Energy Efficient Program Evaluation, Measurement & Verification Report

City of Shasta Lake Electric Fiscal Year 2010-2011

Programs Evaluated

- **Appliance Program**
- **Weatherization Program**

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1 Executive Summary

This report provides findings from an independent Evaluation, Measurement, and Verification (EM&V) analysis of the energy efficiency program for the City of Shasta Lake Electric (SLE) 2010 fiscal year. SLE selected their Appliance and Weatherization energy efficiency programs for EM&V evaluation.

Optimized Energy and Facilities Consulting's (OEFC) evaluation activities consisted primarily of researching, creating evaluation plans, collecting data, and estimating actual energy savings (evaluated savings). Our random sample analysis found the appliance program to realize 68 percent of the reported gross kWh energy savings and 62 percent of the reported gross kW demand energy savings. The weatherization program realized 120 percent of the reported gross kWh energy savings and 78 percent of the reported gross kW demand energy savings. Applying these realization rates to the entire program yields the following results:

Program	SLE-Reported Savings		Sample Evaluated Realization Rate		Evaluated Savings	
	kWh	kW	%	%	kWh	kW
Appliance	23,577	25	68	62	16,032	16
Weatherization	33,929	58	120	78	40,715	45

We suggest SLE employ the following recommendations to increase the energy savings resulting from SLE's energy efficiency program and increase the accuracy of its reporting:

- Increase advertising of Energy Efficiency (EE) programs
- Partner with appliance retailers and weatherization contractors to promote EE purchases and provide instant rebates
- Track and report on recycled refrigerators/freezers

Details on the energy savings analysis and additional results and recommendations from our evaluation can be found in the remainder of this report.

2 Purpose of This Report

EM&V is the documentation of energy savings using direct measurements, engineering calculations, statistical analyses, and computer simulation models. EM&V is a requirement of two bills adopted during the 2005-2006 California legislative session:

- **SB 1037 (Kehoe):** Requires all publicly-owned utilities to report to the California Energy Commission and their local governing boards about current and projected energy efficiency programs, including expenditures and savings.

- **AB 2021 (Levine):** Reaffirms SB1037 mandates but also requires publicly-owned utilities to develop energy efficiency targets on a triennial basis and provide an independent assessment of measured savings.

This report provides unbiased, independent third-party auditing of the programs selected by SLE. Specifically, this report assesses the savings calculation accuracy of the Appliance and Weatherization programs.

3 Methodology

3.1 Evaluation Standards

Independent, third-party EM&V requirements for utilities are still evolving and subject to some interpretation. The published references of the International Performance Measurement and Verification Protocol (IPMVP)[1] and the Technical, Methodological, and Reporting Requirements for Evaluation Professionals[2] were used to guide the evaluation standards.

Evaluating the energy savings from each measure installed as part of SLE's appliance and weatherization programs is not cost effective. Therefore, OEFC used a sample approach to evaluate the energy savings achieved from the programs. The sample size for each evaluated program was designed to achieve a relative precision of 20% at the 90% confidence level (precision of 90/20), exceeding the CPUC evaluation protocols[3] for verification-level of rigor (precision of 90/30). Random samples were selected from stratified samples of both SLE's rebated appliance program measures and SLE's rebated weatherization program measures as shown in Table 3.1.1 below.

Table 3.1.1. Program Calculated Sample Sizes

Program	Installed Measures	Calculated Sample Size
Appliance	112	15
Weatherization	69	14

Evaluation tools and information regarding sample selection and resulting sample measure inclusions are included in the Appliance Program and Weatherization Program sections.

3.2 Reported Energy Savings

SLE used the E3 reporting tool[4] to report energy savings for all measures in the appliance and weatherization programs. The source of the deemed savings values in the E3 tool is the 2009 KEMA study[5], which is largely based on the 2008 Database for Energy Efficient Resources, maintained by the CPUC.

[1] International Performance Measurement and Verification Protocol (IPMVP), Concepts and Options for Determining Energy and Water Savings, Volume 1; prepared for Efficiency Valuation Organization, September 2010

[2] California Energy Efficiency Evaluation Protocols: Technical, Methodological and Reporting Requirements for Evaluation Professionals; prepared for the California Public Utilities Commission, April 2006

[3] 2006 California Energy Efficiency Evaluation Protocols, California Public Utilities Commission

[4] Energy Efficiency (EE) Reporting Tool; created by Energy and Environmental Economics (E3) and KEMA for NCPA, SCPPA, and other public utilities

[5] 2009 Measure Quantification Methodology Statewide Savings and Cost; prepared for NCPA and SCPPA

3.3 Reliability

Energy savings calculations attempt to determine the absence of energy spent and, thus, cannot be measured directly. Instead, energy savings are calculated as the difference between energy expended at baseline conditions (before EE measure implementation) and post-retrofit conditions (after EE measure implementation). Unless energy consumption is measured directly at the source at baseline and retrofit conditions, energy savings calculations are only estimates. It is impossible for OEFC (and unreasonable for SLE) to measure baseline conditions. Therefore, both entities are required to collect a reasonable amount of pertinent data from customers and obtain energy savings from accepted sources who have measured energy consumption in that way. We believe the energy savings calculated in this report to be a reasonably accurate estimate of the energy savings achieved by the sampled program participants; however, the following potential sources of error exist:

- **Baseline conditions** – Baseline conditions were provided by the customer and assumed accurate. Baseline conditions were obtained from the application or via a call to the customer.

- **Telephone surveys** – OEFC call-verified appliance installations instead of conducting site visits. However, a recent evaluation research study[6] for dishwashers found on-site surveys and telephone surveys to yield nearly identical results. It is not likely that an energy-efficient appliance was purchased and not installed (although it is possible the equipment was purchased and installed in a different service area).

- **Sampling self-selection bias** – Four of the twenty-nine identified survey respondents were alternates to the originally selected list of sample participants which introduces self-selection bias potential. However, alternates were used in a randomly prioritized order, so there is no indication that the use of alternates led to any material bias in the survey results.

- **Appliance energy savings** – Appliance energy savings evaluations are based on deemed energy savings from KEMA[7] using standard assumptions regarding consumer behavior, appliance usage, average ENERGY STAR appliance energy consumption, and the customer-reported water heating source.

- **Weatherization energy savings** – Weatherization energy savings were calculated using computer-simulated modeling. While this type of modeling is considered very accurate, it is only as accurate as the data entered. Several assumptions were made to create the computer-simulation and evaluate the actual energy savings (listed in Appendix 7.3); however, the assumptions are reasonable.

- **Net energy savings -** The Net-to-Gross (NTG) ratio is subjective and difficult to measure. Therefore, the Net Energy Savings calculated in this report has a high degree of uncertainty. Our estimated NTG ratio adjusts the evaluated Gross Energy Savings for free ridership (participants who would have implemented the measure without the program) but does not add back the extra benefits of spillover (reduction of energy consumption caused by the program but not directly related to a specific measure). Consequently, the calculated Net Energy Savings is conservative and likely lower than actual.

[6] CPUC 2006-2008 Direct Impact Evaluation, HIM Evaluation Report, Study ID PUC0016.02.

[7] Measure Quantification Statewide Savings and Cost; prepared for NCPA, SCPPA, and SCPPA members by KEMA Services, Inc, 2009

3.4 Net Energy Savings

While the energy savings of a specific measure may be difficult to assess, the portion of the gross energy savings attributable to SLE's EE program (net energy savings) is even more so. Net energy savings is found by multiplying the gross energy savings of a measure by the NTG ratio.

NTG ratios were calculated in accordance with the California Evaluation Framework[8] basic level of rigor. A NTG survey was developed consisting of questions for full and partial free-ridership. A NTG ratio calculation was attempted for each sampled measure. Each participant's answer was combined multiplicatively as follows:

NTR Ratio = Q#1 Multiplier x Q#2 Multiplier x … x Q#5 Multiplier

In accordance with the with California Evaluation Framework,[6] no score was given to participants who refused to answer or answered "Don't know" to any question. The questions and multipliers can be found in Appendix 7.5.

[8] The California Evaluation Framework; prepared for the California Public Utilities Commission and the Project Advisory Group, June 2004

4 Evaluation Activities

4.1 Preliminary Research

OEFC researched numerous sources prior to creating the Evaluation Plan. These sources included:

- SLE 2010 EM&V Report
- SLE Website
- SLE 2010/2011 E3 Report
- SLE 2010/2011 Rebate Spreadsheet
- EM&V Protocol and Best Practice documents
- Energy Efficiency savings studies
- Similar EM&V work efforts

4.2 Create Evaluation Plan

Due to the many measure types and data differences between the Appliance and Weatherization programs, OEFC formulated two separate plans to best evaluate the programs. The evaluation plan included the following components:

- Program review
- Process evaluation
- Sample size calculation
- Sample selection
- Data collection
- Savings evaluation
- Reporting findings
- Creating recommendations

With the exception of the Sample Size Calculation addressed in section 3.1 above, the remaining components of the Evaluation Plan are described per program in the next two sections.

5 Appliance Program

5.1 Program Review

SLE offered the appliance rebates listed in Table 5.1.1 for up to 75 percent of the measure cost.

Table 5.1.1. 2010-11 Appliance Program Rebate Overview

Measure	Rebate Offered	Units Installed[1]	Total Paid in Rebates
Refrigerators	$150	65	$8750
Freezers	$100	2	$200
Dishwashers	$120	22	$2355
Clothes Washers	$150	20	$2775
Room Air Conditioners	$200	1	$30
Variable Speed Pool Pumps	$250	1	$250

1) Fifteen additional units were submitted for a rebate and rejected after verification because the appliance or the hot water source did not meet stated rebate requirements.

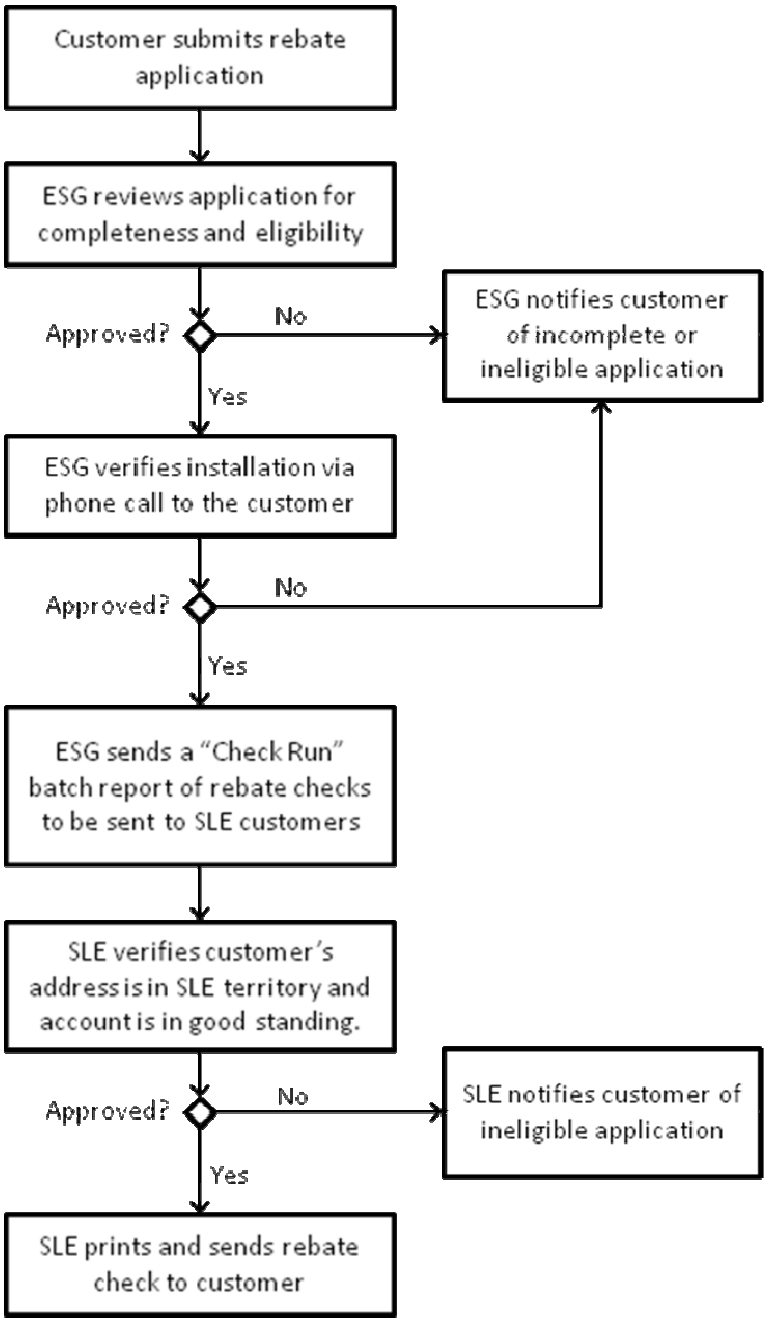
Rebates were only available for certified ENERGY STAR rated appliances. Rebate applications were completed, signed, and received within six months of purchase along with a copy of the purchase receipt and yellow “Energy Savings Guide” label.

5.2 Process Review

SLE advertised the rebate program through two newspaper ads. SLE Customer Service representatives also promoted the program when speaking to SLE customers.

Most appliance rebate applications were mailed directly to SLE's rebate processing consultant, Efficiency Services Group (ESG) by the customer requesting the rebate. Some applications were sent to SLE then forwarded to ESG by SLE. ESG evaluated the applications for completion and eligibility and verified installation by a telephone call to the applicant. ESG notified applicants if the application was incomplete or equipment did not meet eligibility requirements. Periodically, ESG created a batch list of checks to be paid by SLE to the customers. SLE verified these customers were in their service territory and had accounts in good standing before printing a check. It was typically about 10 weeks from the time the customer submitted the rebate application to the time the customer received the rebate check from SLE. This lengthy time period was the most common complaint SLE received from its customers. This process is illustrated in Chart 5.2.1.

Chart 5.2.1. Appliance Program Process Overview



SLE remained flexible with its rebate program being open to customer requests of rebating measures not specifically identified in the program. In these cases, SLE contacted ESG to confirm whether rebating the measure was justified.

5.3 Sample Selection

OEFC obtained an Excel spreadsheet from ESG with all measures rebated in the Appliance program. All measures were assigned a site number and used throughout this evaluation to retain the anonymity of the customers and reduce the likelihood of selection bias. As described in the Methodology section above, we used Excel-generated random numbers to randomly select the number of applications identified as the initial sample design. Ten backup measures were also randomly selected (with priority order of use). The composition of the achieved sample is shown in Table 5.3.1 below.

Table 5.3.1. Appliance Program Initial Sample Composition

Measure Name	Number of Measures in Initial Sample
Refrigerators	10
Freezers	0
Dishwashers	2
Clothes Washers	3
Room Air Conditioners	0
Variable Speed Pool Pumps	0

5.4 Data Collection

OEFC collected hard copies of applications included in the initial sample in additional to the backup application from ESG. Since a site visit to verify appliance installation would be intrusive to SLE customers and recent research found that onsite and telephone installation verifications yield similar results[9], OEFC elected to perform installation verification via a customer call survey. OEFC evaluated information included in the application packets to determine information required to evaluate actual energy savings for each appliance sampled. A telephone survey was created to verify installation, evaluate actual energy savings, and calculate a NTG ratio for each appliance sampled. This survey is included in Appendix 7.6.

OEFC called a total of 24 program participants up to eight different times over multiple days within multiple weeks at various times of day. Eleven of the twenty-four customers were reached and responded to the survey questions. Backup customers were called in priority order based on the measure of the primary unresponsive customer. Table 5.4.1 below shows a summary of the appliance survey call attempts and completions.

5.4.1. Appliance Survey Call Summary

Call Date Range	Attempted Surveys	Completed Surveys	Primary Sample Customers Used	Backup Sample Customers Used
8/15/12 – 9/7/12	24	11	7	4

The composition of the achieved sample is shown in Table 5.4.2.

Table 5.4.2. Appliance Program Achieved Sample Composition

Measure Name	Number of Measures in Achieved Sample
Refrigerators	8
Freezers	0
Dishwashers	1
Clothes Washers	2
Room Air Conditioners	0
Variable Speed Pool Pumps	0

[9] Source: CPUC 2006-2008 Direct Impact Evaluation, HIM Evaluation Report, Study ID PUC0016.02.

5.5 Energy Savings Evaluation

OEFC used savings from the KEMA 2009 study[10] to determine the savings from each measure. The reported savings were obtained from SLE's E3 report which used values from KEMA and energystar.gov. OEFC was able to more accurately measure energy savings by obtaining specific information about each appliance: dishwasher (gas or electric water heating source and decision type), clothes washer (gas or electric water heating source and decision type), and refrigerator (top, side-by-side, or bottom freezer location and decision type). During the telephone survey, OEFC obtained definitive answers to these elements to more accurately estimate the savings.

Table 5.5.1 provides the reported energy savings from SLE's E3 reporting tool, the energy savings determined by OEFC, and the NTG ratio calculated from the telephone survey for each of the sampled participants. Survey responses used to estimate these values are shown in Appendices 8.1 and 8.2.

Table 5.5.1. Appliance Program Reported and Evaluated Energy Savings

Site No	Measure	Reported kWh_1	Reported kW_1	Evaluated kWh	Evaluated kW	NTG_2
50	ENERGY STAR Clothes Washer	471	1.202	261	0.666	0.48
4	ENERGY STAR Clothes Washer	471	1.202	261	0.666	0.34
98	ENERGY STAR Dishwasher	66	0.2295	74	0.257	0.56
105	ENERGY STAR Refrigerator	182	0.031	105	0.018	NA
3	ENERGY STAR Refrigerator	182	0.031	105	0.018	0.32
8	ENERGY STAR Refrigerator	182	0.031	121	0.021	NA
11	ENERGY STAR Refrigerator	182	0.031	182	0.031	NA
56	ENERGY STAR Refrigerator	182	0.031	105	0.018	NA
76	ENERGY STAR Refrigerator	182	0.031	121	0.021	0.36
115	ENERGY STAR Refrigerator	182	0.031	182	0.031	NA
62	ENERGY STAR Refrigerator	182	0.031	146	0.025	NA
	Total Appliance Sample	**2460**	**2.882**	**1663**	**1.772**	

1) Energy savings for appliances were reported in E3 as half natural replacement and half early retirement. To mimic that energy savings in this table, OEFC used an average savings between natural replacement and early retirement values.
2) NA means the ratio could not be determine because the customer could not be reached or the customer's response was inconclusive.

[10] 2009 Measure Quantification Methodology Statewide Savings and Cost, prepared for NCPA and SCPPA

5.6 Results

Table 5.6.1 below shows the calculated realization rates between the energy savings reported and the energy savings evaluated by OEFC. In other words, the realization rate is the percentage of the reported savings that was verified. The net realization rate uses the NTG multiplier and estimates the actual energy savings attributed to the program (gross savings less freeriders).

Table 5.6.1. Appliance Program Realization Rates

Site No	Measure	kWh Realization Rate (%)	kW Realization Rate (%)	Net kWh Realization Rate (%)	Net kW Realization Rate (%)
50	ENERGY STAR Clothes Washer	55	55	26	26
4	ENERGY STAR Clothes Washer	55	55	19	19
98	ENERGY STAR Dishwasher	112	112	63	63
105	ENERGY STAR Refrigerator	58	59	NA	NA
3	ENERGY STAR Refrigerator	58	59	18	19
8	ENERGY STAR Refrigerator	67	68	NA	NA
11	ENERGY STAR Refrigerator	100	100	NA	NA
56	ENERGY STAR Refrigerator	58	59	NA	NA
76	ENERGY STAR Refrigerator	67	68	24	24
115	ENERGY STAR Refrigerator	100	100	NA	NA
62	ENERGY STAR Refrigerator	80	82	NA	NA
	Entire Appliance Sample	**68**	**62**	**NA**	**NA**
	Average of Appliance Sample	**73**	**73**	**30**	**30**

As shown above, two thirds of the gross reported savings were realized in our evaluation. This is largely due to the decision type reporting methods in E3. All appliances were reported as 50 percent Natural Replacement and 50 percent Early Retirement. Our call survey to our sample participants found considerably different percentages as shown in Table 5.6.2 below. Early Retirement measures provide more (sometimes significantly more) savings than Natural Replacement measures.

Table 5.6.2. Appliance Program Reported vs. Evaluated Decision Types

Replacement Type	Reported Percentage	Evaluated Percentage
Natural Replacement	50.0	73.0
Early Retirement	50.0	27.0

As shown in Table 5.6.3 below, we also identified a discrepancy between SLE's rebated measures and the weighted average used in E3 pertaining to freezer locations. Refrigerators with bottom-mounted freezers were undercounted and refrigerators with top-mounted freezers were overcounted. In this case, they were undercounted and overcounted by about the same percentage, so the inaccuracies canceled out in the aggregate reported savings.

Table 5.6.3. Reported vs. Evaluated Freezer Location on Refrigerators

Freezer Location on Rebated Refrigerators	Reported Percentage	Evaluated Percentage
Bottom Mounted	6.0	25.0
Side Mounted	37.2	37.5
Top Mounted	56.9	37.5

Because the program sample was drawn from all appliances, analysis of individual appliance information is statistically incorrect. However, it is interesting to look at the realization rate of each measure in conjunction with the sample measures. Table 5.6.4 below shows the savings realization rates by measure.

Table 5.6.4. Appliance Program Realization Rates by Measure Type

Measure	Qty of Measures In Sample	kWh Realization Rate (%)	kW Realization Rate (%)	Net kWh Realization Rate (%)	Net kW Realization Rate (%)
ENERGY STAR Clothes Washers	2	55	55	26	26
ENERGY STAR Dishwashers	1	112	112	63	63
ENERGY STAR Refrigerators	8	73	74	NA	NA

The table shows the energy savings of clothes washers as being over-reported by about 50 percent. Given there were only two clothes washer measures in the achieved sample and both were Natural Replacement, the Realization Rate may be on the low side of reality. On the other hand, dishwashers are shown above as being slightly underreported. OEFC was only able to

contact one rebated dishwasher customer, and it happened to be an Early Retirement measure. Natural Replacement is a more likely decision type for appliances, so the Realization Rate for dishwashers may be on high side of reality.

While OEFC did not estimate energy savings for Clothes Washers to the level of loads washed per week, we did ask for the information in our phone survey. It is interesting to note that both of the sample customers who purchased new clothes washers ran more loads per week with their new appliance than their old appliance. Further investigation might be interesting.

The NTG value significantly reduced the Net Energy Savings. As can be seen from the survey responses shown in Appendix 7.2, this is largely because: 1) eight of the eleven surveyed customers stated they "definitely" or "probably" would have installed the same ENERGY STAR appliance without the program and 2) nearly half of the sampled customers stated they would have purchased an alternative appliance within a month (which reduces gross energy savings by half). It is also interesting to note that only one of the eleven customers surveyed stated the rebate was the reason for their ENERGY STAR appliance purchase. This same customer stated she would "definitely" have purchased an equally energy efficient appliance without the program within six months.

5.7 Recommendations

OEFC recommends SLE consider the following recommendations to increase the energy savings resulting from SLE's energy efficiency program and increase the accuracy of its reporting:

- **Change the appliance rebate program rebate amounts.**

  Our survey results indicate the current program is not enticing customers to buy ENERGY STAR appliances. Because appliance rebates provide goodwill towards SLE and increase awareness for energy efficiency as a whole, OEFC does not recommend discontinuing the entire appliance rebate program. We do, however, recommend the following changes:

  - Reduce the dishwasher rebate as energy savings are very low for this measure compared to other appliances. (We would recommend discontinuing the dishwasher rebate completely except keeping the rebate will allow SLE to claim the savings of ENERGY STAR dishwasher purchases.)
  - Increase the rebate for refrigerators and clothes washers to provide a greater enticement for ENERGY STAR purchases. (SLE customers seem to make more purchase decisions on "damaged unit" discounts than SLE rebates. Consider finding the typical "damaged unit" discount and set the rebate at that level.) If funding is only available to increase one rebate, increase the clothes washer rebate as ENERGY STAR clothes washers with electric hot water sources provide more savings than ENERGY STAR refrigerators.

- **Advertise rebate programs to SLE customers and ENERGY STAR appliance retailers.**

  Our survey results indicate the current program is not influencing purchase decisions. SLE customers are making more purchase decisions based on contractor or salesperson recommendations rather than the benefits of energy efficiency and the rebate program. If SLE customers saw information about SLE rebate programs in their monthly bills and the newspaper, they might head to the appliance store with an ENERGY STAR purchase in mind. SLE should advertise the rebate, the potential monthly billing savings, and the societal "go green" benefit of saving energy.

  SLE should attempt to educate appliance retailers and their sales force on the rebate programs, the benefits of ENERGY STAR purchases, and how to read the ENERGY STAR label.

- **Provide customers with instant rebates by allowing appliance retailers to sell SLE-rebated ENERGY STAR appliances at the rebated price (upstream rebates).**

  Our survey results found more customers purchasing a reduced-price appliance due to aesthetic damage than a reduced-price appliance due to a rebate. Among other things, this may mean the customer appreciates the instant discount over a mail-in rebate. Customers would receive the rebate as a discount in the purchase price of the appliance, and the vendor would submit receipts and rebate applications on behalf of the customer. SLE would pay the rebate(s) directly to the vendor. It would be important to call the customer to verify installation prior to paying the vendor.

- **Track and accurately report decision types.**

  Within the sample, the kWh energy savings were underreported. This is largely due to the common practice of reporting half the appliances at Natural Replacement and half at Early Retirement. Within the achieved random sample, 73 percent of the retired appliances did not meet the age requirement for Early Retirement. Therefore, 23 percent of those appliances were significantly overreported. The age of a replaced appliance was reported on most of the rebate applications, so it would be simple to capture this data and report this decision type accurately.

- **Track and report recycled refrigerators and freezers**.

  No energy savings for refrigerator recycling was found in the E3 report. Our survey found six of the seven sampled customers who purchased refrigerators replaced an older refrigerator that was hauled away. While most customers did not know what happened to their unit once it left their home, it was likely recycled. SLE did not get energy savings credit from taking these inefficient appliances out of service. This resulted in 757 kWh (removal of secondary refrigerator from conditioned space) and 1271 kWh (removal of primary refrigerator from conditioned space) of unreported savings per recycled refrigerator.

6 Weatherization Program

6.1 Program Review

SLE offered the weatherization rebates listed in Table 6.1.1 for up to 75 percent of the cost. All weatherization measures are site-verified by a third-party consultant, Efficiency Services Group (ESG).

Table 6.1.1. 2010-11 Weatherization Program Rebate Overview

Measure	Rebate Offered	# Rebates Submitted	Units Installed	Total Paid in Rebates
Ceiling/Attic Insulation (R-0 to minimum R-38)	$0.75/sq.ft.	4	5314 sf.	$2354
Ceiling/Attic Insulation (existing to minimum R-38)	$0.50/sq.ft.	13	17711 sf.	$8582
Wall Insulation (R-0 to minimum R-13)	$1.00/sq.ft.	3	2977 sf.	$2429
Window Shade Screens (maximum SHGC= 0.50)	$1.50/sq.ft.	3	169 sf.	$254
Window Films (maximum SHGC= 0.50)	$1.50/sq.ft.	2	132 sf.	$178
Replacement Windows (max U-factor/SHGC = 0.35/0.40) [1]	$4.00/sq.ft.	14	1887sf.	$6801
Blower Door Guided Air Sealing [2]	$200/house	0	0	$0
T24 Duct Sealing & Insulation (R-0 to min R-8)	$900/house	1	1 System	$150
Duct Sealing Only	$500/house	9	9 Systems	$4360
Roof Radiant Barrier	$1.50/sq.ft.	20	27169 sf.	$37898
Cool Roof – Low Slope (min aged solar reflectance/ thermal emittance=.40/.75)	$0.20/sq.ft.	0	0	0
Cool Roof – Steep Slope (min aged solar reflectance/ thermal emittance=.40/.75)[3]	$0.10/sq.ft.	0	0	0

1) NFRC sticker or ENERGY STAR label required.
2) Pre/post blower door air leakage test results required
3) Materials must be ENERGY STAR qualified and CRRC rated

Rebates were only available for single and multi-family residences with permanently installed central air conditioning or electric heat capable of heating the entire dwelling. Rebates applied to upgrades on conditioned spaces in existing homes only. Rebate applications were completed, signed, and received within six months of purchase along with applicable copies of invoices, receipts, and project documentation.

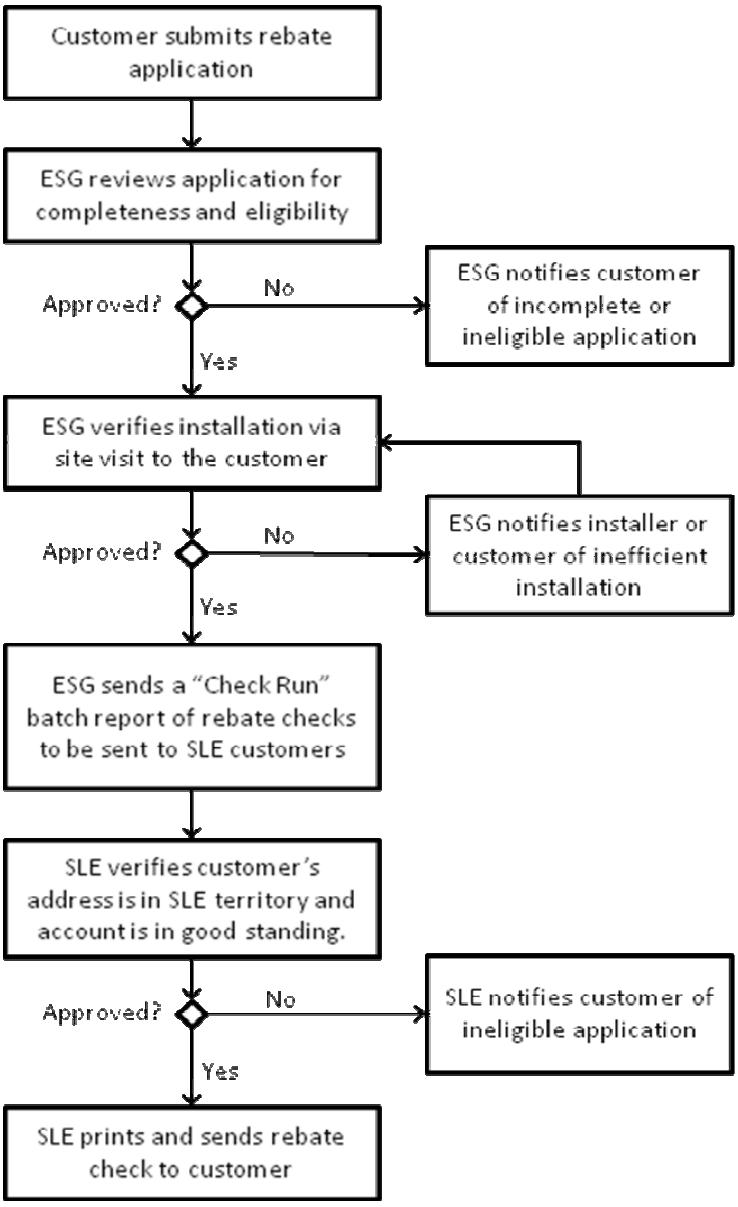
6.2 Process Review

SLE advertised the rebate program through two newspaper ads. SLE Customer Service representatives also promoted the program when speaking to SLE customers.

Most weatherization rebate applications were mailed directly to ESG by the customer requesting the rebate. Some applications were sent to SLE then forwarded to ESG by SLE. ESG evaluated the applications for completion and eligibility and called the applicant to schedule an onsite verification of the measure installation. SLE used the site inspection as an instrument of goodwill to the customer. SLE presented the site inspection as a way to ensure the measure was installed correctly and the customer got what he/she paid for. ESG staff site-verified all weatherization measures post-installation only. Applicants were notified of incomplete applications, ineligible measures, or incorrectly installed measures. Unpaid applications were typically due to ineligible measures.

Periodically, ESG created a batch list of checks to be paid by SLE to the customers. (Checks were paid to contractors with a signed waiver.) SLE verified these customers were in their service territory and had accounts in good standing before printing a check. It was typically about 10 weeks from the time the customer submitted the rebate application to the time the customer received the rebate check from SLE. This lengthy time period was the most common complaint SLE received from its customers. This process is illustrated in Chart 6.2.1 below.

Chart 6.2.1. Weatherization Program Process Overview



SLE remained flexible with its rebate program being open to customer requests of rebating measures not specifically identified in the program. In these cases, SLE contacted ESG to confirm whether rebating the measure was justified.

6.3 Sample Selection

OEFC obtained an Excel spreadsheet from ESG with all measures rebated in the Weatherization program. All measures were assigned a site number and used throughout this evaluation to retain the anonymity of the customers and reduce the likelihood of selection bias. We used Excel-generated random numbers to randomly select the number of applications identified as the initial sample design. Ten backup measures were also randomly selected (with priority order of use). OEFC was able to evaluate and measure energy savings for the entire initial sample; therefore no backup measures were used and the initial sample design was achieved. The composition of the achieved sample is shown in Table 6.3.1 below.

Table 6.3.1. Weatherization Program Achieved Sample Composition

Measure Name	Number of Measures in Initial Sample
Ceiling/Attic Insulation (R-0 to Minimum R-38)	1
Ceiling/Attic Insulation (Vintage to Minimum R-38)	3
Duct Sealing	2
Replacement Windows	1
Roof Radiant Barrier	4
Window Shade Screens	2
Wall Insulation	1

6.4 Data Collection

OEFC collected hard copies of applications included in the initial sample in addition to the backup application from ESG. Because a third party (ESG) had already verified information on the applications and performed a site visit to verify the measures were installed correctly and operational, OEFC omitted these steps. OEFC evaluated information included in the application packets to develop a telephone survey including general information, individualized technical Request for Information (RFI) questions, and NTG questions needed to evaluate actual energy savings for each site. This information is included in Appendices 7.3, 7.4, and 7.7.

OEFC called a total of 14 program participants up to three different times over multiple days within multiple weeks at various times of day. Eight of the fourteen customers were reached and responded to the RFIs. (Two of those customers did not respond to the NTG questions.) Of the six unresponsive customers, only three had outstanding RFIs. Probable assumptions were made for these customers' measures; therefore, no backup customers were used. Assumptions are included in Appendix 7.3. Table 6.4.1 below shows a summary of the weatherization survey call attempts and completions.

Table 6.4.1. Weatherization Survey Call Summary

Call Date Range	Attempted Surveys	Completed Surveys	Primary Sample Customers Used	Backup Sample Customers Used
8/9/12 - 8/15/12	14	8	8	0

6.5 Energy Savings Evaluation

OEFC used EnergyPro software to evaluate the energy savings of the measures. EnergyPro is on the California Energy Commission's List of Approved Computer Programs for the 2008 Residential and Nonresidential Energy Efficiency Standards[11]. For each case, we created a baseline house of its respective square footage with default construction. We included all parameters provided in the rebate application documentation, including the specific measure being upgraded. Unless alternative information was provided, the following was assumed: HVAC tonnage based on house square footage (400sqft./ton); SEER 10; 400 CFM/ton; and 0.7 BHP/1,000 CFM. We then created a second model with the respective EE retrofit measure and compared the energy usage of each model.

Table 6.5.1 provides the reported energy savings from SLE's E3 reporting tool, the energy savings calculated by OEFC, and the NTG ratio calculated from the telephone survey for each of the sampled measures.

[11] http://www.energy.ca.gov/title24/2008standards/2008_computer_prog_list.html

Table 6.5.1. Weatherization Program Reported and Evaluated Energy Savings

Site No	Measure	Reported kWh	Reported kW	Evaluated kWh	Evaluated kW	NTG_1
194	Ceiling/Attic Insulation (R-0 to minimum R-38)	726	0.51	1456	0.91	0.45
154	Ceiling/Attic Insulation (Vintage to minimum R-38)	366	0.40	462	0.76	NA
159	Ceiling/Attic Insulation (Vintage to minimum R-38)	145	0.16	733	0.97	NA
169	Ceiling/Attic Insulation (Vintage to minimum R-38)	191	0.21	405	0.31	NA
134	Duct Sealing and Insulation (R-0 to min R-8)	185	0.22	217	0.17	NA
172	Duct Sealing and Insulation (R-0 to min R-8)	185	0.22	182	0.12	NA
173	Replacement Windows (max U-factor/SHGC = 0.35/0.50)	72	0.12	669	1.05	NA
167	Roof Radiant Barrier	816	2.96	560	2.08	0.64
175	Roof Radiant Barrier	689	2.50	507	1.80	NA
185	Roof Radiant Barrier	660	2.40	457	1.72	NA
186	Roof Radiant Barrier	1216	4.42	419	0.50	NA
180	Window Shade Screens (maximum SHGC= 0.50)	48	0.04	21	0.02	1.00
157	Window Shade Screens (maximum SHGC= 0.50)	346	0.28	512	0.28	1.00
152	Wall Insulation: (R-0 to minimum R-13)	159	0.14	367	0.72	0.48
	Total	5804	14.58	6967	11.43	

1) NA means the ratio could not be determine because the customer could not be reached or the customer's response was inconclusive.

6.6 Results

Table 6.6.1 below shows the calculated realization rates between the energy savings reported and the energy savings evaluated by OEFC. The Net Realization Rate uses the NTG multiplier and estimates the actual energy savings attributed to the program.

Table 6.6.1. Weatherization Program Realization Rates

Site No	Measure	kWh Realization Rate (%)	kW Realization Rate (%)	Net kWh Realization Rate (%)[1]	Net kW Realization Rate (%)[1]
194	Ceiling/Attic Insulation (R-0 to minimum R-38)	201	178	90	80
154	Ceiling/Attic Insulation (Vintage to minimum R-38)	126	191	NA	NA
159	Ceiling/Attic Insulation (Vintage to minimum R-38)	506	606	NA	NA
169	Ceiling/Attic Insulation (Vintage to minimum R-38)	212	149	NA	NA
134	Duct Sealing and Insulation (R-0 to min R-8)	117	79	NA	NA
172	Duct Sealing and Insulation (R-0 to min R-8)	98	56	NA	NA
173	Replacement Windows (max U-factor/SHGC = 0.35/0.50)	929	875	NA	NA
167	Roof Radiant Barrier	69	70	44	45
175	Roof Radiant Barrier	74	72	NA	NA
185	Roof Radiant Barrier	69	72	NA	NA
186	Roof Radiant Barrier	34	11	NA	NA
180	Window Shade Screens (maximum SHGC= 0.50)	44	50	44	50
157	Window Shade Screens (maximum SHGC= 0.50)	148	101	148	101
152	Wall Insulation: (R-0 to minimum R-13)	231	514	110	246
	Entire Weatherization Sample	**120**	**78**	**NA**	**NA**
	Average of Weatherization Sample	**204**	**216**	**87**	**104**

1) Net Realization Rates were available only if a NTG ratio was determined and displayed in previous table.

Our NTG survey results (see Appendix 7.4) found that the rebate program has a significant impact on measure installation. While only six of fourteen customers responded to the survey, all of them indicated the rebate program impacted their decision. Without the rebate program, they probably would not have installed the measure or would have installed a less efficient measure.

SLE has had success this year with some entrepreneurial contractors taking advantage of SLE's weatherization rebate program and spreading the word.

Several instances occurred where site inspectors found incorrect installations and required the contractor to return for proper installation. This is an excellent source of goodwill towards customer and accountability from contractors.

6.7 Recommendations

OEFC recommends SLE consider the following recommendations to increase the energy savings resulting from SLE's energy efficiency program and increase the accuracy of its reporting:

- **Consider creating custom measures for insulation and window replacement measures.**

  With such a small number of samples, it is difficult to generalize; however, most of the wall and ceiling insulation and window replacement measures were significantly underreported. Since these measures make up about 25 percent of SLE's reported weatherization savings, SLE should consider modeling those items to determine savings and entering them as custom measures in E3.

  Conversely, all of the Radiant Roof Barrier measures sampled were overreported. These measures make up nearly 60 percent of SLE's weatherization savings. While it seems to be a popular measure (29 percent of total weatherization rebates submitted) and provides SLE with significant kWh savings, the realization rate of the sampled measures was only 57 percent.

  Modeling every installation may be cost prohibitive. The installer may provide this service. Alternatively, SLE could research the assumptions made in E3. If the assumptions do not generally apply to the SLE service territory, SLE could create new deemed energy savings.

- **Consider changing the weatherization rebate program rebate amounts.**

  SLE's E3 report shows the weatherization program with attractive PAC and TRC cost test ratios – especially ceiling/attic insulation. This EM&V study found ceiling insulation to be underreported in E3 for all samples analyzed. Ceiling insulation makes up a proportionately small amount of SLE's energy savings, so it may be a good area for growth. While additional program marketing alone may increase measure installations, if the budget permits, there appears to be room to increase the rebate for targeted weatherization measures.

- **Advertise rebate programs to SLE customers and SLE-rebated weatherization measure installers.**

  SLE should increase advertising of their weatherization program in two ways:
  - Promote installation of weatherization measures by explaining the environmental, cost-saving, and comfort benefits of weatherization measures (customer examples of payback might be helpful). Since many weatherization measures are expensive and invasive, SLE should focus this kind of advertising on the least expensive, least invasive, and/or most energy-saving measures.
  - Promote energy-efficient upgrades to customers already looking to make modifications to their homes. This type of advertising should focus on the synergies of energy efficient upgrades during remodels and their environmental, cost-saving, and comfort benefits. This advertising should be targeted at contractors (to promote to their clients) or customers at home shows.

- **Actively seek and partner with weatherization measure installers**

  Some installers of weatherization measures in SLE's service territory are already using SLE's rebate programs to promote their services. Consider expanding this marketing strategy since many weatherization measures are most efficiently installed when doing other construction work. SLE could do this for all measures, or just select the most cost-effective, beneficial measures as a starting point. SLE could offer training on proper installation of those measures to attract contractor partners (who could then be listed on SLE's fliers and/or website). Alternatively, SLE could call or send information about the weatherization measure benefits and rebates to local contractors. SLE could also provide contractors with fliers to distribute to their clients about the environmental, cost-saving, and comfort benefits of applicable weatherization measures.

- **Provide instant rebates to weatherization measure installers.**

  Since the ten-week period required to process rebates is the greatest complaint among program participants, we can assume that SLE customers like their rebates sooner than later. (The Appliance program survey also unveiled that SLE customers are interested in an immediate discount.) We recommend SLE provide customers with instant rebates by suggesting SLE-rebated weatherization measure installers include the rebate as a discount on their service. This discount may allow customers to make more energy-efficient purchases. Installers would submit all receipts and rebate applications on behalf of the customer, and the rebate check(s) would be paid directly to the installer. It would be important to call the customer or field-verify installation prior to paying the vendor.

- **Consider decreasing the current 100 percent site verification standard.**

  One hundred percent site verification ensures all measures are installed and installed correctly for greater reporting accuracy. However, site verification can be costly and increases rebate processing time. Performing site inspections at random and/or for rebates over a specified dollar amount (and customer call verifications for all others) would decrease processing time and costs.

7 Appendices

7.1 Appliance Program Sample Survey Responses

Site No	Measure	Installed?	Working?	Model Verified?	Why that model?	Replacing Older Unit?	Age of Replaced Unit	Loads/ Week	<> Loads than Previous	Hot Water Source
50	ENERGY STAR Clothes Washer	Yes	Yes	Yes	Salesman liked it	Yes	5-10 NR	6-7	More	Electric
4	ENERGY STAR Clothes Washer	Yes	Yes	Yes	Dinged - Reduced	Yes	5-10 NR	3-4	More	Electric
98	ENERGY STAR Dishwasher	Yes	Unknown	Yes	Contractor liked it	Yes	<5 ER	?	?	Electric
Site No	**Measure**	**Installed?**	**Working?**	**Model Verified?**	**Why that model?**	**Replacing Older Unit?**	**Where is Old Unit?**	**Age of Replaced Unit**	**Freezer?**	**Freezer Location**
105	ENERGY STAR Refrigerator	Yes	Yes	Yes	Rebate	Yes	Hauled away	20+ NR	Yes	Top
3	ENERGY STAR Refrigerator	Yes	Yes	Yes	Top freezer	Yes	Hauled away	20+ NR	Yes	Top
8	ENERGY STAR Refrigerator	Yes	Yes	Yes	Liked Kenmore	Yes	Recycled	20+ NR	Yes	Bottom
11	ENERGY STAR Refrigerator	Yes	Yes	Yes	Product features	No	N/A	N/A ER	Yes	Side
56	ENERGY STAR Refrigerator	Yes	Yes	?	Energy Efficiency	Yes	Hauled away	20+ NR	Yes	Top
76	ENERGY STAR Refrigerator	Yes	Yes	Yes	Best fit for home	Yes	Garage	None? NR	Yes	Bottom
115	ENERGY STAR Refrigerator	Yes	Yes	Yes	Dented - Reduced	Yes	Hauled away	5-10 ER	Yes	Side
62	ENERGY STAR Refrigerator	Yes	Yes	Yes	Wanted GE	Yes	Hauled away	10-20 NR	Yes	Side

7.2 Appliance Program Sample NTG Survey Responses

Site No	Measure	NTG Questions				NTG Multipliers				NTG
		1	2	3	4	Q1	Q2	Q3	Q4	
50	ENERGY STAR Clothes Washer	5	5	4	5	0.75	0.75	0.85	1	0.48
4	ENERGY STAR Clothes Washer	2	2	5	1	0.95	0.95	0.75	0.5	0.34
98	ENERGY STAR Dishwasher	5	5	5	5	0.75	0.75	1	1	0.56
105	ENERGY STAR Refrigerator	3	5	5	1	N/A	0.75	0.75	0.5	NA
3	ENERGY STAR Refrigerator	5	5	5	2	0.75	0.75	0.75	0.75	0.32
8	ENERGY STAR Refrigerator	4	3	3	2	0.85	N/A	N/A	0.75	NA
11	ENERGY STAR Refrigerator	4	3	3	1	0.85	N/A	N/A	0.5	NA
56	ENERGY STAR Refrigerator	5	3	3	3	0.75	N/A	N/A	0.85	NA
76	ENERGY STAR Refrigerator	4	1	4	1	0.85	1	0.85	0.5	0.36
115	ENERGY STAR Refrigerator	5	3	5	1	0.75	N/A	0.75	0.5	NA
62	ENERGY STAR Refrigerator	2	NR	NR	NR	0.95	N/A	N/A	N/A	NA

7.3 Weatherization Program Sample RFIs and Assumptions

Site No	RFIs for Customer	Assumptions Made for Evaluation
194	None	7 HSPF (or 3.0 COP)
154	None (detailed HVAC specs provided)	
159	Q. Age of House? A. 1974 Q. Original R-value of roof? A. Doesn't know Q. Sqft. of house? A. 912 sqft.	R-11 original roof insulation Used wall electric heater and a PTAC cooling unit (8 EER)
169	Q. What was original roof insulation (R-19->R-30)?	R-19 original insulation 7 HSPF (or 3.0 COP)
134	None (detailed HVAC specs provided)	1,200 sqft. house
172	None (detailed HVAC specs provided)	
173	Q. Previous window type? A. Doesn't know Q. Orientations? A. Replaced all windows throughout, evenly distributed Q. Age of house? A. ~1975	Single-pane, metal frame, clear window 10% window-to-wall ratio Distributed window area 25% for each orientation
167	Q. Heat source? A. Gas	80% furnace
175	None	80% furnace
185	Q. Heat source?	Assumed heating type of gas furnace (80%)
186	None	Heater efficiency 3.41, with evap cooler
180	Q. Window type? A. Double pane, Vinyl, Clear Q. Orientation of shades A. East Q. Heat source? A. Gas furnace	Used Woven Suncreen 80% furnace
152	Q. Age of house? A. 1953 Q. Original wall insulation? A. Some walls had some, some did not. Q. Heat source? A. Gas furnace Q. Sqft of House? A. 1800 sqft.	Existing wall insulation was R-3 (default for 1953) 506 sqft. of walls were replaced equally in all four orientations 80% furnace (SEER 13)
157	Q. Window type? A. Double-pane, nonmetal, clear Q. Orientation of shades A. West	Overhang that covers 90% of windows (5' height) 80% furnace

7.4 Weatherization Program NTG Survey Responses

Site No	Measure	NTG Questions				NTG Multipliers				NTG
		1	2	3	4	Q1	Q2	Q3	Q4	
154	Ceiling/Attic Insulation (Vintage to minimum R-38)	called 8-13 and 8-15								NA
159	Ceiling/Attic Insulation (Vintage to minimum R-38)	3	3	2	5	n/a	n/a	0.95	0.50	NA
169	Ceiling/Attic Insulation (Vintage to minimum R-38)	called 8-9, 8-13. and 8-15								NA
134	Duct Sealing and Insulation (R-0 to min R-8)	called 8-13 and 8-15								NA
172	Duct Sealing and Insulation (R-0 to min R-8)	called 8-13 and 8-15								NA
173	Replacement Windows (max U-factor/SHGC = 0.35/0.50)	called 8-9 and 8-13								NA
167	Roof Radiant Barrier	4	1	1	4	0.85	1.00	1.00	0.75	0.64
175	Roof Radiant Barrier	called 8-9, 8-13. and 8-15								NA
185	Roof Radiant Barrier	called 8-9, 8-13. and 8-15								NA
186	Roof Radiant Barrier	called 8-13 and 8-15								NA
180	Window Shade Screens (maximum SHGC= 0.50)	1	-	-	-	1.00				1.00
152	Wall Insulation: (R-0 to minimum R-13)	4	1	5	4	0.85	1.00	0.75	0.75	0.48
157	Shade Screen (shading coefficient .50 or lower)	1	-	-	-	1.00				1.00

7.5 Net-to-Gross (NTG) Questions and Multipliers

The following multipliers were used to calculate the Net-to-Gross multiplier from NTG survey responses.

Q#	Question	Answer	Multiplier
1	If the Rebate program had not existed, would you have installed the same equipment?	1-Definitely NOT	1
		2-Probably NOT	0.95
		3-Don't know	N/A
		4-Probably	0.85
		5-Definitely	0.75
2	If you had installed the measures without the program, do you think the equipment would have been as efficient?	1-Definitely NOT	1
		2-Probably NOT	0.95
		3-Don't know	N/A
		4-Probably	0.85
		5-Definitely	0.75
3	If you installed the equipment without the program, do you think you would have installed it during the same time period?	1-Definitely NOT	1
		2-Probably NOT	0.95
		3-Don't know	N/A
		4-Probably	0.85
		5-Definitely	0.75
4	If not installed at the same time period, when do you believe it would have been installed?	1-Within a Month	0.5
		2- Within 1-6 Months	0.75
		3- Within 6 Months to 1 Year	0.85
		4- Within 1 to 2 Years	0.95
		5- After 2 Year	1

7.6 Shasta Lake Appliance Rebate Program Survey

Survey Date:
Site No.:
Site Contact Name: <Customer Name>
Site Contact Phone:

Introduction

Hello, my name is <interviewer name>and I'm calling on behalf of Shasta Lake Electric Utility regarding your installation of <measure rebated and installed> in <year installed>.
.
My I speak with <Customer Name>
Yes {*Proceed with intro*.}
No
- {*find out when* <Customer Name>*will be available and reschedule*}
- {If not available, ask to speak to the person responsible or familiar with the purchase of this appliance}

Our firm is conducting research for Shasta Lake Electric to assess accomplishments of their rebate programs and improve Shasta Lake Electric's energy efficiency programs. I am not selling anything and your identity will be completely confidential. This survey will take about 5 minutes or less.

1. Are you the most appropriate person to talk to about the decision to purchase and install the appliance?
YES *Skip to Question A1, B1, or C1*
NO "May I ask who would be the best person to talk to?" *{Obtain, name, phone number }*
Name
Phone
DOES NOT REMEMBER purchase {*Ask Question 2}*

2. Do you recall purchasing and installing the <appliance>?
YES *Skip to Question A1, B1, or C1*
NO "Can you provide me with a contact name and phone number for a person who might be familiar with this purchase? *{Obtain title, name and phone number}*
Name
Phone
{Ask to speak with this person and start again at the beginning.}
{If they express hesitation, use an appropriate combination of the following.}

> **Security:** "Your response will be kept confidential and your individual response will not be shared with anyone."
> **Sales concern:** "I am not selling anything. I simply want to understand what factors were important when you decided to purchase and install the measure."
> **Contact:** "If you would like to talk with someone from Shasta Lake Utility about this effort, you can call **Tom Miller**, who is the **Electric Utility Director** for the **City of Shasta Lake.** He can be reached at **530-275-7457**.

Questions for Savings Analysis

{Ask only questions under the section of the appliance installed: dishwasher, clothes washer, or refrigerator.}

DISHWASHER

To determine if the appliance is installed and working properly:

A1: Is your dishwasher installed at <Address>

Yes – {*jump to A2*}

No – If no, which of the following best describes what happened to your appliance:

It was installed somewhere else. { find out if it was installed within the City of Shasta Lake service territory}

It is in storage or is disconnected and not in use.

It is broken and no longer working.

It was sold or given away.

Don't know

Refused

Other_{*describe*}_____

A2: Is your dishwasher working and performing as you expected?

Yes

No{*describe why*}_____

Other {*describe*}_____

Don't know

A3: The rebate application indicates you purchased a <<Make and Model>from application>. Is this correct?

Yes – Make

Yes – Model # {may be determined from owner's manual, appliance tag, or invoice receipt} on appliance

Don't know either

Other description provided:_____

A4: Why did you choose to purchase this <Dishwasher>

Answer:_____

To determine the dishwasher estimated energy savings:

A5: Did you replace an older <Dishwasher> with this new one?

Yes

No {*skip to A7}*

Don't know

Refused

A6: About how old was the dishwasher you replaced? The appliance rebate form indicates <Age> years – is this correct? <Yes> <No>

Less than 5 years old

5 to less than 10 years old

10 to less than 20 years old

20 or more years old

A7: About how many loads of dishes do you wash each week?

Number:_____

Don't know

{*Only ask A8 if they answered "Yes" to A5*}

A8. Would you say that this is more, the same, or less loads per week than you did with your old Dishwasher?

More

The same

Less

Don't know

Refused

A9: Dishwashers use hot water. What type of fuel does your hot water heater use?

Natural gas

Electric

Don't know

CLOTHES WASHER

To Determine if the appliance is installed and working properly:

B1: Is your clothes washer installed at <Address>?

Yes – {*jump to B2*}

No – If no, which of the following best describes what happened to your appliance:

It was installed somewhere else. {*find out if it was installed within the City of Lodi*}
It is in storage or is disconnected and not in use.
It is broken and no longer working.
It was sold or given away.
Don't know
Refused
Other_{*describe*}_____

B2: Is your clothes washer working and performing as you expected?

Yes
No{*describe why*}_____
Other {*describe*}_____
Don't know

B3: The rebate application indicates you purchased a <Make and Model> from application>. Is this correct?

Yes – Make
Yes – Model # {may be determined from owner's manual, appliance tag, or invoice receipt} on appliance
Don't know either
Other description provided:_____

B4: Why did you choose to purchase this <Clothes Washer>?

Answer:_____

To determine the clothes washer estimated energy savings:

B5: Did you replace an older <Clothes Washer>with this new one?

Yes
No [*skip to B7*]
Don't know)
Refused

B6: About how old was the clothes washer you replaced?

The appliance rebate form indicates <Age> years – is this correct? <Yes> <No>
Less than 5 years old
5 to less than 10 years old
10 to less than 20 years old
20 or more years old

B7: About how many wash loads do you do per week?

Number:_____
Don't know

{*Only ask B8 if they answered "Yes" to B5*}

B8. Would you say that this is more, the same, or less loads per week than you did with your old clothes washer?

More
The same
Less
Don't know
Refused

B9: Clothes Washer use hot water. What type of fuel does your hot water heater use?

Natural gas
Electric
Don't know

REFRIGERATOR

To Determine if the appliance is installed and working properly:
C1: Is your refrigerator installed at <Address>?
Yes – {*jump to C2*}
No – If no, which of the following best describes what happened to your appliance:
It was installed somewhere else. {*find out if it was installed within City of Shasta Lake territory*}
It is in storage or is disconnected and not in use
It is broken and no longer working.
It was sold or given away.
Don't know
Refuse
Other_{*describe*}_____

C2: Is your refrigerator working and performing as you expected?
Yes
No{*describe why*}_____
Other {*describe*}_____
Don't know

C3: The rebate application indicates you purchased a <Make and Model> from application>. Is this correct?
Yes – Make
Yes – Model # {may be determined from owner's manual, appliance tag, or invoice receipt} on appliance
Don't know either
Other description provided:_____

C4: Why did you choose to purchase this <Refrigerator>
Answer:_____

To determine if the refrigerator estimated energy savings:
C5: Did you replace an older <Refrigerator> with this new one?
Yes
No [*skip to C8*]
Don't know)
Refused

C6: What did you do with your old refrigerator?
Answer:_____

C7: About how old was the refrigerator you replaced? The appliance rebate form indicates <Age> years – is this correct? <Yes> <No>
Less than 5 years old
5 to less than 10 years old
10 to less than 20 years old
20 or more years old
No refrigerator replaced

C8. Does the new refrigerator have a freezer unit?
Yes-
No {*skip to end*}
Don't know
Refused

C9. Where is the freezer unit located?
Bottom
Top
Side of refrigerator

Net-to-Gross Questions for Savings Analysis

If the Appliance Rebate program had not existed, would you have purchased the same appliance?

1-Definitely NOT
2-Probably NOT
3-Don't know
4-Probably
5-Definitely

If they answer "1" then you can stop asking them questions. If they answer 2-5 continue to the questions below.

If you had purchased the appliance without the program, do you think the appliance would have been as efficient?

1-Definitely NOT
2-Probably NOT
3-Don't know
4-Probably
5-Definitely

If you purchased the appliance without the program, do you think you would have purchased it during the same time period?

1-Definitely NOT
2-Probably NOT
3-Don't know
4-Probably
5-Definitely

If not installed at the same time period, when do you believe it would have been installed?

1-Within a Month
2- Within 1-6 Months
3- Within 6 Months to 1 Year
4- Within 1 to 2 Years
5- After 2 Year

Closing

That is all the questions I have. Thank you very much for taking the time to talk with me. Your responses will help Shasta Lake Electric continue to improve and enhance its energy efficiency programs for the City of Shasta Lake and its residents. Do you have any final questions or comments.

{*Record any qualitative information offered*} _____

_____

_____

_____

_____

_____

7.7 Shasta Lake Weatherization Rebate Program Survey

Survey Date: MM/DD/YY
Site No.:
Site Contact Name: <Customer Name>
Site Contact Phone:

1. INTRODUCTION
Hello, my name is <interviewer name>and I'm calling on behalf of Shasta Lake Electric Utility regarding
your installation of <measure rebated and installed> in <year installed>.
.
My I speak with <Customer Name>
Yes {*Proceed with intro.*}
No
- {*find out when* <Customer Name>*will be available and reschedule*}
- {If not available, ask to speak to the person responsible or familiar with the purchase of this appliance}

Our firm is conducting research for Shasta Lake Electric to assess accomplishments of their rebate programs and improve Lodi's energy efficiency programs. I am not selling anything and your identity will be completely confidential. This survey will take about 5 minutes or less.

1. Are you the most appropriate person to talk to about the decision to purchase and install the measure ?

YES *Skip to Question A1*
NO "May I ask who would be the best person to talk to?" *{Obtain, name, phone number }*
Name
Phone

DOES NOT REMEMBER purchase {*Ask Question 2}*
2. Do you recall purchasing and installing the <measure>?
YES *Skip to Question A1*
NO "Can you provide me with a contact name and phone number for a person who might be familiar with this purchase? *{Obtain title, name, phone number, email address}*
Name
Phone
{Ask to speak with this person and start again at the beginning.}
{If they express hesitation, use an appropriate combination of the following.}
Security: "Your response will be kept confidential and your individual response will not be shared with anyone."
Sales concern: "I am not selling anything. I simply want to understand what factors were important when you decided to purchase and install the measure."
Contact: "If you would like to talk with someone from Shasta Lake Utility about this effort, you can call **Tom Miller**, who is the **Electric Utility Director** for the **City of Shasta Lake.** He can be reached at **530-275-7457**.

Technical Questions for Savings Analysis

{Ask site-specific RFIs)

Net-to-Gross Questions for Savings Analysis

If the Weatherization Rebate program had not existed, would you have installed the same equipment?

1-Definitely NOT
2-Probably NOT
3-Don't know
4-Probably
5-Definitely

If they answer "1" then you can stop asking them questions. If they answer 2-5 continue to the questions below.

If you had installed the measures without the program, do you think the equipment would have been as efficient?

1-Definitely NOT
2-Probably NOT
3-Don't know
4-Probably
5-Definitely

If you installed the equipment without the program, do you think you would have installed it during the same time period?

1-Definitely NOT
2-Probably NOT
3-Don't know
4-Probably
5-Definitely

If not installed at the same time period, when do you believe it would have been installed?

1-Within a Month
2- Within 1-6 Months
3- Within 6 Months to 1 Year
4- Within 1 to 2 Years
5- After 2 Year

That is all the questions I have. Thank you very much for taking the time to talk with me. Your responses will help Shasta Lake Electric continue to improve and enhance its energy efficiency programs for the City of Shasta Lake and its residents. Do you have any final questions or comments.

Include anything else offered here…_____

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