

Final Report

2010-2012 Palm Desert Demonstration Partnership Program (PDDP) Evaluation

Work Order Number 78

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California Public Utilities Commission

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1

Introduction

This report presents findings from the impact evaluation, program assessment, and process evaluation of Southern California Edison's (SCE's) 2010-2012 Palm Desert Demonstration Partnership Program. While the Palm Desert Demonstration program has been in operation since 2007, the focus of this study is the 2010-12 program years. This evaluation is meant to be a snapshot of the program's performance during these years as opposed to a long term study since its inception. This effort, managed by the California Public Utilities Commission's (CPUC's) Energy Division (ED), began at the end of September of 2013 and continued into the middle of 2015.

1.1 Evaluation Objectives

Key objectives of this evaluation were as follows:

- **Program Assessment**
 - Reviewed the program approach used to achieve energy savings and peak demand reductions
 - Compared a variety of program elements (i.e., budgets, expenditures, cost-effectiveness) between the Palm Desert Demonstration program and other selected SCE programs and local government partnerships (LGPs)
 - Examined the depth of retrofits achieved through the Palm Desert Demonstration program compared with other SCE programs over the same time period
- **Process Evaluation**
 - Assessed participant awareness and participation in energy saving actions and programs
 - Measured customer satisfaction with the program
 - Compared selected findings related to energy savings awareness, satisfaction, and motivations between nonresidential participants of the Palm Desert Demonstration program and SCE's nonresidential downstream lighting program participants.¹

¹ Itron completed a study to estimate net and gross energy and demand savings associated with a number of nonresidential downstream indoor lighting measures on behalf of the CPUC. Common questions from the telephone surveys implemented for this study were included in this analysis to compare the findings of the Palm

■ **Impact Evaluation**

- Verified the installation of selected high energy savings measures rebated by the program
- Estimated the residential and nonresidential sector energy savings and peak demand reductions from the program
- Estimated net-to-gross ratios for residential and nonresidential aggregated measure groups

Data used to conduct this evaluation included the revised Palm Desert Demonstration Partnership Program Implementation Plan² (PIP), SCE program tracking data, in-depth interviews with key SCE managers and a City of Palm Desert official, and telephone surveys with nonresidential and residential program participants. The evaluation also relied on data collected to evaluate SCE's nonresidential downstream lighting programs (in support of a study of the California IOUs' 2010-2012 nonresidential downstream lighting programs), since a large share of the Palm Desert Demonstration program energy savings stem from downstream nonresidential lighting measures. Descriptions of the data sources used for this evaluation can be found in Section 2 of this report.

1.2 Program Background

The concept for the Palm Desert Demonstration program came from initial meetings between Southern California Edison (SCE) and Southern California Gas Company (SCG), The Energy Coalition, and officials from the City of Palm Desert during the 2006-08 program cycle. The program was envisioned as a local government partnership pilot to be implemented and carried out for a period of five years.³ The pilot was initially launched as a campaign to reduce the energy usage and peak load of the City of Palm Desert by 30 percent using the energy usage and

Desert Demonstration program to the findings based on surveys of nonresidential downstream lighting program participants. These two survey efforts were compared in this evaluation because approximately 50% of the nonresidential energy savings from the Palm Desert Demonstration program came from nonresidential downstream lighting measures.

² SCE's 2010-2012 Palm Desert Demonstration Revised Program Implementation Plan (PIP). The revised PIP can be found as Attachment A to Advice Letter 2548-E-A from SCE to the CPUC, dated July 29, 2011. <https://www.sce.com/NR/sc3/tm2/pdf/2548-E-A.pdf>

³ The program came to its conclusion at the end of the 2010-2012 program cycle. According to the revised Palm Desert Demonstration program implementation plan (Attachment A of Advice Letter 2548-E-A, July 2011), "while originally designed as a five year campaign, this partnership ran for six years. The 2010 program year represents the fourth year of implementation, 2011 represents the fifth year of implementation, and 2012 represents the sixth year of implementation for the partnership. This extension is due, in part, to the 2009 EE bridge funding year and the need to align this program with the EE program cycle."

peak demand from 2005 as a baseline. The 30 percent overall reduction was not a CPUC energy efficiency goal, but rather an aspirational goal established by the City of Palm Desert.⁴

The goals of the program were to aggressively reduce energy usage and peak energy demand by the residents and businesses of the City of Palm Desert, while also targeting the city's electricity and natural gas customers for deep retrofits. The program relied on a brand-identity marketing campaign called "Set to Save". The "Set to Save" energy efficiency opportunities available through the Palm Desert Demonstration program were communicated through newsletters, direct mail, the internet, and by visiting residential and nonresidential energy consumers door to door. Later, once targeted home- and business-owners had been engaged to the point of allowing a contractor to conduct an energy audit, a qualified energy efficiency contractor provided a thorough on-site consultation that performed two functions:

- 1) The energy consumer was advised of potential physical upgrades to the building structure and its electric- and gas-using equipment that would result in measurable energy savings; and
- 2) The energy consumer was advised of small habits or actions that could be changed to result in measurable energy savings (a technique known as *behavioral modification*).

The program also had an important component that featured bundled procurement and contractor screening so as to minimize cost, process, and uncertainty for potential customers.

The five pilot initiatives that comprised the Palm Desert Demonstration program were as follows:

- ***One-Stop-Shop for Pool Pumps***: a streamlined approach that guided residential swimming pool owners to retire single-speed pool pumps and replace them with variable-speed pumps; the approach offered assistance to potential customers by navigating them through the complex process of pool pump purchase and installation by reducing the number of contacts and choices that were required to replace the equipment.
- ***Energy Efficiency Upgrade***: a comprehensive residential approach to energy efficiency which utilized local "Set to Save" branding, in-home energy surveys of residences, personalized telephone-follow up, and recommendations of Palm Desert's other offerings including One-Stop-Shop for Pool Pumps, branded residential energy efficiency rebates, and other strategies.
- ***Commercial Strategies Initiative***: enhanced commercial incentives, technical assistance, energy audits, and other means were offered to commercial customers to optimize energy

⁴ The energy savings and demand reduction goals set for the program and approved by the CPUC were included in the Program Implementation Plan for the Palm Desert Demonstration program (July 2011) and in the program assessment section of this report (Section 3).

efficiency. Certain commercial sectors such as lodging, restaurants and other commercial buildings were the focus of this initiative.

- **Emerging Technologies:** the Palm Desert Demonstration program supported the development of emerging technologies that appeal to the community and forwarded suggestions to the Emerging Technologies (ET) program; in addition, the Palm Desert Demonstration program “sponsored” one emerging technology deemed viable by the ET program (the PIP listed LED pool lighting as this emerging technology). Selection of this emerging technology was not surprising given that swimming pools are relatively abundant due to the city’s warm and dry climate with summer temperatures that range from 80 to 100 degrees Fahrenheit.⁵
- **Partnership Rebranded Core Programs:** a comprehensive community-led branding approach designed to unify the different program offerings, which included rebate programs, non-resource programs, and local government program support activities under a single brand, “Set to Save”. The core programs that were rebranded are listed below.
 - **Small Business Direct Install:** enhanced direct install program for small businesses that provided free comprehensive replacement of inefficient lighting systems and maintenance and repair of refrigeration systems. Technical assistance and site assessments were provided and used to generate leads for participation in other energy efficiency programs in real time.
 - **Residential and Commercial Rebates:** rebranded the core residential and commercial energy efficiency programs offered by SCE using the “Set to Save” brand and provided rebates for the installation of energy efficient equipment.
 - **Municipal Facilities:** coordinated with the City to maintain the efficiency levels it had already achieved and explored new building retrofit project opportunities under the “Set to Save” brand.

1.3 Organization of Report

The entirety of this report is organized into six sections.

- **Section 1** presents an introduction that describes the evaluation objectives, provides program background, and lays out the sections of this report.

⁵ According to SCE, the selection of LED swimming pool lighting as the sponsored emerging technology came about because of one hotel chain customer’s interest in this measure. It is rare that a customer is willing to allow for the installation and testing of a new technology, especially one that leads to disruptions in business operations. Because of this customer’s willingness to install and demonstrate the LED swimming pool lighting technology, SCE’s Emerging Technologies program and the Palm Desert Demonstration program both took this opportunity to include this measure in its programs.

- **Section 2** describes the data sources, data collection, and the methodologies employed in the evaluation to arrive at program assessment and process and impact evaluation findings.
- **Section 3** describes the approach used by SCE and the City of Palm Desert to commit customers to participating in the Palm Desert Demonstration program. Special attention is given to the role of in-home energy audits, as this was an important feature of the Palm Desert Demonstration program in reaching SCE customers in the City of Palm Desert. It follows with a description of how the Palm Desert Demonstration program fits in the overall SCE Energy Efficiency portfolio for the 2010-2012 program cycle. This is accomplished through a comparison of program budgets, goals, expenditures, achievements, and cost effectiveness of the Palm Desert Demonstration program and other SCE programs. Lastly, this section presents findings related to the depth of retrofits achieved by participants of the Palm Desert Demonstration program relative to participants of SCE's core energy efficiency programs.
- **Section 4** presents process findings related to program awareness, participation, and satisfaction of both residential and nonresidential program participants. It also includes an analysis of common survey questions asked of Palm Desert Demonstration program nonresidential participants and SCE's nonresidential downstream lighting program participants.
- **Section 5** presents the impact analysis of the Palm Desert Demonstration program to estimate the energy savings and demand reduction achieved. This section includes a description of the net-to gross analysis methodologies used to estimate net-to-gross ratios for aggregated measure groups in both residential and nonresidential sectors.
- **Section 6** conveys the program findings and recommendations for the Palm Desert Demonstration program. While the program was offered until the end of 2012, recommendations are presented that can be applied in the implementation of other partnerships and pilots with similar program designs.

2

Data Collection and Methodology

Program assessment and evaluation results were based on a review of the Palm Desert Demonstration revised program implementation plan¹, SCE monthly energy efficiency program reports², primary research conducted with customers and key market actors through phone surveys and in-depth interviews, and the analysis of participant tracking data and utility customer information databases. Several key parameters were examined including verification of measure installation, kW and kWh unit energy savings values, net-to-gross ratios for determining program free ridership, program participation, awareness, and satisfaction, and cost-effectiveness.

2.1 Data Sources

A variety of primary and secondary data sources were used to conduct the assessment and evaluation of the Palm Desert Demonstration program. The following presents each of the data sources and its uses in the analysis:

2.1.1 Primary Data Sources

In-Depth Interviews: Consultant staff conducted two in-depth interviews for this evaluation. The first was a group telephone interview with SCE staff. Interviewees included the SCE Palm Desert Demonstration program manager, the SCE measurement and evaluation lead for the Palm Desert Partnership program, and the SCE manager responsible for the oversight of Local Government Partnership (LGP) Programs. The second interview was held with the Director of Economic Development of the City of Palm Desert as a one-on-one interview with a member of the consultant staff. Individuals interviewed held their positions during the length of 2010-2012 program cycle and were considered the most knowledgeable experts about the Palm Desert Demonstration program within their organizations.

Residential Telephone Survey Data: A residential participant survey of the Palm Desert Demonstration program was conducted via telephone by the consultant team's survey call center

¹ SCE's 2010-2012 Palm Desert Demonstration Revised Program Implementation Plan (PIP). The Palm Desert Demonstration program revised PIP can be found as Attachment A to Advice Letter 2548-E-A from SCE to the CPUC, dated July 29, 2011. <https://www.sce.com/NR/sc3/tm2/pdf/2548-E-A.pdf>

² SCE's monthly 2010-2012 energy efficiency program reports are available from the Energy Efficiency Groupware Application website: <http://eestats.cpuc.ca.gov/>

located in Berkeley, California. The survey was conducted in December 2013. The sample was provided by DNV–GL (formerly DNV–KEMA) based on IOU tracking data and IOU customer information systems (CIS) data for Palm Desert Demonstration program residential participants³ not previously drawn as a sample for other 2010-2012 CPUC Residential Phone Surveys.

Nonresidential Telephone Survey Data: Responses to a nonresidential participant survey of the Palm Desert Demonstration program were gathered through the administration of the telephone survey conducted by the consultant’s survey call center. The survey was conducted during October and November of 2013. Sample was based on IOU tracking data and IOU customer information systems (CIS) data for the Palm Desert Demonstration program nonresidential participants.⁴ Participants who had completed a telephone survey for other CPUC 2010-2012 studies were excluded from the sample.

2.1.2 Secondary Data Sources

Several secondary data sources were utilized for this evaluation, as described below.

Program Implementation Plan: The revised Palm Desert Demonstration program implementation plan was used to provide background information about the program design, past accomplishments, and goals for the 2010-2012 program cycle. This plan describes the five pilot initiatives that comprise the program and explains the direct customer approach used in an effort to acquire deeper retrofits than the core energy efficiency programs offered by SCE.

Program Implementation Plans (PIPs) of Other Programs: The PIPs of other SCE programs were consulted to gather program budgets and goals for the 2010-2012 program cycle. Breakdown of budgets into administrative, marketing and outreach, and implementation categories were retrieved from these documents. This information was used in the program assessment section of this report.

Monthly 2010-2012 Energy Efficiency Program Reports: SCE’s monthly reports available from the CPUC Energy Efficiency Groupware Application website were used primarily to review monthly program budget and expenditures, energy savings, and peak demand reduction goals and achievements.⁵ The final program cycle monthly report from December of 2012 was used to

³ Palm Desert Demonstration program participants for both residential and nonresidential sectors were defined by their IOU program ID, SCE-L-004N, found in SCE’s monthly reports available from the CPUC Energy Efficiency Groupware Application. The IOU program ID was matched via SCE program tracking databases and those customers with the Palm Desert Demonstration program identified were considered participants.

⁴ See footnote 3.

⁵ A data request was submitted by Itron to SCE to clarify discrepancies found between the revised Palm Desert Demonstration program PIP and SCE’s December 2012 monthly energy efficiency report with regard to program goals. SCE responded to the data request by noting that the goals presented in the revised PIP were accurate for the Palm Desert Demonstration program.

develop comparisons of SCE programs with the Palm Desert Demonstration program as presented in the program assessment section of this report (in Section 3).

SCE Participant Tracking Data: The energy efficiency program tracking data were provided to the consultant by CPUC's Energy Division and SCE. This analysis used the Palm Desert Demonstration program tracking data from 2010-2012. These data contain standardized customer information such as address, city, zip code, customer name, and telephone number. More importantly, a claim identification number is assigned to each record, which generally associates a measure installed for a certain account through the program. The year for which a given record is associated came from this installation date.

Findings from Other Evaluation Work: Results from the 2010-2012 California IOU nonresidential downstream lighting program evaluation effort were also relied upon in this evaluation. Common questions were asked across the surveys administered for the evaluation of the Palm Desert Demonstration program evaluation and the evaluation being conducted of the nonresidential lighting programs. The responses were compared in the process evaluation section of this report to determine if there are observable differences across SCE nonresidential participants of the Palm Desert Demonstration program and the downstream lighting programs.

SCE Work Papers: The SCE work papers, which document the per unit savings values for each of their measures, were reviewed and used to make comparisons to the claimed per unit savings values used for the Palm Desert Demonstration program. Any differences across per unit savings values by measure/building type/climate zone between the Palm Desert Demonstration program and SCE core programs were checked against the estimates presented in the work papers to clarify which programs used the values presented in the work papers.

2.2 Sample Design

The participant telephone survey sample was originally developed at the measure level to meet the needs of the program influence (i.e., net-to-gross) analysis and was then adjusted to avoid oversampling. The sample design was developed to ensure sufficient sample was available to represent the different aggregated measure groups so that the program's influence on purchases of these measure types could be examined. Measures that had significant contributions to savings such that reliable net-to-gross ratios could be achieved were selected first. The sample design was also dependent upon ensuring that there an adequate number of sites between lighting and non-lighting measure groups were available for the estimation of net-to-gross ratios, and further adjustments were made to avoid oversampling of measure groups. The telephone surveys' strata and quotas were based on the participant net-to-gross measure for both the residential and commercial telephone surveys.

2.2.1 Residential Participant Phone Survey

The residential telephone survey sample population consisted of 3,865 unique sites. These sites were categorized into four strata based upon the measure that would be asked about in the program influence battery of the survey. Instead of asking about a specific measure (except in the case of energy efficient pool pumps), the program influence battery asked questions about energy efficiency lighting equipment or non-lighting energy efficient equipment in general. Program influence questions were not asked of those participants who were categorized in the in-home energy audit strata because audits are designed to provide information to participants about energy efficient equipment or behavioral changes that they could make.

The sample for the residential survey was developed to meet two primary objectives. First, an adequate sample size was desired to be able to estimate a program level net-to-gross ratio with a 10% relative precision, measured at the 90% confidence level. Using results of the 2010-12 Nonresidential Downstream Lighting Impact Evaluation, a coefficient of variation (COV) of 0.30 was found for the NTGR. Because this is residential and a mix of measures, a more conservative COV of 0.50 was used which would require a sample size of 67 points. A secondary objective was to have a sufficient sample size to estimate mean values from various process related survey questions that would be statistically reliable, and have a margin of error in the range of 10-15% or less, measured at the 90% confidence level. Furthermore, this later objective was desired for four different program strata – Energy Efficient Equipment, In-Home Energy Audit, Energy Efficient Pool Pump and Energy Efficient Lighting. To meet this objective a sample size of approximately 30 points would be required for each stratum (a worse case situation is a variable with a uniform distribution with mean 0.50, and in this case the margin of error would be 15%). Therefore, an overall sample size of 120 was allocated to the residential survey, with 30 points allocated to each stratum. Because the In-Home Energy Audit is a non-resource program, it will not contribute to the NTGR analysis, leaving a sample size of 90 points for that analysis, which exceeds the targeted 67 points.

As Table 2-1 shows, quotas were met for each of the four strata and therefore for the residential participant survey overall. The goal was to achieve 120 completes and the total number of completes equaled 123. Results from the residential survey presented throughout this analysis are weighted up to the population of the City of Palm Desert.

Table 2-1: Strata, Quota, and Completes for the Palm Desert Demonstration Program Residential Participant Survey

Strata	Quota	Sent to CATI	Completed Surveys
Energy Efficiency Equipment	30	1,301	32
In-Home Energy Audit	30	1,079	30
Energy Efficient Pool Pump	30	815	31
Energy Efficient Lighting	30	670	30
Total	120	3,865	123

2.2.2 Nonresidential Participant Phone Survey

The nonresidential participant telephone survey instrument was developed to collect data to support various aspects of the overall evaluation. The survey questionnaire contained questions to gather information about customer and facility characteristics, verification of the number and type of program measures installed, changes in the number and type of measures not rebated through the program, knowledge of energy efficient equipment, awareness of energy efficiency programs, satisfaction with the Palm Desert Demonstration program and questions to support self-report analysis. Participants were also asked about the age, type, and condition of their lighting measures and other types of equipment in their business.

The sample population of the Palm Desert Demonstration program consisted of 745 unique participant sites. Out of those sites, 531 were sent to the survey call center to be dialed. The 531 nonresidential sites sent to the survey call center had not previously completed or refused a phone survey for any other Work Orders. Due to the small sample population and the NTGR measure groups that were adjusted for oversampling, no quotas and strata were set for the telephone survey. The survey was undertaken as a census.

In total, 93 participant telephone interviews were conducted for the above purposes. The telephone survey data was a random sample of the census population. No biases or oversampling were found within the completed telephone survey data usage size or measure group, thus no weights or adjustments were applied to the analysis.

3

Program Assessment

This section of the report describes the approach used by SCE to recruit City of Palm Desert residents and businesses into the Palm Desert Demonstration program. Particular attention was paid to in-home energy audits since this feature of the program was used to educate residential participants about energy efficiency and encourage retrofits and behavioral changes with regard to energy use. The program assessment also presents a comparison of budgets, expenditures, energy and demand savings, and cost-effectiveness measures of the Palm Desert Demonstration program to other residential and nonresidential programs and local government partnerships offered by SCE during the 2010-12 program cycle. The purpose of this comparison was to assess the costs of the Palm Desert Demonstration program relative to other SCE programs and determine whether the program accomplishments achieved are in line with program expenditures. Last, the depth of retrofits achieved by the Palm Desert program relative to other SCE core programs is addressed since increasing the comprehensiveness of retrofits was understood to be one of the goals of the Palm Desert Demonstration program.

3.1 Program Approach

The program approach taken by SCE to reach the City of Palm Desert residents and businesses was conveyed to the consultant team by SCE staff and a City of Palm Desert official during the two interviews described above. In addition, the marketing campaign was detailed in the SCE 2010-2012 revised program implementation plan¹ (PIP). As mentioned in Section 1, the program was designed as a set of five pilot initiatives to target SCE customers who are located in the City of Palm Desert. These are listed in the Palm Desert Demonstration program PIP as follows:

- One-Stop-Shop for Pool Pumps
- Energy Efficiency Upgrade
- Commercial Strategies Initiative
- Emerging Technologies
- Partnership Rebranded Core Programs

¹ SCE's 2010-2012 Palm Desert Demonstration Revised Program Implementation Plan (PIP). The Palm Desert Demonstration program revised PIP can be found as Attachment A to Advice Letter 2548-E-A from SCE to the CPUC, dated July 29, 2011. Pages 3 and 11. <https://www.sce.com/NR/sc3/tm2/pdf/2548-E-A.pdf>

- Small Business Direct Install
- Residential and Commercial Rebates
- Municipal Facilities

As described earlier in the Section 1 of this report, the Palm Desert Demonstration program sought to provide residential customers with in-home energy audits that recommended energy efficiency behavioral changes and identified equipment installations and maintenance that could produce energy efficiency, potentially to a level that would produce multi-measure deep energy savings. Customers were engaged in the program both through outreach and follow-up contact to better ensure their participation. These forms of direct outreach were primary methods used to communicate the energy efficiency benefits achievable through the Palm Desert Demonstration program.

According to the PIP, the Palm Desert Demonstration program manager, and other SCE managers, the Palm Desert Demonstration program was different from other programs offered by SCE in that it was designed to have a more direct and somewhat personal approach to proposing energy efficiency opportunities to potential customers. The direct approach used by the implementers included door-to-door visits with offers to perform energy audits. The Palm Desert Demonstration program attempted to get deeper retrofits for residential customers by providing home efficiency surveys during which they would be provided with a checklist of the most popular rebates and upgrades available. Recipients of program audits would receive follow-up phone calls with specific recommendations of energy efficient measures for which rebates were available (either through the Palm Desert Demonstration program or other SCE program available to the audit participant).

Commercial customers were also provided with opportunities to receive audits and technical assistance in an effort to inform them of the various energy efficiency opportunities they could pursue. An examination of SCE non-residential customers located in the City of Palm Desert shows that the region is dominated by business sites classified as very small or small.² Not surprisingly, a majority of the businesses that participated in the Palm Desert Demonstration program were defined as very small or small as well (27 percent for small sites and 59 percent for very small sites). The dominant business types in the City of Palm Desert are those classified as Miscellaneous followed by the Retail businesses. This differed for large businesses, where Grocery was the dominant business type. Palm Desert Demonstration program participants followed a similar business type pattern apart from small businesses where the Restaurant business category was the dominant business type.

² Based on SCE's customer tracking data, very small sites make up 27 percent of all sites and small sites make up a total of 59 percent of all sites in the City of Palm Desert. Site sizes have been defined as follows: large sites are defined as those with annual usage over 1,750,000 kWh; medium have greater than 300,000 kWh and less than or equal to 1,750,000 kWh; small sites have a maximum annual usage greater than 40,000 kWh and less than or equal to 300,000; very small sites have annual usage less than or equal to 40,000 kWh.

One of the initiatives available to these commercial sites in the City of Palm Desert was a co-pay program called the Commercial Energy Solutions program that required participants to pay only 10 percent of its energy efficiency project cost. Characterized by SCE as a “direct install hybrid” program, Commercial Energy Solutions provided comprehensive turnkey installation of energy efficiency retrofit measures to SCE commercial customers within the City of Palm Desert that had greater than 99 kW demand. Customers were only required to submit a co-payment for 10 percent of the project cost upon work authorization, and received an incentive for the remaining 90 percent of the project cost. No further paperwork or investment was required from the customer.

It was noted during the two interviews described above that the program’s *uptake* by residential customers was strong and that the outreach campaign targeting this sector was considered a success. According to SCE, uptake rates of 16 percent for the Energy Efficiency Upgrade pilot initiative and 6 percent for the One Stop Shop for Pool Pump pilot initiative were reached. However, this evaluation found that the goals established for the residential pilot initiatives were not met (see Section 5 for a comparison of goals to accomplishments for the residential sector pilot initiatives).

Also worthy of mention is that the City of Palm Desert official interviewed opined that that the One-Stop-Shop for Pool Pumps campaign’s success could be attributed to its convenience factor. Essentially the program’s intended one-stop concierge service eliminated the arduous decision-tree process normally associated with replacement pool pumps, thereby removing a barrier to implementation, while also generously subsidizing the per unit cost of purchase and installation.³ The Palm Desert official noted that it would be advisable to use the same approach for other common energy-intensive equipment found in the city such as HVAC units.

The City of Palm Desert official and SCE staff members who were interviewed were asked about outreach campaign to recruit customers, which relied on the following six tactics:

- Targeting Home Owners Associations through meetings and conversations,
- Newsletters mailed to every resident of the City of Palm Desert,⁴
- Direct mail to residential customers with swimming pools,
- Newspaper advertisements,

³ According to the 2012 “Bright Side” newsletter, issued by the City of Palm Desert, the total installed price of an energy efficient variable speed swimming pool pump including the rebate, installation, and permit fees is \$875. Without the rebate, the equipment cost of this pool pump exceeds \$1,200 (<http://www.amazon.com/Pentair-011012-IntelliFlo-Performance-230-Volt/dp/B000N56HP4>).

⁴ The newsletters were entitled, “Bright Side” and they displayed a “Set to Save” logo on the front page. The logos of all entities that constituted the Palm Desert Demonstration Partnership were also included on the front page and included logos of the City of Palm Desert, SCE, The Energy Coalition, and SCG.

- Direct mailings and face-to-face interactions with local businesses, and
- Meetings with the Chamber of Commerce on a regular basis.

The interviewees also addressed the goal set by the City of Palm Desert to reduce energy usage and energy demand by 30 percent from the city's 2005 baseline. They all noted that while this goal was not met by the program, it still performed well and achieved meaningful savings.⁵ Based on the reported energy savings (see Section 5 of this report), the Palm Desert Demonstration program achieved a 5 percent reduction from the city's 2005 baseline. Both interviewees mentioned a positive response from residential customers in the City of Palm Desert relative to commercial customers. Both interviewees mentioned a positive response from residential customers in the City of Palm Desert relative to commercial customers.

3.2 In-Home Energy Audit

As described above, a primary feature of the Palm Desert Demonstration program was the in-home energy audit component targeting residential customers. Again, the energy audits were an opportunity to inform customers about small changes in habits (*behavioral modification*) that can have a sizable impact on their energy use and spending, as well as energy efficient equipment upgrade options promoted by the Palm Desert Demonstration program.

3.2.1 Customer Satisfaction and User Experience with Home Energy Audits

The residential participant survey posed a series of questions to respondents about their experiences with the in-home energy audits they received from the Palm Desert Demonstration program. The first question asked respondents if an energy audit of their home was performed. Of the 123 residential participants who responded to the survey, approximately 86 respondents (or 70 percent) confirmed that they had had an energy audit.⁶ About 28 percent stated that they did not have an audit, while the remaining 2 percent did not know. Of the 86 participants who had recalled having had an energy audit conducted, the consultant team confirmed that 80 percent of these respondents had actually had an in-home audit conducted were served through the Palm Desert Demonstration program. Therefore, it appears that 20 percent of the 86

⁵ A 30 percent energy usage and demand reduction goal from the City of Palm Desert's 2005 baseline was an aspirational goal set by the City of Palm Desert and not by SCE or the CPUC. For reference, the City of Palm Desert 2005 energy usage baseline was 214,789,934 kWh as noted by SCE in a response to a data request sent by the consultant in October 2013. A 30 percent reduction in energy usage from this baseline would amount to a reduction of 64,436,980 kWh over the 2010-12 program cycle. As Section 5 of this report shows, the reported gross energy savings were 10,637,809 kWh over the 2010-12 program cycle.

⁶ Verification of an energy audit was only initiated if a supposed energy audit claimed by a participant was not noted in the Palm Desert Demonstration program tracking database. The question was asked to find out if Palm Desert Demonstration program participants had received an energy audit through a different program. In other words, if the database showed that a participant had had an energy audit, this question was skipped in the survey and an audit was assumed to have occurred through the Palm Desert Demonstration program.

respondents who had recalled having had an in-home energy audit had inaccurately reported this claim and in fact had not been served by the Palm Desert Demonstration program.⁷

3.2.2 Reasons Residential Customers Chose to Have Energy Audits Performed

The survey next inquired why respondents chose to have an audit. Respondents could provide multiple reasons when answering this question. Based on the survey responses (see Table 3-1), the main reasons were to save money, address causes of high energy bills, out of concern for the environment, and for the rebate/incentive paid to them to have one performed. Secondary reasons given included finding out about energy efficiency programs, existing energy equipment and appliances were not functioning properly, and because they were remodeling their home. An evaluation of all the responses given clearly demonstrates that the main reason residential customers had an in-home energy audit was to find ways to save money.

Table 3-1: Reasons Why an In-Home Energy Audit Was Completed

<AU9>What prompted you to complete an in-home energy survey?	Percentage of Respondents *
Save money	50%
High energy bills	41%
Concern for the environment	16%
Rebate/Incentive	10%
To find out about energy efficiency programs	7%
Appliances/home energy equipment not functioning properly	5%
Remodeling home	3%
Recommendation from friend	2%
I was approached	1%
Other	4%
Don't know	1%
<i>n</i>	86

* Sum of percentages exceeds 100% because multiple responses were permitted.

3.2.3 Contractor Recommendations from In-Home Energy Audits Recalled by Consumers

Respondents were next asked about whether the survey made recommendations regarding the replacement of appliances/equipment or changes in behavior (such as turning off lights when not in use or opening windows instead of using the AC) to save energy. As shown in Table 3-2, more than half the respondents indicated that had received a recommendation to upgrade their equipment and/or appliances.

⁷ The SCE Palm Desert Demonstration program tracking database for these “false positives” was able to verify they did not participate in the Palm Desert Demonstration program to receive an energy audit.

Meanwhile slightly less than half of respondents stated that behavioral change recommendations were made (see Table 3-3). Somewhat surprisingly, over 40 percent of respondents of those surveyed stated that they did not recall recommendations to replace equipment or change the way they use energy, particularly because this was the primary intent of in-home energy audit program component.

Table 3-2: Did Audit Recommend Energy Equipment or Appliance Changes?

<O1> Do you recall whether the survey recommended that you replace appliances or change equipment or systems in your home?	Percentage of Respondents
Yes	55%
No	43%
Don't know	2%
<i>n</i>	86

Table 3-3: Did Audit Recommend Energy Use Behavioral Changes?

<BC1> Do you recall whether the in-home survey recommended behavioral changes to your energy use?	Percentage of Respondents
Yes	47%
No	46%
Don't know	7%
<i>n</i>	86

For those respondents who recalled receiving recommendations on how to save energy in their homes, the survey then asked about the types of equipment/appliance and behavioral change recommendations they received. The responses are presented in Table 3-4 and Table 3-5 below. By far the most common recommendation made with regard to changing equipment was to install new CFL lamps with over half of respondents claiming this, which is nearly twice the rate of second-place, new refrigeration. Other equipment change recommendations included new refrigerators, replacement of pool pumps, and replacement of central AC units.

Table 3-4: Appliance or Equipment Recommendations from Audit

<O2> What appliance or equipment recommendations do you recall?	Percentage of Respondents *
Install CFLs	51%
New refrigerator	27%
Replace pool pump	22%
HVAC - replace central AC	19%
Install low flow showerhead	17%
Install faucet aerators	8%
HVAC Maintenance/Tune Up (Refrigerant Charge Adjustment)	7%
New dishwasher	5%

Table 3-4 (Cont'd): Appliance or Equipment Recommendations from Audit

<O2> What appliance or equipment recommendations do you recall?	Percentage of Respondents *
Insulation	5%
Replace range	5%
Recycle refrigerator	5%
HVAC - duct sealing	4%
Replace water heater	4%
New windows	4%
New washing machine	3%
Whole house fan	3%
Install heat traps on your water heater	2%
Other	3%
Don't know	5%
n	46

* Sum of percentages exceeds 100% because multiple responses were permitted.

The most common behavioral change also pertains to lighting as shown in Table 3-5. Approximately 44 percent of the respondents that claimed to have received behavioral change suggestions noted that turning off lights when not in use was a recommendation made during their in-home audit. The next most common behavioral change recommendation made during in-home audits addressed demand reduction, according to the survey respondents. A total of 40 percent of the respondents received a recommendation to use energy during off peak hours. Other recommendations pertaining to behavior changes include setting home thermostats and not running appliances 24 hours a day.

Table 3-5: Energy Use Behavioral Change Recommendations from Audit

<BC2> What energy use behavioral changes do you recall?	Percentage of Respondents *
Turning off lights when not in use	44%
Use energy off peak hours	40%
Don't run appliances 24/7	14%
Set thermostat	12%
Open windows instead of using the air conditioner	8%
Unplug microwave/coffee maker/digital clocks when not in use	8%
Washing laundry in cold water	7%
Use fans instead of turning on the air conditioner	6%
Reducing the length of time you run your pool pump	5%
Turning off printers/fax machines/computers when not in use	4%
Changing the power settings on computers	3%

Table 3-5 (Cont'd): Energy Use Behavioral Change Recommendations from Audit

<BC2> What energy use behavioral changes do you recall?	Percentage of Respondents *
Drying clothes on a clothes line	3%
Wash dishes using shorter wash cycles	3%
Use blankets and jackets instead of relying on heating	3%
Wash dishes using energy efficient wash setting/fast wash setting	3%
Changing setting/removing automated sprinkler system	3%
Other	13%
Don't know	5%
<i>n</i>	40

* Sum of percentages exceeds 100% because multiple responses were permitted.

3.2.4 Rates of Consumer Implementation of In-Home Energy Audit Recommendations

In addition to inquiring about the types of recommendations that were made when in-home energy audits were performed through the Palm Desert Demonstration program, the survey asked respondents if they had implemented the recommendations. For each recommendation the respondents reported, the survey asked if they followed through on the suggestion and either replaced their equipment/appliances or made behavioral changes to their energy use. Table 3-6 and Table 3-7 show the rates at which respondents claimed to have implemented equipment/appliances changes and energy use behavioral change recommendations listed in Table 3-4 and Table 3-5. Note that these changes were made after the audit was completed and the recommendations made. As mentioned earlier, customers who received an audit received follow-up phone calls with specific energy efficiency measure installation recommendations for which rebates were available.

As seen below in Table 3-6, respondents overwhelmingly indicated that they followed through on the recommendations they had received. Commonly reported equipment/appliance replacements that appear to be attributed to the audit recommendations included the installation of CFLs and purchases of new refrigerators, according to surveyed participants. For example, of the 22 respondents who noted that the CFL installation was recommended, over 85 percent reported acting on this recommendation and changing out their less efficient bulbs. While fewer respondents noted that they received a recommendation to replace their central air conditioners (a total of 9 respondents), over 90 percent took action on the recommendation and made this energy efficiency retrofit.

Table 3-7 shows that turning the lights off when not in use was reported as the most common behavioral modification recommendation made during the in-home energy audit. This

recommendation was implemented by 95 percent of the 19 respondents who reported receiving this recommendation. The other behavioral modification recommendations were not as common.

Table 3-6: Implementation of Equipment/Appliance Changes from Audit Recommendations

Equipment/Appliance Recommendations from Audit	Yes	No	Total
Install CFLs	86%	14%	22
New refrigerator	68%	32%	12
Replace pool pump	55%	44%	10
HVAC - replace central AC	91%	9%	9
Install low flow showerhead	83%	17%	6

Table 3-7: Implementation of Energy Use Behavioral Changes from Audit Recommendations

Behavior Change Recommendations from Audit	Yes	No	Total
Turning off lights when not in use	95%	5%	19
Open windows instead of using the air conditioner	50%	50%	4
Unplug microwave/coffee maker/digital clocks when not in use	67%	33%	3
Use fans instead of turning on the air conditioner	67%	33%	3

Based on the results presented in Table 3-6 and Table 3-7, it appears that in-home energy audits result in greater action toward equipment/appliance changes than toward behavioral changes. Although not everyone who recalled receiving recommendations from their energy audits followed through, there were a significant number who reported having installed free CFLs provided through the Palm Desert Demonstration program and changing the way they use lighting in their homes. It is important to keep in mind that this conclusion is based on self-reported responses from those surveyed.

3.3 Context of the Palm Desert Demonstration Program in SCE's Energy Efficiency Portfolio

In order to gauge the performance of the Palm Desert Demonstration program, a comparative overview of selected SCE energy efficiency programs is offered alongside the Palm Desert Demonstration program below. This analysis is included to provide a sense of perspective regarding SCE's overall EE portfolio and how the Palm Desert Demonstration program measures up against other programs in terms of expenditures and accomplishments. Note that the Palm Desert Demonstration program began as a local government partnership (LGP) which addresses both residential and commercial sectors. During the 2010-12 program cycle however, the Palm

Desert Demonstration program was reclassified as a pilot program.⁸ Because LGPs and pilot programs, such as the Palm Desert Demonstration program, are designed to reach out to a specific city or region, they are less focused on serving a specific sector or offering rebates for a particular type of energy efficient measure. As a result, measures of cost effectiveness can oftentimes be lower for LGPs and pilots than for core residential or commercial programs. This should be kept in mind when reviewing the data presented below.

The local government partnership programs presented in this section are selected examples of partnerships offered by SCE.⁹ The core programs listed below are either residential or commercial programs and should be viewed with this in mind as the budgets, expenditures, and savings are presented alongside those of the Palm Desert Demonstration program.

3.3.1 Budget and Expenditures

Information presented in Table 3-8 through Table 3-10 was taken from SCE's December 2012 monthly report and from the revised PIP of the Palm Desert Demonstration program. As shown in Table 3-8, the entire Palm Desert Demonstration program budget of \$8.8 million was not spent during the program cycle. Other programs, such as the Home Energy Efficiency Survey (HEES) Program and the Commercial Deemed Incentives Program spent more than their budgeted amounts, while others spent less. The other local government partnerships (LGPs) spent between 41 and 72 percent of their budgets, while the Palm Desert Demonstration program spent approximately 74 percent. Note that the budget and the expenditures of the Palm Desert Demonstration program during the 2010-2012 program cycle are not only the largest of the set of LGPs presented in Table 3-8, they are also the largest of all of SCE's LGP programs offered during the 2010-2012 program cycle.

⁸ According to SCE, the CPUC Energy Division requested that the Palm Desert Demonstration program not be included in the Energy Leader Partnership program. As noted in Advice Letter 2548-E-A dated July 29, 2011, the Palm Desert Demonstration program differs in its structure from other LGPs and therefore SCE was asked to reclassify the program as a pilot.

⁹ Formal sample selection of LGP programs to include in this program assessment was not conducted. Rather a few LGPs of those with larger budgets (over \$1,000,000 for the 2010-2012 program cycle) are included for comparative purposes. A full comparison of all SCE's LGPs was not in the scope of this evaluation.

Table 3-8: Budgets and Expenditures of the Palm Desert Demonstration Program and Other Selected Core/Statewide and Local Government Partnership SCE Programs for the 2010-2012 Program Cycle

Program ID	Program Name	Program Budget *	Program Expenditures	% of Budget Spent
SCE-L-004	Palm Desert Demonstration Partnership	\$8,787,112	\$6,500,045	74%
Residential				
SCE-SW-001A	Home Energy Efficiency Survey Program	\$9,965,413	\$10,185,844	102%
SCE-SW-001D	Home Energy Efficiency Rebate Program	\$25,387,601	\$21,992,035	87%
Commercial				
SCE-SW-002B	Calculated Incentives Program	\$51,369,662	\$41,847,833	81%
SCE-SW-002C	Deemed Incentives Program	\$73,263,233	\$82,203,599	112%
SCE-SW-002D	Commercial Direct Install Program	\$138,232,530	\$131,350,171	95%
LGP				
SCE-L-004I	Desert Cities Energy Leader Partnership	\$1,473,975	\$762,274	52%
SCE-L-004M	Orange County Cities Energy Leader Partnership	\$2,211,838	\$1,117,956	51%
SCE-L-004Q	South Bay Energy Leader Partnership	\$2,961,007	\$2,127,279	72%
SCE-L-004S	Ventura County Energy Leader Partnership	\$4,747,803	\$1,938,478	41%

* Budgets for all programs were taken from SCE's December 2012 monthly report with the exception of the Palm Desert Demonstration program budget. This was taken from the revised PIP (dated July 2011), as SCE stated that this is the accurate budget for the program.

3.3.2 Annual Energy Savings

Table 3-9 presents the projected and reported gross annual kWh savings of the Palm Desert Demonstration program and other programs as reported in SCE's December 2012 monthly report.¹⁰ The projected savings listed in the monthly report differs from the amount that was listed in the PIP of the Palm Desert Demonstration program.¹¹ Based on this table, the Palm Desert Demonstration program did not meet its energy savings goal for the program cycle. Other SCE programs' performances varied, with some exceeding their projected savings (such as the Residential Home Energy Efficiency Survey (HEES) Program, the Commercial Deemed

¹⁰ Projected gross annual kWh savings for the Palm Desert Demonstration program were taken from the revised PIP dated July 2011. The projected kWh savings in the SCE monthly report were not accurate, according to SCE's response to Itron's data request.

¹¹ According to SCE staff, the information about the Palm Desert Demonstration program was not updated in the monthly reports to reflect the revisions that were made to the program's goals. The program goals are accurately reflected in the revised PIP.

Incentive Program, and the Commercial Direct Install Program), with others falling short of expectations (such as the Residential Home Energy Efficiency Rebate (HEER) Program, and the LGPs included in the table). Note that the Palm Desert Demonstration program performed on par with the local government partnerships listed in the table, with the exception of the Ventura County Energy Leader Partnership which only met 25 percent of its energy savings goal.

Table 3-9: Projected and Actual Gross Annual kWh Savings for the Palm Desert Demonstration Program and Selected Core/Statewide and Local Government Partnership SCE Programs for the 2010-2012 Program Cycle

Program ID	Program Name	Projected Gross Annual kWh Savings *	Actual Gross Annual kWh Savings	% of Actual to Projected Savings
SCE-L-004	Palm Desert Demonstration Partnership	19,049,650	10,637,809	56%
Residential				
SCE-SW-001A	Home Energy Efficiency Survey Program	22,085,775	63,726,273	289%
SCE-SW-001D	Home Energy Efficiency Rebate Program	63,416,418	37,067,862	58%
Commercial				
SCE-SW-002B	Calculated Incentives Program	212,850,165	212,497,092	100%
SCE-SW-002C	Deemed Incentives Program	273,934,503	492,643,728	180%
SCE-SW-002D	Commercial Direct Install Program	262,095,973	358,711,613	137%
LGP				
SCE-L-004I	Desert Cities Energy Leader Partnership	2,984,783	1,734,738	58%
SCE-L-004M	Orange County Cities Energy Leader Partnership	4,473,555	2,808,494	63%
SCE-L-004Q	South Bay Energy Leader Partnership	5,980,790	3,761,458	63%
SCE-L-004S	Ventura County Energy Leader Partnership	9,920,092	2,517,580	25%

* Projected savings for all programs were taken from SCE's 2012 monthly report with the exception of the Palm Desert Demonstration program kWh savings. This was taken from the revised PIP, as SCE stated that this is the source with the correct statement of energy savings goals for the program.

3.3.3 Annual Peak Summer Demand Reduction

Similar comments can be made about the comparison of projected and reported peak demand reductions for the SCE programs listed in Table 3-10. In this case, the Palm Desert Demonstration program saved 48 percent of its projected kWh peak demand reduction of 5.8 MW. Other programs saved far in excess of what was projected (such as the HEES program, Commercial Deemed Incentives program, and the Commercial Direct Install program) while others did not come close to their projected demand reduction (such as the HEER program, and all listed LGPs).

Table 3-10: Projected and Actual Peak Demand Reduction for the Palm Desert Demonstration Program and Selected Core/Statewide and Local Government Partnership SCE Programs for the 2010-2012 Program Cycle

Program ID	Program Name	Projected kW Peak Demand Reduction *	Actual kW Peak Demand Reduction	% of Actual to Projected Demand Reduction
SCE-L-004	Palm Desert Demonstration Partnership	5,800	2,772	48%
Residential				
SCE-SW-001A	Home Energy Efficiency Survey Program	6,818	25,396	372%
SCE-SW-001D	Home Energy Efficiency Rebate Program	30,541	12,316	40%
Commercial				
SCE-SW-002B	Calculated Incentives Program	32,935	29,777	90%
SCE-SW-002C	Deemed Incentives Program	60,017	123,280	205%
SCE-SW-002D	Commercial Direct Install Program	53,561	80,761	151%
LGP				
SCE-L-004I	Desert Cities Energy Leader Partnership	624	425	68%
SCE-L-004M	Orange County Cities Energy Leader Partnership	961	268	28%
SCE-L-004Q	South Bay Energy Leader Partnership	1,324	551	42%
SCE-L-004S	Ventura County Energy Leader Partnership	2,131	498	23%

* Projected kWh peak demand reduction for all programs were taken from SCE's 2012 monthly report with the exception of the Palm Desert Demonstration program peak demand reduction. This was taken from the revised PIP, as SCE stated that this is the source with the correct statement of demand reduction goals for the program.

3.3.4 Cost Effectiveness

Table 3-11 presents the budget per goal kWh, cost per estimated lifecycle kWh, cost per estimated lifecycle kW, and TRC test values for the same set of SCE programs. The budget per goal kWh is presented in order to see if it exceeded or fell below the reported cost per estimated lifecycle kWh. In other words, these ratios allow for a comparison of the expected cost per expected kWh savings to the reported cost per achieved kWh savings. Of the core programs, the table shows that all but one has a budget per goal kWh that exceeds the reported cost per achieved kWh. The only core program which had a lower budget per goal kWh was the Home Energy Efficiency Rebate program. In other words, the per unit cost to achieve 1 kWh of energy savings was less than anticipated for all but the HEER program.

Table 3-11: Budget and Cost per kWh and per kW Reduction Achieved and TRCs for the Palm Desert Demonstration Program and Selected Core/Statewide and Local Government Partnership SCE Programs for the 2010-2012 Program Cycle *

Program ID	Program Name	Budget per Goal kWh	Cost per kWh	Cost per kW	TRC
SCE-L-004	Palm Desert Demonstration Partnership	\$0.46	\$0.61	\$2,344.75	0.59
Residential					
SCE-SW-001A	Home Energy Efficiency Survey Program	\$0.45	\$0.16	\$401.08	0.84
SCE-SW-001D	Home Energy Efficiency Rebate Program	\$0.40	\$0.59	\$1,785.61	1.14
Commercial					
SCE-SW-002B	Calculated Incentives Program	\$0.24	\$0.20	\$1,405.38	1.04
SCE-SW-002C	Deemed Incentives Program	\$0.27	\$0.17	\$666.80	1.27
SCE-SW-002D	Commercial Direct Install Program	\$0.53	\$0.37	\$1,626.41	1.62
LGP					
SCE-L-004I	Desert Cities Energy Leader Partnership	\$0.49	\$0.44	\$1,791.81	0.72
SCE-L-004M	Orange County Cities Energy Leader Partnership	\$0.49	\$0.40	\$4,165.88	0.56
SCE-L-004Q	South Bay Energy Leader Partnership	\$0.50	\$0.57	\$3,860.83	0.57
SCE-L-004S	Ventura County Energy Leader Partnership	\$0.48	\$0.77	\$3,891.26	0.51

* Annual kWh and kW savings are used to calculate the budget per goal kWh, cost per kWh, and cost per kW ratios above. The proper ratios for comparison would use lifecycle savings values but the goal kWh savings were not available as lifecycle savings. For this reason, the cost per kWh savings should not be compared to the cost of electricity per kWh that appears in electricity bills.

A comparison of the ratios of the budget per goal kWh to the cost per achieved kWh for the LGP programs shows that some of the programs were more cost effective than expected (Desert Cities Energy Leader Partnership and Orange County Energy Leader Partnership), while others were not (Palm Desert Demonstration program, South Bay Energy Leader Partnership, and Ventura County Energy Leader Partnership). This finding shows that the anticipated cost per goal kWh for the Palm Desert Demonstration program was lower (\$0.46) than the reported cost per kWh saved (\$0.61). While the Palm Desert Demonstration program is not the only program to have cost more per kWh than anticipated. Generally speaking, the comparison in Table 3-11 shows that the core residential and commercial programs performed better (lower cost per kWh) than anticipated (budget per goal kWh) than the Palm Desert Demonstration program or the LGP programs included in this assessment did.

The reported cost per kWh reduction achieved of the Palm Desert Demonstration program is the second highest of all the programs listed (including all the selected LGPs); however, the reported cost per kW reduction achieved is on the lower side when compared to the cost per kW of other LGPs. As an innovative partnership pilot, the cost of the program is expected to be relatively higher and these data show that to be the case. However, the TRC test value for the Palm Desert Demonstration program is approximately 0.59 which is in line with the other local government partnerships listed in the table. With the exception of the LGP programs, the TRC test values for the other programs shown in the table are higher than that of the Palm Desert Demonstration program, especially for the SCE commercial core programs.¹²

It should be noted that the Home Energy Efficiency Survey has a low cost per kWh saved but also has a low TRC test value. One would expect that if the cost per kWh saved is relatively low, then the TRC test value would reflect this with a value closer to 1. In this case, the absolute cost and absolute energy savings are low since most of the audits conducted through this residential program are online. On the energy benefits side, not many energy savings can be claimed through in-home audits since these do not require energy efficiency equipment retrofits with savings that are verified through the program. The HEES program, however, is designed to add to the energy benefits that are attributable to other programs through its references of HEES program participants to other rebate programs.

Comparisons of the budget per goal kWh saved and cost per reported kWh saved are presented in this section in addition to TRC test values. These metrics are discussed as a simple expression of dollars spent per kWh savings and the evaluators recognize that these metrics do not incorporate the benefits of avoided supply costs to the cost of providing the program. Use of the ratios of cost to energy savings are presented to provide a simple comparison of value of dollars spent on the programs in terms of kWh savings. Additionally it should be noted that the proper comparison of cost per kWh savings would use lifecycle savings instead of annual energy savings. For this reason, the reader is cautioned not to compare the figures in Table 3-11 to the cost per kWh presented in electricity bills.

3.3.5 Administrative and Marketing & Outreach Budgets and Expenditures

A review of the program implementation plans (PIPs) for the SCE programs listed in Table 3-8 through Table 3-11 was completed to examine the budgets in more detail. As shown in Table 3-12, it is clear that of all of the LGP programs selected for this program assessment, the administrative cost budget for the Palm Desert Demonstration program represent a much smaller percentage of the overall program budget. In fact, the administrative budget represents 6 percent of the total Palm Desert Demonstration program budget, which is in line with the proportions set

¹² Cost effectiveness as measured by the TRC test is only required to be greater than 1 by IOU and not by individual program.

aside for the administrative cost budgets of most of the core residential and commercial programs (with the exception of the Home Energy Efficiency Survey program). However, this proportion is small when compared to the budget proportions set aside for administrative costs for LGP programs.

An additional observation that can be made about the Palm Desert Demonstration program is that the marketing and outreach (M&O) budget represents only 2 percent of the total budget and the direct implementation cost budget represents 92 percent of the total budget. For the LGP programs presented in the table, the proportion of M&O cost budgets are between 9 and 12 percent of the total budget and the direct implementation costs represent 65 to 67 percent of the total budget. Clearly the budget allocation for the Palm Desert Demonstration program differs from those of the local government partnerships. It is surprising that both the administrative cost budget and the M&O cost budget is smaller or just about equal to those of the LGP programs presented in the table, especially when the overall budget of the Palm Desert Demonstration program is the largest when compared to the LGP programs.

Table 3-12: Administrative, Marketing & Outreach, and Direct Implementation Budgets from Program Implementation Plans (PIPs) of the Palm Desert Demonstration Program and Selected Core/Statewide and Local Government Partnership SCE Programs for 2010-12 Program Cycle *

Program Name	Admin Cost	Marketing & Outreach Cost	Direct Implementation Cost	Total Budget	Admin Cost as % of Total Budget
Palm Desert Demonstration Partnership	\$528,159	\$199,685	\$8,059,268	\$8,787,112	6%
Residential					
Home Energy Efficiency Survey Program	\$1,612,928	\$2,041,846	\$3,296,136	\$6,950,910	23%
Home Energy Efficiency Rebate Program	\$1,966,643	\$4,944,320	\$19,235,638	\$26,146,601	8%
Commercial					
Calculated Incentives Program	\$3,739,576	\$599,910	\$47,669,175	\$52,008,661	7%
Deemed Incentives Program	\$3,347,240	\$1,259,934	\$48,656,060	\$53,263,234	6%
Commercial Direct Install Program	\$6,828,012	\$1,262,617	\$99,125,907	\$107,216,536	6%

Table 3-12 (Cont'd)13: Administrative, Marketing & Outreach, and Direct Implementation Budgets from Program Implementation Plans (PIPs) of the Palm Desert Demonstration Program and Selected Core/Statewide and Local Government Partnership SCE Programs for 2010-12 Program Cycle *

Program Name	Admin Cost	Marketing & Outreach Cost	Direct Implementation Cost	Total Budget	Admin Cost as % of Total Budget
LGP					
Desert Cities Energy Leader Partnership	\$356,843	\$159,668	\$957,465	\$1,473,976	24%
Orange County Cities Energy Leader Partnership	\$526,602	\$210,168	\$1,475,069	\$2,211,839	24%
South Bay Energy Leader Partnership	\$697,259	\$280,612	\$1,983,136	\$2,961,007	24%
Ventura County Energy Leader Partnership	\$1,069,830	\$555,695	\$3,122,279	\$4,747,804	23%

* Data presented in this table was retrieved from PIPs of the individual programs. The Palm Desert Demonstration program information was taken from the revised PIP, as SCE stated that this is accurate source of information for this program. The data for the LGPs was taken from SCE's Energy Leader Partnership Program PIP dated February 2011.

Expenditures over the program cycle were also examined to determine whether the same trends were present with regard to the Palm Desert Demonstration program relative to the other programs included in this program assessment. As Table 3-13 shows below, administrative expenditures of the Palm Desert Demonstration program are still a smaller percentage of the overall program expenditures compared to the other LGP programs listed, though the difference in proportion is relatively smaller than it was when comparing the percentage of administrative cost budgets to overall budgets in Table 3-12. In this case, administrative expenditures are equal to 8 percent for the Palm Desert Demonstration program while those of the other LGPs were between 12 and 21 percent. Similar to the administrative budgets, the administrative expenditures on the Palm Desert Demonstration program seem to be more in line with the administrative expenditures of the core residential and commercial programs, with the exception of the Deemed Incentives program, which shows that administrative expenditures were 2 percent of its overall program expenditures.

The marketing and outreach (M&O) expenditures of the Palm Desert Demonstration program represents 5 percent of the program's total expenditures and the direct implementation cost represents 87 percent of the total budget. For the LGP programs presented in the table, the proportion of M&O expenditures are between 3 and 10 percent of program expenditures and the direct implementation costs represent 71 to 82 percent of total program spending. Unlike the M&O budgets, the Palm Desert Demonstration program's M&O expenditures in this category fall more in line with those of the other LGPs. The comparison of expenditures on M&O across

the Palm Desert Demonstration program with other LGPs shows they are more similar than when the budgets of these programs are compared.

Table 3-14: Administrative, Marketing & Outreach, and Direct Implementation Expenditures of the Palm Desert Demonstration Program and Selected Core/Statewide and Local Government Partnership SCE Programs for 2010-12 Program Cycle *

Program Name	Admin Cost	Marketing & Outreach Cost	Direct Implementation Cost	Total Budget	Admin Cost as % of Total Budget
Palm Desert Demonstration Partnership	\$496,208	\$322,468	\$5,681,369	\$6,500,045	8%
Home Energy Efficiency Survey Program	\$1,265,793	\$1,510,581	\$7,409,470	\$10,185,844	12%
Home Energy Efficiency Rebate Program	\$1,052,082	\$2,914,747	\$18,025,206	\$21,992,035	5%
Calculated Incentives Program	\$2,057,191	\$260,230	\$39,530,412	\$41,847,833	5%
Deemed Incentives Program	\$1,921,534	\$458,486	\$79,823,579	\$82,203,599	2%
Commercial Direct Install Program	\$8,212,174	\$2,892,582	\$120,245,416	\$131,350,171	6%
Desert Cities Energy Leader Partnership	\$157,090	\$24,900	\$580,284	\$762,274	21%
Orange County Cities Energy Leader Partnership	\$137,959	\$59,980	\$920,016	\$1,117,956	12%
South Bay Energy Leader Partnership	\$331,390	\$169,816	\$1,626,073	\$2,127,279	16%
Ventura County Energy Leader Partnership	\$380,675	\$188,719	\$1,369,084	\$1,938,478	20%

* Data presented in this table was provided by SCE upon its receipt of a data request for categorized expenditures of these programs during the 2010-12 program years.

3.4 Depth of Retrofits

One of the goals of the Palm Desert Demonstration program was to implement a deeper or more comprehensive retrofit than is commonly achieved through other programs. For this evaluation, the depth of retrofit has been measured by the average number of end uses installed per site and the average savings per site. To determine if the Palm Desert Demonstration program achieved deeper or more comprehensive retrofits than were achieved by other programs, the measures of

depth of retrofit (average number of end uses installed and average savings per site) from the Palm Desert Demonstration program were compared with similar measurements from other SCE programs. To control for the potential influence of climate zone on these measurements, the evaluation team calculated the depth of retrofit measurements restricting the comparison programs' values to projects in SCE's climate zone 15, the climate zone for the Palm Desert Demonstration program.

3.4.1 Depth of Retrofit – Nonresidential

Table 3-13 lists the average number of end uses installed in nonresidential sites under the Palm Desert Demonstration program and within other SCE programs in climate zone 15. These results are presented by the size of customer (based on annual consumption categories of very small, small, medium, and large¹³). The comparison was based on 1,316 very small participants, 719 small participants, 286 medium sized participants, and 65 large participants. In general, larger customers have more end uses within their facility than smaller customers, increasing the potential number of end use retrofits and necessitating the stratification of results by the size of the customer. If the Palm Desert Demonstration program led to deeper retrofits, it is anticipated that the average number of end uses installed per site within the Palm Desert Demonstration program would be higher than in other SCE programs, controlling for size of customer.

The findings presented in Table 3-12 indicate that the average number of end uses installed is higher for medium and small sized customers. These results are statistically significant at the 95 percent confidence level. As the table shows, small non-residential sites in the Palm Desert Demonstration program installed an average of 1.59 end uses while non-residential climate zone 15 sites that participated in other SCE programs installed an average of 1.36 end uses. The difference in the number of end uses installed by medium sites across the Palm Desert Demonstration program and other SCE programs is even larger; medium non-residential sites in the Palm Desert Demonstration program installed an average of 1.81 end uses while non-residential participants in other SCE programs (in climate zone 15) installed 1.20 end uses per site.

These results support the hypothesis that Palm Desert Demonstration sites implement energy efficiency measures across more end uses than sites participating in other SCE energy efficiency programs. In addition, the average number of end uses installed for very small- and large-size customers is greater than that for non-Palm Desert Demonstration program participants, but not so much greater as to be statistically significant at the 95 percent confidence level.

¹³ Large sites have annual usage over 1,750,000 kWh, medium have greater than 300,000 kWh and less than or equal to 1,750,000, small have max annual usage greater than 40,000 kWh and less than or equal to 300,000, very small have annual usage less than or equal to 40,000 kWh.

Table 3-15: Average Number of End Uses Installed by Program – Nonresidential

Program	Very Small	Small	Medium	Large
Palm Desert Demonstration Program	1.42	1.59	1.81	1.82
SCE CZ 15	1.37	1.36	1.20	1.54
P - Value	0.16121	0.00004 ✓	0.00002 ✓	0.34428
<i>n</i>	1,316	719	286	65

✓ Indicates statistically significant difference in results at the 95 percent confidence level.

Table 3-13 lists the average lighting and non-lighting savings per participant for participants in the Palm Desert Demonstration program and participants in other SCE programs in climate zone 15. Generally, the Palm Desert Demonstration program nonresidential participants do not show statistically significantly larger savings than participants in other SCE programs. However, Palm Desert Demonstration program small sites do exhibit statistically significantly lower savings than sites in other SCE programs in climate zone 15 for lighting end uses. For non-lighting end uses, medium Palm Desert Demonstration program sites show statistically significantly higher savings, while very small sites show statistically significantly lower savings at the 95 percent level.

Table 3-16: Average Lighting and Non-Lighting Savings per Participant by Program – Nonresidential

Program and End Use	Very Small	Small	Medium	Large
Palm Desert Demonstration Program Average Lighting kWh	3,506	8,016	34,083	92,011
SCE CZ 15 Average Lighting kWh	3,694	10,253	35,605	129,298
P – Value	0.41027	0.01315 ✓	0.83971	0.47552
<i>N</i>	761	476	140	41
Palm Desert Demonstration Program Average Non-Lighting kWh	1,452	6,081	49,712	148,113
SCE CZ 15 Average Non-Lighting kWh	2,256	6,322	31,225	337,559
P – Value	0.00033 ✓	0.79335	0.04685 ✓	0.28694
<i>N</i>	602	444	196	50

✓ Indicates statistically significant difference in results at the 95 percent confidence level.

3.4.2 Depth of Retrofit – Residential

For residential sites, the evaluation compared the average savings per site for residential sites under the Palm Desert Demonstration program and within other SCE programs in climate zone 15 but the evaluation did not compare the average number of end uses installed per site. For residential sites, the audit programs appear to provide participants with no cost lighting and

water heating measures that distort the calculation of the number of end uses installed and average savings per site due to the larger number of no cost items in the SCE programs outside the Palm Desert Demonstration program.

Table 3-16 lists the average whole household, lighting, and non-lighting savings per participant for residential participants in the Palm Desert Demonstration and participants in other SCE programs in climate zone 15. Generally, the Palm Desert Demonstration residential participants have shown statistically significant larger savings than participants in other SCE programs. When the savings are analyzed by the type of households, single family households in PDPP have statistically significantly larger savings than single family households in other SCE programs in climate zone 15, multi-family households have higher non-lighting savings, and mobile home households have lower savings in the PDPP program.

Table 3-17: Average Household, Lighting, and Non-Lighting Savings per Participant by Program – Residential

Program and End Use	All Households	Single Family	Multi-Family	Mobile Home
Palm Desert Demonstration Program Average Household kWh Savings	758	805	423	488
SCE CZ 15 Average Household kWh Savings	485	491	398	1,012
P – Value	0.0000	0.0000	0.0926	0.0000
N	3,804	3,313	312	179
Palm Desert Demonstration Program Average Lighting kWh	531	560	352	419
SCE CZ 15 Average Lighting kWh	217	121	371	902
P – Value	0.0000	0.0000	0.4075	0.0000
n	1,142	956	110	76
Palm Desert Demonstration Program Average Non-Lighting kWh	612	656	307	314
SCE CZ 15 Average Non-Lighting kWh	503	431	183	625
P - Value	0.0000	0.0000	0.0000	0.0000
n	4,808	3,245	304	177

4

Process Evaluation

This section of the report assesses implementation-related aspects of the Palm Desert Demonstration program with particular attention paid to program awareness, satisfaction and whether participants have learned about and participated in other SCE programs through their PDDP program experience. Both residential and nonresidential participants were surveyed and their responses are discussed in separate subsections below.

The nonresidential subsection includes an analysis of common survey questions asked to SCE's nonresidential downstream lighting program participants and to Palm Desert Demonstration program nonresidential participants. Results from both surveys are included to see what sorts of commonalities and differences are detected about energy saving actions and awareness between the participants of these two SCE programs.

4.1 Residential Participant Process Evaluation

The residential survey instrument included questions about how participants learned about the PDDP program, whether they were familiar with the goals of the program, and how satisfied they were with the equipment installed, the installation/service contractor, and the program overall.¹ They were also asked if their experience with the Palm Desert Demonstration program led them to participate in other SCE programs.

4.1.1 Program Awareness

Residential participants were asked how they first learned about the Palm Desert program and a variety of responses were given, as Table 4-1 shows. The most common sources reported by respondents included word of mouth, SCE bill inserts, vendors/contractors who install equipment, and program literature (which could include brochures from SCE or the City of Palm Desert describing the program). Other less referenced sources included SCE representatives, SCE's website, newspaper articles, and family or friends. Based on these findings, no single source stands out as the predominant one noted by program participants.

¹ In addition to the availability of rebates for energy efficiency equipment, the Palm Desert Demonstration program also offered AC maintenance as well as in-home energy audits. Satisfaction questions were rephrased to address these services offered by the Palm Desert Demonstration program and are included in the responses reported in this section.

The survey followed by asking respondents for other ways they learned about the Palm Desert Demonstration program. Again, no source stands out; however over 60 percent of respondents noted that they did not hear about the program from any other sources aside from the first one they mentioned.

Table 4-1: Information Sources from Which Participants First Learned About the PDDP Program

<AP9> How did you first learn about the program?	Percentage of Respondents
Word of mouth	15%
SCE/Edison bill insert	13%
Vendor/Contractor	11%
Program Literature	10%
Newspaper article	7%
SCE/Edison website	7%
Family/Friend	7%
SCE/Edison representative	7%
Community event	5%
Letter from SCE/Edison	5%
Television/radio advertisement	5%
Previous experience with program	3%
Phone call from City of Palm Desert official	1%
Email from utility or City of Palm Desert	1%
Other	1%
Don't Know	2%
<i>n</i>	123

In addition to inquiring about how they first learned about the program, the survey asked participants if they were aware of the goal to reduce the City of Palm Desert's energy usage by 30 percent from a 2005 baseline over a period of 5 years. As mentioned in the program background in Section 1, this was a City of Palm Desert goal and was not set by SCE or approved by the CPUC for this program. Nevertheless, this goal was discussed in the revised PIP and was advertised by the City of Palm Desert as it conducted marketing and outreach for the program. Findings from the survey show that slightly less than half of the respondents were aware of this goal, as Table 4-2 shows. Given that only half of those who participated were aware of this goal, it may be the case that those who did not participate were not even aware that the program was trying to build community support to reduce city-wide energy use through this partnership.

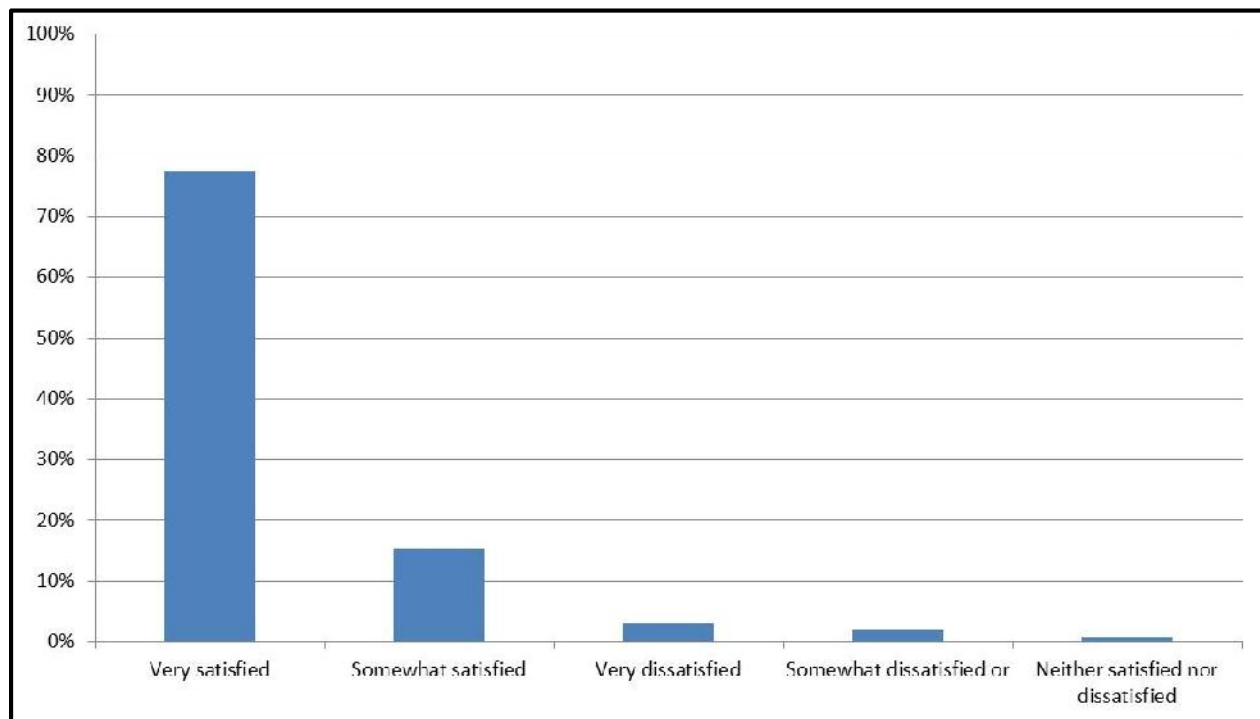
Table 4-2: Awareness of Goal to Reduce Energy Usage by 30% in Five Years

<AP10> Are you aware that Palm Desert had a city-wide goal to reduce total energy usage by 30% over the past five years?	Percentage of Respondents
Yes	47%
No	53%
<i>n</i>	123

4.1.2 Program Satisfaction

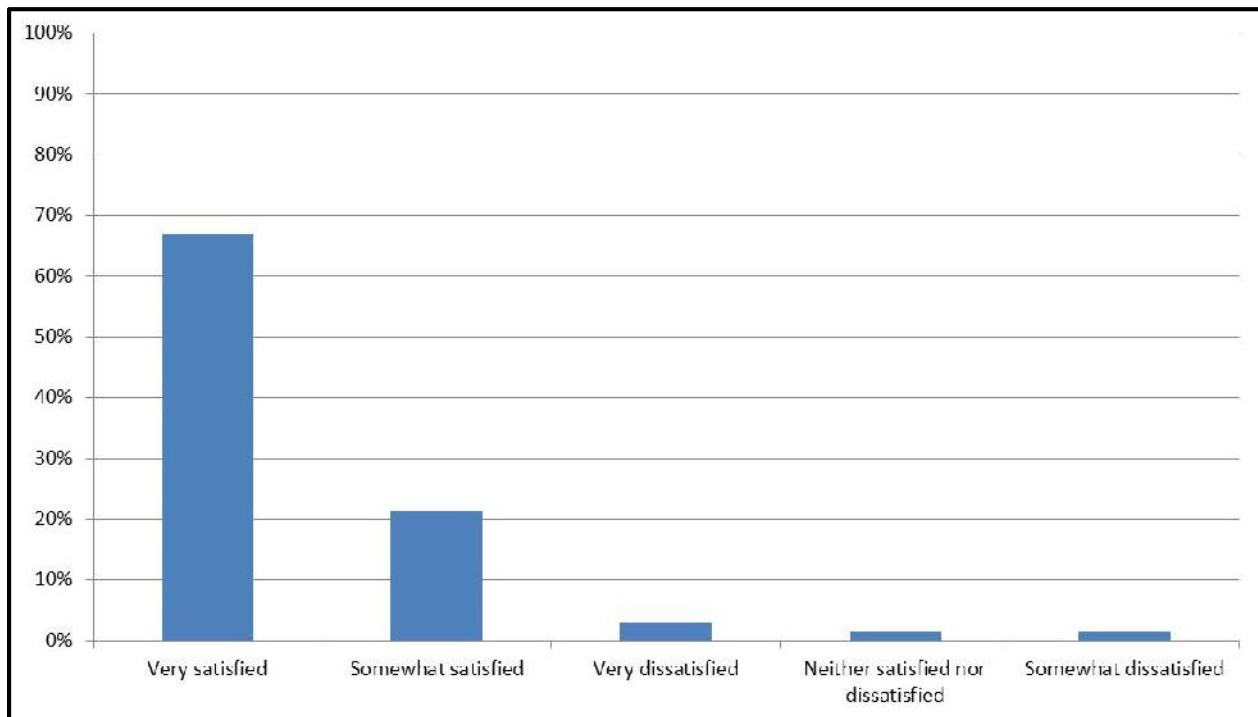
Overall, residential participants report that they are very satisfied with a variety of programmatic elements with very little to almost no dissatisfaction. The survey asked about respondents' satisfaction with the contractor who installed/maintained their equipment, the application process, and the program overall.

Figure 4-1 shows the level of satisfaction respondents had with contractors who were responsible for installation or maintenance of energy efficiency equipment. Over 75 percent reported that they were very satisfied with the performance of their contractor, with an additional 15 percent stating that they were somewhat satisfied. Note that less than 5 percent said that they were very dissatisfied with the contractor who installed or maintained their energy efficiency equipment.

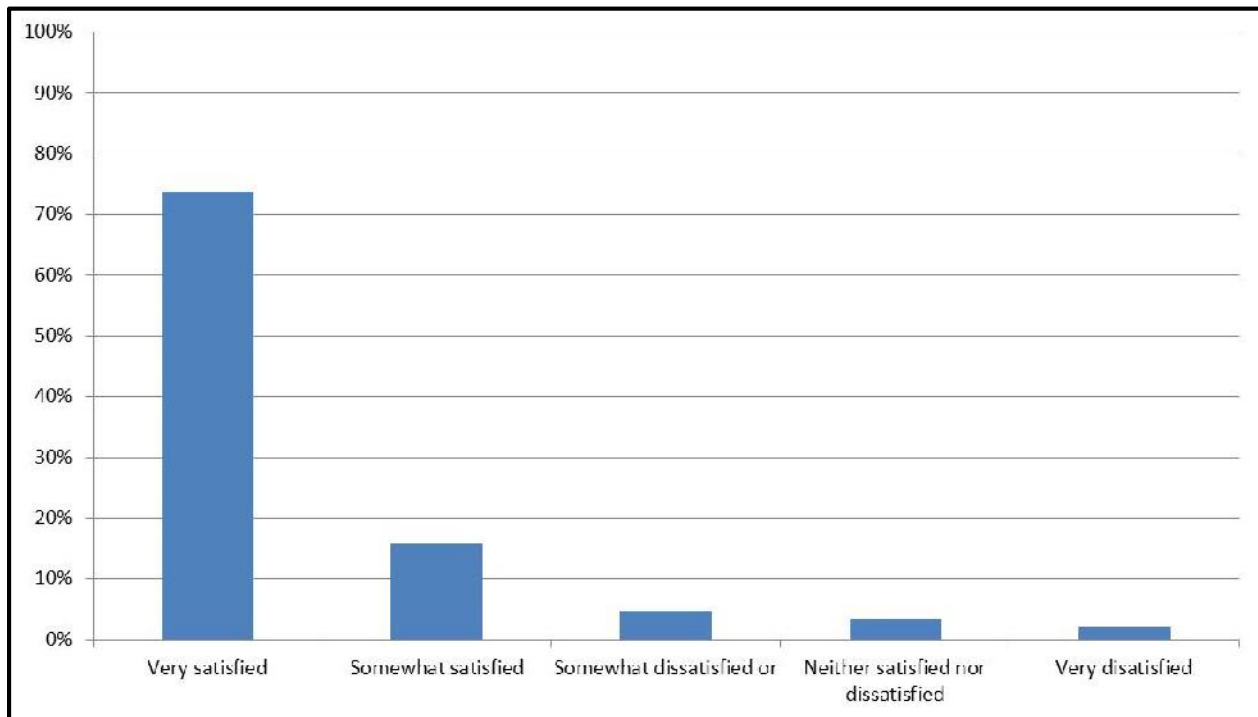
Figure 4-1: Satisfaction with Contractor Who Installed Equipment (*n* = 93)


In order to participate in the Palm Desert Demonstration program, SCE customers had to complete an application to receive a rebate for the purchase of energy efficiency equipment or to receive services through the program such as air conditioning maintenance or an in-home energy audit. The survey asked respondents to rate their level of satisfaction with the application process and based on these results, approximately 65 percent were very satisfied with an additional 20 percent noting that they were somewhat satisfied. It is not surprising that respondents showed higher satisfaction with contractors than they did with the application process; however it is notable that the levels of dissatisfaction remain extremely low.

Figure 4-2: Satisfaction with the Application Process (n = 93)



The last satisfaction question asked participants to rate their level of satisfaction with the program overall (see Figure 4-3). Not surprisingly, respondents were very satisfied with the program overall which reflects the findings for the individual program elements that were already reported. Of the 93 responses received, 74 percent stated that they were very satisfied with an additional 16 percent noting that they were somewhat satisfied with the program. The high satisfaction ratings provide evidence to support the benefits of implementing a program that incorporates community outreach and customer facing visits.

Figure 4-3: Satisfaction with the Program Overall (n = 93)

4.1.3 Program Participation

The residential survey inquired with participants to find out if they learned about and participated in other SCE programs after participating in the Palm Desert Demonstration program. Of the respondents who had participated in the Palm Desert program, less than 10 percent stated that they had participated in other programs since their experience with the Palm Desert program. It is not surprising that the number is relatively low since the Palm Desert Demonstration program ended not long ago. The types of programs mentioned by these respondents were mostly demand response programs and AC cycling programs. Respondents were asked how they were informed of other programs after they participated in the Palm Desert Demonstration program. Very few participants responded to this question, but of those who did, most stated that they were informed by SCE or by a contractor.

Respondents who had participated in another SCE program subsequent to their participation in the PDDP program were asked if the Palm Desert program experience was a primary factor in their decision. As Table 4-3 shows, about half of the respondents stated that their experience with the Palm Desert program was the primary factor that led them to become participants in another SCE program. The number of responses received to this question is quite small therefore this finding should be viewed with this in mind.

Table 4-3: Experience with Palm Desert Demonstration Program on Subsequent SCE Program Participation

<PA3> Was your experience with the Palm Desert program the primary factor that led you to participate in other Edison programs?	Percentage of Respondents
Yes	55%
No	46%
<i>n</i>	11

4.2 Nonresidential Participant Process Evaluation

Nonresidential program participants were also surveyed to assess their awareness of energy savings actions and satisfaction with various aspects of the program. Because consultant staff is also conducting an evaluation of California IOU downstream lighting programs on behalf of the CPUC, this subsection includes a comparison of selected findings related to energy savings awareness, satisfaction, and motivations between nonresidential participants of the Palm Desert Demonstration program and SCE's nonresidential downstream lighting program participants. Results from both surveys are included to compare the energy saving actions and awareness of the participants of these two SCE programs. A comparison of results from these programs is made because over half of the Palm Desert Demonstration program energy savings from the non-residential sector are from downstream lighting measures. This makes the survey results from these two programs comparable to some degree.

4.2.1 Program Awareness

Nonresidential participants were asked how they first learned about the Palm Desert Demonstration program and Table 4-4 lists the variety of responses that were given. The most common source reported was a program representative, with close to 30 percent of respondents stating that they first learned about the program from them. Other common sources included an email or phone call from someone representing the City of Palm Desert, a program approved vendor, and their account representative. The survey follows by asking respondents for other ways they learned about the Palm Desert Demonstration program. Over 80 percent of respondents noted that they did not hear about the program from any other sources aside from the first one they mentioned.

The same question was asked of participants of SCE's nonresidential downstream lighting program and the responses from these participants are included alongside for comparison. Similar to the responses from the Palm Desert Demonstration program participants, a program representative was the most common source from which nonresidential lighting program participants learned about the program. In this case, 23 percent of respondents noted this as a first source. A very close second source for the nonresidential lighting participants was

contractors, which is not surprising since IOU nonresidential lighting programs have traditionally been communicated by contractors to their clientele. Note that this was not a primary way Palm Desert Demonstration program participants first learned about their program. Account representatives were also a common source from which both Palm Desert Demonstration program participants and nonresidential lighting participants first learned of the programs.

Table 4-4: Information Sources from Which Participants First Learned About the Program

<AP9> How did you first learn about the program?	Palm Desert *	Nonresidential Lighting *
Program representative	29%	23%
Program Approved Vendor ✓	17%	9%
Email/Letter from utility or City of Palm Desert ✓	14%	0%
Contractor ✓	8%	22%
Account representative	8%	11%
Bill insert	5%	6%
Program literature	5%	6%
Word of mouth	5%	9%
Phone call from City of Palm Desert office ✓	2%	0%
Previous experience with it	1%	2%
Trade publication	1%	0%
Newspaper article	1%	0%
Trade shows/exhibits	1%	0%
Utility or program website	0%	1%
Conference	0%	1%
Company used it at other locations	0%	1%
Other	0%	4%
Don't Know	2%	2%
<i>n</i>	93	817

* Percentages may not sum to 100% due to rounding.

✓ Chi-square test was performed and indicates that the difference in means is statistically significantly different.

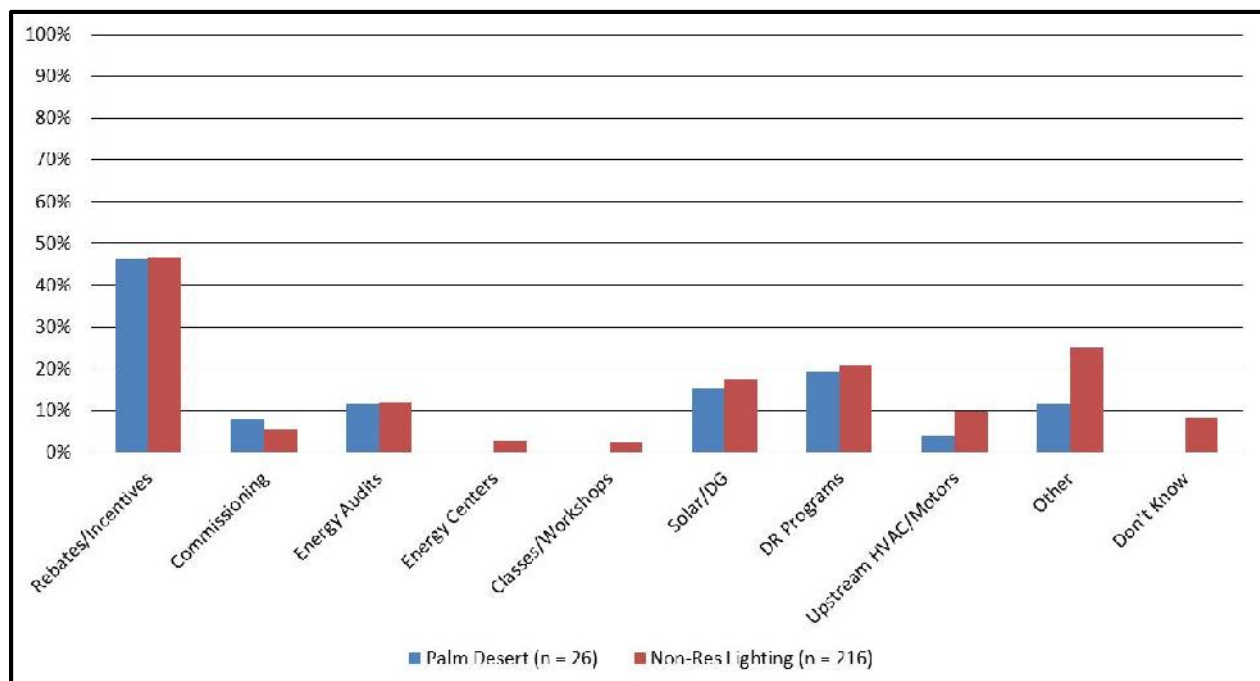
Both surveys inquired about participants' familiarity with other programs or resources that are designed to help businesses reduce their energy bills. Responses to this inquiry were similar across the PDDP program and the nonresidential lighting program, as can be seen in Table 4-5. Based on these results, approximately one-quarter of program participants know about other ways to save energy.

Table 4-5: Awareness of Other Energy Saving Programs or Resources

<ID1> Are you aware of any other programs or resources that are designed to help organizations like yours reduce its energy bills?	Palm Desert	Nonresidential Lighting
Yes	28%	26%
No	72%	73%
Don't know	0%	1%
<i>n</i>	93	817

Chi-square tests were performed and indicate that the differences in means are NOT statistically significantly different for each answer category.

A follow up question was asked to find out what types of programs and/or resources these respondents knew about and the responses are shown in Figure 4-4. The largest proportion of participants of both the Palm Desert Demonstration program and the nonresidential lighting program mention rebate programs (approximately 45 percent of both sets of program participants). Demand response and solar programs were also mentioned but not by as many respondents. Even fewer respondents mentioned energy audits and commissioning. Participants of the nonresidential lighting programs mentioned a wider variety of programs and resources relative to those mentioned by the Palm Desert Demonstration program participants. For example, Energy Centers and classes and workshops were mentioned by lighting program participants but were not mentioned by participants of the Palm Desert program.

Figure 4-4: Other Programs and Resources to Help Save Energy


Other aspects of awareness were addressed in both the Palm Desert Demonstration program and nonresidential lighting program surveys. For example, both surveys asked respondents how involved their businesses are in making lighting and climate control equipment purchasing decisions for their facilities. Responses from both surveys are presented below in Table 4-6 and show that well over half of the participants in both programs say they are very active. Just over 60 percent of Palm Desert Demonstration program participants report that they are very active in these decisions and over 70 percent of the SCE participants of the downstream lighting program report the same. A larger percentage of businesses in the nonresidential lighting program say they are very active compared to those businesses who have participated in the Palm Desert Demonstration program.² This is not surprising since the size of nonresidential businesses who participate in the lighting programs is larger than those that are concentrated in the City of Palm Desert. Evidence to support this can also be seen by the larger percentage of Palm Desert respondents who state they are not at all involved in decisions related to these types of purchases.

Table 4-6: Role in Lighting and Climate Control Equipment Purchases

<CC6> How active a role does your business take in making lighting and climate control equipment purchase decisions at this facility? Would you say you are...	Palm Desert	Nonresidential Lighting
Very active – involved in all phases and have veto power	62%	71%
Somewhat active-we approve decisions and provide some input and review	19%	17%
Slightly active – we have a voice but it's not the dominant voice	10%	7%
Not active at all –we are part of a large organization	1%	1%
Not active at all – our firm doesn't get involved in these issues	8%	4%
Don't know	0%	0%
n	93	1017

Chi-square tests were performed and indicate that the differences in means are NOT statistically significantly different for each answer category.

4.2.2 Program Satisfaction

In order to assess what nonresidential participants liked about the programs in which they participated, the survey asked respondents what they felt the strengths of the program were (see Table 4-7). Results across the two surveys show that the main program strengths are energy efficiency/environmental impacts and the financial benefits that are reaped from not just the rebate but the energy savings that are achieved from the installation of energy efficiency equipment. Over 50 percent of nonresidential lighting program participants rated financial benefits as a program strength. This exceeds the number of Palm Desert participants who noted this as a program strength (30 percent).

² A chi-square test was performed and found that the difference in the percentage of participants across these categories is not statistically significantly different.

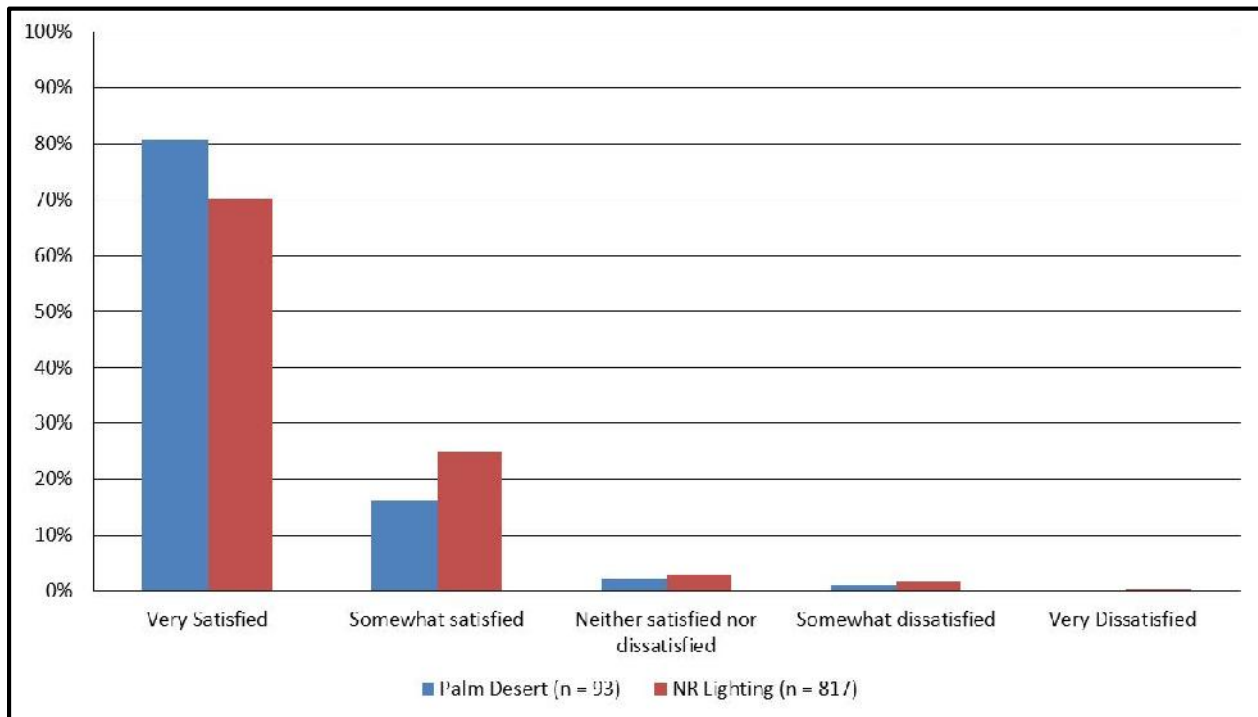
Table 4-7: Program Strengths

<PP1> What do you believe the program's primary strengths are?	Palm Desert *	Nonresidential Lighting *
Energy efficiency/environmental impacts	43%	35%
Financial benefits (upfront costs, savings, payback, ROI) ✓	30%	51%
Ease of participation	10%	13%
Improved lighting quality ✓	6%	13%
Educational benefit	4%	4%
Program awareness	3%	4%
Reliability of program	1%	3%
Other	1%	4%
Don't Know	1%	1%
<i>n</i>	93	817

* Sum of percentages exceeds 100% because multiple responses were permitted.

✓ T-tests indicate that these results are statistically significantly different at the 95% confidence level.

Participants of both the Palm Desert Demonstration program and SCE's nonresidential lighting program were both asked to rate their levels of satisfaction with the program overall. As Figure 4-5 shows, an overwhelming majority of participants in both programs were satisfied with their experiences. Over 80 percent of Palm Desert Demonstration program participants said they were very satisfied with an additional 16 percent stating that they were somewhat satisfied. No participants of the Palm Desert program noted that they were very dissatisfied. Approximately 70 percent of nonresidential lighting program participants were very satisfied with the program overall and an additional 25 percent noted that they were somewhat satisfied. Less than 1 percent of participants said they were very dissatisfied with their program experience. When comparing the satisfaction ratings of these programs, a slightly larger percentage of Palm Desert participants stated that they were very satisfied relative to participants of the nonresidential lighting program; however it is clear that both of these programs are well received.

Figure 4-5: Satisfaction with Program Overall

4.2.3 Participation

Though saving energy is a main goal for the utilities when they offer rebate programs, there may be several reasons why businesses choose to participate. In fact, because rebate programs differ in their design, equipment types rebated, the application processes, etc., participants likely choose to participate in different programs for different reasons. In order to get a sense of why nonresidential participants enrolled in these programs, the surveys asked respondents to provide reasons why they enrolled in the programs. Based on the findings presented in Table 4-8, the main motivating factor participants of both the Palm Desert Demonstration program and the nonresidential lighting program cited was to reduce energy costs. Three of every four respondents gave this as a reason across both programs. Other reasons that were important to participants included the availability of rebates and the reduction of energy use. Note that a larger fraction of Palm Desert Demonstration program participants cited rebates (37 percent) than those who participated in the nonresidential lighting program (24 percent). The opposite is true about reducing energy use as a motivating factor; in this case a larger share of lighting program participants noted this as a reason than participants of the Palm Desert program (32 percent versus 26 percent). In any case, it is clear that reducing energy costs is reported as a main reason for program participation.

Table 4-8: Reasons for Program Participation

<A3> Why did you decide to participate in this program?	Palm Desert *	Nonresidential Lighting *
To reduce energy costs	75%	76%
To get a rebate from the program ✓	37%	24%
To reduce energy use/power outages	26%	32%
To protect the environment	14%	11%
To replace old/outdated equipment	10%	9%
To improve equipment performance	4%	6%
To improve the quality of equipment performance ✓	4%	14%
Maintenance downtime/ expenses for old equipment too high	3%	1%
To update to the latest technology	2%	4%
As part of a planned remodeling/build-out/expansion	1%	0%
To comply with codes set by regulatory agencies	0%	1%
To improve visibility/plant safety	0%	4%
Other	2%	4%
<i>n</i>	93	1017

* Sum of percentages exceeds 100% because multiple responses were permitted.

✓ T-tests indicate that these results are statistically significantly different at the 95% confidence level.

5

Impact Evaluation

This section presents the results from the impact evaluation conducted for this study. As explained earlier, due to the short time frame and limited budget for this evaluation, the analysis relied on self-reported information collected during phone surveys with participants instead of on-site surveys. The impact evaluation:

- Compared the per unit ex-ante savings claimed by the Palm Desert Demonstration program to those claimed by other SCE programs by measure, building type, climate zone, etc. Any differences would indicate inconsistencies and would warrant further examination.
 - Measures from the four lighting and four non-lighting measure groups with the highest savings in the Palm Desert Demonstration program were examined.
- Estimated verification rates based on self-reported installation quantities gathered as part of the participant phone surveys.
 - Phone surveys were conducted for 123 residential participants and 93 nonresidential participants of the Palm Desert Demonstration program. Self-reported installation quantities were compared to ex ante quantities reported in the tracking data to estimate verification rates.
- Estimated program influence by calculating net-to-gross ratios.
 - Program influence was estimated using phone surveys from 88 residential Palm Desert Demonstration participants and 121 nonresidential participants. Of the 121 nonresidential Palm Desert Demonstration surveys, 28 surveys were conducted as part of the study of nonresidential downstream lighting programs.
 - Compared the net-to-gross ratios between nonresidential lighting measures installed under Palm Desert Demonstration program to other SCE programs.¹ This comparison was completed only for the sectors/measure groups where enough sample points were available.

¹ Please note that the comparisons were made to preliminary net-to-gross estimates from the nonresidential downstream lighting study. It is expected that the net-to-gross methodology will change for measures that have a dual baseline. Note that this comparison was used to determine whether the Palm Desert Demonstration program achieved higher, lower, or roughly the same net-to-gross ratios as similar SCE programs; that difference is not likely to change based on any future modifications to the net-to-gross algorithm.

Since the final evaluation results were not available for several of the CPUC 2010-12 evaluation studies at the time this evaluation was completed, gross unit energy savings were not adjusted to provide final net energy savings for the Palm Desert Demonstration program.

5.1 Overview of Palm Desert Demonstration Program Reported Savings

Table 5-1 below provides a high-level overview of planned and reported energy savings for the residential and commercial pilot initiatives.^{2,3} The reported energy savings in Table 5-1 come from SCE's program tracking data. As shown, the program reported savings exceeds the planned kWh savings in the nonresidential sector and fell short of the planned kWh savings in the residential sector. Approximately 75 percent of the claimed savings from the Palm Desert Demonstration program are nonresidential.

While SCE's program tracking data identified the claimed savings attributable to the Palm Desert Demonstration program, they did not provide any information to identify a claim to a specific pilot initiative within the program (e.g., Energy Efficiency Upgrade, Emerging Technologies, and Commercial Strategies Initiatives). As a result, the reported energy savings in Table 5-1 were estimated by summing the energy savings from residential and nonresidential sites that participated in the Palm Desert Demonstration program during the 2010-12 program years. Of the residential sites, the savings from the installation of pool pumps were used to provide an estimate for the One-Stop-Shop for Pool Pumps pilot initiative. The total savings claimed from Residential Pool Pumps was 0.8 GWh. The energy savings from all other measures installed by residential customers were then used to provide the aggregated estimate of reported kWh savings from the Energy Efficiency Upgrade and Residential Rebate initiatives. The residential pilot initiatives resulted in estimated savings of 1.8 GWh. Last, the nonresidential program tracking data claims a total of almost 8 GWh. This total was compared to the planned savings for the combined Commercial Rebates, Commercial Strategy, and Small Business Direct Install initiatives carried out under the Palm Desert Demonstration program for the 2010-12 program years.

² The planned energy savings for the Emerging Technologies and Municipal Facilities pilot initiatives were not included in the table. According to the revised Palm Desert Demonstration program implementation plan (PIP), the planned savings for the Emerging Technologies pilot initiative was 148,373 kWh and was 100,000 kWh for the Municipal Facilities pilot initiative. The total planned energy savings for all the pilot initiatives was 19,049,650 kWh. The revised plan can be found as Attachment A to Advice Letter 2548-E-A from SCE to the CPUC, dated July 29, 2011. <https://www.sce.com/NR/sc3/tm2/pdf/2548-E-A.pdf>

³ The energy savings goals listed in the December 2012 SCE monthly report differs from the goals listed in the Palm Desert Demonstration PIP. A data request was submitted to SCE (mentioned earlier in this memorandum) to clarify which goals were correct. SCE's response indicated that the goals listed in the PIP are the correct ones.

Table 5-1: Palm Desert Demonstration Program High Level Savings Overview – 2010-2012 Reported Savings versus Planned Savings for Palm Desert Pilot Initiatives

Pilot Initiatives	kWh – Planned	kWh – Reported	Reported/Planned
One Stop Shop for Pool Pumps	4,875,541	843,710	17%
Energy Efficiency Upgrade	4,441,056	1,802,777	20%
Residential Rebates	4,593,117		
Commercial Rebates	840,000	7,991,321	163%
Commercial Strategy	2,361,937		
Small Business Direct Install	1,689,626		
Total	18,801,277	10,637,809	57%

Since the Palm Desert Demonstration program is included in SCE’s portfolio, claims made under this program were assigned to CPUC 2010-12 evaluation studies in the same manner as all other SCE claims. Each record in the tracking data was assigned to a study based on a combination of Measure Group, Res/NonRes Flag, and Upstream Flag. Table 5-2 below presents how the Palm Desert Demonstration program savings were distributed among the CPUC 2010-12 studies. As shown, approximately half of the Palm Desert Demonstration program savings were nonresidential downstream lighting savings and were therefore assigned to the study evaluating those measures. As explained below, since such a large portion of the Palm Desert Demonstration program savings were included in the nonresidential downstream lighting evaluation, the phone surveys conducted under that study corresponding to Palm Desert Demonstration program participants were included in the program influence analysis for this report.

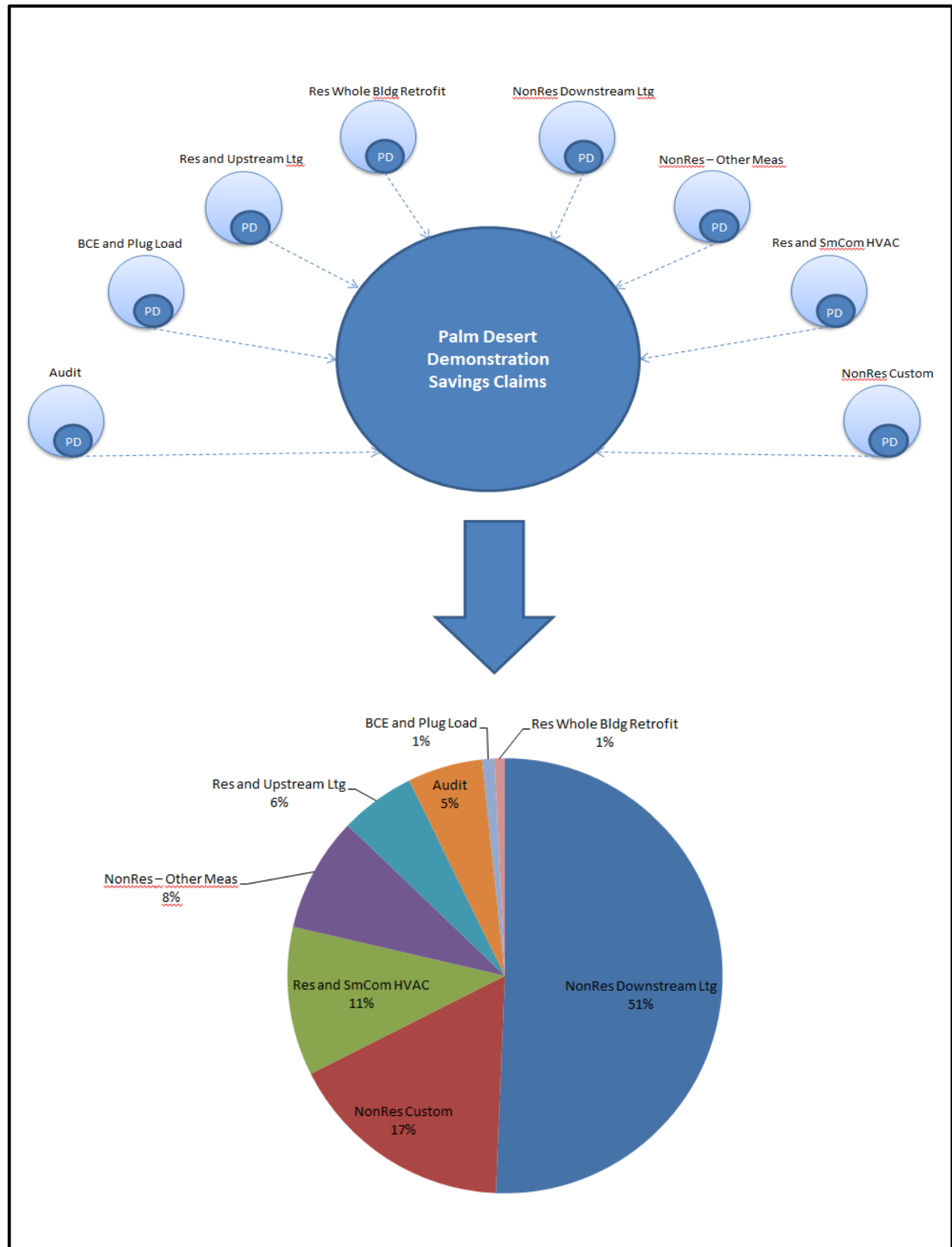
Table 5-2: High Level Savings Overview for the Palm Desert Demonstration Program – by CPUC 2010-12 Studies

Work Order #	Study Title	kWh Reported	% of Total	kW Reported	% of Total
WO029	NonRes Downstream Ltg	5,390,603	51%	1,194	43%
WO033	NonRes Custom	1,796,386	17%	274	10%
WO032	Res and SmCom HVAC	1,176,688	11%	844	30%
WO042	NonRes – Other Meas	907,193	9%	209	8%
WO028	Res and Upstream Ltg	594,600	6%	74	3%
WO036	Audit	593,524	6%	128	5%
WO034	BCE and Plug Load	96,028	1%	34	1%
WO046	Res Whole Bldg Retrofit	82,786	1%	15	1%
Total	Palm Desert Demonstration Program Savings	10,637,809	100%	2,772	100%

* Percent of Total columns may not sum to 100% due to rounding.

Figure 5-1 contains a flowchart showing the 2010-12 CPUC studies which included the savings of the Palm Desert Demonstration program for analysis. In addition, it provides a pie chart showing the distribution of Palm Desert program energy savings covered by the various CPUC studies. Both Table 5-1 and Figure 5-1 show that most of the savings for the Palm Desert program were from nonresidential downstream lighting measures (51 percent) followed far behind by nonresidential custom measures (17 percent) and residential and small commercial HVAC measures (11 percent).

Figure 5-1: CPUC 2010-12 Studies Constituting the Savings Claims for the Palm Desert Demonstration Program



5.1.1 Comparison of Ex-Ante per Unit Savings to Other SCE Programs

A comparison of ex-ante per unit energy savings between measures under the Palm Desert Demonstration program and measures under all other SCE core programs (not including the Palm Desert Demonstration program) was completed for the lighting and non-lighting measure groups with the highest energy savings.⁴ As can be seen in Table 5-3, the measures that were reviewed make up approximately two-thirds of the total Palm Desert Demonstration program kWh savings. Of the program kWh savings that were reviewed, 42 percent of the savings came from lighting measures, while the remaining 24 percent of savings was from non-lighting measures. At this level there were 303 unique sets of unit savings values claimed for the top measure groups mentioned.

Table 5-3: 2010-12 Ex Ante Gross Savings – Measure Groups Reviewed

Measure Group	kWh	% of Program	kW	% of Program
Lighting Indoor Linear Fluorescent	1,332,668	13%	313	11%
Lighting Indoor Linear Fluorescent Delamping	1,215,882	11%	293	11%
Lighting Indoor LED Reflector Lamp	1,089,616	10%	219	8%
Lighting Indoor CFL Reflector	802,161	8%	144	5%
Lighting	4,440,328	42%	969	35%
Pool Pump	868,504	8%	206	7%
Ag Pump Overhaul	780,642	7%	124	4%
Survey Residential Onsite	593,524	6%	128	5%
HVAC RCA	323,551	3%	258	9%
Non-Lighting	2,566,222	24%	717	26%
Total	7,006,549	66%	1,686	61%

The set of savings values compared from the SCE core programs were only selected if there was a match with a Palm Desert Demonstration program measure name, building type and climate zone combination. Out of the 303 Palm Desert Demonstration program measure-building type-climate zone groups, only 149 groups had such a set of SCE per unit savings values to compare to at the measure-building type-climate zone level. For the remaining 154 sets of Palm Desert Demonstration program savings values, 102 groups had SCE core measures to compare against at the measure-building type level. However, it was determined that a comparison at only the measure-building type level would not be a fair comparison of unit savings values between Palm

⁴ It is important to note that this comparison could only be performed for the tracking data records that either contained a work paper or DEER reference as its source for ex ante unit savings. To make an ex-ante unit savings comparison for the Palm Desert Demonstration program, custom records would not be applicable since these values are determined at the site-level. However, the ex-ante unit savings for work paper and DEER measures could be determined at the measure name, building type, and climate zone level.

Desert Demonstration program measures and SCE core program measures since climate zone plays such a crucial role in determining savings for both lighting and non-lighting measures.

For the 149 sets of unit savings that could be compared to SCE (non-Palm Desert program) measures, there was only one inconsistency found. This inconsistency in unit savings can be seen in Table 5-4. The savings claimed under this set of measure name, building type, and climate zone accounts for less than 0.01 percent of the total savings under the Palm Desert Demonstration program. Overall, the ex-ante unit savings for the Palm Desert Demonstration program was consistent with other similar measures under SCE core programs. This examination was made to confirm that the unit savings were the same for the measures rebated under the Palm Desert Demonstration program and had not been changed from what was being claimed for measures rebated in other SCE programs. There have been cases of other programs, in particular third-party programs, where the unit savings have differed. For this reason, the consultant carried out this comparison.

Table 5-4: 2010-12 Ex Ante UES Savings – Inconsistency Found

SCE Measure Name	Building Type	Climate Zone	PDDP kW UES	SCE kW UES	PDDP kWh UES	SCE kWh UES	PDDP Therm UES	SCE Therm UES
(1) 48in (1) Instant Start Ballast - Normal Light Output T8 Linear Fluorescent replacing (1) 48in T12 Linear Fluorescent	Retail - Small	15	0.015	0.013	54.2	47.7	-0.025	-0.014

5.2 Nonresidential Impact Analysis

5.2.1 Overview of Energy and Demand Savings

Table 5-5 presents the total nonresidential savings claimed under the Palm Desert Demonstration program. Note that the measure groups with the highest energy savings were all related to indoor lighting and accounted for one-third of the overall savings from the nonresidential sector. An examination of the nonresidential sector demand reduction by measure group showed that HVAC coil cleaning was responsible for the largest reduction in peak demand.

Table 5-5: 2010-12 Ex Ante Gross Savings for Nonresidential Measures

Measure Group	Sites	kWh	% of Program	kW	% of Program
Lighting Indoor Linear Fluorescent	393	1,332,668	12.5%	313	11.3%
Lighting Indoor Linear Fluorescent Delamping	274	1,215,882	11.4%	293	10.6%
Lighting Indoor LED Reflector Lamp	196	1,089,616	10.2%	219	7.9%
Ag Pump Overhaul	14	780,642	7.3%	124	4.5%
Lighting Indoor CFL Reflector	104	627,597	5.9%	119	4.3%
Refrigeration Strip Curtain	50	595,688	5.6%	42	1.5%
HVAC Coil Cleaning	14	546,974	5.1%	491	17.7%
Lighting Indoor CFL Basic	109	367,331	3.5%	68	2.5%
Lighting Indoor LED Lamp	145	274,159	2.6%	51	1.8%
Building Envelope Window Film	207	246,888	2.3%	97	3.5%
Lighting Outdoor LED Other	3	169,981	1.6%	0	0.0%
Lighting Indoor Controls Wall or Ceiling Mounted Occupancy Sensor	244	136,461	1.3%	108	3.9%
HVAC Controls Thermostat	40	98,658	0.9%	-19	-0.7%
Plug Load Sensor	9	96,028	0.9%	34	1.2%
Refrigeration Door Closer	40	75,317	0.7%	5	0.2%
Lighting Indoor High Bay Fluorescent	9	60,489	0.6%	17	0.6%
Lighting Indoor LED Other	2	57,583	0.5%	0	0.0%
<i>All Other Nonresidential Measures</i>	202*	219,359	2.1%	15	0.5%
Total	733	7,991,321	75.1%	1,977	71.3%

* This number of sites may be slightly over stated due to sites that installed more than one “other” nonresidential measure.

5.2.2 Measure Installation Verification – Comparison of Phone Survey Responses to Tracking Data

The telephone survey data were used as the primary vehicle for verifying that the measures were installed as reported within the lighting and non-lighting end uses, rebated under the Palm Desert Demonstration program. Telephone surveys were conducted for 93 program participants who had installed lighting and/or non-lighting measures to verify their participation in the program. Verification of participation in the Palm Desert Demonstration program and knowledge of the measures installed were asked early on in the survey and was a requirement to continue on with the survey, thus 100% of sites surveyed verified installation of measures through the Palm Desert Demonstration program. Respondents were also asked to verify the quantity of measures installed resulting in a verification rate of just over 100 percent (101.4 percent).

5.2.3 Net-to-Gross Analysis

Data Sources

This section describes the preliminary results of the net-to-gross phone survey conducted for the nonresidential sector of the Palm Desert Demonstration Program. It is important to note that the net-to-gross methodology and survey questionnaire utilized are consistent with that developed for the evaluation of nonresidential custom measures. These results are based on 121 completed phone interviews of Palm Desert Demonstration nonresidential program participants. Of the 121 surveys, 28 surveys were conducted as part of the nonresidential downstream lighting study.

Calculations

The approach used to for the net-to-gross analysis was consistent with the large nonresidential free ridership approach developed by the Net-to-Gross Ratio Working Group and is documented in Appendix A of this report, “Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers.” This methodology was also used in the CPUC 2010-12 Nonresidential Downstream Lighting Program Evaluation Report. . This approach was thoroughly vetted and was used to develop results for the nonresidential sector of the Palm Desert Demonstration program. The explanations provided below assume knowledge of the approach taken in these memorandums. It is worth noting that some phone survey questions were slightly adjusted to more appropriately reflect the measures installed (i.e. lighting and non-lighting measures).

As discussed in the aforementioned report, the net-to-gross ratio consists of three scores known as PAI_1, PAI_2, and PAI_3. These three scores were averaged and divided by 10 to estimate a net-to-gross ratio:

$$\text{Net-to-gross ratio} = \left(\frac{PAI_1 + PAI_2 + PAI_3}{\text{Number of non-missing scores}} \right) \div 10$$

If one of the scores was missing (generally due to respondents giving a “don’t know” or “refusal” response), then the other two scores were averaged. If two or more scores were missing, the respondent was not used in the calculation. The three scores were calculated in the following way:

- 1) PAI_1: The PAI_1 score is calculated as the highest program influence factor divided by the sum of the highest program influence plus the highest non-program influence factor. Factors included as potentially influencing efficiency were: previous experience with the measure, recommendation from an engineer, standard practice, corporate policy, compliance with rules or regulations, organizational maintenance or equipment replacement policies and “other – specify.” In addition, payback was treated as a program

influence if the respondent said the rebate played a major role in meeting their payback criteria and as a non-program influence if it did not.

- 2) PAI_2: Customers were asked, “How many of...ten points would you give to the importance of the PROGRAM in your decision”? Their response to this question determined PAI_2. The PAI_2 score was reduced by 50 percent if the respondent reported learning about the program and available incentives **after** they had made the decision to install the program qualifying equipment.
- 3) PAI_3: The third score is defined as 10 minus the likelihood that the respondent would have installed the exact same measure/equipment in the absence of the program.

Results

The following results are based on 121 phone survey responses. The net-to-gross ratio results were developed at an aggregated measure group level. These aggregated measure groups were based on the Energy Division (ED) assigned measure groups that came directly from the 2012 Q4 tracking data. A higher level of aggregation was created due to sample size. Table 5-6 presents net-to-gross ratios by aggregate measure group for the customers surveyed.

The overall net-to-gross ratio weighted average of the 121 respondents used for this analysis was 0.61 (weighted by kWh). The average unweighted net-to-gross ratio is 0.63, indicating that the larger projects have smaller net-to-gross ratios, as might be expected. For nonresidential Palm Desert Demonstration program participants, the weighted net-to-gross ratios range from 0.54 and 0.67.

Table 5-6: Palm Desert Demonstration Program Net-to-Gross Ratios by Aggregated Measure Group for the Nonresidential Sector

Aggregated Measure Group	Palm Desert		Sample Size
	Net-to-Gross Ratio (unweighted)	Net-to-Gross Ratio (weighted)	
Ltg - LEDs	0.62	0.57	36
Ltg - Linears	0.68	0.67	48
Ltg - Other	0.59	0.58	13
NonLtg	0.56	0.54	24

Table 5-7 presents a comparison of net-to-gross ratios estimated for aggregated measure groups by program type for SCE nonresidential downstream lighting projects to the net-to-gross ratios estimated for the Palm Desert program for the same aggregated measure group categories. Results for the SCE nonresidential downstream lighting programs were generated by measure and program type for three generalized types of programs. Only deemed measures were included

as those are the vast majority of what was installed through the Palm Desert Demonstration program. As Table 5-7 shows:

- The net-to-gross ratios for LEDs are higher for the Palm Desert Demonstration program than the deemed program and slightly below the direct install program, as might be expected. The Palm Desert program utilized direct marketing campaigns and offered audits which likely led to reaching more customers that may not have been in the market for LEDs. In addition, direct install programs tend to serve customers that are harder-to-reach and may not have considered the installation of LEDs but for the program.
- For linear measures, Palm Desert Demonstration net-to-gross ratios are higher than deemed and about the same for both direct install and local government partnership/third party programs.
- For other lighting measures, Palm Desert Demonstration program net-to-gross ratios are lower than all program types, but this may be a result of the measure mix.

Obviously there are other factors involved in the comparison of net-to-gross ratios, such as building type distributions, but the most relevant comparison, and the one with the most significant sample sizes, would be between linear fluorescents and the local government partnership/third party program. For this segment, results are very comparable, indicating that the Palm Desert Demonstration program is not resulting in significantly higher net-to-gross ratios than comparable programs in SCE territory.

Table 5-7: Comparison Table of Palm Desert Demonstration Program Net-to-Gross Ratios and Nonresidential Downstream Lighting Study Net-to-Gross Ratios by Measure and Program Type (SCE Deemed Measures only)

Aggregated Measure Group	Palm Desert Demonstration Program		Program Type	Nonresidential Downstream Lighting Study for SCE	
	NTG Ratio (unweighted)	NTG Ratio (weighted)		NTG Ratio (unweighted)	NTG Ratio (weighted)
Ltg – LEDs *	0.62	0.57	Core/Statewide Deemed	0.54	-
			Direct Install	0.65	-
Ltg - Linears	0.68	0.67	Core/Statewide Deemed	0.62	0.62
			Direct Install	0.68	0.68
			LGP/Third Party	0.66	0.69
Ltg - Other	0.59	0.58	Core/Statewide Deemed	0.62	0.59
			Direct Install	0.66	0.67
			LGP/Third Party	0.63	0.64

* The LED measure group was not part of the core nonresidential downstream lighting impact evaluation. These net-to-gross ratios for the LED measures were developed for a separate add-on LED Impact Evaluation and no weighting method is in place. These net-to-gross ratios cannot be weighted the same as those developed for the core study due to sampling bias.

Weighting

Participant weights were created using the annual ex-ante kWh savings within the measure group associated with the questions asked in the net-to-gross phone survey battery. Due to the small nonresidential population, the survey was undertaken as a census of the population. The telephone survey data consisted of 121 completes and was a random sample of the census population. No biases or oversampling were found within the completed telephone survey data usage size or measure group, thus the weight applied to the analysis was the respondents' kWh savings within the measure group associated with the questions asked in the net-to-gross ratio phone survey battery. However, the weights were capped at 10,000 kWh to avoid having the results influenced by a single or small number of participants.

5.3 Residential Impact Analysis

5.3.1 Overview of Energy and Demand Savings

Table 5-8 presents the total residential savings claimed under the Palm Desert Demonstration program. Pool pumps yielded the highest energy savings with close to 8 percent of the total kWh savings from the residential sector. The measure group leading to the highest demand reduction was HVAC Tune-Up (RCA).

Table 5-8: 2010-12 Ex Ante Gross Savings for Residential Measures

Measure Group	Sites	kWh	% of Program	kW	% of Program
Pool Pump	815	843,710	7.9%	205	7.4%
Survey Residential Onsite	1,862	593,524	5.6%	128	4.6%
Lighting Indoor CFL Basic	719	329,094	3.1%	48	1.7%
HVAC Tune-Up (RCA)	1,383	323,551	3.0%	258	9.3%
Lighting Indoor CFL Reflector	425	174,564	1.6%	25	0.9%
HVAC Installation	277	120,099	1.1%	36	1.3%
Building Envelope Window Other	90	56,039	0.5%	0	0.0%
HVAC Duct Sealing	200	50,397	0.5%	42	1.5%
Lighting Outdoor CFL Reflector	139	44,473	0.4%	0	0.0%
HVAC Rooftop or Split System	264	37,010	0.3%	36	1.3%
Building Envelope New Windows	12	26,748	0.3%	15	0.5%
<i>All Other Residential Measures</i>	<i>486*</i>	<i>47,279</i>	<i>0.4%</i>	<i>2</i>	<i>0.1%</i>
Total		2,646,488	24.9%	795	28.7%

* This number of sites may be slightly over stated due to sites that installed more than one "other" nonresidential measure.

5.3.2 Measure Installation Verification – Comparison of Phone Survey Responses to Tracking Data

The telephone survey data were used as the source for verifying installation of measures. Telephone surveys were conducted for 123 residential program participants who participated in the Palm Desert Demonstration program, including participants who only participated in taking part in the in home energy audit and did not install any measures. Thirty-one respondents were asked to verify if they had an air conditioner tune-up or maintenance through the Palm Desert Demonstration program and 100% percent verified that they did have an air conditioner tune up or maintenance.

Eighty-three respondents were asked to verify the installation of lighting and/or non-lighting measures through the Palm Desert Demonstration program. Respondents were asked to verify up to three measures: 63 respondents were asked to verify the installation of one measure, 16 respondents were asked to verify the installation of two measures, and 4 respondents were asked to verify the installation of three measures. In total, 138 measures installed through the Palm Desert Demonstration program were asked to be verified. Two respondents replied with “I don’t know,” one for an HVAC installation and another for HVAC duct sealing. All other measures were verified and confirmed as installed.

5.3.3 Net-to-Gross Analysis

Data Sources

This section describes the results of the net-to-gross phone survey conducted for the residential sector of the Palm Desert Demonstration program. These results are based on 88 completed phone interviews of Palm Desert Demonstration program participants.⁵

Calculations

The main goal of the net-to-gross methodology was to describe a participant as either a free-rider or a non-free-rider; only when necessary, partial free-ridership was granted. The net-to-gross ratio consisted of three scores (i.e. FR4AD, FR5911, FR10) and is defined as:

$$Z = \left(\frac{FR4AD + FR5911 + FR10}{\text{Number of non – missing scores}} \right)$$

⁵ There were 123 residential survey completes. Thirty of these were for participants who had in-home energy audits, which did not go through the net-to-gross battery. An additional 4 surveys had zero kWh savings associated with them and should not have been sent as part of the phone survey sample. This left a total of 89 surveys for the net-to-gross analysis. One of the participants did not provide enough information to calculate a net-to-gross ratio, which brings the final total of participants used for the analysis to 88.

$$\text{Net-to-gross ratio} = g(z) = \begin{cases} 1, & z \geq \frac{5}{6} \\ z, & \frac{1}{6} < z < \frac{5}{6} \\ 0, & z \leq \frac{1}{6} \end{cases}$$

- If the average of the three scores was less than or equal to one-sixth then the net-to-gross ratio was zero.
- If the average of the three scores was greater than one-sixth but less than five-sixths, then the net-to-gross ratio was equal to the average computed. For example, if the average of the three scores was one-half, then the net-to-gross ratio would be one-half.
- If the average of the three scores was greater than or equal to five-sixths then the net-to-gross ratio was one.

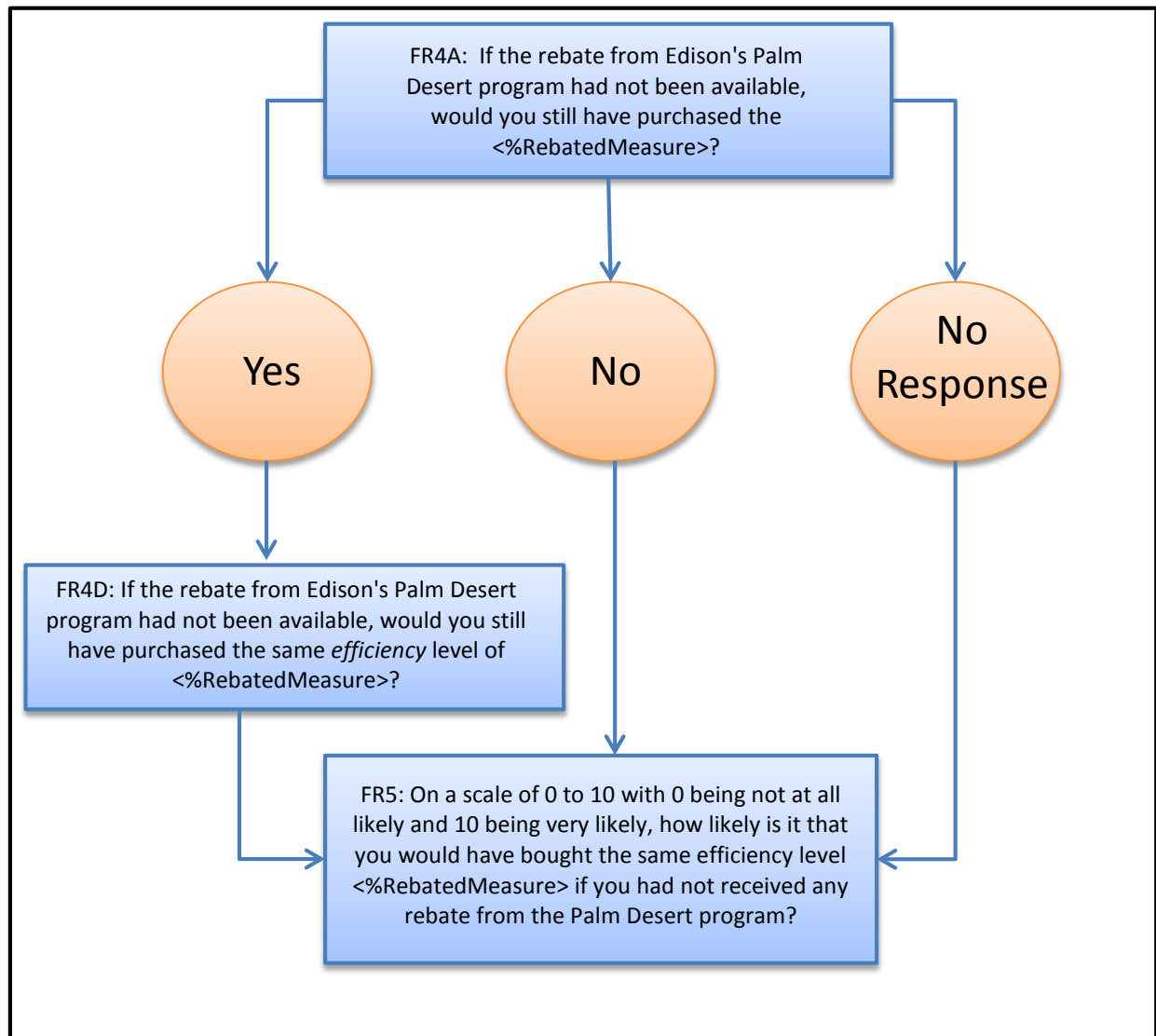
If one of the scores was missing (generally due to respondents giving a “don’t know” or “refusal” response), then the other two scores were averaged. If two or more scores were missing, the respondent was not used in the calculation. The three scores were calculated in the following way:

- 1) FR4AD Score: The FR4AD score is determined by two questions that ask:
 - FR4A: “If the rebate from Edison's Palm Desert program had not been available, would you still have purchased the <%RebatedMeasure>?”

It should be noted that if the respondent participated in an air conditioner tune-up, then nothing was actually installed and instead maintenance on the air conditioning unit was performed. The survey used captures this slight variation and each question is modified appropriately.

If the respondent answers “Yes” to question FR4A, then they are asked FR4D. If the respondent did not say “Yes” to question FR4A, then they are skipped to question FR5 (see Figure 5-2).

Figure 5-2: Question Flow in Program Influence Battery of Phone Survey



- FR4D: “If the rebate from Edison's Palm Desert program had not been available, would you still have purchased the same *efficiency* level of <%RebatedMeasure>?”

If the participant responded “Yes” to question FR4D, this is evidence that the program rebate had little, if any, influence on the respondent’s decision to install the measures. In this case, the FR4AD score would be 0. If the participant responded “No” to either question FR4A or FR4D, then if it hadn’t been for the rebate, they would not have installed the same measure and efficiency level. In this case, a score of 1 would be given. If the participant was not sure on either of the questions, then the score would be left missing.

It is important to keep in mind that asking about efficiency level is not entirely applicable to air conditioner tune-ups. For this reason, only question FR4A was used for air conditioner tune-ups.

- 2) FR5-9-11 Score: After questions FR4A and FR4D, participants were asked questions FR5, FR9, and FR11. These three questions determine the FR5-9-11 Score.
- FR5: “On a scale of 0 to 10 with 0 being not at all likely and 10 being very likely, how likely is it that you would have bought the same efficiency level <%RebatedMeasure> if you had not received any rebate from the Palm Desert program?”
 - If the measure discussed is an air conditioner tune-up then the questions is asked in the following way, “On a scale of 0 to 10 with 0 being not at all likely and 10 being extremely likely, how likely is it that you would have had maintenance performed on your air conditioner if you had not received any rebate from the Palm Desert Program?”

As can be seen, discussing efficiency level is not mentioned when participants are asked about air conditioner tune-ups. For succinctness, only one variation of the question is presented.

- FR9: “On a scale of 0 to 10 where 0 is strongly disagree and 10 is strongly agree, how much do you agree with each statement? If I had not had any assistance from the program, I would have paid the additional amount required to buy the <%RebatedMeasure> on my own.”
- FR11: “On a scale of 0 to 10 where 0 is strongly disagree and 10 is strongly agree, how much do you agree with each statement? I would have bought the energy efficient equipment within a year of when I did even without the rebate from the Edison Palm Desert program.”

A high score for any of the three questions (FR5, FR9, and FR11) are indications of free-ridership and results in a lower FR5-9-11 score. On the other hand, a low score for questions FR5, FR9, and FR11 is evidence that the participant did need the program rebate as an incentive to install the same measure and efficiency level. The FR5-9-11 Score is computed in the following way:

$$X = \frac{(10 - FR5) + (10 - FR9) + (10 - FR11)}{\text{Number of non-missing responses from FR5, FR9, FR11}}$$

$$\text{FR5-9-11 Score} = f(x) = \begin{cases} 1, & x > 6 \\ 0.5, & 4 \leq x \leq 6 \\ 0, & x < 4 \end{cases}$$

From the equation above, if X is greater than 6, then this is an indication of non-free-ridership and the FR5-9-11 Score is set to 1 to indicate net participation. If X is less than 4, then this is an indication of free-ridership and the score is set to 0. However, if X is between 4 and 6, then there is no strong indication of either free-ridership or net participation. Therefore, the FR5-9-11 Score is set to 0.5 to indicate that there is likely to be some free-ridership, but not full free-ridership. If any responses to questions FR5, FR9, or FR11 are missing, then an average of the questions with responses are averaged and set to 0, 0.5, or 1 based on the equation above.

- 3) FR10 Score: The third score seeks to determine the importance of the rebate in the participant's decision and is determined by question FR10:
- FR10: "On a scale of 0 to 10 where 0 is strongly disagree and 10 is strongly agree, how much do you agree with each statement? The rebate from the Edison Palm Desert program was a critical factor in my decision to purchase the energy efficient equipment."

The FR10 score is computed in the following way:

$$\text{FR10 Score} = \begin{cases} 1, & \text{FR10} > 6 \\ 0.5, & 4 \leq \text{FR10} \leq 6 \\ 0, & \text{FR10} < 4 \end{cases}$$

As shown above, if FR10 is greater than 6, this is evidence for net participation and so the FR10 Score is set to 1. If FR10 is less than 4, this is an indication of free-ridership and the score is set to 0. When FR10 is between 4 and 6 though, the FR10 Score is set to 0.5 because there is evidence for some free-ridership, but not full free-ridership.

Overall, we have three scores which are indicators of either free-ridership (i.e. score of 0), net participation (i.e. score of 1), or partial free-ridership/partial net participation (i.e. score of 0.5). Many combinations can occur between these three scores. To illustrate the calculation of the net-to-gross ratio of a participant, a case by case approach can be taken. For cases 1 through 5, it is assumed that no scores are missing (i.e., there is a calculated value for all three scores).

Case 1: All three scores are either 0 or 1.

If all scores are indicators of free-ridership (i.e. FR4AD Score=0, FR5911 Score=0, FR10 Score =0), then there is overwhelming evidence that this participant is a free-rider and should receive a net-to-gross ratio of 0. Similarly, if all scores are 1, then the net-to-gross ratio equals 1.

Case 2: Two scores are 1 and the third score is 0 (or two scores are 0 and the third score is 1).

If two scores indicate net participation and the third score indicates free-ridership, then there is an inconsistency here. Any time there is an inconsistency of this sort where one score indicates net participation (i.e. score of 1) and another score indicates free-ridership (i.e. score of 0) or vice versa, then there is evidence for partial free-ridership and partial net participation. In this case, the net-to-gross ratio would be calculated as an average of the three scores.

Case 3: Two scores are either 0 or 1 and the third score is 0.5.

If two scores indicate net participation and the third score is 0.5 (i.e. a neutral indicator), then since there is no direct contradiction, we will take all three scores as an indication of net participation (i.e. net-to-gross ratio of 1). A similar argument can be made for when two scores indicate free-ridership and the third score is neutral.

Case 4: Two scores are 0.5 and the third score is either 0 or 1.

If two scores came out to be 0.5, which represents an indication of partial free-ridership and partial net participation, and the third score was either 0 or 1, then no definitive conclusion can be made about the participant. In this case, the net-to-gross ratio would be the average of the three scores.

Case 5: All three scores are different (0, 0.5, and 1).

If all three scores are different, then no conclusion can be made of the participant as to whether they are a free-rider or net participant. In this case, the NTGR would be taken as the average of the three scores.

Case 6: Missing Scores.

Out of the 89 participants surveyed, there are 5 participants who have missing scores for only FR4AD, 1 participant missing only an FR10 score, and 1 other participant missing both the FR4AD score and the FR10 score. The participant missing both scores has been removed from the analysis as there is not enough information to conclude a reliable net-to-gross ratio. However, for the other six participants only missing one score, an average of the two non-missing scores was taken. For this reason the final number of participants included in the analysis is 88.

Results

The following results are based on 88 phone survey responses (i.e., out of the 89 total survey responses, one was dropped as previously mentioned in Case 6). The net-to-gross ratio results were developed at an aggregate measure group level. These aggregate measure groups are based on the Energy Division (ED) assigned measure groups that come directly from the 2012 Q4 tracking data. A higher level of aggregation was created due to sample size. Table 5-9 presents net-to-gross ratios by this aggregation of measure group.

The overall net-to-gross ratio weighted average of the 88 respondents used for this analysis was 0.58 (weighted by kWh savings), while the average unweighted net-to-gross ratio is 0.55. As seen in Table 5-9, the weighted net-to-gross ratios range from 0.37 to 0.67.

Table 5-9: Results by Measure Group

Aggregate Measure Group	Palm Desert		Sample Size
	Net-to-Gross Ratio (unweighted)	Net-to-Gross Ratio (weighted)	
Air conditioner tune-up	0.38	0.45	12
Pool Pump	0.58	0.59	31
Lighting	0.63	0.67	30
Other Non-lighting	0.47	0.37	15

A search of recent evaluations was completed to find comparable net-to-gross results of similar customers and programs to that of the residential sector of the Palm Desert Demonstration program, but no such results were found. It is recommended that the net-to-gross results of the residential Palm Desert Demonstration program participants be compared to the 2010-12 ex post evaluation results when finalized for similar programs and customers.

Weighting

Weighting for the net-to-gross results were created using the residential Palm Desert Demonstration program participant's annual ex-ante kWh savings. The kWh weights for each participant within the sample were developed by dividing the total kWh savings of all eligible residential Palm Desert Demonstration program participants in the population for that stratum by the total kWh savings of all surveyed sites in that stratum. The Palm Desert Demonstration program participant population was divided into four net-to-gross strata based on lighting, non-lighting, pool pumps, and HVAC tune-up.

The weight for site i in strata j is:

$$W_i = \frac{\text{Population Stratum kWh}_j}{\text{Sample Stratum kWh}_j}$$

where:

The denominator is summed from i to the number of sampled participants in the strata. This provides each participant within a stratum the same weight, but each stratum's weight is dependent on the total participant kWh savings in the Palm Desert Demonstration residential population of that stratum.

6

Program Findings and Recommendations

This section of the report first presents selected findings about the Palm Desert Demonstration program from the evaluation. Recommendations are then made based on the findings. Because the Palm Desert Demonstration program concluded at the end of 2012, the recommendations are more general in nature and can be considered for similar SCE pilot programs and partnerships that are carried out in the future.

6.1 Findings

Findings were made about the Palm Desert Demonstration program throughout the program assessment, process evaluation, and impact evaluation conducted by the consultant. This subsection describes some of the findings regarding the following:

- Effect of home energy audits provided by the program,
- Performance of the Palm Desert Demonstration program relative to other SCE residential, nonresidential, and LGP programs in its energy efficiency portfolio of programs,
- Depth of retrofits achieved through the Palm Desert Demonstration program,
- Customer awareness and satisfaction with the Palm Desert Demonstration program,
- Energy savings and peak demand reductions resulting from the program, and
- Degree of free-ridership found in the residential and nonresidential Palm Desert Demonstration program populations.

6.1.1 Program Assessment

In-Home Energy Audits

One of the overarching principals of the Palm Desert Demonstration program was to provide residential customers with energy efficiency audits that recommended a variety of energy efficiency behavioral modifications and energy efficiency equipment installations and maintenance in an effort to obtain deep retrofits. Of the 123 residential participants who completed the survey, approximately 70 percent confirmed that an energy audit of their home was performed.

The survey asked residential participants why they decided to have in-home audits performed. Based on survey responses, the main reasons reported were to save money, address causes of high energy bills, out of concern for the environment, and for the rebate/incentive paid to them to have one performed.

Respondents were also asked about whether the survey made any recommendations related to the replacement of appliances/equipment or changes in behavior (such as turning off lights when not in use, opening windows instead of using the AC) to save energy. About 55 percent of the respondents noted that recommendations to replace equipment and/or appliances were made.

Slightly less than half of the respondents (47 percent) stated that behavioral modification recommendations were made. Recommendations from audits were related to changing to CFLs and to turning off lights when not in use.

Of the respondents who indicated whether or not they implemented the recommendations made during the in-home audits they received, more respondents stated that they followed the recommendations than those who said they did not. Note that the number of respondents was small for this finding.

Context of the Palm Desert Demonstration Program in SCE's Energy Efficiency Portfolio

In order to gain a sense of the performance of the Palm Desert Demonstration program, a presentation of selected SCE energy efficiency programs in addition to the Palm Desert Demonstration program was made in Section 3. A selection of residential, commercial, and local government partnership programs (LGPs) was used since the Palm Desert Demonstration program is a local government partnership that, like other LGPs, serves the residential and nonresidential sectors.¹ The SCE programs included in the assessment are presented in Table 6-1. The budgets, expenditures, goals, and energy savings and demand reduction achievements were presented for each of these programs. Also included in the program assessment are measures of cost effectiveness and the proportion of budgets dedicated to administrative costs, marketing and outreach (M&O) costs, and direct implementation costs.

¹ Note that in Advice Letter 2548-E-A dated July 29, 2011, the CPUC requested that the Palm Desert Demonstration program be reclassified as a pilot. See Section 3 for further details.

Table 6-1: SCE Core Statewide and Local Government Partnership Programs Included in Palm Desert Demonstration Partnership Program Assessment

Program ID	Program Name
SCE-L-004	Palm Desert Demonstration Partnership
Residential	
SCE-SW-001A	Home Energy Efficiency Survey Program
SCE-SW-001D	Home Energy Efficiency Rebate Program
Commercial	
SCE-SW-002B	Calculated Incentives Program
SCE-SW-002C	Deemed Incentives Program
SCE-SW-002D	Commercial Direct Install Program
LGP	
SCE-L-004I	Desert Cities Energy Leader Partnership
SCE-L-004M	Orange County Cities Energy Leader Partnership
SCE-L-004Q	South Bay Energy Leader Partnership
SCE-L-004S	Ventura County Energy Leader Partnership

Approximately \$6.5 million of the Palm Desert Demonstration program budget of \$8.8 million was spent during the program cycle. Some programs, such as the Home Energy Efficiency Survey (HEES) program and the Commercial Deemed Incentives program spent more than their budgeted amounts, while others, such as the Calculated Incentives program and the Calculated Direct Install program spent less. The sample of local government partnerships (LGPs) included in the assessment spent between 40 percent and 72 percent of their budgets (excluding the Palm Desert Demonstration program, which spent 74 percent of its budget).

When an examination of energy savings and demand reduction goals was made, the data showed that the Palm Desert Demonstration program saved 56 percent of its energy savings goal of 19 GWh and 48 percent of its demand reduction goal of 5.8 MW. All of the commercial programs met or exceeded their goals (with the exception of the Calculated Incentives program which met 90 percent of its demand reduction goal) as did the residential HEES program. None of the LGPs presented in this assessment met their energy savings or peak demand reduction goals. The ones included in this assessment saved between 25 percent and 63 percent of their planned kWh savings and between 23 percent and 68 percent of the kW savings.

As an innovative partnership pilot, the cost of the Palm Desert Demonstration program is expected to be relatively higher and the data presented in the program assessment show that to be the case. It was the most expensive of the LGP programs offered by SCE during the 2010-2012 program cycle (both in terms of budgets and actual expenditures). Also notable is that the proportion of the total budget allocated to administration and marketing and outreach were relatively small when compared to other LGP programs. However, the TRC test for the Palm

Desert Demonstration program is approximately 0.59 which is in line with the other local government partnerships.

Depth of Retrofit

One of the goals of the Palm Desert Demonstration program was to implement deeper or more comprehensive retrofits than is commonly achieved through other programs. To determine if the Palm Desert Demonstration program achieved deeper or more comprehensive retrofits than were achieved by other programs, the measures of depth of retrofit (average number of end uses installed and average savings per site) from the Palm Desert Demonstration program were compared with similar measurements from other SCE programs.

Based on the depth of retrofit measures calculated for this analysis, the Palm Desert Demonstration program nonresidential participants do not show statistically significantly larger savings than participants in other SCE programs. However, Palm Desert Demonstration program residential participants did show larger savings than participants in other SCE programs at a significance level of 95 percent.

6.1.2 Process Evaluation

The process evaluation of the Palm Desert Demonstration program focused on determining program awareness and satisfaction using the residential and nonresidential survey instruments.

Residential Process Evaluation Findings

Residential participants reported that the primary way they first heard about the Palm Desert Demonstration program through word of mouth. This finding was not expected considering the amount of “Set to Save” branding undertaken by the City of Palm Desert and SCE. Other sources that were useful included SCE bill inserts, vendors/contractors who install equipment and program literature (which could include brochures from SCE or the City of Palm Desert describing the program). Residential customers noted that they were very satisfied with the program overall. Of the 93 responses received, 74 percent stated that they were very satisfied with an additional 16 percent noting that they were somewhat satisfied with the program. The high satisfaction ratings provide evidence to support the benefits of implementing a program that incorporates community outreach and customer facing visits.

Nonresidential Process Evaluation Findings

A comparison of survey responses from nonresidential participants of the Palm Desert Demonstration program and SCE’s downstream lighting program was made in this evaluation. A comparison of results from these programs is made because over half of the Palm Desert Demonstration program energy savings from the nonresidential sector are from downstream

lighting measures. This makes the survey results from these two programs comparable to some degree.

Nonresidential customers noted that the most common source from which they learned about the Palm Desert Demonstration program was an SCE program representative. Approximately 29 percent of respondents gave this response. This was also the most common source from which nonresidential lighting program participants learned about the program. In this case, 23 percent of respondents noted this as the first way they learned about this particular program.

A main reason customers participated in the Palm Desert Demonstration program as well as the downstream lighting program was to reduce energy costs. In fact, three of every four respondents of both programs reported this as the reason why they elected to participate in their programs.

An overwhelming majority of participants in both programs were satisfied with their experiences. Over 80 percent of Palm Desert Demonstration program participants said they were very satisfied with an additional 16 percent stating that they were somewhat satisfied. No participants of the Palm Desert program noted that they were very dissatisfied. Approximately 70 percent of nonresidential lighting program participants were very satisfied with the program overall and an additional 25 percent noted that they were somewhat satisfied. Less than 1 percent of participants said they were very dissatisfied with their program experience.

6.1.3 Impact Evaluation

The impact evaluation of the Palm Desert Demonstration program relied upon data collected through the phone surveys since no onsite surveys were performed for this study. This section includes an overview of energy and demand savings and a presentation of net-to-gross ratios. The Palm Desert Demonstration program was comprised of pilot initiatives that targeted either the residential or nonresidential sectors, so the impact evaluation findings are presented by these sectors below.

Nonresidential Impact Evaluation Findings

The Palm Desert Demonstration program energy savings goals for the nonresidential pilot initiatives made up a quarter of the total energy savings goals; however, these pilots achieved a majority of the total energy savings of the program. Together, the Commercial Rebates, Commercial Strategy, and Small Business Direct Install pilot initiatives resulted in energy savings of almost 8 GWh, which is 163 percent of the nonresidential pilot initiatives energy savings goal of 4.9 GWh (see Table 6-2). As discussed in Section 5, the measure groups that resulted in the most energy savings for the nonresidential sector were indoor lighting measures.

Table 6-2: High Level Palm Desert Demonstration Program Nonresidential Sector Energy Savings

Nonresidential Pilot Initiatives	kWh – Planned	kWh – Reported	Reported/Planned
Commercial Rebates	840,000	7,991,321	163%
Commercial Strategy	2,361,937		
Small Business Direct Install	1,689,626		
Total	4,891,563	7,991,321	163%

The nonresidential net-to-gross analysis estimated net-to-gross ratios using survey data from 121 nonresidential participants. Of the 121 nonresidential Palm Desert Demonstration program surveys, 28 surveys were conducted as part of the California IOU nonresidential downstream lighting study and could therefore be added to the Palm Desert Demonstration program net-to-gross analysis. The net-to-gross results were developed at an aggregated measure group level of segmentation based upon Energy Division (ED) assigned measure groups that came directly from the 2012 Q4 tracking data. The following aggregated measure groups were used for the nonresidential sector net-to-gross analysis:

- Lighting – LEDs,
- Lighting – Linear Fluorescents,
- Lighting – Other, and
- Non-Lighting.

Unweighted and weighted net-to-gross ratios were estimated for these groups and were presented in Section 5. The overall net-to-gross ratio weighted average of the 121 respondents used for this analysis was 0.61 (weighted by kWh). The average unweighted net-to-gross ratio was 0.63, indicating that the larger projects have smaller net-to-gross ratios, as might be expected. For nonresidential Palm Desert Demonstration program participants, the weighted net-to-gross ratios ranged from 0.54 and 0.67.

The net-to-gross ratios for the Palm Desert Demonstration program were compared against net-to-gross ratios calculated for the CPUC nonresidential downstream lighting evaluation for SCE projects only. Results were generated by measure and program type for three generalized types of programs. Only deemed measures are included as those are the vast majority of what was installed through the Palm Desert Demonstration program. A comparison of the ratios led to the following findings:

- The net-to-gross ratios for LEDs are higher for the Palm Desert Demonstration program than the deemed program and slightly below the direct install program, as might be expected. The Palm Desert program utilized direct marketing campaigns and offered

audits which likely led to reaching more customers that may not have been in the market for LEDs. In addition, direct install programs tend to serve customers that are harder-to-reach and may not have considered the installation of LEDs but for the program.

- For linear measures, the Palm Desert Demonstration program net-to-gross ratios are higher than deemed and about the same for both direct install and LGP/L3P.
- For other lighting measures, the Palm Desert Demonstration program net-to-gross ratios are lower than all program types, but this may be a result of the measure mix.

The full comparison of results can be found in Section 5.2.3.

Residential Impact Evaluation Findings

The three residential pilot initiatives in the Palm Desert Demonstration program were the One Stop Shop for Pool Pumps, Energy Efficiency Upgrade, and Residential Rebates. Approximately three-fourth of the overall Palm Desert Demonstration program energy savings goals were planned to come from the residential sector pilot initiatives; however these pilots only achieved 19 percent of their goals. The energy savings goals were 13.9 GWh and reported savings were 2.6 GWh (see Table 6-3). The measure groups that contributed the most to Palm Desert Demonstration program residential sector energy savings were pool pumps, in-home energy audits, and indoor CFL lighting.

Table 6-3: High Level Palm Desert Demonstration Program Residential Sector Energy Savings

Residential Pilot Initiatives	kWh – Planned	kWh – Reported	Reported/Planned
One Stop Shop for Pool Pumps	4,875,541	843,710	17%
Energy Efficiency Upgrade	4,441,056	1,802,777	20%
Residential Rebates	4,593,117		
Total	13,909,714	2,646,487	19%

In addition to reviewing the energy savings that came from the residential sector, the evaluation team estimated net-to-gross ratios for residential sector aggregated measure groups. The net-to-gross ratios were estimated using data from 88 completed residential surveys. The groups for which net-to-gross ratios were estimated were:

- Air conditioning tune-up,
- Pool pumps,
- Lighting, and
- Non-Lighting.

The overall net-to-gross ratio weighted average of the 88 respondents used for this analysis was 0.58 (weighted by kWh savings), while the average unweighted net-to-gross ratio is 0.55. The weighted net-to-gross ratios for the above listed aggregated measure groups range from 0.37 to 0.67.

As mentioned in Section 5.3.3, no residential net-to-gross results of customers and programs similar to the Palm Desert Demonstration program could be found for comparison purposes. It is recommended that the net-to-gross results of the residential Palm Desert Demonstration program participants be compared to the 2010-12 ex post evaluation results when finalized for similar programs and customers.

6.2 High Level Findings and Recommendations

Though the Palm Desert Demonstration program concluded at the end of 2012, programs and partnerships with similar program designs and implementation strategies can apply the recommendations made in this study. The recommendations below are meant to be more general in nature since they cannot be applied to the Palm Desert Demonstration program now that it has ended. Each recommendation is paired with a high level finding made in this evaluation.

Finding #1: Residential participants claimed that the main reasons they elected to have in-home energy audits were to save money and address causes of high energy bills. The Palm Desert Demonstration program emphasized the monetary benefits of home energy audits through its marketing and outreach campaign carried out throughout the life of the program.

Recommendation #1: Based on this finding, this evaluation recommends that programs with an in-home audit component be marketed as a way to save money on energy bills, just as the Palm Desert Demonstration program was. By emphasizing the cost savings achieved through the installation of energy efficient equipment and changes in energy usage, customers may be more willing to allow their utility to conduct audits. The message of saving money is expected to resonate well with customers since this was the main motivation for having in-home energy audits.

Finding #2: Survey findings showed that approximately half of the residential respondents who recall receiving recommendations from in-home audits took action to either replace equipment or modify their behavior to reduce energy use. The most common equipment change recommendation taken was to replace old lighting with CFLs and the most common behavioral modification recommendation was to turn off lights when not in use. Other equipment change recommendations made through the audits included replacement of inefficient refrigerators and swimming pool pumps. Behavioral modification recommendations included opening windows

instead of relying on air conditioners and unplugging digital clocks and household appliances with digital displays.

Recommendation #2: Programs that employ in-home audits should make sure to not only recommend changes with regard to lighting and lighting use, but also should emphasize the benefits of making other equipment replacements such as appliances and pool pumps whether these are available through the same program or other SCE programs. These recommendations were also made during in-home audits and should continue as they lead to energy savings as well. Behavior modifications should also be heavily encouraged since they do not require customers to make upfront outlays of capital.

Finding #3: The One Stop Shop for Pool Pumps pilot initiative was designed to simplify the process of switching out single speed inefficient pool pumps with variable speed pool pumps. A single phone number was made available to residential participants through the Palm Desert Demonstration program that would begin the process of making this change.

Recommendation #3: The simplified process of setting up a single hotline to help customers replace inefficient energy using equipment should be considered for other measures that could lead to high energy savings or demand reductions. As mentioned by a City of Palm Desert official who helped with the implementation of the program, this model of program implementation should be considered for other heavily used measures such as HVAC or HVAC tune-ups (since HVAC tune-up was the measure responsible for the largest demand reduction for the residential sector).

Finding #4: The energy savings goals for the Palm Desert Demonstration program were weighted more heavily towards the residential sector; however, the nonresidential sector was responsible for approximately 75 percent of the total energy savings from this program. This likely stems from differences in the way the program was marketed to the two sectors. As noted in Section 3, word of mouth was the predominant way residential customers heard about the program at only 15 percent, while nonresidential customers heard about the program through SCE program representatives (29 percent), vendors and contractors (25 percent), and from an email or letter from the utility or the City of Palm Desert (14 percent).

Budgets of a number of core residential and commercial programs and LGPs offered by SCE were compared in Section 3. Based on the comparison it was clear that the proportion of the Palm Desert Demonstration program budget allocated to marketing and outreach was extremely small when compared to other LGPs.

Recommendation #4: Based on the energy savings achieved by the non-residential sector relative to the residential sector from Palm Desert Demonstration program participants, the evaluation team recommends that the method of marketing used for nonresidential

customers should be considered for residential customers to achieve higher energy savings from this sector. Additionally, the proportion of the Palm Desert Demonstration program budget allocated to marketing and outreach (M&O) should be increased as a way to reach residential customers and encourage their participation in the program and, as a result, meet the residential pilot initiative energy savings goals.

This evaluation has examined the performance of the program and based upon the findings, it is clear that the program had some moderate successes. It surpassed the energy savings goals that were established for the nonresidential sector (it achieved 163 percent of its nonresidential savings goal). It led to deeper retrofits for the residential sector relative to other SCE programs and comparable retrofits in the nonresidential sector to those performed through other SCE programs. Additionally, participants were highly satisfied with the program overall.

While the program performed well in these ways, there are factors that temper the successes of the program. The program overall only achieved 56 percent of its energy savings goal but spent 74 percent of its budget. More specifically, the residential sector achieved 19 percent of its energy savings goal. The cost/kWh was \$0.61, which was one of the higher values of the programs presented in the program assessment. The TRC test for the Palm Desert Demonstration program was equal to 0.59, which was lower than the residential and nonresidential programs in the assessment but comparable to other LGPs carried out in SCE's service territory.

Overall, the Palm Desert Demonstration program does not really stand apart from the majority of the other LGP programs, except in a couple of ways. This program did work with the City of Palm Desert to develop a brand-identity marketing campaign called "Set to Save" to promote the availability of energy efficiency rebates, while most other LGPs do little marketing and outreach of the availability of SCE rebates through its core programs. It also used a single hotline number to help residential customers participate in the One Stop Shop for Pool Pumps and replace single speed pumps with variable speed ones.

However, the aspects of the program that were successful did not reveal many significant differences in approaches or new best practices in program delivery, nor were the results significantly better than any other LGP program. Given that this program was allocated significantly more budget than any other LGP program SCE offered, it would be difficult to justify a similar allocation of program funds unless it could be shown that there was significantly more remaining market potential in the Palm Desert Demonstration program territory relative to other LPG program territories.

Appendix A

NTGR Working Group Framework for NTG Analysis

Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers

**Prepared for the Energy Division, California Public Utilities
Commission**

By

The Nonresidential Net-To-Gross Ratio Working Group

October 16, 2012

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Appendix A: References

Acknowledgments

As part of the evaluation of the 2010-12 energy efficiency programs designed and implemented by the four investor-owned utilities (Pacific Gas & Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas and Electric Company) and third parties, the Energy Division of the California Public Utilities Commission (CPUC) re-formed the nonresidential net-to-gross ratio working group that was originally formed during the PY2006-2008 evaluation. The main purpose of this group was to further refine and improve the standard net-to-gross methodological framework that was developed during the PY2006-2008 evaluation cycle. This framework includes decision rules, for integrating in a systematic and consistent manner the findings from both quantitative and qualitative information in estimating net-to-gross ratios. The working group, listed alphabetically, is composed of the following evaluation professionals:

- Jennifer Fagan, Itron, Inc.
- Nikhil Gandhi, Strategic Energy Technologies, Inc.
- Kay Hardy, Energy Division, CPUC
- Jeff Hirsch, James J. Hirsch & Associates
- Richard Ridge, Ridge & Associates
- Mike Rufo, Itron, Inc.
- Claire Palmgren, KEMA
- Valerie Richardson, KEMA
- Philippus Willems, PWP, Inc.

A public webinar was conducted to obtain feedback from the four investor-owned utilities and other interested stakeholders. The questionnaire was then pre-tested and, based on the pre-test results, finalized in December 2011.

1. OVERVIEW OF THE LARGE NONRESIDENTIAL FREE RIDERSHIP APPROACH

The methodology described in this section was developed to address the unique needs of Large Nonresidential customer projects developed through energy efficiency programs offered by the four California investor-owned utilities and third-parties. This method relies exclusively on the Self-Report Approach (SRA) to estimate project and program-level Net-to-Gross Ratios (NTGRs), since other available methods and research designs are generally not feasible for large nonresidential customer programs. This methodology provides a standard framework, including decision rules, for integrating findings from both quantitative and qualitative information in the calculation of the net-to-gross ratio in a systematic and consistent manner. This approach is designed to fully comply with the *California Energy Efficiency Evaluation: Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals* (Protocols) and the *Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approaches* (Guidelines).

This approach preserves the most important elements of the approaches previously used to estimate the NTGRs in large nonresidential customer programs. However, it also incorporates several enhancements that are designed to improve upon that approach, for example:

- The method incorporates a 0 to 10 scoring system for key questions used to estimate the NTGR, rather than using fixed categories that are assigned weights.
- The method asks respondents to jointly consider and rate the importance of the many likely events or factors that may have influenced their energy efficiency decision making, rather than focusing narrowly on only their rating of the program's importance. This question structure more accurately reflects the complex nature of the real-world decision making and should help to ensure that all non-program influences are reflected in the NTGR assessment in addition to program influences.

It is important to note that the NTGR approach described in this document is a general framework, designed to address all large nonresidential programs. In order to implement this approach on a program-specific basis, it also needs to be customized to reflect the unique nature of the individual programs.

2. BASIS FOR SRA IN SOCIAL SCIENCE LITERATURE

The social sciences literature provides strong support for use of the methods used in the SRA to assess program influence. As the *Guidelines* notes,

More specifically, the SRA is a mixed method approach that involves asking one or more key participant decision-makers a series of structured and open-ended questions about whether they would have installed the same EE equipment in the

absence of the program as well as questions that attempt to rule out rival explanations for the installation (Weiss, 1972; Scriven, 1976; Shadish, 1991; Wholey et al., 1994; Yin, 1994; Mohr, 1995). In the simplest case (e.g., residential customers), the SRA is based primarily on quantitative data while in more complex cases the SRA is strengthened by the inclusion of additional quantitative and qualitative data which can include, among others, in-depth, open-ended interviews, direct observation, and review of program records. Many evaluators believe that additional qualitative data regarding the economics of the customer's decision and the decision process itself can be very useful in supporting or modifying quantitatively-based results (Britan, 1978; Weiss and Rein, 1972; Patton, 1987; Tashakkori and Teddlie, 1998).¹

More details regarding the philosophical and methodological underpinnings of this approach are in Ridge, Willems and Fagan (2009), Ridge, Willems, Fagan and Randazzo (2009) and Megdal, Patil, Gregoire, Meissner, and Parlin (2009). In addition to these two articles, Appendix A provides an extensive listing of references in the social sciences literature regarding the methods employed in the SRA.

3. FREE RIDERSHIP ANALYSIS BY PROJECT TYPE

There are three levels of free-ridership analysis. The most detailed level of analysis, the **Standard – Very Large Project** NTGR, is applied to the largest and most complex projects (representing 10 to 20% of the total) with the greatest expected levels of gross savings² The **Standard** NTGR, involving a somewhat less detailed level of analysis, is applied to projects with moderately high levels of gross savings. The least detailed analysis, the **Basic** NTGR, is applied to all remaining projects. Evaluators must exercise their own discretion as to what the appropriate thresholds should be for each of these three levels.

4. SOURCES OF INFORMATION ON FREE RIDERSHIP

There are five sources of free-ridership information in this study. Each level of analysis relies on information from one or more of these sources. These sources are described below.

1. **Program Files.** As described in previous sections of this report, programs often maintain a paper file for each paid application. These can contain various pieces of information which are relevant to the analysis of free-ridership, such as letters written by the utility's customer representatives that document what the customer had planned to do in the absence of the rebate and explain the customer's motivation for implementing the efficiency measure. Information on the measure payback with and without the rebate may also be available.

¹ *Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approaches*, October 15, 2007, pg. 3.

² Note that we do not refer to an Enhanced level of analysis, since this is defined by the Protocols to involve the application of two separate analysis approaches, such as billing analysis or discrete choice modeling.

2. **Decision-Maker Surveys.** When a site is recruited, one must also determine who was involved in the decision-making process which led to the implementation of measures under the program. They are asked to complete a Decision Maker survey. This survey obtains highly structured responses concerning the probability that the customer would have implemented the same measure in the absence of the program. First, participants are asked about the timing of their program awareness relative to their decision to purchase or implement the energy efficiency measure. Next, they are asked to rate the importance of the program versus non-program influences in their decision making. Third, they are asked to rate the significance of various factors and events that may have led to their decision to implement the energy efficiency measure at the time that they did. These include:

- the age or condition of the equipment,
- information from a feasibility study or facility audit
- the availability of an incentive or endorsement through the program
- a recommendation from an equipment supplier, auditor or consulting engineer
- their previous experience with the program or measure,
- information from a program-sponsored training course or marketing materials provided by the program
- the measure being included as part of a major remodeling project
- a suggestion from program staff, a program vendor, or a utility representative
- a standard business practice
- an internal business procedure or policy
- stated concerns about global warming or the environment
- a stated desire to achieve energy independence.

In addition, the survey obtains a description of what the customer would have done in the absence of the program, beginning with whether the implementation was an early replacement action. If it was not, the decision maker is asked to provide a description of what equipment would have been implemented in the absence of the program, including both the efficiency level and quantities of these alternative measures. This is used to adjust the gross engineering savings estimate for partial free ridership, as discussed in Section 5.2.

This survey contains a core set of questions for **Basic** NTGR sites, and several supplemental questions for both **Standard** and **Standard – Very Large** NTGR sites. For example, if a Standard or Standard-Very Large respondent indicates that a financial calculation entered highly into their decision, they are asked additional questions about their *financial criteria* for investments and their rationale for the current project in light of them. Similarly, if they respond that a *corporate policy* was a primary consideration in their decision, they are asked a series of questions about the specific policy that led to their adoption of the installed measure. If they indicate the installation was a *standard practice*, there are supplemental questions to understand the origin and evolution of that standard practice within their

organization. These questions are intended to provide a deeper understanding of the decision making process and the likely level of program influence versus these internal policies and procedures. Responses to these questions also serve as a basis for consistency checks to investigate conflicting answers regarding the relative importance of the program and other elements in influencing the decision. In addition, **Standard – Very Large** sites may receive additional detailed probing on various aspects of their installation decision based on industry- or technology-specific issues, as determined by review of other information sources. For Standard-Very Large sites all these data are used to construct an internally consistent “story” that supports the NTGR calculated based on the overall information given.

3. **Vendor Surveys.** A Vendor Survey is completed for all **Standard** and **Standard-Very Large** NTGR sites that utilized vendors, and for **Basic** NTGR sites that indicate a high level of vendor influence in the decision to implement the energy efficient measure. For those sites that indicate the vendor was very influential in decision making, the vendor survey results enter directly into the NTGR scoring. The vendor survey findings are also be used to corroborate Decision Maker findings, particularly with respect to the vendor’s specific role and degree of influence on the decision to implement the energy efficient measure. Vendors are queried on the program’s significance in their decision to recommend the energy efficient measures, and on their likelihood to have recommended the same measure in the absence of the program. Generally, the vendors contacted as part of this study are contractors, design engineers, distributors, and installers.
4. **Utility and Program Staff Interviews.** For the Standard and Standard-Very Large NTGR analyses, interviews with utility staff and program staff are also conducted. These interviews are designed to gather information on the historical background of the customer’s decision to install the efficient equipment, the role of the utility and program staff in this decision, and the name and contact information of vendors who were involved in the specification and installation of the equipment.
5. **Other information.** For **Standard – Very Large Project** NTGR sites, secondary research of other pertinent data sources is performed. For example, this could include a review of standard and best practices through industry associations, industry experts, and information from secondary sources (such as the U.S. Department of Energy's Industrial Technologies Program, Best Practices website URL, <http://www1.eere.energy.gov/industry/bestpractices/>). In addition, the Standard- Very Large NTGR analysis calls for interviews with other employees at the participant’s firm, sometimes in other states, and equipment vendor experts from other states where the rebated equipment is being installed (some without rebates), to provide further input on standard practice within each company.

Table 1 below shows the data sources used in each of the three levels of free-ridership analysis. Although more than one level of analysis may share the same source, the amount of information that is utilized in the analysis may vary. For example, all three levels of analysis obtain core question data from the Decision Maker survey.

Table 1: Information Sources for Three Levels of NTGR Analysis

	Program File	Decision Maker Survey Core Question	Vendor Surveys	Decision Maker Survey Supplemental Questions	Utility & Program Staff Interviews	Other Research Findings
Basic NTGR	√	√	√ ¹		√ ²	
Standard NTGR	√	√	√ ¹	√	√	
Standard NTGR - Very Large Projects	√	√	√ ³	√	√	√

¹Only performed for sites that indicate a vendor influence score (N3d) greater than maximum of the other program element scores (N3b, N3c, N3g, N3h, N3l).

²Only performed for sites that have a utility account representative

³Only performed if significant vendor influence reported or if secondary research indicates the installed measure may be becoming standard practice.

A copy of the complete survey forms (with lead-in text and skip patterns) are available upon request.

5. NTGR FRAMEWORK

The Self-Report-based Net-to-Gross analysis relies on responses to a series of survey questions that are designed to measure the influence of the program on the participant's decision to implement program-eligible energy efficiency measure(s). Based on these responses, a NTGR is derived based on responses to a set of "core" NTGR questions.

5.1. NTGR Questions and Scoring Algorithm

A self-report NTGR is computed for all NTGR levels using the following approach. Adjustments may be made for **Standard – Very Large** NTGR sites, if the additional information that is collected is inconsistent with information provided through the Decision Maker survey.

The NTGR is calculated as an average of three scores. Each of these scores represents the highest response or the average of several responses given to one or more questions about the decision to install a program measure.

- **Program attribution index 1 (PAI-1) score** that reflects the influence of the **most important** of various program and program-related elements in the

customer's decision to select the specific program measure at this time. Program influence through vendor recommendations is also incorporated in this score.

- **Program attribution index 2 (PAI-2) score** that captures the perceived importance of the program (whether rebate, recommendation, training, or other program intervention) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score is determined by asking respondents to assign importance values to both the program and most important non-program influences so that the two total 10. The program influence score is adjusted (i.e., divided by 2) if respondents say they had already made their decision to install the specific program qualifying measure before they learned about the program.
- **Program attribution index 2 (PAI-3) score** that captures the likelihood of various actions the customer might have taken at this time and in the future if the program had not been available (the counterfactual).

When there are multiple questions that feed into the scoring algorithm, as is the case for both the **PAI-1** and **PAI-3** scores, the maximum score is always used. The rationale for using the maximum value is to capture the most important element in the participant's decision making. Thus, each score is always based on the strongest influence indicated by the respondent. However, high scores that are inconsistent with other previous responses trigger consistency checks and can lead to follow-up questions to clarify and resolve the discrepancy.

The calculation of each of the above scores is discussed below. For each score, the associated questions are presented and the computation of each score is described.

5.1.1. PAI-1 score

For the Decision Maker, the questions asked are:

I'm going to ask you to rate the importance of the program as well as other factors that might influence your decision to implement [MEASURE.] Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means not at all important and 10 means very important, so that an importance rating of 8 shows twice as much influence as a rating of 4.

Now, using this 0 to 10 rating scale, where 0 means "Not at all important" and 10 means "Very important," please rate the importance of each of the following in your decision to implement this specific [MEASURE] at this time.

- Availability of the PROGRAM rebate
- Information provided through a recent feasibility study, energy audit or other types of technical assistance provided through PROGRAM
- Information from PROGRAM training course

- Information from other PROGRAM marketing materials
- Suggestion from program staff
- Suggestion from your account rep
- Recommendation from a vendor/supplier (If a score of greater than 5 is given, a vendor interview is triggered)

For the Vendor, the questions asked (if the interview is triggered) are:

I'm going to ask you to rate the importance of the [PROGRAM] in influencing your decision to recommend [MEASURE] to [CUSTOMER] and other customers. Think of the degree of importance as being shown on a scale with equally spaced units from 0 to 10, where 0 means not at all important and 10 means very important, so that an importance rating of 8 shows twice as much influence as a rating of 4.

1. Using this 0 to 10 scale where 0 is "Not at all important" and 10 is "Very Important," how important was the PROGRAM, including incentives as well as program services and information, in influencing your decision to recommend that CUSTOMER install the energy efficiency MEASURE at this time?
2. And using a 0 to 10 likelihood scale, where 0 denotes "not at all likely" and 10 denotes "very likely," if the PROGRAM, including incentives as well as program services and information, had not been available, what is the likelihood that you would have recommended this specific energy efficiency MEASURE to CUSTOMER?
3. Now, using a 0 to 100 percent scale, in what percent of sales situations did you recommend MEASURE before you learned about the [PROGRAM]?
4. And using the same 0 to 100 percent scale, in what percent of sales situations do you recommend MEASURE now that you have worked with the [PROGRAM]?
5. And, using the same 0 to 10 scale where 0 is "Not at all important" and 10 is "Very important", how important in your recommendation were:
 - a. Training seminars provided by UTILITY?
 - b. Information provided by the UTILITY website?
 - c. Your firm's past participation in a rebate or audit program sponsored by UTILITY?

If the Vendor interview is triggered, a score is calculated that captures the highest degree of program influence on the vendor's recommendation. This score (VMAX) is calculated as the MAXIMUM value of the following:

1. The response to question 1
2. 10 minus the response to question 2
3. The response to question 4 minus the response to question 3, divided by 10
4. The response to question 5a.
5. The response to question 5b.
6. The response to question 5c.

Note that vendors are asked an additional question regarding other ways that their recommendations regarding the measure might have been influenced. Their responses are not used in the direct calculation of the NTGR but are potentially useful in making adjustments to the core NTGR.

The PAI-1 score is calculated as:

The highest program influence score divided by the sum of the highest program influences (i.e., the responses to the first six decision maker questions) plus the highest non-program influence score, multiplied by 10. and, if the vendor interview has been triggered, the VMAX score multiplied by the score the decision makers assigned to the vendor recommendation.

5.1.2. PAI-2 score

The questions asked are:

1. Did you learn about PROGRAM BEFORE or AFTER you decided to implement the specific MEASURE that was eventually adopted or installed?
2. Now I'd like to ask you a last question about the importance of the program to your decision as opposed to other factors that may have influenced your decision. Again using the 0 to 10 rating scale we used earlier, where 0 means "Not at all important" and 10 means "Very important," please rate the overall importance of PROGRAM versus the most important of the other factors we just discussed in your decision to implement the specific MEASURE that was adopted or installed. This time I would like to ask you to have the two importance ratings -- the program importance and the non-program importance -- total 10.

The PAI-2 score is calculated as:

The importance of the program, on the 0 to 10 scale, to question 2. This score is reduced by half if the respondent learned about the program after the decision had been made.

5.1.3. PAI-3 Score

The questions asked are:

1. Now I would like you to think about the action you would have taken with regard to the installation of this equipment if the &PROGRAM had not been available. Using a likelihood scale from 0 to 10, where 0 is "Not at all likely" and 10 is "Extremely likely", if PROGRAM had not been available, what is the likelihood that you would have installed exactly the same program-qualifying efficiency equipment that you did in this project?

The PAI-3 score is calculated as:

10 minus the likelihood of installing the same equipment

5.1.4. The Core NTGR

The self-reported core NTGR in most cases is simply the average of the PAI-1, PAI-2, and PAI-3 scores, divided by 10. The one exception to this is when the respondent indicates a 10 in 10 probability of installing the same equipment at the same time in the absence of the program, in which case the NTGR is based on the average of the PAI-2 and PAI-3 scores only.

5.2. Data Analysis and Integration

The calculation of the Core NTGR is fairly mechanical and is based on the answers to the closed-ended questions. However, the reliance of the Standard NTGR – Very Large on more information from so many different sources requires more of a case study level of effort. The SRA Guidelines point out that a case study is one method of assessing both quantitative and qualitative data in estimating a NTGR. A case study is an organized presentation of all these data available about a particular customer site with respect to all relevant aspects of the decision to install the efficient equipment. In such cases where multiple interviews are conducted eliciting both quantitative and qualitative data and a variety of program documentation has been collected, one will need to integrate all of this information into an internally consistent and coherent story that supports a specific NTGR.

The following data sources should be investigated and reviewed as appropriate to supplement the information collected through the decision maker interviews.

- Account Representative Interview
- Utility Program Manager/Staff Interview
- Utility Technical Contractor Interview
- Third party Program Manager Interview
- Evaluation Engineer Interview
- Gross Impact Site Plan/Analysis Review
- Corporate Green/Environmental Policy Review (if mentioned as important)
- Corporate Standard Practice Review (if mentioned as important)
- Industry Standard Practice Review (if mentioned as important)
- Corporate payback review (if mentioned as important)
- Review relevant codes and standards, including regulatory requirements
- Review industry publications, websites, reports such as the Commercial Energy Use Survey, historical purchase data of specific measures etc.

As detailed in the Self-Report NTGR Guidelines, when complementing the quantitative analysis of free-ridership with additional quantitative and qualitative data from multiple respondents and other sources, there are some basic concerns that one must keep in mind. Some of the other data – including interviews with third parties who were involved in the decision to install the energy efficient equipment – may reveal important influences on the customer’s decision to install the qualifying program measure. When one chooses to

incorporate other data, one should keep the following principles in mind: 1) the method chosen should be balanced. That is, the method should allow for the possibility that the other influence can either increase or decrease the NTGR calculated from the decision maker survey responses, 2) the rules for deciding which customers will be examined for potential other influences should be balanced. In the case of Standard –Very Large interviews, all customers are subject to such a review, so that the pool of customers selected for such examination will not be biased towards ones for whom the evaluator believes the external influence will have the effect of influencing the NTGR in only one direction, 3) the plan for capturing other influences should be based on a well-conceived causal framework. The onus is on the evaluator to build a compelling case using a variety of quantitative and/or qualitative data for estimating a customer’s NTGR.

Establishing Rules for Data Integration

Before the analysis begins, the evaluation team should establish, to the extent feasible, rules for the integration of the quantitative and qualitative data. These rules should be as specific as possible and be strictly adhered to throughout the analysis. Such rules might include instructions regarding when the NTGR based on the quantitative data should be overridden based on qualitative data, how much qualitative data are needed to override the NTGR based on quantitative data, how to handle contradictory information provided by more than one person at a given site, how to handle situations when there is no decision-maker interview, when there is no appropriate decision-maker interview, or when there is critical missing data on the questionnaire, and how to incorporate qualitative information on deferred free-ridership.

One must recognize that it is difficult to anticipate all the situations that one may encounter during the analysis. As a result, one may refine existing rules or even develop new ones during the initial phase of the analysis. One must also recognize that it is difficult to develop algorithms that effectively integrate the quantitative and qualitative data. It is therefore necessary to use judgment in deciding how much weight to give to the quantitative versus qualitative data and how to integrate the two. The methodology and estimates, however, must contain methods to support the validity of the integration methods through preponderance of evidence or other rules/procedures as discussed above.

For the **Standard-Very Large** cases in the large Nonresidential programs, the quantitative data used in the NTGR Calculator (which calculates the “core” NTGR), together with other information collected from the decision maker regarding the installation decision, form the initial basis for the NTG “story” for each site. Note that in most cases, supplemental data such as tracking data, program application files and results of interviews with program/IOU staff and vendors, will have been completed before the decision maker is contacted and will help guide the non-quantitative questioning in the interview. In practice, this means that most potential inconsistencies between decision maker responses and other sources of information should have been resolved before the interview is complete and data are entered into the NTGR Calculator. For example, if a company has an aggressive “green” policy widely promoted on its website that is not mentioned by the decision makers, the interviewer will ask the respondent to clarify the role of that policy in the decision. Conversely, if the decision maker attributes the

decision to install the equipment to a new company wide initiative rather than the program, yet there is no evidence of such an initiative reported by program staff, vendors, or the company's website, the decision maker will be asked to explain the discrepancy so that his or her responses can be changed if needed.

In some cases, however, it may be necessary to modify or override one of the scores contributing to the overall NTGR or the NTGR itself. Before this is done all quantitative and qualitative data will be systematically (and independently) analyzed by two experienced researchers who are familiar with the program, the individual site and the social science theory that underlies the decision maker survey instrument. Each will determine whether the additional information justifies modifying the previously calculated NTGR score, and will present any recommended modifications and their rationale in a well-organized manner, along with specific references to the supporting data. Again, it is important to note that the other influences can have the effect of either increasing or decreasing the NTGR calculated from the decision maker survey responses, and one should be skeptical about a consistent pattern of "corrections" in one direction or another.

Sometimes, *all* the quantitative and qualitative data will clearly point in the same direction while, in others, the *preponderance* of the data will point in the same direction. Other cases will be more ambiguous. In all cases, in order to maximize reliability, it is essential that more than one person be involved in analyzing the data. Each person must analyze the data separately and then compare and discuss the results. Important insights can emerge from the different ways in which two analysts look at the same set of data. Ultimately, differences must be resolved and a case made for a particular NTGR. Careful training of analysts in the systematic use of rules is essential to insure inter-rater reliability³.

Once the individual analysts have completed their review, they meet to discuss their respective findings and present to the other the rationale for their recommended changes to the Calculator-derived NTGR. Key points of these arguments will be written down in summary form (e.g., Analyst 1 reviewed recent AQMD ruling and concluded that customer would have had to install the same measure within 2 years, not 3, thereby reducing NP score from 7.8 to 5.5) and also presented in greater detail in a workpaper so that an independent reviewer can understand and judge the data and the logic underlying each NTGR estimate. Equally important, the CPUC will have all the essential data to enable them to replicate the results, and if necessary, to derive their own estimates.

The outcome of the reconciliation by two analysts determines the final NTGR for a specific project. Again, the reasoning behind the "negotiated" final value must be thoroughly documented in a workpaper, while a more concise summary description of the rationale can be included in the NTGR Calculator workbook (e.g., Analyst 1 and Analyst 2 agreed that the NTGR score should have been higher than the calculated value of 0.45

³ Inter-rater reliability is the extent to which two or more individuals (coders or raters) agree. Inter-rater reliability addresses the consistency of the implementation of a rating system.

because of extensive interaction between program technical staff and the customer, but they disagreed on whether this meant the NTGR should be .6 or .7. After discussion, they agreed on a NTGR of .65 as reflecting the extent of program influence on the decision).

In summary, it has been decided that supplemental data from non-core NTG questions collected through these surveys should be used in the following ways in the California Large Nonresidential evaluations:

- Vendor interview data will be used at times in the direct calculation of the NTGR. It will also be used to provide context and confirming/contradictory information for Standard-Very Large decision maker interviews.
- Qualitative and quantitative information from other sources (e.g., industry data, vendor estimates of sales in no-program areas, and other data as described above) may be used to alter core inputs only if contradictions are found with the core survey responses. Since judgments will have to be made in deciding which information is more compelling when there are contradictions, supplemental data are reviewed independently by two senior analysts, who then summarize their findings and recommendations and together reach a final NTGR value.
- Responses will also be used to construct a NTGR “story” around the project; that is they will help to provide the context and rationale for the project. This is particularly valuable in helping to provide guidance to program design for future years. It may be, for example, that responses to the core questions yield a high NTGR for a project, but additional information sources strongly suggest that the program qualifying technology has since become standard practice for the firm or industry, so that free ridership rates in future years are likely to be higher if program rules are not changed.
- Findings from other non-core NTGR questions (e.g., Payback Battery, Corporate Policy Battery) are also be used to **cross-check the consistency** of responses to core NTGR questions. When an inconsistency is found, it is presented to the Decision Maker respondent who is then be asked to explain and resolve it if they can. If they are not able to do so, their responses to the core NTGR question with the inconsistency may be overridden by the findings from these supplemental probes. These situations are handled on a case-by-case basis; however consistency checks are programmed into the CATI survey instrument used for the Basic and Standard cases.

Finally, some analysis of additional information beyond the close-ended questions that are used to calculate the Core NTGR could be done for the **Standard NTGR**. For example information regarding the financial criteria used to make capital investments, corporate policy regarding the purchase of energy efficiency equipment or the influence of standard practice in the same industry as the participant could be taken into account and used to make adjustments to the Core NTGR in a manner similar what is done for the Standard – Very Large NTGR.

5.3. Accounting for Partial Free Ridership

Partial free-ridership can occur when, in the absence of the program, the participant would have installed something more efficient than the program-assumed baseline efficiency but not as efficient as the item actually installed as a result of the program.

In situations where there is partial free ridership, the assumed baseline condition is affected. Absent partial free ridership, the assumed baseline would normally be based on existing equipment (in early replacement cases), on code requirements (in normal replacement cases), or on a level above current code (e.g., this could be a market average or value purposefully set above code minimum but below market average; in this case, the definition and requirement would typically be defined by a specific program's baseline rules). In some cases, there may be a "dual" baseline (more specifically, a baseline that changes over the measure's EUL) if the project involves early replacement plus partial free ridership. In such cases, the baseline basis for estimating savings is the existing equipment over the remaining useful life (RUL) of the equipment, and then a baseline of likely intermediate efficiency equipment (e.g., code or above) for the remainder of the analysis period (i.e., the period equal to the EUL-RUL). When there is partial free ridership, the baseline equipment that would have been installed absent the program is of an intermediate efficiency level (resulting in lower energy savings than that assumed by the program if the program took in situ equipment efficiency as the basis for savings over the entire EUL). A related issue with respect to determination of the appropriate baseline is whether the adjustment made, if any, from the in situ or otherwise claimed baseline in the ex ante calculation, is whether the adjustment applies to the gross or net savings calculation.

Assignment of Partial Free Ridership Effects to Gross versus Net. In past evaluations, partial free ridership impacts have principally been incorporated into the net-to-gross ratio. This is because most partial free ridership is induced by market conditions, rather than by non-market factors. Market conditions refer primarily to standard adoption of a technology by a particular market segment or end user as a result of competitive market forces or other end user-specific factors. The key determining principle with respect to application of the adjustment to the net-to-gross ratio is whether there is a level of efficiency, below the efficiency of the measure for which savings are paid and claimed, but above what is required by code or minimum program baseline requirements that the end user would have implemented anyway without the program. Conditions that cause this adjustment to be made to gross savings rather than the net-to-gross ratio may include factors such as

- changing baseline equipment to meet changed business circumstances (such as increased production/throughput, changes in occupancy, etc.);
- compliance with environmental regulations, indoor air quality requirements, safety requirements; or
- the need to address an operational problem.

Each project should be examined separately for partial free ridership and a determination should be made based on the unique circumstances of each installation of whether an adjustment to gross savings or the net-to-gross ratio is warranted.

Data Collection Procedures. Information is gathered on partial free ridership using the following questions asked as part of the decision maker NTGR survey.

1. Now I would like you to think one last time about what action you would have taken if the program had not been available. Supposing that you had not installed the program qualifying equipment, which of the following alternatives would you have been MOST likely to do?
 - a. Install fewer units
 - b. Install standard efficiency equipment or whatever required by code
 - c. Install equipment more efficient than code but less efficient than what you installed through the program
 - d. repair/rewind or overhaul the existing equipment
 - e. do nothing (keep the existing equipment as is)
 - f. something else (specify what _____)
2. (IF FEWER UNITS) How many fewer units would you have installed? (It is okay to take an answer such as ...HALF...or 10 percent fewer ... etc.)
3. (IF MORE EFFICIENT THAN CODE) Can you tell me what model or efficiency level you were considering as an alternative? (It is okay to take an answer such as ... 10 percent more efficient than code or 10 percent less efficient than the program equipment)
4. (IF REPAIR/REWIND/OVERHAUL) How long do you think the repaired/rewound/refurbished equipment would have lasted before requiring replacement?

In addition, these same partial free ridership questions should be asked during the on-site audit for a given project. This latter interview will be conducted by the project engineers. The collected information helps the gross impact and NTG analysis teams gain a more complete understanding of the true project baseline and equipment selection decision. These decision maker questions are included in the Excel version of the CATI-based Standard and Basic decision maker survey instrument as well as in the Standard-Very Large instrument.

Data Analysis and Integration Procedures. In cases where partial free ridership is found and it is determined that the adjustment should be made to the net-to-gross ratio, the following procedure should be used:

On the net side, the adjustment is based on the intermediate baseline indicated by the decision maker for the time period in which the intermediate equipment would have been installed. The calculation of energy saved under this intermediate baseline is done, and then divided by the savings calculated under the in situ baseline. The resulting ratio is then multiplied by the initial NTGR which was previously calculated using only the

‘core’ scoring inputs. The effect of this adjustment is to reduce the NTGR further to reflect the effects of the revealed partial free ridership.

In all cases, the Gross Impacts and NTG analysis teams will need to carefully coordinate their calculations to ensure that they are not inadvertently adjusting the savings twice for the same partial free ridership, i.e., through adjustments both to the gross savings calculation and to the NTG ratio.

6. NTGR INTERVIEW PROCESS

The NTGR surveys are conducted via telephone interviews. Highly-trained professionals with experience levels that are commensurate with the interview requirements should perform these interviews. Basic and Standard level interviews should be conducted by senior interviewers, who are highly experienced conducting telephone interviews of this type. Standard - Very Large interviews should be completed by professional consulting staff due to the complex nature of these projects and related decision making processes. More than likely, these will involve interviews of several entities involved in the project including the primary decision maker, vendor representatives, utility account executives, program staff and other decision influencers, as well as a review of market data to help establish an appropriate baseline.

All but the Standard -Very Large interviews should be conducted using computer-aided telephone interview (CATI) software. Use of a CATI approach has several advantages: (1) the surveys can be customized to reflect the unique characteristics of each program, and associated program descriptions, response categories, and skip patterns; (2) it drastically reduces inaccuracies associated with the more traditional paper and pencil method; and (3) the process of checking for inconsistent answers can be automated, with follow up prompts triggered when inconsistencies are found.

7. COMPLIANCE WITH SELF-REPORT GUIDELINES

The proposed NTGR framework fully complies with all of the CPUC/ED and the MECT’s Guidelines for Estimating Net-to-Gross Ratios Using the Self-Report Approach.

Appendix A

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