EM&V of Small Commercial Rapid and Multi Family Audit Programs

Submitted to Roseville Electric

Submitted By Nexant

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1 EXECUTIVE SUMMARY

Nexant, Inc. (Nexant) has been retained by Roseville Electric (RE) to conduct a third party independent evaluation of the Commercial Rapid Audit ("Rapid Audit") and the Multi-Family Audit ("MF Audit") programs. The evaluation builds on previous research conducted by RE and adheres to the California Energy Commission's (CEC) EM&V Guidelines for Public Owned Utilities (POUs).[1] The project includes both a process and impact evaluation of the 2014 program year (July 1, 2013 to June 30, 2014) activities. This report contains the evaluation objectives, methodology, findings, results and recommendations for prospective program changes.

1.1 PROGRAM SUMMARY

Within its DSM portfolio, Roseville Electric offers two (2) public benefit programs – one commercial and one residential - that provide an energy audit ("Audit") and the direct installation ("DI") of CFLs at no charge to the participants. LED open signs are also offered to commercial participants on a case-by-case basis. These programs serve as a benefit to small businesses and multi-family customers, who are less likely to implement energy efficiency projects because they typically have short-term leases and do not own the equipment for which they pay the energy bills.

This evaluation report provides an independent review of the following programs during the 2014 program year:

1. **Commercial Rapid Audit Program:** The program offers a short on-site energy audit of small commercial customers (peak demand below 250 kW). The audit is performed by Staples and Associates, takes approximately 20 minutes to complete and provides the customer with a written list of recommended energy efficiency projects, mainly lighting-related. The auditor also replaces screw-in incandescent bulbs with CFLs and provides an LED open sign at no charge to the customer on a case-by-case basis.

2. **Multi-Family Audit Program:** The program provides a short on-site energy audit to the renter of a residential apartment at multi-family complex. The audit is performed by Staples and Associates, takes approximately 20 minutes per apartment to complete and provides the tenant with a list of recommended energy efficiency tips in a handout called "10 Steps to Save" that is provided in Appendix A. The auditor also replaces screw-in incandescent bulbs with CFLs at no charge to the customer.

1.2 SUMMARY OF EVALUATION RESULTS

There were 127 direct installations and 841 audits under the Commercial Rapid Audit program and 618 direct installations and 713 audits under the Residential Multi-Family Audit program during the 2014 program year. Realization rates and net-to-gross ratios were calculated separately for the audit

[1] KEMA, *California Energy Commission EM&V Guidelines, POU Energy Efficiency Programs, Version January 2011*, Draft 12-29-10.

and direct install component of each program. Table 1-1 summarizes the energy savings achieved by each program component. Nexant made adjustments to the claimed savings for the direct install components of each program to correct issues in the program tracking data. No adjustments were made to claimed audit savings prior to the gross impact evaluation. The audit components of the programs had claimed more savings than the direct install components, but had low realization rates that led to much smaller gross verified and net verified savings. The low realization rate for the Commercial Audit was a function of a low observed conversion rate from audits to non-rebated installations. Nexant believes that the MF Audit realization rate was driven by the focus on capital-intensive recommendations that aren't practical for a renter to implement.

Table 1-1: 2014 Program Impacts- Energy

Program	Adjusted Claimed Energy Savings (kWh)[1]	Realization Rate (%)	Gross Verified Energy Savings (kWh)	Net-to-Gross (%)	Net Verified Energy Savings (kWh)
Commercial Direct Install	146,204	84.9	124,185 ± 19,167	92	114,250 ± 15,575
Commercial Audit	298,555	28.6	85,275 ± 71,047	66	56,281 ± 46,891
Commercial – TOTAL	**444,759**	**47.1**	**209,460 ± 73,587**	**81**	**170,531 ± 49,410**
MF Direct Install	113,880	95.6	108,904 ± 6,699	100	108,904 ± 6,699
MF Audit	270,891	7.6	20,619	100	20,619
MF – TOTAL	**384,771**	**33.7**	**129,523 ± 6,699**	**100**	**129,523 ± 6,699**

Table 1-2 summarizes the demand savings for each component of the two programs. The demand savings values tracked by the program are non-coincident demand reduction – or the change in connected load attributable to the efficient installation.

[1] An Adjusted Claimed Energy Savings was calculated for the direct installation component of both programs.

Table 1-2: 2014 Program Impacts- Demand

Program	Adjusted Claimed Demand Savings (kW)	Realization Rate (%)	Gross Verified Demand Savings (kW)	Net-to-Gross (%)	Net Verified Demand Savings (kW)
Commercial Direct Install	30.4	86.2	26.2 ± 3.9	92	24.1 ± 3.3
Commercial Audit	84.1	38.2	32.2 ± 27.8	66	21.2 ± 18.4
Commercial – TOTAL	**114.5**	**51**	**58.4 ± 28.1**	**78**	**45.3 ± 18.7**
MF Direct Install	141.7	95.6	135.6 ± 8.3	100	135.6 ± 8.3
MF Audit	58.3	7.6	4.4	100	4.4
MF – TOTAL	**200**	**70.0**	**140.0 ± 8.3**	**100**	**140.0 ± 8.3**

1.3 FINDINGS AND RECOMMENDATIONS

Nexant found the Rapid Audit and MF Audit programs to be successful offerings to two customer segments that are notoriously difficult to reach with energy efficiency programs. Customer satisfaction scores were consistently high across the both programs and measure verification rates were high. Nexant believes Roseville Electric and its implementation contractor should consider the following list of recommendations for future program years.

- The Rapid Audit program has potential to serve as a dynamic marketing tool for Roseville's other rebate programs. Nexant identified five Rapid Audit participants who completed lighting projects that were rebated by Roseville for a total of 132,000 kWh in savings. Audit recommendations should stress the availability of rebates from Roseville Electric for installation of efficient lighting. Although this is positive finding, it does lower the per-unit impact of the audit because savings can't be double-counted by the Rapid Audit program and Roseville's other rebate programs.

- The audit component of the Multi-Family program was less successful than its Commercial counterpart. Apartment tenants are unlikely to follow through on any equipment improvement recommendations because the HVAC and appliances are the property of the building owner. Recommendations should focus on behavioral changes for these participants. The direct install component of the program also reduces the potential savings from lighting recommendations.

- Audit recommendations and direct installations in the MF Audit program were limited to in-unit areas of the complexes in the 2014 program year. Nexant believes the program will be more successful if building owners are engaged through direct installation of lighting

measures in common areas measures and recommendations are shared with property managers.

- A thorough review of per-unit assumptions in the EnergyOrbit tracking system would improve the accuracy of reported savings. A large number of lamps installed within units in the Multi-Family program claimed savings using prescriptive assumptions for common area lighting where operating hours are significantly higher. In the Commercial program, uniform assumptions were used for each wattage range regardless of the type of business. Since Staples gathers the building type for each site visited and the E3 database contains separate kWh and kW savings values for each, a conditional lookup of impacts by building type should be considered.

- During our review of prescriptive input assumptions and discussions with program staff it was discovered that the 'kW' value stored in the program tracking system is demand savings – or the change in connected load attributable to the measure. Nexant recommends that coincident demand, which takes into the likelihood of the equipment operating during system peak hours, also be tracked. Coincident demand should be better aligned with the generation, transmission, and distribution capacity costs that could be potentially be avoided so tracking it would be beneficial for cost effectiveness calculations.

- Surveys revealed that several Rapid Audit participants who received an LED open sign did not previously have an open sign. Although the LED sign is efficient, it represents an increase in consumption over no open sign. Recipients were very pleased to receive the sign and it opened the door to additional audits, but Staples Associates and Roseville Electric should consider the tradeoffs associated with a measure that can result in negative savings.

- In most cases the proposed measures for Rapid Audit participants are captured in program documentation. However, it was noted that 154 customers who were listed as audit recipient did not have any proposed measures on file. This phenomenon should be investigated further as either (a) there was a record keeping issue that prevented the proposed measures from being documented, or (b) these customers did not receive any energy efficiency recommendations and no savings should have been claimed from the audit component of the visit.

- The program attribute that received the lowest customer satisfaction scores was the quality of the installed equipment. Several respondents reported removing the CFLs because they didn't like the light quality and several others reported that the lamps had burned out. The quality of available CFLs on the market ranges widely so we recommend Roseville research vendors and decide where the right balance of bulb quality and cost lies given program objectives.

1.4 REPORT ORGANIZATION

This report is divided in two primary chapters. Section 2 presents the evaluation of the Commercial Rapid Audit program and Section 3 presents the methodology and results of Multi-Family Audit program. Each chapter includes a brief overview of the program and documents participation during the program year. The gross and net impact evaluation methodology and results are presented separately for the direct install and audit components of each program. Process evaluation results are presented in Sections 2.4 and 3.4. Each chapter concludes with a summary of the key findings and recommendations identified over the course of the evaluation. Appendix A provides a copy of the "10 Steps to Save" recommendations left with MF Audit recipients. Appendix B and Appendix C include the survey instruments fielded with program participants as part of the evaluation.

2 COMMERCIAL RAPID AUDIT

This section of the report contains Nexant's impact and process evaluations for the direct install and audit components of Roseville Electric's Commercial Audit program.

2.1 PROGRAM OVERVIEW

The purpose of the Commercial Rapid Audit program is to help small businesses reduce demand and achieve energy savings. The program is available at no charge to small businesses with a peak demand below 250 kW. Eligible sites were visited by a Staples and Associates contractor, who performed an audit, a direct install, or a combination of both. Tenants participating in the program range from building owners to renters, seasoned business owners and startup businesses. The contractors visited shopping centers, business parks and campuses, and strip malls across the area, dropping into each business and soliciting participation on the spot. Those who agreed to a brief audit and/or direct install invited the contractor in.

Generally there was one point of contact at the site who escorted the contractor throughout the facility while he or she conducted the audit and/or direct install. If an audit was conducted, the tenant was given a written report specifying energy saving ideas for their business, including a list of measures eligible for rebates. If a direct install was completed, the tenant was made aware of all fixtures that had been retrofitted by the contractor, and given a brief explanation of the energy savings that could occur.

The direct installed measures were limited to the replacement of screw-in incandescent bulbs with screw-in compact fluorescent light bulbs (CFLs) and the replacement of an open sign with an LED open sign. Only hard-wired and/or permanent lighting fixtures were eligible to receive the CFLs. The direct install and audit components of the program are evaluated separately. The impact evaluation activities, findings, and recommendations for both components are discussed in this section.

2.2 PROGRAM PARTICIPATION

For the 2014 program year, the EnergyOrbit tracking database used by Roseville Electric listed 825[3] participating businesses in the Commercial Rapid Audit program. Staples and Associates provided 847 Rapid Audits and 127 direct installs. The contractor completed a combined audit and direct install for 120 units, while 727 units received the audit only and 7 units received the direct install only. Table 2-1 shows the program's performance metrics for the 2014 program year. The audit component of the program has claimed savings of 300,685 kWh[4] for the program year. The direct install component of the program has claimed savings of 102,522 kWh.

[3] Some businesses had multiple accounts visited

[4] All kWh savings values are annualized unless otherwise noted

Table 2-1: Commercial Rapid Audit Program - Participation

Program Component	Participating Accounts	Claimed Energy Savings (kWh)	Claimed Demand Savings (kW)[5]
Direct Install	127	102,522	21.2
Audit	847	300,685	84.7

2.3 IMPACT EVALUATION

Nexant completed and a separate gross and net impact evaluation of the direct install and audit components of the Commercial Rapid Audit program. The following sections document the methodology and results of each component separately.

2.3.1 Direct Install Component

The first step in the evaluation process was a record-by-record review of the projects listed in the EnergyOrbit tracking database. This review uncovered several issues, so Nexant recalculated Adjusted Claimed savings prior to beginning evaluation activities in earnest. The gross impact evaluation approach for the DI component was to verify both the reported quantity and the continued use of CFLs and LED Open signs. Verification of program installs was conducted via a random sample of program participants. Each evaluation step and the associated outcomes are described in detail in the following sections.

2.3.1.1 Database Review

Nexant received remote access to the EnergyOrbit database which Roseville Electric uses as the system of record for capturing program implementation data. Through the system, Nexant was able to review project documentation supplied by Staples and Associates in support of its activities and access the deemed savings values used by the system to generate claimed savings for the program.

Nexant found that savings amounts reported by the system were in agreement with the Staples supporting documentation except for two instances where 20W CFLs were miscoded as 27W CFLs. Nexant adjusted the measure name and adjusted claimed savings accordingly. Nexant also reviewed the deemed per-unit kWh and kW savings used by Roseville Electric for the Rapid Audit DI measures. Table 2-2 lists the prescriptive assumptions stored in the EnergyOrbit for each installed measure.

[5] All demand values shown are the change in connected unless otherwise noted.

Table 2-2: Commercial Direct Install - Deemed Savings

Measure	Deemed Energy Savings (kWh)	Deemed Demand Savings (kW)
LED Open Sign	759	0.148
CFL-Screw-In (<=13w)	93	0.023
CFL-Screw-In (14-26)	91	0.018
CFL-Screw-In (>=27w)	340	0.066

Nexant noted two issues with the deemed values. First, the kWh and kW savings for the lower wattage CFL-Screw-In (<=13w) are greater than those for the CFL-Screw-In (14-26w). The kWh and kW savings for CFL-Screw-In (<=13w) should be lower than the values for CFL-Screw-In (14-26) assuming a uniform hours-of-use value because the change in connected load from the baseline to efficient case is larger.

Second, the savings do not account for differences in hours of operation between building types. Nexant believes that adjusting savings for different building types is important and notes that Staples did collect the building type for all program participants and building type specific savings data is available.[6] Nexant proposes the use of the deemed savings in Table 2-3 below based on the KEMA report[7] used for the MF Audit program prescriptive assumptions. The table contains deemed savings for the building types and DI measures contained within the 2014 Rapid Audit DI Program. In most cases the building-specific CFL savings assumptions are larger than prescriptive values stored in EnergyOrbit.

[6] KEMA (2009) *MEASURE QUANTIFICATION Statewide Savings ad Cost, Final Report*, December 9, 2009, Table 113, Screw-in CFL Savings (per lamp)
[7] Ibid

Table 2-3: Commercial Direct Install - Deemed Savings by Building Type[8]

Building Type	Measure	Deemed Energy Savings (kWh)	Deemed Demand Savings (kW)
Grocery	CFL-Screw-In (14-26w)	200	0.030
Office Large	CFL-Screw-In (<=13w)	88	0.022
Office Large	CFL-Screw-In (14-26w)	168	0.041
Office Small	CFL-Screw-In (<=13w)	93	0.023
Office Small	CFL-Screw-In (14-26w)	178	0.044
Restaurant Fast Food	CFL-Screw-In (14-26w)	273	0.049
Restaurant Sit Down	CFL-Screw-In (<=13w)	147	0.026
Restaurant Sit Down	CFL-Screw-In (14-26w)	281	0.050
Retail Large	CFL-Screw-In (<=13w)	131	0.023
Retail Large	CFL-Screw-In (14-26w)	250	0.044
Retail Small	CFL-Screw-In (<=13w)	122	0.024
Retail Small	CFL-Screw-In (14-26w)	233	0.046
All Building Types	LED Open Sign	759	0.148

Nexant calculated Adjusted Claimed Savings for the DI component of the program based on the results of the document review and the deemed savings evaluation. Adjusted Claimed Savings are calculated by applying the deemed savings values from Table 2-3 against the installed measures and quantities in EnergyOrbit. The results are shown in Table 2-4.

Table 2-4: Commercial Direct Install - Adjusted Claimed Savings

Claimed Energy Savings (kWh)	Claimed Demand Savings (kW)	Adjusted Claimed Energy Savings (kWh)	Adjusted Claimed Demand Savings (kW)
102,522	21.2	146,204	30.4

2.3.1.2 Sampling

The evaluation sample for the program as a whole was designed to achieve ±10% precision at the 90% confidence level for measurement and verification activities. Random sampling methods were used to select and survey 37 representative projects from the direct install component. Each of these 37 sites was also a participant in the audit component of the program. A nested sample of 11

[8] Ibid

of the 37 participants was selected for on-site inspections and the remaining sites received telephone surveys. Nexant reviewed the audit reports and selected participants for on-site inspections that had a large number of reported direct install measures. This approach proved effective as having the engineer verify everything on site proved more straightforward than verifying each measure installation over the phone. The sampling plan is shown in Table 2-5.

Table 2-5: Commercial Rapid Audit - Sample Summary

Population	Target Sample	Achieved Sample	Percent of Population Sampled	Percent of kWh Savings Sampled
127	13	37	29%	30%

2.3.1.3 Telephone Survey and On-Site Inspection

Commercial Rapid Audit customers were evaluated using an interview battery via phone and in-person. The Nexant team designed a survey instrument using standard evaluation survey design protocols with modules to assess installation verification, freeridership, spillover, and customer satisfaction.

In an attempt to get as much information as possible without burdening the customer, the survey was kept short and concise, asking only critical questions necessary to evaluate each participant. A common survey instrument was developed for customers who had participated in the direct install only, audit only, or both program components. The complete survey instrument is included for reference in Appendix B. Table 2-6 shows the distribution of questions across the verification, free-ridership, spillover, and satisfaction modules.

Table 2-6: Survey Questions

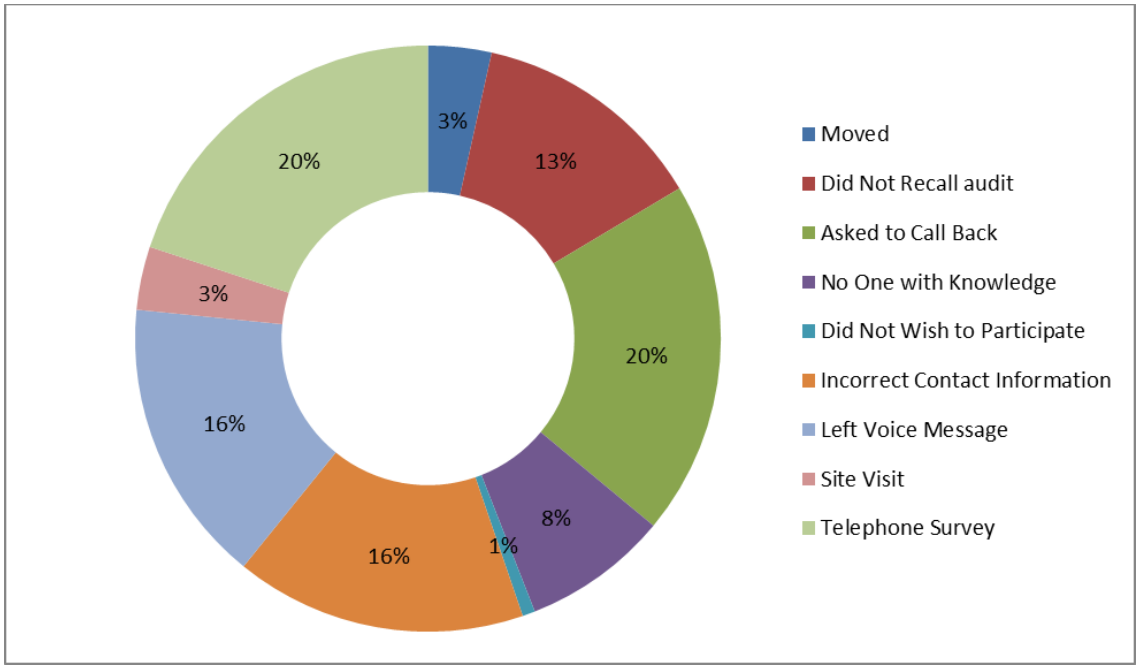
Module	Number of Questions
Verification Questions for DI and Audit	20
Freeridership	8
Spillover	5
Satisfaction	6

Roseville Electric sent a letter to 777 participating commercial customers explaining that they might be contacted to participate in the study and describing what might be asked of them if Nexant contacted them. During the ensuing three weeks, a Nexant representative contacted a total of 303 Small Commercial Rapid Audit participants to conduct the brief survey. 102 of these sites received direct install measures. The Nexant representative would contact the business and ask for the individual who the auditor met with initially (generally someone in management, operations, or the

owner of the building/facility). If the individual remembered the visit from the contractor and agreed to take the survey, he or she was given the option of answering the survey questions at the time of the call or scheduling a more convenient time.

Figure 2-1 shows a breakdown of the outgoing calls to the Commercial Rapid Audit customers (both audit and DI). A phone survey or site visit was completed with 38 of the 102 direct install sites contacted for a completion percentage of 38%. The response rate for sites that received an audit without DI measures was lower.

Figure 2-1: Commercial Rapid Audit Recruitment Results



Telephone survey responses were recorded in Qualtrics, an industry accepted survey administration platform. The surveys questions administered on-site were the same as the phone survey; however, the on-site survey afforded a higher level of rigor because an engineer was able to physically verify the quantity and type of each DI measure

A qualified engineer spent two days visiting the 11 customer sites. The engineer was given a form that reflected the direct install measures and measures proposed in the audit report. During each visit, the engineer spent roughly 30 minutes asking the customer the interview battery (the same one administered via phone) and conducting a walkthrough of the facility to verify the direct install measures were still installed (and if not, what they were replaced with) and to see whether any of the proposed measures had been installed.

2.3.1.4 Impact Evaluation Methodology and Results

An impact evaluation was performed to evaluate the verified savings attributable to the direct install component of the program. It was divided into two research areas to determine gross and net savings (or impacts). Gross impacts are the energy and demand savings that are found at a customer site as the direct result of a measure implementation. Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and funds. The net savings were calculated by applying a NTG ratio to the gross savings. The gross and net adjustments were calculated by applying the results observed amongst a random sample of participants to the program population at large. Because a sample was used rather than a census, there is a margin of error associated with the results. This is presented in the form or a confidence interval around the savings estimate.

Gross Verified Savings

Gross savings are determined through a combination of engineering analysis, telephone surveys, and on-site inspections for a sample of program participants. Gross verified savings estimates are developed for each project in the sample based on observed lamp counts and wattages. The ratio of gross verified savings to adjusted claimed savings within the sample is referred to as the realization rate. The realization rate calculated from the sample is applied to the DI component of the program at large using Equation 2-1.

Equation 2-1: Gross Verified Savings Calculation

$$kWh_{Gross} = (kWh_{Claimed}) * (Realization\ Rate)$$

Where

kWh_{Gross} = kWh verified by the evaluation team for the program (evaluation verified savings)

$kWh_{Claimed}$ = kWh claimed by the program reflecting any QA/QC adjustments

$Realization\ Rate = kWh_{Gross} / kWh_{Claimed}$ for the research sample, same for kW

The kWh and kW realization rates and gross verified savings for the DI component are presented in Table 2-7.

Table 2-7: Commercial Direct Install – Gross Savings

Adjusted Claimed Energy Savings (kWh)	Adjusted Claimed Demand Savings (kW)	Realization Rate - kWh	Realization Rate - kW	Gross Verified Energy Savings (kWh)	Gross Verified Demand Savings (kW)
146,204	30.4	84.9%	86.2%	124,185 ± 19,167	26.2 ± 3.9

Key factors affecting the Gross Verified Savings were as follows:

- LED Open Signs. Of the 19 open signs within the sample, three signs did not replace an existing open sign, and one sign was still in the box because the contractor had not installed it.
- Incandescent Bulbs. One participant re-installed incandescent bulbs because he did not like the CFL's light quality.
- Lamp Quantity. The quantity of installed CFLs at six sites was found to be different for the figure stored in the EnergyOrbit tracking system.

The relative precision of the gross verified energy savings at the 90% confidence level is ±15.4 %. The variability between claimed and verified introduced by LED open signs that did not replace an open sign led to a reduction in the precision of the findings.

Net Verified Savings

The objective of the net savings analysis is to determine the program's net effect from savings which would have occurred absent the program. After calculating gross verified savings, Nexant used Equation 2-2 to derive net verified savings by estimating a net-to-gross ratio that quantifies the percentage of the gross program impacts that can reliably be attributed to the program.

Equation 2-2: Net-To-Gross Calculation

$$Net\text{-}To\text{-}Gross\ (NTG) = (1 - FR + SO)$$

Where:

FR = Freeridership

SO = Participant Spillover

Freeridership

Nexant assessed freeridership using a survey designed to assess the likelihood that participants would have replaced the incandescent bulbs with CFLs or installed a replacement LED Open Sign without program intervention. The two components of freeridership are intention and influence as shown in Equation 2-3. The score for each component ranges from 0 to 50.

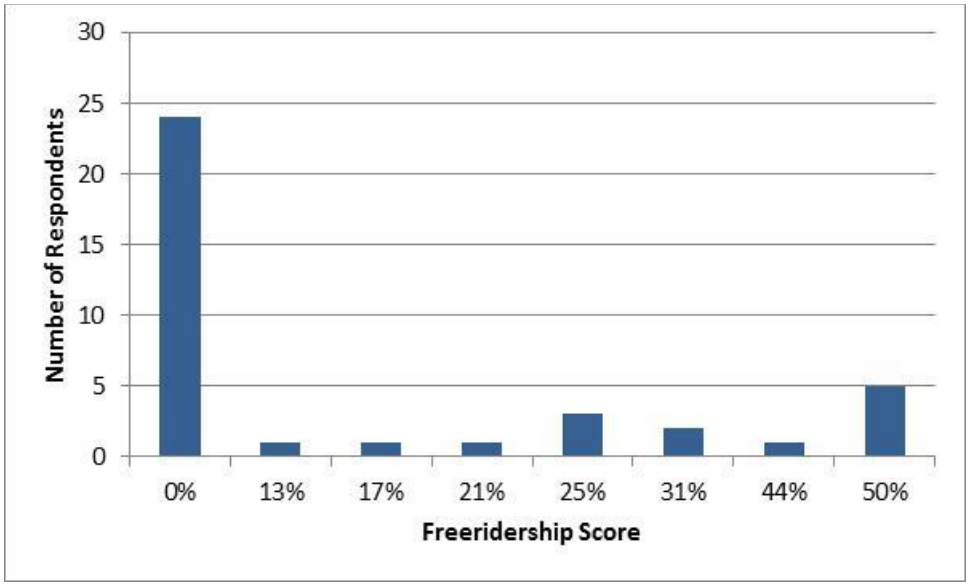
Equation 2-3: Freeridership Calculation

$$FR = \frac{(Intention\ Score) + (Influence\ Score)}{100}$$

The DI survey battery measured only the intention score for the participant, *i.e.,* whether the participant had intended to install any of the direct install measures if not for the program. A battery of questions was used to determine how strong the intent was. The influence score was set to zero for all respondents because the program identified the savings opportunity and installed the measure (screw-in CFLs and LED Open Signs) at no cost to the participant. Based on this design, the highest possible freeridership score a respondent could receive was 50%.

Figure 2-2 shows the distribution of freeridership scores for the 37 survey responses. The overall freeridership score was 0.13 with 24 of the surveyed participants reporting that they would not have installed any measures if not for the program (FR = 0) and five participants reporting that they definitely intended to install the measures if the program did not exist.

Figure 2-2: Distribution of Freeridership Score (n=37)



Spillover

Spillover refers to additional savings generated by participants who are influenced by program activities. Program records do not capture these savings. Savings achieved from installation of additional measures are considered spillover savings if the program significantly influenced customer decisions to purchase.

However, there is an interaction between the direct install and audit components of this program. The implementation of additional measures could be influenced by the direct install component of the program, the audit component, or both. It is necessary to define whether the installation of additional measures is classified as direct install spillover or gross verified audit savings since the two components are evaluated separately. Nexant elected to credit the direct install component with influencing the implementation of non-lighting measures and the audit component with the implementation of lighting measures.

The spillover factor for the direct install component is based on one survey respondent, who began powering down computers at night after participating in the program. Nexant estimates the annual impact of the measure is 1,920 kWh and the calculated spillover rate for the DI component of the program is 0.05. Equation 2-4 shows the formula used to calculate spillover. The spillover value calculated for energy was also used for demand savings.

Equation 2-4: Spillover Calculation

$$SO = \frac{Spillover\ Savings\ in\ Sample}{Gross\ Verified\ Savings\ in\ Sample}$$

The NTG ratio for the DI component of the Commercial Rapid Audit program was determined to be 0.92 based a freeridership score of 0.13 and a spillover factor of 0.05. Net verified savings were calculated by applying the NTG ratio to the gross verified savings and the results are shown in Table 2-8.

Table 2-8: Commercial Direct Install - Net Savings

Gross Verified Energy Savings (kWh)	Gross Verified Demand Savings (kW)	NTG Ratio	Gross Verified Net Energy Savings (kWh)	Gross Verified Net Demand Savings (kW)
124,185 ± 19,167	26.2 ± 3.9	0.92	114,250 ± 15,575	24.1 ± 3.3

2.3.2 Audit Component

Nexant evaluated the impacts of audit recommendations separately from measures directly installed by Staples technicians. Because of the overlapping participation between the two program components some of the evaluation components are shared.

2.3.2.1 Methodology

The evaluation approach for the audit component of program is similar to that used for direct install, but differs in one important aspect – verification of program savings is based on the identification of installed energy efficiency projects that were influenced by the audit and have not been reported in another program. Evaluation activities and the associated results are explored in the following sections.

2.3.2.2 Database Review

Nexant received remote access to the EnergyOrbit database. Through the system, Nexant was able to review project documentation supplied by Staples and Associates in support of its activities and access the deemed savings values used by the system to generate claimed savings for the program. Six audit entries were identified as duplicates and assigned zero verified savings.

The deemed values in Table 2-9 show the savings per audited site used by Roseville Electric and stored in the EnergyOrbit database. The values are from a work paper published by Pacific Gas and Electric (PGE) PGECOALL 102, 2nd revision, 12/6/2009 and are based on a 2008 Itron study[9] that evaluated the impacts of the Statewide Non-Residential Audit Program and the PG&E's Program.

Table 2-9: Commercial Rapid Audit - Deemed Savings

Claimed Energy Savings (kWh/site)	Claimed Demand Savings (kW/site)
355	0.100

The deemed values represent gross savings for the Very Small/Small non-residential customer segment in the source document. 37% of PG&E respondents owned their property while just 12% of Roseville program participants owned their properties. This is an important finding because our survey responses indicate that property owners are more likely to follow through on audit recommendations and invest in energy efficient technologies than tenants.

2.3.2.3 Sampling

The evaluation sample for the program as a whole was designed to achieve ±10% precision at the 90% confidence level for measurement and verification activities. Random sampling methods were used to select and survey representative projects. The sampling plan is shown in Table 2-10. A total of 68 audit recipient were surveyed. 31 of these sites received only the audit, while the other 37 received both the audit and direct installation of measures.

Table 2-10: Commercial Rapid Audit - Sample Summary

Stratum	Population	Target Sample	Achieved Sample	Percent of Population
Audit and DI	120	10	37	31%
Audit Only	721	57	31	4%

2.3.2.4 Telephone Survey and On-Site Inspection

A common survey instrument was used for the audit and DI components of the Rapid Audit program. The various modules within the battery and customer response rates were discussed in Section 2.3.1.3 and the full instrument is included in Appendix B.

[9] Itron, Study ID# PGE0216.01, *Evaluation of the 2004-2005 Nonresidential Audit and PG&E Local Program*, September 4, 2008. See Section 5 for impact results.

2.3.2.5 Impact Evaluation Methodology and Results

An impact evaluation was performed to evaluate the net savings attributable to the audit component of the program. It was divided into two research areas to determine gross and net savings (or impacts). Gross impacts are the energy and demand savings that are found at a customer site as the direct result of a measure implementation. Net impacts are a reflection of the degree to which the gross savings are a result of the program efforts and funds.

Gross Verified Savings

Gross savings are determined through a review of EnergyOrbit and phone / on-site surveys for a sample of program participants. The program-reported savings for the sample is adjusted to reflect the review findings, and this adjustment is captured in a realization rate, the ratio of evaluation verified savings to program-reported savings for the sample.

Equation 2-5: Gross Verified Savings Calculation

$$kWh_{Gross} = (kWh_{Claimed}) * (Realization\ Rate)$$

Where

kWh_{Gross} = kWh verified by the evaluation team for the program

$kWh_{Claimed}$ = kWh claimed by the program reflecting any QA/QC adjustments

$Realization\ Rate = kWh_{Gross} / kWh_{Claimed}$ for the research sample, same for kW

Through the 68 surveys conducted with audit recipients, Nexant identified four sampled sites that installed lighting measures after the audits were performed that were no claimed by other programs within Roseville's DSM portfolio. These measures ranged from the installation of additional CFLs to the replacement of T12 fixtures with T8s. Nexant estimates the annual energy savings of these measures at 6,895 kWh with a demand savings of 2.6 kW. Table 2-11 shows the realization rates calculated gross verified savings estimates for the audit component of the program.

Table 2-11: Commercial Audit – Gross Savings

Claimed Energy Savings (kWh)	Claimed Demand Savings (kW)	Realization Rate - kWh	Realization Rate - kW	Gross Verified Energy Savings (kWh)	Gross Verified Demand Savings (kW)
298,555	84.1	28.6%	38.2%	85,275 ± 71,047	32.2 ± 27.8

The realization rates are low in part because of the interaction between the audit and other rebate programs offered by Roseville Electric. When customers follow through on recommendations and install efficient equipment rebated by Roseville, the rebate program is credited with the kWh and

kW savings rather than the Rapid Audit program. This interaction is discussed in more detail in Section 2.4.2 under process evaluation.

The results are not statistically significant enough to recommend a new per-unit savings estimate, as the relative precision for the sample is ±83% at the 90% confidence level. This result is not surprising since only four participants implemented measures and the sampled audit savings range from 0 (no installed measures) to 2,214 kWh. The 90% confidence interval for per-audit energy savings per audit has a lower bound of 17 kWh and an upper bound of 186 kWh, with a midpoint of 102 kWh. We can confidently demonstrate that the audit recommendations are converted into efficient projects (the average impact is greater than zero). However the results also indicate that 355 kWh and 0.1 kW per site assumptions appear too optimistic.

Net Verified Savings

The objective of the net savings analysis is to determine the program's net effect on the program savings. After calculating gross program impacts, Nexant derived net program impacts by estimating a net-to-gross ratio that quantifies the percentage of the gross program impacts that can reliably be attributed to the program. The formula for the net-to-gross ratio was shown in Equation 2-2.

Freeridership

Nexant assessed freeridership using a survey designed to assess the likelihood that participants would have installed the recommended lighting equipment if they had not received an energy assessment from Staples. The two components of freeridership are intention and influence as shown in Equation 2-3. The score for each component ranges from 0 to 50. The survey measured only the influence of the audit program, or whether the audit influenced the customer to implement the lighting measure. The intention score was set to zero for all respondents. Based on this design, the highest possible freeridership score a respondent could receive was 50%.

Based on the limited number (n=4) of respondents who implemented recommended measures, the freeridership score was 0.34 for the sample.

Spillover

Spillover refers to additional savings generated by participants influenced by program activities, but not captured by program records. Savings received from installation of additional measures could be considered spillover savings if the program significantly influenced customer decisions to purchase efficient equipment. Spillover is set to zero for the audit component because all reported spillover was credited to the DI portion of the program.

The NTG ratio was determined to be 0.66 based on a freeridership score of 0.34 and a spillover factor of 0. This value is comparable to the 0.62 NTG ratio found in the Itron study[10].

Table 2-12: Commercial Rapid Audit - Net Savings

Gross Verified Energy Savings (kWh)	Gross Verified Demand Savings (kW)	NTG Ratio	Net Verified Energy Savings (kWh)	Net Verified Demand Savings (kW)
85,275± 71,047	32.2 ± 27.8	0.66	56,281 ± 46,891	21.2 ± 18.4

The average net savings per participant is 67 kWh and 0.025 kW.

2.4 PROCESS EVALUATION

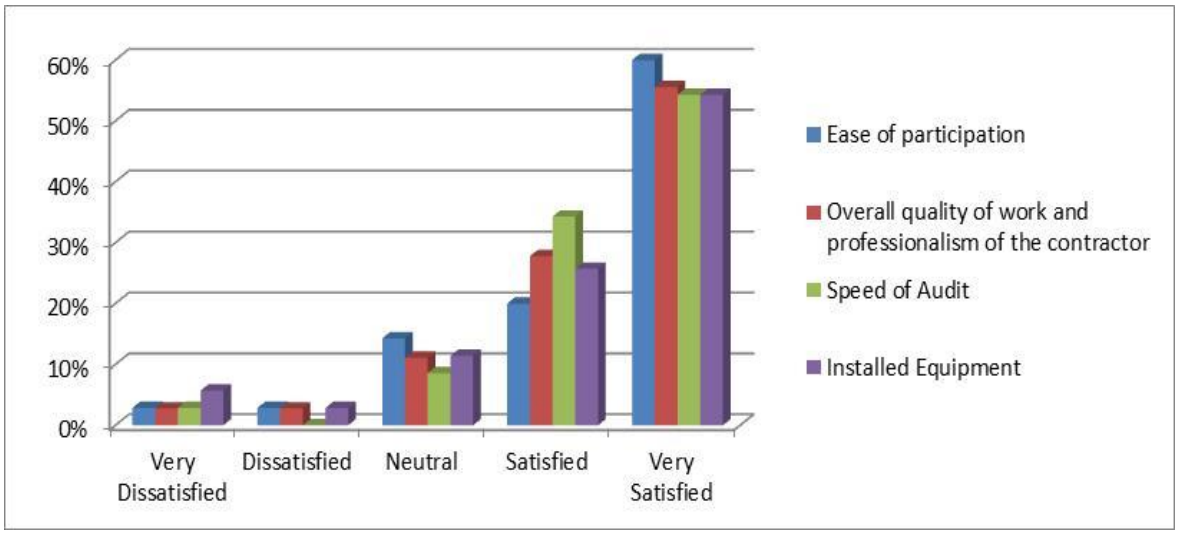
Nexant conducted a process evaluation that focused on a database review and an analysis of program flow and relationships. The process evaluation utilized phone surveys and on-site interviews with 68 program participants. The results are for both the direct install and audit components of the program.

2.4.1 Program Satisfaction

The Small Commercial Rapid Audit survey prompted respondents with four satisfaction questions. The questions covered all aspects of the audit and gauged the customer response to the program. The responses ranged from 1 to 5, 1 meaning not at all satisfied, 3 meaning that they were indifferent, and 5 meaning very satisfied. Overall customers were pleased with the program. The results for the four questions are shown in Figure 2-3 and responses to each are discussed in detail following the figure.

[10] Itron, Study ID# PGE0216.01, *Evaluation of the 2004-2005 Nonresidential Audit and PG&E Local Program*, September 4, 2008.

Figure 2-3: Commercial Rapid Audit - Satisfaction Scores

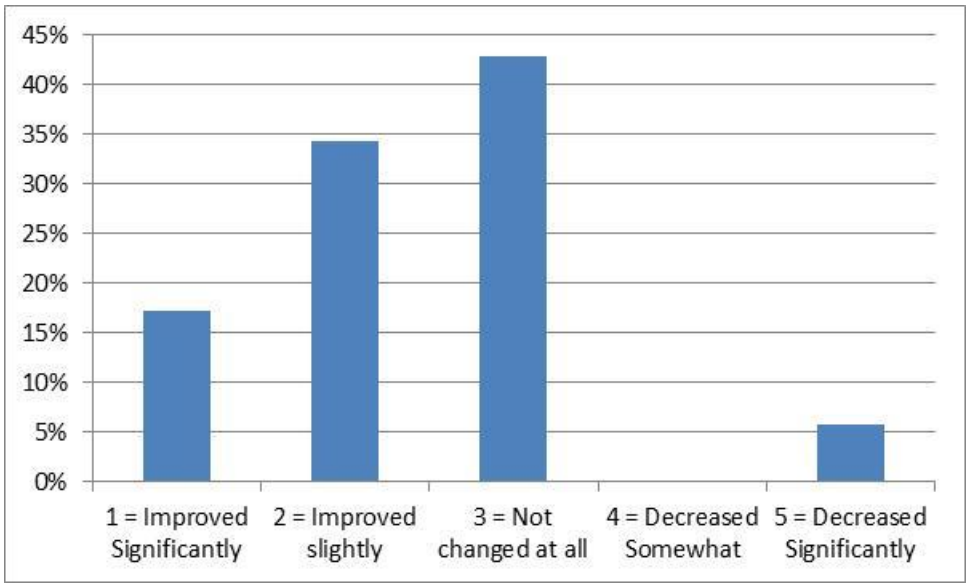


- **Ease of Participation** - The first question asked how satisfied customers were with the ease of participation in the Small Commercial Rapid Audit program. In essence, the auditor approached the customer, and asked to conduct a brief audit in the customer's facility. The customers who answered yes to having the audit allowed the contractor to survey the facility. Typically the audit would last less than 20 minutes, meaning the whole process of the auditor approaching the customer to leaving the facility took less than half hour. 80% of the respondents reported that they were satisfied or very satisfied with the ease of participation. 6% of respondents were dissatisfied or very dissatisfied, and 14% felt neutral about the ease of participation in the program.
- **Overall quality of work** - The second question asked the customer how satisfied they were with the overall quality of work and professionalism of the contractor. The contractor initiated the audit, installed CFL bulbs into a portion of the participant's fixtures, and provided them with a list of energy efficient that could be completed in their facility. 84% of participants felt satisfied or very satisfied with the work completed by the contractor and his professionalism. 6% of respondents were dissatisfied or very dissatisfied, and 11% were neutral about the quality of work completed by the contractor.
- **Speed of Audit** - The third question asked how satisfied the customer was with the speed in which the audit was conducted. The audit was estimated to take less than 20 minutes to complete. 88% of respondents were either satisfied or very satisfied with the speed in which the contractor completed the audit. Only 3% were very dissatisfied with the speed of the audit, leaving 9% of respondents feeling neutral about the speed of the audit.
- **Satisfaction with Installed Equipment –** Direct install participants were asked how satisfied they were with the equipment installed during the visit. 80% of participants felt satisfied or very satisfied. 9% of the respondents reported that they were dissatisfied or very

dissatisfied with their equipment and 11% reported they were neither satisfied nor dissatisfied.

Nexant also asked customers how participation in the program affected their opinion of Roseville Electric. The results are shown in Figure 2-4. 51% of participants had a more favorable view of Roseville Electric, 6% had a less favorable view and 43% did not change their opinion. These results indicate that the Rapid Audit program is a viable way to build loyalty and public opinion.

Figure 2-4: Opinion of Roseville



Respondents were also asked if they had recommended the audit to friends or colleagues since receiving the audit. 23% of direct install participants stated that they had recommended the program to at least one other person. Customers who received DI measures were more likely to remember being visited by Staples and Associates. 15% of Audit participants did not remember the visit compared to 9% of those who received DI measures.

2.4.2 Marketing / Outreach

Nexant believes that the audit component is successfully recruiting participants into other Roseville programs. Nexant was able to identify five (5) Commercial Lighting projects at businesses that received recommendations from the Commercial Rapid Audit program. These LED projects, shown in Table 2-13, were initiated two to five months after the audit was performed and are equivalent to 44% of the Claimed kW and 35% of the kW savings for the audit component of the program.

Table 2-13: Commercial Lighting Projects

Project	Claimed Energy Savings (kWh)	Claimed Demand Savings (kW)
RQR-00073444 - Custom LED (SCS Lighting)	17,565	3.0
RQR-00073436 - Exterior LED (SCS Lighting)	61,074	14.9
RQR-00073428 - Custom LED (SCS Lighting)	34,828	6.06
RQR-00071981 - LED retrofit (Z Energy)	2,899	0.90
RQR-00068748 - LED Retrofit (Staples)	16,124	4.92
Total	**132,490**	**29.70**

The low realization rate of the audit component of program is buoyed somewhat by the finding that audits are bolstering participation in other programs. While the per-unit savings credited to the audit component clearly need to be adjusted downward, it is also possible that a portion of the audit costs could be considered marketing and outreach for Roseville Electric's rebate program. This approach would offset the reduction in cost-effectiveness caused by lower kWh and kW savings.

2.4.3 EnergyOrbit Database

Nexant reviewed the EnergyOrbit database to determine if documentation was complete. The following items should be addressed in future program years.

- **Not all Direct Install participants are Audit participants**. Seven DI participants did not have a corresponding Audit record within EnergyOrbit. It is our understanding that each visit to a qualifying account is considered an audit. Checks should be put in place to ensure DI participants are also Audit participants.
- **Not all Audits participants had Staples proposed measures associated with them**. There are 154 audit customers that do not have documented proposed measures. This could mean either (a) there was a record keeping issue that prevented the proposed measures from being documented, or (b) these customers did not receive any energy efficiency recommendations and no savings should have been claimed from the audit component of the visit.

2.5 PROGRAM FINDINGS AND RECOMMENDATIONS

The following list summarizes Nexant's key findings and recommendations for the Commercial Rapid Audit program.

- The overall net verified savings for the Rapid Audit program were 170,531 kWh ± 49,410 and 45.3 kW ± 18.7 and are shown Table 2-14 and Table 2-15. The low realization rate for the program is a function of a low observed conversion rate from audits to non-rebated installations.

Table 2-14: 2014 Program Impacts- Energy

Program	Adjusted Claimed Energy Savings (kWh)[11]	Realization Rate (%)	Gross Verified Energy Savings (kWh)	Net-to-Gross (%)	Net Verified Energy Savings (kWh)
Commercial Direct Install	146,204	84.9	124,185 ± 19,167	92	114,250 ± 15,575
Commercial Audit	298,555	28.6	85,275 ± 71,047	66	56,281 ± 46,891
Commercial – TOTAL	444,759	47.1	209,460 ± 73,587	81	170,531 ± 49,410

Table 2-15: 2014 Program Impacts- Demand

Program	Adjusted Claimed Demand Savings (kW)	Realization Rate (%)	Gross Verified Demand Savings (kW)	Net-to-Gross (%)	Net Verified Demand Savings (kW)
Commercial Direct Install	30.4	86.2	26.2 ± 3.9	92	24.1 ± 3.3
Commercial Audit	84.1	38.2	32.2 ± 27.8	66	21.2 ± 18.4
Commercial – TOTAL	114.5	51.0	58.4 ± 28.1	78	45.3 ± 18.7

- The Rapid Audit program has potential to serve as a dynamic marketing tool for Roseville's other rebate programs. Nexant identified five Rapid Audit participants who completed lighting projects that were rebated by Roseville for a total of 132,000 kWh in savings. Audit recommendations should stress the availability of rebates from Roseville Electric for installation of efficient lighting. Although this is positive finding, it does lower the per-unit impact of the audit because savings can't be double-counted by the Rapid Audit program and Roseville's other rebate programs.

[11] An Adjusted Claimed Energy Savings was calculated for the direct installation component of both programs.

- A thorough review of per-unit assumptions in the EnergyOrbit tracking system would improve the accuracy of reported savings. In the Commercial program, uniform assumptions were used for each wattage range regardless of the type of business. Since Staples gathers the building type for each site visited and the E3 database contains separate kWh and kW savings values for each, a conditional lookup of impacts by building type should be considered.

- During our review of prescriptive input assumptions and discussions with program staff it was discovered that the 'kW' value stored in the program tracking system is demand savings – or the change in connected load attributable to the measure. Nexant recommends that coincident demand, which takes into the likelihood of the equipment operating during system peak hours, also be tracked. Coincident demand should be better aligned with the generation, transmission, and distribution capacity costs that could be potentially be avoided so tracking it would be beneficial for cost effectiveness calculations.

- Surveys revealed that several Rapid Audit participants who received an LED open sign did not previously have an open sign. Although the LED sign is efficient, it represents an increase in consumption over no open sign. Recipients were very pleased to receive the sign and it opened the door to additional audits, but Staples Associates and Roseville Electric should consider the tradeoffs associated with a measure that can result in negative savings.

- In most cases the proposed measures for Rapid Audit participants are captured in program documentation. However, it was noted that 154 customers who were listed as audit recipients did not have any proposed measures on file. This phenomenon should be investigated further as either (a) there was a record keeping issue that prevented the proposed measures from being documented, or (b) these customers did not receive any energy efficiency recommendations and no savings should have been claimed from the audit component of the visit.

3 MULTI-FAMILY AUDIT

This section of the report contains the methodology and results of Nexant's impact and process evaluations for the direct install and audit components of Roseville Electric's Multi-Family Audit program.

3.1 PROGRAM OVERVIEW

The purpose of the Multi-Family Audit program is to increase awareness of energy savings opportunities by Multi-Family residents. The program is provided to participants at no charge and consists of one or both of the following - a rapid energy audit and the direct install of screw-in CFLs. Eligible homes were visited by a Staples and Associates energy auditor, who would visit a multi-family complex and solicit participants for the program. Those who agreed were provided with a brief audit and/or the direct install of screw-in CFLs. The length of the audit and any CFL installations was approximately 20 minutes per apartment and the customer was provided with a list of recommended energy efficiency measures and the handout "10 Steps to Save." Only hard-wired and/or permanent fixtures were eligible to receive the screw-in CFLs.

3.2 PROGRAM PARTICIPATION

Eligible participants reside in multi-family complexes within the Roseville Electric service territory. In the 2014 program year there were twelve participating complexes and a total of 713 participating units. The contractor completed a combined audit and direct install for 616 units, while 95 units received the audit only and 2 units received the direct install only.

Table 3-1 shows the program's performance metrics for the 2014 program year. The audit component of the program had claimed energy savings of 270,891 kWh for the program year, or 381 kWh per audited home. The direct install component of the program had a claimed energy savings of 225,300 kWh, or an average of 364 kWh per home.

Table 3-1: Multi-Family Audit Participation

Program	Number of Participants	Claimed Energy Savings (kWh)	Claimed Demand Savings (kW) [12]
Direct Install	618	225,300	122.5
Audit	711	270,891	58.3

[12] All demand values shown are the change in connected unless otherwise noted.

3.3 IMPACT EVALUATION

Nexant evaluated the direct install and audit components of the program separately. The impact evaluation activities, findings, and recommendations for both components are discussed in the following sections.

3.3.1 Direct Install Component

The direct install component of the program was more straightforward to evaluate than the audit component. Nexant approach to DI relied largely on participant self-report and engineering analysis. The evaluation methodology consisted of an on-line survey of program participants, tracking data analysis, and project file reviews. Survey questions were designed to verify the reported quantity and the continued use of CFLs. Prior to sample selection and survey administration, Nexant conducted a record-by-record review of the projects listed in the tracking database and recalculated the savings estimates to correct for several issues that were identified. The following sections explore the evaluation activities and associated outcomes in detail.

3.3.1.1 Database Review

Nexant received remote access to the EnergyOrbit database that is used to track program participation, impacts, and store supporting documentation. Through the system, Nexant was able to review project documentation supplied by Staples and Associates in support of its activities and access the deemed savings values used by the system to generate claimed savings for the program. Nexant identified 618 records related to the direct installation component of the Multi-Family Audit. Each record was matched cleanly to the CFL quantity and type in the Staples and Associates documentation within the EnergyOrbit database. However, we did note one residential unit in Staples' documentation did not appear in EnergyOrbit.

The review examined the deemed kWh and kW savings for each of the CFL types that were installed. Our review determined that deemed savings for most bulb types are reasonable except for decorative CFLs. As shown in Table 3-2, the annual hours of use for decorative and reflector CFLs range from 4,000 to 5,000 hours of use per year, abnormally high for a typical residential apartment where lamps are typically only used 2-3 hours per day.

Table 3-2: Multi-Family Direct Install CFLs - Deemed Savings and HOUs

Measure	Annual kWh Savings	Demand Savings (kW) per Unit	Annual HOU
CFL-Screw-In (<=15W)	23	0.029	793
CFL-Screw-In (16-24W)	42	0.051	824
CFL-Screw-In Reflector (14-26W)	93	0.023	4,043
CFL-Screw-In Decorative 9W (<=13w)	91	0.018	5,056
CFL-Screw-In Decorative 14W (14-26W)	91	0.018	5,056
CFL-Screw-In Decorative 20 W (14-26W)	91	0.018	5,056

Our review and discussions with program staff determined that the intended application of these high-use deemed CFL impacts was in multi-family common areas, not residential units. These assumptions are reasonable for common area lighting where lamps are used frequently, but not for in-unit fixtures. Figure 3-1 and Figure 3-2 demonstrate the disproportionate impact that the coding of decorative CFLs has on claimed kWh savings. Measures coded as decorative CFLs in EnergyOrbit accounted for 40% of the installed lamps, but 70% of the energy savings.

Figure 3-1: Quantity of CFL Lamps by Type

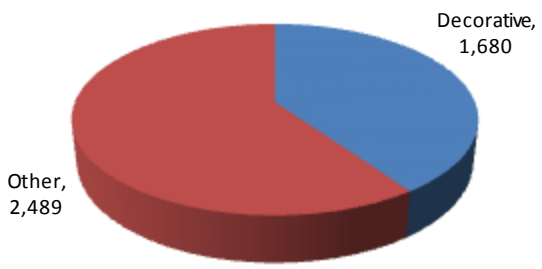
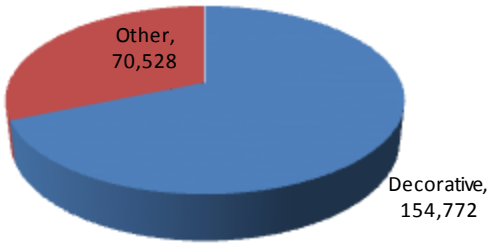


Figure 3-2: kWh Savings by Lamp Type



Nexant recommends modifying the kWh and kW savings for the reflector and decorative CFLs to match the savings for the CFL-Screw-In (<=15W) and CFL-Screw-In (16-24W) measures. Table 3-3 shows the recommended deemed savings for the in-unit CFL types.

Table 3-3: Multi-Family Direct Install CFLs - Modified Deemed Savings

Measure	Annual kWh Savings	Demand Savings (kW) per Unit
CFL-Screw-In (<=15W)	23	0.029
CFL-Screw-In (16-24W)	42	0.051
CFL-Screw-In Reflector (14-26W)	42	0.051
CFL-Screw-In Decorative 9W (<=13w)	23	0.029
CFL-Screw-In Decorative 14W (14-26W)	42	0.051
CFL-Screw-In Decorative 20W (14-26W)	42	0.051

Nexant calculated adjusted claimed kWh and kW savings based on the results of the documentation review and the deemed savings evaluation. Adjusted claimed savings were calculated by applying the deemed savings values from Table 3-3 against the installed measures and quantities in EnergyOrbit. The results are shown in Table 3-4.

Table 3-4: Multi-Family Direct Install Sample Savings

Claimed Energy Savings (kWh)	Claimed Energy Savings (kW)	Adjusted Claimed Energy Savings (kWh)	Adjusted Claimed Energy Savings (kW)
225,300	122.5	113,880	141.7

3.3.1.2 Sampling

Prior to the start of the evaluation, Roseville Electric and Nexant decided to restrict the survey to multi-family homes which had not experienced tenant turnover since participating in the program. As a result, the pool of survey respondents was reduced by 52% to 377 apartments. Based on the smaller response pool and an anticipated 10% response rate, Nexant designed the sample to achieve ±15% precision at the 90% confidence level assuming a coefficient of variation (C_v) of 0.5. The sampling plan is shown in Table 3-4.

Table 3-5: Multi-Family DI – Sampling Plan

Project	Population Size	Target Confidence / Precision	Target Sample Size	Achieved Sample Size
Direct Install	618	90/15	33	41

3.3.1.3 Online Surveys

In designing its Multi-Family program survey, Nexant limited the survey to 11 questions to avoid customer fatigue. The survey consisted of basic questions about the auditor's visit, with most questions directed towards the installation of CFL bulbs in the unit. Keeping in mind that this survey would be taken by individuals who might not be familiar with light bulb terminology, pictures of CFL and incandescent bulbs were provided for reference.

Roseville Electric sent a letter to 377 multi-family homes explaining the purpose of the study and what it would entail if the customer were contacted. Nexant, subsequently, sent a second letter inviting all customers to take the online survey. The letter gave the customer the option to take the survey online or to call in and have someone administer the survey if they did not have access to a computer. A $10 gift card was offered to the first 33 qualified respondents as an incentive.

After ten days, fewer than 20 responses had been received. Nexant obtained permission from Roseville Electric to contact multi-family customers using email addresses that Staples and Associates had gathered during its multi-family audits. Within a week, the target sample size had been exceeded. Out of the 47 responses to the survey, 42 were used for Nexant's analysis of gross energy savings. The five excluded surveys were units not occupied by the same tenant, were incomplete, or were a duplicate submission.

3.3.1.4 Impact Evaluation Methodology and Results

An impact evaluation was performed to evaluate the net savings attributable to the direct install component of the program. Gross energy and demand impacts were the focus DI evaluation efforts.

Gross Verified Savings

Gross savings are determined through a combination of data analysis and surveys for a sample of program participants. Gross verified savings estimates are developed for each project in the sample based on verified lamp counts and wattages. The ratio of gross verified savings to adjusted claimed savings within the sample is referred to as the realization rate. Nexant verified information such as lamp counts and lamp types and calculated gross verified energy savings according to Equation 3-1.

Equation 3-1: Adjusted Savings Calculation

$kWh_{Gross} = (kWh_{Claimed}) * (Realization\ Rate)$

Where:

kWh_{Gross} = kWh verified by the evaluation team for the program (evaluation verified savings)

$kWh_{Claimed}$ = kWh claimed by the program reflecting any QA/QC adjustments

Realization Rate = $kWh_{Gross} / kWh_{Claimed}$ for the research sample, same for kW

Claimed quantities and lamp types were verified with a high level of accuracy and the resulting realization rates and gross verified savings values are shown in Table 3-6. The relative precision of the gross verified kWh and kW savings estimates are each ± 6.1% at the 90% confidence level.

Table 3-6: Multi-Family Direct Install – Gross Verified Gross Savings

Program Attribute	Adjusted Claimed kWh	Adjusted Claimed kW	Realization Rate - kWh	Realization Rate - kW	Gross Verified kWh Savings	Gross Verified kW Savings
PY14 DI Population	113,880	141.7	95.6%	95.6%	108,904 ± 6,699	135.6 ± 8.3
Savings per Home	184	0.229			176	0.219

Net Verified Savings

In keeping with the "rapid" spirit of the program, Nexant elected not to include modules on freeridership or spillover. Therefore the net-to-gross ratio was not directly quantified for the direct install component of the MF Audit program. Based on the level of involvement of Staples in the efficient installation and the high NTG ratio observed in similar programs, Nexant used a stipulated NTG ratio of 1.0 to calculate net verified savings. The net savings were calculated by applying a NTG ratio to the gross savings and are shown in Table 3-7. The 90% confidence intervals for the gross verified savings are carried forward to the net verified savings.

Table 3-7: Multi-Family Direct Install - Net Savings

Program Attribute	Gross Verified kWh	Gross Verified kW	NTG Ratio	Net Verified kWh	Net Verified kW
Population	108,904 ± 6,699	135.6 ± 8.3	1.00	108,904 ± 6,699	135.6 ± 8.3
Per Home	176	0.219		176	0.219

3.3.2 MF Audit Component

The audit component of the Multi-Family program was the least successful of the four program components evaluated in this study. Most recommendations were misplaced on apartment tenants because they do not own the appliances and HVAC equipment in their units. The evaluation of the audit component of Multi-Family program was performed through a review of the deemed savings attributed to the audit as well as billing analysis that looked at pre- and post-retrofit monthly electricity usage.

3.3.2.1 Deemed Savings Evaluation

While no adjustments to claimed savings were ultimately made, Nexant performed a desk analysis of the deemed savings assumptions used for the audit component of the MF program that foreshadowed the results of the impact evaluation. The deemed values, 381 kWh and 0.082 kW per in-home survey, are taken from a 2009 KEMA Measure Quantification Report for NCPA and SCPPA members. The report cites a Southern California Edison work paper WPSCREM10001 Revision 1, Residential Energy Audits, August 24, 2007 in addition to referring to a 2002 report by Ridge & Associates.

Our examination of the Ridge report provided two indications that the deemed savings values of 381 kWh and 0.082 kW per residential unit should be adjusted.

1) The average size of the audited multi-family units in the Roseville program was 859 square feet while the size of the dwellings in the Ridge & Associates paper is 1,761 square feet. Simple scaling to account for home size results in a de-rated savings of:

$$381\ kWh * \frac{859\ ft^2}{1{,}761\ ft^2} = 186\ kWh$$

$$0.082\ kW * \frac{859\ ft^2}{1{,}761\ ft^2} = 0.040\ kW$$

2) Replacement of incandescent lamps with CFLs[13] was a measure recommended by the in-home audits reviewed in the Ridge report. This indicates that the deemed audit savings include savings from the installation of CFL. However, the Roseville program replaces incandescent bulbs with CFLs as part of the DI component. While the direct installation proved highly effective, it cannibalizes the savings potential of the audit recommendations.

[13] *Evaluation of Southern California Edison's Residential Audit Programs: Final Report*, Ridge & Associates, September 6, 2002, Table B-1

3.3.2.2 Impact Evaluation Methodology and Results

The audit recommendations provided to program participants were a mixture of equipment and behavioral measures which make evaluating impact via engineering analysis problematic. Nexant elected to use a billing analysis approach to estimate the total net energy change in the home. This gross and net verified savings from the direct install component were then subtracted from this total energy change to arrive at the gross and net verified savings from the audit component. Because a NTG ratio of 1.0 was used for the DI component, gross and net verified saving for the audit component are also the same.

Gross Verified Savings

Nexant was provided historical billing records for 104 participants of the Multi Family Audit and Direct Install program for analysis. A weather normalized billing analysis was conducted to estimate the total change in electric consumption in the homes following the Staples visit. These estimates include the impacts from the direct install measures, recommended measures implemented by the tenant, as well as any exogenous changes that would have occurred absent the program. The results of the analysis validate the ex post performance estimates of direct install lighting measures and indicate that the audits had some impact.

The billing records supplied by Roseville Electric included the meter read date, the number of days in the billing period and the consumption in kWh. This data was merged with historical heating degree day (HDD) and cooling degree day (CDD) values from the Sacramento Executive weather station to determine the HDD and CDD in each billing period. The kWh, CDD, and HDD terms were divided by the number of days in the billing period to produce average daily consumption and weather conditions. The billing period during which the Staples visit occurred was excluded from the analysis and units with fewer than 8 months of data before or after the visit were dropped (n=4).

Nexant elected to use a time series regression model to account for the autocorrelated nature of the data. Autocorrelation refers to the fact that residuals are usually clustered over time. Standard errors were also clustered by customer to address the fact that our data set consisted of repeated measurements from the same unit. The basic form of the model is shown below:

$$Daily\ kWh = \beta_0 + \beta_1 * AveCDD + \beta_2 * AveHDD * ElecHeat + \beta_3 * AveHDD * Postind * ElecHeat + \beta_4 * AveCDD * Postind + \beta_5 * PostInd$$

Where:

Daily kWh = The energy (kWh) consumed during the billing period divided by the number of days in the billing period.

β_0 = The intercept term in the regression model. This represents the energy which would be consumed in the home pre-retrofit if no heating or cooling load were present, or the non-weather dependent load.

β_1 = Cooling coefficient determined during the modeling process. This represents the number of daily kWh the home uses per cooling degree day prior to program participation.

AveCDD = Average number of cooling degree days observed in the billing period.

β_2 = Heating coefficient determined during the modeling process. This represents the number of daily kWh the home uses per heating degree day prior to measure installation.

AveHDD = Average number of heating degree days observed in the billing period.

Postind = An indicator variable equal to 0 for billing periods prior to measure installation and 1 for billing periods after measure installation.

ElecHeat = An indicator variable equal to 0 for units with gas heat and 1 for units with electric heat.

β_3 = Coefficient representing the change in daily kWh use per HDD following measure installation.

β_4 = Coefficient representing the change in daily kWh use per CDD following measure installation.

β_5 = Coefficient representing the change in daily base load kWh use following measure installation.

Table 3-8: Model Coefficients and Interpretations

Model Term	Coefficient	Interpretation
β_0	11.81	Homes used 11.81 kWh of base load per day pre-retrofit
β_1	1.03	Homes used 1.03 kWh per CDD pre-retrofit
B_2	0.06	Homes used 0.06 kWh per HDD pre-retrofit[14]
β_3	-0.02	Homes used 0.02 fewer kWh per HDD post-retrofit (0.04 kWh per CDD)
β_4	-0.11	Homes used 0.11 fewer kWh per CDD post-retrofit (0.92 kWh per CDD)
β_5	-0.12	Daily base load was reduced by 0.12 kWh post-retrofit (11.69 kWh per day)

[14] This number is lowered somewhat by the fact that only a subset of the homes are electrically heated

The model coefficients shown in Table 3-8 were applied to normal weather conditions for Sacramento (2,614 HDD and 1,173 CDD[15]) to estimate the change in normalized annual consumption (NAC) from the program. This analysis showed an average savings of 205 kWh per home, or a 3.63% reduction in electric consumption for the average home. Homes included in the analysis were 75% electrically heated and 25% gas heated. Table 3-9 also provides separate estimates by fuel type.

Table 3-9: Annual kWh Savings per Multi-Family Residence

Customer Type	NAC – Pre (kWh)	NAC – Post (kWh)	kWh Savings	Percent Savings
Average	5,645	5,440	205	3.63%
Gas Heat	5,521	5,350	171	3.10%
Electric Heat	5,687	5,455	232	4.07%

The gross verified savings from the audit were calculated by subtracting the per-home gross verified savings from DI (176 kWh) from the average total change in consumption (205 kWh) to arrive at a gross verified savings estimate of 29 kWh per audit. The energy realization rate of 29/381 = 7.6% was applied to the claimed demand savings as well and gross verified savings for the audit component are shown in Table 3-10.

Table 3-10: Multi-Family Audit - Gross Savings

Claimed kWh	Claimed kW	Realization Rate - kWh	Realization Rate - kW	Gross Verified kWh	Gross Verified kW
270,891	58.3	7.6%	7.6%	20,619	4.4

Net Verified Savings

The net verified savings for the audit component of the MF program was calculated by subtracting the per-home net verified savings from direct install (176 kWh) from the total change in annual consumption per home (205 kWh). Because the NTG ratio of the direct install component of the MF Audit program was stipulated at 1.0, the gross and net verified savings from the audit component are also the same. The billing analysis should capture the effects of spillover, and to some extent free-ridership, but extracting these factors from gross savings was not practical.

[15] CDD and HDD are base 65 degrees (F)

Table 3-11: Multi-Family Audit - Net Savings

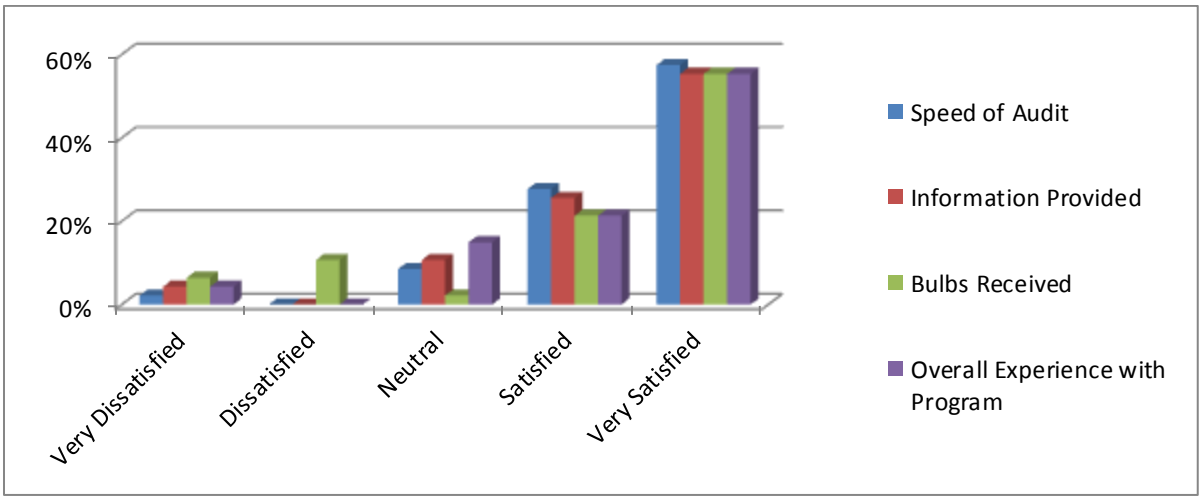
	Gross Verified Gross kWh	Gross Verified Gross kW	NTG Ratio	Gross Verified Net kWh	Gross Verified Net kW
Billing Analysis	20,619	4.4	1.00	20,619	4.4

3.4 PROCESS EVALUATION

3.4.1 Program Satisfaction

The Multi-Family Audit survey prompted respondents with four satisfaction questions. The questions touched on various aspects of the audit and gauged customer sentiment regarding the program. The responses ranged from 1 to 5, 1 meaning not at all satisfied, 3 meaning indifference, and 5 meaning very satisfied. The customer responded to these questions through a web-based survey. Overall customers were pleased with the program. The results for the four questions are shown in Figure 3-3 and discussed in detail following the figure

Figure 3-3: Multi-Family Rapid Audit - Satisfaction Scores



- **Speed of Audit** - The first question asked how satisfied the customer was with the speed in which the audit was conducted. 85% of respondents were either satisfied or very satisfied with the speed in which the contractor completed the audit. The purpose of this audit was to be quick and effective, and the former was proven to be successful. Only 2% were very dissatisfied with the speed of the audit, leaving 9% of respondents feeling neutral about the speed of the audit.

- **Information Provided** - The second question asked how satisfied the customer was with the information provided by the auditor regarding energy savings. The information provided was a pamphlet titled "10 Steps to Save" which gave a brief summary on ten ways the

resident could make their living space more efficient, including the purchase of ENERGY STAR appliances and CFL/LED bulbs. 81% of the respondents were either satisfied or very satisfied with the information provided. 4% were very dissatisfied, leaving 11% feeling neutral about the information provided.

- **Bulbs Received** - The third question asked how satisfied the customer was with the CFL bulbs installed in their unit. 77% of the respondents indicated that they were satisfied or very satisfied with the equipment. However, 17% of respondents indicated that they were dissatisfied or very dissatisfied with the equipment installed, which is a higher rate of dissatisfaction than any other question elicited. Just 2% of respondents felt neutral about the installed CFLs. Of the four respondents who no longer used the CFLs, two removed the bulbs because they did not like the light they gave off, one replaced the CFLs with incandescent bulbs and the last has not replaced the lamps.

- **Overall Experience** - The final question asked how satisfied the customer was with the overall experience with the Rapid Audit program. This would be a combination of the three prior questions and all aspects of the audit. 77% of respondents answered that they were satisfied or very satisfied with their experience, indicating the speed of the audit, and equipment installed, and the information provided was beneficial to the residents. 15% of respondents were neither satisfied nor dissatisfied with their experience, and only 4% were very dissatisfied with their overall experience.

3.5 PROGRAM RECOMMENDATIONS

The following list summarizes Nexant's key findings and recommendations for the Multi-Family Rapid Audit program.

- The overall net verified savings for the Rapid Audit program were 170,531 kWh ± 49,410 and 45.3 kW ± 18.7 and are shown Table 2-14 and Table 2-15. The low realization rate for the program is a function of a low observed conversion rate from audits to non-rebated installations.

Table 3-12: 2014 Program Impacts- Energy

Program	Adjusted Claimed Energy Savings (kWh)[16]	Realization Rate (%)	Gross Verified Energy Savings (kWh)	Net-to-Gross (%)	Net Verified Energy Savings (kWh)
MF Direct Install	113,880	95.6	108,904 ± 6,699	100	108,904 ± 6,699
MF Audit	270,891	7.6	20,619	100	20,619
MF – TOTAL	**384,771**	**33.7**	**129,523 ± 6,699**	**100**	**129,523 ± 6,699**

Table 3-13: 2014 Program Impacts- Demand

Program	Adjusted Claimed Demand Savings (kW)	Realization Rate (%)	Gross Verified Demand Savings (kW)	Net-to-Gross (%)	Net Verified Demand Savings (kW)
MF Direct Install	141.7	95.6	135.6 ± 8.3	100	135.6 ± 8.3
MF Audit	58.3	7.6	4.4	100	4.4
MF – TOTAL	**200**	**70.0**	**140.0 ± 8.3**	**100**	**140.0 ± 8.3**

- The audit component of the Multi-Family program was less successful than its Commercial counterpart. Apartment tenants are unlikely to follow through on any equipment improvement recommendations because the HVAC and appliances are property of the building owner. Recommendations should focus on behavioral changes for these participants. The direct install component of the program also reduces the potential savings from lighting recommendations.

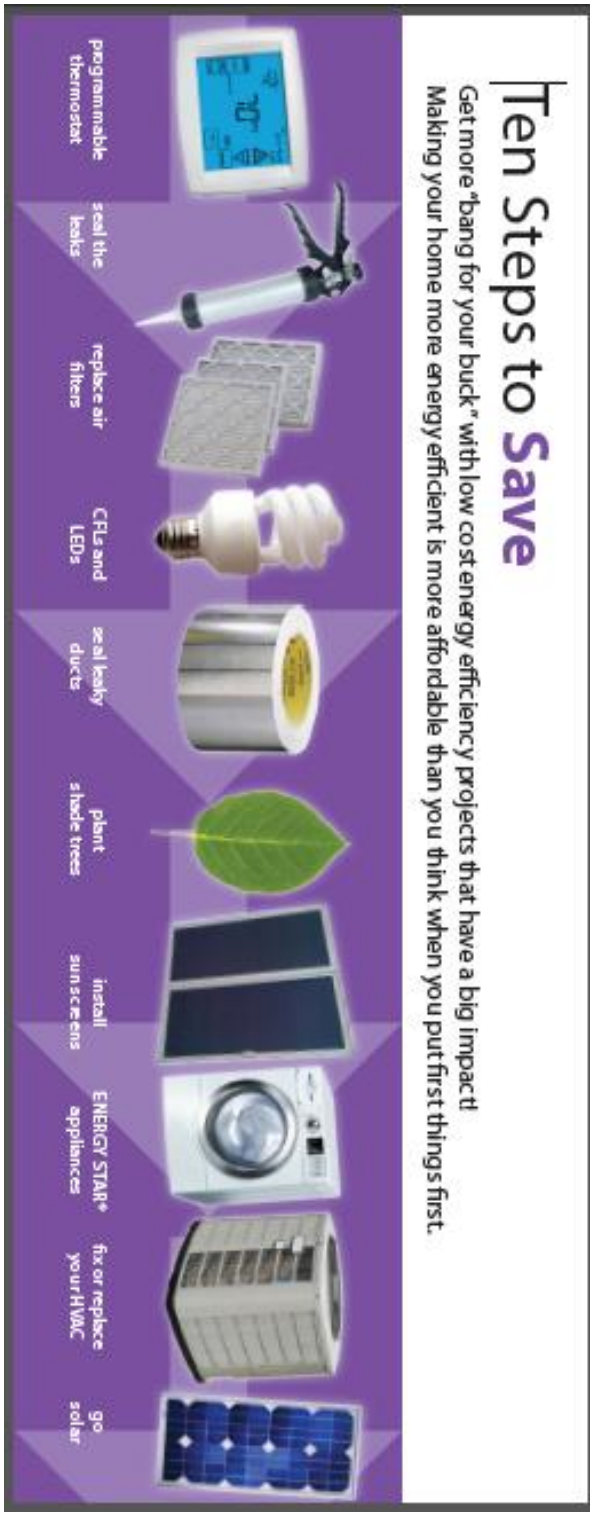
- A thorough review of per-unit assumptions in the EnergyOrbit tracking system would improve the accuracy of reported savings. A large number of lamps installed within units in the Multi-Family program claimed savings using prescriptive assumptions for common area lighting where operating hours are significantly higher.

- During our review of prescriptive input assumptions and discussions with program staff it was discovered that the 'kW' value stored in the program tracking system is demand savings – or the change in connected load attributable to the measure. Nexant recommends that coincident demand, which takes into the likelihood of the equipment operating during system peak hours, also be tracked. Coincident demand should be better aligned with the

[16] An Adjusted Claimed Energy Savings was calculated for the direct installation component of both programs.

generation, transmission, and distribution capacity costs that could be potentially be avoided so tracking it would be beneficial for cost effectiveness calculations.

- The program attribute which received the lowest customer satisfaction scores was the quality of the installed equipment. Several respondents reported removing the CFLs because they didn't like the light quality and several other reported that the lamps had burned out. The quality of available CFLs on the market ranges widely so we recommend Roseville research vendors and decide where the right balance of bulb quality and cost lies given program objectives. Modify the direct install component of the Commercial Rapid Audit program to include the deemed savings for various building types.



Ten Steps to Save

Programmable Thermostat: Absolutely, one of the most cost effective ways to save energy and money is to properly program your thermostat, or install a programmable thermostat if you do not have one.

Seal the Leaks: Use caulking and weather stripping to seal around windows, doorways, recessed light fixtures, light switches and electrical outlets.

Replace Air Filters: Clean air filters are an affordable way to keep your HVAC system running efficiently and your family healthy. Air filters should be checked and replaced once a month.

CFLs & LEDs: New ENERGY STAR® rated technology allows you to get better lighting using less energy. Start by changing out the lights you use the most like kitchen, hallways and other main living spaces.

Seal Leaky Ducts: Inspect or have your ducts inspected. Use metallic tape (not duct tape) to seal leaks in your duct-work to avoid heating and cooling your attic or crawlspace.

Shade Trees: Shade trees can reduce your cooling cost up to 40 percent. Shade windows and AC units but not solar panels by choosing the right size trees for your home.

Sun Screens: Block up to 80 percent of the sun's heat and glare with new window 'solar screens'. Use high insulation curtains and window treatments to reduce heat loss in the winter.

ENERGY STAR® Appliances: Choose energy efficient appliances and electronics for your home. Look for the ENERGY STAR logo, these products have been tested and proven to save energy.

Fix or Replace your HVAC: A new system is a costly upgrade. The first 7 steps will prolong the life of your system and allow you to choose a smaller system when it is time to replace or upgrade.

Go Solar: After taking all these steps to improve your home's efficiency, consider making your own energy with a photovoltaic (PV) system. The more efficient your home is, the smaller the system you will need.

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CITY OF ROSEVILLE CALIFORNIA
Roseville Electric

Small Business Rapid Audit Customer Survey

The following interview will be regarding the audit completed at **[Address]** in 2013/2014. This is only regarding the energy audit program offered by Roseville, and no other program offered by Roseville or any other utility. Please answer each question to the best of your ability, and if you are unsure of anything but you think you will be able to obtain the information after this interview, please tell me and we can arrange for you to send the information at a later time.

Verification

1) For verification purposes, what is your name?
   [Record Response]
2) 2) What is your position or title in your organization
   [Record Response]
3) Were you present at the time of the audit
   - Yes
   - No
4) Whose decision was it to participate in the audit
   [Record Response]

5) [DO NOT READ] Please indicate whether the customer participated in the Direct Install and Audit **or ** JUST the Audit

- Direct Install and Audit (1)
- Audit ONLY (2)

IF Customer received [DI] or [DI and Audit] start with Section 1: Direct Install Verification; otherwise go to Section 4: Audit

Section 1 Direct Install (DI) Verification

DI0) Do you recall a representative of Staples & Associates installing **<Read applicable CFL measure and quantity and/or LED Open Sign and quantity>** during the Rapid Audit?

- Yes – CFL (1) **< Go to Question DI1>**
- Yes – CFL and LED Sign (2) **<Go to Question DI1>**
- Yes –LED Sign Only (3) **<Go to Question DI7 - Ask questions DI7 and DI8>**
- No (4) **<Terminate Survey>**
- Don't Know (5)
- Refused (6)

DI1) Did the contractor install **[Quantity] [Measure]** during his visit?

- Yes (1)
- No (2) **<Go to Question DI2>**
- Don't know (3)
- Refused (4)

DI2) What is the correct quantity?

- [Record Response] (1) _____
- Don't know (2)
- Refused (3)

Compact Fluorescent **<Ask if DI Q1 answer was "Compact Fluorescent Only" or "Compact Fluorescent and LED Sign">**

DI3) Are all the installed Compact Fluorescent Lamps (CFLs) that I listed currently being used?

- Yes **<Go to Question DI7 if "Compact Fluorescent and LED Sign" >**
- No
- Don't know (3)
- Refused (4)

DI4) How many are no longer used?

- **<Record Response>**

DI5) Why are some CFLs no longer being used? **<Read options>**

- Did not like the light they gave off (1)
- They burnt out (2)
- Other (3) [Record Response]

DI6) What did you replace the CFLs with? **<Read options>**

- Another CFL (1)
- Incandescent (2)
- Halogen (3)
- LED (4)
- Light is not being used (5)
- Other (6) [Record Response]_____

LED Open Sign **<Ask if DI Q1 answer was "LED Sign Only" or "Compact Fluorescent and LED Sign">**

DI7) Did the installed LED sign replace an existing Open sign at your facility?

- Yes (1) **<Go to Question D8>**
- No (2) **< Go to Section 2: Free-Ridership Question 1 if "Compact Fluorescent and LED Sign"> otherwise < Go to Section 2: Free-Ridership Question 6 if "LED Sign Only">**
- N/A (No LED sign given to customer) (3)

DI8) What did you do with the old open sign?

<Record answer> <Follow up if needed -trying to be sure replaced sign is not still being used.>

Section 2: Free-Ridership

Ask Questions 1 to 5 if DI Q1 answer was "Compact Fluorescent Only" or "Compact Fluorescent and LED Sign"

FR1) Prior to the Rapid Audit being conducted, had you considered installing CFLs in any of the fixtures retrofitted by Staples?

- Yes (1) **<Go to Question FR3>**
- No (2) **<Go to Question FR6>**
- Do Not Know(3)
- Refused (4)

FR2) Which of the following do you think would have happened if you had not participated in

the Rapid Audit program? **<Read the list>**

- Would not have installed any CFLs (1) **<Go to question FR6 >**
- Would have installed fewer CFLs (2)
- Done the exact same project as under Rapid Audit (3)**<Go to question FR4>**
- Don't know (4) **<Go to question FR6>**
- Refused (5)

FR3) Earlier you indicated that **<Quantity>** CFLs were installed by Staples. You indicated that you would have installed fewer CFLs if you would not have participated in the Rapid Audit program. How many do you think you would have installed?
[Record Response]

FR4) When do you think would have installed CFLs in those fixtures? **<Do not read from list; Time is from when the Rapid Audit was performed>**

- Within the next year (1)
- Within two years (2)
- More than two years/Upon burn out of existing equipment (3)
- Don't know (4)
- Refused (5)

FR5) Would your business have paid the entire cost of the upgrade?

- Yes (1)
- No (2)
- Don't Know (3)
- Refused (4)

Ask Questions 6 to 8 if "LED Sign Only" or "Compact Fluorescent and LED Sign"

FR6) Prior to the Rapid Audit being conducted, had you considered installing an LED open sign?

- N/A (customer did not receive LED open sign) (1) **<Go to Section 3: Audit>**
- Yes (2)
- No (3) **<Go to Section 3: Audit>**

FR7) When do you think you would have installed the LED open sign? **<Do not read from list (Time is from when the Rapid Audit was performed)>**

- Within the next year (1)
- Within two years (2)
- More than two years/Upon burn out of existing equipment (3)
- Don't know (4)
- Refused (5)

FR8) Would your business have paid the entire cost of the upgrade?

- Yes (1)
- No (2)
- Don't Know (3)
- Refused (4)

Section 3 Audit

A1) Do you recall receiving a list of recommended energy efficiency measures from a representative of Staples & Associates after the Rapid Audit?

- Yes (1)
- No (2) IF AUDIT ONLY **– prompt with measure info; if still no knowledge <End survey>**
- No (3) IF DI & AUDIT **– <Go to Section 4: Spillover>**

A2) Have you implemented any of the recommended measures?

- Yes (1)
- No (2)**<End survey>**
- Don't know (3) **<Go to question A6>**
- Refused (4) **<Go to question A6>**

A3) What measures have you implemented?

Record response = measure & Quantity

Measure 1	Quantity 1
Measure 2	Quantity 2
Measure 3	Quantity 3
Measure 4	Quantity 4

A4) Were you considering installing any of the recommended measures prior to receiving the Rapid Audit?

- Yes (1)
- No (2) **<Go to question A6>**
- Don't know (3) **<Go to question A6>**
- Refused (4) **<Go to question A6>**

A5) When had you planned on installing the recommended measures?

Record response = measure & Time frame

Measure 1

- Within the next year
- Within two years
- More than two years/Upon burn out
- Don't know

Measure 2

- Within the next year
- Within two years
- More than two years/Upon burn out
- Don't know

Measure 3

- Within the next year
- Within two years
- More than two years/Upon burn out
- Don't know

Measure 4

- Within the next year
- Within two years
- More than two years/Upon burn out
- Don't know

A6) How influential was receiving the list of recommended measures on your decision to implement those energy efficiency measures?

- None at all (1)
- Not much (2)
- Neutral (3)
- Somewhat (4)
- Very (5)

A7) How influential was the auditor (Staples & Associates) in your decision to implement those energy efficiency measures?

- None at all (1)
- Not much (2)
- Neutral (3)
- Somewhat (4)
- Very (5)

Section 4: Spill Over

SO1) Since participating in the program, have you implemented energy efficient improvements that were not on the recommended measure list?

- Yes (1)
- No (2) **<Go to Section 5: Satisfaction>**

SO2) What type of energy efficient improvements, products or equipment did you install?

[Record measure1]	[Record Quantity 1]	[Std / High Efficiency1]
[Record Measure2]	[Record Quantity2]	[Std / High Efficiency2]
[Record Measure 3]	[Record Quantity 3]	[Std / High Efficiency 3]

SO3) Were you considering installing any of these measures prior to receiving the Rapid Audit?

- Yes (1)
- No (2) **<Go to Section 5: Satisfaction>**

SO4) How influential was the Rapid Audit program on your decision to implement energy efficiency projects that were not on the recommendation list? **<READ FROM LIST>**

- None at all (1)
- Not much (2)
- Neutral (3)

- Somewhat (4)
- Very (5)

SO5) Did your opinion about the equipment installed during the Rapid Audit influence you decision to implement projects not on the recommended measure list? **<READ FROM LIST>**

- None at all (1)
- Not much (2)
- Neutral (3)
- Somewhat (4)
- Very (5)

Section 5: Satisfaction <Read All Options to Respondent>

S1a) How satisfied are you with the ease of participation in the Rapid Audit program?

- Not at all satisfied (1)
- Not too satisfied (2)
- Neutral (3)
- Somewhat satisfied (4)
- Very satisfied (5)

S1b) How satisfied are you with the overall quality of work and professionalism of the contractor during the rapid audit?

- Not at all satisfied (1)
- Not too satisfied (2)
- Neutral (3)
- Somewhat satisfied (4)
- Very satisfied (5)

S1a) How satisfied are you with the speed with which the audit was conducted?

- Not at all satisfied (1)
- Not too satisfied (2)
- Neutral (3)
- Somewhat satisfied (4)
- Very satisfied (5)

S2) After participating in the rapid audit program, has your opinion of Roseville…

- Improved significantly (1)
- Improved somewhat (2)
- Not changed at all (3)
- Decreased somewhat (4)
- Decreased significantly (5)

S3) Since participating in the rapid audit program, have you recommended the program to friends, relatives, colleagues, etc?

- Yes (1)
- No (2)

The following question is applicable only to respondents with direct installation of CFLs and/or LED Open Sign

S6) How satisfied are you with the equipment installed during the Rapid Audit visit? (i.e. CFL and/or LED Open sign)

- Not at all satisfied (1)
- Not too satisfied (2)
- Neutral (3)
- Somewhat satisfied (4)
- Very satisfied (5)

Multi-Family Audit/Direct Install Customer Survey

MF1 For verification purposes, please enter your full name

MF2 Please enter today's date

MF3 Our records indicate that you participated in Roseville Electric's Multi Family Rapid Audit program and received a visit from a representative of Staples & Associates during the past 16 months, is that correct?

1. Yes (1)
2. No (2)

If No Is Selected, Then Skip To End of Survey

Q6 Did the Staples & Associates representative install one or more CFL (Compact Fluorescent) light bulbs during this visit?

3. Yes (1)
4. No (2)

If No Is Selected, Then Skip To End of Survey

Q7 Are you still using the CFL light bulbs that were installed?

Yes (1)

No (2)

If Yes Is Selected, Then Skip To On a scale of 1 to 5, where one means...

Q8 What is the reason for no longer using the CFL light bulbs?

I did not like the light they gave off (1)

They burnt out (2)

The landlord replaced the lamps in which they were installed (3)

Other (4) _____

Answer If What is the reason for no longer using the CFL light bulbs? They burnt out Is Selected

Q9 Did you replace the burnt out CFL light bulbs with new CFL light bulbs or regular incandescent light bulbs?

Replaced with CFL (1)

Replaced with incandescent (2)

Other (3) _____

Q10 On a scale of 1 to 5, where one means "Very unsatisfied" and 5 means "Very satisfied", how satisfied were you with the following aspects of the audit?

The speed in which the audit was conducted (1)
Information provided by the auditor regarding energy savings? (2)
The CFL light bulbs installed in your unit (3)
Overall experience with the program (4)

Q13 Thank you for responding to our survey! For your time and effort we would like to send you a gift card to the Westfield Galleria at Roseville. Please enter your full address below including unit number, and we will mail you the gift card

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