

2014 Nonresidential Downstream Deemed ESPI Pipe Insulation Impact Evaluation Report

Prepared for
California Public Utilities Commission

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Executive Summary

This report documents the activities undertaken by the Nonresidential Downstream Deemed ESPI Impact Evaluation of the 2013-2014 investor-owned utilities' (IOU) energy efficiency programs.¹ The overall goal of this study is to perform an impact evaluation on the deemed savings and measure-parameters associated with the pipe insulation measures that were identified in the Efficiency Savings and Performance Incentive (ESPI) decision.²

The objective of this study is to perform a measure and/or measure-parameter impact evaluation, utilizing new primary evaluation data, in order to update existing gross and/or net savings estimates and inform future savings values for the pipe insulation measures identified in the ESPI decision. In order to implement this approach in meeting the overall study goal, a number of research objectives were targeted. The following tasks have been performed by collecting new primary data from participant phone surveys and on-site verification analyses:

- Confirm installations (verification). This step includes on-site verification of measure installations that represent a significant percentage of ex ante claimed natural gas savings.
- Estimate baseline (pre-retrofit) and replacement (post-retrofit) pipe heat loss rates and operating hours to support the estimate of unit energy savings values.
- Estimate participant free-ridership to support the development of net-to-gross ratios and net savings values.
- Based on the above, estimate first year and lifetime gross and net ex post impacts (therm) for pipe insulation measures.

Pipe insulation measures are generally classified into two groups: hot applications (leading to natural gas savings) and cold applications (leading to electric savings). The Pipe Insulation – Hot Application measure contributes 1.6% to the statewide portfolio's overall therm savings in 2013, and increasingly so (2.3%) in 2014. However, the Pipe Insulation – Cold Application measure contributes insignificantly to overall portfolio kWh and kW savings in 2013 and 2014. As a result, the hot application savings are the focus of this study, and the cold application measure group is not assessed in this study.

¹ This report focuses on the ESPI measures that were identified for the 2013 program cycle.

² D.13.09.023, Decision Adopting Efficiency Savings and Performance Incentive Mechanism. <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M076/K775/76775903.PDF>

The evaluation team designed a sampling approach to achieve statistically significant results at the measure level; the initial sample design was generated using 2013 and 2014 program participants. Per 2013-14 tracking data, the most significant savings are generated from hot water and medium pressure steam boilers within PG&E and SCG service territories. As a result, the initial sample design included only sites within these territories and with insulation on hot water and medium pressure steam pipe runs. Phone surveys and on-sites were initially attempted for only the projects in the preliminary sample; however, due to lower-than-expected response rate and the limited population, a census was eventually attempted to meet the desired sample of 30 on-sites.

1.1 Key Findings

Two distinct evaluation activities were performed, as summarized below.

Gross Energy Savings Analysis. The primary objective of this activity was to develop gross and net realization rates (ratio between *ex post* and *ex ante* savings) that can be applied to the participant population for the pipe insulation measure, such that population estimates of net and gross savings can be estimated for both first year and lifecycle savings. For each sampled project in the analysis, *ex post* savings were evaluated by separately establishing a number of impact parameters including installation rates; annual operating hours; bare pipe and surrounding air temperatures; and boiler combustion efficiencies. These parameters were estimated based on performing on-site audits on 31 projects that encompassed 93 distinct pipe runs at commercial and industrial facilities. Measurement and verification was performed for each distinct pipe run in the sample of 31 projects.

Net-To-Gross Analysis. The objective of this analysis was to develop net-to-gross ratios (NTGRs) for the pipe insulation measure group. The approach for estimating NTGRs was based on a self-report methodology utilizing 49 participant survey phone responses. This methodology was based on the large non-residential free ridership approach developed by the NTGR Working Group and documented in Appendix C of that report, *Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Non-residential Customers*. The methodology estimated three separate measurements of free ridership from different inquiry routes and then averaged the values to derive the final free ridership estimate at the measure level.

Table 1-1 presents the overall results for this study. Shown are the net and gross *ex ante* and *ex post* values, along with NTGRs, gross realization rates (GRRs), and net realization rates (NRRs), for the first year therm savings from pipe insulation measures.³ Results are presented by IOU.

³ All IOU *ex ante* data are derived directly from the 2013-2014 quarterly tracking data posted to Energy Division's Central Server with the vintage of 11/02/2015. These *ex ante* data originate directly from the IOUs.

These savings represent all pipe insulation (hot application) measures that were evaluated as part of this study. Overall 65% of the first year net ex ante therm savings were realized through the evaluation. Lifecycle realization rates are similar to the first-year realization rates listed in Table 1-1 as evaluators used the same effective useful life as the IOUs in the lifecycle savings calculation.

Table 1-1: Aggregate First Year Therm Savings and Realization Rates by IOU for 2014 Pipe Insulation Measure Population

PA	First Year Gross Therms Savings				First Year Net Therms Savings			
	Ex ante Savings	Ex post Savings	GRR	Relative Precision	Ex ante Savings	Ex post Savings	NRR	Relative Precision
PG&E	370,701	341,227	92%		247,569	167,377	68%	
SCG	905,293	709,301	78%		543,176	347,923	64%	
SDG&E	6,903	4,676	68%		4,142	2,294	55%	
Statewide	1,282,898	1,055,204	82%	13%	794,886	517,593	65%	17%

1.2 Conclusions

This section presents the conclusions developed for this evaluation. Section 6 of the report explains each of these conclusions in more detail.

Installation Rates

- All rebated insulation was determined to be 100% installed as tracked. However, the field auditors determined that 9% of the rebated insulated piping required minimally-compliant baseline insulation;⁴ this baseline adjustment resulted in a 5% reduction of the GRR.

Operating Hours

- Boiler annual operating hours in large commercial and industrial facilities were found to be 5,560 and 6,560 hours per year, respectively.

Pipe Temperature

- The hot water bare pipe temperature was found to be 136°F and 135°F at commercial and industrial facilities, respectively. The medium-pressure steam bare pipe temperature was found to be 292°F and 317°F at commercial and industrial facilities, respectively.

⁴ OSHA requires that pipes with a surface temperature of 140°F or greater that are “located within 7 feet measured from floor or working level or within 15 inches measures horizontally from stairways, ramps, or fixed ladders shall be covered with a thermal insulating material or otherwise guarded against contact.”

Surrounding Air Temperature

- The hot water piping's surrounding air temperature was found to be 81°F and 76°F at commercial and industrial facilities, respectively. The medium-pressure steam piping's surrounding air temperature found to be 79°F and 87°F at commercial and industrial facilities, respectively.

Boiler Combustion Efficiency

- The hot water boiler combustion efficiency was found to be 78%, but no difference was found for the IOU-assumed medium-pressure steam boiler combustion efficiency of 83%.

Pipe Diameter

- The average diameter of insulated pipe was considerably higher for all customers and fluid types in the higher-diameter tier. Greater-than-assumed diameter leads to higher savings per insulated linear foot.

Net-to-Gross Ratio

- The pipe insulation measure NTGR was found to be 0.49.

2

Introduction and Overview of Study

This report documents the activities undertaken by the Nonresidential Downstream Deemed ESPI Impact Evaluation of the 2013-2014 IOUs' energy efficiency programs⁵. The overall goal of this study is to perform an impact evaluation on the deemed savings and measure-parameters associated with the pipe insulation measures that were identified in the ESPI decision.⁶

This report is informed by Attachment 2 and 3 of the ESPI decision for program year (PY) 2013 and details the goals and objectives of the impact evaluation to meet those requirements. Likewise, the report will discuss the researchable issues, information on the measure groups evaluated as well as the data sources used, the approach for sampling, the verification analysis and the methods used to determine ex post energy and demand impacts. Finally, the report will present the results and findings from the analysis that can then be used to update the impact parameters, unit energy savings (UES), NTGRs, and gross/net first year and lifecycle savings for the measures detailed in the ESPI decision.

2.1 Evaluation Research Objectives

The objective of this study is to perform a measure and/or measure-parameter impact evaluation, utilizing existing evaluation data and new primary evaluation data, in order to update existing gross and/or net savings estimates and inform future savings values for the pipe insulation measures identified in the ESPI decision. Attachment 2 of the ESPI decision provides an overview of the portfolio parameters that have been identified as potentially requiring ex post verification. The parameters associated with deemed measure verification for pipe insulation include: measure installation/verification, UES, NTGRs, gross and net energy savings values, effective useful life (EUL), bare pipe temperature, ambient temperature, annual hours of operation, and boiler combustion efficiency.

In order to implement this approach in meeting the overall study goal, a number of research objectives were targeted. The following tasks have been performed by collecting new primary data from participant phone surveys and on-site verification analyses. A more thorough

⁵ This report focuses on the ESPI measures that were identified for the 2013 program cycle.

⁶ D.13.09.023, Decision Adopting Efficiency Savings and Performance Incentive Mechanism. <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M076/K775/76775903.PDF>

discussion of how these research objectives are applied to the pipe insulation measures and the algorithm by which they have been evaluated are discussed in Section 4, but to summarize:

- Confirm installations (verification). This step includes on-site verification of measure installations that represent a significant percentage of ex ante claimed natural gas savings.
- Estimate baseline (pre-retrofit) and replacement (post-retrofit) pipe heat loss rates and operating hours to support the estimate of unit energy savings values.
- Estimate participant free-ridership to support the development of net-to-gross ratios and net savings values.
- Based on the above, estimate first year and lifetime gross and net ex post impacts (therm) for pipe insulation measures.

2.2 Studied Measure Groups

Table 2-1 presents the pipe insulation measure group's contribution to each PA's portfolio electric and natural gas energy savings⁷ (as well as the statewide contribution) for 2013 and 2014.

Table 2-1: Summary of Deemed ESPI Pipe Insulation Measure Expressed as a Percentage of each PA's 2013 and 2014 Portfolio Gross Ex ante Savings

	2013 Savings				2014 Savings			
	SW	PG&E	SCG	SDG&E	SW	PG&E	SCG	SDG&E
kW	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
kWh	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Therms	1.6%	0.6%	3.2%	1.7%	2.3%	1.2%	4.3%	0.3%

As evidenced above in Table 2-1, pipe insulation contributes insignificantly to overall portfolio kWh savings in 2013 and 2014. As a result, the Pipe Insulation – Cold Application measure group is not assessed in this study. On the other hand, Pipe Insulation – Hot Application contributes significantly to the portfolio's therm savings, and increasingly so in 2014, as indicated in Table 2-1. Therefore, hot application savings from pipe insulation is the focus of this study.

Different levels of rigor have been applied to most appropriately assess the performance of the pipe insulation measure. These levels of rigor are informed by the availability and reliability of

⁷ These savings do not include those associated with Codes and Standards.

existing data sources along with the need to gather new primary data. Table 2-2 summarizes the levels of rigor applied to pipe insulation measure groups.

Table 2-2: Percent Portfolio Savings, Levels of Rigor and Data Sources for 2013-14 Deemed ESPI Measures

Measure Group	2013-14 Savings (% of total kWh or therm)	Level of Rigor	Existing Data Source	New Data Collection		Monitoring Source
				Phone Survey	On-Site	
Pipe insulation cold application	0.0%	Do Nothing	No	No	No	Do Nothing
Pipe insulation hot application	2.0%	High	No	Yes	Yes	New

The energy savings associated with each level of rigor (as a percentage of the statewide deemed ex ante ESPI savings) is provided below along with a brief discussion of how these levels of rigor have been applied:

- **High** – 0% of deemed pipe insulation kWh and kW savings; 100% of deemed pipe insulation therm savings
 - For the hot application pipe insulation measure, new primary data has been collected utilizing a phone and on-site survey instrument, including the measurement of combustion efficiency and the installation of temperature loggers.
- **Do Nothing** – 100% of deemed pipe insulation kWh and kW savings
 - For the cold application pipe insulation measure, which comprises no more than 0.1% of any IOU's portfolio kWh or kW savings, there are no existing data sources to utilize and no new primary data has been collected.

2.3 Overview of Impact Evaluation Approach

For pipe insulation measures, the general approach used to estimate ex post gross savings values was based on developing hourly heat loss profiles for both baseline (bare or less-insulated pipe) and as-built (insulated pipe) conditions. Heat loss calculations reflect conduction, convection, and radiation heat transfer processes. Metered data characterizes specific parameters included in the following algorithm:

$$\Delta Q = \frac{t * (Q_p - Q_i)}{100,000 * E_b}$$

Where,

ΔQ = annual energy savings (in therms). This parameter represents the ex post savings objective of this study.

t = annual operating time, in hours. Metered data on pipe surface temperature indicates when the insulated pipe transmits heated fluid. Metered data, gathered over 2-8 weeks, was extrapolated to represent a full year, after accounting for any seasonal variations determined from facility staff interviews. For long spans of insulated pipe, installed meters were deployed as close to the pipe span's midpoint as possible.

Q_p = Heat Loss Rate from Bare (or Less-Insulated) Pipe⁸ (Btu/hr/ft). Bare pipe experiences heat loss from convection and radiation processes. Both convection and radiation heat losses are primarily dependent on the following parameters: pipe diameter, pipe surface temperature, and ambient air temperature, the latter two of which were determined from interval metered data. Other pipe and insulation parameters were collected during the site visit. Remaining relevant parameters such as pipe conductivity and pipe emissivity were referenced from a heat transfer resource⁹ based on material type.

Q_i = Heat Loss Rate from Insulated Pipe (Btu/hr/ft). Insulated pipe features convection and radiation heat transfer processes, as described above, but also involves conduction heat transfer between the pipe and insulating material. Key insulation characteristics such as thickness and material were confirmed during each site visit. The insulation's surface temperature was spot-measured during the site visit, and relevant insulation parameters (conductivity and emissivity) were referenced from manufacturer data.

E_b = Combustion efficiency (%) of the boiler being used to generate the hot water or steam in the pipe. Combustion efficiency was spot-measured during each site visit or referenced from manufacturer testing data.

100,000 = conversion factor (1 therm = 100,000 Btu).

To develop the UES values, each of the above parameters is informed by metered and/or collected data from site inspections.

⁸ Should the affected pipe have required insulation per OSHA guidelines, the baseline reflects the minimum level of insulation needed to comply. Information on OSHA compliance and minimum insulation requirements were gathered through discussions with facility staff.

⁹ An example resource is: *Introduction to Heat Transfer*, Frank Incropera and David DeWitt, John Wiley & Sons, Inc, New York, NY, 2002.

The remainder of this report will discuss how these UES values were generated for the ESPI pipe insulation measure along with the following:

- Section 3 discusses the data sources that were utilized to estimate each of the individual measure-parameters, the sample design, and resulting data used in the evaluation.
- Section 4 presents the methods used for estimating each individual impact parameter, including the installation rate, the various temperature values, the pre- and post-operating hours, and the NTGRs.
- Section 5 presents the final study results, including a discussion of how the UES values were applied to the population to develop gross and net realization rates and total population level ex post energy savings values.
- Section 6 summarizes the key findings and conclusions from this measure study.
- Appendix A presents the participant telephone survey instrument.
- Appendix B presents the on-site survey instrument.
- Appendix C presents the phone survey banners.
- Appendix D presents the detailed project level data and results.
- Appendix AA presents the standardized high level savings for both gross and net first year and lifecycle.
- Appendix AB presents the standardized per unit savings for both gross and net first year and lifecycle.

3

Data Sources, Sample Design, and Data Collection

3.1 Data Sources

A number of data sources were utilized to support the development of each impact parameter in order to update UES values, installation rates and NTGRs for the ESPI pipe insulation measure researched in this study. As discussed in Section 2, the impacts associated with the pipe insulation measure rely exclusively on new primary on-site data collection: (1) engineering on-site assessments to evaluate the gross impacts associated with those measures and (2) new phone surveys to generate NTGRs. The various sources of data are discussed in more detail below.

3.1.1 On-Site Data Collection

Verification data was collected to support installation rates, pipe characteristics (length, diameter, material), and insulation characteristics (length, thickness, material). The onsite involved collecting spot-reads on a number of parameters affecting insulation savings, including fluid pressure and temperature (via gauge readings), boiler combustion efficiency (via spot combustion analyzer) and insulation surface temperature (via infrared temperature gun). Both spot and long-term measurements of bare pipe temperature as well as insulation surface temperature occurred at similar sections of the pipe run, at the pipe run's midpoint when possible. Field staff noted the installed insulation quality by inspecting the insulation for gaps and contact with the pipe wall.

Self-report data was also gathered on the pre-existing pipe configuration insulation condition to help define the baseline condition. Data was gathered on preexisting insulation quality, such as missing sections, gaps, or sagging, through interviews with facility staff. If possible, preexisting insulation quality was assessed by examining areas of the facility that did not receive a recent pipe insulation enhancement.

Information on the layout of affected pipes was also noted. Specifically, OSHA requires that pipes with a surface temperature of 140°F or greater that are “located within 7 feet measured from floor or working level or within 15 inches measures horizontally from stairways, ramps, or fixed ladders shall be covered with a thermal insulating material or otherwise guarded against contact.” This study assessed if these safety compliance measures apply to any of the projects selected in this sample.

3.1.2 Time of Use Loggers

As part of the on-site visit, a selection of insulated pipe(s) was monitored for a period of two to eight weeks, depending on facility schedule and variability, to gather interval data to support key energy savings parameters. Specifically, type-K temperature probes with HOBO data loggers were deployed on the pipe's exterior surface to inform fluid temperature and boiler operating hour parameters. HOBO ambient temperature loggers were deployed among a selection of facility spaces with insulated pipe in order to inform the surrounding air temperature, which affects pipe heat loss.

3.1.3 Participant Phone Survey

A phone survey was conducted to recruit customers for the on-site visit, as well as collect data useful for the NTG analysis and various other components of the evaluation. One other key use of the phone survey was to gather information on annual operating hours and schedule variability of facility boiler(s) prior to the site visit. This information allowed the field team to more accurately estimate the logging interval and duration to maximize data resolution. A copy of the participant phone survey script is included in Appendix A.

3.2 On-Site and Phone Survey Data Collection

As mentioned above, the on-site visits collected data to support a number of the impact parameters including the installation rates, bare pipe and surrounding temperatures, and combustion efficiencies for pipe insulation measures. The on-site sample was designed to develop statistically significant results at the measure level. The 2013-14 Nonresidential Downstream Deemed ESPI Impact Evaluation Research Plan¹⁰ for this study discusses the sample design in greater detail, but the resulting design focuses on developing estimates of key impact parameters that can be used to augment existing data in order to update ex ante net and gross therm savings values for each ESPI measure.

The initial sample design for pipe insulation measures was generated using 2013 and 2014 program participants. According to the ESPI decision, the therms savings associated with steam and hot water pipe insulation are unclear given uncertainties regarding the internal and surrounding temperatures of typical pipes. As presented in Table 2-2, the ex ante statewide therms savings for hot application pipe insulation was roughly 2.0% of portfolio level savings. As presented in Table 3-1, the most significant savings for each PA are generated from hot water and medium pressure steam boilers within PG&E and SCG service territories. As a result, the initial sample design included only sites within these territories and with insulation on hot water and medium pressure steam pipe runs.

¹⁰ http://www.energydataweb.com/cpucFiles/pdaDocs/1210/PY2013-2014%20Deemed%20ESPI%20Research%20Plan_PDA.pdf

Table 3-1: 2013-14 Therms Savings for Hot Application Pipe Insulation by Measure Category and PA

PA	Measure Name	Population Sites	Therms Savings	% Therms Savings
PG&E	PIPE INSULATION PIPE DIAMETER <1" - HOT STEAM < 15PSI	2	16,126	3%
PG&E	PIPE INSULATION PIPE DIAMETER <1" - HOT STEAM >= 15PSI	65	143,704	25%
PG&E	PIPE INSULATION PIPE DIAMETER <1" - HOT WATER	9	18,104	3%
PG&E	PIPE INSULATION PIPE DIAMETER >= 1" - HOT WATER	10	156,571	27%
PG&E	PIPE INSULATION PIPE DIAMETER >=1" - HOT STEAM < 15PSI	2	10,504	2%
PG&E	PIPE INSULATION PIPE DIAMETER >=1" - HOT STEAM >= 15PSI	61	228,694	40%
SCG	PIPE INSULATION - INDUSTRIAL - HOT WATER < 1" PIPE, INDOOR	6	19,790	1%
SCG	PIPE INSULATION - INDUSTRIAL - HOT WATER >= 1" PIPE, INDOOR	20	177,459	12%
SCG	PIPE INSULATION - INDUSTRIAL - HOT WATER >= 1" PIPE, OUTDOOR	1	22,090	1%
SCG	PIPE INSULATION - INDUSTRIAL - LOW PRESSURE STEAM <15 PSI < 1" PIPE, INDOOR	1	2,957	0%
SCG	PIPE INSULATION - INDUSTRIAL - LOW PRESSURE STEAM <15 PSI >= 1" PIPE, INDOOR	3	41,251	3%
SCG	PIPE INSULATION - INDUSTRIAL - MEDIUM PRESSURE STEAM >=15 PSI < 1" PIPE, INDOOR	15	66,149	4%
SCG	PIPE INSULATION - INDUSTRIAL - MEDIUM PRESSURE STEAM >=15 PSI >= 1" PIPE, INDOOR	34	763,937	50%
SCG	PIPE INSULATION - INDUSTRIAL - MEDIUM PRESSURE STEAM >=15 PSI >= 1" PIPE, OUTDOOR	1	27,746	2%
SCG	PIPE INSULATION - LG COM >=12 HR - HOT WATER < 1" PIPE, INDOOR	10	41,353	3%
SCG	PIPE INSULATION - LG COM >=12 HR - HOT WATER >= 1" PIPE, INDOOR	26	135,247	9%
SCG	PIPE INSULATION - LG COM >=12 HR - LOW PRESSURE STEAM <15 PSI < 1" PIPE, INDOOR	1	1,366	0%
SCG	PIPE INSULATION - LG COM >=12 HR - LOW PRESSURE STEAM <15 PSI >= 1" PIPE, INDOOR	2	5,476	0%
SCG	PIPE INSULATION - LG COM >=12 HR - MEDIUM PRESSURE STEAM >=15 PSI < 1" PIPE, INDOOR	4	6,345	0%
SCG	PIPE INSULATION - LG COM >=12 HR - MEDIUM PRESSURE STEAM >=15 PSI >= 1" PIPE, INDOOR	13	164,854	11%
SCG	PIPE INSULATION - SM COM <12 HR - HOT WATER < 1" PIPE, INDOOR	2	231	0%
SCG	PIPE INSULATION - SM COM <12 HR - HOT WATER >= 1" PIPE, INDOOR	6	6,292	0%
SCG	PIPE INSULATION - SM COM <12 HR - LOW PRESSURE STEAM <15 PSI < 1" PIPE, INDOOR	1	66	0%
SCG	PIPE INSULATION - SM COM <12 HR - LOW PRESSURE STEAM <15 PSI >= 1" PIPE, INDOOR	1	1,545	0%

Table 3-2: 2013-14 Therms Savings for Hot Application Pipe Insulation by Measure Category and PA

PA	Measure Name	Population Sites	Therms Savings	% Therms Savings
SCG	PIPE INSULATION - SM COM <12 HR - MEDIUM PRESSURE STEAM >=15 PSI < 1" PIPE, INDOOR	4	12,291	1%
SCG	PIPE INSULATION - SM COM <12 HR - MEDIUM PRESSURE STEAM >=15 PSI >= 1" PIPE, INDOOR	5	24,785	2%
SDG&E	PIPE INSULATION - HOT WATER APPLIC. >=1 IN.	2	7,652	23%
SDG&E	PIPE INSULATION - LOW PRESSURE (<=15 PSI) STEAM APPLIC. >=1 IN.	1	18,130	55%
SDG&E	REPLACED HOT WATER LINE INSULATION (ELECTRIC)	248	-	0%
SDG&E	REPLACED HOT WATER LINE INSULATION (GAS)	325	6,914	21%

Phone surveys and on-sites were initially attempted for only the projects in the preliminary sample; however, due to lower-than-expected response rate and the limited population, **a census was eventually attempted to meet the desired sample of 30 on-sites**. Table 3-3 summarizes the sample design for hot application pipe insulation along with the actual number of phone surveys and on-sites completed, which was stratified by boiler type and project size, in terms of the magnitude of therm savings. The sample frame includes PG&E and SCG hot application participants from program year 2013 and 2014. Please note that the actual number of completed on-sites is 31, as compared with the initial sample goal of 30.

Table 3-3: Pipe Insulation Sample Design and Achieved Data Collection by Boiler Type and Project Size – PY2013-14

Boiler Type	Project Size (Therms)	Percent of Ex ante Savings	Population*	Initial Sample Design	Actual Completed On-sites	Actual Completed Phone Surveys*
Hot Steam	> 25,000	34%	11	6	6	5
Hot Steam	10,000 - 25,000	16%	20	7	7	9
Hot Steam	< 10,000	18%	91	7	7	17
Hot Water	> 25,000	15%	8	3	3	3
Hot Water	10,000 - 25,000	6%	9	4	4	7
Hot Water	< 10,000	7%	49	3	4	15
Total		95%¹¹	170	30	31	49

* The column sums up to more than the total because some participants installed multiple measures across various strata.

Participating customers often featured more than one unique pipe run insulated with IOU assistance. When possible, field engineers independently assessed each unique pipe run at each project in the sample of 31. Therefore, this study assessed 93 distinct pipe runs (hereafter referred to as “observations”) at the 31 participating facilities in the evaluation sample. The on-site sample represented 36% of the ex ante therm savings claim and the phone survey represented 46% of the ex ante therm savings claim.

¹¹ The total sums to 95% because SDG&E is not included in the sample design and represents 5% of savings.

4

Evaluation Methodology

This section provides an overview of the methods used to estimate the key impact parameters, the ex post UES values and the NTGRs for the deemed pipe insulation ESPI measure identified for PY 2013.

4.1 Overview of Approach

The primary objective of this evaluation is to perform a measure and measure-parameter impact evaluation, utilizing new primary evaluation data, in order to update existing gross and net savings estimates and inform future savings values for the pipe insulation measure identified in the ESPI decision. Researched parameters, including operating hours, bare pipe temperature, surrounding temperature, boiler combustion efficiency, installation rates, RULs and estimates of free ridership, can be used to measure ex post performance for PY 2013.

More specifically, these parameter level results will be aggregated in order to develop therm UES values and NTGRs for the pipe insulation measure identified in Appendix 3 of the ESPI decision.

As discussed in more detail below, the impact parameter estimates were developed at different levels of segmentation in order to generate unique UES values by market segment and pipe characteristic. For example, operating hours were generated by market segment, whereas bare pipe temperature and surrounding air temperature values were generated by fluid type. However, only a single NTGR was developed for the overall measure group. Unless otherwise indicated, all parameter-level averages have been weighted by insulation length (in feet) among the various segments of interest.

This section discusses, in detail, the inputs that were used to develop these parameter estimates. They also inform the general approach that was used to develop the UES values. The algorithm that was applied to estimate unit energy savings for a specific hour is:

$$\Delta Q = \frac{t * (Q_p - Q_i)}{100,000 * E_b}$$

Where,

ΔQ = annual energy savings (in therms). This parameter represents the ex post savings objective of this study.

t = annual operating time, in hours. Metered data on pipe surface temperature indicates when the insulated pipe transmits heated fluid. Metered data, gathered over 2-8 weeks, was extrapolated to represent a full year, after accounting for any seasonal variations determined from facility staff interviews. For long spans of insulated pipe, installed meters were deployed as close to the pipe span's midpoint as possible.

Q_p = Heat Loss Rate from Bare (or Less-Insulated) Pipe¹² (Btu/hr/ft). Bare pipe experiences heat loss from convection and radiation processes. Both convection and radiation heat losses are primarily dependent on the following parameters: pipe diameter, bare pipe surface temperature, and ambient air temperature, the latter two of which were determined from interval metered data. Other pipe and insulation parameters were collected during the site visit. Remaining relevant parameters such as pipe conductivity and pipe emissivity were referenced from a heat transfer resource¹³ based on material type.

Q_i = Heat Loss Rate from Insulated Pipe (Btu/hr/ft). Insulated pipe features convection and radiation heat transfer processes, as described above, but also involves conduction heat transfer between the pipe and insulating material. Key insulation characteristics such as thickness and material were confirmed during each site visit. The insulation's surface temperature was spot-measured during the site visit, and relevant insulation parameters (conductivity and emissivity) were referenced from manufacturer data.

E_b = Combustion efficiency (%) of the boiler being used to generate the hot water or steam in the pipe. Combustion efficiency was spot-measured during each site visit or referenced from manufacturer testing data.

100,000 = conversion factor (1 therm = 100,000 Btu).

¹² Should the affected pipe have required insulation per OSHA guidelines, the baseline reflects the minimum level of insulation needed to comply. Information on OSHA compliance and minimum insulation requirements were gathered through discussions with facility staff.

¹³ An example resource is: Introduction to Heat Transfer, Frank Incropera and David DeWitt, John Wiley & Sons, Inc, New York, NY, 2002.

The remainder of this section will discuss the following:

- The approach for estimating each individual impact parameter, including the installation rate, the various temperature values and the operating hours.
- The approach for estimating the NTGRs.

4.2 Installation Rate Analysis

The installation rate is defined as the percentage of equipment found to be installed and operable. The installation rate is estimated for each site based on data gathered during the on-site visit. As part of these on-site visits, an objective of the auditor was to attempt to identify and assess the quantity and operability of all pipe insulation installed.

The key measure count that is identified on site is the length (in feet) of pipe insulation that is currently installed and in working condition. Field auditors used a combination of spot measurement, staff interviews, and review of project invoices to confirm the quantity of incented pipe insulation in feet. The installation rate is calculated directly from this measurement:

$$\text{Installation Rate} = \frac{\text{Length of pipe insulation installed and operable from on – site visit}}{\text{Length of pipe insulation reported installed in tracking system}}$$

In addition to identifying the amount of equipment that was installed and operable, the auditor was also prepared to identify the length of insulation that was:

- Failed and in place – The length of pipe insulation currently installed but not in working condition (failed).
- Failed and replaced – The length of pipe insulation that had been installed, but then had failed and was replaced with different insulation.
- Removed and not replaced - The length of pipe insulation that had been installed, but had been removed (either due to failure or other reasons), but was not replaced, such that the pipe is now bare.

For all 31 pipe insulation projects in the sample, the field auditors found the pipe insulation to be 100% installed as tracked, through visual inspection, spot measurement, and review of project invoices.

It is important to note that the field auditors also found that 9% of the rebated insulated piping required insulation to minimally comply with OSHA. OSHA requires that pipes with a surface temperature of 140°F or greater that are “located within 7 feet measured from floor or working level or within 15 inches measures horizontally from stairways, ramps, or fixed ladders shall be

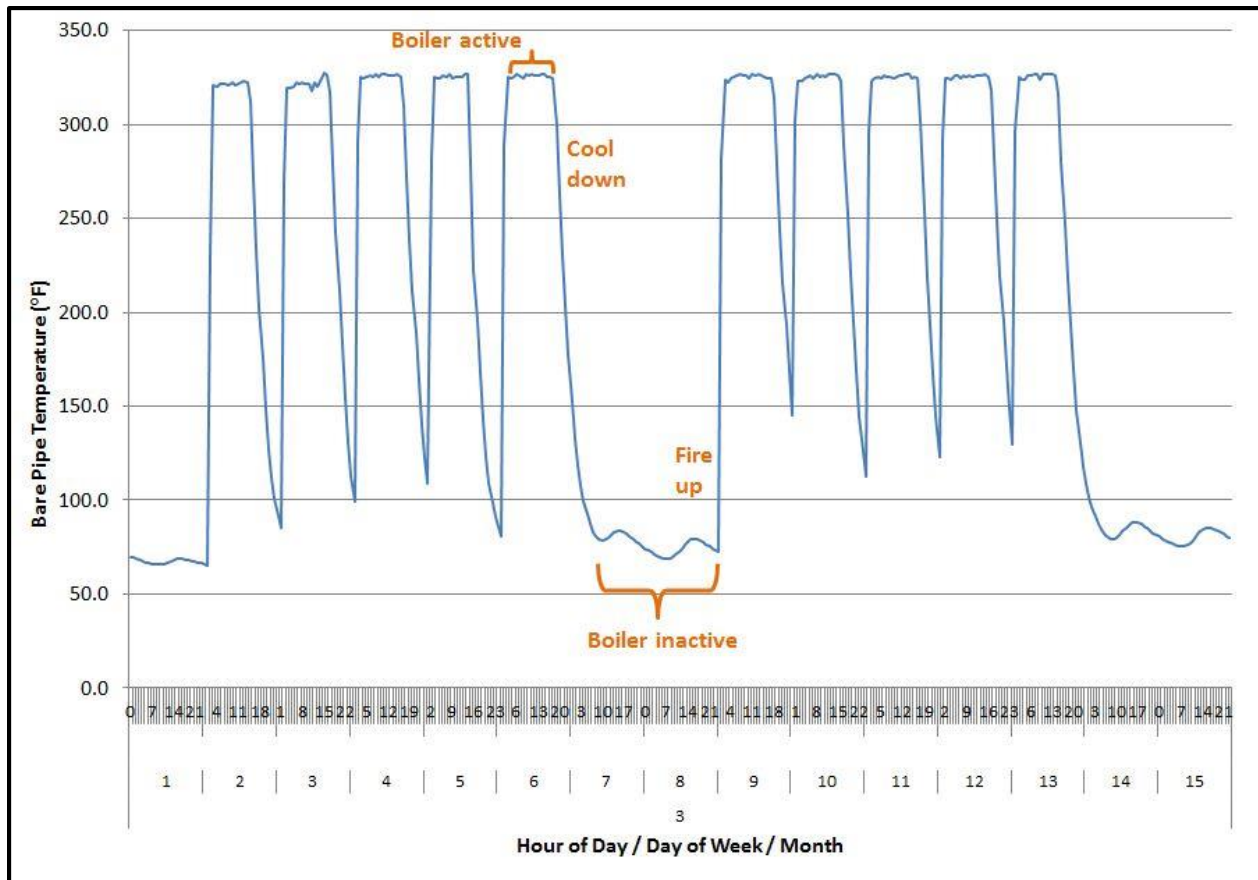
covered with a thermal insulating material or otherwise guarded against contact.” Such piping requires a minimally-compliant amount of insulation, reducing the program savings due to baseline adjustment.

4.3 Operating Hour Analysis

One of the primary inputs to the gross savings calculations is the number of annual hours that the insulated pipe is heated. This section will discuss the development of the annual operating hours value from the analysis of logger data.

As discussed throughout this report, type-K temperature loggers were installed on representative sections of insulated pipe at sampled facilities. These loggers not only provide information on key temperature inputs in the heat loss calculation (see Section 4.4) but also indicate when the measured pipe was heated, providing insight into the parent boiler’s operating schedule. An example analysis of operating hours from temperature data is illustrated in Figure 4-1; the analysis considered the “boiler active” periods as the operating hours over the metering period.

Figure 4-1: Calculation of Operating Hours from Bare Pipe Temperature Profile



Because loggers were not installed for a full year, the logger data needed to be extrapolated out to a full year of 8,760 hours. In general, the analysis calculated the ratio between the number of hours the insulated pipe was heated over the metering period and the total number of hours in the metering period; this ratio was applied to 8,760 hours to determine the total number of annual hours that the insulated pipe was heated.

While on site, the field auditors gathered information on any seasonal changes in facility operation (e.g., a vineyard that featured an increase in shifts during the grape harvest); these seasonal effects were considered in the extrapolation on a case-by-case basis. Industrial customers typically quantified seasonal effects through an estimate in the weekly number of shifts by season, whereas commercial customers typically indicated changes in hours open.

The final step after extrapolating each individual logger to an annual operating hours value is to aggregate each logger to a customer type. IOUs classify participating customers as small commercial, large commercial, and industrial, each with a unique ex ante annual operating hours assumption. Table 4-1 compares the ex ante operating hours assumption with the ex post finding for each customer type.

Table 4-1: Comparison of Ex Ante and Ex Post Annual Operating Hours by Customer Type

Customer Type	Sites	Observations	Ex Ante Operating Hours	Ex Post Operating Hours
Small Commercial*	0	0	2,425	N/A
Large Commercial	11	33	4,380	5,560
Industrial	20	60	7,752	6,560

* No small commercial projects were featured in the sample.

Industrial participants were confirmed to operate for more annual hours than large commercial participants, though the difference is smaller than reflected within ex ante assumptions. Large commercial customers were found to operate 27% more than assumed within IOU deemed savings, while industrial customers were found to operate 15% less. The sample of 31 projects featured no small commercial customers, due to their relatively low contribution to overall measure savings. As sampled projects often featured multiple different unique pipe runs, the evaluation team assessed nearly three times as many “observations” as sites in the sample.

4.4 Temperature Analysis

In addition to indicating boiler operating schedule, deployed temperature loggers also provided valuable data on key temperatures influencing the hourly heat loss calculation discussed in Section 4.1. This section will discuss the use of metered data in characterizing bare pipe temperatures and surrounding air temperatures among a sample of participating customers.

4.4.1 Bare Pipe Temperature

Pipe heat loss is a combination of conductive, convective, and radiative heat losses, each of which is a function of bare pipe temperature. Field auditors collected relevant information related to bare pipe temperature using a combination of three methods:

- **Data metering** – The type-K thermocouple loggers provided interval data on bare pipe temperature throughout the 2- to 8-week metering period.
- **Gauge readings and spot measurement** – Field auditors supplemented long-term metered data with spot readings from infrared temperature guns and inspection of fluid gauges. As pipe material is highly conductive, fluid temperature and bare pipe temperature values are typically within one percent.
- **Customer interviews** – Metered temperature data was confirmed as representative of the facility’s process over an entire year through interviews with facility contacts on site and/or over the phone, as needed.

The heat loss calculation tool determined the average bare pipe temperature when the pipe was heated (i.e., during “boiler active” periods of Figure 4-1). As IOUs classify heating processes based on fluid temperature and pressure, Table 4-2 compares ex ante bare pipe temperature assumptions with ex post findings for three fluid categories: hot water, low-pressure steam, and high-pressure steam.

Table 4-2: Comparison of Ex Ante and Ex Post Bare Pipe Temperature by Fluid Type

Fluid Type	Observations	Ex Ante Bare Pipe Temperature (°F)	Ex Post Bare Pipe Temperature (°F)
Hot Water	36	150.0	135.3
Low-Pressure Steam	4	243.0	256.3
Medium-Pressure Steam	53	328.0	312.5

Hot water and medium-pressure steam piping, which account for the most significant shares of total measure savings, featured slightly lower bare pipe temperatures than reflected within IOU deemed savings assumptions. Please note that only four low-pressure steam runs were

encountered in the sample of projects, due to the infrequency of low-pressure steam piping in the participant population.

Evaluators further assessed variation in hot water and medium-pressure steam bare pipe temperature as a function of customer type, as summarized in Table 4-3. Each of the customer-fluid permutations resulted in an ex post bare pipe temperature lower than the ex ante assumption.

Table 4-3: Comparison of Ex Ante and Ex Post Bare Pipe Temperatures by Fluid and Customer Type

Customer Type Fluid Type	Observations ¹	Ex Ante Bare Pipe Temperature (°F)	Ex Post Bare Pipe Temperature (°F)
Commercial			
Hot Water	21	150.0	135.5
Medium-Pressure Steam	10	328.0	291.6
Industrial			
Hot Water	15	150.0	135.2
Medium-Pressure Steam	43	328.0	317.3

¹ Excludes low-pressure steam data due to low observation count.

4.4.2 Surrounding Air Temperature

Convective and radiative heat loss is also a function of the temperature of the air surrounding the pipe. Field auditors collected relevant information related to surrounding air temperature using a combination of three methods:

- **Data metering** – Air temperature loggers were deployed at a representative location near the insulated pipe, providing interval data on surrounding air temperature throughout the 2- to 8-week metering period.
- **Gauge readings and spot measurement** – Field auditors supplemented long-term metered data with spot readings from infrared temperature guns.
- **Customer interviews** – Air temperature data was confirmed as representative of the facility’s process over an entire year through interviews with facility contacts on site and/or over the phone, as needed.

The heat loss calculation tool determined the average bare pipe temperature when the pipe was heated (i.e., during “boiler active” periods of Figure 4-1). Any seasonal adjustment, such as weather fluctuation for insulated pipe located outdoors, was factored into the extrapolation on a case-by-case basis. As most insulated pipe was assumed to be located indoors, IOUs assumed a

surrounding air temperature of 75°F for all customer types and fluid types. Table 4-4 presents evaluator findings in surrounding temperature as a function of fluid type.

Table 4-4: Comparison of Ex Ante and Ex Post Surrounding Air Temperature by Fluid Type

Fluid Type	Observations	Ex Ante Surrounding Air Temperature (°F)	Ex Post Surrounding Air Temperature (°F)
Hot Water	36	75.0	77.6
Low-Pressure Steam	4	75.0	102.3
Medium-Pressure Steam	53	75.0	85.8

Evaluators determined surrounding air temperature to be similar to the ex ante assumption for hot water piping, while medium-pressure steam was found to feature a surrounding air temperature 14% higher than the ex ante assumption. The comparatively low number of low-pressure steam observations resulted in a weighted average surrounding temperature significantly higher than hot water and medium-pressure steam values. Field engineers often encountered insulated piping in boiler rooms or industrial spaces not mechanically cooled; each of the surrounding air temperatures for low-pressure steam piping were above 96°F on average.

Evaluators further assessed variation in hot water and medium-pressure steam surrounding air temperatures as a function of customer type, as summarized in Table 4-5. Each of the customer-fluid permutations resulted in an ex post surrounding air temperature higher than the ex ante assumption of 75°F.

Table 4-5: Comparison of Ex Ante and Ex Post Surrounding Air Temperature by Customer and Fluid Type

Customer Type Fluid Type	Observations ¹	Ex Ante Surrounding Air Temperature (°F)	Ex Post Surrounding Air Temperature (°F)
Commercial			
Hot Water	21	75.0	81.3
Medium-Pressure Steam	10	75.0	79.2
Industrial			
Hot Water	15	75.0	76.1
Medium-Pressure Steam	43	75.0	87.3

¹ Excludes low-pressure steam data due to low observation count.

4.5 Combustion Efficiency Analysis

Finally, pipe insulation savings are dependent on the combustion efficiency of the boiler generating the heated fluid. Field auditors collected relevant information related to boiler combustion efficiency using a combination of two methods:

- **Combustion efficiency measurement and skin loss estimate** – Field auditors spot-measured the combustion efficiency of boiler(s) with insulated pipes.
- **Equipment nameplate reference and research** – Not all boilers were accessible for a combustion efficiency measurement. In some cases, the field auditors collected nameplate information on the affected boiler(s) and researched manufacturer’s combustion efficiency testing data.

IOUs assumed combustion efficiencies based on fluid type. Table 4-6 compares ex ante combustion efficiency estimates with ex post values by fluid type.

Table 4-6: Comparison of Ex Ante and Ex Post Combustion Efficiencies by Fluid Type

Fluid Type	Observations	Ex Ante Combustion Efficiency	Ex Post Combustion Efficiency
Hot Water	36	82.0%	77.6%
Low-Pressure Steam	4	83.0%	82.9%
Medium-Pressure Steam	53	83.0%	83.9%

Low-pressure steam and medium-pressure steam boilers will found to feature combustion efficiencies within 1% of the ex ante assumption, while hot water boilers were determined to be 4% less efficient than the ex ante value, leading to additional pipe insulation measure savings. Please note that only four low-pressure steam runs were encountered in the sample of projects, due to the infrequency of low-pressure steam piping in the participant population.

4.6 Development of Unit Energy Savings Values

The annual operating hours, bare pipe temperature, surrounding air temperature, and boiler combustion efficiency parameter estimates are then applied to the hourly heat loss equation (as presented in Section 4.1) for all customer type and fluid type combinations. Table 4-7 presents the unit energy savings (UES) values as a function of customer type and fluid type. UES values were generated for all sites in the sample, some of which featured both hot water and steam piping, leading to two UES values for a single project; therefore, Table 4-7 site count is greater than the overall sample of 31 projects. Due to constraints in sample size, not all customer-fluid combinations were reflected in the evaluation sample; these cells are noted with N.D. (no data).

Table 4-7: Ex Post UES Values by Customer and Fluid Type

Customer Type Pipe Fluid and Size	Obsv.	Ave. Pipe Dia.	Delta Temp.	Annual Operating Hours	Boiler Combustion Efficiency	UES (therms per foot)
Small Commercial						
Hot Water ($\leq 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Hot Water ($> 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Low-Pressure Steam ($\leq 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Low-Pressure Steam ($> 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Medium-Pressure Steam ($\leq 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Medium-Pressure Steam ($> 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Large Commercial						
Hot Water ($\leq 1''$ Pipe)	6	0.7''	57.3	6,457	75.6%	2.1
Hot Water ($> 1''$ Pipe)	15	3.3''	50.8	5,752	86.7%	5.5
Low-Pressure Steam ($\leq 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Low-Pressure Steam ($> 1''$ Pipe)	2	2.8''	244.7	8,760	80.0%	60.6
Medium-Pressure Steam ($\leq 1''$ Pipe)	1	1.0''	200.6	8,760	80.0%	19.7
Medium-Pressure Steam ($> 1''$ Pipe)	9	1.9''	213.3	3,167	84.3%	11.9
Industrial						
Hot Water ($\leq 1''$ Pipe)	5	0.7''	70.2	4,387	76.4%	1.8
Hot Water ($> 1''$ Pipe)	10	2.3''	75.7	7,560	76.2%	8.9
Low-Pressure Steam ($\leq 1''$ Pipe)	0	N.D.	N.D.	N.D.	N.D.	N.D.
Low-Pressure Steam ($> 1''$ Pipe)	2	3.7''	143.5	6,213	83.3%	26.8
Medium-Pressure Steam ($\leq 1''$ Pipe)	8	0.8''	222.4	6,322	83.4%	12.9
Medium-Pressure Steam ($> 1''$ Pipe)	35	2.7''	231.2	6,130	84.0%	36.3

* The sample draw of 31 projects featured no small commercial customers, due to their relatively low contribution to overall measure savings.

Some observations from the UES data:

- Medium-pressure steam UES values vary by fluid type and customer type, from those higher than used by the IOUs¹⁴ (large commercial customers with less than 1'' diameter pipe, due to higher operating hours and lower boiler combustion efficiency; industrial customers with greater than 1'' pipe, due to higher delta-temperature), to those lower (industrial customers with less than 1'' pipe, due to lower annual operating hours). Please note the low observation count for large commercial customers with less than 1'' diameter medium-pressure steam piping.

¹⁴ Per PGE workpaper PGECOHVC104 Revision #5, dated June 1, 2012.

- The UES for large commercial hot water piping with greater than 1” diameter is higher than the IOU-assumed value, due to higher operating hours and lower boiler combustion efficiency. However, UES for industrial hot water piping (both size tiers) are lower than the IOU-assumed values, due primarily to lower annual operating hours.
- Low-pressure steam piping features UES values higher than those used by the IOUs due to higher annual operating hours (for large commercial customers), higher average pipe diameter, and higher delta-temperature. Please note the low observation count for low-pressure steam piping, as mentioned previously in this report.

4.7 Net-to-Gross Analysis

For program years 2013 and 2014, the approach for estimating NTGRs was based on the same approach utilized for the 2010-12 Nonresidential Downstream Lighting Impact Evaluation¹⁵, which relied solely on participant phone survey data. The NTGR methodology utilized for the 2010-12 Nonresidential Downstream Lighting Impact Evaluation was based on the large non-residential free ridership approach developed by the NTGR Working Group and documented in Appendix C of that report, *Methodological Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Non-residential Customers*. The NTGR is calculated as the average of three program attribution indices (PAI) known as PAI-1, PAI-2, and PAI-3. Each of these scores represents the highest response or the average of several responses given to one or more questions about the decision to install a program measure. The participant phone survey was the basis for the inputs to each score.

- **Program Attribution Index 1 (PAI-1)** is a score that reflects the influence of the most important of various program-related elements in the customer’s decision to select a given program measure. The PAI-1 score is calculated as the highest program influence factor divided by the sum of the highest program influence factor and the highest non-program influence factor. Some example non-program factors are: previous experience with the measure, recommendation from an engineer, standard practice, corporate policy, compliance with rules or regulations, organizational maintenance or equipment replacement policies and “other – specify.” Payback is treated as a program influence factor if the rebate/incentives played a major role in meeting payback criteria, but is treated as a non-program influence factor if it did not play a major role in meeting payback criteria.
- **Program Attribution Index 2 (PAI-2)** is a score that captures the perceived importance of program factors (including rebate/incentives, recommendation, and training) relative to non-program factors in the decision to implement the specific measure that was eventually adopted or installed. This score is determined by asking respondents to assign

¹⁵ <http://www.energydataweb.com/cpuc/deliverableView.aspx?did=1155&uid=0&tid=0&cid=>

importance values to the program and most important non-program influences so that the two total 10. The program influence score is adjusted (i.e., divided by 2) if respondents had made the decision to install the measure before learning about the program. The final score is divided by 10 to be put into decimal form, thus making it consistent with PAI-1.

- **Program attribution index 3 (PAI-3)** is a score that captures the likelihood of various actions the customer might have taken at the given time and in the future if the program had not been available (the counterfactual). This score is calculated as 10 minus the likelihood that the respondent would have installed the same measure in the absence of the program. The final score is divided by 10 to put into decimal form, thus making it consistent with PAI-1 and PAI-2.

The NTGR was estimated as an average of these three scores. If one of the scores was not available (generally due to respondents giving a “don’t know” or “refusal” response), then the NTGR was estimated as the average of the two available score. If two or more scores were missing, results were discarded from the calculation.

Table 4-8 presents the ex ante and ex post NTGR values weighted by ex ante therm savings. Recall that only hot applications were evaluated for pipe insulation, so only therm based NTGRs were developed. Overall, at the statewide level, the ex post NTGR is approximately 80% of the ex ante value. The weighted average program attribution scores for the population were 0.49 for PAI-1, 0.52 for PAI-2 and 0.47 for PAI-3. All scores were within 5% of the overall NTGR.

Table 4-8: Ex Ante and Ex Post NTGRs by Measure, Weighted by Ex Post Therms

Measure	n	Weight	Ex Ante NTGR	Ex Post NTGR	Relative Precision
Pipe Insulation	49	Therms	0.61	0.49	10%

5

Evaluation Results

This section presents the gross and net realization rates for first year and lifecycle therm savings, as well as aggregate ex post population-level savings for first year and lifecycle therms.

5.1 Gross First Year Realization Rates

Once all the UES values have been created, as discussed in Section 4, these values can be applied to the population of participants. Gross realization rates (GRRs) are then estimated for therm savings by looking at the ratio of the aggregate evaluated gross savings to the aggregate ex- ante gross savings. Specifically, the GRR for customer-fluid type segment j is estimated as:

$$Gross_Realization_Rate_j = \frac{\sum_{i=1}^n Gross_Ex_Post_Impact_{i,j}}{\sum_{i=1}^n Gross_Ex_Ante_Impact_{i,j}}$$

Where,

$Gross_Ex_Post_Impact_{i,j}$ is the site-specific gross ex post impact estimate for customer i , in the population, who is in customer-fluid type segment j .

$Gross_Ex_Ante_Impact_{i,j}$ is the site-specific gross ex ante impact estimate for customer i , in the population, who is in customer-fluid type segment j .

Table 5-1 presents the therm first year gross realization rates, by customer and fluid type. Also shown are the aggregate ex post and ex ante savings values for the sample by segment that were used to develop the realization rates.

Table 5-1: First Year Gross Therm Realization Rates by Customer and Fluid Type

Customer Type - Fluid Type	First Year Gross Therms Savings				
	Sample Size	Ex Ante Savings Onsite Sample	Ex Post Savings Onsite Sample	GRR	Relative Precision
Agricultural/Industrial - Steam	39	561,681	442,033	79%	8%
Agricultural/Industrial - Hot Water	13	115,712	71,752	62%	40%
Large Commercial - Steam	14	43,719	54,333	124%	45%
Large Commercial - Hot Water	18	24,604	16,667	68%	30%

As discussed throughout Section 4, the ex post impacts and ex ante claims are products of several unique parameters that are generated in the impact algorithm. The underlying ex ante assumptions regarding each parameter vary by measure as do the ex post impacts. Below is a brief discussion of some of those underlying differences and how they affected the overall realization rates.

For **agricultural or industrial** facilities, several factors led to lower ex post first-year therm savings as compared with ex ante:

- Lower-than-anticipated annual operating hours—15% lower than assumed within IOU deemed savings, per Table 4-1—primarily reduced the ex post annual therm savings.
- Table 4-2 indicated that field auditors determined a weighted average medium-pressure steam bare pipe temperature of 313°F as compared with the IOU assumption of 328°F. Table 4-4 indicated an evaluated surrounding air temperature of 86°F as compared with the IOU assumption of 75°F. This difference in bare pipe and surrounding air temperatures further reduced the ex post savings for medium-pressure steam piping, due to the high prevalence of medium-steam pipe runs at industrial facilities.
- As noted earlier in Section 2.3, if the insulated pipe is proximate to work areas, an OSHA minimum compliance baseline is appropriate; field auditors determined that 11% of evaluated insulated pipe at industrial facilities required an OSHA baseline, thereby reducing ex post savings by 5%.
- Counteracting the three reductions in ex post savings listed above, the field auditors determined that insulated pipe at industrial facilities was larger in diameter than assumed within IOU deemed savings calculations. Evaluators found that industrial hot water piping was 35% higher-diameter than the IOU assumption of 1.7", and industrial medium-steam piping 59% higher-diameter. Higher diameter pipe leads to higher baseline heat loss rates, leading to higher therm savings for insulated pipe.

For **commercial** facilities, steam piping savings were 24% higher than reported by IOUs, while hot water piping was 32% lower. The following factors led to these savings differences:

- Nearly a third of the commercial pipe runs encountered in the sample of 31 projects was medium-pressure steam piping. The lower-than-anticipated bare pipe temperature and higher-than-anticipated surrounding air temperature for medium-pressure steam piping led to lower ex post therm savings.
- Similarly as with industrial facilities, 5% of insulated steam piping at large commercial facilities was determined to require a baseline reflecting OSHA minimum compliance.
- However, Table 4-1 indicates that evaluators determined 27% higher annual operating hours at commercial facilities as compared with the IOU assumption. Additionally, insulated pipe at commercial facilities was generally of higher diameter than assumed by the IOU; each of these factors serve to counteract the savings reductions noted above.
- Hot water boilers at commercial facilities were found to operate at 78% combustion efficiency, 4% lower than the ex ante assumption. This difference in combustion efficiency resulted in higher ex post savings for hot water piping at commercial facilities.

Table 5-2 presents the first year gross realization rates along with the corresponding ex ante and ex post first year therms savings for hot application pipe insulation measure by PA and statewide. The corresponding relative precision at the statewide level is also included. The relative precision is not shown at the PA level given the fact that evaluation was not conducted at that level, but rather at the overall facility type and pipe fluid type level.

Table 5-2: 2014 Aggregate First Year Ex Post Gross Therm Savings by PA

PA	First Year Gross Therms Savings			
	Ex Ante Savings	Ex Post Savings	GRR	Relative Precision
PG&E	370,701	341,227	92%	
SCG	905,293	709,301	78%	
SDG&E	6,903	4,676	68%	
Statewide	1,282,898	1,055,204	82%	13%

The objective of this study was to develop GRRs that could be used to estimate IOU level therms savings across all nonresidential hot application pipe insulation measures. The differences in GRR at the IOU level are predicated on differences in the distribution of facility types and pipe fluid types as well as differences in the unique parameters that comprise the overall impact of each measure. The first year GRRs range from 92% in PGE to 68% in SDG&E. The statewide GRR was estimated at 82% at a 13% relative precision.

5.2 Lifecycle Gross Realization Rates

Table 5-3 presents the lifecycle GRRs along with the corresponding ex ante and ex post first year therms savings for hot application pipe insulation measure by PA and statewide. The corresponding relative precision at the statewide level is also included. Again, the relative precision is not shown at the PA level given the fact that evaluation was not conducted at that level, but rather at the overall facility type and pipe fluid type level. Lifecycle savings values are equal to the first year savings multiplied by the EUL. Because this study did not evaluate the EULs, the ex ante EUL was used. Therefore, first year and lifecycle realization rates are very similar.

Table 5-3: 2014 Aggregate Lifecycle Ex Post Gross Therm Savings by PA

PA	LifeCycle Gross Therms Savings			
	Ex Ante Savings	Ex Post Savings	GRR	Relative Precision
PG&E	4,198,936	3,892,468	93%	
SCG	9,958,220	7,802,311	78%	
SDG&E	75,937	51,441	68%	
Statewide	14,233,093	11,746,220	83%	13%

5.3 Net First Year Realization Rates

Net savings are estimated in a manner similar to the gross savings. UES values are multiplied by the corresponding NTGRs to get net savings values. Net realization rates (NRRs) are then estimated for therm savings by looking at the ratio of the aggregate evaluated gross savings to the aggregate ex ante gross savings. Specifically, the NRR for PA-Measure segment j is estimated as:

$$Net_Realization_Rate_j = \frac{\sum_{i=1}^n Net_Ex_Post_Impact_{i,j}}{\sum_{i=1}^n Net_Ex_Ante_Impact_{i,j}}$$

Where,

Net_Ex_Post_Impact_{i,j} is the site-specific net ex post impact estimate for customer i, in the population, who is in PA-Measure segment j.

Net_Ex_Ante_Impact_{i,j} is the site-specific net ex ante impact estimate for customer i, in the population, who is in PA-Measure segment j.

Table 5-4 presents the therm first year net realization rates, by PA and measure, along with statewide totals. Also shown are the aggregate ex post and ex ante savings values by segment that were used to develop the realization rates.

Table 5-4: 2014 Aggregate First Year Ex Post Net Therm Savings by PA

PA	First Year Net Therms Savings			
	Ex Ante Savings	Ex Post Savings	NRR	Relative Precision
PG&E	247,569	167,377	68%	
SCG	543,176	347,923	64%	
SDG&E	4,142	2,294	55%	
Statewide	794,886	517,593	65%	17%

The NRRs differ for the same reasons discussed above for GRRs; however, they are also influenced by differences between ex post and ex ante NTGRs. For the most part, the ex post NTGRs are less than ex ante NTGRs (about 80% of ex ante), which explains why NRRs are lower than GRRs (about 80% of the GRRs).

5.4 Lifecycle Net Realization Rates

Lifecycle NRRs are estimated in a similar way as lifecycle GRRs by looking at the ratio of the evaluated ex post net lifecycle savings to the ex ante net lifecycle savings. The approach is identical to that for the lifecycle GRRs, but using net savings instead of gross. As with the first year values, the lifecycle NRRs in Table 5-4 are very similar to the first-year NRRs in Table 5-5.

Table 5-5: 2014 Aggregate Lifecycle Ex Post Net Therm Savings by PA

PA	LifeCycle Net Therms Savings			
	Ex Ante Savings	Ex Post Savings	NRR	Relative Precision
PG&E	2,795,989	1,909,313	68%	
SCG	5,974,932	3,827,149	64%	
SDG&E	45,562	25,232	55%	
Statewide	8,816,483	5,761,695	65%	17%

6

Key Findings and Conclusions

This section presents findings and conclusions of this research study.

Conclusion 1 [Section 4.2]: All rebated insulation was determined to be 100% installed as tracked. Field auditors determined that all incented insulation was installed and operable via visual inspection, spot measurement, and review of project invoices. However, field auditors also determined that 9% of the rebated insulated piping required minimally-compliant baseline insulation.¹⁶

Conclusion 2 [Section 4.3]: Affected boilers at participating large commercial facilities operate 27% more than assumed within IOU deemed savings values, while affected boilers at participating industrial facilities operate 15% less. Boilers at large commercial facilities were assumed to operate 4,380 hours per year, but evaluators determined that they operate 5,560 hours per year. Boilers at industrial facilities were assumed to operate 7,752 hours per year, but evaluators determined that they operate 6,560 hours per year.

Conclusion 3 [Section 4.4.1]: Ex post bare pipe temperatures were lower than ex ante assumptions for all customer type-fluid type permutations. The hot water bare pipe temperature was found to be 136°F and 135°F at commercial and industrial facilities, respectively. The medium-pressure steam bare pipe temperature was found to be 292°F and 317°F at commercial and industrial facilities, respectively.

Conclusion 4 [Section 4.4.2]: Surrounding air temperatures exceeded the IOU assumption for all fluid type and customer sector segments. Evaluators determined that insulated hot water piping features an average surrounding air temperature of 81°F and 76°F at commercial and industrial facilities, respectively. Medium-pressure steam piping features an average surrounding air temperature of 79°F and 87°F at commercial and industrial facilities, respectively. IOU deemed savings values reflected a surrounding air temperature assumption of 75°F for all fluid segments.

¹⁶ OSHA requires that pipes with a surface temperature of 140°F or greater that are “located within 7 feet measured from floor or working level or within 15 inches measures horizontally from stairways, ramps, or fixed ladders shall be covered with a thermal insulating material or otherwise guarded against contact.”

Conclusion 5 [Section 4.5]: Hot water boilers at participating facilities feature a combustion efficiency 5% lower than assumed within IOU deemed savings values. Evaluators determined that hot water boilers feature a combustion efficiency of 78% on average, as compared with the IOU assumption of 82%. Evaluators determined no significant difference from the IOU assumption of 83% for medium-pressure steam boilers.

Conclusion 6 [Section 5.1]: The average diameter of insulated pipe was considerably higher for all customers and fluid types in the higher-diameter tier. The IOUs separated pipe insulation measures by diameter: less than 1" (0.7" average assumed in IOU calculations) and greater than or equal to 1" (1.7" average assumed in IOU calculations). Evaluators determined a greater average diameter for the latter tier, for all fluid-customer permutations: large commercial hot water (3.3" diameter on average), large commercial medium-pressure steam (1.9"), industrial hot water (2.3"), and industrial medium-pressure steam (2.7"). Greater-than-assumed diameter leads to higher savings per insulated linear foot.

Conclusion 7 [Section 4.7]: The evaluation team surveyed 49 participating customers and determined a NTGR of 0.49. This value is 20% lower than the current program assumption of 0.61 reflected in reported data.

Appendix A

Nonresidential Downstream Impact Evaluation Phone Survey

Participant Survey for CPUC 2013-2014 Commercial Evaluation

INTRODUCTION AND FINDING CORRECT RESPONDENT

OUTCOME1

This is _____ calling on behalf of the CPUC, from ITRON CONSULTING. THIS IS NOT A SALES CALL NOR A SERVICE CALL. May I please speak with ...<%CONTACT> ...<%OLDCONTACT> ... <%BUSINESS> ... the person at your organization that is most knowledgeable about your participation in <%UTILITY>'s <%PROGRAM> program.
!___[IF NEEDED]...This is a fact-finding survey only, authorized by the California Public Utilities Commission.

1	Yes (go to next screen)	Continue
2	Make appointment	Make appt and record time
3	Busy/engaged	Record Response and T&T
4	No Answer	Record Response and T&T
5	Refused	Record Response and T&T
6	Disconnected	Record Response and T&T
7	Answering Machine - no message	Record Response and T&T
8	Duplicate	Record Response and T&T
9	DRNA	Record Response and T&T

10	Disability	Record Response and T&T
11-12	Language Barriers	Record Response and T&T
13	Answering Machine - left message	Record Response and T&T
14	NO SCREEN - Participant	Record Response and T&T
15	Hang up	Record Response and T&T
16	Residence	Record Response and T&T
17	Fax	Record Response and T&T
18	Quota full	Record Response and T&T
19	Wrong Address	Record Response and T&T
20	Home office	Record Response and T&T
21	Max attempts	Record Response and T&T
24	General callback	Record Response and T&T
25	Name/Number changed	Record Response and T&T

Thank & Terminate PBLOCK NO_ONE	Thank you for your time. For this study, we need to speak to someone about your organization's installation of energy efficient equipment that your organization installed through <%UTILITY>'s <%PROGRAM> program.	END
--	---	-----

Q1B [IF YOU ARE TRANSFERRED TO ANOTHER PERSON OTHER THAN THE BEST CONTACT]Who would be the person most familiar about your organization's participation in <%UTILITY>'S <%PROGRAM> program? [ENTER NEW CONTACT NAME AND MOVE ON]
 [IF NEEDED] This is not a sales call.
 [IF NEEDED] This is a fact-finding survey only, and responses will not be connected with your firm in any way. The California Public Utilities Commission wants to better understand how businesses think about and manage their energy consumption.

77	There is no one here who can help you	T&T
1	Continue Q1B until you find appropriate contact person, record as &NEW CONTACT NAME	Intro3:s

Intro3:S [IF BEST CONTACT IS AVAILABLE]
 Hello, my name is _____%n_____ and I am calling on behalf of the California Public Utilities Commission from Itron Consulting. THIS IS NOT A SALES CALL. We are interested in speaking with the person most knowledgeable about your organization's participation in ... <%UTILITY>'s <%PROGRAM> program...I was told that would be you.
 ...Your organization participated in <%UTILITY>'s <%PROGRAM>

by installing lighting equipment around 2013 or 2014.

Through this program, your organization installed....

<%CUSTOM_MEASURE>

<%QTY_1> ... <%UNITS_1> ... <%MEASURE_1>

<%QTY_2> ... <%UNITS_2> ... <%MEASURE_2>

<%QTY_3> ... <%UNITS_3> ... <%MEASURE_3>

Are you the best person to speak to about your organization's participation in this program?

1	Yes	Person:s
2	No, there is someone else	Intro3:s
3	No and I don't know who to refer you to	Appoint
5	Property management company handles this	PMNAME
99	Don't know/refused	T&T

Ext Is there a phone extension or phone number you recommend we use when we call back?

77	Record Extension or Phone Number, &PHONE	Thank&Terminate
88	Refused	Thank&Terminate
99	Don't know	Thank&Terminate

PMNAME May I have the name and contact information of your property management company?

1	Yes - RECORD	Record Response and T&T
2	No	Thank&Terminate
88	Refused	Thank&Terminate
99	Don't Know	Thank&Terminate

Appoint [IF RECOMMENDED CONTACT IS NOT CURRENTLY AVAILABLE]

When would be a good day and time for us to call back?

77	Record day of the week, time of day and date to call back, as &APPOINT	Record Response and T&T
88	Refused	Intro3(99)
99	Don't know	Intro3(99)

If Person(3)

Intro3(99)	Thank you for your time. We need to speak with the person at your organization that is most familiar with this facility's energy using equipment. Those are all of the questions I have for you today.	Abandoned User30
-------------------	--	------------------

PBLOCK Hi Who would be the person at this location who is most knowledgeable about this facility's energy using equipment? [Enter New Contact Name and move on.]

77	Record Name, as &CONTACT	May_I
88	Refused	Thank&Terminate
99	Don't know	Intro3(99)

May_I May I speak with him/her?

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77	Yes	Intro3:s
88	No (not available right now@, set cb)	Abandoned Appointment

According to our records, your organization participated in
<%UTILITY>'s <%PROGRAM> program by installing energy
saving equipment around ... <%DEEM_PAID_DATE1>
<%CUST_PAID_DATE>
Through this program, your organization installed....
PERSON:s <%CUSTOM_MEASURE>
<%QTY_1> ... <%UNITS_1> ... <%MEASURE_1>
<%QTY_2> ... <%UNITS_2> ... <%MEASURE_2>
<%QTY_3> ... <%UNITS_3> ... <%MEASURE_3>
Are you the person most knowledgeable about your organization's
participation in ...<%UTILITY>'s <%PROGRAM> Program?

1	Yes	Continue
2	Yes, need to make appointment	Appoint
4	No, but I will give you a name	Thank&Terminate
99	No one knows about the energy using equipment	Thank&Terminate

If you need to provide validation for this survey, provide the
following contact name and number: Mona Dzvova (LAST NAME
PRONOUNCED 'ZOVA'), (415) 703-1231, and the following
website: **www.cpuc.ca.gov/evaluation**

DISPLAY Before we start, I would like to inform you that for quality control
purposes, this call may be monitored by my supervisor. Today we're
conducting a very important study on the energy needs and
perceptions of organizations like yours. We are interested in how
organizations like yours think about and manage their energy
consumption. Your input will allow the California Public Utilities
Commission to build and maintain better energy savings programs
for customers like you. And we would like to remind you, your
responses will not be connected with your organization in any way.

SCREENER

VERIFY For verification purposes only, may I please have your name?

77	Get name	Scrn_Addr
88	Refused	Scrn_Addr
99	Don't know	Scrn_Addr

DISPLAY For the sake of expediency, I will refer to<%UTILITY>'s
<%PROGRAM> ...program as the PROGRAM.

Scrn_Addr First, I'd like to ask you a few questions about your organization and
facility. Our records show your organization is located at
%ADDRESS in %CITY. Is that correct?
[CONTINUE IF ADDRESS REPORTED BY RESPONDENT IS
SIMILAR ENOUGH]

1	Yes	Bus_Name
----------	-----	----------

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2	No	CORRECT
88	Refused	COMMENT
99	Don't Know	COMMENT

COMMENT We were attempting to reach <%UTILITY>'s customer at <%ADDRESS> and since you cannot confirm this address, those are all the questions that we have for you today, on behalf of the California Public Utilities Commission, thank you for your time.

CORRECT May I have your correct address?

%CORRECT	Corrected Address	COMPARE
-----------------	-------------------	----------------

COMPARE Are these addresses similar or totally different?
Computer Address - %ADDRESS
Corrected Address - &CORRECT

1	Similar	Bus_Name
2	Totally Different	COMMENT2

COMMENT2	We were attempting to reach the <%UTILITY> customer at <%ADDRESS> in <%CITY> and since that does not match your address, then we must have mis-dialed the telephone number. Those are all the questions that we have for you today, on behalf of the California Public Utilities Commission. Thank you for your time and cooperation.	Thank and Terminate
-----------------	---	---------------------

BUS_NAME Our records show your organization's name as: <%BUSINESS> <%CONTACT> <%OLDCONTACT>. Is that correct?

1	Yes	INCENT
2	No	Bus_Correct
88	Refused	COMMENT
99	Don't Know	COMMENT

BUS_CORRECT What is the correct name for your organization?

&BUS_CORRECT	Corrected Business	INCENT
-------------------------	--------------------	---------------

INCENT What percentage of the cost of your rebated equipment was covered by the program?

77	RECORD RESPONSE	A1gg
88	REFUSED	FM050
99	DON'T KNOW	FM050

IF INCENT <> 100 then ask; Else skip to FM050

A1gg What incentive amount did your organization receive from the program towards your energy efficient equipment installation?

77	RECORD VERBATIM	FM050
88	Refused	FM050
99	Don't know	FM050

FM050 What is the main business ACTIVITY at this facility? [DO NOT READ]

1	Offices (non-medical)	FM050a
2	Restaurant/Food Service	FM050b
3	Food Store (grocery/liquor/convenience)	FM050c
4	Agricultural (farms, greenhouses)	FM050d
5	Retail Stores	FM050e
6	Warehouse	FM050f
7	Health Care	FM050g
8	Education	FM050h
9	Lodging (hotel/rooms)	FM050i
10	Public Assembly (church, fitness, theatre, library, museum, convention)	FM050j
11	Services (hair, nail, massage, spa, gas, repair)	FM050k
12	Industrial (food processing plant, manufacturing)	FM050l
13	Laundry (Coin Operated, Commercial Laundry Facility, Dry Cleaner)	FM050m
14	Condo Assoc./Apartment Mgr (Garden Style, Mobile Home Park, High-rise, Townhouse)	FM050n
15	Public Service (fire/police/postal/military)	FM050o
77	OPEN\Record Other Service Shop	LANG
88	Refused	LANG
99	Don't know	LANG

FM050a Which of the following types of offices best describes this facility? Would you say...[READ]

1	Administration and management	LANG
2	Financial/Legal	LANG
3	Insurance/Real Estate	LANG
4	Data Processing/Computer Center	LANG
5	Mixed-Use/Multi-tenant	LANG
6	Lab/R&D Facility	LANG
7	Software Development	LANG
8	Government Services	LANG
9	Office with Warehouse	LANG
10	Contractor's Offices	LANG
11	Telecommunications Center (call center)	LANG
12	Travel Services (Travel Agent)	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050b Which of the following types of restaurants or food service best describes this facility? Would you say... [READ]

1	Fast Food or Self Service	LANG
2	Specialty/Novelty Food Service	LANG

3	Table Service	LANG
4	Bar/Tavern/Nightclub/Brew Pub or Microbrewery/Other entertainment	LANG
5	Caterer	LANG
6	Other Food Service	LANG
88	Refused	LANG
99	Don't know	LANG

FM050c Which of the following types of food stores best describes this facility? Would you say...[READ]

1	Supermarkets	LANG
2	Small General Grocery	LANG
3	Specialty/Ethnic Grocery/Deli	LANG
4	Convenience Store	LANG
5	Liquor Store	LANG
6	Retail Bakery	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050d What type of agricultural facility is this? [READ]

1	Commercial Greenhouse	LANG
2	Commercial Farm	LANG
3	Dairy/Ranch	LANG
4	Vineyard/Orchard	LANG
5	Agricultural Storage (Grain Elevators, etc.)	LANG
6	Equine Facility (Horse Boarding/Grooming/Racing/Breeding)	LANG
77	OPEN\Describe type of agricultural facility	LANG
88	Refused	LANG
99	Don't know	LANG

FM050e Which of the following types of retail stores best describes this facility? Would you say... [READ]

1	Department/Variety Store	LANG
2	Retail Warehouse/Club	LANG
3	Shop in Enclosed Mall	LANG
4	Shop in Strip Mall	LANG
5	Auto/Truck/Motorcycle Sales	LANG
6	Art Gallery	LANG
7	Auction House	LANG
8	Heavy Equipment Sales	LANG
9	Facility is a Mall/Strip Mall	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050f Which of the following types of warehouses best describes this facility? Would you say... [READ]

1	Refrigerated Warehouse	LANG
2	Unconditioned Warehouse, High Bay (lighting higher than 13 ft.)	LANG
3	Unconditioned Warehouse, Low Bay	LANG
4	Conditioned Warehouse, High Bay (lighting higher than 13 ft.)	LANG
5	Conditioned Warehouse, Low Bay	LANG
6	Shipping/Distribution Center	LANG
7	Garage/Parking/Storage for Commercial Fleet	LANG
8	Public Self Storage Facility	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050g Which of the following types of health care centers best describes this facility? Would you say... [READ]

1	Hospital	LANG
2	Nursing Home	LANG
3	Medical/Dental Office	LANG
4	Clinic/Outpatient Care	LANG
5	Medical/Dental Lab	LANG
6	Alcohol/Drug Treatment/Rehabilitation	LANG
7	Doctor's Office	LANG
8	Dentist's Office	LANG
9	Veterinary Hospital/Clinic	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050h Which of the following types of educational centers best describes this facility? Would you say... [READ]

1	Daycare or Preschool	LANG
2	Elementary School	LANG
3	Middle/Secondary School	LANG
4	College or University	LANG
5	Vocational or Trade School	LANG
6	Instructional Studio (Dance/Music/Martial Arts)	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050i Which of the following types of lodging best describes this facility? Would you say... [READ]

1	Hotel	LANG
2	Motel	LANG

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3	Resort	LANG
4	Bed and Breakfast	LANG
5	Campground/Trailer Camping/KOA	LANG
6	Residential Hotel/Motel	LANG
7	Dormitory/Sorority/Fraternity	LANG
8	Activity Camp/Summer Camp	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050j Which of the following types of public assembly buildings best describes this facility? Would you say... [READ]

1	Religious Assembly (worship only)	LANG
2	Religious Assembly (mixed use)	LANG
3	Health/Fitness Center/Athletic Center/Gym	LANG
4	Movie Theaters	LANG
5	Theater/Performing Arts Venue	LANG
6	Library/Museum	LANG
7	Conference/Convention Center	LANG
8	Community Center/Activity Center	LANG
9	Country Club	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050k Which of the following types of service buildings best describes this facility? Would you say...[READ]

1	Hair Salon	LANG
2	Nail Salon	LANG
3	Massage Spa	LANG
4	Day Spa	LANG
5	Gas Station/Auto Repair	LANG
6	Gas Station w/Convenience Store	LANG
7	Repair (Non-Auto)	LANG
8	Copy Center/Printing	LANG
9	Package Delivery (Fed Ex/UPS/DHL)	LANG
10	HVAC Repair Installation	LANG
11	Aircraft Maintenance/Repair	LANG
12	Airport	LANG
13	Parking Lot/Commuter Service	LANG
14	Marina	LANG
15	Amusement (mini-golf/go-carts/skating/bowling)	LANG
16	Pet Care/Grooming	LANG
17	Car Rental	LANG

18	Car Wash	LANG
19	Cemetery/Mortuary/Crematorium	LANG
20	Equipment Rental	LANG
21	Fleet Fueling Services	LANG
22	Pest Control	LANG
23	Photographer	LANG
24	Vehicle Inspections	LANG
25	Transportation	LANG
26	Upholstery	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050l Which of the following types of buildings best describes this facility?
Would you say...[READ]

1	Assembly/Light Manufacturing	LANG
2	Food Processing Plant	LANG
3	Recycling Center	LANG
4	Commercial/Industrial Bakery	LANG
5	Commercial Brewery/Winery	LANG
6	Chemical/Petrochemical Production	LANG
7	Industrial Process	LANG
8	Radio/Television/Film/Music Production	LANG
9	Energy Generation/Distribution	LANG
10	Machine Shop	LANG
11	Pharmaceutical Production/Manufacturing	LANG
12	Mail Sorting	LANG
13	Mining	LANG
77	OPEN\DO NOT USE unless necessary	LANG
88	Refused	LANG
99	Don't know	LANG

FM050m What type of laundry facility is this? [READ]

1	Coin Operated	LANG
2	Commercial Laundry Facility	LANG
3	Dry Cleaners	LANG
77	OPEN\Record other building type	LANG
88	Refused	LANG
99	Don't know	LANG

FM050n Which of the following types of buildings best describes this facility?
Would you say...[READ]

1	Garden Style	LANG
2	Mobile Home	LANG

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3	High-rise	LANG
4	Townhouse	LANG
5	Condominium	LANG
6	Apartment	LANG
7	Artists' Studio/Live Work/Loft	LANG
8	Assisted Living	LANG
77	OPEN\Record other building type	LANG
88	Refused	LANG
99	Don't know	LANG

FM050o Which of the following types of buildings best describes this facility?
Would you say...[READ]

1	Police station	LANG
2	Fire station	LANG
3	Post office	LANG
4	Military	LANG
5	Ambulance Service	LANG
6	Jail/Correctional facility	LANG
7	Courthouse	LANG
8	Library	LANG
9	Water/Waste Water Treatment	LANG
10	General Government (Municipal/State/Federal Agency Buildings)	LANG
11	Public Park	LANG
77	OPEN\Record other building type	LANG
88	Refused	LANG
99	Don't know	LANG

LANG Is another language besides English used to conduct business at this facility?

1	Yes	OTH_LANG
2	No	CC2a
88	Refused	CC2a
99	Don't Know	CC2a

OTH_LANG Which languages are used to conduct business at this facility?

1	Spanish	CC2a
2	Chinese	CC2a
3	Korean	CC2a
4	Vietnamese	CC2a
5	Japanese	CC2a
6	Hindi	CC2a
77	OPEN	CC2a
88	Refused	CC2a
99	Don't know	CC2a

CUSTOMER CHARACTERISTICS

Now, I'd like to ask you questions regarding your facility.

CC2a What is the total square footage at this facility?

77	RECORD Square feet	CC2c
888888	Refused	CC3
999999	Don't know	CC3

IF CC2a IN (88, 99)

CC3 Would you say that the floor area is ...?

1	less than 1,500 sq. ft.	CC2c
2	1,500 - 5,000 sq. ft.	CC2c
3	5,000 - 10,000 sq. ft.	CC2c
4	10,000 – 25,000 sq. ft.	CC2c
5	25,000 – 50,000 sq. ft.	CC2c
6	50,000 – 75,000 sq. ft.	CC2c
7	75,000 – 100,000 sq. ft.	CC2c
8	over 100,000 sq. ft. (ag area)	CC2c
88	Refused	CC2c
99	Don't know	CC2c

CC2c Is the entire floor area of this facility heated or cooled?

1	Yes	CC3a
2	No	CC2d
88	Refused	C0
99	Don't know	C0

CC2d What percentage of the floor area is heated or cooled?

77	Percent	CC3a
101	Refused	C0
102	Don't know	C0

If CC2d > 0 or CC2c = 1; else skip to C0

CC3a Is your space heated using electricity or gas or something else?

1	Electricity	C0
2	Gas	C0
3	Both electricity and gas	C0
4	Propane	C0
77	OPEN\Other-record	C0
88	Refused	C0
99	Don't know	C0

C0 About what percentage of your operating costs does energy account for?

1	Less than 1 percent	CC4
2	1-2 percent	CC4
3	3-5 percent	CC4
4	6-10 percent	CC4
5	11-15 percent	CC4
6	16-20 percent	CC4
7	21-50 percent	CC4
8	Over 51 percent	CC4
88	Refused	CC4
99	Don't Know	CC4

CC4 Does your organization own, lease, or manage the facility?

1	Own	C5
2	Lease/Rent	C5
3	Manage	C5
88	Refused	C5
99	Don't know	C5

C5 How many locations does your organization have. Is it....

1	This facility only	CC6
2	2 to 4 locations	CC6
3	5 to 10 locations	CC6
4	11 to 25 locations	CC6
5	more than 25 locations	CC6
88	Don't know	CC6
99	Refused	CC6

CC6 How active a role does your organization take in making purchase decisions related to energy using equipment at this facility? Would you say you are...

1	Very active – involved in all phases and have veto power	CC8
2	Somewhat active – we approve decisions and provide some input and review	CC8
3	Slightly active – we have a voice but it's not the dominant voice	CC8
4	Not active at all – we're part of a larger firm	CC8
5	Not active at all – our firm doesn't get involved in these issues	CC8
88	Refused	CC8
99	Don't know	CC8

CC8 In what year was the facility built?

7777	Year	CC11
8888	Refused	CC10
9999	Don't know	CC10

If CC8 in (88, 99) then ask; else skip to CC11

CC10 If don't know, would you say it was...

1	After 2010	CC11
2	2000s	CC11
3	1990s	CC11
4	1980s	CC11
5	1970s	CC11
6	1960s	CC11
7	1950	CC11
8	Before 1950	CC11
88	Refused	CC11
99	Don't know	CC11

CC11 In what year was this facility last remodeled? [PROBE FOR BEST GUESS]

7777	Year	CC12a
6666	Never Remodeled	CC12a
8888	Refused	CC11a
9999	Don't know	CC11a

CC11a **Ask if CC11 in (88, 99); else skip to CC12a**
Would you say the last remodeling was done [READ RESPONSES.]

1	Between 2010 and present	CC12a
2	Between 2006 and end of 2009	CC12a
3	Between 2000 and the end of 2005	CC12a
4	During the 1990s	CC12a
5	Before the 1990s	CC12a
88	Refused	CC12a
99	Don't know	CC12a

CC12a In what year was this organization established at this location?

7777	Year	BC090
8888	Refused	CC12b
9999	Don't know	CC12b

CC12b **If CC12a in (88, 99) then ask; else skip to BC090**
Would you say it was...

1	After 2010	BC090
2	Between 2006 and 2010	BC090
3	Between 2000 and 2005	BC090
4	In the 1990s	BC090
5	In the 1980s	BC090
6	In the 1970s	BC090
7	In the 1960s or	BC090
8	Before 1960	BC090
88	Don't know	BC090
99	Refused	BC090

ADDITIONAL FACILITY CHARACTERISTICS

BC090 Has the square footage of the facility increased, decreased or remained the same since January 2012?

1	Increase in square footage	BC100
2	Decrease in square footage	BC110
3	Stayed the same	CA15
88	Refused	CA15
99	Don't know	CA15

If BC090 = 1 then ask; else skip to BC110

BC100 How many square feet were added?

77	Square feet	BC120
88	Refused	BC120
99	Don't know	BC120

If BC090 = 2 then ask; else skip to BC120

BC110 By how many square feet was the facility reduced?

77	Square feet	BC120
88	Refused	BC120
99	Don't know	BC120

If BC090 in (1, 2) then ask; else skip to CA15

BC120 In what year did this <%BC090> occur?

1	2012	V1
2	2013	V1
3	2014	V1
88	Refused	V1
99	Don't know	V1

ROLE OF CONTRACTORS

V1 Did you use a contractor/vendor to install any of the the energy efficient measures that were purchased through the program?

1	Yes	V2
2	No	AP9
88	Refused	AP9
99	Don't Know	AP9

If V1 = 1 then ask; else skip to AP9

V2 How did you come into contact with the contractor/vendor?

1	They contacted you	V2b
2	You contacted them	V3

3	You had worked with them before	V2a
77	OTHER - Record	V3
88	Refused	V3
99	Don't Know	V3

Ask if V2 = 3; else skip to V2b

In relation to this project, did the vendor/contractor approach you about your energy efficient equipment retrofit/installation?

V2a

1	Yes	V2b
2	No	V3
88	Refused	V3
99	Don't Know	V3

Ask if V2 = 1 or V2a = 1; else skip to V3

On a scale of 0 - 10, with 0 being NOT AT ALL LIKELY and 10 is VERY LIKELY, how likely is it that your organization would have installed this new equipment had the contractor/vendor not contacted you?

V2b

1	0-10 response	V3
88	Refused	V3
99	Don't Know	V3

Did the contractor/vendor tell you about or recommend the program?

V3

1	Yes	V4
2	No	AP9
88	Refused	AP9
99	Don't Know	AP9

Ask if V3 = 1; else skip to AP9

Prior to coming into contact with the contractor/vendor, did your organization have plans to replace/install this equipment?

V4

1	Yes	V4a
2	No	V4a
88	Refused	V4a
99	Don't Know	V4a

Using the same scale of 0 - 10 as before, how likely is it that your organization would have installed the new energy efficient equipment had the contractor/vendor not recommended it?

V4a

1	0-10 response	V4b
88	Refused	V4b
99	Don't Know	V4b

Using the same scale, how likely is it that your organization would have installed the energy efficient equipment with the same level of efficiency if the contractor/vendor had not recommended to do so?

V4b

1	0-10 response	V40
88	Refused	V40
99	Don't Know	V40

On a scale of 0 - 10, with 0 being not at all important and 10 being very important, how important was the input from the contractor you worked with in deciding which specific equipment to install?

V40

1	0-10 response	AP9
88	Refused	AP9
99	Don't Know	AP9

PROGRAM AWARENESS

Next, I'd like to ask you about various energy efficiency programs and what influenced your program participation.

How did you FIRST learn about <%UTILITY>'s program? [DO NOT READ ANSWERS]

AP9

1	Bill insert	AP9a
2	Program literature	AP9a
3	Account representative	AP9a
4	Program approved vendor	AP9a
5	Program representative	AP9a
6	Utility or program website	AP9a
7	Trade publication	AP9a
8	Conference	AP9a
9	Newspaper article	AP9a
10	Word of mouth	AP9a
11	Previous experience with it	AP9a
12	Company used it at other locations	AP9a
13	Contractor	AP9a
14	Result of an audit	AP9a
15	Part of a larger expansion or remodeling effort	AP9a
77	Other (RECORD VERBATIM)	AP9a
88	Refused	A1b
99	Don't know	A1b

If AP9 in (1-77) then ask; else skip to A1b

How ELSE did you learn about <%UTILITY>'s program? [DO NOT READ LIST, ACCEPT MULTIPLES]

AP9a

1	Bill insert	N33
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2	Program literature	N33
3	Account representative	N33
4	Program approved vendor	N33
5	Program representative	N33
6	Utility or program website	N33
7	Trade publication	N33
8	Conference	N33
9	Newspaper article	N33
10	Word of mouth	N33
11	Previous experience with it	N33
12	Company used it at other locations	N33
13	Contractor	N33
14	Result of an audit	N33
15	Part of a larger expansion or remodeling effort	N33
77	Other (RECORD VERBATIM)	N33
88	Refused	N33
99	Don't know	N33

If AP9 = 3 or AP9A = 3 then ask; else skip to A1b

You mentioned that you have a Utility or Program Administrator Account Rep.

Can you give me his or her name?

!! ___ Do you have his/her email address?

! ___ Do you have a phone number for him/her?

N33 ! ___ Do you have a cell phone number for him/her? \,

77	RECORD NAME, Phone, Email, etc.	A1b
88	Refused	A1b
99	Don't know	A1b

INTEGRATED DEMAND SIDE MANAGEMENT

If AUDIT = 1 then ask; else skip to ID0

According to our records, your organization also received an

A1b AUDIT from <%UTILITY>. Is this correct?

1	Yes	ID0
2	No	ID0
88	Refused	ID0
99	Don't know	ID0

If AUDIT <> 1

To the best of your knowledge, has the facility located at this address received a <%UTILITY>-sponsored energy audit within the past 3 years?

ID0

1	Yes	ID1
2	No	ID1
88	Refused	ID1
99	Don't Know	ID1

ID1 Are you aware of other programs, other than the one we mentioned earlier, or resources that are designed to help organizations like yours reduce its energy bills?

1	Yes	ID2
2	No	ID3
88	Refused	ID3
99	Don't Know	ID3

If ID1 = 1 then ask; else skip to ID3

ID2 What types of programs can you recall? **[RECORD ALL MENTIONS]** [After each response prompt with "Can you recall any others?"]

1	Rebates/incentives (include mentions of SPC and Express)	ID3
2	Building Commissioning (Retrocommissioning, Monitoring based commissioning)	ID3
3	Business energy audits and feasibility studies	ID3
4	Energy Centers (Pacific Energy Center, SCE CTAC)	ID3
5	Seminars, classes, and workshops	ID3
6	Solar or other Distributed Generation Programs (CSI, SGIP)	ID3
7	Demand Response Programs (Flex Your Power, Peak Choice, BIP, DBP, Aggregator, PDP) ID3	ID3
8	Upstream HVAC and Motors Program	ID3
77	Other programs [SPECIFY:] _____	ID3
88	Refused	ID3
99	Don't Know	ID3

ID3 Has your Account Representative, or any Program Staff or Program Vendors discussed solar, wind or other self-generation equipment opportunities with you?

1	Yes, Account Representative	ID3a
2	Yes, Program Staff	ID3a
3	Yes, Program Vendor	ID3a
4	No	ID3a
88	Refused	ID3a
99	Don't Know	ID3a

ID3a Has your Account Representative, Program Staff, or Program Vendors discussed Demand Reduction programs, technologies, or opportunities with you? (Select all that apply)

1	Yes, Account Representative	Program_Lighting
2	Yes, Program Staff	Program_Lighting
3	Yes, Program Vendor	Program_Lighting
4	No	Program_Lighting
88	Don't Know	Program_Lighting
99	Refused	Program_Lighting

PROGRAM LIGHTING EQUIPMENT

Ask if LIGHTING = 1; else skip to NEXT BATTERY

Comment	One way that organizations like yours can reduce their energy use is to install more energy efficient lighting equipment. I would like to ask you about the lighting changes you made as part of your participation in <%UTILITY>'s program.	LI99
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CONTINUE IF CUSTOM = 1; ELSE SKIP TO A3A IF DEEMED = 1

Our records indicate that your organization installed CUSTOM LIGHTING EQUIPMENT through the program. It is described as <%CUSTOM_MEASURE>. Is this correct?

LI99

1	Yes	LI100
2	No	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

Ask if LI99 in (2-99); else skip to LI100.

DISPLAY	We can not continue this study unless we can speak to someone at your organization that is familiar with the lighting equipment that was installed through the program.	A3A
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Ask if LI99 = 1; else skip to A3A.

What types of fixtures, ballasts, or light controls were installed as part of this lighting installation?

<\$2>

LI100

1	High performance T8 (1" diameter bulbs)	LI101A <\$1>
2	T8 fluorescent fixtures (1" diameter bulbs)	LI101A <\$1>
3	T10 fluorescent fixtures	LI101A <\$1>
4	Compact HID (High Density Discharge) Fixtures	LI101A <\$1>
5	Screw-in modular CFLs	LI101A <\$1>
6	Hardwire CFL fixtures	LI101A <\$1>
7	CFL Exit Signs	LI101A <\$1>
8	Led Exit Signs	LI101A <\$1>
9	Halogen bulbs	LI101A <\$1>
10	Reflectors	LI101A <\$1>

11	Electronic Ballasts	LI101A <\$1>
12	Lighting Controls, Time Clock	LI101A <\$1>
13	Lighting Controls, Occupancy Sensor	LI101A <\$1>
14	Lighting Controls, Bypass/Delay Timers	LI101A <\$1>
15	Lighting Controls, Photocell	LI101A <\$1>
16	Other Fluorescent	LI101A <\$1>
17	Skinny/Thin Tubes	LI101A <\$1>
18	T5 Fixtures (5/8" diameter)	LI101A <\$1>
19	Screw-in LEDs	LI101A <\$1>
20	Screw-in LEDs Reflector Lamps	LI101A <\$1>
21	LED Fixtures or Panels (e.g., replacement for linear fixtures)	LI101A <\$1>
77	Other (PLEASE SPECIFY)	LI101A <\$1>

IF CUSTOM = 1 START MACRO <LI99> FOR CUSTOM MEASURES (LI101A THROUGH LI101H)

LI101A (\$1) Approximately how many <\$2> were installed through the program?

77	Record #	LI101C <\$4>
8888	Refused	LI101B <\$3>
9999	Don't know	LI101B <\$3>

If LI101A <\$1> in (88, 99) the ask; else skip to LI101C <\$4>

LI101B (\$3) Would you say that the number of <\$2> installed under the program are...

1	less than 10 units	LI101C <\$4>
2	11 - 50 units	LI101C <\$4>
3	50 - 100 units	LI101C <\$4>
4	More than 100 units	LI101C <\$4>
88	Refused	LI101C <\$4>
99	Don't know	LI101C <\$4>

LI101C (\$4) Were any of the program provided <\$2> placed/installed at another facility? If so, what percentage would you estimate?

1	Yes, #record percentage	LI101D <\$5>
2	No	LI101D <\$5>
101	Refused	LI101D <\$5>
102	Don't know	LI101D <\$5>

LI101D (\$5) What type of lighting equipment was removed and replaced when you installed <\$2> through the program?

1	High performance T8 (1" diameter bulbs)	LI101F <\$7>
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2	T8 fluorescent fixtures (1" diameter bulbs)	LI101F <\$7>
3	T10 fluorescent fixtures	LI101F <\$7>
4	T12 Fixtures (1.5" diameter bulbs)	LI101F <\$7>
5	Compact HID (High Density Discharge) Fixtures	LI101E <\$6>
6	Screw-in Modular CFLs	LI101F <\$7>
7	Hardwire CFL Fixtures	LI101F <\$7>
8	Incandescent bulbs	LI101F <\$7>
9	CFL Exit Signs	LI101F <\$7>
10	LED Exit Signs	LI101F <\$7>
11	Halogen bulbs	LI101F <\$7>
12	Reflectors	LI101F <\$7>
13	Electronic Ballast	LI101F <\$7>
14	Magnetic Ballast	LI101F <\$7>
15	Manual Switches	LI101F <\$7>
16	Lighting Controls, Time Clock	LI101F <\$7>
17	Lighting Controls, Occupancy Sensor	LI101F <\$7>
18	Lighting Controls, Bypass/Delay Timers	LI101F <\$7>
19	Lighting Controls, Photocell	LI101F <\$7>
20	Other Fluorescent	LI101F <\$7>
21	Fat/Thick Tubes	LI101F <\$7>
22	Skinny/Thin Tubes	LI101F <\$7>
23	T5 Fixtures (5/8" diameter)	LI101F <\$7>
24	Screw-in LEDs	LI101F <\$7>
25	Screw-in LEDs Reflector Lamps	LI101F <\$7>
26	LED Fixtures or Panels (e.g., replacement for linear fixtures)	LI101F <\$7>
66	Did not replace anything - new equipment	LI90
77	Other (PLEASE SPECIFY)	LI101F <\$7>

Ask if LI101D <\$5> = 5; else skip to LI101F

Were the HID lamps you removed High Pressure

LI101E (\$6) Sodium, Metal Halide, Mercury Vapor or Incandescent?

1	High pressure sodium	LI101F <\$7>
2	Metal Halide	LI101F <\$7>
3	Mercury Vapor	LI101F <\$7>
4	Incandescent	LI101F <\$7>
88	Refused	LI101F <\$7>
99	Don't know	LI101F <\$7>

Ask if LI101D <\$5> <> 66; else skip to LI90

Approximately how old was the lighting that was

LI101F (\$7) removed and replaced with <\$2>? Would you say...

1	Less than 5 years old	LI101G <\$8>
2	Between 5 and 10 years old	LI101G <\$8>
3	Between 10 and 15 years old	LI101G <\$8>
4	More than 15 years old	LI101G <\$8>

88	Refused	LI101G <\$8>
99	Don't know	LI101G <\$8>

LI101G (\$8) How would you describe the removed equipment's condition? Would you say they were in...

1	Poor condition	LI101H <\$9>
2	Fair condition	LI101H <\$9>
3	Good condition	LI101H <\$9>
88	Refused	LI101H <\$9>
99	Don't know	LI101H <\$9>

LI101H (\$9) Approximately what percentage of the lighting equipment that was removed and replaced was broken or not working prior to installing <\$2>?

%	Percent	LI90
101	Refused	LI90
102	Don't know	LI90

**END MACRO FOR CUSTOM MEASURES;
RESTART LOOP IF NEEDED FOR ADDITIONAL
MEASURES SELECTED IN LI100; ELSE GO TO
LI90**

Ask if LI100 = 5

Of the CFLs you received through the program, what percentage do you estimate were placed into storage for later use?

LI90

77	Open Record	LI901
101	Refused	LI901
102	Don't know	LI901

Ask if LI100 = 19

Of the LEDs you received through the program, what percentage do you estimate were placed into storage for later use?

LI901

77	Open Record	LI902
101	Refused	LI902
102	Don't know	LI902

Ask only if LI100 = 20

Of the LED Reflector Lamps you received through the program, what percentage do you estimate were placed into storage for later use?

LI902

77	Open Record	CUST_INSTALL_DATE_ NU
101	Refused	CUST_INSTALL_DATE_ NU
102	Don't know	CUST_INSTALL_DATE_ NU

CUST_INSTALL_DATE_NU **IF UNRECORDED <> CUST_INSTALL_DATE;**
Our records indicate that your company installed this
CUSTOM LIGHTING EQUIPMENT on
<%CUST_INSTALL_DATE>. Is this correct?

1	Yes	NTGCHECK
2	No	CUST_INSTALL_YEAR
88	Refused	CUST_INSTALL_YEAR
99	Don't know	CUST_INSTALL_YEAR

DISPLAY **IF UNRECORDED(CUST_INSTALL_DATE) & ^UNRECORDED(CUST_PAID_DATE);**
According to our records, your organization received a
rebate for the installation of your CUSTOM LIGHTING
EQUIPMENT on ... <%CUST_PAID_DATE>.
IF CUST_INSTALL_DATE_NU = 2 OR
(UNRECORDED = CUST_INSTALL_DATE AND
UNRECORDED <> CUST_PAID_DATE);
In what year did you install this CUSTOM LIGHTING
EQUIPMENT (PROBE FOR BEST GUESS)

CUST_INSTALL_YEAR		
1	2013	CUST_INSTALL_MONTH
2	2014	CUST_INSTALL_MONTH
88	Refused	NTGCHECK
99	Don't know	NTGCHECK

If CUST_INSTALL_YEAR in (1-3) then ask; else skip to A3a

CUST_INSTALL_MONTH And in which Month. If you don't know the MONTH,
could you remember the SEASON?

1	January	NTGCHECK
2	February	NTGCHECK
3	March	NTGCHECK
4	April	NTGCHECK
5	May	NTGCHECK
6	June	NTGCHECK
7	July	NTGCHECK
8	August	NTGCHECK
9	September	NTGCHECK
10	October	NTGCHECK
11	November	NTGCHECK
12	December	NTGCHECK
13	Fall	NTGCHECK
14	Winter	NTGCHECK
15	Spring	NTGCHECK

16	Summer	NTGCHECK
88	Refused	NTGCHECK
99	Don't know	NTGCHECK

NTGCHECK GO TO NTG BATTERY IF NTGCUSTOM = 1;
ELSE CONTINUE

IF DEEMED = 1 START LOOP FOR DEEMED MEASURES (<%LT_MEAS_x>, WHERE x = 1, 2, or 3); ELSE SKIP TO LI30

According to our records, your organization (MxDELAMP = 0) installed/delamped <%LT_QTY_x> <%LT_MEAS_x> through <%UTILITY>'s program, is this correct? [IF MxDELAMP == 1, READ: delamping occurs when you retrofit your T12s to T8s and reduce the number of lamps in a fixture or simply reduce the number of fixtures]

A3[A-C]

1	Yes - Quantity is Correct	DEEMED_INSTALL_DATE_NU
2	Yes - Installed Different Quantity	A3_QTY
3	No, did not install	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

IF A3[A-C](3 - 99), READ: "We must conduct this study with someone that knows about the installation of this measure." and ABANDON USER. Else continue with A3[A-C]_QTY

DISPLAY

Ask if A3[A-C] = 2 or LT_QTY_x = 0
Approximately how many units of <%LT_MEAS_x> were (MxDELAMP = 0) installed/delamped under the %PROGRAM program?

A3[A-C]_QTY

77	Record #	DEEMED_INSTALL_DATE_NU
8888	Refused	A3_OTH
9999	Don't know	A3_OTH

IF A3_QTY IN (88, 99)

Would you say that the number of <%LT_MEAS_x> (MxDELAMP = 0) installed/delamped are...

A3[A-C]_OTH

1	less than 10 units	DEEMED_INSTALL_DATE_NU
2	11 - 50 units	DEEMED_INSTALL_DATE_NU
3	50 - 100 units	DEEMED_INSTALL_DATE_NU
4	More than 100 units	DEEMED_INSTALL_DATE_NU
88	Refused	DEEMED_INSTALL_DATE_NU
99	Don't know	DEEMED_INSTALL_DATE_NU

IF ^UNRECORDED(DEEM_INSTALL_DATEx)

Our records indicate that your organization
<(MxDELAMP = 0)/installed/delamped>

...<%LT_MEAS_x> on

DEEM_INSTALL_DATE <%DEEM_INSTALL_DATEx>. _____ Is this
x_NU correct?

1	Yes	LI18
2	No	DEEM_INSTALL_YEA R
88	Refused	DEEM_INSTALL_YEA R
99	Don't know	DEEM_INSTALL_YEA R

**IF UNRECORDED(DEEM_INSTALL_DATEx) &
^UNRECORDED(DEEM_PAID_DATEx)**

According to our records, your organization received a
rebate for the (MxDELAMP = 0)
installation/delamping> of ...<%LT_MEAS_x>... on
DISPLAY <%DEEM_PAID_DATEx>.

**IF DEEM_INSTALL_DATEx_NU in (2,88,99) |
(UNRECORDED(DEEM_INSTALL_DATEx) &
^UNRECORDED(DEEM_PAID_DATEx))**

DEEM_INSTALL_YEAR In what year did you (MxDELAMP = 0) install/delamp
x <%LT_MEAS_x>? (PROBE FOR BEST GUESS)

1	2013	DEEM_INSTALL_MO NTHx
2	2014	DEEM_INSTALL_MO NTHx
88	Refused	LI18
99	Don't know	LI18

IF DEEM_INSTALL_YEARx in (1-3)

DEEM_INSTALL_MON And what month? {If they can not recall month, try to
THx get the season.}

1	January	LI18
2	February	LI18
3	March	LI18
4	April	LI18
5	May	LI18
6	June	LI18
7	July	LI18
8	August	LI18
9	September	LI18
10	October	LI18
11	November	LI18
12	December	LI18
13	Fall	LI18
14	Winter	LI18

15	Spring	LI18
16	Summer	LI18
88	Refused	LI18
99	Don't know	LI18

If A3[A-C] is 1 or 2;

Ask only if CFLx = 1; else skip to LI181[A-C]

Of the CFLs you received through the program, what percentage do you estimate were placed into storage for later use?

LI18[A-C]

77	Open Record	LI181
101	Refused	LI181
102	Don't know	LI181

Ask only if LEDx = 1; else skip to LI182[A-C]

Of the LEDs you received through the program, what percentage do you estimate were placed into storage for later use?

LI181[A-C]

77	Open Record	LI182
101	Refused	LI182
102	Don't know	LI182

ASK ONLY IF LEDRLx = 1

Of the LED Reflector Lamps you received through the program, what percentage do you estimate were placed into storage for later use?

LI182[A-C]

77	Open Record	LI19
101	Refused	LI19
102	Don't know	LI19

Were any of the program provided <%LT_MEAS_x> (MxDELAMP = 0) installed/delamped at another facility? If so, what percentage would you estimate?

LI19[A-C]

77	Yes, #record percentage	LI20
101	Refused	LI20
102	Don't know	LI20

IF MxDELAMP = 0; else skip to end of DEEMED MEASURE LOOP

What type of lighting was removed and replaced when you installed <%LT_MEAS_x> through the program?

LI20[A-C]

1	High performance T8 (1" diameter bulbs)	LI22
2	T8 fluorescent fixtures (1" diameter bulbs)	LI22
3	T10 fluorescent fixtures	LI22
4	T12 Fixtures (1.5" diameter bulbs)	LI22
5	Compact HID (High Density Discharge) Fixtures	LI21
6	Screw-in Modular CFLs	LI22

7	Hardwire CFL Fixtures	LI22
8	Incandescent	LI22
9	CFL Exit Signs	LI22
10	LED Exit Signs	LI22
11	Halogen bulbs	LI22
12	Reflectors	LI22
13	Electronic Ballast	LI22
14	Magnetic Ballast	LI22
15	Manual Switches	LI22
16	Lighting Controls, Time Clock	LI22
17	Lighting Controls, Occupancy Sensor	LI22
18	Lighting Controls, Bypass/Delay Timers	LI22
19	Lighting Controls, Photocell	LI22
20	Other Fluorescent	LI22
21	Fat/Thick Tubes	LI22
22	Skinny/Thin Tubes	LI22
23	T5 Fixtures (5/8" diameter)	LI22
24	Screw-in LEDs	LI22
25	Screw-in LEDs Reflector Lamps	LI22
26	LED Fixtures or Panels (e.g., replacement for linear fixtures)	LI22
66	DID NOT REMOVE ANYTHING-ADDITIONAL EQUIP ONLY	NTGCHECK1
77	Other (PLEASE SPECIFY)	LI22

IF MxDELAMP = 0;

ASK IF LI20[A-C] = 5; else skip to LI22[A-C]

Were the HID lamps you removed High Pressure

LI21[A-C] Sodium, Metal Halide, Mercury Vapor or Incandescent?

1	High pressure sodium	LI22
2	Metal Halide	LI22
3	Mercury Vapor	LI22
4	Incandescent	LI22
88	Refused	LI22
99	Don't know	LI22

If LI20[A-C]^= 66 then ask; else skip to end of

DEEMED Loop

Approximately how old was the equipment that were

LI22[A-C] removed and replaced? Would you say...

1	Less than 5 years old	LI23
2	Between 5 and 10 years old	LI23
3	Between 10 and 15 years old	LI23
4	More than 15 years old	LI23
88	Refused	LI23
99	Don't know	LI23

LI23[A-C] How would you describe the removed equipment's condition? Would you say they were in...

1	Poor condition	LI24
2	Fair condition	LI24
3	Good condition	LI24
88	Refused	LI24
99	Don't know	LI24

LI24[A-C] Approximately what percentage of the lighting equipment that was removed and replaced was broken or not working prior to installing <%LT_MEAS_x>?

%	Percent	NTGCHECK1
101	Refused	NTGCHECK1
102	Don't know	NTGCHECK1

NTGCHECK1 GO TO NTGBATTERY IF NTGDEEMED =1;
ELSE RESTART LOOP IF NEEDED FOR
<%LT_MEAS_x> WHERE x = 2, 3

AFTER ALL DEEMED MEASURES HAVE GONE THROUGH LOOP AND THE NTGBATTERY HAS BEEN COMPLETED FOR A LIGHTING MEASURE, ASK LI30

ASK IF LIGHTING=1

Considering all of the lighting changes we just discussed, approximately what percentage of the facility's lighting was affected by those changes?

LI30

%	Percent	HB1
101	Refused	HB1
102	Don't know	HB1

HIGH BAY AND DELAMPING

**If LINEAR = 1 or LI100 in (1, 2, 3, 16, 17, 18, 77);
else skip to HB1a**

Thinking about all of the types of linear fluorescent bulbs that were installed through the program, what is the highest height, in feet, above the area they light? [IN FEET]

HB1

1	Record number of feet	HB2
66	Did not install linear fluorescent lamps	HB1a
88	Refused	HB2
99	Don't know	HB2

IF HB1 < 13 then ask; else skip to HB3

Just to double check, was any of the linear fluorescent lighting installed through the program at a height of 13 or more feet above the area it is meant to light? This would qualify as HIGH BAY lighting.

HB2

1	Yes	HB3
2	No	HB1a
88	Refused	HB1a
99	Don't know	HB1a

ASKI IF IF (HB1 >> 12 & HB1 <> 66 & HB1 <> 88 & HB1 <> 99) | HB2(1); else skip to HB1a

What is the main kind of linear fluorescent bulbs located at this height?

HB3

1	T8s	HB1a
2	T5s	HB1a
77	OPEN\RECORD OTHER	HB1a
88	Refused	HB1a
99	Don't know	HB1a

Ask if NON_LINEAR = 1 or LI100 in (4, 5, 6, 9, 77); else skip to DEL1

Is any of the lighting installed through the program considered to be High Bay? (If needed, lighting higher than 13 ft)

HB1a

1	Yes	HB2a
2	No	DEL1
88	Refused	DEL1
99	Don't know	DEL1

Ask if HB1a = 1 else skip to DEL1

HB2a

What kind of High Bay Lighting is it?

1	HID (High-intensity discharge) High pressure sodium	DEL1
2	HID Metal halide	DEL1
3	HID Mercury Vapor	DEL1
4	HID - I don't know what type	DEL1
5	CFLs	DEL1
77	OPEN\RECORD OTHER	DEL1
88	Refused	DEL1
99	Don't know	DEL1

Ask if DELAMP = 1; else skip to DEL1a

We also show that you delamped linear fluorescent fixtures. Is this correct? (If needed: delamping occurs when you retrofit your T12s to T8s and reduce the number of lamps in a fixture or simply reduce the number of fixtures.)

DEL1

1	Yes	DEL2
2	No	Gas
88	Refused	Gas
99	Don't know	Gas

Ask if DELAMP ^= 1 and LINEAR = 1 and M1DELAMP ^= 1 and M2DELAMP ^= 1 and M3DELAMP ^= 1 OR LI100(1-3, 16-18, 77);
 As part of the lighting installation you had completed during your participation in program did you have any delamping done? (If needed: delamping occurs when you retrofit your T12s to T8s and reduce the number of lamps in a fixture or simply reduce the number of fixtures.)

DEL1a		
1	Yes	DEL2
2	No	Gas
88	Refused	Gas
99	Don't know	Gas

Ask if DEL1 = 1 or DEL1a = 1 or (M1DELAMP = 1 and A3A in (1, 2)) or (M2DELAMP = 1 and A3B in (1, 2)) or (M3DELAMP = 1 and A3C in (1, 2))
 There are a few different types of delamping that can take place. Today we will be asking about 3 types in particular. One type of delamping occurs when fixtures are simply removed (removal only). Another type of delamping occurs when the fixtures themselves are removed and replaced with new fixtures containing less bulbs (remove and replace fixtures). The final type is where the current fixtures are retrofitted, not replaced, to accomodate less bulbs (reduce # of bulbs).
 Have you had Removal only Delamping done within your facility since January 2012?

DEL2		
1	Yes	DEL2a
2	No	DEL3
88	Refused	DEL3
99	Don't know	DEL3

If DEL2 = 1 then ask; else skip to DEL3

DEL2a What percent of the original fixtures within the delamped area were removed?

77	Record percentage	DEL3
101	Refused	DEL3
102	Don't know	DEL3

Have you had Remove and Replace delamping done within your facility since 2012? Remove and replace occurs when the fixtures themselves are removed and replaced with new fixtures containing less bulbs.

DEL3		
1	Yes	DEL3a
2	No	DEL4
88	Refused	DEL4
99	Don't know	DEL4

If DEL3 = 1 then ask; else skip to DEL4

DEL3a What type of fixtures were removed?

77	Open Record	DEL3b
88	Refused	DEL3b
99	Don't know	DEL3b

DEL3b What type of fixtures were installed?

77	Open Record	DEL3c
88	Refused	DEL3c
99	Don't know	DEL3c

How many lamps per fixture were present prior to the delamping retrofit? [PROBE FOR BEST GUESS IF DON'T KNOW]

DEL3c

1	1	DEL3d
2	2	DEL3d
3	3	DEL3d
4	4	DEL3d
5	5	DEL3d
6	6	DEL3d
7	7	DEL3d
8	8	DEL3d
88	Refused	DEL3d
99	Don't know	DEL3d

How many lamps per fixture are present now, after the delamping retrofit? [PROBE FOR BEST GUESS IF DON'T KNOW]

DEL3d

1	1	DEL3E
2	2	DEL3E
3	3	DEL3E
4	4	DEL3E
5	5	DEL3E
6	6	DEL3E
7	7	DEL3E
8	8	DEL3E
88	Refused	DEL4
99	Don't know	DEL4

Approximately how old were the fixtures that were removed and replaced as a result of this Remove and Replace delamping? Would you say...

DEL3E

1	Less than 5 years old	LI23
2	Between 5 and 10 years old	LI23
3	Between 10 and 15 years old	LI23
4	More than 15 years old	LI23
88	Refused	LI23
99	Don't know	LI23

DEL3F How would you describe the condition of the fixtures that were Removed and Replaced as a result of the remove and replace delamping? Would you say they were in...

1	Poor condition	LI24
2	Fair condition, or	LI24
3	Good condition	LI24
88	Refused	LI24
99	Don't know	LI24

DEL3G Approximately what percentage of the fixtures that were removed and replaced were broken or not working prior to the Remove and Replace delamping?

%	Percent	LI30
101	Refused	LI30
102	Don't know	LI30

DEL4 Have you had a delamping retrofit to reduce the number of lamps per fixture within your facility since 2012? This is where the current fixtures are retrofitted, not replaced, to accomodate less bulbs (reduce # of lamps).

1	Yes	DEL4a
2	No	DEL5
88	Refused	DEL5
99	Don't know	DEL5

If DEL4 = 1 then ask; else skip to DEL5

DEL4a How many lamps per fixture were present prior to the delamping retrofit?[PROBE FOR BEST GUESS IF DON'T KNOW]

77	Open Record	DEL4b
88	Refused	DEL4b
99	Don't know	DEL4b

DEL4b How many lamps per fixture are present now, after the delamping retrofit? [PROBE FOR BEST GUESS IF DON'T KNOW]

77	Open Record	DEL5
88	Refused	DEL5
99	Don't know	DEL5

DEL5 Is the amount of lighting better, worse, or the same than before your delamping job?

1	Better	Gas
2	Worse	DEL11
3	Same	Gas
88	Refused	DEL11
99	Don't know	DEL11

If DEL5 in (2, 88, 99) then ask; else skip to G1

Did you install additional lighting equipment to increase the amount of lighting in the delamped area(s)?

DEL11

1	Yes	Gas
2	No	Gas
88	Refused	Gas
99	Don't know	Gas

GAS EQUIPMENT

Ask if CC3a(2/3) (respondent said organization has gas heating) or GAS=1; else skip to NEXT BATTERY

In this next section we will be discussing the GAS EQUIPMENT present at your facility.

DISPLAY

Which of the following natural gas equipment is present at your facility?...

G1

1	Water Heater	G25
2	Gas Furnace	G25
3	Gas Boiler	G25
4	Gas Stove	G25
5	Gas Clothes Dryer	G25
66	No natural gas	Refrigeration
77	Other (specify)	G25
88	Refused	G25
99	Don't know	G25

Does your organization have any plans to install any high efficiency gas equipment within the next 12 months?

G25

1	Yes	Refrigeration
2	No	Refrigeration
88	Refused	Refrigeration
99	Don't Know	Refrigeration

REFRIGERATION EQUIPMENT

Ask R9 through CD4 if REFRIGERATION = 1; else skip to NEXT BATTERY

READ IF ^UNRECORDED(RF_MEAS_x) where x = 1, 2, 3....

DISPLAY

In this section of the survey we would like to ask you about the refrigeration equipment changes you made as part of your participation in <%UTILITY>'s program.

According to our records, your organization installed <%RF_QTY_x> ... <%RF_UNITS_x>...<%RF_MEAS_x> through the <%UTILITY> program, is this correct?

R9_x

1	Correct as stated	R5b_x
2	Refrigeration equipment installed but not as described	R9X_x
3	No refrigeration equipment installed through the program	Next Measure/Greenhouse
88	Refused	Greenhouse
99	Don't know	Greenhouse

ASK IF IF R9_x(2)

Approximately how many units of ...<%RF_MEAS_x>... were installed under the Program?

R9X_x

77	Record #	Calc
88	Refused	R5b_x
99	Don't know	R5b_x

If <%ClaimInstal_RF_x>/<%RFx_QTY_x> <75% then ask RF9Y_x;
else if <%ClaimInstal_RF_x>/<%RFx_QTY_x> > 125% ask RF9Z_x;
else skip to R5b_x

Calc

ASK R9Y IF R9X_x <> 88888 & R9X_x <> 99999; R9X_x << RFxUNDER

Perhaps you could help us to understand the difference between our records and what has been installed...Do you have any suggestions as to why our numbers differ? Were any of these <%RF_MEAS_x> put into storage, perhaps installed at another facility, or never received? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would really help us to evaluate the program's record keeping?

R9Y_x

1	Have no idea why numbers differ	R5b_x
2	Did not install all of the refrigeration equipment, Put some in storage	R5b_x
3	Installed at another facility	R5b_x
4	Did not receive all of the <%RF_MEAS_x>	R5b_x
77	Other	R5b_x
88	Refused	R5b_x
99	Don't know	R5b_x

ASK R9Z_x IF R9X_x >> RFxOVER

Perhaps you can help us to understand the difference between our records and what has been installed....Do you have any suggestions as to why our numbers differ? Did your facility participate multiple times in the program since 2013 and maybe we don't have these other records? Did you install additional equipment outside of the program that you are including in these numbers? It is okay if you don't know why there is a difference, but if you had any ideas of why our counts don't match, it would really help us to evaluate the program's record keeping?

R9Z_x

1	Have no idea why numbers differ	R5b_x
2	Multiple participation	R5b_x
3	Installed equipment outside of the program	R5b_x
77	Other	R5b_x
88	Refused	R5b_x
99	Don't know	R5b_x

ASK IF R9_x(1|2);

R5b_x

What type of refrigeration equipment was removed and replaced when you installed <%RF_MEAS_x>?

1	Old Strip curtains	R5c_x
2	Older Main door cooler/freezer door gaskets	R5c_x
3	Older Anti-sweat heat controllers	R5c_x
4	Same Equipment, just newer	R5c_x
5	Older Display cases without doors	R5c_x
66	NONE - Not a replacement	R5c_x
77	Other (Specify)	R5c_x
88	Refused	R5c_x
99	Don't know	R5c_x

ASK IF IF R5b_x(1|65|77)

R5c_x

How would you describe the condition of refrigeration equipment that was removed and replaced? Was it...

1	Inoperable (broken)	R5d_x
2	Poor condition	R5d_x
3	Fair condition	R5d_x
4	Good condition	R5d_x
88	Refused	R5d_x
99	Don't know	R5d_x

R5d_x

Approximately how old was the refrigeration equipment that was removed and replaced by the refrigeration equipment we just discussed? Would you say...

1	Less than 5 years old	R9d1_x
2	Between 5 and 10 years old	R9d1_x
3	10 to 20 years old	R9d1_x
4	more than 20 years old	R9d1_x
88	Refused	R9d1_x
99	Don't know	R9d1_x

**ASK IF ^UNRECORDED(RF_INSTDTx); ELSE GO TO
DISPLAY**

R9d1_x Our records indicate that your company installed the refrigeration equipment in <%RF_INSTDTx> through the <%PROGRAM> program, is this correct?

1	Yes	NTGCHECK3
2	No	DISPLAY; RF9f1_x
88	Refused	DISPLAY; RF9f1_x
99	Don't know	DISPLAY; RF9f1_x

**ASK IF ^UNRECORDED(RF_CHKDTx) &
UNRECORDED(RF_INSTDTx)**

DISPLAY Our records indicate that your company received a rebate for the refrigeration equipment installed through the program in <%RF_CHKDTx>.

**ASK IF (^UNRECORDED(RF_CHKDTx) &
UNRECORDED(RF_INSTDTx)) | R9D1_x(2)**

RF9f1_x In what year did you install <%RF_MEAS_x>? (PROBE FOR BEST GUESS) Was it in....

1	2013	R9f2
2	2014	R9f2
88	Refused	NTGCHECK3
99	Don't know	NTGCHECK3

ASK IF RF9F1_x(1||2)

RF9f2_x And what month? {If they can not recall month, try to get the season.}

1	January	NTGCHECK3
2	February	NTGCHECK3
3	March	NTGCHECK3
4	April	NTGCHECK3
5	May	NTGCHECK3
6	June	NTGCHECK3
7	July	NTGCHECK3
8	August	NTGCHECK3
9	September	NTGCHECK3
10	October	NTGCHECK3
11	November	NTGCHECK3
12	December	NTGCHECK3
13	Fall	NTGCHECK3
14	Winter	NTGCHECK3
15	Spring	NTGCHECK3
16	Summer	NTGCHECK3
88	Refused	NTGCHECK3
99	Don't know	NTGCHECK3

NTGCHECK3 IF NTGREFRIG == 1 PERFORM NTG BATTERY; ELSE CONTINUE....

END REFRIGERATION MEASURE LOOP; GO TO R9_x if ^UNRECORDED(RF_MEAS_x) WHERE x = 2, 3; ELSE CONTINUE WITH SURVEY

IF CASES = 1 ASK CD2 THROUGH CD4 ; ELSE SKIP TO NEXT BATTERY

CD2 What is the length across the front (linear feet) of your display case? An approximation would be fine.

77	Record length of case and number of cases	CD3
88	Refused	CD3
99	Don't know	CD3

CD3 Does your new display case have efficient lighting (T-8 or LED lighting) installed?

1	Yes	CD4
2	No	CD4
88	Refused	CD4
99	Don't know	CD4

CD4 Does your new display case have a variable speed fan motor installed?

1	Yes	Greenhouse
2	No	Greenhouse
88	Refused	Greenhouse
99	Don't know	Greenhouse

GREENHOUSE HEAT CURTAINS

Ask if CONTROLS = 1 and FM050 in 4 (Agricultural - farms/greenhouses), 8 (Education), or 12 (Industrial); else skip to NEXT BATTERY

GG1 Does your facility have any greenhouses?

1	Yes	GG1a
2	No	Cooling
88	Refused	Cooling
99	Don't know	Cooling

Ask if GG1=1; else skip to NEXT BATTERY

GG1a How many square feet of greenhouses do you have at your facility?

66	We do not have any greenhouses	Cooling
77	Square feet	GG1b
88	Refused	GG1a1
99	Don't know	GG1a1

Ask if GG1a IN (88, 99)

GG1a1 Can you identify the appropriate size range from the following list?

1	< 1,500 sq ft	Cooling
2	1,500 - 5,000 sq ft	Cooling
3	5,000 - 10,000 sq ft	Cooling
4	10,000 – 25,000 sq ft	Cooling
5	25,000 – 50,000 sq ft	Cooling
6	50,000 – 75,000 sq ft	Cooling
7	75,000 – 100,000 sq ft	Cooling
8	> 100,000 sq ft	Cooling
88	Refused	Cooling
99	Don't know	Cooling

COOLING EQUIPMENT

Now we would like to discuss your cooling equipment.

What type of equipment is used to cool this facility? (allow multiples)

CL1

1	No A/C	PipeInsulation
2	Split system (two components; compressor is separate from the supply air fan, air conditioner, or heat pump)	CL2
3	Packaged systems (one component; rooftop units)	CL2
4	Package Terminal A/C or Heat Pump (e.g., Hotel/Motel units)	CL2
5	Evaporative coolers (swamp coolers)	CL2
6	Water Chiller (Central plant)	CL2
7	Individual A/C or Heat Pump Units (e.g., Unitary Equipment, Central A/C with multiple units, single unit for small business) NOTE: ASK IF SPLIT OR PACKAGED SYSTEM	CL2
8	Window/Wall Units	CL2
77	Other (Specify)	CL2
88	Refused	CL2
99	Don't Know	CL2

Ask if CL1<>1; else skip to NEXT BATTERY

How would you describe the condition of the primary cooling equipment currently in use at your facility? Would you say the cooling equipment is in ...

CL2

1	In poor condition	CL3
2	In fair condition	CL3
3	Good condition	CL3
88	Refused	CL3
99	Don't know	CL3

CL3 How old is this cooling equipment currently in use at your facility? Would you say...

1	Less than 5 years old	CL4
2	Between 5 and 10 years old	CL4
3	10 to 20 years old	CL4
4	more than 20 years old	CL4
88	Refused	CL4
99	Don't know	CL4

CL4 What is the primary fuel used by this cooling equipment?

1	Electricity	CL35
2	Natural Gas	CL35
3	Both Electricity and Gas	CL35
77	Other (PLEASE SPECIFY)	CL35
88	Refused	CL35
99	Don't Know	CL35

CL35 Does your company have any plans to install high efficiency cooling equipment within the next 12 months?

1	Yes	PipeInsulation
2	No	PipeInsulation
88	Refused	PipeInsulation
99	Don't Know	PipeInsulation

PIPE INSULATION

ASK IF PIPE = 1; else skip to NEXT BATTERY

DISPLAY

In the next section we'll be discussing the pipe insulation present at your facility.

ASK IF ^UNRECORDED(PI_INSTDT); ELSE GO TO DISPLAY/PI1a

PI1 We'd like to confirm that new pipe insulation was installed at your facility on approximately <%PI_INSTDT>. Is this correct?

1	Yes	PI3
2	No	DISPLAY; PI1a
88	Refused	DISPLAY; PI1a
99	Don't know	DISPLAY; PI1a

ASK IF ^UNRECORDED(PI_CHKDT) & UNRECORDED(PI_INSTDT)

DISPLAY

Our records indicate that your company received a rebate for the pipe insulation installed through the program in <%PI_CHKDT>.

ASK IF (^UNRECORDED(PI_CHKDT) & UNRECORDED(PI_INSTDT)) | PI1(2)

PI1a In what year did you install the pipe insulation?

1	2013	PI1b
2	2014	PI1b
88	Refused	PI3
99	Don't know	PI3

ASK IF PI1A(1||2)

PI1b And what month? {If they can not recall month, try to get the season.}

1	January	PI3
2	February	PI3
3	March	PI3
4	April	PI3
5	May	PI3
6	June	PI3
7	July	PI3
8	August	PI3
9	September	PI3
10	October	PI3
11	November	PI3
12	December	PI3
13	Fall	PI3
14	Winter	PI3
15	Spring	PI3
16	Summer	PI3
88	Refused	PI3
99	Don't know	PI3

PI3 Our records indicate that <%PI_QTY> feet of pipe insulation was installed at your facility. Is this about right?

1	Yes	PI7
2	No	PI3a
88	Refused	PI3a
99	Don't know	PI3a

ASK IF PI3(2||99)

How many total linear feet of pipe insulation is present at your facility?

PI13a Your best estimate is okay.

66	No pipe insulation	Sprinklers_Ag
77	Total linear feet of pipe insulation	PI7
88	Refused	PI3aa
99	Don't know	PI3aa

ASK IF PI3a = 88,99

Can you estimate what percent of the pipes present at your facility were insulated through the program?

P13aa		
1	Total linear feet of pipe insulation:	PI7
2	Percentage of pipe insulation replaced:	PI7
101	Refused	PI7
102	Don't know	PI7

ASK IF PI3a <> 66;

Was the pipe insulation installed on new pipes or was it a retrofit of older pipes or both?

PI7		
1	ONLY NEW	PI7b
2	ONLY OLDER	PI7b
3	BOTH NEW AND OLDER	P17a
88	Refused	PI8
99	Don't know	PI8

ASK IF PI7 = 3; else skip

PI7a What percentage of the pipe insulation was installed on new pipes?

Record	(record percentage)	PI7b
77	Other	PI7b
101	Refused	PI7b
102	Don't know	PI7b

ASK IF PI7(2|3);

PI7b How many years old were the pipes receiving the pipe insulation?

Record	(record in # of years)	PI8
77	Other	PI8
88	Refused	PI8
99	Don't know	PI8

Was insulation already present on the pipes before the insulation was installed through the program?

PI8		
1	Yes	P21
2	No	P25
77	Other	P25
88	Refused	P25
99	Don't know	P25

ASK IF PI8(1);

Was the existing insulation removed and replaced, or was additional insulation added to existing insulation?

P21		
1	old insulation removed and replaced	P23
2	Additional insulation added over old insulation	P23
3	Both	P23
88	Refused	P23

99	Don't know	P23
-----------	------------	-----

P23 What condition was your old pipe insulation in at the time of the replacement?

1	Good	P25
2	Fair	P25
3	Poor	P25
4	Not a replacement	P25
88	Refused	P25
99	Don't know	P25

ASK ALL

P25 Are boilers present at your facility?

1	Yes	P27
2	No	P33
77	Other [Record Verbatim]	P33
88	Refused	P33
99	Don't know	P33

ASK IF PI25(1)

P27 Have the boilers been repaired or replaced since you installed the pipe insulation through the program?

1	Yes	P29
2	No	P33
77	Other [Record Verbatim]	P33
88	Refused	P33
99	Don't know	P33

ASK IF PI27(1)

P29 How long ago in months was the most recent boiler repair or replacement?

#	Record DATE or # of months ago	P33
77	Other [Record Verbatim]	P33
88	Refused	P33
99	Don't know	P33

ASK IF PI3A<>66666

P33 Whose idea was it to install new pipe insulation?

1	Me or someone at my facility	P35
2	Contractor	P35
3	Utility company contact	P35
4	Manufacturer	P35
77	Other (specify)	P35
88	Refused	P35
99	Don't know	P35

P35 What percentage of the pipe insulation cost would you estimate the program rebate covered?

1	Rebate covered all of the cost	P37
2	Rebate covered most of the cost	P37
3	Rebate covered less than half of the cost	P37
4	Other	P37
88	Refused	P37
99	Don't know	P37

P37 How effective was the new pipe insulation in reducing your natural gas bill? Would you say there were...

1	Considerable gas savings	P39
2	Some gas savings	P39
3	No noticeable savings	P39
88	Refused	P39
99	Don't know	P39

P39 Have you noticed any problems with the pipe insulation since the installation?

1	Yes	P40
2	No	NTGCHECK4
88	Refused	NTGCHECK4
99	Don't know	NTGCHECK4

ASK IF P39(1)

P40 What problems have you noticed since the pipe insulation was installed?

77	RECORD RESPONSE	NTGCHECK4
88	Refused	NTGCHECK4
99	Don't know	NTGCHECK4

NTGCHECK4 GO TO NTG BATTERY IF NTGPIPES = 1; ELSE CONTINUE

AGRICULTURAL SPRINKLERS

ASK IF SPRINKLERS = 1; ELSE SKIP TO NEXT BATTERY

DISPLAY Now, I would like to ask you about the low-pressure sprinkler nozzles you installed on your irrigation system as part of your participation in <%UTILITY>'s program.

ASK IF AG_QTY > 0

Our records indicate that <%AG_QTY> low-pressure sprinkler nozzles were installed on either portable or permanent irrigation systems. Is this correct?

AG1

1	Yes, correct	AG40
2	Yes, but a different quantity	AG200

3	Did not install	Computer_Power_Mgmt
88	Refused	Computer_Power_Mgmt
99	Don't know	AG40

ASK IF AG1(2) | AG_QTY = 0

How many low-pressure sprinkler nozzles were installed through the program?

AG200

77	Record	AG40
88	Refused	AG40
99	Don't know	AG40

ASK IF ^AG1(3);

ASK IF ^UNRECORDED(AG_INSTDT); ELSE GO TO DISPLAY/AG41

AG40

Our records indicate that you installed the low-pressure sprinkler nozzles around <%AG_INSTDTx> through the <%PROGRAM> program, is this correct?

1	Yes	AG5
2	No	DISPLAY; AG41
88	Refused	DISPLAY; AG41
99	Don't know	DISPLAY; AG41

ASK IF ^UNRECORDED(AG_CHKDT) & UNRECORDED(AG_INSTDT)

Our records indicate that your company received a rebate for the low-flow sprinkler nozzles installed through the program in

DISPLAY <%AG_CHKDT>.

ASK IF (^UNRECORDED(AG_CHKDT) & UNRECORDED(AG_INSTDT)) | AG40(2);

AG41

In what year did you install low-flow sprinkler nozzles? (PROBE FOR BEST GUESS) Was it in....

1	2013	AG42
2	2014	AG42
88	Refused	AG42
99	Don't know	AG42

ASK IF AG41(1||2)

AG42

And what month? {If they can not recall month, try to get the season.}

1	January	AG5
2	February	AG5
3	March	AG5
4	April	AG5
5	May	AG5
6	June	AG5
7	July	AG5

8	August	AG5
9	September	AG5
10	October	AG5
11	November	AG5
12	December	AG5
13	Fall	AG5
14	Winter	AG5
15	Spring	AG5
16	Summer	AG5
88	Refused	AG5
99	Don't know	AG5

ASK IF AG1(1 | 99);

On what type of irrigation systems are the low-pressure sprinkler nozzles installed? Portable, permanent, or some combination of the two?

AG2

1	Portable irrigation system	AG5
2	Permanent irrigation system	AG5
3	Both portable and permanent irrigation systems	AG3
66	Neither	Computer_Power_Mgmt
88	Refused	Computer_Power_Mgmt
99	Don't know	Computer_Power_Mgmt

READ IF AG2 = 3; ELSE SKIP TO AG5

Since you have low-pressure sprinkler nozzles installed on both portable and permanent irrigation systems, I'd like for you to tell me what share is installed on each type of irrigation system. Adding up to 100 percent, what share is installed on each type of irrigation system? What percent is installed on PORTABLE irrigation systems?

AG3

77	Record percentage	AG4
101	Refused	AG4
102	Don't know	AG4

ASK IF AG3 < 100;

Of all the low-pressure sprinkler nozzles you have installed, what percent is installed on permanent irrigation systems?

AG4

77	Record percentage	CHECKSUM
101	Refused	CHECKSUM
102	Don't know	CHECKSUM

IF AG3 < 101 AND (AG3 + AG4 ^ = 100) REDO AG3 AND CHECKSUM AG4; ELSE AG3a

IF AG3 = 102 ASK AG3a;

Can you estimate the percentage installed on portable irrigation systems. Is it....

AG3a

1	1 to 10 percent	AG4a
2	11 to 20 percent	AG4a
3	21 to 30 percent	AG4a
4	31 to 40 percent	AG4a
5	41 to 50 percent	AG4a
6	51 to 60 percent	AG4a
7	61 to 70 percent	AG4a
8	71 to 80 percent	AG4a
9	81 to 90 percent	AG4a
10	91 to 100 percent	AG4a
101	Refused	AG4a
102	Don't know	AG4a

If you are not sure, can you estimate the percentage installed on permanent irrigation systems. Is it...

AG4a

1	1 to 10 percent	CHECK_EST_SUM
2	11 to 20 percent	CHECK_EST_SUM
3	21 to 30 percent	CHECK_EST_SUM
4	31 to 40 percent	CHECK_EST_SUM
5	41 to 50 percent	CHECK_EST_SUM
6	51 to 60 percent	CHECK_EST_SUM
7	61 to 70 percent	CHECK_EST_SUM
8	71 to 80 percent	CHECK_EST_SUM
9	81 to 90 percent	CHECK_EST_SUM
10	91 to 100 percent	CHECK_EST_SUM
88	Refused	CHECK_EST_SUM
99	Don't know	CHECK_EST_SUM

CHECK_EST_SUM **PERFORM A CHECK SO THAT AG3+AG4 = 100% OR**
M AG3a+AG4a=100%

What type(s) of crops are grown in the areas irrigated with the installed low-pressure sprinkler nozzles? [ACCEPT MULTIPLES...]

AG5

1	Asparagus	AG5a
2	Tomatoes	AG5a
3	Almonds	AG5a
4	Grapes	AG5a
5	Apricots	AG5a
77	Other [RECORD] - list only one other crop	AG5a
88	Refused	AG5a
99	Don't know	AG5a

ASK IF AG5(77); ELSE SKIP TO AG5b

AG5a Is there another crop grown in theses irrigated areas?

66	No other crop	AG5_1
77	Other - list only one crop	AG5b
88	Refused	AG5_1
99	Don't know	AG5_1

ASK IF AG5a(77); ELSE SKIP TO AG5_1

AG5b Is there another crop grown in theses irrigated areas?

66	No other crop	AG5_1
77	Other - list only one crop	AG5_1
88	Refused	AG5_1
99	Don't know	AG5_1

ASK IF AG5(1); ELSE SKIP TO AG5_2

What is the growing season, in months, for ASPARAGUS? If you cannot, the season will do.

AG5_1

1	January	AG5_2
2	February	AG5_2
3	March	AG5_2
4	April	AG5_2
5	May	AG5_2
6	June	AG5_2
7	July	AG5_2
8	August	AG5_2
9	September	AG5_2
10	October	AG5_2
11	November	AG5_2
12	December	AG5_2
13	Fall	AG5_2
14	Winter	AG5_2
15	Spring	AG5_2
16	Summer	AG5_2
88	Refused	AG5_2
99	Don't know	AG5_2

ASK IF AG5(2); ELSE SKIP TO AG5_3

What is the growing season, in months, for TOMATOES? If you cannot, the season will do.

AG5_2

1	January	AG5_3
2	February	AG5_3
3	March	AG5_3
4	April	AG5_3
5	May	AG5_3
6	June	AG5_3
7	July	AG5_3

8	August	AG5_3
9	September	AG5_3
10	October	AG5_3
11	November	AG5_3
12	December	AG5_3
13	Fall	AG5_3
14	Winter	AG5_3
15	Spring	AG5_3
16	Summer	AG5_3
88	Refused	AG5_3
99	Don't know	AG5_3

ASK IF AG5(3); ELSE SKIP TO AG5_4

What is the growing season, in months, for ALMONDS? If you cannot, the season will do.

AG5_3

1	January	AG5_4
2	February	AG5_4
3	March	AG5_4
4	April	AG5_4
5	May	AG5_4
6	June	AG5_4
7	July	AG5_4
8	August	AG5_4
9	September	AG5_4
10	October	AG5_4
11	November	AG5_4
12	December	AG5_4
13	Fall	AG5_4
14	Winter	AG5_4
15	Spring	AG5_4
16	Summer	AG5_4
88	Refused	AG5_4
99	Don't know	AG5_4

ASK IF AG5(4); ELSE SKIP AG5_5

What is the growing season, in months, for GRAPES? If you cannot, the season will do.

AG5_4

1	January	AG5_5
2	February	AG5_5
3	March	AG5_5
4	April	AG5_5
5	May	AG5_5
6	June	AG5_5
7	July	AG5_5
8	August	AG5_5

9	September	AG5_5
10	October	AG5_5
11	November	AG5_5
12	December	AG5_5
13	Fall	AG5_5
14	Winter	AG5_5
15	Spring	AG5_5
16	Summer	AG5_5
88	Refused	AG5_5
99	Don't know	AG5_5

ASK IF AG5(5); ELSE SKIP AG5_77

What is the growing season, in months, for APRICOTS? If you cannot, the season will do.

AG5_5

1	January	AG5_77
2	February	AG5_77
3	March	AG5_77
4	April	AG5_77
5	May	AG5_77
6	June	AG5_77
7	July	AG5_77
8	August	AG5_77
9	September	AG5_77
10	October	AG5_77
11	November	AG5_77
12	December	AG5_77
13	Fall	AG5_77
14	Winter	AG5_77
15	Spring	AG5_77
16	Summer	AG5_77
88	Refused	AG5_77
99	Don't know	AG5_77

ASK IF AG5(77); ELSE SKIP TO AG5a_77

What is the growing season, in months, for <%AG5>? If you cannot, the season will do.

AG5_77

1	January	AG5a_77
2	February	AG5a_77
3	March	AG5a_77
4	April	AG5a_77
5	May	AG5a_77
6	June	AG5a_77
7	July	AG5a_77
8	August	AG5a_77
9	September	AG5a_77

10	October	AG5a_77
11	November	AG5a_77
12	December	AG5a_77
13	Fall	AG5a_77
14	Winter	AG5a_77
15	Spring	AG5a_77
16	Summer	AG5a_77
88	Refused	AG5a_77
99	Don't know	AG5a_77

ASK IF AG5a(77); ELSE SKIP TO AG5b_77

What is the growing season, in months, for <%AG5a>? If you cannot, the season will do.

AG5a_77

1	January	AG5b_77
2	February	AG5b_77
3	March	AG5b_77
4	April	AG5b_77
5	May	AG5b_77
6	June	AG5b_77
7	July	AG5b_77
8	August	AG5b_77
9	September	AG5b_77
10	October	AG5b_77
11	November	AG5b_77
12	December	AG5b_77
13	Fall	AG5b_77
14	Winter	AG5b_77
15	Spring	AG5b_77
16	Summer	AG5b_77
88	Refused	AG5b_77
99	Don't know	AG5b_77

ASK IF AG5b(77); ELSE SKIP TO AG6

What is the growing season, in months, for <%AG5b>? If you cannot, the season will do.

AG5b_77

1	January	AG6
2	February	AG6
3	March	AG6
4	April	AG6
5	May	AG6
6	June	AG6
7	July	AG6
8	August	AG6
9	September	AG6
10	October	AG6

11	November	AG6
12	December	AG6
13	Fall	AG6
14	Winter	AG6
15	Spring	AG6
16	Summer	AG6
88	Refused	AG6
99	Don't know	AG6

AG6 Are the fields with low-pressure sprinkler nozzles irrigated during non-growing seasons?

1	Yes	AG6a
2	No	AG7
88	Refused	AG7
99	Don't know	AG7

ASK IF AG6(1)

AG6a Can you provide the months during which those fields are irrigated?

1	January	AG7
2	February	AG7
3	March	AG7
4	April	AG7
5	May	AG7
6	June	AG7
7	July	AG7
8	August	AG7
9	September	AG7
10	October	AG7
11	November	AG7
12	December	AG7
13	Fall	AG7
14	Winter	AG7
15	Spring	AG7
16	Summer	AG7
88	Refused	AG7
99	Don't know	AG7

AG7 Can you estimate the size of the fields, in acres, irrigated with the low-pressure sprinkler nozzles?

77	Record number of acres	AG8
88	Refused	AG8
99	Don't know	AG7a

ASK IF AG7=99

If you are unable to give an exact number of acres, can you estimate a range of the size of the fields irrigated with low-pressure sprinkler nozzles. Is it...

AG7a

1	1-25 acres	AG8
2	26-50 acres	AG8
3	51-100 acres	AG8
4	101-200 acres	AG8
5	201+ acres	AG8
88	Refused	AG8
99	Don't know	AG8

How many irrigation pumps were affected by the installation of low-pressure sprinkler nozzles?

AG8

1	1	AG9_1
2	2	AG9_1
3	3	AG9_1
4	4	AG9_1
5	5	AG9_1
6	More than 5 pumps	AG9_1
88	Refused	AG9_1
99	Don't know	AG9_1

ASK IF AG8(1|6); ELSE SKIP TO AG9_2

What is the rated horsepower of the 1st pump? Would you say it is....

AG9_1

1	Less than 15 hp	AG9_2
2	15-30 hp	AG9_2
3	35-55 hp	AG9_2
4	60 hp or greater	AG9_2
88	Refused	AG9_2
99	Don't know	AG9_2

ASK IF AG8(2|6); ELSE SKIP TO AG9_3

What is the rated horsepower of the 2nd pump? Would you say it is....

AG9_2

1	Less than 15 hp	AG9_3
2	15-30 hp	AG9_3
3	35-55 hp	AG9_3
4	60 hp or greater	AG9_3
88	Refused	AG9_3
99	Don't know	AG9_3

ASK IF AG8(3|6); ELSE SKIP TO AG9_4

What is the rated horsepower of the 3rd pump? Would you say it is....

AG9_3

1	Less than 15 hp	AG9_4
2	15-30 hp	AG9_4

3	35-55 hp	AG9_4
4	60 hp or greater	AG9_4
88	Refused	AG9_4
99	Don't know	AG9_4

ASK IF AG8(4||6); ELSE SKIP TO AG9_5

What is the rated horsepower of the 4th pump? Would you say it is....

AG9_4

1	Less than 15 hp	AG9_5
2	15-30 hp	AG9_5
3	35-55 hp	AG9_5
4	60 hp or greater	AG9_5
88	Refused	AG9_5
99	Don't know	AG9_5

ASK IF AG8(5||6); ELSE SKIP TO AG10

What is the rated horsepower of the 5th pump? Would you say it is....

AG9_5

1	Less than 15 hp	AG10
2	15-30 hp	AG10
3	35-55 hp	AG10
4	60 hp or greater	AG10
88	Refused	AG10
99	Don't know	AG10

Whose idea was it to install new the low-pressure sprinkler nozzles?

AG10

1	Me or someone at my facility	AG11
2	Contractor	P35
3	Utility company contact	P35
4	Manufacturer	P35
77	Other (specify)	P35
88	Refused	P35
99	Don't know	P35

Have you noticed any problems with the low-pressure sprinkler nozzles since the installation?

AG11

1	Yes	AG12
2	No	NTGCHECK5
88	Refused	NTGCHECK5
99	Don't know	NTGCHECK5

ASK AG12 if AG11(1)

What problems have you noticed since the sprinkler nozzles were installed?

AG12

77	RECORD RESPONSE	NTGCHECK5
88	Refused	NTGCHECK5

99	Don't know	NTGCHECK5
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**GO TO NTG BATTERY IF NTGSPRINKLERS = 1; ELSE
NTGCHECK5 CONTINUE**

PC POWER MANAGEMENT SOFTWARE

ASK IF PCPOWER = 1; ELSE SKIP TO NEXT BATTERY
In the next section we'll be discussing the PC power management software
DISPLAY present at your facility.

IF PC_QTY > 0; ELSE SKIP TO PC200

PC100 According to our records, your organization purchased <%PC_QTY>
power management software licenses through the program, is this correct?

1	Yes, correct	PC1a
2	Yes, but different amount	PC200
3	Did not purchase any	NEXT BATTERY
88	Refused	PC200
99	Don't know	PC200

IF PC_QTY = 0 | PC100(2)

PC200 Approximately how many power management software licenses were
purchased through the program?

77	Record amt	PC1a
88	Refused	PC1a
99	Don't know	PC1a

IF PC100 ^=3

ASK IF ^UNRECORDED(PC_CHKDT); ELSE SKIP TO PC1b

Our records indicate that your company received a rebate for the software
licenses purchased through the program in <%PC_CHKDT>. Is this
PC1a correct?

1	Yes	PI3
2	No	PC1b
88	Refused	PC1b
99	Don't know	PC1b

ASK IF PC1a(2||99) OR UNRECORDED(PC_CHKDT);

In what year did you purchase the software licenses through the program?
PC1b Was it in...

1	2013	PC1c
2	2014	PC1c
88	Refused	PC1
99	Don't know	PC1

ASK IF PC1b(1||2);

PC1c And what month? {If they can not recall month, try to get the season.}

1	January	PI3
2	February	PI3
3	March	PI3
4	April	PI3
5	May	PI3
6	June	PI3
7	July	PI3
8	August	PI3
9	September	PI3
10	October	PI3
11	November	PI3
12	December	PI3
13	Fall	PI3
14	Winter	PI3
15	Spring	PI3
16	Summer	PI3
88	Refused	PI3
99	Don't know	PI3

How many desktop computers are present at this location? We are not counting LAPTOPS.....Your best estimate is fine. DO NOT READ....if they say don't know, then ask them if it is more or less than 50, then find another number within a range and try to get the estimate from that.

PC1

Record	Total number of computers	PC2
88	Refused	PC1A
99	Don't know	PC1A

How many desktop computers are controlled by the power management software at this location?

PC2

Record	Total number of computers	PC3
88	Refused	PC2A
99	Don't know	PC2A

ASK IF PC2 = 88,99

What percent of the desktop computers at this location are controlled by the software?

PC2A

Record	Percentage of desktop computers controlled	PC3
88	Refused	PC3
99	Don't know	PC3

What is the predominant type of computer processor installed within your desktop computers? Is it....(READ LIST)

PC3

1	AMD Athlon	PC3a
2	Intel Pentium 3	PC3a
3	Intel Pentium 4	PC3a

77	Other [Record Verbatim]	PC3a
88	Refused	PC3a
99	Don't know	PC3a

PC3a What is the predominant type of monitor that is controlled by the software at this location? Is it... (READ LIST)

1	CRT	PC3b
2	LCD	PC3b
3	LED	PC3b
77	Other [Record Verbatim]	PC3b
88	Refused	PC3b
99	Don't know	PC3b

PC3b What is the predominant size (in inches) of the monitors that are controlled by the software at this location?

1	(record in # of inches)	PC4
77	Other [Record Verbatim]	PC4
88	Refused	PC4
99	Don't know	PC4

PC4 How often do you upgrade/replace your desktop computers/monitors at this location?

1	Number of years	PC5
77	Other [Record Verbatim]	PC5
88	Refused	PC5
99	Don't know	PC5

PC5 Is the central server that controls the installed network software located at this facility?

1	Yes	PC6
2	No	PC8
77	Other	PC8
88	Refused	PC8
99	Don't know	PC8

ASK IF PC5=1

PC6 Does this server control desktop computers aside from those located at this facility?

1	Yes	PC7
2	No	PC8
77	Other	PC8
88	Refused	PC8
99	Don't know	PC8

ASK IF PC6=1

PC7 How many desktop computers are controlled by the power management software at this other location(s)?

Record	Total number of computers	PC8
88	Refused	PC8
99	Don't know	PC8

PC8 Does the software monitor and provide reports on the usage of individual or groups of network computers?

1	Yes	PC9
2	No	PC9
77	Other [Record Verbatim]	PC9
88	Refused	PC9
99	Don't know	PC9

PC9 How effective was the desktop computer power management software at reducing your energy bill? Would you say you have achieved...

1	Considerable energy savings	PC10
2	Some energy savings	PC10
3	No noticeable savings	PC10
88	Refused	PC10
99	Don't know	PC10

PC10 Have you noticed any problems with the software performance since the installation?

1	Yes	PC10a
2	No	PC11
77	Other [Record Verbatim]	PC11
88	Refused	PC11
99	Don't know	PC11

ASK PC10a if PC10(1)

PC10a What problems have you noticed since the software was installed?

77	RECORD RESPONSE	PC11
88	Refused	PC11
99	Don't know	PC11

PC11 Whose idea was it to install the power management software?

1	Me or someone at my facility.	PC12
2	Contractor.	PC12
3	Utility company contact.	PC12
4	Manufacturer.	PC12
77	Other (specify)	PC12
88	Refused	PC12
99	Don't know	PC12

Did your facility have any guidelines or protocols in place for turning off equipment or putting equipment in sleep mode while not in use before the power management software was installed?

PC12		
1	Yes	PC13
2	No	NTGCHECK6
77	Other [Record Verbatim]	PC13
88	Refused	NTGCHECK6
99	Don't know	NTGCHECK6

ASK IF PC12=1

What specific guidelines or protocols were in place before the software was installed?

PC13		
1	[Record Verbatim]	NTGCHECK6
88	Refused	NTGCHECK6
99	Don't know	NTGCHECK6

Go to NTG BATTERY IF NTGPC = 1; ELSE CONTINUE WITH NTGCHECK6 SPILLOVER BATTERY

FINANCE QUESTIONS

I would like to ask you about funding this project. Funding could include external financing such as a company credit card, getting financing through a contractor or retailer, getting a bank loan or internal financing such as using retained earnings.

DISPLAY

FIN1 Did you use internal or external funding for this project?

1	Internal funding	SURVEY_OP_HOURS
2	External funding	FIN2
3	Combination of internal and external funding	FIN2
88	Refused	SURVEY_OP_HOURS
99	Don't know	SURVEY_OP_HOURS

[ASK IF FIN1 = 2, 3]

We are interested in known what type of external financing you used? Did you use....[READ THROUGH FULL LIST, RECORD 1=Yes, 2=No, 88=Refused, 99=Don't Know]

FIN2		
FIN2A	Contractor financing	Y, N, Ref, DK
FIN2B	Vendor financing [FOR INTERVIEWER: for example, taking a store loan from SEARS to buy an appliance]	Y, N, Ref, DK
FIN2C	Secured loan from bank [FOR INTERVIEWER: a loan using property or assets as collateral or lien on the business]	Y, N, Ref, DK
FIN2D	Unsecured loan from bank [FOR INTERVIEWER: a loan which does not require a collateral]	Y, N, Ref, DK
FIN2E	Line of credit	Y, N, Ref, DK

FIN2F	Equipment financing or leasing	Y, N, Ref, DK
FIN2G	Company credit card	Y, N, Ref, DK
FIN2H	Energy efficiency financing program (please specify)	Y, N, Ref, DK
FIN2HA	Please specify which EE financing program. [ASK IF FIN2H=1]	
FIN2I	&UTILITY sponsored on-bill financing	Y, N, Ref, DK
FIN2J	Property Assessed Clean Energy (PACE) Financing	Y, N, Ref, DK
FIN2K	Any other type of financing (please specify)	NONE, OPENEND

SPILLOVER BATTERY - LIGHTING

Comment Thanks for discussing the new equipment that you installed through the program. Next I would like to discuss any equipment you might have installed OUTSIDE of the <%UTILITY> <%PROGRAM> program. SP1

ASK ALL

Since receiving the PROGRAM INCENTIVE we just discussed, did you implement any additional energy efficiency equipment without any assistance from the ...<%UTILITY> program... either at this facility or at other locations?

SP1

1	Yes, only at this facility	SP2
2	Yes, only at other locations	SP2
3	Yes, at this facility and other locations	SP2
4	No	End
88	Refused	End
99	Don't know	End

If SP1(1||3); else skip out of spillover battery

What type of equipment did you install? Was the equipment related to lighting, air conditioning, heating, refrigeration, motors or something else? (SELECT ALL THAT APPLY AND RECORD

SP2 ADDITIONAL INFO)

1	Lighting	SP2L
2	HVAC or Cooling equipment	OT5
3	Water Heating Equipment	OT5
4	Compressed Air Equipment	OT5
5	Food Service Equipment	OT5
6	Refrigeration Equipment	OT5
7	Gas Equipment	OT5
77	Other (SPECIFY)	OT5
88	Refused	OT5
99	Don't Know	OT5

Ask if SP2 = 1; else OT5

What type of fixtures, ballasts, or lighting controls were installed as part of this lighting retrofit without any assistance from the utility program? [SELECT ALL THAT APPLY, AFTER EACH RESPONSE, PROMPT WITH,]

SP2L

<\$2>

1	High performance T8 fluorescent fixtures (1" diameter bulbs)	High
2	T8 fluorescent fixtures (1" diameter bulbs)	High
3	T10 fluorescent fixtures	Low
4	T12 Fixtures (1.5" diameter bulbs)	Low
5	HID (High Density Discharge) Fixtures, Compact	High
6	Screw-in Modular CFLs	High
7	Hardwire CFLs	High
8	Incandescent bulbs	None
9	Compact Fluorescent Exit Signs	High
10	LED Exit Signs	High
11	Halogen	Low
12	Installed Reflectors	High
13	Electronic Ballast	Low
14	Magnetic Ballast	Low
15	Time Clock Lighting Controls	High
16	Occupancy Sensors Lighting Controls	High
17	Bypass/Delay Timers Lighting Controls	High
18	Photocell Lighting Controls	High
19	Other Fluorescent	Low
20	Fat/Thick Tubes	Low
21	Skinny/Thin Tubes	High
22	T5 Fixtures (5/8" diameter)	High
23	Generic Screw-Based LEDs	High
77	Other (PLEASE SPECIFY)	Low
88	Refused	None
99	Don't Know	None

ASK IF SP2L = 5; ELSE SKIP TO MSP2a

Were the HID lamps you installed High Pressure Sodium, Metal Halide, Mercury Vapor or Incandescent?

LI17

1	High pressure sodium	MSP2a
2	Metal Halide	MSP2a
3	Mercury Vapor	MSP2a
4	Incandescent	MSP2a
88	Refused	MSP2a
99	Don't know	MSP2a

BEGIN MACRO HIGH

PERFORM MACRO HIGH OR LOW FOR FIRST THREE MEASURES MENTIONED IN SP2L

Ask if SP1 in (1/3); else skip to MSP2b <\$3>

MSP2a <\$1> How many <\$2> products did you buy on your own for this facility?

1	{Record Number} for this facility	MSP2b <\$3>
88	Refused	MSP2b <\$3>
99	Don't know	MSP2b <\$3>

Ask if SP1 in (2|3); else skip to SP2bL <\$4>

MSP2b <\$3> How many <\$2> products did you buy on your own for other locations?

1	{Record Number} for other locations	SP2bL <\$4>
88	Refused	SP2bL <\$4>
99	Don't know	SP2bL <\$4>

SP2bL <\$4> Did you receive an incentive or rebate, or do you expect to receive an incentive or rebate for &LIGHT_TECH1B from elsewhere, such as another utility or from another organization such as the government?

1	Yes, Received/expect to receive an incentive from ANOTHER utility program	SP2cU <\$5>
2	Yes, Received/expect to receive an incentive from a program offered by an organization other than a utility (e.g. a government program)	SP2c <\$6>
3	Yes, Received/expect to receive an incentive from the manufacturer	SP5L <\$7>
4	No, did not receive/expect to receive an incentive	SP5L <\$7>

ASK IF SP2bL <\$4> = 1

SP2cU <\$5> From what utility program did you receive/expect to receive an incentive or rebate?

77	Record	RESTART MACRO
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ASK IF SP2bL <\$4> = 2

SP2c <\$6> From what organization or program did you receive/do you expect to receive an incentive or rebate?

77	Record	SP5L <\$7>
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Ask if SP2bL <\$4> ^ = 1

SP5L <\$7> Why did you install this energy efficiency equipment without receiving a rebate or incentive from the &UTILITY program? {DO NOT READ; INDICATE ALL THAT APPLY}

1	Too much paperwork	SP5c <\$9>
2	Takes too long to get approval	SP5c <\$9>
3	No time to participate, needed equipment immediately	SP5c <\$9>
4	The program had ended	SP5c <\$9>
5	The equipment would not qualify {PROBE: Why not?}	<\$8>

6	The amount of the rebate wasn't important enough	SP5c <\$9>
7	Did not know the program was available	SP5c <\$9>
8	There was no program available	SP5c <\$9>
9	Received rebate from an organization other than a utility	SP5c <\$9>
10	Received a larger incentive from another organization	SP5c <\$9>
11	Took the first incentive offered	SP5c <\$9>
77	Other {SPECIFY}	SP5c <\$9>
88	Refused	SP5c <\$9>
99	Don't know	SP5c <\$9>

ASK IF SP5L <\$7> = 5; ELSE SKIP TO SP5c

<\$8> Why would this equipment not qualify?

77	Record reason...	SP5c <\$9>
88	Refused	SP5c <\$9>
99	Don't know	SP5c <\$9>

SP5c <\$9> Was this equipment specifically recommended by a PROGRAM or UTILITY sponsored audit?

1	Yes	SP5d <\$10>
2	No	SP5d <\$10>
88	Refused	SP5d <\$10>
99	Don't know	SP5d <\$10>

SP5d <\$10> Can you briefly explain why you decided to implement this equipment? (Note to interviewer, if the respondent mentions the utility programs as a factor in deciding to install the measure, record the open ended response in the appropriate response below)

77	Response not related to utility program (record verbatim)	SP5eL <\$11>
78	Response related to utility program (record verbatim)	SP5f <\$12>

If \$10 is not 78

SP5eL <\$11> Did your experience participating in the <%UTILITY> in 2013-2014 encourage you in any way to implement <\$2>?

1	Yes	SP5f <\$12>
2	No	SP5h <\$15>
88	Refused	SP5f <\$12>
99	Don't Know	SP5f <\$12>

SP5f <\$12> How influential was your experience in the <PROGRAM> in your decision to implement this equipment, using a scale of 0 to 10, where 0 is not at all influential and 10 is extremely influential?

	{Record Response (0-10)} _____	SP5f_CONCHECK <\$13>
88	Refused	SP5f_CONCHECK <\$13>
99	Don't Know	SP5f_CONCHECK <\$13>

IF (\$10(78) | \$11(1)) & \$12(11|1|2|3|4); else skip to SP5gL

SP5f_CONCHECK
<\$13> Earlier you indicated that the program encouraged you to implement this equipment, but now you've scored the program fairly low. Why is that?

77	Record VERBATIM [REVISE SP5f IF NECESSARY]	SP5h <\$15>
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If they would like to give a new rating, type it in the open end below and the reason\,

IF \$12(5||10); else skip to SP5h

SP5gL <\$14> Can you explain specifically how your experience with the PROGRAM influenced your decision to install this additional energy efficient equipment?

77	Record VERBATIM	MEAS2_1 <\$17>
88	Don't know	MEAS2_1 <\$17>
99	Refused	MEAS2_1 <\$17>

IF \$12(11|1|2|3|4);

Using a 0 to 10 scale where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install this equipment...<\$2>...if you had not participated in the program?

SP5h <\$15>

#	Record 0 to 10 likelihood rating (_____)	SP5h_CONCHECK K <\$16>
88	Refused	SP5h_CONCHECK K <\$16>
99	Don't know	SP5h_CONCHECK K <\$16>

IF \$15 (11 or 1 - 4) & (\$10(77) | \$11(2)); else skip to MEAS2_1 <\$17>

SP5h_CONCHECK
K <\$16> Earlier you indicated that the program did not encourage you to implement this equipment, but now say that you would have been less likely to install the measure without the program. Why is that?

77	Record VERBATIM [REVISE SP5h IF NECESSARY]	MEAS2_1 <\$17>
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MEAS2_1 <\$17> In what year did you install <\$2>? (PROBE FOR BEST GUESS)

1	2013	MSP20 <\$18>
2	2014	MSP20 <\$18>
88	Refused	MSP20 <\$18>
99	Don't know	MSP20 <\$18>

MSP20 <\$18> What type of lighting was removed and replaced when you installed <\$2>?

1	High performance T8 (1" diameter bulbs)	MSP25 <\$19>
2	T8 fluorescent fixtures (1" diameter bulbs)	MSP25 <\$19>
3	T10 fluorescent fixtures	MSP25 <\$19>
4	T12 Fixtures (1.5" diameter bulbs)	MSP25 <\$19>

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5	HID (High Density Discharge) Fixtures, Compact	MSP25 <\$19>
6	Compact Fluorescent, Screw-in Modular	MSP25 <\$19>
7	Compact Fluorescent, Hardwire	MSP25 <\$19>
8	Incandescent	MSP25 <\$19>
9	Exit Signs, Compact Fluorescent	MSP25 <\$19>
10	Exit Signs, LED	MSP25 <\$19>
11	Halogen	MSP25 <\$19>
12	Install Reflectors	MSP25 <\$19>
13	Electronic Ballast	MSP25 <\$19>
14	Magnetic Ballast	MSP25 <\$19>
15	Lighting Controls, Time Clock	MSP25 <\$19>
16	Lighting Controls, Occupancy Sensor	MSP25 <\$19>
17	Lighting Controls, Bypass/Delay Timers	MSP25 <\$19>
18	Lighting Controls, Photocell	MSP25 <\$19>
19	Other Fluorescent	MSP25 <\$19>
20	Fat/Thick Tubes	MSP25 <\$19>
21	Skinny/Thin Tubes	MSP25 <\$19>
22	T5 Fixtures (5/8" diameter)	MSP25 <\$19>
66	NOTHING, EQUIPMENT WAS ONLY ADDED, NOT REPLACED	
77	Other (PLEASE SPECIFY)	MSP25 <\$19>
88	Refused	MSP25 <\$19>
99	Don't know	MSP25 <\$19>

ASK IF ^\$18(66)

Approximately how old was this light equipment that you removed/replaced? Would you say...

MSP25 <\$19>		
1	Less than 5 years old	MSP26 <\$20>
2	Between 5 and 10 years old	MSP26 <\$20>
3	Between 10 and 15 years old	MSP26 <\$20>
4	More than 15 years old	MSP26 <\$20>
88	Refused	MSP26 <\$20>
99	Don't know	MSP26 <\$20>

How would you describe the condition of this removed equipment?

MSP26 <\$20>	Would you say they were...	
1	In poor condition	MSP27 <\$21>
2	Fair condition, or	MSP27 <\$21>
3	Good condition	MSP27 <\$21>
88	Refused	MSP27 <\$21>
99	Don't know	MSP27 <\$21>

Approximately what percentage of this removed lighting equipment was broken or not working prior to installing...

MSP27 <\$21>		
%	Percent	MACRO LOW
101	Refused	MACRO LOW

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102	Don't know	MACRO LOW
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BEGIN MACRO LOW

<\$1> In what year did you install <\$2>? (PROBE FOR BEST GUESS)

1	2013	<\$3>
2	2014	<\$3>
88	Refused	<\$3>
99	Don't know	<\$3>

<\$3> What type of lighting was removed and replaced when you installed <\$2>?

1	High performance T8 (1" diameter bulbs)	<\$4>
2	T8 fluorescent fixtures (1" diameter bulbs)	<\$4>
3	T10 fluorescent fixtures	<\$4>
4	T12 Fixtures (1.5" diameter bulbs)	<\$4>
5	HID (High Density Discharge) Fixtures, Compact	<\$4>
6	Compact Fluorescent, Screw-in Modular	<\$4>
7	Compact Fluorescent, Hardwire	<\$4>
8	Incandescent	<\$4>
9	Exit Signs, Compact Fluorescent	<\$4>
10	Exit Signs, LED	<\$4>
11	Halogen	<\$4>
12	Install Reflectors	<\$4>
13	Electronic Ballast	<\$4>
14	Magnetic Ballast	<\$4>
15	Lighting Controls, Time Clock	<\$4>
16	Lighting Controls, Occupancy Sensor	<\$4>
17	Lighting Controls, Bypass/Delay Timers	<\$4>
18	Lighting Controls, Photocell	<\$4>
19	Other Fluorescent	<\$4>
20	Fat/Thick Tubes	<\$4>
21	Skinny/Thin Tubes	<\$4>
22	T5 Fixtures (5/8" diameter)	<\$4>
66	NOTHING, EQUIPMENT WAS ONLY ADDED, NOT REPLACED	<\$4>
77	Other (PLEASE SPECIFY)	<\$4>
88	Refused	<\$4>
99	Don't know	<\$4>

ASK IF ^\$3(66)

<\$4> Approximately how old was this light equipment that you removed/replaced? Would you say...

1	Less than 5 years old	<\$5>
2	Between 5 and 10 years old	<\$5>
3	Between 10 and 15 years old	<\$5>
4	More than 15 years old	<\$5>

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88	Refused	<\$5>
99	Don't know	<\$5>

<\$5> How would you describe the condition of this removed equipment?
Would you say they were...

1	In poor condition	<\$6>
2	Fair condition, or	<\$6>
3	Good condition	<\$6>
88	Refused	<\$6>
99	Don't know	<\$6>

<\$6> Approximately what percentage of this removed lighting equipment
was broken or not working prior to installing...

%	Percent	CFL1A
88	Refused	CFL1A
99	Don't know	CFL1A

--	--	--

IF SP2L = 6; else skip to VEND1

CFL1A Where did you purchase the CFLs that were installed OUTSIDE the
program? [ACCEPT MULTIPLES]

1	Home Depot	CFL3A
2	Costco	CFL3A
3	Orchard Supply Hardware	CFL3A
4	ACE Hardware	CFL3A
5	Lowe's	CFL3A
6	SaveMart	CFL3A
7	K-Mart	CFL3A
8	Sam's Club	CFL3A
9	Smart & Final	CFL3A
10	Yardbirds Home Center	CFL3A
11	Fry's Electronics	CFL3A
12	True Value	CFL3A
65	CONTRACTOR INSTALLED	CFL3A
66	Did not install CFLs	VEND1
77	OTHER [Specify:]	CFL3A
88	Refused	CFL3A
99	Don't know	CFL3A

ASK IF ^CFL1A(66)

CFL3A Were all these CFLs installed or were some put in storage for later
use?

1	All installed	VEND1
2	All in storage	VEND1
3	Some in storage, Some installed	CFL4
88	Refused	VEND1

99	Don't Know	VEND1
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IF CFL3A = 3

CFL4 What percentage were installed?

77	Open Record	CFL5
88	Refused	CFL5
99	Don't know	CFL5

IF CFL3A = in (2, 3)

CFL5 Why were they put in storage?

77	Open Record	VEND1
88	Refused	VEND1
99	Don't know	VEND1

ROLE OF CONTRACTORS

ASK IF SP2L(1|2|5|6|7|9|10|12|15|16|17|18|21|22|23)

Now I would like to find out, did you use a contractor/vendor to install the non-rebated energy efficient lighting?

VEND1

1	Yes	VEND2
2	No	ENDLOOP
3	Received a rebate	ENDLOOP
88	Refused	ENDLOOP
99	[DO NOT READ] Don't know/No Answer	ENDLOOP

IF VEND1 = 1

On a scale of 0 - 10, with 0 being very unimportant and 10 being very important. How important was the input from the contractor you worked with in deciding which specific equipment to install?

VEND2 Was it ...

1	0-10 response	VEND3
88	Refused	VEND3
99	Don't know	VEND3

Ask if VEND2(7||10); Else LI30_A;

Can you give me your contractor's name?

Do you have his/her email address?

VEND3 Do you have a phone number for him/her?

77	RECORD NAME, Phone, Email ETC	LI30_A
88	Refused	LI30_A
99	Don't know	LI30_A

ASK IF SP2L(1||77)

Considering all of the lighting changes we just discussed (purchases outside the programs), approximately what percentage of the facility's lighting was affected by those changes?

LI30_1

%	Percent	OT5
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101	Refused	OT5
102	Don't know	OT5

SPILLOVER BATTERY - OTHER

IF SP2(2||77)

Comment Next I would like to discuss any equipment you might have installed OUTSIDE of the &UTILITY program.

DISPLAY Earlier you mentioned that your organization installed...<(SP2(2))/HVAC or COOLING EQUIPMENT/> <(SP2(3))/WATER HEATING EQUIPMENT/> <(SP2(4))/COMPRESSED AIR EQUIPMENT/> <(SP2(5))/FOOD SERVICE EQUIPMENT/> <(SP2(6))/GAS EQUIPEMNENT/> %O<%SP2> outside of the program without any benefit of incentive or rebate. I would like to ask you a few questions about this equipment.

Response names in the following questions will have endings "_#" where # signifies the response number to SP2 (# = 1, 2, or 3)

MACRO OTHER

<\$1> Was this equipment ...<\$2> ...installed at this facility or another facility or was it installed in both?

1	This facility	<\$3>
2	Another facility	<\$2>
3	Both this and another facility	<\$3>
66	Was not installed	NEXT MEASURE
88	Refused	NEXT MEASURE
99	Don't know	NEXT MEASURE

Ask if <\$1> in (1,3)

<\$3> Please describe the type of <\$2> that you installed at this facility.

77	Record verbatim	<\$4>
88	Refused	<\$4>
99	Don't know	<\$4>

<\$4> Please describe the quantity of <\$2> that was installed at this facility.

77	Record verbatim	<\$5>
88	Refused	<\$5>
99	Don't know	<\$5>

<\$5> Please describe the efficiency level of <\$2> that was installed at this facility.

1	Standard Efficiency	<\$6>
2	High Efficiency	<\$6>
3	Energy Star	<\$6>
88	Refused	<\$6>
99	Don't know	<\$6>

Ask if <\$1> in (2-3)

<\$6> Please describe the type of <\$2> that you purchased and installed at your other facility

77	Record verbatim	<\$7>
88	Refused	<\$7>
99	Don't know	<\$7>

<\$7> Please describe the quantity of <\$2> that was installed at your other facility

77	Record verbatim	<\$8>
88	Refused	<\$8>
99	Don't know	<\$8>

<\$8> Please describe the efficiency level of <\$2> that was installed at your other facility

1	Standard Efficiency	<\$9>
2	High Efficiency	<\$9>
3	Energy Star	<\$9>
88	Refused	<\$9>
99	Don't know	<\$9>

<\$9> Did you receive an incentive or rebate, or do you expect to receive an incentive or rebate for &OT_TECH1B from elsewhere, such as another utility or from another organization such as the government?

1	Yes, Received/expect to receive an incentive from ANOTHER utility program	<\$10>
2	Yes, Received/expect to receive an incentive from a program offered by an organization other than a utility (e.g. a government program)	<\$11>
3	Yes, Received/expect to receive an incentive from the manufacturer	<\$12>
4	No, did not receive/expect to receive an incentive	<\$12>

ASK IF \$9 = 1

<\$10> From what utility program did you receive/expect to receive an incentive or rebate?

77	Record	end for this measure
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ASK IF \$9 = 2

<\$11> From what organization or program did you receive/expect to receive an incentive or rebate?

77	Record	SP50
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ASK IF ^\$9(1)

Why did you purchase this equipment without the financial assistance available through &UTILITY program? {DO NOT READ; INDICATE

<\$12> ALL THAT APPLY }

1	Too much paperwork	<\$14>
2	Takes too long to get approval	<\$14>
3	No time to participate, needed equipment immediately	<\$14>
4	The program had ended	<\$14>
5	The equipment would not qualify {PROBE: Why not?}	<\$13>
6	The amount of the rebate wasn't important enough	<\$14>
7	Did not know the program was available	<\$14>
8	There was no program available	<\$14>
10	Received a larger incentive from another organization	<\$14>
11	Took the first incentive offered	<\$14>
77	Other {SPECIFY}	<\$14>
88	Refused	<\$14>
99	Don't know	<\$14>

ASK IF <\$12> = 5

<\$13> Why would this equipment not qualify?

77	Record answer	<\$14>
88	Refused	<\$14>
99	Don't know	<\$14>

Was this equipment... <\$2>... specifically recommended by a PROGRAM/UTILITY sponsored audit?

<\$14>

1	Yes	<\$15>
2	No	<\$15>
88	Refused	<\$15>
99	Don't know	<\$15>

Can you briefly explain why you decided to implement this equipment?
(Note to interviewer, if the respondent mentions the utility programs as a factor in deciding to install the measure, record the open ended response in the appropriate response below

<\$15>

77	Response not related to utility program (record verbatim)	<\$17>
78	Response related to utility program (record verbatim)	<\$16>
88	Refused	<\$17>
99	Don't know	<\$17>

ASK IF <\$15> ^= 78

Did your experience participating in the <%UTILITY> <%PROGRAM> program in 2013-2014 encourage you in any way to implement

<\$16> &OT_TECH1B?

1	Yes	<\$17>
2	No	<\$17>
88	Refused	<\$17>
99	Don't Know	<\$17>

<\$17> How influential was your experience in the PROGRAM in your decision to implement this equipment, using a scale of 0 to 10, where 0 is not at all influential and 10 is extremely influential?

	{Record Response (0-10)} _____	<\$18>
88	Refused	<\$18>
99	Don't Know	<\$18>

ASK IF (\$15(78) | \$16(1)) & \$17(11|1|2|3|4)

<\$18> Earlier you indicated that the program encouraged you to implement this equipment, but now you've scored the program fairly low. Why is that?

77	Record VERBATIM [REVISE <\$17> IF NECESSARY]	
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ASK IF IF \$17(5||10)

<\$19> Can you explain specifically how your experience with the <%PROGRAM> program influenced your decision to install this additional energy efficient equipment?

77	Record VERBATIM	
88	Don't know	
99	Refused	

ASK IF \$17(11|1|2|3|4)

<\$20> Using a 0 to 10 scale where 0 is not at all likely and 10 is extremely likely, how likely would you have been to install this equipment...<\$2>...if you had not participated in the program?

#	Record 0 to 10 likelihood rating (_____)	
88	Refused	
99	Don't know	

ASK IF \$20(11|1|2|3|4) & (\$15(77) | \$16(2))

<\$21> Earlier you indicated that the program did not encourage you to implement this equipment ...<\$2> >..., but now say that you would have been less likely to install the equipment without the program. Why is that?

77	Record VERBATIM [REVISE xxx IF NECESSARY]	
----	---	--

<\$22> In what year did you install <\$2>

1	2013	VEND1
2	2014	VEND1
88	Refused	VEND1
99	Don't know	VEND1

ROLE OF CONTRACTORS

ASK IF SP2(2||77)

Now I would like to find out, did you use a contractor/vendor to install the non-rebated energy efficient equipment?

OTVEND1

1	Yes	OTVEND2
2	No	ENDOTHERLOOP
88	Refused	ENDOTHERLOOP
99	[DO NOT READ] Don't know/No Answer	ENDOTHERLOOP

ASK IF OTVEND1(1)

On a scale of 0 - 10, with 0 being very unimportant and 10 being very important. How important was the input from the contractor you worked with in deciding which specific equipment to install? Was it ...

OTVEND2

1	0-10 response	VEND3
88	Refused	VEND3
99	Don't know	VEND3

IF OTVEND2(7||10)

Can you give me your contractor's name?

OTVEND3_(1

Do you have his/her email address?

-3) Do you have a phone number for him/her?

77	RECORD NAME, Phone, Email ETC	ENDOTHERLOOP
88	Refused	ENDOTHERLOOP
99	Don't know	ENDOTHERLOOP

END OTHER MEASURE LOOP; IF FINISHED OTHER MEASURES OR NO MORE OTHER MEASURES, GO ON TO NEXT BATTERY

OPERATING HOURS

DISPLAY

We are almost finished. The next few questions are to help us get a full understanding of your organization's operational hours.

ALWAYS

Is your organization operation 24 hours a day, 7 days a week?

1	Yes	HOLIDAYS
2	No	HOLIDAYS
88	Refused	HOLIDAYS

HOLIDAYS Dose your facility closed for any holidays during the year? If so, which one(s)?

1	New Year's Day - January 1	DAYS
2	Martin Luther King Jr. Day - January 18, 2010 (3rd Monday in January)	DAYS
3	President's Day - February 15, 2010 (3rd Monday in February)	DAYS
4	Memorial Day - May 31, 2010 (Last Monday in May)	DAYS
5	Independence Day - July 4th (Or Surrounding Monday/Friday if July 4 is a weekend)	DAYS
6	Labor Day - September 6, 2010 (First Monday in September)	DAYS
7	Thanksgiving - November 26, 2010 (4th Thursday in November)	DAYS
8	Day after Thanksgiving	DAYS
9	Christmas Eve - December 24	DAYS
10	Christmas Day - December 25	DAYS
66	NO HOLIDAY CLOSURES	DAYS
77	Other - Specify	DAYS
88	Refused	DAYS
99	Don't Know	DAYS

Ask if ALWAYS = 2; else skip to OS_REC;

DAYS Is your facility closed any of the 7 days of the week? If so, which days are you CLOSED?

1	Monday	MONDAY_OPEN
2	Tuesday	MONDAY_OPEN
3	Wednesday	MONDAY_OPEN
4	Thursday	MONDAY_OPEN
5	Friday	MONDAY_OPEN
6	Saturday	MONDAY_OPEN
7	Sunday	MONDAY_OPEN
66	Open EVERYDAY	MONDAY_OPEN
88	REFUSED	MONDAY_OPEN
99	DON'T KNOW	MONDAY_OPEN

Ask if ALWAYS(2)&^DAYS(1); else skip to TUESDAY_OPEN;

MONDAY_OPEN What time do you open your facility on MONDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	MONDAY_CLOSE
88	REFUSED	MONDAY_CLOSE
99	DON'T KNOW	MONDAY_CLOSE

IF MONDAY_OPEN(1||64)

What time do you close your facility on
MONDAY?

MONDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	TUESDAY_OPEN
88	REFUSED	TUESDAY_OPEN
99	DON'T KNOW	TUESDAY_OPEN

Ask if ALWAYS(2)&^DAYS(2); else skip to WEDNESDAY_OPEN;

What time do you open your facility on
TUESDAY?

TUESDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	TUESDAY_CLOSE
88	REFUSED	TUESDAY_CLOSE
99	DON'T KNOW	TUESDAY_CLOSE

IF TUESDAY_OPEN(1||65)

What time do you close your facility on
TUESDAY?

TUESDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	WEDNESDAY_OPEN
88	REFUSED	WEDNESDAY_OPEN
99	DON'T KNOW	WEDNESDAY_OPEN

Ask if ALWAYS(2)&^DAYS(3); else skip to THURSDAY_OPEN;

What time do you open your facility on
WEDNESDAY?

WEDNESDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	WEDNESDAY_CLOSE
88	REFUSED	WEDNESDAY_CLOSE
99	DON'T KNOW	WEDNESDAY_CLOSE

IF WEDNESDAY_OPEN(1||65)

What time do you close your facility on
WEDNESDAY?

WEDNESDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	THURSDAY_OPEN
88	REFUSED	THURSDAY_OPEN
99	DON'T KNOW	THURSDAY_OPEN

Ask if ALWAYS(2)&^DAYS(4); else skip to FRIDAY_OPEN;

What time do you open your facility on
THURSDAY?

THURSDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	THURSDAY_CLOSE
88	REFUSED	THURSDAY_CLOSE
99	DON'T KNOW	THURSDAY_CLOSE

IF THURSDAY_OPEN(1||65)

What time do you close your facility on THURSDAY?

THURSDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	FRIDAY_OPEN
88	REFUSED	FRIDAY_OPEN
99	DON'T KNOW	FRIDAY_OPEN

Ask if ALWAYS(2)&^DAYS(5); else skip to SATURDAY_OPEN;

What time do you open your facility on FRIDAY?

FRIDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	FRIDAY_CLOSE
88	REFUSED	FRIDAY_CLOSE
99	DON'T KNOW	FRIDAY_CLOSE

IF FRIDAY_OPEN(1||65)

What time do you close your facility on FRIDAY?

FRIDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SATURDAY_OPEN
88	REFUSED	SATURDAY_OPEN
99	DON'T KNOW	SATURDAY_OPEN

Ask if ALWAYS(2)&^DAYS(6); else skip to SUNDAY_OPEN;

What time do you open your facility on SATURDAY?

SATURDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SATURDAY_CLOSE
88	REFUSED	SATURDAY_CLOSE
99	DON'T KNOW	SATURDAY_CLOSE

IF SATURDAY_OPEN(1||65)

What time do you close your facility on SATURDAY?

SATURDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SUNDAY_OPEN
88	REFUSED	SUNDAY_OPEN
99	DON'T KNOW	SUNDAY_OPEN

Ask if ALWAYS(2)&^DAYS(7); else skip to DIFF_SCHEDULE;

What time do you open your facility on SUNDAY?

SUNDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	SUNDAY_CLOSE
88	REFUSED	SUNDAY_CLOSE

99	DON'T KNOW	SUNDAY_CLOSE
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IF SUNDAY_OPEN(1||65)

What time do you close your facility on SUNDAY?

SUNDAY_CLOSE	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	DIFF_SCHEDULE
88	REFUSED	DIFF_SCHEDULE
99	DON'T KNOW	DIFF_SCHEDULE

Some organizations have different schedules for certain times of the year. Does your organization maintain a different schedule for certain months of the year?

DIFF_SCHEDULE		
1	Yes	MONTHS
2	No	OS_REC
88	REFUSED	OS_REC
99	DON'T KNOW	OS_REC

Ask if DIFF_SCHEDULE = 1; Else skip to OS_REC;

Which months of the year does the schedule vary from the times I just recorded?

MONTHS		
1	January	ALT_DAYS
2	February	ALT_DAYS
3	March	ALT_DAYS
4	April	ALT_DAYS
5	May	ALT_DAYS
6	June	ALT_DAYS
7	July	ALT_DAYS
8	August	ALT_DAYS
9	September	ALT_DAYS
10	October	ALT_DAYS
11	November	ALT_DAYS
12	December	ALT_DAYS
88	REFUSED	ALT_DAYS
99	DON'T KNOW	ALT_DAYS

Is your organization operation 24 hours a day, 7 days a week?

ALT_ALWAYS		
1	Yes	HOLIDAYS
2	No	HOLIDAYS
88	Refused	HOLIDAYS

If ^ALT_ALWAYS(1) then ask; Else skip to OS_REC;

During this alternate schedule, is your facility closed any of the 7 days of the week? If so, which days are you CLOSED?

ALT_DAYS

1	Monday	ALT_MONDAY_OPEN
2	Tuesday	ALT_MONDAY_OPEN
3	Wednesday	ALT_MONDAY_OPEN
4	Thursday	ALT_MONDAY_OPEN
5	Friday	ALT_MONDAY_OPEN
6	Saturday	ALT_MONDAY_OPEN
7	Sunday	ALT_MONDAY_OPEN
66	Open EVERYDAY	ALT_MONDAY_OPEN
88	REFUSED	ALT_MONDAY_OPEN
99	DON'T KNOW	ALT_MONDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(1);
else skip to ALT_TUESDAY_OPEN;

For the alternate schedule, what time do you open your facility on MONDAY?

ALT_MONDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_MONDAY_CLOSE
88	REFUSED	ALT_MONDAY_CLOSE
99	DON'T KNOW	ALT_MONDAY_CLOSE

IF ALT_MONDAY_OPEN(1||64)

What time do you close your facility on MONDAY?

ALT_MONDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_TUESDAY_OPEN
88	REFUSED	ALT_TUESDAY_OPEN
99	DON'T KNOW	ALT_TUESDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(2);
else skip to ALT_WEDNESDAY_OPEN;

What time do you open your facility on TUESDAY during your alternate schedule?

ALT_TUESDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_TUESDAY_CLOSE
88	REFUSED	ALT_TUESDAY_CLOSE
99	DON'T KNOW	ALT_TUESDAY_CLOSE

IF ALT_TUESDAY_OPEN(1||65)

What time do you close your facility on TUESDAY?

ALT_TUESDAY_CLOSE

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_WEDNESDAY_OPEN
88	REFUSED	ALT_WEDNESDAY_OPEN
99	DON'T KNOW	ALT_WEDNESDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(3);
else skip to ALT_THURSDAY_OPEN;

ALT_WEDNESDAY_OPEN What time do you open your facility on
WEDNESDAY during your alternate schedule?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_WEDNESDAY_CLOSE
88	REFUSED	ALT_WEDNESDAY_CLOSE
99	DON'T KNOW	ALT_WEDNESDAY_CLOSE

IF ALT_WEDNESDAY_OPEN(1||65)

ALT_WEDNESDAY_CLOSE What time do you close your facility on
WEDNESDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_THURSDAY_OPEN
88	REFUSED	ALT_THURSDAY_OPEN
99	DON'T KNOW	ALT_THURSDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(4);
else skip to ALT_FRIDAY_OPEN;

ALT_THURSDAY_OPEN What time do you open your facility on
THURSDAY during your alternate schedule?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_THURSDAY_CLOSE
88	REFUSED	ALT_THURSDAY_CLOSE
99	DON'T KNOW	ALT_THURSDAY_CLOSE

ALT_THURSDAY_OPEN(1||65)

ALT_THURSDAY_CLOSE What time do you close your facility on
THURSDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_FRIDAY_OPEN
88	REFUSED	ALT_FRIDAY_OPEN
99	DON'T KNOW	ALT_FRIDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(5);
else skip to ALT_SATURDAY_OPEN;

ALT_FRIDAY_OPEN What time do you open your facility on
FRIDAY during this alternate schedule?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_FRIDAY_CLOSE
88	REFUSED	ALT_FRIDAY_CLOSE
99	DON'T KNOW	ALT_FRIDAY_CLOSE

IF ALT_FRIDAY_OPEN(1||65)

ALT_FRIDAY_CLOSE What time do you close your facility on FRIDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SATURDAY_OPEN
88	REFUSED	ALT_SATURDAY_OPEN
99	DON'T KNOW	ALT_SATURDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(6);
else skip to ALT_SUNDAY_OPEN;
 I recorded that during your alternate schedule you are also open on Saturday. What time do you open your facility on SATURDAY?

ALT_SATURDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SATURDAY_CLOSE
88	REFUSED	ALT_SATURDAY_CLOSE
99	DON'T KNOW	ALT_SATURDAY_CLOSE

IF ALT_SATURDAY_OPEN(1||65)

ALT_SATURDAY_CLOSE What time do you close your facility on SATURDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SUNDAY_OPEN
88	REFUSED	ALT_SUNDAY_OPEN
99	DON'T KNOW	ALT_SUNDAY_OPEN

Ask if
DIFF_SCHEDULE(1)&^ALT_DAYS(7);
else skip to OS_REC;
 I recorded that during your alternate schedule you are also open on Sunday. What time do you open your facility on SUNDAY?

ALT_SUNDAY_OPEN

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	ALT_SUNDAY_CLOSE
88	REFUSED	ALT_SUNDAY_CLOSE
99	DON'T KNOW	ALT_SUNDAY_CLOSE

IF ALT_SUNDAY_OPEN(1||65)

ALT_SUNDAY_CLOSE What time do you close your facility on SUNDAY?

	Record Time 1AM - 12:30 AM in 12 hour format by half hour as 1-24	OS_REC
88	REFUSED	OS_REC
99	DON'T KNOW	OS_REC

NET TO GROSS

DISPLAY For the sake of expediency, during this next battery we will be referring to the program as THE PROGRAM and we will be referring to the installation of ...<%NTGMEASURE>... as THE MEASURE.

A3 There are usually a number of reasons why an organization like yours decides to participate in energy efficiency programs like this one. In your own words, can you tell me why you decided to participate in this program?

1	To replace old or outdated equipment	N2
2	As part of a planned remodeling, build-out, or expansion	N2
3	To gain more control over how the equipment was used	N2
4	Maintenance downtime/associated expenses for old equip were too high	N2
5	Had process problems and were seeking a solution	N2
6	To improve equipment performance	N2
7	To improve production as a result of the change in equipment	N2
8	To comply with codes set by regulatory agencies	N2
9	To improve visibility/plant safety	N2
10	To comply with company policies regarding regular equipment retrofits or remodeling	N2
11	To get a rebate from the program	N2
12	To protect the environment	N2
13	To reduce energy costs	N2
14	To reduce energy use/power outages	N2
15	To update to the latest technology	N2
16	To improve the comfort level of the facility	N2
77	RECORD VERBATIM	N2
88	Don't know	N2
99	Refused	N2

N2 Did your organization make the decision to install this new equipment before or after you became aware of rebates/cost reduction available through the PROGRAM?

1	Before	N3a
2	After	N3a
88	Refused	N3a
99	Don't know	N3a

DISPLAY Next, I'm going to ask you to rate the importance of the program as well as other factors that might have influenced your decision to install this equipment through the program. Using a scale of 0 to 10 where 0 means not at all important and 10 means extremely important, how would you rate the importance of...

N3a The age or condition of the old equipment

#	Record 0 to 10 score (_____)	N3aa
88	Refused	N3b

99	Don't know	N3b
-----------	------------	-----

IF N3a > 5 and NTG_TYPE >= 2 THEN ASK

How, specifically, did this enter into your decision to install/delamp this equipment?

N3aa

77	RECORD VERBATIM	N3b
88	Don't know	N3b
99	Refused	N3b

N3b Availability of the PROGRAM rebate/cost reduction

#	Record 0 to 10 score (_____)	N3bb
88	Refused	N3c
99	Don't know	N3c

IF N3b > 7 AND NTG_TYPE >= 2, THEN ASK

N3bb Why do you give it this rating?

77	Record VERBATIM	N3c
88	Refused	N3c
99	Don't know	N3c

IF A1B(1)|ID0(1) THEN ASK; ELSE SKIP TO N3d

Please rate the degree of importance of information provided through...A1B(1)|<ID0(1)/The Facility or System AUDIT/>

N3c

#	Record 0 to 10 score (_____)	N3cc
88	Refused	N3d
99	Don't know	N3d

IF N3c > 7 and NTG_TYPE >= 2, THEN ASK

N3cc Why do you give it this rating?

77	Record VERBATIM	N3d
88	Refused	N3d
99	Don't know	N3d

If V1 = 1 THEN ASK; ELSE SKIP TO N3e

Recommendation from an equipment vendor that sold you the equipment and/or installed it for you [VENDOR_1]

N3d

#	Record 0 to 10 score (_____)	N3e
88	Refused	N3e
99	Don't know	N3e

N3e Your previous experience with energy efficient projects?

#	Record 0 to 10 score (_____)	N3f
88	Refused	N3f
99	Don't know	N3f

N3f Your previous experience with <%UTILITY>'s program or a similar utility program?

#	Record 0 to 10 score (_____)	N3g
88	Don't know	N3g
99	Refused	N3g

NTG_TYPE >= 3 THEN ASK, ELSE N3h

N3g Information from the Program, Utility, or Program Administrator training course?

#	Record 0 to 10 score (_____)	N3gg
88	Refused	N3h
99	Don't know	N3h

IF N3g > 5, THEN ASK

N3gg What type of information was provided during the training?

77	Record VERBATIM	N3ggg
88	Refused	N3h
99	Don't know	N3h

N3ggg How, specifically, did this enter into your decision to install/delamp this equipment?

77	RECORD VERBATIM	N3h
88	Don't know	N3h
99	Refused	N3h

N3h Information from the Program, Utility, or Program Administrator Marketing materials?

#	Record 0 to 10 score (_____)	N3hh
88	Refused	N3j
99	Don't know	N3j

IF N3h > 5 and NTG_TYPE >= 2, THEN ASK

N3hh What type of information was provided that pertained to the PROJECT?

77	Record VERBATIM	N3hhh
88	Refused	N3j
99	Don't know	N3j

IF N3hh = 77, THEN ASK

N3hhh How, specifically, did this enter into your decision to install/delamp this energy efficient equipment?

77	RECORD VERBATIM	N3j
88	Don't know	N3j
99	Refused	N3j

IF NTG_TYPE >= 2

N3j Standard practice in your business/industry

#	Record 0 to 10 score (_____)	N3k
---	------------------------------	-----

88	Refused	N3k
99	Don't know	N3k

IF AP9 = 3 or AP9a = 3 THEN ASK; ELSE SKIP TO N3m

N3l Endorsement or recommendation by your account rep?

#	Record 0 to 10 score (_____)	N3ll
88	Refused	N3m
99	Don't know	N3m

IF N3l > 5 & NTG_TYPE >= 2 THEN ASK

N3ll What did they recommend?

77	Record VERBATIM	N3lll
88	Refused	N3m
99	Don't know	N3m

IF N3LL(77)

N3lll How specifically did this enter into your decision to install this project using energy efficient equipment?

77	RECORD VERBATIM	N3m
88	Don't know	N3m
99	Refused	N3m

IF NTG_TYPE >= 2, ASK

N3m Corporate policy or guidelines

#	Record 0 to 10 score (_____)	N3mm
88	Refused	N3n
99	Don't know	N3n

IF N3m > 5, THEN ASK

N3mm How, specifically, did this enter into your decision to install/delamp this equipment?

77	RECORD VERBATIM	N3n
88	Don't know	N3n
99	Refused	N3n

N3n Payback or return on investment of installing this equipment

#	Record 0 to 10 score (_____)	N3o
88	Refused	N3o
99	Don't know	N3o

N3o Improved product quality

#	Record 0 to 10 score (_____)	N3oo
88	Refused	N3p
99	Don't know	N3p

IF N3o > 5, THEN ASK

N3oo How, specifically, did this enter into your decision to install/delamp this equipment?

77	RECORD VERBATIM	N3p
88	Don't know	N3p
99	Refused	N3p

IF FM050 = 12 AND NTG_TYPE = 4, THEN ASK, ELSE SKIP TO N3r

N3p Compliance with state or federal regulations such as Title 24, air quality, OSHA, or FDA regulations

#	Record 0 to 10 score (_____)	N3pp
88	Refused	N3r
99	Don't know	N3r

IF N3p > 5, THEN ASK

N3pp How, specifically, did this enter into your decision to upgrade to energy efficient equipment?

77	RECORD VERBATIM	N3r
88	Don't know	N3r
99	Refused	N3r

ASK IF NTG_TYPE >= 3

N3r Compliance with your organization's normal remodeling or equipment replacement practices?

#	Record 0 to 10 score (_____)	N3rrr
88	Refused	N3s
99	Don't know	N3s

IF A3(2|10)&N3R(6|10);

N3RRR What is your normal cycle in number of years for which you typically retrofit your equipment to comply with your organization's normal remodeling or equipment replacement practices?

# yrs	Record Number of Years	N3rr
88	Refused	N3rr
99	Don't know	N3rr

IF N3r > 5, THEN ASK

N3rr How, specifically, did this enter into your decision to install/delamp this equipment?

77	RECORD VERBATIM	N3s.
88	Don't know	N3s.
99	Refused	N3s.

N3s Were there any other factors we haven't discussed that were influential in your decision to install/delamp this MEASURE?

1	Nothing else influential	CC1
77	Record verbatim	N3ss
88	Refused	CC1
99	Don't know	CC1

ASK IF N3s = 77

Using the same zero to 10 scale, how would you rate the influence of this factor?

N3ss	#	Record 0 to 10 score (_____)	CC1
	88	Refused	CC1
	99	Don't know	CC1

CONSISTENCY CHECKS ON N3p, N3q and N3r

If NTG_TYPE = 4

IF A3 = 8, AND N3p < 4, THEN ASK

You indicated earlier that compliance with codes or regulatory policies was one of the reasons you did the project. However, just now you scored the importance of compliance with state or federal regulations or standards such as Title 24, air quality, OSHA, or FDA regulations in your decision making fairly low, why is that?

CC1	77	RECORD VERBATIM	CC1a
	88	Don't know	CC1a
	99	Refused	CC1a

IF A3 ^ = 8, and N3p > 7, THEN ASK

You indicated earlier that compliance with codes or regulatory policies was not one of the primary reasons you did the project. However, just now you scored the importance of compliance with state or federal regulations or standards such as Title 24, air quality, OSHA, or FDA regulations in your decision making fairly high, why is that?

CC1a	77	RECORD VERBATIM	CC3
	88	Don't know	CC3
	99	Refused	CC3

IF A3 = 2 or 10, AND N3r < 4, THEN ASK

You indicated earlier that a regularly scheduled retrofit was one of the reasons you did the project. However, just now you scored the importance of compliance with your company's regularly scheduled retrofit or equipment replacement in your decision making fairly low, why is that?

NCC3	77	RECORD VERBATIM	CC3a
	88	Don't know	CC3a
	99	Refused	CC3a

IF A3 ^ = 2 and A3 ^ = 9 and A3 ^ = 10 AND N3r > 7 THEN ASK

You indicated earlier that a regularly scheduled retrofit was NOT one of the reasons you did the project. However, just now you scored the importance of compliance with your company's regularly scheduled retrofit or equipment replacement in your decision making fairly high, why is that?

NCC3a	77	RECORD VERBATIM	N33
	88	Don't know	N33
	99	Refused	N33

PAYBACK BATTERY

If INCENT < 100 AND NTG_TYPE >= 2, THEN ASK; ELSE SKIP TO N33

What financial calculations does your company typically make before proceeding with the installation of energy efficient equipment like you installed through the program?

P1

1	Payback	P2A
2	Return on investment	P2B
77	Record VERBATIM	P3
88	Don't know	P3
99	Refused	P3

If P1 = 1 THEN ASK; ELSE SKIP TO P2B

What is your threshold in terms of the payback or return on investment your company uses before deciding to proceed with installing energy efficient equipment like you installed through the program? Is it...

P2A

1	0 to 6 months	P3
2	6 months to 1 year	P3
3	1 to 2 years	P3
4	2 to 3 years	P3
5	3 to 5 years	P3
6	Over 5 years	P3
88	Don't know	P3
99	Refused	P3

IF P1 = 2 THEN ASK

P2B

What is your ROI?

1	Record ROI_____;	P3
----------	------------------	----

Did the rebate move your energy efficient equipment project within this acceptable range?

P3

1	Yes	P4
2	No	P3a
88	Don't know	P3a
99	Refused	P3a

If P3 = 1 THEN ASK; ELSE SKIP TO P3A

On a scale of 0 to 10, with a 0 meaning Not At All Important and a 10 meaning a Very Important, how important in your decision was it that the project was now in the acceptable range?

P4

#	Record 0 to 10 score (_____)	P3a
88	Refused	P3a
99	Don't know	P3a

CONSISTENCY CHECKS ON N3b and P3

IF P3 = 1, AND N3b < 5, THEN ASK

The rebate seemed to make the difference between meeting your financial criteria and not meeting them, but you are saying that the rebate didn't have much effect on your decision, why is that?

P3a

77	Record VERBATIM	P3e
88	Don't know	P3e
99	Refused	P3e

IF P3 = 2, AND N3b > 5, THEN ASK

The rebate didn't cause the installation of energy efficient equipment to meet your company's financial criteria, but you said that the rebate had an impact on the decision to install this energy efficient equipment. Why did it have an impact?

P3e

77	Record VERBATIM	N33
88	Don't know	N33
99	Refused	N33

IF N3A(8||10) | N3D(8||10) | N3E(8||10) | N3F(8||10) | N3J(8||10) | N3M(8||10) | N3N(8||10) | N3O(8||10) | N3P(8||10) | N3R(8||10);

Next, I would like you to rate the importance of the PROGRAM in your decision to implement this MEASURE as opposed to other factors that may have influenced your decision such as...(SCAN BELOW AND READ TO THEM THOSE

DISPLAY

ITEMS WHERE THEY GAVE A RATING OF 8 or higher)

<%N3A> Age or condition of old equipment,	...@[%N3A>@
<%N3D> Equipment Vendor recommendation	...@[%N3D>@
<%N3E> Previous experience with this measure	...@[%N3E>@
<%N3F> Previous experience with this program	...@[%N3F>@
<%N3J> Standard practice in your business/industry	...@[%N3J>@
<%N3M> Corporate policy or guidelines	...@[%N3M>@
<%N3N> Payback on investment.	...@[%N3N>@
<%N3O> To improve production as a result of lighting,	...@[%N3O>@
<%N3P> Compliance with state or federal regulations or standards such as Title 24, air quality, OSHA, or FDA regulations	...@[%N3P>@
<%N3R> Compliance with normal maintenance or retrocommissioning policies or your companies regularly scheduled retrofit or lighting replacement	...@[%N3R>@

If you were given 10 points to award in total, how many points would give to the importance of the program and how many points would you give to these other factors?\

DISPLAY

How many of the ten points would you give to the importance of the PROGRAM in your decision?

N41

#	Record 0 to 10 score (_____)	N42
88	Refused	N42
99	Don't know	N42

N42 and how many points would you give to all of these other factors?\

#	Record 0 to 10 score (_____)	N41a
88	Refused	N41a

99	Don't know	N41a
----	------------	------

If N41 <> 88 and N41 <> 99 and N42 <> 88 and N42 <> 99, computer N41 + N42. While N41+N42 <> 10, display:

__We want these two sets of numbers to equal 10.

<%N41> for Program influence and

<%N42> for Non Program factors

IF DELAMP <> 1;

Was the installation of this measure....<%NTGMEASURE> ...a replacement of existing equipment or was it additional equipment you installed in your facility?

REPLACE

1	Replace	DISPLAY
2	Add-on	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

Now I would like you to think about the action you would have taken with regard to the installation of this equipment if the program had not been available.

DISPLAY

IF REPLACE(1) | DELAMP == 1

Using a likelihood scale from 0 to 10, where 0 is Not at all likely and 10 is Extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same program qualifying energy efficient equipment that you did in this project?

N5

#	Record 0 to 10 score (_____)	N5a
88	Refused	N5B
99	Don't know	N5B

IF REPLACE(2) THEN ASK; ELSE SKIP TO N6

Using a likelihood scale from 0 to 10, where 0 is Not at all likely and 10 is Extremely likely, if THE PROGRAM had NOT BEEN AVAILABLE, what is the likelihood that you would have installed exactly the same energy efficient equipment at the same time as you did?

N5aa

#	Record 0 to 10 score (_____)	N6
88	Don't know	N6
99	Refused	N6

CONSISTENCY CHECKS

IF N3b > 7 and N5 > 7, THEN ASK

When you answered ...<%N3B> ... for the question about the influence of the rebate, I would interpret that to mean that the rebate was quite important to your decision to install. Then, when you answered ..<%N5>... for how likely you would be to install the same equipment **without** the rebate, it sounds like the rebate was not very important in your installation decision.

I want to check to see if I am misunderstanding your answers or if the questions may have been unclear. Will you explain in your own words, the role the rebate played in your decision to install this efficient equipment?

N5a

77	Record VERBATIM	NN5aa
88	Don't know	NN5aa
99	Refused	NN5aa

Would you like for me to change your score on the importance of the rebate that you gave a rating of <%N3B> and/or change your rating on the likelihood you would install the same equipment without the rebate which you gave a rating of <%N5> and/or we can change both if you wish?

NN5aa

1	No change	N5b
77	Record how they would rate rebate influence and how they would rate likelihood to install without the rebate	N5b
88	Don't know	N5b
99	Refused	N5b

ASK IF REPLACE(1)

Using the same scale as before, if the program had not been available, what is the likelihood that you would have done this project at the same time as you did?

N5b

#	Record 0 to 10 score (_____)	DISPLAY
88	Refused	DISPLAY
99	Don't know	DISPLAY

DEFERRED FREE RIDERSHIP FOLLOW-UP

DISPLAY if N5b < 9; ELSE SKIP TO N6

Next, I'd like to ask a couple of questions to help us estimate at what point in the future you would definitely have replaced your existing equipment. We understand that you can't know exactly when you would have done this, especially so far into the future. We're just trying to get a sense of how long you think the current equipment or process would have kept serving your company's needs before you had to or chose to replace it.

DISPLAY

TD1

If the program had not been available, how likely is it that you would have replaced your existing equipment within one year of when you did?

TD1

1	Definitely would have (1.0 probability)	N9bb
2	Probably would have (0.75 probability)	TD2
3	50-50 chance (0.50 probability)	TD2
4	Probably not (0.25 probability)	TD2
5	Definitely not (0.0 probability)	TD2

IF TD1 = 2, 3, 4, 5 ASK TD2, ELSE GO TO N9bb

TD2 If the program had not been available, how likely is it that you would have replaced your existing equipment within three years of when you did?

1	Definitely would have (1.0 probability)	N9bb
2	Probably would have (0.75 probability)	TD3
3	50-50 chance (0.50 probability)	TD3
4	Probably not (0.25 probability)	TD3
5	Definitely not (0.0 probability)	TD3

IF TD2 = 2, 3, 4, 5 ASK TD3; ELSE GO TO N6

TD3 If the program had not been available, how likely is it that you would have replaced your existing equipment within five years of when you did?

1	Definitely would have (1.0 probability)	N9bb
2	Probably would have (0.75 probability)	N9bb
3	50-50 chance (0.50 probability)	N9bb
4	Probably not (0.25 probability)	N9bb
5	Definitely not (0.0 probability)	N9bb

CONSISTENCY CHECK ON AGE

IF (N3a > 6 AND TD3 = 3, 4 or 5) THEN ASK; ELSE SKIP TO N6

Earlier when I asked about the influence of the age/condition of the old equipment on your decision to install this new equipment, you gave me a rating of <%N3A> out of ten. I would interpret this to mean that the age/condition was quite influential in your decision to install this new equipment when you did. Perhaps I have either recorded something incorrectly or maybe you could explain in your own words the role the age/condition of the existing equipment played in your decision to install this new energy efficient equipment.

N9bb		
77	Record VERBATIM	N6
88	Don't know	N6
99	Refused	N6

ADDITIONAL BASELINE INPUT

Now I would like you to think one last time about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do?

N6		
1	Install/Delamped fewer units	N7
2	Install standard efficiency equipment or whatever required by code	N7
3	Installed equipment more efficient than code but less efficient than what you installed through the program	N7
4	Done nothing (keep existing equipment as is)	N7
5	Done the same thing I would have done as I did through the program	N7
6	Repair/rewind or overhaul the existing equipment	N7
77	Something else (specify what _____)	N7
88	Don't know	N7
99	Refused	N7

Ask if N6 = (1, 2, 3, 4) and (N5 > 8 and N5b > 8 OR N5aa > 8)

In an earlier response, you said that if the program had not been available, there was a very high likelihood that you would have installed exactly the same equipment as you did through the program. However, just now you have indicated that you would not have installed the same equipment as you did without the benefit of the program. Can you explain to me why there is this difference?

N7		
77	Record VERBATIM	N6a
88	Don't know	N6a
99	Refused	N6a

Ask if N6(1);

How many fewer units would you have installed/Delamped? (It is okay to take an answer such as ...HALF...or 10 percent fewer ... etc.)

N6a		
77	RECORD VERBATIM	ER2
88	Refused	ER2
99	Refused	ER2

Ask if N6(3);

Can you tell me what model or efficiency level you were considering as an alternative? (It is okay to take an answer such as ... 10 percent more efficient than code or 10 percent less efficient than the program equipment)

N6b		
77	RECORD VERBATIM	ER2
88	Don't know	ER2
99	Refused	ER2

Ask if N6(6);

How long do you think the repaired equipment would have lasted before requiring replacement?

N6c		
77	RECORD VERBATIM	ER2
88	Don't know	ER2
99	Refused	ER2

EARLY REPLACEMENT BATTERY

[IF N5b < 8 and A3 = 1, 4, 8, or 10 THEN ASK. ELSE SKIP TO SP1]

Earlier, when I asked you a question about why you decided to implement the project using high efficiency equipment, you gave reasons related to <A3>

Now I would like to ask you some follow up questions regarding these responses you gave me.

DISPLAY ER2

IF REPLACE(1);

How many more years do you think your equipment would have gone before failing and required replacement?

ER2		
77	___ Estimated Remaining Useful Life (in years)	ER6
88	Don't know	ER6
99	Refused	ER6

IF A3 = 4, THEN ASK

ER6 How much downtime did you experience in the past year?

77	_____ Downtime Estimate (in weeks)	ER9
88	Don't know	ER9
99	Refused	ER9

ER9 In your opinion, based on the economics of operating this equipment, for how many more years could you have kept this equipment functioning?

Yrs	___ Estimated Remaining Useful Life	ER11
88	Don't know	ER11
99	Refused	ER11

IF A3 = 8, THEN ASK

ER15 Can you briefly describe the specific code/regulatory requirements that this project addressed?

77	RECORD VERBATIM	ER19
88	Don't know	ER19
99	Refused	ER19

IF A3 = 10, THEN ASK

ER19 Can you briefly describe the specific company policies regarding regular/normal maintenance/replacement policy(ies) that were relevant to this project? Or briefly describe the specific company policies regarding regular equipment retrofits and remodeling?

77	RECORD VERBATIM	PP1
88	Don't know	PP1
99	Refused	PP1

PROCESS QUESTIONS - ASK ALL

PP1 What do you believe the PROGRAM'S primary strengths are?

77	Record VERBATIM	PP2
88	Don't know	PP2
99	Refused	PP2

What concerns do you have about the PROGRAM, if any? (IF NEEDED:

PP2 What do you view as the primary features that need to be improved?)

77	Record VERBATIM	PP4
88	Don't know	PP4
99	Refused	PP4

On a scale of 0 - 10, where 0 is completely dissatisfied and 10 is completely satisfied, how would you rate your OVERALL satisfaction with the

PP4 <%PROGRAM>?

#	Record 0 to 10 score (_____)	PP5
88	Refused	PP5
99	Don't know	PP5

IF PP4 < 4 THEN ASK; ELSE SKIP TO PP5A

PP5 Why do you say that?

77	Record VERBATIM	PP5A
88	Don't know	PP5A
99	Refused	PP5A

PP5A Using the same 0 - 10 scale, how would you rate your OVERALL satisfaction with the performance of the energy efficient measures you had installed?

#	Record 0 to 10 score (_____)	PP5B
88	Refused	PP6
99	Don't know	PP6

IF PP5A < 6 THEN ASK; ELSE SKIP TO PP6

PP5B Why do you say that?

77	Record VERBATIM	PP6
88	Don't know	PP6
99	Refused	PP6

PP5C Using the same 0 - 10 scale, how would you rate your OVERALL satisfaction with the quality of the installers' work?

#	Record 0 to 10 score (_____)	PP5D
88	Refused	PP5E
99	Don't know	PP5E

PP5D Why do you say that?

77	Record VERBATIM	PP5E
88	Don't know	PP5E
99	Refused	PP5E

PP5E From your perspective, what if anything could be done to improve the quality of the installers' work?

77	Record VERBATIM	PP6
88	Don't know	PP6
99	Refused	PP6

In qsl: IF ^UNRECORDED(IMPLEMENTER);

ASK IF %IMPLEMENTER = "a local government", "state government", or "an independent firm"; ELSE PP10

The program you participated in was run by %IMPLEMENTER. Has your organization participated in energy efficiency programs run by <%UTILITY> in the past three years?

1	Yes	PP8
2	No	PP10
88	Refused	PP10
99	Don't know	PP10

ASK IF PP6=1

Please consider your recent experience with the PROGRAM run by %IMPLEMENTER versus your past experience with the program run by <%UTILITY>. Are there any differences between the two that stand out?

PP8 Any there attributes or services that seemed better in one or the other?

1	No differences	PP10
77	Yes, Record DIFFERENCES	PP10
88	Don't know	PP10
99	Refused	PP10

ASK IF IOU_PROG = 1 (utility administered program); ELSE PP12

The program you participated in was run by <%UTILITY>. Have you participated in programs run by governments, institutions, or other independent firms in the past three years? (select all that apply)

PP10

1	Local Government	PP14
2	State Government or Institution	PP14
3	Independent Firm	PP12
88	Refused	PP16
99	Don't know	PP16

ASK IF PP10 = 3;

Please consider your experiences with the program run by an independent firm versus your recent experience with the program run by an independent firm versus your recent experience with <%UTILITY>'s program. Are there any differences between the two that stand out? Are there attributes or services that seemed better in one or the other? (NOTE: SPECIFY WHICH ENTITY IS REFERRED TO IN EACH COMMENT)

PP12

1	No differences	PP16
77	Yes, RECORD DIFFERENCES	PP16
88	Refused	PP16
99	Don't know	PP16

ASK if PP10 in (1, 2)

Please consider your experiences with the program run by a government or institution versus your recent experience with <%UTILITY>'s PROGRAM. Are there any differences between the two that stand out? Are there attributes that seemed better in one or the other? (NOTE: SPECIFY WHICH ENTITY IS REFERRED TO IN EACH COMMENT)

PP14

77	Yes, Record VERBATIM	PP16
78	No differences	PP16
88	Refused	PP16
99	Don't know	PP16

ASK if PP6 = 1 AND PP10 = 1, 2 or 3. ELSE PP3

Which entity, the <%UTILITY> program or the <%IMPLEMENTER> <%PP10> program was more effective in supporting your organization's decision making process?

PP16

1	%IMPLEMENTER	PP18
2	%UTILITY	PP18

3	Very little difference	PP18
88	Refused	PP18
99	Don't know	PP18

If PP16 in (1, 2) then ask; else skip to PP20

PP18 How significant was this difference, would you say...

1	Very Significant	PP20
2	Somewhat Significant	PP20
3	Not very significant	PP20
88	Refused	PP20
99	Don't know	PP20

PP20 Which entity had a better technical understanding of the energy use at your facility and provided the best technical assistance in specifying the project?

1	%IMPLEMENTER	PP22
2	%UTILITY	PP22
3	Very little difference	PP22
88	Refused	PP22
99	Don't know	PP22

If PP20 in (1, 2) then ask; else skip to PP24

PP22 How significant was this difference, would you say...

1	Very Significant	PP24
2	Somewhat Significant	PP24
3	Not Very Significant	PP24
88	Refused	PP24
99	Don't know	PP24

PP24 Which entity was more effective in supporting you through the application process

1	%IMPLEMENTER	PP26
2	%UTILITY	PP26
3	Very little difference	PP26
88	Refused	PP26
99	Don't know	PP26

If PP24 in (1, 2) then ask; else skip to PP3;

PP26 How significant was this difference, would you say...

1	Very Significant	PP3
2	Somewhat Significant	PP3
3	Not very significant	PP3
88	Refused	PP3
99	Don't know	PP3

PP3 Do you have any comments on the current incentive structure of the PROGRAM?

1	No	ID1
77	Yes - RECORD COMMENTS_____	ID1
88	Don't know	ID1
99	Refused	ID1

LONG TERM INFLUENCE

If NTG_TYPE >= 2

IF N3f > 4, THEN ASK, ELSE CCC12A

Now I'd like you to think about your organization's experiences with %UTILITY's energy efficiency programs and efforts over the longer term, for example, over the past 5, 10, or even 20 years.

In an earlier question, you indicated that your previous experience with utility energy efficiency programs was a factor that influenced your decision to implement this PROJECT. I would like to ask you a few questions about this experience.

DISPLAY

LT2

LT2 For how many years have you been participating in %UTILITY's energy efficiency programs?

# yrs	Record Number of Years	LT3
88	Refused	LT3
99	Don't know	LT3

LT3 During this time, how many times has your organization participated in these PROGRAM(s)?

1	7 to 10 times, or more	CA6
2	4 to 7 times	CA6
3	2 to 4 times	CA6
4	less than 2 times	CA6
88	Refused	LT6
99	Don't know	LT6

IF LT3(1||4);

CA6 What type of equipment did you install through this (these) program(s)?
[READ RESPONSE CATEGORIES]

1	Indoor lighting	LT6
2	Cooling equipment	LT6
3	Natural gas equipment, such as water heater, furnace or appliances	LT6
4	Insulation or windows	LT6
5	Refrigeration	LT6
6	Industrial process equipment	LT6
7	Greenhouse heat curtains	LT6
8	Food service equipment	LT6
77	OPEN \SOMETHING OTHER (specify)	LT6
88	Refused	LT6
99	Don't Know	LT6

LT6 What factors led you to participate in these program(s)?

77	Record VERBATIM	LT7
88	Refused	LT7
99	Don't know	LT7

And exactly how did that experience help to convince you to install this energy efficient equipment?

LT7

77	Record VERBATIM	LT8
88	Refused	LT8
99	Don't know	LT8

IF LT3 = 1 or 2, THEN ASK. ELSE CCC12A.

Have these programs had any long-term influence on your organization's energy efficiency related practices and policies that go beyond the immediate effect of incentives on individual projects? [DO NOT READ: Examples are causing them to add energy efficiency procurement policies, internal incentive or reward structures for improving energy efficiency, or adoption of energy management best practices.]

LT8

1	Yes	LT9
2	No	CC12A
88	Refused	CC12A
99	Don't know	CC12A

If LT8 = 1 then ask; else skip to CA2;

Has your organization developed a specification policy for the selection of energy efficient equipment? [EXAMPLES... REQUIREMENTS THAT ALL NEW FLUORESCENT LIGHTING SYSTEMS USE ELECTRONIC BALLAST, OR THAT ALL NEW MOTORS BE PREMIUM EFFICIENCY]

LT9

1	Yes	LT10
2	No	LT10
88	Refused	LT10
99	Don't know	LT10

Has your organization assigned responsibility for controlling energy usage and costs to any of the following?

LT10

1	An in-house staff person	LT11
2	A group of staff	LT11
3	An outside contractor	LT11
4	NONE OF THESE	LT11
88	Refused	LT11
99	Don't know	LT11

Does your organization have any internal incentive or reward policies for business units or staff responsible for managing energy costs?

LT11

1	Yes	LC7
2	No	CA2
88	Refused	CA2
99	Don't know	CA2

Ask if LT11(1)

LC7 How do these incentive/reward structures work?

77	OPEN/Record	CA2
88	Refused	CA2
99	Don't know	CA2

CA2 In marketing materials or in communications with customers, does your company highlight the ways in which your business is environmentally conscious?

1	Yes	RETURN TO REMAINDER OF SURVEY
2	No	RETURN TO REMAINDER OF SURVEY
77	OPEN\RECORD OTHER	RETURN TO REMAINDER OF SURVEY
88	Refused	RETURN TO REMAINDER OF SURVEY
99	Don't know	RETURN TO REMAINDER OF SURVEY

ONSITE RECRUITING

TO SCHEDULE INSTALLATION OF MONITORING EQUIPMENT

If LOGGER= 1; Else Skip to Comment1

In order to improve this program's performance, <%UTILITY> would also like to make an accurate measurement of the energy savings associated with the energy efficient equipment installed by collecting and analyzing information from selected customers. If you agree to participate, Itron, on behalf of <%UTILITY>, will come to your business to install monitoring devices on your equipment to record when the equipment is in use. The monitoring devices will be installed in an unobtrusive place and would be removed by us at the end of the research project. We expect the site visit to take about two hours. We'll come back and remove the monitoring devices within 3-6 months. Note, the electric use data will be used strictly for the study of the <%PROGRAM> and will not affect your electric service at all. You will need to sign a brief participation agreement.

DISPLAY

LOG_REC

LOG_REC Are you interested in participating in this project?

1	Yes	LOG_NAME
2	No	Comment1
88	Refused	Comment1

99	Don't know	Comment1
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	ASK IF LOG_REC(1)	
LOG_NAME	May I have the name of the person that our technician should contact to make an appointment?	LOG_PHONE
LOG_PHONE	What would be the most convenient phone number for our technician to contact<%LOG_NAME>?	LOG_ALT
LOG_ALT	In the even that<%LOG_NAME> ... is unavailable, would there be an alternate contact that we could schedule an appointment with?	LOG_PH_ALT
LOG_PH_ALT	What would be the most convenient phone number to reach this person?	LOG_NOTE

	Are there any notes that would facilitate our technician's ability to make an appointment? For example, are some days of the week better for making contacts, are early mornings better or are afternoons better?	
LOG_NOTE		
66	No Notes	OS_NAME1
77	Record Notes	OS_NAME1

IF ONSITE = 1

TO SCHEDULE ONSITE VERIFICATION

COMMENT1	As we've discussed, the <%PROGRAM> is an important component of the California Public Utilities Commission's ongoing efforts to save energy and reduce emissions affecting climate change. In order to improve this program's performance, the CPUC would like to make an accurate measurement of the energy savings associated with energy efficiency equipment installed by collecting and analyzing information from selected customers. Your input to this research is extremely important. By receiving a rebate through the <%PROGRAM>, your firm has agreed to allow verification of the installation of the equipment rebated through the program.
-----------------	--

	Our verification technician will need to meet a facilities representative of your company. This should be either the manager of the facility or part of the facilities staff.	
OS_NAME1	May I please have the name of the person who our technician can call you to set up an appointment time?	
1	Same as for logger	HB_Lift
77	Record Name	OS_PHONE1
99	Don't know	T&T

IF OS_NAME1(77)

OS_PHONE1	May I also have the best phone number for the technician to reach this person?	
&OS_PHONE1	PHONE FOR PRIMARY CONTACT	OTHER
88	Refused	T&T
99	Don't know	T&T

OTHER	Is there another person that the engineer might speak with at your company, if this primary person is not available?	
&OTHER	Get name	OS_NAME2

88	Refused	T&T
99	Don't know	T&T

OS_NAME2 May I please have their name so our technician can call them at another time?

&OS_NAME2	Get name	OS_PHONE2
88	Refused	T&T
99	Don't know	T&T

OS_PHONE2 May I also have the best phone number for the technician to reach them?

&OS_PHONE2	Get phone number	HB_Lift
88	Refused	T&T
99	Don't know	T&T

Ask if HIGHBAY = 1 or (HB1 > 12 and HB1<>66 and HB1<>88 and HB1<>99) or HB2 = 1 or HB1a = 1; Else skip to OS_Business

HB_Lift Do you have some form or a lift or ladder available to reach the lighting at your facility that is located 13ft or more above ground?

1	Yes	OS_Business
2	No	OS_Business
88	Refused	T&T
99	Don't know	T&T

OS_Business Do you have a sign or business name other than <%BUSINESS> that our technicians should look for when they visit your site?

1	Yes	OS_Bus_Name
2	No	Vendor_Name
88	Refused	T&T
99	Don't know	T&T

Ask if OS_BUSINESS(1)

OS_Bus_Name What is the sign or business name they should be looking for?

1	Get name	Vendor_Name
----------	----------	--------------------

VISIT_NOTES DO NOT READ.....If you have any special notes about the on@-site visit or the installation of loggers, add these notes here.

1	No additional notes	Vendor_Name
77	Record Notes	Vendor_Name

Ask if V1(1)

Earlier you stated that you had a vendor/contractor that helped you with the installation of the lighting equipment that was installed through the 2010-2012 <%UTILITY> Program. Could you provide me with their name and phone number?

Vendor_Name		
1	Cannot provide	END
77	Record Name, Phone Number, Email Address or any other information they can provide. More is better.	END
88	Refused	END
99	Don't know	END
END	Those are all the questions I have for you today. On behalf of the CPUC, I would like to thank you very much for your kind cooperation. Have a good day.	

Appendix B

Pipe Insulation Onsite Survey Instrument

CPUC ESPI Pipe Insulation Prescriptive Measure Study

1. General Info	
Visit Date & Time	
Field Engineer	
Facility Name	
Address	
Contact	
Phone	
Facility Type	
Operation Notes	

5. Logger Deployment Info				
Logger #	Time In	Time Out	Location	Notes

Site Visit Checklist	
3. Data Collection	
	Inspect bare pipe properties including pipe diameter, length (estimate) and material
	Inspect insulated pipe properties including length, thickness and material
	Gather information on facility's boiler plant including nameplate data and end uses
4. Spot Measurements	
	Request permission to meter bare pipe temperature by puncturing small hole in insulation
	Spot measurements of bare pipe surface, insulation surface and surrounding air temperature
	Spot measurements of gauge pressures and temperatures
	Spot measurement of boiler combustion efficiency
5. Logger Deployment - Ask about possible EMS or SCADA trending as well	
	Deploy temperature probe loggers on bare pipe surface, insulation surface and surrounding area
	Ensure that loggers are deployed near the midpoint of a representative pipe run
Baseline	
	Survey site staff for information on project baseline and preexisting conditions at facility
	Was insulation installed on preexisting or new pipes? Use backside to elaborate further
	Note percentage of pipe previously insulated, if applicable
	Inspect preexisting pipe insulation material, thickness and condition at facility (where available)
	Examine piping layout to ensure it does not require insulation per OSHA requirements*
Facility Operating Conditions	
	Survey site staff for information on facility's operating schedule and seasonal variation
	Request production data if system operation varies with production
Checkout	
	Summarize what loggers were deployed and their locations
	Ensure that facility staff agrees that boiler is operating as it was before
	Provide contact information via business card
	Arrange logger shipment (via prepaid box) on a given date <i>OR</i> schedule retrieval date

2. Site Visit Preparation Checklist
<input type="checkbox"/> Identify and check out loggers needed
<input type="checkbox"/> Bring site visit kit, gloves, combustion analyzer, IR gun
<input type="checkbox"/> Confirm site visit date/time/location
<input type="checkbox"/> Ask battery of pre-visit questions with site contact
<input type="checkbox"/> Loggers to be shipped back? Confirm with site contact

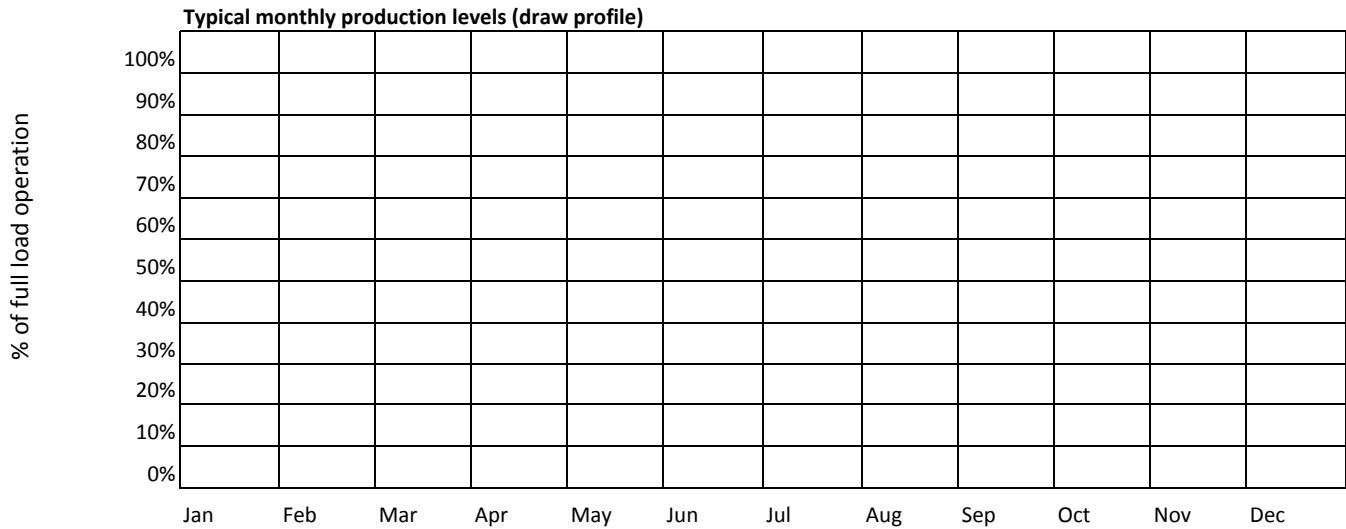
3. Collected Data		
Group	Parameter	Value
Piping	Est. length (ft)	
	Avg. diameter (in)	
	Material †	
	Thickness (in)	
Insulation	Est. length (ft)	
	Thickness (in)	
	Material ††	
	Quality (good/fair/poor)	
Fluid	Fluid type	
	Gauge temperature (F)	
	Gauge pressure (psi)	
Baseline	% pipe previously insulated	
	Pre insulated pipe length (ft)	
	Pre insulated thickness (in)	
	Pre insulation material ††	
	Pre insulation quality	

† Examples include cast iron, various grades of steel, copper

†† Examples include fiberglass, cellular glass, polystyrene

4. Spot Measurements		
Group	Parameter	Value
Boiler information	Make/Model	
	Fuel type	
	Input (Btu/hr)	
	Output (Btu/hr)	
	EMS combustion efficiency	
	Test combustion efficiency	
Bare pipe temperature	Fluid gauge temperature	
	Infrared gun temperature	
	Logger check temperature	
Insulation surface temp	Infrared gun temperature	
	Logger check temperature	
Ambient temperature	Thermostat temperature	
	Logger check temperature	

* OSHA requires insulation on pipes > 140F located within 7' of floor/working level or within 15" of stairs, ramps, ladders

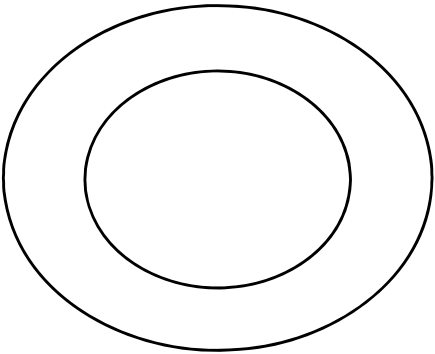


Typical weekly operating schedules (shade cells)

	12:00 AM	2:00 AM	4:00 AM	6:00 AM	8:00 AM	10:00 AM	12:00 PM	2:00 PM	4:00 PM	6:00 PM	8:00 PM	10:00 PM	12:00 AM
Sunday													
Monday													
Tuesday													
Wednesday													
Thursday													
Friday													
Saturday													

System Diagram (Identify load, supply, logger locations)

Pipe Insulation Cross-Section Diagram - Indicate possible gaps or corrosion on incented or preexisting insulation:



Baseline and spillover questions:

- Was the incented insulation installed on new pipes? Indicate % new pipes in overall project.
- Were the preexisting pipes insulated? Indicate % insulated and its details.
- Are pipes required to be insulated per OSHA (see footnote on other side). Estimate % requiring insulation.
- Discuss any OSHA requirement and how the facility would have complied absent the IOU program.
- Was additional pipe insulation installed that was not incented? Gather details on this insulation and the facility decisions behind its install.

Appendix C

Phone Survey Banners

	ALL	PG&E (%)	SCG (%)
<FM050> What is the main business activity at this facility?			
Restaurant/Food Service	1.38	0.00	1.85
Agricultural (farms, greenhouses)	1.66	2.35	1.42
Retail Stores	19.27	0.00	25.89
Warehouse	2.70	0.00	3.62
Health Care	2.61	0.00	3.51
Education	0.09	0.00	0.12
Lodging (hotel/rooms)	3.23	0.00	4.34
Industrial (food processing plant, Manufacturing)	19.57	11.09	22.48
Laundry (Coin Operated, Commercial Laundry Facility, Dry Cleaner)	31.48	49.32	25.34
Condo Assoc./Apartment Mgr. (Garden Style, Mobile Home Park, High-rise, Townhouse)	1.92	0.00	2.58
Public Service (fire, police, postal, military)	0.42	0.00	0.56
Other	15.69	37.24	8.28
<i>n</i>	49	14	35
<FM050B> Which of the following types of restaurants or food service best describes this facility?			
Caterer	46.54	0.00	46.54
Other	53.46	0.00	53.46
<i>n</i>	2	0	2
<FM050D> What type of agricultural facility is this?			
Dairy / Ranch	44.66	0.00	70.02
Other	55.34	100.00	29.98
<i>n</i>	3	1	2

<FM050F> Which of the following types of warehouses best describes this facility?			
Industrial (food processing plant, Manufacturing)	100.00	0.00	100.00
<i>n</i>	<i>1</i>	<i>0</i>	<i>1</i>
<FM050G> Which of the following types of health care centers best describes this facility?			
Hospital	42.43	0.00	42.43
Alcohol/Drug Treatment / Rehabilitation	57.57	0.00	57.57
<i>n</i>	<i>2</i>	<i>0</i>	<i>2</i>
<FM050H> Which of the following types of educational centers best describes this facility?			
College or University	100.00	0.00	100.00
<i>n</i>	<i>3</i>	<i>0</i>	<i>3</i>
<FM050I> Which of the following types of lodging best describes this facility?			
Hotel	100.00	0.00	100.00
<i>n</i>	<i>1</i>	<i>0</i>	<i>1</i>
<FM050L> Which of the following types of buildings best describes this facility?			
Assembly / Light Manufacturing	2.29	14.20	0.18
Food Processing Plant	44.79	85.80	37.53
Commercial Brewery / Winery	1.67	0.00	1.97
Industrial Process	43.46	0.00	51.16
Other	7.79	0.00	9.16
<i>n</i>	<i>14</i>	<i>3</i>	<i>11</i>
<FM050M> What type of laundry facility is this?			
Coin Operated	1.87	0.00	2.89
Commercial Laundry Facility	62.72	0.00	97.11
Dry Cleaners	35.41	100.00	0.00
<i>n</i>	<i>10</i>	<i>6</i>	<i>4</i>
<CC2A> What is the total square footage at this facility?			
Between 1500 and 5000 sq. ft.	16.56	63.32	0.48
Between 5000 and 10,000 sq. ft.	0.14	0.00	0.19
Between 10,000 and 25,000 sq. ft.	6.49	0.00	8.72
Between 25,000 and 50,000 sq. ft.	8.99	5.79	10.09
Between 50,000 and 75,000 sq. ft.	4.43	0.00	5.95
Between 75,000 and 100,000 sq. ft.	4.48	0.00	6.01
Over 100,000 sq. ft. (Ag area)	33.28	1.58	44.18

Don't Know	25.64	29.32	24.37
<i>n</i>	49	14	35
<CC2B> Would you say that the floor area is...			
Between 1500 and 5000 sq. ft.	0.16	0.00	0.22
Between 25,000 and 50,000 sq. ft.	8.78	0.00	12.42
Between 50,000 and 75,000 sq. ft.	3.17	0.96	4.08
Between 75,000 and 100,000 sq. ft.	11.99	40.99	0.00
Over 100,000 sq. ft. (Ag area)	30.59	8.00	39.94
Don't Know	45.31	50.05	43.34
<i>n</i>	14	5	9
<CC2C> Is the entire floor area of this facility heated or cooled?			
Yes	22.01	24.40	21.19
No	75.19	64.66	78.81
Don't Know	2.80	10.94	0.00
<i>n</i>	49	14	35
<CC2D> What percentage of the floor area is heated or cooled at this facility?			
0 Percent	24.50	29.18	23.18
Between 0 and 15 Percent	43.37	0.00	55.61
Between 15 and 30 Percent	5.99	0.43	7.56
Between 30 and 45 Percent	0.42	0.00	0.54
Between 45 and 60 Percent	2.91	13.23	0.00
Between 60 and 80 Percent	10.23	0.00	13.12
Don't Know	12.58	57.16	0.00
<i>n</i>	36	9	27
<CC3A> Is your space heated using electricity or gas?			
Electricity	34.61	4.07	43.62
Gas	51.05	73.12	44.53
Both Gas and Electricity	6.92	8.25	6.53
No Heating	3.32	14.56	0.00
Other	4.10	0.00	5.31
<i>n</i>	36	8	28
<C0> About what percentage of your operating costs does energy account for?			
Less than 1 percent	3.23	0.00	4.34
1 to 2 percent	5.35	5.79	5.20
3 to 5 percent	7.09	7.52	6.95
6 to 10 percent	4.91	0.28	6.51
11 to 15 percent	6.44	19.25	2.03
16 to 20 percent	4.33	0.00	5.82
21 to 50 percent	3.97	15.53	0.00

Over 51 percent	20.38	0.00	27.38
Don't Know	44.29	51.63	41.77
<i>n</i>	49	14	35
<CC4> Does your business own, lease or manage the facility?			
Own	59.38	32.76	68.54
Lease/Rent	28.08	30.28	27.33
Manage	1.47	0.00	1.97
Don't Know	11.06	36.96	2.16
<i>n</i>	49	14	35
<C5> How many locations does your organization have. Is it....			
This facility only	54.88	73.23	48.58
2 to 4 locations	8.30	13.33	6.57
5 to 10 locations	2.37	1.58	2.64
11 to 25 locations or	7.21	3.73	8.41
More than 25 locations	25.62	8.13	31.64
Don't Know	1.61	0.00	2.16
<i>n</i>	49	14	35
<CC6> How active a role does your organization take in making purchase decisions related to energy using equipment at this facility? Would you say you are...			
Very active – involved in all phases and have veto power	54.08	35.02	60.63
Somewhat active-we approve decisions and provide some input and review	20.95	3.51	26.95
Slightly active-we have a voice but it's not the dominant voice	4.46	12.02	1.86
OR not active at all- our firm doesn't get involved in these issues	9.53	6.51	10.56
Don't Know	10.99	42.94	0.00
<i>n</i>	49	14	35
<CC8> In what year was your facility built?			
After 2000	10.33	12.02	9.74
In the 1990's	2.36	5.98	1.12
1980's	2.68	6.07	1.52
1970's	26.77	8.84	32.94
1960's	0.03	0.00	0.04
1950's	11.28	36.96	2.45
Before 1950	4.65	2.88	5.26
Don't Know	41.90	27.25	46.93
<i>n</i>	49	14	35
<CC10> If don't know, would you say it was...			
1990's	23.78	13.69	25.79
1980's	9.37	22.79	6.70

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1970's	19.08	0.00	22.89
1960's	12.20	0.00	14.63
1950's	1.77	0.00	2.12
Before 1950	16.19	0.00	19.42
Don't Know	17.61	63.52	8.45
<i>n</i>	22	5	17
<CC11> In what year was this facility last remodeled?			
Between 2008 and present	56.55	31.45	65.18
Between 2000 and 2007	9.31	0.28	12.41
During the 1990's	1.63	0.00	2.19
Before the 1990's	2.03	7.80	0.04
Don't Know	30.48	60.47	20.17
<i>n</i>	49	14	35
<CC11A> Would you say the last remodeling was done ...			
Between 2010 and present	33.13	61.12	4.29
Between 2000 and end of 2005	7.40	0.00	15.02
During the 1990's	18.32	0.00	37.21
Don't Know	41.15	38.88	43.49
<i>n</i>	12	5	7
<CC12a> In what year was this organization established at this location?			
Between 2009 and present	18.45	0.28	24.69
Between 2006 and 2008	8.69	13.59	7.01
Between 2000 and 2005	22.43	2.86	29.16
In the 1990's	16.33	22.19	14.32
1980's	1.84	7.10	0.03
1970's	6.73	0.00	9.04
1960's	0.95	2.35	0.47
Before 1950	4.61	0.00	6.20
Don't Know	19.97	51.63	9.08
<i>n</i>	49	14	35
<CC12b> If don't know, would you say it was...			
In the 1990s	4.78	7.23	0.00
In the 1980s	8.06	0.00	23.80
In the 1970s	32.38	21.19	54.26
Before 1960	54.78	71.58	21.94
<i>n</i>	9	3	6
<V1> Now I would like to find out, did you use a contractor/vendor to install the measures that were installed through the Program?			
Yes	61.92	61.19	62.17
No	38.08	38.81	37.83

<i>n</i>	49	14	35
<V2> How did you come into contact with the contractor/vendor?			
They contacted you	23.05	32.47	19.86
You contacted them	18.12	0.00	24.25
You had worked with them before	54.21	49.64	55.76
Other	0.10	0.00	0.13
Don't Know	4.52	17.88	0.00
<i>n</i>	42	11	31
<V2A> In relation to this project, did the vendor/contractor approach you about your energy efficient equipment retrofit/installation?			
Yes	25.30	40.42	20.74
No	66.19	59.58	68.19
Don't Know	8.51	0.00	11.08
<i>n</i>	20	5	15
<V2B> On a scale of 0 - 10, with 0 being very unlikely and 10 being very likely. How likely is it that your organization would have retrofitted install this equipment had the contractor/vendor not contacted you?			
4	3.24	0.00	5.07
6	21.88	0.00	34.25
9	6.72	18.61	0.00
10 Very Likely	44.12	38.20	47.48
Zero Not at All Likely	12.40	34.31	0.00
Don't Know	11.64	8.89	13.20
<i>n</i>	13	7	6
<V3> Did the contractor/vendor tell you about or recommend the program?			
Yes	20.34	32.93	16.08
No	63.24	67.07	61.95
Don't Know	16.42	0.00	21.98
<i>n</i>	42	11	31
<V4> Prior to coming into contact with the contractor/vendor, did you organization have plans to replace/install this equipment?			
Yes	42.15	29.68	50.78
No	57.85	70.32	49.22
<i>n</i>	13	5	8
<V4A> On a scale of 0 - 10, with 0 being very unlikely and 10 being very likely. How likely is it that your organization would have retrofitted install this equipment had the contractor/vendor not recommended it?			
3	9.63	17.42	4.24
4	5.85	0.00	9.91
6	17.73	14.18	20.19
8	22.05	29.68	16.75

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10 Very Likely	42.08	32.21	48.91
Zero Not at All Likely	2.66	6.50	0.00
<i>n</i>	<i>13</i>	<i>5</i>	<i>8</i>
<V4B> On a scale of 0 - 10, with 0 being very unlikely and 10 being very likely. How likely is it that your organization would have installed install this equipment with the same level of efficiency if the contractor/vendor had not recommended to do so?			
3	2.50	0.00	4.24
4	14.64	0.00	24.79
8	43.08	29.68	52.37
10 Very Likely	31.31	49.63	18.60
Zero Not at All Likely	2.66	6.50	0.00
Don't Know	5.81	14.18	0.00
<i>n</i>	<i>13</i>	<i>5</i>	<i>8</i>

<V40> On a scale of 0 - 10, with 0 being very unlikely and 10 being very likely. How important was the input from the contractor you worked with in deciding which specific equipment to install? Was it ...			
2	5.88	0.00	9.95
7	6.96	0.00	11.78
8	47.78	43.87	50.50
9	8.79	0.00	14.88
10 Extremely Important	30.59	56.13	12.89
<i>n</i>	<i>13</i>	<i>5</i>	<i>8</i>
<AP9> How did you FIRST learn about the Utility's program?			
Program literature	2.25	0.00	3.03
Account representative	42.39	14.37	52.02
Program Approved Vendor	2.28	0.28	2.97
Program representative	7.69	12.52	6.03
Utility or program website	8.35	5.79	9.23
Word of mouth	5.64	6.49	5.35
Previous experience with it	13.78	36.96	5.82
Contractor	7.71	19.87	3.53
Other	0.03	0.00	0.04
Don't Know	9.87	3.73	11.99
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<AP9A> How else did you learn about Utility's program?			
Bill insert	1.00	3.65	0.00

Program literature	0.00	0.00	0.00
Account representative	7.25	0.00	9.98
Program Approved Vendor	2.99	0.00	4.11
Program representative	0.00	0.00	0.00
Utility or program website	1.23	0.00	1.69
Trade publication	0.00	0.00	0.00
Conference	0.00	0.00	0.00
Newspaper article	0.00	0.00	0.00
Word of mouth	4.88	15.10	1.03
Previous experience with it	3.17	0.00	4.36
Company used it at other locations	0.00	0.00	0.00
Contractor	0.00	0.00	0.00
Result of an audit	0.00	0.00	0.00
Part of larger expansion or remodeling effort	0.00	0.00	0.00
Television	0.00	0.00	0.00
No Other Sources	79.34	81.25	78.61
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.15	0.00	0.21
Television	0.00	0.00	0.00
<i>n</i>	45	13	32
<N33> You mentioned that you have an Utility Account Rep. Can you give me his or her name?			
Don't have Account Rep	74.88	0.00	100.00
Record information	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	25.12	100.00	0.00
<i>n</i>	3	1	2
<A1B> According to our records, your organization also received an audit from your Utility. Is this correct?			
.	0.00	0.00	0.00
<i>n</i>	0	0	0
<ID0> To the best of your knowledge, has the facility located at this address received a Utility-sponsored energy audit within the past 3 years?			
Yes	30.92	14.60	36.53
No	46.83	67.96	39.57
Don't Know	22.25	17.43	23.90
<i>n</i>	49	14	35
<ID1> Are you aware of any programs, other than the one we mentioned early, or resources that are designed to help organizations like yours reduce its energy bills?			
Yes	71.75	77.96	69.62

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No	20.39	22.04	19.82
Don't Know	7.86	0.00	10.56
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<ID2> What types of programs can you recall?			
Rebates/incentives (include mentions of SPC and Express)	18.42	44.68	14.37
Building Commissioning (retrocommissioning, Monitoring based commissioning)	0.72	5.08	0.04
Business energy audits and feasibility studies	10.26	5.08	11.06
Energy Centers (Pacific Energy Center, SCE CTAC)	14.96	26.01	13.26
Seminars, classes, and workshops	0.68	5.08	0.00
Solar or other Distributed Generation Programs (CSI, SGIP)	1.76	5.08	1.25
Demand Response Programs (Flex Your Power, Peak Choice, BIP, DBP, Aggregator, PDP)	12.99	5.08	14.21
Upstream HVAC and Motors Program	16.90	0.00	19.50
VFD programs/VFD rebates	0.00	0.00	0.00
Lighting programs	12.83	55.32	6.28
Other programs	45.20	0.00	52.17
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	<i>22</i>	<i>5</i>	<i>17</i>
<ID3> Has your Account Representative, or any Program Staff or Program Vendors discussed solar, wind or other self-generation equipment opportunities with you?			
Yes, Account Representative	85.01	52.02	89.27
Yes, Program Staff	1.30	10.29	0.14
Yes, Program Vendor	7.22	0.00	8.15
Refused	0.00	0.00	0.00
Don't Know	7.73	47.98	2.54
<i>n</i>	<i>22</i>	<i>4</i>	<i>18</i>
<ID3A> Has your Account Representative, Program Staff, or Program Vendors discussed Demand Reduction programs, technologies, or opportunities with you?			
Yes, Account Representative	67.37	21.65	91.50
Yes, Program Staff	5.15	4.28	5.61
Yes, Program Vendor	3.67	0.00	5.61
Refused	0.00	0.00	0.00
Don't Know	32.63	78.35	8.50
<i>n</i>	<i>21</i>	<i>5</i>	<i>16</i>
<PI3> Our records indicate that <QTY> feet of pipe insulation was installed at your facility. Is this about right?			
Yes	60.51	56.55	61.87
No	31.63	43.45	27.57
Don't Know	7.86	0.00	10.56

<i>n</i>	49	14	35
<PI3a> How many total linear feet of pipe insulation is present at your facility? Your best estimate is okay.			
100	23.94	85.06	0.00
200	0.25	0.00	0.34
250	48.79	0.00	67.91
600	4.21	14.94	0.00
2303	19.90	0.00	27.70
3000	2.91	0.00	4.05
<i>n</i>	6	2	4
<PI7> Was the pipe insulation installed on new pipes or was it a retrofit of older pipes or both?			
Only New	18.04	12.02	20.11
Only Older	31.67	33.94	30.89
Both New and Older	49.39	50.53	49.00
Don't Know	0.90	3.51	0.00
<i>n</i>	49	14	35
<PI7a> What percentage of the pipe insulation was installed on new pipes?			
20	7.84	0.00	10.62
25	5.45	0.00	7.38
30	0.64	0.00	0.87
50	10.21	5.20	11.98
75	47.04	0.00	63.72
80	3.30	0.00	4.47
90	0.65	0.00	0.88
102	24.87	94.80	0.08
<i>n</i>	16	4	12
<PI7b> How many years old were the pipes receiving the pipe insulation?			
0	9.70	0.00	13.22
1	0.39	0.00	0.53
4	1.98	0.00	2.71
5	1.81	0.00	2.47
6	2.44	7.68	0.54
8	0.12	0.00	0.16
10	9.80	15.73	7.65
15	13.60	0.00	18.54
18	1.96	7.35	0.00
20	26.54	10.23	32.46
25	5.91	8.95	4.81
30	2.37	0.00	3.23
31	0.41	1.55	0.00

38	3.99	0.00	5.43
40	0.05	0.00	0.07
50	0.09	0.33	0.00
82	1.37	0.00	1.86
Don't Know	17.48	48.17	6.32
<i>n</i>	34	12	22
<PI8> Was insulation already present on the pipes before the insulation was installed through the program?			
Yes	18.36	10.73	21.13
No	81.64	89.27	78.87
<i>n</i>	34	12	22
<PI21> Was the existing insulation removed and replaced, or was additional insulation added to existing insulation?			
Old insulation removed and replaced	68.32	100.00	62.47
Additional insulation added over old insulation	10.09	0.00	11.95
Both	21.59	0.00	25.58
<i>n</i>	10	2	8
<PI23> What condition was your old pipe insulation in at the time of the replacement?			
Good	10.67	68.48	0.00
Fair or	31.41	0.00	37.21
Poor	57.91	31.52	62.79
<i>n</i>	10	2	8
<PI25> Are boilers present at your facility?			
Yes	99.93	99.72	100.00
No	0.07	0.28	0.00
<i>n</i>	49	14	35
<PI27> Have the boilers been repaired or replaced since you installed the pipe insulation through the program?			
Yes	26.18	20.07	28.28
No	73.82	79.93	71.72
<i>n</i>	48	13	35
<PI29> How long ago in months was the most recent boiler repair or replacement?			
1	7.37	0.00	9.17
6	13.09	14.28	12.80
7	40.74	54.69	37.35
9	0.08	0.00	0.10
12	7.28	31.03	1.51
16	0.15	0.00	0.19
24	14.01	0.00	17.42
30	2.46	0.00	3.06

60	14.80	0.00	18.41
<i>n</i>	13	3	10
<PI33> Whose idea was it to install new pipe insulation?			
Me or someone at my facility	55.00	84.05	44.23
Contractor	7.30	22.57	1.64
Utility company contact	36.96	1.64	50.05
Manufacturer	0.00	0.00	0.00
Other specify	4.03	0.00	5.52
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	44	13	31
<P35> What percentage of the pipe insulation cost would you estimate the program rebate covered?			
Rebate covered all of the cost	8.96	19.87	5.20
Rebate covered most of the cost	28.19	0.00	37.88
Rebate covered less than half of the cost	41.41	43.17	40.80
Don't Know	21.45	36.96	16.12
<i>n</i>	49	14	35
<P37> How effective was the new pipe insulation in reducing your natural gas bill? Would you say there were...?			
Considerable gas savings	18.43	21.37	17.41
Some gas savings	60.25	27.14	71.64
No noticeable savings	0.60	2.35	0.00
Don't Know	20.72	49.15	10.95
<i>n</i>	49	14	35
<P39> Have you noticed any problems with the pipe insulation since the installation?			
Yes	1.59	6.21	0.00
No	98.41	93.79	100.00
<i>n</i>	49	14	35
<P40> What problems have you noticed since the pipe insulation was installed?			
Describe problems	100.00	100.00	0.00
<i>n</i>	1	1	0
<A3> In your own words, can you tell me why you decided to participate in this program?			
To replace old/outdated install this equipment	4.30	1.58	5.23
As part of a planned remodeling/build-out/expansion	0.00	0.00	0.00
To gain more control over how the equipment was used	0.60	2.35	0.00
Maintenance downtime/associated expenses for old equip were too high	0.00	0.00	0.00
Had process problems and were seeking a solution	0.00	0.00	0.00
To improve install this equipment performance	3.23	0.00	4.34
To improve the quality of the lighting in your facility	0.00	0.00	0.00

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To comply with codes set by regulatory agencies	0.00	0.00	0.00
To improve visibility/plant safety	5.92	0.00	7.96
Comply w/co. policies regarding lighting retrofits/remodeling	1.92	0.00	2.58
To get a rebate from the program	20.68	10.64	24.13
To protect the environment	8.40	10.22	7.77
To reduce energy costs	63.51	92.20	53.65
To reduce energy use/power outages	55.31	55.75	55.16
To update to the latest technology	0.00	0.00	0.00
To improve the comfort level of the faci	0.00	0.00	0.00
100% paid for	0.34	1.31	0.00
Water Conservation	0.00	0.00	0.00
Other	1.50	0.00	2.02
Refused	0.00	0.00	0.00
Don't Know	1.15	0.00	1.54
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<N2> Did your company make the decision to install measure before or after you became aware of rebates/cost reduction available through the program?			
Before	41.11	75.34	29.34
After	48.00	24.66	56.02
Don't Know	10.89	0.00	14.64
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<N3A> On a scale of 1-10 please rate the age or condition of the old measure?			
1 Not at All Important	5.48	0.00	7.37
5	13.34	16.92	12.11
6	2.25	0.00	3.03
7	16.69	5.31	20.61
8	7.17	14.85	4.53
9	0.39	0.00	0.52
10 Extremely Important	8.78	12.63	7.45
Zero Not at All Important	25.14	48.98	16.94
Don't Know	20.76	1.31	27.45
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<N3AA> How, specifically, did this enter into your decision to install this equipment?			
To reduce energy costs	50.63	0.00	50.63
To reduce energy use/power outages	67.98	0.00	67.98
To update to the latest technology	0.00	0.00	0.00
Had process problems and were seeking a solution	0.00	0.00	0.00
As part of a planned remodeling/build-out/expansion	0.00	0.00	0.00
To replace old/outdated equipment	21.49	0.00	21.49
To improve equipment performance	0.00	0.00	0.00

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To improve production as a result of the change in equipment	0.00	0.00	0.00
To improve visibility/plant safety	0.00	0.00	0.00
To improve the comfort level of the facility	0.00	0.00	0.00
To protect the environment	0.00	0.00	0.00
100% paid for	0.00	0.00	0.00
For the rebate	0.00	0.00	0.00
Very Important	0.00	0.00	0.00
Did not effect	0.00	0.00	0.00
Old equipment was too expensive	0.00	0.00	0.00
Other	27.88	0.00	27.88
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	<i>4</i>	<i>0</i>	<i>4</i>
<N3B> On a scale of 1-10 please rate the availability of the program rebate/cost reduction			
3	1.24	0.00	1.65
4	1.39	0.00	1.86
5	5.55	0.29	7.30
6	22.25	38.30	16.93
7	4.69	17.54	0.43
8	2.54	2.43	2.58
9	17.25	16.32	17.56
10 Extremely Important	43.87	25.11	50.09
Zero Not at All Important	0.04	0.00	0.05
Don't Know	1.16	0.00	1.54
<i>n</i>	<i>48</i>	<i>13</i>	<i>35</i>
<N3BB> Why do you give it this rating?			
Cost effectiveness/Payback	81.66	0.00	87.81
It motivated the decision to participate in the program	7.01	100.00	0.00
Needed rebate to participate	9.87	0.00	10.61
Other	1.47	0.00	1.58
<i>n</i>	<i>9</i>	<i>1</i>	<i>8</i>
<N3C> Information provided through...			
4	3.98	0.00	4.52
6	2.90	24.03	0.00
7	3.72	0.00	4.23
8	69.58	10.79	77.66
9	1.11	0.00	1.26
10 Extremely Important	18.40	65.18	11.96
Don't Know	0.32	0.00	0.36
<i>n</i>	<i>14</i>	<i>4</i>	<i>10</i>

<N3CC> Why do you give it this rating?			
Estimated energy savings	96.32	0.00	96.32
Very Important	3.68	0.00	3.68
<i>n</i>	2	0	2
<N3D> Recommendation from an equipment vendor that sold you the measure and/or installed it			
3	1.99	0.00	2.66
4	4.35	0.00	5.82
5	25.90	0.00	34.66
6	6.07	0.00	8.13
7	22.86	35.15	18.70
8	18.47	10.15	21.29
9	6.06	23.98	0.00
10 Extremely Important	12.56	26.88	7.71
Zero Not at All Important	1.74	3.84	1.04
<i>n</i>	42	11	31
<N3E> On a scale of 1-10 please rate your previous experience with energy efficient projects?			
1 Not at All Important	0.14	0.00	0.19
2	6.16	0.00	8.28
5	14.88	10.94	16.24
6	1.54	3.51	0.86
7	2.61	1.58	2.96
8	25.43	42.94	19.41
9	9.50	0.00	12.76
10 Extremely Important	32.33	18.36	37.14
Zero Not at All Important	7.41	22.68	2.16
<i>n</i>	49	14	35
<N3F> On a scale of 1-10 please rate your previous experience with the Utility the program or a similar Utility program?			
1 Not at All Important	0.17	0.00	0.23
4	1.23	0.00	1.65
5	9.16	0.00	12.30
6	2.57	0.00	3.46
7	8.06	12.52	6.53
8	23.86	46.26	16.16
9	7.71	5.98	8.30
10 Extremely Important	41.72	21.64	48.62
Zero Not at All Important	5.11	13.61	2.19
Don't Know	0.42	0.00	0.56
<i>n</i>	49	14	35

<N3G> Information from the program or Utility training course?			
1 Not at All Important	100.00	0.00	100.00
<i>n</i>	<i>1</i>	<i>0</i>	<i>1</i>
<N3GG> What type of information was provided that was related to the project?			
How to use equipment	0.00	0.00	0.00
Information on reducing energy bills	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	<i>0</i>	<i>0</i>	<i>0</i>
<N3GGG> How, specifically, did this enter into your decision to install this equipment?			
Save energy	0.00	0.00	0.00
Very important	0.00	0.00	0.00
Did not effect	0.00	0.00	0.00
Information on new technology	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	<i>0</i>	<i>0</i>	<i>0</i>
<N3H> On a scale of 1-10 please rate Information from the program or Utility marketing materials?			
1 Not at All Important	0.14	0.00	0.19
2	0.42	0.00	0.56
3	1.50	5.86	0.00
4	2.27	5.98	0.99
5	14.54	10.94	15.78
6	12.73	36.96	4.40
7	16.85	1.58	22.10
8	36.39	24.40	40.51
9	4.31	0.00	5.79
10 Extremely Important	8.77	6.49	9.55
Zero Not at All Important	2.09	7.80	0.13
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<N3HH> What type of information was provided that pertained to the project?			
Flyer/Brochure/Pamphlets	2.47	0.00	3.18
Program Approved Vendor	34.44	0.00	44.39
Complete overview/documentation/seminar/training	0.00	0.00	0.00
Proposal costs/ Estimate Quotes	0.00	0.00	0.00
Rebates/Discounts/Incentives	14.05	0.00	18.10
To reduce energy use/power outages	17.65	75.46	0.96

2014 Deemed ESPI Pipe Insulation Impact Evaluation

Account representative	8.99	0.00	11.58
Information about new technology	0.00	0.00	0.00
The website	0.00	0.00	0.00
Other	14.29	0.00	18.41
Refused	0.00	0.00	0.00
Don't Know	10.18	24.54	6.03
<i>n</i>	<i>12</i>	<i>2</i>	<i>10</i>
<N3HHH> How, specifically, did this enter into your decision to install this equipment?			
To reduce energy costs	1.47	0.00	1.81
100% paid for	0.00	0.00	0.00
Program Approved Vendor	15.64	0.00	19.27
Complete overview/documentation/seminar/training	0.00	0.00	0.00
To improve equipment performance	1.47	0.00	1.81
To reduce energy use/power outages	0.00	0.00	0.00
Because of the rebate	9.44	0.00	11.63
Did not effect	18.82	100.00	0.00
Other	45.64	0.00	56.22
Refused	0.00	0.00	0.00
Don't Know	8.99	0.00	11.07
<i>n</i>	<i>9</i>	<i>1</i>	<i>8</i>
<N3J> On a scale of 1-10 please rate standard practice in your business/industry			
5	4.14	18.26	0.00
6	9.12	0.00	11.79
7	23.40	61.68	12.17
8	17.97	0.00	23.25
9	3.87	0.00	5.01
10 Extremely Important	35.10	20.06	39.51
Don't Know	6.40	0.00	8.28
<i>n</i>	<i>15</i>	<i>3</i>	<i>12</i>
<N3L> A suggestion by your account representative			
4	1.51	0.00	1.64
5	1.23	16.34	0.00
6	9.49	0.00	10.27
7	6.82	0.00	7.37
8	14.63	0.00	15.82
9	19.07	0.00	20.62
10 Extremely Important	47.25	83.66	44.29
<i>n</i>	<i>17</i>	<i>2</i>	<i>15</i>

<N3LL> What did they recommend?			
Replacement of lighting	6.84	0.00	7.42
To reduce energy costs	68.97	0.00	74.81
No recommendation	0.00	0.00	0.00
Rebates/Discounts/Incentives	0.00	0.00	0.00
100% paid for	0.00	0.00	0.00
Recommendation of low pressure nozzles/sprinklers	0.00	0.00	0.00
Other	22.55	100.00	15.99
Refused	0.00	0.00	0.00
Don't Know	1.64	0.00	1.77
<i>n</i>	7	1	6
<N3LLL> How, specifically, did this enter into your decision to install this equipment?			
To reduce energy costs	0.00	0.00	0.00
To reduce energy use/power outages	0.00	0.00	0.00
To replace old/outdated equipment	0.00	0.00	0.00
Played an important role/decision	56.76	0.00	61.66
To protect the environment	0.00	0.00	0.00
100% paid for	0.00	0.00	0.00
Did not effect	20.31	0.00	22.07
Because of the rebate	11.19	0.00	12.15
Other	11.74	100.00	4.12
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	6	1	5
<N3M> How, specifically, did this enter into your decision to install this equipment?			
5	9.12	0.00	11.79
6	12.25	0.00	15.84
7	20.39	61.68	8.28
8	17.40	20.06	16.62
9	11.39	18.26	9.37
10 Extremely Important	29.46	0.00	38.10
<i>n</i>	15	3	12
<N3MM> How, specifically, did this enter into your decision to install this equipment?			
Cost effectiveness	2.92	0.00	3.89
To reduce energy use/power outages	9.39	20.06	5.84
100% paid for	0.00	0.00	0.00
To protect the environment	0.00	0.00	0.00
To improve the comfort level of the facility	0.00	0.00	0.00
To replace old/outdated equipment	0.00	0.00	0.00
Did not effect	12.79	0.00	17.05

Decision made by management	31.37	0.00	41.79
Rebate/incentive	5.97	0.00	7.95
Following official mandates	7.04	0.00	9.39
Because of a recommendation	0.00	0.00	0.00
Other	8.15	18.26	4.78
Refused	0.00	0.00	0.00
Don't Know	22.38	61.68	9.31
<i>n</i>	14	3	11
<N3N> Please rate the degree of importance of payback or return on investment of installing this equipment...?			
5	0.91	0.28	1.13
6	12.01	5.79	14.15
7	10.38	0.00	13.95
8	14.31	8.33	16.37
9	9.11	12.02	8.11
10 Extremely Important	20.26	32.46	16.06
Zero Not at All Important	9.79	38.27	0.00
Don't Know	23.23	2.86	30.24
<i>n</i>	49	14	35
<N3O> Please rate the degree of importance of improving quality?			
3	7.34	0.00	9.86
4	0.74	0.00	0.99
5	12.16	0.00	16.34
6	3.52	0.00	4.74
7	2.20	3.73	1.67
8	16.51	10.94	18.42
9	6.96	7.56	6.75
10 Extremely Important	28.66	67.81	15.20
Zero Not at All Important	1.91	7.10	0.13
Don't Know	20.00	2.86	25.89
<i>n</i>	49	14	35
<N3OO> How, specifically, did this enter into your decision to install this equipment?			
To reduce energy costs	36.47	36.29	36.60
To reduce energy use/power outages	0.05	0.00	0.08
100% paid for	0.00	0.00	0.00
To update to the latest technology	2.60	0.00	4.31
To replace old/outdated equipment	0.11	0.00	0.18
To improve visibility/plant safety	0.00	0.00	0.00
Had process problems and were seeking a solution	0.82	2.06	0.00
No change in appearance/lighting	0.00	0.00	0.00

To improve the comfort level of the facility	6.34	0.00	10.53
To protect the environment	0.00	0.00	0.00
New lights had longer life span	0.00	0.00	0.00
Did not effect	5.39	4.14	6.21
For the rebate	1.75	0.00	2.91
Other	30.36	57.50	12.39
Refused	0.00	0.00	0.00
Don't Know	17.38	0.00	28.87
<i>n</i>	35	11	24
<N3P> Compliance with state or federal regulations or standards such as Title 24?			
.	0.00	0.00	0.00
<i>n</i>	0	0	0
<N3PP> How, specifically, did this enter into your decision to install this equipment?			
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	0	0	0
<N3R> Compliance with your organization's normal remodeling or replacement practices?			
5	100.00	0.00	100.00
<i>n</i>	1	0	1
<N3RRR>What is your normal cycle in number of years for which you typically retrofit your equipment to comply with your organization's normal remodeling or equipment replacement practices?			
.	0.00	0.00	0.00
<i>n</i>	0	0	0
<N3RR> How, specifically, did this enter into your decision to install this equipment?			
Improve equipment	0.00	0.00	0.00
Save on energy bills	0.00	0.00	0.00
Compliance with mandates	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	0	0	0
<N3SS> Using the same zero to 10 scale, how would you rate the influence of this factor?			
9	5.94	0.00	5.94
10 Extremely Important	94.06	0.00	94.06
<i>n</i>	3	0	3
<P1> What financial calculations does your company typically make before proceeding with the installation of install this equipment like you installed through the program?			
Payback	36.86	18.26	42.32

Return on Investment (ROI)	71.64	38.32	81.41
To reduce energy costs	0.00	0.00	0.00
To improve equipment performance	0.00	0.00	0.00
100% paid for	0.00	0.00	0.00
To reduce energy use/power outages	0.00	0.00	0.00
To replace old/outdated equipment	0.00	0.00	0.00
Other	9.41	0.00	12.17
Refused	13.99	61.68	0.00
Don't Know	1.70	0.00	2.20
<i>n</i>	<i>15</i>	<i>3</i>	<i>12</i>
<P2A> What is your threshold in terms of the payback or return on investment your company uses before deciding to proceed with an investment?			
6 months to 1 year	88.57	100.00	87.12
1 to 2 years	5.90	0.00	6.64
2 to 3 years	2.96	0.00	3.33
Over 5 years	2.58	0.00	2.91
<i>n</i>	<i>5</i>	<i>1</i>	<i>4</i>
<P3> Did the rebate move your project within this acceptable range?			
Yes	75.20	38.32	86.01
No	24.80	61.68	13.99
<i>n</i>	<i>15</i>	<i>3</i>	<i>12</i>
<P4> On a scale of 0 to 10, with a 10 meaning a "Very Important" and a 0 meaning "Not at all important", how important in your decision was it that the project was now in the acceptable range?			
6	37.91	0.00	42.86
7	5.30	0.00	5.99
8	25.35	0.00	28.67
9	17.45	52.34	12.90
10 Very Important	13.99	47.66	9.59
<i>n</i>	<i>12</i>	<i>2</i>	<i>10</i>
<N41> How many of the ten points would you give to the importance of the program in your decision?			
1	0.14	0.00	0.19
3	10.19	0.00	13.69
4	15.52	48.98	4.02
5	9.75	7.67	10.47
6	10.54	10.94	10.40
7	14.60	3.51	18.41
8	36.25	19.83	41.89
9	1.43	2.86	0.94

10	1.59	6.21	0.00
<i>n</i>	49	14	35
<N42> And how many points would you give to all of these other factors?			
0	1.59	6.21	0.00
1	1.43	2.86	0.94
2	36.25	19.83	41.89
3	14.60	3.51	18.41
4	10.54	10.94	10.40
5	9.75	7.67	10.47
6	15.52	48.98	4.02
7	10.19	0.00	13.69
9	0.14	0.00	0.19
<i>n</i>	49	14	35
<N41p> How many of the ten points would you give to the importance of the program in your decision?			
0	1.35	2.49	0.57
1	0.35	0.00	0.58
2	0.79	0.00	1.32
3	15.35	0.00	25.69
5	5.08	3.72	5.99
6	6.90	5.91	7.58
7	30.80	58.52	12.12
8	28.72	9.16	41.90
9	1.74	0.00	2.91
10	8.93	20.19	1.34
<i>n</i>	30	8	22
<N42p> And how many points would you give to all of these other factors?			
0	8.93	20.19	1.34
1	1.74	0.00	2.91
2	28.72	9.16	41.90
3	30.80	58.52	12.12
4	6.90	5.91	7.58
5	5.08	3.72	5.99
7	15.35	0.00	25.69
8	0.79	0.00	1.32
9	0.35	0.00	0.58
10	1.35	2.49	0.57
<i>n</i>	30	8	22

<N5> Using a likelihood scale from 0 to 10, what is the likelihood that you would have installed exactly the same program qualifying install this equipment that you did in this project?			
1 Not at All Likely	8.56	0.00	14.87
2	3.53	2.22	4.49
3	9.78	0.00	16.98
5	0.07	0.00	0.12
6	4.48	0.00	7.78
7	23.00	15.42	28.58
8	10.84	0.00	18.83
9	22.08	52.08	0.00
10 Extremely Likely	13.95	21.53	8.36
Zero Not at All Likely	3.71	8.75	0.00
<i>n</i>	21	7	14
<N5AA> Using a likelihood scale from 0 to 10, what is the likelihood that you would have installed exactly the same install this equipment at the same time as you did?			
3	0.04	0.00	0.04
4	20.90	0.00	23.77
5	0.57	0.00	0.65
6	3.98	0.00	4.53
7	0.13	1.05	0.00
8	3.39	0.00	3.86
9	0.25	0.00	0.28
10 Extremely Likely	29.08	69.35	23.55
Zero Not at All Likely	40.37	18.89	43.32
Don't Know	1.29	10.71	0.00
<i>n</i>	27	6	21
<N5A> Will you explain in your own words, the role the rebate played in your decision to install this efficient equipment?			
Other	100.00	100.00	0.00
<i>n</i>	1	1	0
<NN5AA> Would you like for me to change your score on the importance of the rebate that you gave a rating of <N3B> and/or change your rating on the likelihood you would install the same equipment without the rebate which you gave a rating of <N5> and/or			
No change	100.00	100.00	0.00
<i>n</i>	1	1	0
<N5B> If the program had not been available, what is the likelihood that you would have done this project at the same time as you did?			
2	13.31	2.22	21.47
5	20.95	0.00	36.37
6	5.59	4.95	6.07
7	10.00	23.58	0.00

8	10.99	8.43	12.87
10 Extremely Likely	26.90	52.08	8.36
Zero Not at All Likely	12.27	8.75	14.87
<i>n</i>	21	7	14
<TD1> If the program had not been available, how likely is it that you would have replaced your existing equipment within one year of when you did?			
Definitely would have within one year	17.90	27.91	14.04
Probably would have (within one year)	18.61	0.00	25.78
50-50 chance you would (within one year)	39.67	32.18	42.56
Probably not (within one year)	7.37	22.89	1.39
Definitely not (within one year)	11.71	0.00	16.22
Don't Know	4.73	17.02	0.00
<i>n</i>	18	6	12
<TD2> If the program had not been available, how likely is it that you would have replaced your existing equipment within three years of when you did?			
Definitely would have within three years	0.12	0.00	0.15
Probably would have (within three years)	64.10	58.43	65.49
50-50 chance you would (within three yea	12.42	0.00	15.48
Probably not (within three years)	8.22	41.57	0.00
Definitely not (within three years)	15.14	0.00	18.87
<i>n</i>	13	3	10
<TD3> If the program had not been available, how likely is it that you would have replaced your existing equipment within five years of when you did?			
Definitely would have within five years	61.19	58.43	61.87
Probably would have (within five years)	14.12	0.00	17.61
50-50 chance you would (within five year	16.46	0.00	20.53
Probably not (within five years)	8.23	41.57	0.00
<i>n</i>	12	3	9
<N9BB> you could explain in your own words the role the age/condition of the existing equipment played in your decision to install this new measure?			
To reduce energy costs	0.00	0.00	0.00
To reduce energy use/power outages	0.00	0.00	0.00
To update to the latest technology	0.00	0.00	0.00
Maintenance cost of equipment	0.00	0.00	0.00
Age didn't make a big impact	0.00	0.00	0.00
Had process problems and were seeking a solution	0.00	0.00	0.00
To improve equipment performance	0.00	0.00	0.00
To replace old/outdated equipment	0.00	0.00	0.00
Rebates/Discounts/Incentives	0.00	0.00	0.00
100% paid for	0.00	0.00	0.00

Other	37.35	45.75	0.00
Refused	0.00	0.00	0.00
Don't Know	62.65	54.25	100.00
<i>n</i>	5	3	2
<N6> Now I would like you to think one last time about what action you would have taken if the program had not been available. Which of the following alternatives would you have been MOST likely to do?			
Installed fewer units	6.52	2.35	7.96
Install standard efficiency equipment or whatever required by code	7.48	3.51	8.85
Installed equipment more efficient than code but less efficient than what you installed through the program	12.92	10.94	13.59
Done nothing (keep existing equipment as is)	24.92	11.95	29.39
Done the same thing I would have done as I did through the program	39.03	61.45	31.33
Repair/rewind or overhaul the existing equipment	7.28	4.01	8.41
Other	0.36	0.00	0.48
Don't Know	1.48	5.79	0.00
<i>n</i>	49	14	35
<N6A> How many fewer units would you have?			
0-9%	0.00	0.00	0.00
10-19%	0.00	0.00	0.00
20-29%	45.45	0.00	45.45
30-39%	0.00	0.00	0.00
50% or less	0.00	0.00	0.00
40% or less	0.00	0.00	0.00
70% or less	0.00	0.00	0.00
0.0095	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	54.55	0.00	54.55
<i>n</i>	2	0	2
<N6B> Can you tell me what model or efficiency level you were considering as an alternative?			
Other	23.71	100.00	0.00
Refused	0.00	0.00	0.00
Don't Know	76.29	0.00	100.00
<i>n</i>	3	1	2
<ER2> How many more years do you think your equipment would have gone before failing and required replacement?			
10 years	17.36	100.00	0.00
Don't Know	82.64	0.00	100.00
<i>n</i>	2	1	1

<PP1> What do you believe the program's primary strengths are?			
To reduce energy costs	19.86	0.00	23.48
Rebates/Discounts/Incentives	52.53	32.62	56.15
To replace old/outdated equipment	0.00	0.00	0.00
To reduce energy use/power outages	26.69	16.85	28.48
To protect the environment	0.00	0.00	0.00
No charge to the company	1.47	9.53	0.00
To update/upgrade to the latest technology	0.00	0.00	0.00
Professional Installation/Good Rating	0.00	0.00	0.00
To improve equipment performance	0.00	0.00	0.00
Assistance for small business/business owners	5.99	0.00	7.08
Making aware that the program was available	0.00	0.00	0.00
Other	11.45	41.01	6.08
Refused	0.00	0.00	0.00
Don't Know	4.14	0.00	4.89
<i>n</i>	21	6	15
<PP2> What concerns do you have about the program, if any?			
No concerns/None	89.19	73.62	92.09
Highly Satisfied with program/High Ratings on program	0.00	0.00	0.00
Not satisfied with service/Could have done something better	2.05	0.00	2.44
Recommending other options based on experience	1.50	9.53	0.00
Concerns/Questions from customer	5.34	16.85	3.19
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	1.92	0.00	2.28
<i>n</i>	19	6	13
<PP4> On a scale of 0 - 10, where 0 is completely dissatisfied and 10 is completely satisfied, how would you rate your overall satisfaction with the program?			
5	1.30	5.09	0.00
7	4.68	0.28	6.19
8	22.40	40.69	16.11
9	20.65	16.92	21.92
10 Completely Satisfied	50.98	37.02	55.78
<i>n</i>	49	14	35
<PP5> Why do you say that?			
Energy bill too high	0.00	0.00	0.00
Other concerns	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00

	<i>n</i>	<i>0</i>	<i>0</i>	<i>0</i>
<PP5A> Using the same 0 - 10 scale, how would you rate your OVERALL satisfaction with the performance of the energy efficient measures you had installed?				
	7	1.04	3.51	0.19
	8	22.17	5.98	27.74
	9	15.90	13.80	16.62
	10 Completely Satisfied	60.89	76.71	55.45
	<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<PP5> Why do you say that?				
	No concerns/None	0.00	0.00	0.00
	To replace old/outdated equipment	0.00	0.00	0.00
	To reduce energy costs	0.00	0.00	0.00
	Other concerns	0.00	0.00	0.00
	Other	0.00	0.00	0.00
	Refused	0.00	0.00	0.00
	Don't Know	0.00	0.00	0.00
	<i>n</i>	<i>0</i>	<i>0</i>	<i>0</i>
<PP5C> Using the same 0 - 10 scale, how would you rate your OVERALL satisfaction with the quality of the installers' work?				
	7	3.50	10.94	0.94
	8	29.06	18.36	32.74
	9	7.01	5.98	7.36
	10 Completely Satisfied	60.43	64.71	58.96
	<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<PP5D> Why do you say that?				
	Professional Installation/Good Rating	32.30	16.84	37.61
	Not satisfied with service/Could have done something better	6.84	2.86	8.21
	Recommending other options based on experience	5.49	10.94	3.62
	Other	53.12	69.36	47.53
	Don't Know	2.25	0.00	3.03
	<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<PP5E> From your perspective, what if anything could be done to improve the quality of the installers' work?				
	None	48.22	6.37	62.61
	Recommending other options based on experience	4.72	18.46	0.00
	Not satisfied with service/Could have done something better	3.07	12.02	0.00
	Concerns/opinions/Questions relating to installer's work	3.84	0.00	5.16
	Other	30.28	24.62	32.23
	Don't Know	9.86	38.53	0.00
	<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>

<PP8> Please consider your recent experience with the program run by the implementer versus your past experience with the Utility run programs. Are there any differences between the two that stand out? Any there attributes or services that seemed better?			
No Differences	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	0	0	0
<PP10> The program you participated in was run by IOU, have you participated in programs run by governments, institutions, or other independent firms in the past three years? (select all that apply)			
Local Government	14.90	0.00	20.02
State Government or Institution	8.85	1.58	11.35
Independent Firm	26.86	0.00	36.09
No Other Government Programs	60.34	92.64	49.24
Refused	0.00	0.00	0.00
Don't Know	4.20	5.79	3.65
<i>n</i>	49	14	35
<PP12> Please consider your experiences with the program run by an independent firm versus your recent experience with the Utility run program. Are there any differences between the two that stand out? Are there attributes or services that seemed better?			
No Differences	100.00	0.00	100.00
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	3	0	3
<PP14> Please consider your experiences with the program run by a government or institution versus your recent experience with the Utility run program. Are there any differences between the two that stand out? Are there attributes that seemed better?			
No Differences	61.77	0.00	61.77
PG&E was simpler/easier to work with. Recommended.	0.00	0.00	0.00
Edison offers better service and support. Recommended.	0.00	0.00	0.00
Other	38.23	0.00	38.23
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	3	0	3
<PP3> Do you have any comments on the current incentive structure of the program?			
No Comments	70.21	96.81	61.53
Highly Satisfied with program/High Ratings on program	0.79	3.19	0.00
Recommending other options based on experience	0.00	0.00	0.00
Questions/Concerns from customer	27.27	0.00	36.18

Not satisfied with service/Could have done something better	0.00	0.00	0.00
Other	1.73	0.00	2.29
Refused	0.00	0.00	0.00
Don't Know	0.00	0.00	0.00
<i>n</i>	45	11	34
<LT2> For how many years have you been participating in Utility's energy efficiency program(s)?			
1	11.77	0.00	14.55
2	31.85	0.00	39.38
3	12.26	0.00	15.16
5	6.75	0.00	8.35
10	6.49	0.00	8.03
15	5.72	0.00	7.07
20	4.37	22.84	0.00
25	14.75	77.16	0.00
99	6.04	0.00	7.47
<i>n</i>	13	2	11
<LT3> During this time, how many times has your organization participated in these program(s)?			
7 to 10 times, or more	6.75	0.00	8.35
4 to 7 times	9.92	0.00	12.26
2 to 4 times	16.63	22.84	15.16
less than 2 times	49.01	0.00	60.59
Refused	14.75	77.16	0.00
Don't Know	2.94	0.00	3.64
<i>n</i>	13	2	11
<CA6> What type of equipment did you install through this (these) program(s)?			
Indoor lighting	5.31	100.00	0.00
Cooling equipment	0.00	0.00	0.00
Natural gas equipment (Water heater/furnace/appliances)	43.47	0.00	45.90
Insulation or windows	0.00	0.00	0.00
Refrigeration	11.68	0.00	12.33
Industrial process equipment	0.00	0.00	0.00
Greenhouse heat curtains	0.00	0.00	0.00
Food Service Equipment	8.20	0.00	8.66
Outdoor Lighting	5.31	100.00	0.00
Occupancy Sensors	0.00	0.00	0.00
Thermostats	0.00	0.00	0.00
Outdoor Lighting	0.00	0.00	0.00
Irrigation Equipment	5.10	0.00	5.39

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LED Lighting	0.00	0.00	0.00
Solar Panel	0.00	0.00	0.00
HVAC	0.00	0.00	0.00
Other	59.98	0.00	63.34
Refused	0.00	0.00	0.00
Don't Know	2.78	0.00	2.94
<i>n</i>	<i>10</i>	<i>1</i>	<i>9</i>
<LT6> What factors led you to participate in these program(s)?			
To reduce energy costs	27.04	22.84	28.31
To reduce energy use/power outages	59.92	0.00	77.95
To get a rebate from the program	0.00	0.00	0.00
Word of Mouth	0.00	0.00	0.00
Program Approved Vendor	0.00	0.00	0.00
To update to the latest technology	1.39	0.00	1.81
To replace old/outdated equipment	5.08	0.00	6.61
To improve equipment performance	0.00	0.00	0.00
To improve the comfort level of the facility	0.00	0.00	0.00
To improve efficiency and effectiveness	6.92	0.00	9.00
Free program	0.00	0.00	0.00
Other	0.00	0.00	0.00
Refused	17.85	77.16	0.00
Don't Know	4.94	0.00	6.43
<i>n</i>	<i>10</i>	<i>2</i>	<i>8</i>
<LT7> And exactly how did that experience help to convince you to install this install this equipment?			
Positive experience	0.00	0.00	0.00
To reduce energy use/power outages	0.00	0.00	0.00
To reduce energy costs	0.00	0.00	0.00
Rebates/Discounts/Incentives/ROI	0.00	0.00	0.00
To improve equipment performance	0.00	0.00	0.00
To update to the latest technology	0.00	0.00	0.00
100% paid for	0.00	0.00	0.00
Not satisfied with service/Could have done something better	0.00	0.00	0.00
Describe how experience helped to convin	49.97	22.84	58.14
Refused	17.85	77.16	0.00
Don't Know	32.17	0.00	41.86
<i>n</i>	<i>10</i>	<i>2</i>	<i>8</i>

<LT8> Have these programs had any long-term influence on your organization's energy efficiency related practices and policies that go beyond the immediate effect of incentives on individual projects?			
Yes	100.00	0.00	100.00
<i>n</i>	3	0	3
<LT9> Has your organization developed a specification policy for the selection of energy-efficient equipment?			
Yes	100.00	0.00	100.00
<i>n</i>	3	0	3
<LT10> Has your organization assigned responsibility for controlling energy usage and costs to any of the following?			
An in-house staff person	65.69	0.00	65.69
A group of staff	34.31	0.00	34.31
<i>n</i>	3	0	3
<LT11> Does your organization have any internal incentive or reward policies for business units or staff responsible for managing energy costs?			
Yes	25.19	0.00	25.19
Don't Know	74.81	0.00	74.81
<i>n</i>	3	0	3
<LC7> How do these incentive/reward structures work?			
Other	0.00	0.00	0.00
Refused	0.00	0.00	0.00
Don't Know	100.00	0.00	100.00
<i>n</i>	1	0	1
<CA2> In marketing materials or in communications with customers, does your company highlight the ways in which your business is environmentally conscious?			
Yes	92.03	86.06	94.08
No	6.80	13.94	4.35
Don't Know	1.17	0.00	1.57
<i>n</i>	49	14	35
<A3A> According to our records, your organization installed <XX> many measures through <XX> period is this correct?			
YES-quantity correct	85.34	85.99	85.12
Yes-Change Quantity	14.66	14.01	14.88
<i>n</i>	49	14	35
<A3A_QTY> Approximately how many of this measure did you install?			
1	5.05	10.94	3.03
6	0.73	2.86	0.00
21	0.32	0.00	0.43
30	3.23	0.00	4.34
65	0.04	0.00	0.05

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82	0.07	0.28	0.00
120	0.36	0.00	0.48
138	1.53	5.98	0.00
201	1.11	0.00	1.49
233	1.59	6.21	0.00
270	1.92	0.00	2.58
280	1.47	0.00	1.97
300	1.34	2.35	0.99
310	0.34	1.31	0.00
360	0.95	3.73	0.00
390	0.32	0.00	0.43
581	4.33	0.00	5.82
650	1.66	6.49	0.00
800	3.34	0.00	4.48
862	2.02	0.00	2.72
1000	4.34	0.00	5.83
1100	1.23	0.00	1.65
2003	7.86	0.00	10.56
3000	1.15	0.00	1.54
Don't Know	53.71	59.85	51.60
<i>n</i>	<i>49</i>	<i>14</i>	<i>35</i>
<A3A_OTH> Would you say that the number of units installed through the program were ...?			
50 to 100 units or	6.42	20.08	0.97
More than 100 units	47.13	9.67	62.07
Don't Know	46.45	70.25	36.96
<i>n</i>	<i>21</i>	<i>5</i>	<i>16</i>

Appendix D

Pipe Insulation On-Site Results

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Site	Sector	Fluid Type	Pipe Size	Pipe Qty (ft)	Pipe Size (in)	Insulation Thickness (in)	Boiler Eff.	Process Temp	Ambient Temp	Operating Hours	Evaluated Savings (MMBtu/yr)	Reported Savings (MMBtu/yr)	GRR
1	LG COM	Med. steam	>=1	270	2	1.5	82%	273.4	99.9	2,576	252	794	32%
2	LG COM	Med. steam	>=1	300	3	1.5	81%	317.0	84.6	2,668	555	882	63%
	LG COM	Med. steam	>=1	102	3	1.5	81%	317.0	84.6	2,668	189	300	63%
3	INDUSTRIAL	Med. steam	>=1	153	3	2	81%	352.5	77.9	6,461	843	796	106%
	INDUSTRIAL	Med. steam	>=1	153	2	2	81%	352.5	77.9	6,461	580	796	73%
	INDUSTRIAL	Med. steam	>=1	153	1	2	81%	352.5	77.9	6,461	341	796	43%
4	INDUSTRIAL	HW	>=1	1,660	2	1	96%	134.3	89.8	8,696	550	1,122	49%
	INDUSTRIAL	Low steam	>=1	1,455	4	2	85%	231.8	106.0	8,728	4,948	2,198	225%
5	INDUSTRIAL	Med. steam	>=1	500	0.75	1	82%	283.9	86.8	8,241	677	1,420	48%
	INDUSTRIAL	Med. steam	>=1	100	0.5	1	82%	283.9	86.8	8,241	111	284	39%
6	INDUSTRIAL	Med. steam	>=1	280	3	2	80%	340.2	100.0	7,373	1,599	732	218%
	INDUSTRIAL	Med. steam	<1	610	1	1	80%	335.4	88.0	7,206	1,292	824	157%
7	INDUSTRIAL	Med. steam	>=1	99	3	1	89%	314.6	92.0	5,679	325	515	63%
	INDUSTRIAL	Med. steam	>=1	60	1.5	1	89%	314.6	92.0	5,679	110	312	35%
	INDUSTRIAL	Med. steam	>=1	498	4	1	89%	314.6	92.0	5,679	2,089	2,590	81%
	INDUSTRIAL	Med. steam	>=1	1,998	2	1	89%	309.5	83.8	5,550	4,424	10,390	43%
	INDUSTRIAL	Med. steam	>=1	399	1	1	89%	314.6	92.0	5,679	515	2,075	25%
	INDUSTRIAL	Med. steam	<1	300	0.75	1	89%	314.6	92.0	5,679	307	1,560	20%
	INDUSTRIAL	Med. steam	<1	498	0.5	1	89%	314.6	92.0	5,679	417	2,590	16%
	INDUSTRIAL	Med. steam	>=1	300	6	1	89%	314.6	92.0	5,679	1,812	1,560	116%
8	INDUSTRIAL	HW	>=1	501	4	1	91%	140.3	81.6	4,553	286	947	30%
	INDUSTRIAL	Med. steam	<1	252	0.5	0.5	84%	299.9	81.6	3,988	136	716	19%
	INDUSTRIAL	Med. steam	>=1	300	1.25	1.25	84%	299.9	81.6	3,988	348	1,560	22%
	INDUSTRIAL	Med. steam	>=1	1,002	2	2	84%	299.9	81.6	3,988	1,696	5,210	33%
	INDUSTRIAL	HW	<1	249	0.5	0.5	91%	140.3	81.6	4,553	26	261	10%
9	INDUSTRIAL	Med. steam	>=1	21	2	1	74%	328.5	95.9	4,193	45	55	82%
	INDUSTRIAL	Med. steam	<1	51	1	0.75	74%	328.5	95.9	4,193	60	69	87%
	INDUSTRIAL	Med. steam	<1	102	1	0.75	74%	328.5	95.9	4,193	120	138	87%
	INDUSTRIAL	Med. steam	>=1	30	2	1	74%	328.5	95.9	4,193	65	78	82%
10	LG COM	HW	>=1	180	2.5	1	87%	113.6	89.1	8,577	46	69	67%
	LG COM	HW	>=1	168	2.5	1	87%	113.6	89.1	8,577	43	64	67%
	LG COM	HW	>=1	180	2.5	1	87%	113.6	89.1	8,577	46	69	67%
	LG COM	HW	>=1	300	4	1	87%	113.6	89.1	8,577	118	115	103%
	LG COM	HW	>=1	168	2.5	1	87%	113.6	89.1	8,577	43	64	67%
	LG COM	HW	<1	120	0.5	0.75	87%	113.6	89.1	8,577	9	23	37%
	LG COM	HW	<1	192	0.5	0.75	87%	113.6	89.1	8,577	14	37	37%
11	INDUSTRIAL	Med. steam	>=1	200	2	1.5	83%	233.2	97.7	8,760	402	523	77%
	INDUSTRIAL	Med. steam	>=1	60	2	1.5	83%	227.7	92.5	4,923	67	157	43%
12	LG COM	HW	>=1	65	4	2	84%	159.9	74.8	1,099	16	25	64%
	LG COM	HW	>=1	65	4	2	84%	159.9	74.8	1,099	16	25	64%
13	INDUSTRIAL	Med. steam	>=1	300	2	1.5	79%	323.0	84.2	6,557	1,009	784	129%
14	INDUSTRIAL	HW	>=1	103	2.5	1	85%	185.3	80.7	6,574	121	36	341%
	INDUSTRIAL	HW	<1	27	1	1	85%	185.3	80.7	6,574	15	9	163%
15	LG COM	Med. steam	>=1	315	1.5	1	90%	317.6	87.2	2,825	297	139	214%
16	INDUSTRIAL	Med. steam	>=1	15	3	2	82%	348.5	94.1	4,656	60	78	77%
	INDUSTRIAL	Med. steam	>=1	72	1.5	2	82%	348.5	94.1	4,656	161	374	43%
	INDUSTRIAL	Med. steam	>=1	12	6	2	82%	348.5	94.1	4,656	89	62	143%
	INDUSTRIAL	Med. steam	>=1	130	4	2	82%	348.5	94.1	4,656	663	676	98%
	INDUSTRIAL	Med. steam	>=1	21	8	2	82%	348.5	94.1	4,656	201	109	184%
	INDUSTRIAL	Med. steam	>=1	60	2	2	82%	348.5	94.1	4,656	166	312	53%
	INDUSTRIAL	Med. steam	>=1	102	2.5	2	82%	348.5	94.1	4,656	340	530	64%
17	LG COM	HW	>=1	10	1.5	1	80%	193.6	74.0	4,106	6	56	11%
	LG COM	Med. steam	>=1	20	1.5	1	80%	331.1	74.0	4,106	35	111	32%

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Site	Sector	Fluid Type	Pipe Size	Pipe Qty (ft)	Pipe Size (in)	Insulation Thickness (in)	Boiler Eff.	Process Temp	Ambient Temp	Operating Hours	Evaluated Savings (MMBtu/yr)	Reported Savings (MMBtu/yr)	GRR
18	INDUSTRIAL	Med. steam	>=1	498	6	3	85%	318.0	98.5	8,738	5,219	2,590	202%
19	INDUSTRIAL	Low steam	>=1	790	3	1	80%	272.7	96.7	1,582	588	1,193	49%
20	INDUSTRIAL	HW	>=1	1,040	1.769231	1	68%	141.8	88.1	4,539	323	703	46%
	INDUSTRIAL	HW	<1	800	0.65625	1	68%	141.8	88.1	4,539	113	276	41%
21	INDUSTRIAL	HW	>=1	2,167	2	1	68%	129.7	69.5	8,760	1,725	1,560	111%
	INDUSTRIAL	HW	>=1	2,167	1.5	1	68%	148.3	69.5	8,760	1,952	1,560	125%
	INDUSTRIAL	HW	>=1	2,167	3	1	68%	96.8	66.5	8,760	1,072	1,560	69%
22	INDUSTRIAL	HW	>=1	153	2	1	76%	166.3	92.2	6,892	117	103	113%
	INDUSTRIAL	Med. steam	>=1	12	2	1	89%	325.7	110.0	7,014	33	31	107%
23	LG COM	Med. steam	<1	201	1	1.5	80%	287.8	87.1	8,760	399	153	260%
	LG COM	Med. steam	>=1	206	3	1.5	80%	288.8	97.2	8,760	997	304	328%
24	INDUSTRIAL	Med. steam	<1	93	1	1.5	80%	279.2	96.6	8,552	160	282	57%
	INDUSTRIAL	Med. steam	>=1	100	2	1.5	80%	347.7	79.3	8,687	509	556	92%
	INDUSTRIAL	Med. steam	>=1	150	2	1.5	80%	347.7	79.3	8,687	764	834	92%
	INDUSTRIAL	Med. steam	>=1	626	2	1.5	80%	347.7	79.3	8,687	3,188	3,479	92%
	INDUSTRIAL	Med. steam	>=1	581	2	1.5	80%	347.7	79.3	8,687	2,959	3,229	92%
	INDUSTRIAL	Med. steam	<1	305	1	1.5	80%	279.2	96.6	8,552	525	923	57%
	INDUSTRIAL	Med. steam	>=1	24	2	1.5	80%	347.7	79.3	8,687	122	133	92%
	INDUSTRIAL	Med. steam	>=1	105	2	1.5	80%	347.7	79.3	8,687	535	583	92%
25	LG COM	HW	>=1	70	2	2	84%	180.0	60.1	1,754	22	27	84%
26	LG COM	HW	>=1	72	3	1	68%	139.1	66.5	2,655	31	57	54%
	LG COM	Med. steam	>=1	600	1.5	1	85%	282.1	67.9	2,655	469	474	99%
	LG COM	HW	>=1	18	4	1	68%	139.1	66.5	2,655	10	14	68%
	LG COM	Med. steam	>=1	360	1.5	1	85%	282.1	67.9	2,655	281	284	99%
	LG COM	Med. steam	>=1	416	1.5	1	85%	282.1	67.9	2,655	325	329	99%
27	INDUSTRIAL	HW	<1	440	0.75	1	82%	170.7	60.7	4,234	119	587	20%
	INDUSTRIAL	HW	>=1	360	2	1	82%	170.7	60.7	4,234	212	866	24%
28	INDUSTRIAL	HW	<1	82	0.75	1	83%	110.6	69.8	2,495	5	109	4%
29	INDUSTRIAL	Med. steam	>=1	1,011	4	2	79%	323.5	90.1	3,786	3,583	2,643	136%
	INDUSTRIAL	HW	>=1	990	4	2	95%	149.3	85.9	3,885	541	1,871	29%
30	LG COM	HW	<1	385	0.75	0.5	68%	150.4	83.1	7,771	113	227	50%
	LG COM	HW	>=1	45	2.5	1	68%	150.4	83.1	7,771	38	48	80%
	LG COM	HW	<1	1,470	0.75	0.5	68%	150.4	83.1	7,771	430	867	50%
	LG COM	HW	>=1	81	2.5	1	68%	150.4	83.1	7,771	69	87	80%
	LG COM	HW	<1	54	0.75	0.5	68%	150.4	83.1	7,771	16	32	50%
	LG COM	HW	>=1	153	2.5	1	68%	150.4	83.1	7,771	130	164	80%
	LG COM	Low steam	>=1	129	4	1.5	80%	343.5	98.8	8,760	1,122	235	478%
	LG COM	Low steam	>=1	132	1.5	0.75	80%	343.5	98.8	8,760	467	240	194%
31	LG COM	HW	<1	610	0.75	1	94%	117.5	74.8	1,261	15	119	13%
	LG COM	HW	>=1	1,045	4	1.5	94%	135.3	75.4	3,650	483	399	121%

Industrial		Negative Impact		Positive Impact		Overall	
Discrepancy Category	Explanation of Discrepancy	# Instances	GRR Impact	GRR Impact	# Instances	GRR Impact	# Instances
Difference in boiler efficiency	The evaluators found that the facility's boiler efficiency was different than the program's deemed value.	1	-1.4%	0.7%	4	-0.7%	5
Difference in fluid temperature	The evaluators found that the average fluid temperature was different than the program's deemed value.	7	-6.7%	1.8%	4	-4.9%	11
Difference in operating hours	The evaluators found that the boiler plant's hours of operation were different than the program's deemed value.	10	-18.9%	2.2%	2	-16.7%	12
Incorrect baseline - OSHA requirement	The evaluators found that a portion of the installed insulation was mandatory per OSHA requirements; this mandate resulted in an adjusted baseline, which reduced the savings.	8	-5.8%	0.0%	0	-5.8%	8
Incorrect insulation thickness	The evaluators found that the installed insulation thickness was different than the program's deemed value.	1	-1.0%	0.6%	2	-0.4%	3
Incorrect pipe diameter	The evaluators found that the pipe which received insulation was of a different diameter than the program's deemed value.	1	-1.1%	6.9%	7	5.8%	8
Unknown	Uncharacterizable discrepancy.	1	-1.5%	0.0%	0	-1.5%	1
Total		29	-36%	12%	19	-24%	48

Large Commercial		Negative Impact		Positive Impact		Overall	
Discrepancy Category	Explanation of Discrepancy	# Instances	GRR Impact	GRR Impact	# Instances	GRR Impact	# Instances
Difference in boiler efficiency	The evaluators found that the facility's boiler efficiency was different than the program's deemed value.	1	-0.1%	2.2%	2	2.1%	3
Difference in fluid temperature	The evaluators found that the average fluid temperature was different than the program's deemed value.	3	-4.7%	2.3%	3	-2.4%	6
Difference in fluid type (steam vs. HW)	The evaluators found that the facility's fluid type was mischaracterized.	2	-0.4%	0.0%	0	-0.4%	2
Difference in operating hours	The evaluators found that the boiler plant's hours of operation were different than the program's deemed value.	5	-15.2%	12.2%	4	-3.0%	9
Incorrect baseline - OSHA requirement	The evaluators found that a portion of the installed insulation was mandatory per OSHA requirements; this mandate resulted in an adjusted baseline, which reduced the savings.	3	-3.2%	0.0%	0	-3.2%	3
Incorrect insulation thickness	The evaluators found that the installed insulation thickness was different than the program's deemed value.	0	0.0%	0.1%	1	0.1%	1
Incorrect pipe diameter	The evaluators found that the pipe which received insulation was of a different diameter than the program's deemed value.	0	0.0%	4.8%	3	4.8%	3
Unknown	Uncharacterizable discrepancy.	0	0.0%	5.9%	1	5.9%	1
Total		14	-23%	27%	14	4%	28

Overall		Negative Impact		Positive Impact		Overall	
Discrepancy Category	Explanation of Discrepancy	# Instances	GRR Impact	GRR Impact	# Instances	GRR Impact	# Instances
Difference in boiler efficiency	The evaluators found that the facility's boiler efficiency was different than the program's deemed value.	2	-1.3%	0.8%	6	-0.5%	8
Difference in fluid temperature	The evaluators found that the average fluid temperature was different than the program's deemed value.	10	-6.5%	1.8%	7	-4.6%	17
Difference in fluid type (steam vs. HW)	The evaluators found that the facility's fluid type was mischaracterized.	2	0.0%	0.0%	0	0.0%	2
Difference in operating hours	The evaluators found that the boiler plant's hours of operation were different than the program's deemed value.	15	-18.4%	3.0%	6	-15.4%	21
Incorrect baseline - OSHA requirement	The evaluators found that a portion of the installed insulation was mandatory per OSHA requirements; this mandate resulted in an adjusted baseline, which reduced the savings.	11	-5.5%	0.0%	0	-5.5%	11
Incorrect insulation thickness	The evaluators found that the installed insulation thickness was different than the program's deemed value.	1	-0.9%	0.5%	3	-0.4%	4
Incorrect pipe diameter	The evaluators found that the pipe which received insulation was of a different diameter than the program's deemed value.	1	-1.0%	6.6%	10	5.6%	11
Unknown	Uncharacterizable discrepancy.	1	-1.3%	0.5%	1	-0.8%	2
Total		43	-35%	13%	33	-22%	76

Appendix AA

Standardized High Level Savings

The tables in Appendix AA summarizing natural gas savings make use of the unit MTherms – 1,000 Therms – rather than MMTherms – 1,000,000 Therms – for formatting purposes.

Gross Lifecycle Savings (MWh)

	Standard	Ex-Ante	Ex-Post		% Ex-Ante	
PA	Report Group	Gross	Gross	GRR	Gross Pass Through	Eval GRR
PGE	Cold Application	5,513	5,513	1.00	100.0%	
PGE	Hot Application	0	0			
PGE	Total	5,513	5,513	1.00	100.0%	
SCG	Hot Application	0	0			
SCG	Total	0	0			
SDGE	Cold Application	410	410	1.00	100.0%	
SDGE	Hot Application	105	105	1.00	100.0%	
SDGE	Total	515	515	1.00	100.0%	
	Statewide	6,028	6,028	1.00	100.0%	

Net Lifecycle Savings (MWh)

PA	Standard Report Group	Ex-Ante		Ex-Post Net	NRR	% Ex-Ante Net Pass		Ex-Ante NTG	Ex-Post NTG	Eval	
		Net	Net			Through	Through			Ex-Ante NTG	Ex-Post NTG
PGE	Cold Application	3,449	3,449		1.00	100.0%		0.63	0.63		
PGE	Hot Application	0	0								
PGE	Total	3,449	3,449		1.00	100.0%		0.63	0.63		
SCG	Hot Application	0	0								
SCG	Total	0	0								
SDGE	Cold Application	246	246		1.00	100.0%		0.60	0.60		
SDGE	Hot Application	63	63		1.00	100.0%		0.60	0.60		
SDGE	Total	309	309		1.00	100.0%		0.60	0.60		
Statewide		3,758	3,758		1.00	100.0%		0.62	0.62		

Gross Lifecycle Savings (MW)

	Standard	Ex-Ante	Ex-Post		% Ex-Ante	
PA	Report Group	Gross	Gross	GRR	Gross Pass Through	Eval GRR
PGE	Cold Application	1.4	1.4	1.00	100.0%	
PGE	Hot Application	0.0	0.0			
PGE	Total	1.4	1.4	1.00	100.0%	
SCG	Hot Application	0.0	0.0			
SCG	Total	0.0	0.0			
SDGE	Cold Application	0.1	0.1	1.00	100.0%	
SDGE	Hot Application	0.0	0.0			
SDGE	Total	0.1	0.1	1.00	100.0%	
	Statewide	1.5	1.5	1.00	100.0%	

Net Lifecycle Savings (MW)

					% Ex-Ante			Eval	Eval
PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	Net Pass Through	Ex-Ante NTG	Ex-Post NTG	Ex-Ante NTG	Ex-Post NTG
PGE	Cold Application	0.9	0.9	1.00	100.0%	0.63	0.63		
PGE	Hot Application	0.0	0.0						
PGE	Total	0.9	0.9	1.00	100.0%	0.63	0.63		
SCG	Hot Application	0.0	0.0						
SCG	Total	0.0	0.0						
SDGE	Cold Application	0.0	0.0	1.00	100.0%	0.60	0.60		
SDGE	Hot Application	0.0	0.0						
SDGE	Total	0.0	0.0	1.00	100.0%	0.60	0.60		
Statewide		0.9	0.9	1.00	100.0%	0.63	0.63		

Gross Lifecycle Savings (MTherms)

PA	Standard Report Group	Ex-Ante Gross	Ex-Post Gross	GRR	% Ex-Ante	Eval GRR
					Gross Pass Through	
PGE	Cold Application	0	0			
PGE	Hot Application	4,199	3,892	0.93	0.0%	0.93
PGE	Total	4,199	3,892	0.93	0.0%	0.93
SCG	Hot Application	9,958	7,802	0.78	0.0%	0.78
SCG	Total	9,958	7,802	0.78	0.0%	0.78
SDGE	Cold Application	0	0			
SDGE	Hot Application	76	51	0.68	0.0%	0.68
SDGE	Total	76	51	0.68	0.0%	0.68
Statewide		14,233	11,746	0.83	0.0%	0.83

Net Lifecycle Savings (MTherms)

PA	Standard Report Group	Ex-Ante		NRR	% Ex-Ante		Ex-Ante	Ex-Post	Eval	
		Net	Net		Net Pass Through	NTG			Ex-Ante NTG	Ex-Post NTG
PGE	Cold Application	0	0							
PGE	Hot Application	2,796	1,909	0.68	0.0%	0.67	0.49		0.67	0.49
PGE	Total	2,796	1,909	0.68	0.0%	0.67	0.49		0.67	0.49
SCG	Hot Application	5,975	3,827	0.64	0.0%	0.60	0.49		0.60	0.49
SCG	Total	5,975	3,827	0.64	0.0%	0.60	0.49		0.60	0.49
SDGE	Cold Application	0	0							
SDGE	Hot Application	46	25	0.55	0.0%	0.60	0.49		0.60	0.49
SDGE	Total	46	25	0.55	0.0%	0.60	0.49		0.60	0.49
Statewide		8,816	5,762	0.65	0.0%	0.62	0.49		0.62	0.49

Gross First Year Savings (MWh)

	Standard	Ex-Ante	Ex-Post		% Ex-Ante	
PA	Report Group	Gross	Gross	GRR	Gross Pass Through	Eval GRR
PGE	Cold Application	501	501	1.00	100.0%	
PGE	Hot Application	0	0			
PGE	Total	501	501	1.00	100.0%	
SCG	Hot Application	0	0			
SCG	Total	0	0			
SDGE	Cold Application	32	32	1.00	100.0%	
SDGE	Hot Application	8	8	1.00	100.0%	
SDGE	Total	40	40	1.00	100.0%	
	Statewide	541	541	1.00	100.0%	

Net First Year Savings (MWh)

PA	Standard Report Group	Ex-Ante		Ex-Post Net	NRR	% Ex-Ante Net Pass		Ex-Ante NTG	Ex-Post NTG	Eval	
		Net	Net			Through	Through			Ex-Ante NTG	Ex-Post NTG
PGE	Cold Application	314	314		1.00	100.0%		0.63	0.63		
PGE	Hot Application	0	0								
PGE	Total	314	314		1.00	100.0%		0.63	0.63		
SCG	Hot Application	0	0								
SCG	Total	0	0								
SDGE	Cold Application	19	19		1.00	100.0%		0.60	0.60		
SDGE	Hot Application	5	5		1.00	100.0%		0.60	0.60		
SDGE	Total	24	24		1.00	100.0%		0.60	0.60		
Statewide		337	337		1.00	100.0%		0.62	0.62		

Gross First Year Savings (MW)

	Standard	Ex-Ante	Ex-Post		% Ex-Ante	
PA	Report Group	Gross	Gross	GRR	Gross Pass Through	Eval GRR
PGE	Cold Application	0.1	0.1	1.00	100.0%	
PGE	Hot Application	0.0	0.0			
PGE	Total	0.1	0.1	1.00	100.0%	
SCG	Hot Application	0.0	0.0			
SCG	Total	0.0	0.0			
SDGE	Cold Application	0.0	0.0	1.00	100.0%	
SDGE	Hot Application	0.0	0.0			
SDGE	Total	0.0	0.0	1.00	100.0%	
	Statewide	0.1	0.1	1.00	100.0%	

Net First Year Savings (MW)

PA	Standard Report Group	Ex-Ante Net	Ex-Post Net	NRR	% Ex-Ante	Ex-Ante	Ex-Post	Eval	Eval
					Net Pass Through			NTG	NTG
PGE	Cold Application	0.1	0.1	1.00	100.0%	0.63	0.63		
PGE	Hot Application	0.0	0.0						
PGE	Total	0.1	0.1	1.00	100.0%	0.63	0.63		
SCG	Hot Application	0.0	0.0						
SCG	Total	0.0	0.0						
SDGE	Cold Application	0.0	0.0	1.00	100.0%	0.60	0.60		
SDGE	Hot Application	0.0	0.0						
SDGE	Total	0.0	0.0	1.00	100.0%	0.60	0.60		
Statewide		0.1	0.1	1.00	100.0%	0.63	0.63		

Gross First Year Savings (MTherms)

	Standard	Ex-Ante	Ex-Post		% Ex-Ante	
PA	Report Group	Gross	Gross	GRR	Gross Pass Through	Eval GRR
PGE	Cold Application	0	0			
PGE	Hot Application	371	341	0.92	0.0%	0.92
PGE	Total	371	341	0.92	0.0%	0.92
SCG	Hot Application	905	709	0.78	0.0%	0.78
SCG	Total	905	709	0.78	0.0%	0.78
SDGE	Cold Application	0	0			
SDGE	Hot Application	7	5	0.68	0.0%	0.68
SDGE	Total	7	5	0.68	0.0%	0.68
	Statewide	1,283	1,055	0.82	0.0%	0.82

Net First Year Savings (MTherms)

PA	Standard Report Group	Ex-Ante		NRR	% Ex-Ante		Ex-Ante	Ex-Post	Eval	
		Net	Ex-Post Net		Net Pass Through	NTG			Ex-Ante NTG	Ex-Post NTG
PGE	Cold Application	0	0							
PGE	Hot Application	248	167	0.68	0.0%	0.67	0.49		0.67	0.49
PGE	Total	248	167	0.68	0.0%	0.67	0.49		0.67	0.49
SCG	Hot Application	543	348	0.64	0.0%	0.60	0.49		0.60	0.49
SCG	Total	543	348	0.64	0.0%	0.60	0.49		0.60	0.49
SDGE	Cold Application	0	0							
SDGE	Hot Application	4	2	0.55	0.0%	0.60	0.49		0.60	0.49
SDGE	Total	4	2	0.55	0.0%	0.60	0.49		0.60	0.49
Statewide		795	518	0.65	0.0%	0.62	0.49		0.62	0.49

Appendix AB

Standardized Per Unit Savings

Per Unit (Quantity) Gross Energy Savings (kWh)

PA	Standard Report Group	Pass Through	% ER Ex-Ante	% ER Ex-Post	Average EUL (yr)	Ex-Post Lifecycle	Ex-Post First Year	Ex-Post Annualized
PGE	Hot Application	0	0.0%		11.8	0.0	0.0	0.0
PGE	Cold Application	1	0.0%		11.0	283.1	25.7	25.7
SCG	Hot Application	0	0.0%		11.0	0.0	0.0	0.0
SDGE	Hot Application	0	0.0%		11.0	0.0	0.0	0.0
SDGE	Cold Application	1	0.0%		13.0	45.1	3.5	3.5
SDGE	Hot Application	1	0.0%		13.0	781.4	60.1	60.1

Per Unit (Quantity) Gross Energy Savings (Therms)

PA	Standard Report Group	Pass Through	% ER Ex-Ante	% ER Ex-Post	Average EUL (yr)	Ex-Post Lifecycle	Ex-Post First Year	Ex-Post Annualized
PGE	Hot Application	0	0.0%		11.8	181.6	15.9	15.9
PGE	Cold Application	1	0.0%		11.0	0.0	0.0	0.0
SCG	Hot Application	0	0.0%		11.0	107.1	9.7	9.7
SDGE	Hot Application	0	0.0%		11.0	32.1	2.9	2.9
SDGE	Cold Application	1	0.0%		13.0	0.0	0.0	0.0
SDGE	Hot Application	1	0.0%		13.0	0.0	0.0	0.0

Per Unit (Quantity) Net Energy Savings (kWh)

PA	Standard Report Group	Pass Through	% ER Ex-Ante	% ER Ex-Post	Average EUL (yr)	Ex-Post Lifecycle	Ex-Post First Year	Ex-Post Annualized
PGE	Hot Application	0	0.0%		11.8	0.0	0.0	0.0
PGE	Cold Application	1	0.0%		11.0	177.1	16.1	16.1
SCG	Hot Application	0	0.0%		11.0	0.0	0.0	0.0
SDGE	Hot Application	0	0.0%		11.0	0.0	0.0	0.0
SDGE	Cold Application	1	0.0%		13.0	27.1	2.1	2.1
SDGE	Hot Application	1	0.0%		13.0	468.8	36.1	36.1

Per Unit (Quantity) Net Energy Savings (Therms)

PA	Standard Report Group	Pass Through	% ER Ex-Ante	% ER Ex-Post	Average EUL (yr)	Ex-Post Lifecycle	Ex-Post First Year	Ex-Post Annualized
PGE	Hot Application	0	0.0%		11.8	89.1	7.8	7.8
PGE	Cold Application	1	0.0%		11.0	0.0	0.0	0.0
SCG	Hot Application	0	0.0%		11.0	52.5	4.8	4.8
SDGE	Hot Application	0	0.0%		11.0	15.8	1.4	1.4
SDGE	Cold Application	1	0.0%		13.0	0.0	0.0	0.0
SDGE	Hot Application	1	0.0%		13.0	0.0	0.0	0.0