distributor LED trial; concerns about specific qualifying products, etc.]

Q21. [If TRIAL=1] Do you think any other types of commercial energy efficiency equipment – lighting or otherwise – would benefit from a distributor incentive approach? What types? Why?

Q22. [If TRIAL=1] Was the process for getting LED products from the distributor any different than usual because of the distributor LED trial? If yes, how so? [Probe on speed, communication, etc.]

Q23. [If TRIAL=1] Do you tell your customers about the (PG&E/SCE) distributor LED trial rebates?

Q24. [If TRIAL=1] Does the discounted price affect what you present to end user customers? How so? [Probe on pricing, options, brand, comparisons, payback period, ROI]

Q25. [If TRIAL=1] Do you think that end use customers and/or facilities managers would prefer to receive a rebate directly from the utility as opposed to through a distributor (via the distributor LED trial)?

[SCE ONLY] Questions for Midstream Trial Non-participants:

Q26. [TRIAL=0] We would like to understand the reasons that your company has not yet participated in SCE's distributor LED trial. Are there any reasons why your company hasn't participated yet? Like what? [Haven't had interest, haven't discussed, haven't had opportunity, probe for additional reasons…]

Q27. [If TRIAL=0] Do you see value in utility LED rebates offered directly by distributors or not? [If yes] Like what? [If no] Why not?

Q28. [If TRIAL=0] Do you have any concerns related to utility LED rebates offered directly by distributors or not? Like what?

Q29. [If TRIAL=0] If a distributor offered you LED replacement lamps and/or fixtures at a reduced cost – due to distributor incentives from SCE – would you be interested in promoting the LEDs to your commercial customer base? Why or why not?

Q30. [If TRIAL=0 and Q29=Yes] If you received LED products at a lower cost from a distributor, how would it affect what you present to end-use customers? [Probe on pricing, options, brand, comparisons, payback period, ROI]

[PG&E ONLY] Trade Professional Alliance

Now I have some questions about your experience with PG&E's Trade Professional Alliance (which is part of their end-user rebate program in which distributors and contractors can receive rebates for LED fixtures directly from PG&E on behalf of commercial end-users, with permission from the end-user).

Q31. [If PG&E=1] and TPA=1] According to PG&E's records, you participated in their Trade Professional Alliance… Is this correct? [If needed: this is an alliance of trade professionals where you can receive rebate updates, rebate payments, and event invitations from PG&E]

Q32. [If PG&E=1 and Q31=Yes] Since early 2013, has your company applied for or received rebates for LED fixtures through the PG&E Trade Professional Alliance by getting customer permission?

Q33. [If PG&E=1 and Q31=Yes] Please describe the influence that the PG&E Trade Professional Alliance has had on your sales of LED fixtures. Have LED fixture sales increased or decreased or not changed since January 2013? [If increased or decreased ask:] By how much?

[PG&E ONLY] Trial and Trade Professional Alliance Overlap:

[If TRIAL=1 and Q32=Yes] Now I'd like to discuss any overlap between the PG&E midstream incentive program/trial and the PG&E Trade Professional Alliance incentives.

Q34. [If PG&E=1, TRIAL=1 and Q32=Yes] How does the Trade Professional Alliance rebate approach vary from that of the distributor LED trial rebates? Please explain. [Probe for differences in measures and program processes]

Q35. [If PG&E=1, TRIAL=1 and Q32=Yes] Are the end-users for both rebate programs (distributor LED trial lamps and Trade Professional Alliance fixtures) the same? [If not the same, probe for differences]

Q36. [If PG&E=1, TRIAL=1 and Q32=Yes] What factors influence whether sales go through the distributor LED trial or the Trade Professional Alliance LED fixtures program? [Probe for differences in program structure]

Q37. [If PG&E=1, TRIAL=1 and Q32=Yes] Is there anything that you like more about the Trade Professional Alliance than the distributor LED trial? Like what? [Probe for measure differences, program design/requirements, ease of process]

Q38. [If PG&E=1, TRIAL=1 and Q32=Yes] Is there anything that you like less about the Trade Professional Alliance than the distributor LED trial? Like what? [Probe for measure differences, program design/requirements, ease of process]

Q39. [If PG&E=1, TRIAL=1 and Q32=Yes] More specifically, is the distributor LED trial program a complementary, superior, or inferior program design than the Trade Professional Alliance structure (where you can receive an incentive for a specific project on behalf of a customer, with their approval)? Why do you say that? Do you prefer one to the other?

[PG&E ONLY] Trial and Direct Install Overlap:

[If TRIAL=1 and PG&E=1] Now I'd like to discuss any overlap between the PG&E distributor LED trial and PG&E commercial lighting direct install programs.

Q40. [If PG&E=1 and TRIAL=1] Have you installed LED replacement lamps or LED fixtures through any of PG&E's direct install programs? Which ones? [If yes, DI=1]

Q41. [If PG&E=1, TRIAL=1 and Q40=Yes] How does the direct install approach vary from that of the midstream LED rebates? Please explain. [Probe for differences in measures and program processes]

Q42. [If PG&E=1, TRIAL=1 and Q40=Yes] Are the end-users for both PG&E rebate programs (midstream trial LED lamps and direct install fixtures) the same? [If not the same, probe for differences]

Q43. [If PG&E=1, TRIAL=1 and Q40=Yes] What factors influence whether sales go through the distributor LED trial or the direct install program? [Probe for differences in program structure]

Q44. [If PG&E=1, TRIAL=1 and Q40=Yes] Is there anything that you like more about the direct install program than the distributor LED trial? Like what? [Probe for measure differences, program design/requirements, ease of process]

Q45. [If PG&E=1, TRIAL=1 and Q40=Yes] Is there anything that you like less about the direct install program than the distributor LED trial? Like what? [Probe for measure differences, program design/requirements, ease of process]

Q46. [If PG&E=1, TRIAL=1 and Q40=Yes] More specifically, is the distributor LED trial a complementary, superior, or inferior program design than the direct install program structure? Why do you say that? Do you prefer one to the other?

[SCE ONLY] Midstream Trial and Downstream Programs Overlap:

[If TRIAL=1] Now I'd like to discuss any overlap with SCE downstream programs where commercial end-use customers receive rebates directly from SCE for the installation of efficient technologies such as lighting and LEDs. These programs are commonly known as express, calculated, deemed, or prescriptive. To make things simpler, we will refer to these programs collectively as downstream programs going forward.

Q47. [If SCE=1, TRIAL=1] How does the downstream rebate approach vary from that of the distributor LED rebates? Please explain. [Probe for differences in measures and program processes]

Q48. [If SCE=1 and TRIAL=1] Are the end-users for both rebate programs (distributor LED trial and downstream programs) the same? [If not the same, probe for differences]

Q49. [If SCE=1, TRIAL=1] What factors influence whether you access rebates through the distributor LED trial or the downstream programs? [Probe for differences in program structure]

Q50. [If SCE=1, TRIAL=1] Is there anything that you like more about the downstream rebate programs than the distributor LED trial? Like what? [Probe for measure differences, program design/requirements, ease of process]

Q51. [If SCE=1, TRIAL=1] Is there anything that you like less about the downstream rebate programs than the distributor LED trial? Like what? [Probe for measure differences, program design/requirements, ease of process]

Q52. [If SCE=1, TRIAL=1] More specifically, is the distributor LED trial a complementary, superior, or inferior program design than the downstream rebate program structures? Why do you say that? Do you prefer one over the other?

LED Sales

Now I have a few questions about recent changes you may or may not have seen in the LED market…

Q53. Have you noticed any changes in your company's sales of LED replacement lamps (if SCE=1, or fixtures) over the past two years? [Probe for % increase/decrease] Are any types of LED replacement lamps increasing or decreasing more than others? Which types?

Q54. [If Q53=Yes] What factors do you think have contributed to this change in your company's sales? Which of the factors have had the largest impact? [Probe for effect of distributor LED trial as well as other effects, such as general market changes and other programs]

Q55. Has the mix of products that you install changed in any way since the (PG&E/SCE) distributor LED trial began? What changes and when did they occur?

Q56. [If Q64=Yes] What factors do you think have contributed to this change in the mix of products you install? Which of the factors have had the largest impact? [Probe for effect of distributor LED trial as well as other effects, such as general market changes and other programs]

Cannibalization and Attribution:

I would like to ask you a few questions related to your sales through the distributor trial, and code requirements in California.

[IF NEEDED: In the updated version of Title 24, lighting systems will be required to meet all code requirements, including both maximum allowable lighting power density (LPD) and required control functionality, whenever 10% or more of the luminaires (i.e. fixtures) in an enclosed space are impacted by a retrofit. There is an exception for modifications in place that allows 10% of luminaires to be modified per year, per enclosed space in a building of more than 40 luminaires without triggering the requirement that all luminaires and controls in the impacted enclosed spaces be brought up to code.]

Q57. Were any of your sales through the distributor LED trial required to comply with California Title 24 building code? Please explain.

Q58. [IF Q57=YES] Approximately what percent of your LED replacement lamp (if SCE=1 and fixture) sales through the distributor LED trial occurred to comply with California Title 24 building code?

Q59. [IF Q57=YES] Thinking *only* about the sales that were made to comply with California Title 24 building code… Would sales of the same or similar LED replacement lamps (if SCE=1 and/or fixtures) have occurred in absence of the code requirements? Approximately what percent?

Now I want to continue our conversation about sales by talking a bit more about the different available rebate options.

Q60. [If TRIAL=1] In absence of the (PG&E/SCE) distributor LED trial, would any of the installations that received distributor LED trial incentives have received rebates via another incentive program?

Q61. [If Q60=Yes] Approximately what percent of installations would have occurred in another incentive program (in absence of the (PG&E/SCE) distributor LED incentives)? Through which programs? What are the reasons that they would go through the (PG&E/SCE) distributor LED trial as opposed to another incentive program?

Q62. [If Q60=No or Q61<100%/all] What is it about the PG&E/SCE distributor LED trial that led to some sales that would not have occurred otherwise? [Probe for differences in program design/format; product types]

Q63. [If TRIAL=0] Do you think distributor LED product rebates (discounts given to you through distributors, rather than through the end-users) would overlap with other incentive programs? If yes, how do they help or hinder any efforts to increase LED sales? [Probe on sales, customer wants and needs]

[If TRIAL=1 and PG&E=1] Now we are going to talk a bit about the downstream rebate program – which provides incentives to commercial customers for purchasing LED fixtures, but not LED replacement lamps – as compared to the distributor LED trial – which provides incentives through distributors for selling LED replacement lamps, but not fixtures. I am going to present you with a couple of hypothetical situations, followed by questions…

Q64. [If TRIAL=1 and PG&E=1] If PG&E made a change, and LED replacement lamps qualified for ONLY the downstream rebate – to the end-user – as opposed to ONLY the distributor LED trial rebate, what impact would that have on your volume of sales for LED replacement lamps? Would you expect your:

a) Sales to remain about the same?

b) Sales to increase?

c) Sales to decrease?

Why do you say that? [Probe for importance of program design aspects]

Q65. [If TRIAL=1 and PG&E=1] Now, If PG&E made a different change, and LED fixtures qualified for ONLY the distributor rebate – to the distributor – as opposed to ONLY the downstream rebate – to the end-user – what impact would that have on the volume of sales for LED fixtures? Would you expect your:

a) Sales to remain about the same?

b) Sales to increase?

c) Sales to decrease?

Why do you say that? [Probe for importance of program design aspects]

Q66. [If Trial=1 and SCE=1] In the future SCE may not be able to offer the same LED products in two separate programs (like the distributor LED trial and the downstream program). SCE would like us to solicit feedback regarding the best way to divide LED products into the two programs. Which LED products do you think would work best in which program, or should all rebates go through one program (if so, which program?)? [Probe for fixtures vs. lamps and sub types (e.g. A-lamp, candelabra, MR-16, Par, R-BR))

Q67. Overall, do you believe the (PG&E/SCE) distributor LED incentives are impacting the volume of LED replacement lamp sales into the commercial sector? How so? [Probe for % increase/decrease, reasons for change]

Q68. [If SCE=1] Overall, do you believe the SCE distributor LED trial incentives are impacting the volume of LED fixture sales into the commercial sector? How so? [Probe for % increase/decrease, reasons for change]

Q69. Do you think that overall, the distributor LED incentive approach is beneficial as an addition to the (PG&E/SCE) program portfolio for lighting or not? Why do you say that?

Q70. [If TRIAL=1 and SCE=1] How likely or unlikely are you to increase your installations of LED replacement lamps and fixtures that have been rebated through the (PG&E/SCE) distributor LED incentive program in the future if it is expanded to more distributors? Please rate your likelihood on a scale of one to five, with one being very unlikely and five being very likely. Why do you give that rating?

Q71. [If TRIAL=0 and PG&E=1] How likely or unlikely are you to install LED replacement lamps that have been rebated through the (PG&E/SCE) distributor LED incentive program in the future? Please rate your likelihood on a scale of one to five, with one being very unlikely and five being very likely. Why do you give that rating?

Those are all my questions. Before I let you go, is there anything you'd like to add, anything that you think I should have asked about or that we should keep in mind as we conduct this research into LEDs in California?

Thank you very much for your time on the phone today!