

2013 Evaluation of Commercial and Industrial Energy Efficiency Incentive Programs

Evaluation Report

Prepared for the FirstEnergy Ohio Companies:

*Ohio Edison Company
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Table of Contents

1.Executive Summary	1-1
2.Introduction and Purpose of Study	2-1
3.Description of Programs.....	3-1
4.Methodology.....	4-1
5.Detailed Evaluation Findings.....	5-1
6.Summary and Conclusions	6-1
Appendix A: Required Savings Tables	A-1
Appendix B: Survey Instruments	B-1

List of Figures

Figure 3-1 Large Equipment Cumulative Ex Post kWh Savings by Date of Application Submission.....	3-3
Figure 3-2 Small Equipment Cumulative Ex Post kWh Savings by Date of Application Submission.....	3-3
Figure 3-3 Small Buildings Cumulative Ex Post kWh Savings by Date of Application Submission.....	3-5
Figure 4-1. Process Evaluation Overview	4-15
Figure 5-1 Sample Project Realization Rate versus Expected kWh Savings for Large Equipment	5-8
Figure 5-2 Sample Project Realized kWh Savings versus Expected kWh Savings for Large Equipment.....	5-9
Figure 5-3 Sample Project Realization Rate versus Expected kWh Savings for Small Equipment	5-9
Figure 5-4 Sample Project Realized kWh Savings versus Expected kWh Savings for Small Equipment	5-10
Figure 5-5 Sample Project Realization Rate versus Expected kWh Savings for Government Lighting	5-10
Figure 5-6 Sample Project Realized kWh Savings versus Expected kWh Savings for Government Lighting	5-11
Figure 5-7 Cumulative Savings Associated with Installation Date by Month during 2013 for Large Equipment.....	5-14
Figure 5-8 Cumulative Savings Associated with Installation Date by Month during 2013 for Small Equipment.....	5-14
Figure 5-9 Distribution of Large and Small Equipment Programs Projects across Service Territory.....	5-15
Figure 5-10 Technical Potential and Large and Small Equipment Ex Post Savings by Building Type	5-16
Figure 5-11 Trade Ally Satisfaction	5-27

List of Tables

Table 1-1 Sample Sizes for Data Collection Efforts	1-2
Table 1-2 Gross Savings by Program	1-2
Table 1-3 Summary of Annualized kWh Savings for Large Equipment.....	1-2
Table 1-4 Summary of Annualized Peak kW Savings for Large Equipment.....	1-3
Table 1-5 Summary of Annualized kWh Savings for Small Equipment	1-3
Table 1-6 Summary of Annualized Peak kW Savings for Small Equipment	1-3
Table 1-7 Summary of Annualized kWh Savings for Small Buildings.....	1-4
Table 1-8 Summary of Annualized Peak kW Savings for Small Buildings.....	1-4
Table 1-9 Summary of Annualized kWh Savings for Government Lighting	1-4
Table 1-10 Summary of Annualized Peak kW Savings for Government Lighting	1-4
Table 3-1 Rate Code by Customer Size.....	3-1
Table 3-2 Ex Ante Annual Energy Savings of Large Equipment	3-2
Table 3-3 Ex Ante Annual Energy Savings of Small Equipment	3-2
Table 3-4 Ex Ante Annual Energy Savings of Small Buildings.....	3-4
Table 4-1 Population Statistics Used for Sample Design for Large Equipment.....	4-2
Table 4-2 Population Statistics Used for Sample Design for Small Equipment	4-2
Table 4-3 Population Statistics Used for Sample Design for Small Buildings.....	4-3
Table 4-4 Expected kWh Savings for Sampled Projects by Stratum for Large Equipment	4-3
Table 4-5 Expected kWh Savings for Sampled Projects by Stratum for Small Equipment	4-3
Table 4-6 Expected kWh Savings for Projects in Government Lighting Equipment Census	4-4
Table 4-7 Expected Peak Demand kW Savings for Sampled Projects by Stratum for Large Equipment.....	4-4
Table 4-8 Expected Peak Demand kW Savings for Sampled Projects by Stratum for Small Equipment	4-4
Table 4-9 Expected Peak Demand kW Savings for Projects in Government Lighting Census.....	4-5
Table 4-10 Typical Methods to Determine Savings for Custom Measures.....	4-7
Table 5-1 Gross Savings by Program	5-1
Table 5-2 Expected and Gross Realized kWh Savings for Large Equipment by Sample Stratum.....	5-2

Table 5-3 Expected and Gross Realized kWh Savings for Small Equipment by Sample Stratum.....	5-2
Table 5-4 Expected and Gross Realized kWh Savings for Small Buildings by Kit Type 5-2	
Table 5-5 Expected and Gross Realized kWh Savings for Government Lighting by Sample Stratum	5-3
Table 5-6 Expected and Gross Realized kWh Savings for Large Equipment by Project 5-3	
Table 5-7 Expected and Gross Realized kWh Savings for Small Equipment by Project 5-4	
Table 5-8 Expected and Gross Realized kWh Savings for Government Lighting by Project.....	5-5
Table 5-9 Realized Gross kWh Savings by Facility Type for Large Equipment.....	5-5
Table 5-10 Realized Gross kWh Savings by Facility Type for Small Equipment.....	5-6
Table 5-11 Realized Gross kWh Savings by Facility Type for Small Buildings	5-6
Table 5-12 Expected and Gross Realized Peak kW Savings for Large Equipment	5-7
Table 5-13 Expected and Gross Realized Peak kW Savings for Small Equipment.....	5-7
Table 5-14 Expected and Gross Realized Peak kW Savings for Small Buildings	5-7
Table 5-15 Expected and Gross Realized Peak kW Savings for Government Lighting 5-7	
Table 5-16 Realized kWh Savings by Measure Type and Company for Large Equipment	5-11
Table 5-17 Realized kWh Savings by Measure Type and Company Small Equipment .5-11	
Table 5-18 Reasons Given for Not Installing All CFLs	5-17
Table 5-19 Incentive Characteristics by Equipment Type, Large Equipment	5-17
Table 5-20 Incentive Characteristics by Equipment Type, Small Equipment	5-18
Table 5-21 How Customers Learned about the Incentive Program, Large Equipment ..5-19	
Table 5-22, How Customers Learned about the Incentive Program, Small Equipment..5-19	
Table 5-23 Trade Ally's Views of Program Marketing and Customer Awareness	5-20
Table 5-24 Policies and Procedures Regarding Energy Efficiency Improvements, Large Equipment	5-20
Table 5-25 Policies and Procedures Regarding Energy Efficiency Improvements, Large Equipment	5-21
Table 5-26 Influences on Decision Making, Large Equipment	5-21

Table 5-27 Influences on Decision Making, Small Equipment.....	5-22
Table 5-28 Clarity of Application Instructions, Large Equipment.....	5-22
Table 5-29 Clarity of Application Instructions, Small Equipment	5-22
Table 5-30 Assessment of Application Process, Large Equipment Program	5-23
Table 5-31 Assessment of Application Process, Small Equipment	5-23
Table 5-32 Knowledge of Program Staff, Large Equipment	5-24
Table 5-33 Knowledge of Program Staff, Small Equipment	5-24
Table 5-34 Satisfaction with Program Staff Interactions, Large Equipment.....	5-25
Table 5-35 Satisfaction with Program Staff Interactions, Small Equipment.....	5-25
Table 5-36 Satisfaction with Equipment & Implementation, Large Equipment	5-25
Table 5-37 Satisfaction with Equipment & Implementation, Small Equipment	5-26
Table 5-38 Satisfaction with Overall Program Elements, Large Equipment	5-26
Table 5-39 Satisfaction with Overall Program Elements, Small Equipment	5-27
Table A-1 Gross Savings by Program	A-1
Table A-2 Summary of kWh Savings for Large Equipment	A-1
Table A-3 Summary of Peak kW Savings for Large Equipment	A-1
Table A-5 Summary of Lifetime kWh Savings for Large Equipment.....	A-1
Table A-6 Summary of kWh Savings for Small Equipment	A-2
Table A-7 Summary of Peak kW Savings for Small Equipment	A-2
Table A-9 Summary of Lifetime kWh Savings for Small Equipment.....	A-2
Table A-10 Summary of kWh Savings for Small Buildings	A-2
Table A-11 Summary of Peak kW Savings for Small Buildings.....	A-2
Table A-13 Summary of Lifetime kWh Savings for Small Buildings	A-3
Table A-14 Summary of kWh Savings for Government Lighting	A-3
Table A-15 Summary of Peak kW Savings for Government Lighting	A-3
Table A-17 Summary of Lifetime kWh Savings for Government Lighting.....	A-3

1. Executive Summary

During 2013, the Ohio Operating companies The Cleveland Electric Illuminating Company (CEI), Ohio Edison Company (OE), and The Toledo Edison Company (TE) (collectively “Companies”), continued to implement commercial and industrial programs. These programs (collectively “C/I Programs”) include the following:

- Energy Efficient Equipment Program – Large (Large Equipment)
- Energy Efficient Equipment Program – Small (Small Equipment)
- Energy Efficient Buildings Program – Large (Large Buildings)
- Energy Efficient Buildings Program – Small (Small Buildings)
- Government Tariff Lighting Program (Government Lighting)

The main features of the approach used for the evaluation are as follows:

- Data for the study were collected through review of program materials, on-site inspections, end-use metering, and interviews with the Companies’ staff members, program implementation contractor staff members, and participating customers and contractors. Based on data provided by the Companies’ and their program implementation contractor, a sample design was developed for on-site data collection. Samples were drawn that provide savings estimates for each program providing energy savings estimation with $\pm 10\%$ statistical precision at the 90% confidence level. Table 1-1 shows the total sample sizes for different types of data collection employed for this study for the C/I Programs.
- On-site visits were used to collect data for savings impact calculations, to verify measure installation, and to determine measure operating parameters. Facility staff were interviewed to determine the operating hours of installed systems and to locate any additional benefits or shortcomings with the installed systems. For many of the sites, energy efficient equipment was monitored in order to obtain accurate information on equipment operating characteristics. The 68 projects, for which on-site measurements and verification data were collected, and the 4 appliance recycling projects for which a phone interview was conducted to verify participation, account for approximately 63% of Large Equipment ex ante kWh savings, and 22% of Small Equipment ex ante kWh savings. For Large Buildings, there was no program activity in 2013. For Small Buildings, a survey of randomly selected kit recipients was performed to collect data for savings impact calculations, and to determine measure in-service rate. In total, data was collected from 372 program participants. For Government Lighting, a census approach was taken to collect data for savings impact calculations, to verify measure installation, and to determine measure operating parameters. The 4 projects, for which on-site measurements and verification data were collected, account for 100% of Government Lighting ex ante kWh savings.

- Customer surveys provided information for the process evaluation. A census of the decision makers who completed a project through the Sodexo administered programs and for whom names and contact information were available was attempted. Of this population, 43 customers who completed projects through the Sodexo-managed Small and Large Equipment Programs were interviewed. Additionally, 35 trade allies who assisted customers with projects completed through the programs currently managed by Sodexo were interviewed. Additionally, relevant Company and implementation contractor staff members were interviewed to provide information for the process evaluation.

Table 1-1 Sample Sizes for Data Collection Efforts

<i>Type of Data Collected</i>	<i>Large Equipment</i>	<i>Small Equipment</i>	<i>Small Buildings</i>	<i>Government Lighting</i>	<i>Total</i>
Project On-Site Measurement and Verification	27	45	0	4	76
Kit Random Sample			372		372
Customer Decision Maker Survey	14	31	0	0	43
Trade Ally Survey		35			35

Gross savings were estimated using proven techniques, including industry standard engineering calculations and verification of computer simulations developed by program contractors to determine energy savings. The realized energy savings for each program are summarized in Table 1-2.

Table 1-2 Gross Savings by Program

<i>Program</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
Large Equipment	79,230,083	71,446,442	90%	10,659.14	10,274.94	96%
Small Equipment	80,230,947	78,850,049	98%	14,549.66	14,802.08	102%
Small Buildings	74,177,680	60,501,647	82%	15,623.19	14,616.35	94%
Government Lighting	632,101	631,282	100%	60.97	58.48	96%
Total	234,270,810	211,429,420	90%	40,892.96	39,751.85	97%

The realized energy savings of the 2013 Large Equipment Program from the three service territories are summarized in Table 1-3. For the entire program, the realized gross energy savings totaled 71,446,442 kWh. The gross realization rate for the program is 90%.

Table 1-3 Summary of Annualized kWh Savings for Large Equipment

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	13,093,064	12,880,658	98%
OE	53,751,292	48,058,277	89%
TE	12,385,727	10,507,508	85%
Total Companies	79,230,083	71,446,442	90%

The realized gross peak kW reductions of the 2013 Large Equipment Program from the three service territories are summarized in Table 1-4. The achieved gross peak demand savings for the program are 10,274.94 kW. The gross realization rate for the program is 96%.

Table 1-4 Summary of Annualized Peak kW Savings for Large Equipment

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	2,028.46	2,100.28	104%
OE	6,789.74	6,749.51	99%
TE	1,840.94	1,425.16	77%
Total Companies	10,659.14	10,274.94	96%

The realized energy savings of the 2013 Small Equipment Program from the three service territories are summarized in Table 1-5. For the entire program, the realized gross energy savings totaled 78,850,049 kWh. The gross realization rate for the program is 98%.

Table 1-5 Summary of Annualized kWh Savings for Small Equipment

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	38,920,116	37,286,911	96%
OE	32,067,254	32,400,096	101%
TE	9,243,576	9,163,043	99%
Total Companies	80,230,947	78,850,049	98%

The realized gross peak kW reductions of the 2013 Small Equipment Program from the three service territories are summarized in Table 1-6. The achieved gross peak demand savings for the program are 14,802.08 kW. The gross realization rate for the program is 102%.

Table 1-6 Summary of Annualized Peak kW Savings for Small Equipment

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	7,272.78	7,168.94	99%
OE	5,561.43	5,861.44	105%
TE	1,715.46	1,771.70	103%
Total Companies	14,549.66	14,802.08	102%

The realized energy savings of the 2013 Small Buildings Program from the three service territories are summarized in Table 1-7. For the entire program, the realized gross energy savings totaled 60,501,647 kWh. The gross realization rate for the program is 82%.

Table 1-7 Summary of Annualized kWh Savings for Small Buildings

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	21,508,226	17,737,324	82%
OE	37,121,073	30,122,245	81%
TE	15,548,380	12,642,078	81%
Total Companies	74,177,680	60,501,647	82%

The realized gross peak kW reductions of the 2013 Small Buildings Program from the three service territories are summarized in Table 1-8. The achieved gross peak demand savings for the program are 14,616.35 kW. The gross realization rate for the program is 94%.

Table 1-8 Summary of Annualized Peak kW Savings for Small Buildings

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	4,505.14	4,246.76	94%
OE	7,850.36	7,338.32	93%
TE	3,267.68	3,031.27	93%
Total Companies	15,623.19	14,616.35	94%

The realized energy savings of the 2013 Government Lighting Program from the three service territories are summarized in Table 1-9. For the entire program, the realized gross energy savings totaled 631,282 kWh. The gross realization rate for the program is 100%.

Table 1-9 Summary of Annualized kWh Savings for Government Lighting

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	632,101	631,282	100%
Total Companies	632,101	631,282	100%

The realized gross peak kW reductions of the 2013 Government Lighting Program from the three service territories are summarized in Table 1-10. The achieved gross peak demand savings for the program are 58.48 kW. The gross realization rate for the program is 96%.

Table 1-10 Summary of Annualized Peak kW Savings for Government Lighting

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	60.97	58.48	96%
Total Companies	60.97	58.48	96%

The following presents a selection of key conclusions from the 2013 year of program operations:

- **Smooth Transition to New Implementer:** The C&I Program implementer changed from SAIC to Sodexo in August of 2013. The transition from SAIC to Sodexo appears to have created little disruption for the program. Project savings accrued at a fairly

consistent rate during the year, although there was somewhat less activity during the middle portion of the year for the Large Enterprise Equipment Program. Additionally, the Companies are generally satisfied with Sodexo's performance. In comparison to the previous implementation staff, the Companies felt that Sodexo was much improved with regard to speed, ease, and timeliness. Sodexo's weekly, monthly and ad hoc activity reports to the Companies were also useful. Additionally, a larger share of trade allies reported that they were satisfied with the programs than in prior years. Specifically, 79% of the trade allies indicated that they were very or somewhat satisfied, up from approximately one-half of the trade allies last year.

Because SAIC implemented the C&I Program for 7 months, many of the issues that were reported during 2013 are either resolved or are currently being addressed by Sodexo. Steps taken by Sodexo to improve the programs include: online application processing and tracking as well as increased interactions with customers and trade allies.

- **Large and Small Customers Satisfied with Program:** Both large and small customers expressed high levels of satisfaction with the overall program. Few customers reported dissatisfaction with the program participation process, the implemented equipment, the range of the equipment offered, or the program overall.

Survey respondents who completed projects through the Sodexo managed programs in 2013 reported similar levels of satisfaction with the program overall as 2012 program participants. The largest difference in reported satisfaction between 2012 and 2013 participants was with the time it took to receive the incentive. Seventy-six percent of the participants in the Sodexo-managed 2013 programs reported that they were satisfied or very satisfied with this aspect of the program compared to 51% of 2012 survey respondents. The increased satisfaction with the time it takes to receive the incentive may encourage repeat participation in the program.

- **Robust Marketing Effort:** Sodexo maintains primary responsibility for the marketing of the program. They promote the program through the website, trade ally network, open houses, telephone and direct communication with customers. Trade allies also promote the program during in-person and telephone discussions with potential customers. Sodexo is currently developing materials to help trade allies promote the program including case studies, reference cards, and logos. Administrators, which are organizations contracted with the Companies to assist with the implementation of the program, also play an important role in promoting the programs. These organizations promote the programs through webinars, energy summits, and at conferences. Additionally, Administrators market the program to their members in face-to-face meetings and through phone calls. Administrators also distribute printed materials about the program to customers including case studies, success stories, and newsletters. The Companies also assist with promoting the program. Specifically, the Companies distribute email newsletters to commercial customers and customer

service representatives are in contact with customers and inform them of the incentive opportunities available.

- **Trade Allies Felt Supported in Program:** Trade allies were supported by both the Companies and Sodexo in many ways. Trade allies are given access to sales and outreach staff at both organizations. They also receive technical support and assistance in completing applications. In addition, they are invited to in-person events focused on maintaining engagement in the program, developing new relationships and strengthening former relationships with program staff. In future program years, trade allies will also be supported in their marketing efforts. They will be provided with co-branded materials such as quick reference cards and case studies.
- **Incentive Levels and Program Offerings are Adequate:** Most trade allies thought that the incentives were adequate to encourage customers to select energy efficient equipment options. Additionally, the prescriptive and custom equipment incentives cover a wide variety of equipment types.
- **Few Customers Reported Problems with Application Process:** A large majority of surveyed participants who worked on completing the applications found the materials to be clear and acceptable. However, a few participants indicated that they had to submit materials more than once. Sodexo has made changes to the online application process to reduce the need for participants to resubmit application materials. Additionally, a few participants noted that some of the application materials were difficult to understand, such as how to use the wattage table. However, these infrequent anecdotal comments likely reflect the individual experiences of participants rather than a broader problem with the program or its materials.
- **Programs are Changing What Equipment Trade Allies Offer Customers:** Participation in the program encouraged trade allies to offer more energy efficient products and services. Many trade allies noted that they market equipment that complies with the program to maximize their customers' rebates. Further, the incentives made energy efficient products more appealing to customers. The rebates help to mitigate the out of pocket and upfront costs for customers, so they can make larger purchases earlier than they otherwise would.
- **Current Online Tracking and Application System Adequate for Program Staff and Participants but Trade Allies Suggested Improvements:** Staff members from the Companies and Sodexo felt that the Applied Energy's Groups (AEG) Vision software system was adequately meeting their needs. Built-in quality control functions flag applications that need further review, and the system enables staff members to run reports as needed. Further, the system can be used by trade allies and customers to submit online applications.

A few trade allies made suggestions for improving the online application system. These suggestions include displaying more information on the website (e.g., pre-approved and final approved incentive amounts), allow documents to be uploaded to

the website rather than through email submissions, and include a checklist on the website for what needs to be submitted. Sodexo continues to make enhancements to address trade allies concerns about the online application process.

- **Data Quality Issues Noted in Tracking Data:** Some data quality issues were noted when analyzing the program tracking data and preparing it for use in surveys of participants and trade allies. These included inconsistencies in formatting and use of fields and missing names and contact information for participating customers. These issues have been communicated to Sodexo and are being addressed.
- **Customers received more CFLs than they Installed Despite Screening Protocol:** While the majority of CFLs shipped to customers were installed and the installation rate was not unusually low, sixty-one percent of respondents indicated that they did not install all of the kit components they received due to lack of fixtures, waiting for existing bulbs to burn out, or otherwise saving the bulbs for future installation.

Recommendations have been developed based on survey and interview findings and overall analysis of program processes. These recommendations may provide strategic advantage during the future program years.

- **Better Match Kits Contents to Need for CFLs:** The C&I Kits contain an assortment of compact fluorescent lamps (CFLs) and power strips and are available to small enterprise customers. The kits vary in the types and quantities of measures that are included, allowing a degree of customization to the customers need. The process to receive the CFL kits includes a screening protocol that asks customers to estimate how many CFLs they “can install immediately.” However, a little less than two-third of the respondents reported that they did not install all of the CFLs sent in the kits. Although the in-service rate is not unusually low, it may be possible to increase it by better matching kit contents to customers’ need and willingness to install the CFLs immediately. Program staff may want to consider a more detailed screening protocol that clarifies whether or not they are willing to replace the incandescent lamps that are still operating or if they will wait until they burn out, asking for a clear commitment from the customer indicating how many CFLs the intend to install immediately, and ensuring that the total number of CFLs sent is equal to or less than this amount. These changes may produce a marginal increase in the in-service rate.
- **Continue to Utilize C&I Kits to Reach a Wide Array of Customers:** In addition to delivering energy savings, the C&I Kits are useful from a marketing perspective because they appeal to a broad array of customers and allow the Companies to reach a large number of smaller businesses. Small businesses can be a challenging segment of the market for efficiency programs to reach. Small businesses face barriers to implementing efficiency improvements such as a lack of program awareness, a lack of information about ways to save energy, and insufficient resources for planning and implementing energy saving projects. The C&I Kits program provide an opportunity to connect with small businesses and inform them

about how energy efficiency and the Companies programs can impact their energy usage.

- **Consider Modifications to the Online Application System:** Although most participants and trade allies found the online application process to be adequate, a few trade allies suggested improvements to the online application system that would improve the experience from their perspective. These suggestions include displaying more information on the website (e.g., pre-approved and final approved incentive amounts), allow documents to be uploaded to the website rather than through email submissions, and include a checklist on the website for what needs to be submitted. Additionally, a few trade allies suggested that the calculators online could potentially be simplified. However, they did not elaborate on which specific calculators they were referring to.
- **Utilize Webinars to Inform Trade Allies of the Application Process:** Nearly half of the trade allies who responded to the survey indicated that they had participated in the trade ally webinar. A few of these trade allies noted that the website was only somewhat useful, namely because they were previously familiar with the program or because the webinar did not discuss how to complete the application materials. Additionally, some of the trade allies who reported that they sought assistance from program staff indicated that they needed assistance with completing the application or using the online system. Consequently, there may be an opportunity to provide further information through the webinars regarding how to utilize the online application system and submit the required documentation. Furthermore, training to avoid any common errors that program staff finds during the application review process could also be incorporated into the trade ally webinar.

2. Introduction and Purpose of Study

This report presents the results of the impact and process evaluations of the Large Equipment, Small Equipment, Small Buildings, and Government Lighting Programs (collectively “C/I Programs”) for activity during the 2013 program year.

2.1 Overview of Evaluation Approach

The overall objective for the impact evaluation of the C/I Programs was to verify the gross energy savings and peak demand (kW) reduction resulting from participation in the program during the 2013 program year.

The approach for the impact evaluation had the following main features.

- Available documentation (e.g., audit reports, savings calculation work papers, etc.) was reviewed for a sample of projects, with particular attention given to the calculation procedures and documentation for savings estimates.
- On-site data collection was conducted for a sample of projects to provide the information needed for estimating savings and demand reductions. Monitoring was also conducted at some sites to obtain more accurate information on the hours of operation for lighting and HVAC equipment.
- Gross savings were estimated using proven techniques:
 - Analysis of lighting savings was accomplished using ADM’s custom-designed lighting evaluation model with system parameters (fixture wattage, operating characteristics, etc.) based on information on operating parameters collected on-site and, if appropriate, industry standards.
 - For HVAC measures, the original analyses used to calculate the expected savings were reviewed and the operating and structural parameters of the analysis were verified. For custom measures or relatively more complex measures, simulations with the DOE-2 energy analysis model were used to develop estimates of energy use and savings from the installed measures.
- A customer survey was conducted with a sample of program participants to gather information on their decision making, and their likes and dislikes of the program.

3. Description of Programs

3.1 Description of Large Equipment and Small Equipment Programs

To be eligible to participate in the Large Equipment Program, a customer had to be considered “large” as defined by the customer’s rate code. To be eligible to participate in the Small Equipment Program, a customer had to be considered “small” as defined by the customer’s rate code. Rate codes and corresponding customer sizes are presented in Table 3-1.

Table 3-1 Rate Code by Customer Size

<i>Rate Code</i>	<i>Customer Size</i>
GP	Large
GS	Small
GSU	Large
GT	Large

The primary objective of these programs is to increase the market share of high efficiency equipment among commercial and industrial customers. Qualifying existing small commercial, industrial, and municipal customers with buildings in the Companies’ service territories are eligible to participate in the program.

The energy efficiency measures (EEMs) that are implemented by the Large Equipment Program are organized into three categories: *HVAC measures, Lighting measures, and Custom Equipment measures.*

The HVAC measures within Large Equipment are intended to encourage customers to maintain or install more efficient HVAC equipment in an effort to reduce both energy consumption and demand. The Lighting measures within Large Equipment are intended to encourage customers to install more efficient lighting equipment in an effort to reduce both energy consumption and demand. The Custom measures within Large Equipment are intended to encourage customers to retrofit to or install more efficient specialized process equipment in an effort to reduce both energy consumption and demand.

The EEMs that are implemented by the Small Equipment Program are organized into five categories: *HVAC & Water Heating measures, Appliances measures, Food Service measures, Lighting measures, and Custom Equipment measures.*

The HVAC & Water Heater measures within Small Equipment are intended to encourage customers to maintain or install more efficient HVAC equipment and water heating equipment in an effort to reduce both energy consumption and demand. The Appliance measures within Small Equipment are intended to encourage customers with inefficient refrigeration and room air conditioning appliances to replace them with ENERGY STAR® qualified appliances in an effort to reduce both energy consumption and demand. The Food Service measures within the Small Equipment are intended to encourage customers

to install more efficient food service equipment in an effort to reduce both energy consumption and demand. The Lighting measures within Small Equipment are intended to encourage customers to install more efficient lighting equipment in an effort to reduce both energy consumption and demand. The Custom measures within Small Equipment are intended to encourage customers to retrofit to or install more efficient specialized process equipment and applications in an effort to reduce both energy consumption and demand.

Customers can submit large and small equipment projects using the program's online application process. Equipment projects are categorized into eight types and include, prescriptive and calculated lighting, HVAC and water heaters, appliances, food services, custom equipment, traffic signals, and data centers.

Expected energy savings were calculated using methodologies outlined in the Ohio Technical Reference Manual (TRM), or using industry standard engineering calculations.

For the Large Equipment Program, the expected gross savings by measure type are shown in Table 3-2. There were 203 projects in the program which were expected to provide savings of 79,230,083 kWh.

Table 3-2 Ex Ante Annual Energy Savings of Large Equipment

Measure Type	Ex Ante kWh Savings			
	CEI	OE	TE	Total Companies
Custom Equipment	2,258,723	26,908,708	2,419,048	31,586,480
HVAC		4,762	19,258	24,020
Lighting	10,834,341	26,837,821	9,947,420	47,619,583
Total	13,093,064	53,751,292	12,385,727	79,230,083

For the Small Equipment Program, the expected gross savings by measure type are shown in Table 3-3. There were 1,310 projects in the program which were expected to provide savings of 80,230,947 kWh.

Table 3-3 Ex Ante Annual Energy Savings of Small Equipment

Measure Type	Ex Ante kWh Savings			
	CEI	OE	TE	Total Companies
Appliances	66,364	98,844	32,608	197,816
Custom Equipment	3,773,211	4,475,029	1,409,574	9,657,813
Food Service	322,936	113,149	49,135	485,219
HVAC & Water Heating	113,846	74,665	52,241	240,752
Lighting	34,643,759	27,305,568	7,700,019	69,649,346
Total	38,920,116	32,067,254	9,243,576	80,230,947

Figure 3-1 shows the Large Equipment Program's ex post kWh savings by the date of application submission.

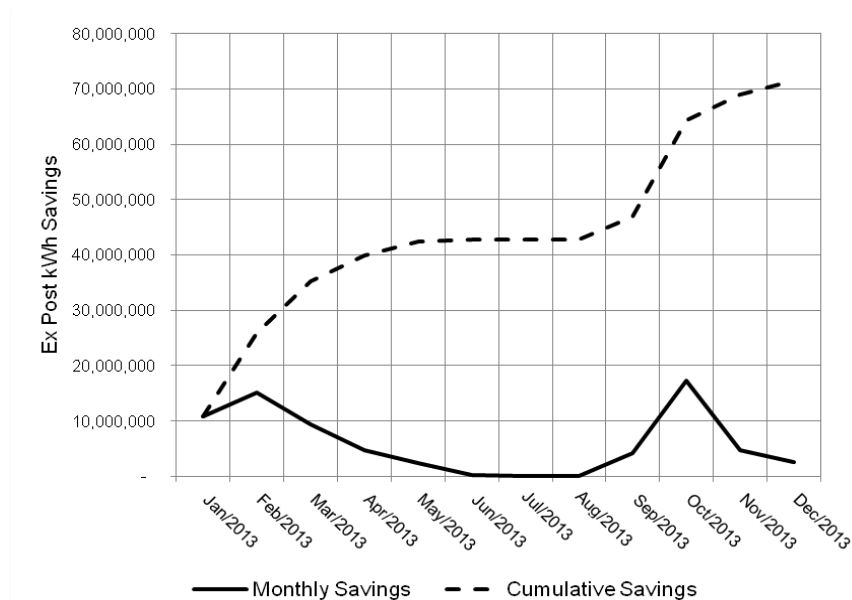


Figure 3-1 Large Equipment Cumulative Ex Post kWh Savings by Date of Application Submission

Figure 3-2 shows the Small Equipment Program's ex post kWh savings by the date of application submission.

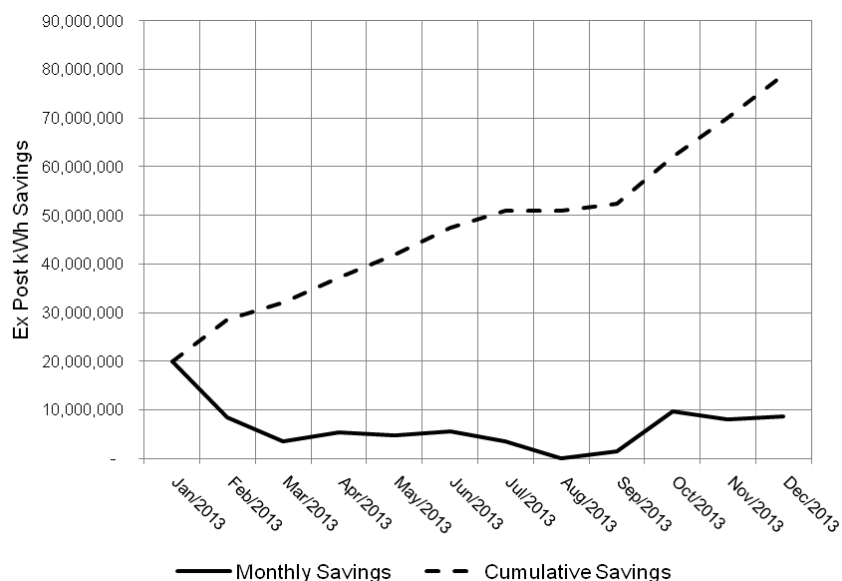


Figure 3-2 Small Equipment Cumulative Ex Post kWh Savings by Date of Application Submission

3.2 Description of the Small Buildings Program

To be eligible to participate in the Small Buildings Program, a customer had to be considered “small” as defined by the customer’s code. Rate codes and corresponding customer size are presented in Table 3-1.

The primary objective of this program is to increase the energy efficiency of existing buildings used by commercial and industrial customers. Qualifying existing commercial, industrial, and municipal customers with buildings in the Companies’ service territories are eligible to participate in the program.

The EEMs that are implemented by the Program are organized into four categories: *New Construction measures*, *Audit measures*, *Custom Buildings measures*, and *Kit measures*.

The New Construction measure is intended to encourage customers to construct buildings to higher efficiency codes and standards. The Audit measure is intended to encourage customers to acquire a detailed third party energy efficiency audit for their building. The Custom Buildings measure is intended to encourage customers to install specialized building shell improvements that reduce energy consumption and power demand. The Kit measure is intended to educate customers on the benefits of simple EE&C measures and other opportunities to accelerate the adoption and increase the market share of high efficiency equipment in the small business sector, and to improve building energy performance in an effort to reduce both energy consumption and demand.

Expected energy savings were calculated using methodologies outlined in the Ohio TRM, or using industry standard engineering calculations.

For the Small Buildings Program, the expected gross savings by kit type are shown in Table 3-4. There were 31,249 shipped kits in the program which were expected to provide savings of 74,177,680 kWh.

Table 3-4 Ex Ante Annual Energy Savings of Small Buildings

<i>Kit Type</i>	<i>Ex Ante kWh Savings</i>			
	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>
Kit A	13,946,705	24,895,173	10,816,640	49,658,518
Kit B	5,048,560	8,945,130	3,164,529	17,158,220
Kit C	1,525,053	2,207,155	857,465	4,589,673
Kit D	231,190	429,818	244,215	905,224
Kit E	121,565	247,471	84,661	453,697
Kit F	44,501	93,344	26,050	163,895
MultiFamily	590,651	302,981	354,821	1,248,453
Total	21,508,226	37,121,073	15,548,380	74,177,680

Figure 3-3 shows the Small Buildings Program’s ex post kWh savings by the date of application submission.

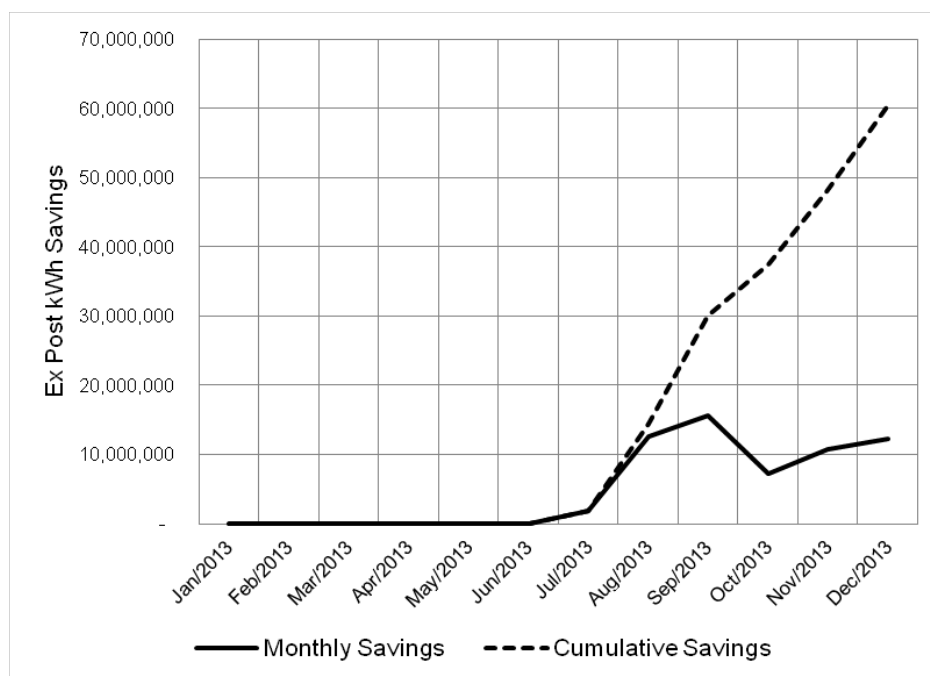


Figure 3-3 Small Buildings Cumulative Ex Post kWh Savings by Date of Application Submission

3.3 Description of the Government Lighting Program

To be eligible to participate in the Government Lighting Program, a non-residential retail customer must convert existing fixtures to the following types of lighting technologies:

- LED Round Signals
 - 8" and 12" Red, Yellow & Green Signals
- LED Pedestrian Sign

Furthermore, equipment must have been purchased on or after April 11, 2011.

Expected energy savings were calculated using methodologies outlined in the Ohio TRM, or using industry standard engineering calculations.

For the Government Lighting Program there is only one category of equipment; there were 4 projects in the program which were expected to provide savings of 632,101 kWh. All projects in this program were installed in January 2013.

4. Methodology

ADM's evaluation of the 2013 C/I Programs consisted of both an impact evaluation and a process evaluation. The impact evaluation methodology is described in section 4.1 and the process evaluation methodology is described in section 4.2 of this chapter.

4.1 Impact Methodology

The methodology used for estimating gross savings is described in this section.

4.1.1 Sampling Plans – C/I Equipment Programs

Data used to estimate the gross savings achieved through the Large Equipment Program were collected for samples of projects completed during the 2013 program year. Data provided by the implementation contractor showed that during 2013, there were 203 projects for the program, which were expected to provide savings of 79,230,083 kWh annually.

Data used to estimate the gross savings achieved through the Small Equipment Program were collected for samples of projects completed during the 2013 program year. Data provided by the implementation contractor showed that during 2013, there were 1,310 projects for the program, which were expected to provide savings of 80,230,947 kWh annually.

Data used to estimate the gross savings achieved through the Small Buildings Program were collected for a random sample of program participants who participated during the 2013 program year. Data provided by the implementation contractor showed that during 2013, there were 31,249 shipped kits for the program, which were expected to provide savings of 74,177,680 kWh annually.

Data used to estimate the gross savings achieved through the Government Lighting Program were collected for a census of projects completed during the 2013 program year. Data provided by the implementation contractor showed that during 2013, there were 4 projects for the program, which were expected to provide savings of 632,101kWh annually.

For Large and Small Equipment Programs, inspection of data on kWh savings for individual projects provided by implementation contractor indicated that the distribution of savings was generally positively skewed, with a relatively small number of projects accounting for a high percentage of the estimated savings. Estimation of savings for each program is based on a ratio estimation procedure, which allows precision/confidence requirements to be met with a smaller sample size. ADM selected a sample with a sufficient number of projects to estimate the total achieved savings with 10% precision at 90% confidence. For the Large Equipment Program sample, the actual precision is $\pm 8\%$. For the Small Equipment Program sample, the actual precision is $\pm 9\%$.

For the Small Buildings Program, estimation of savings for the program is based on a random sample of survey respondents. There was no stratification performed for purposes of sample selection for the population of Small Buildings projects. ADM selected a sample with a sufficient number of participants to estimate the total achieved savings with 10% precision at 90% confidence. For the Small Buildings Program sample, the actual precision is $\pm 1\%$.

For the Government Lighting Program, estimation of savings for the program is based on a census estimation procedure. A total of four site visits were performed for all the projects in the program.

Sampling for the collection of program M&V data accounted for the M&V effort occurring in real time during program implementation. Completed projects accumulate over time as the program is implemented, and sample selection was thus spread over the entire program year. ADM used a near real-time process whereby a portion of the sample was selected periodically as projects in the program were completed. The timing of sample selection was contingent upon the timing of the completion of projects during the program year.

Table 4-1 shows the number of projects and expected energy savings of projects by stratum for the Large Equipment Program. Table 4-2 shows the number of projects and expected energy savings of projects by stratum for the Small Equipment Program. Stratum 0 contains all Appliance Recycling projects in the Small Equipment Program. Table 4-3 shows the number of projects and expected energy savings of projects for the Small Buildings Program.

Table 4-1 Population Statistics Used for Sample Design for Large Equipment

	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Stratum 5	Totals
Strata boundaries (kWh)	< 32914	32914 - 193861	193862 - 764963	764964 - 1894434	1894435 - 12081374	
Number of projects	68	64	45	18	8	203
Total kWh savings	839,003	6,075,077	17,587,654	19,570,133	35,158,216	79,230,083
Average kWh Savings	12,338	94,923	390,837	1,087,230	4,394,777	390,296
Standard deviation of kWh savings	7,365	45,120	141,942	318,168	3,488,191	1,090,552
Coefficient of variation	0.60	0.48	0.36	0.29	0.79	2.79
Final design sample	3	3	4	9	8	27

Table 4-2 Population Statistics Used for Sample Design for Small Equipment

	Stratum 0 & 1	Stratum 2	Stratum 3	Stratum 4	Stratum 5	Totals
Strata boundaries (kWh) Savings	< 25743	25743 - 94675	94676 - 248501	248502 - 787578	787579 - 2360359	
Number of projects	767	341	132	61	8	1,309
Total kWh savings	5,766,372	17,983,659	20,650,465	23,998,649	11,831,801	80,230,947
Average kWh Savings	7,540	52,738	156,443	393,420	1,478,975	61,292

	<i>Stratum 0 & 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Stratum 4</i>	<i>Stratum 5</i>	<i>Totals</i>
Standard deviation of kWh savings	6,510	19,423	47,011	134,292	593,395	152,056
Coefficient of variation	0.86	0.37	0.30	0.34	0.40	2.48
Final design sample	9	9	10	10	7	45

Table 4-3 Population Statistics Used for Sample Design for Small Buildings

	<i>Sample</i>
Number of participants	26,829
Total kWh savings	74,177,680
Average kWh Savings	2,765
Standard deviation of kWh savings	860
Coefficient of variation	0.31
Final design sample	372

As shown in Table 4-4, the Large Equipment Program sample projects account for approximately 60% of the expected kWh savings. As shown in Table 4-5, the Small Equipment Program sample projects account for approximately 22% of the expected kWh savings. As shown in Table 4-6, the Government Lighting Program census accounts for 100% of the expected kWh savings.

Table 4-4 Expected kWh Savings for Sampled Projects by Stratum for Large Equipment

<i>Stratum</i>	<i>Ex Ante kWh Savings (Population)</i>	<i>Ex Ante kWh Savings (Sample)</i>	<i>Percent of Ex Ante kWh Savings in Sample</i>
5	35,158,216	35,158,216	100%
4	19,570,133	9,958,998	51%
3	17,587,654	2,279,728	13%
2	6,075,077	431,694	7%
1	839,003	48,924	6%
Total	79,230,083	47,877,560	60%

Table 4-5 Expected kWh Savings for Sampled Projects by Stratum for Small Equipment

<i>Stratum</i>	<i>Ex Ante kWh Savings (Population)</i>	<i>Ex Ante kWh Savings (Sample)</i>	<i>Percent of Ex Ante kWh Savings in Sample</i>
5	11,831,801	10,949,595	93%
4	23,998,649	4,266,860	18%
3	20,650,465	1,888,066	9%
2	17,983,659	627,793	3%
1	5,568,556	28,561	1%
0	197,816	10,734	5%
Total	80,230,947	17,771,609	22%

Table 4-6 Expected kWh Savings for Projects in Government Lighting Equipment Census

<i>Stratum</i>	<i>Ex Ante kWh Savings (Population)</i>	<i>Ex Ante kWh Savings (Sample)</i>	<i>Percent of Ex Ante kWh Savings in Sample</i>
Census	632,101	632,101	100%
Total	632,101	632,101	100%

As shown in Table 4-7, the Large Equipment Program sample projects account for approximately 58% of the expected peak kW savings. As shown in Table 4-8, the Small Equipment Program sample projects account for approximately 19% of the expected peak kW savings. As shown in Table 4-9, the Government Lighting Program census accounts for 100% of the expected peak kW savings.

Table 4-7 Expected Peak Demand kW Savings for Sampled Projects by Stratum for Large Equipment

<i>Stratum</i>	<i>Ex Ante Peak kW Savings (Population)</i>	<i>Ex Ante Peak kW Savings (Sample)</i>	<i>Percent of Ex Ante Peak kW Savings in Sample</i>
5	4,035.40	4,035.40	100%
4	2,912.07	1,752.29	60%
3	2,538.18	226.68	9%
2	1,027.85	105.84	10%
1	145.63	10.37	7%
Total	10,659.14	6,130.58	58%

Table 4-8 Expected Peak Demand kW Savings for Sampled Projects by Stratum for Small Equipment

<i>Stratum</i>	<i>Ex Ante Peak kW Savings (Population)</i>	<i>Ex Ante Peak kW Savings (Sample)</i>	<i>Percent of Ex Ante Peak kW Savings in Sample</i>
5	1,479.64	1,313.39	89%
4	4,545.56	962.78	21%
3	3,749.22	317.23	8%
2	3,455.27	123.51	4%
1	1,275.71	4.76	0%
0	44.26	2.77	6%
Total	14,549.66	2,724.44	19%

Table 4-9 Expected Peak Demand kW Savings for Projects in Government Lighting Census

<i>Stratum</i>	<i>Ex Ante Peak kW Savings (Population)</i>	<i>Ex Ante Peak kW Savings (Sample)</i>	<i>Percent of Ex Ante Peak kW Savings in Sample</i>
Census	60.97	60.97	100%
Total	60.97	60.97	100%

4.1.2 Review of Documentation

After the samples of projects were selected, the program implementation contractor provided documentation pertaining to the projects. The first step in the evaluation effort was to review this documentation and other program materials that were relevant to the evaluation effort.

For each project, the available documentation (e.g., audit reports, savings calculation work papers, etc.) for each rebated measure was reviewed, with particular attention given to the calculation procedures and documentation for savings estimates. Documentation that was reviewed for all projects selected for the sample included program forms, data bases, reports, billing system data, weather data, and any other potentially useful data. Each application was reviewed to determine whether the following types of information had been provided:

- Documentation for the equipment changed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Documentation for the new equipment installed, including (1) descriptions, (2) schematics, (3) performance data, and (4) other supporting information
- Information about the savings calculation methodology, including (1) what methodology was used, (2) specifications of assumptions and sources for these specifications, and (3) correctness of calculations

If there was uncertainty regarding a project, or apparently incomplete project documentation, ADM staff contacted the implementation contractor to seek further information to ensure the development of an appropriate project-specific M&V plan.

4.1.3 On-Site Data Collection Procedures

On-site visits were used to collect data that were used in calculating savings impacts. The visits to the sites of the sampled projects were used to collect primary data on the facilities participating in the program.

When projects were selected for the M&V sample, ADM notified the Companies in two ways:

- 1) The Companies Customer Service Representatives (CSR) were provided with a list of all sites for which ADM attempted to schedule M&V activities for which there was a CSR. This list includes the company name, the respective CSR for the customer, the site address or other premise identification, as well as the respective contact information for the customer representative ADM intended to contact in order to schedule an appointment.
- 2) ADM provided the Companies Energy Efficiency and Demand Response EM&V staff with a list of projects for which ADM planned to schedule M&V activities. This notification also served as a request to the implementation contractor for any documentation relating to the projects. This list included the company name, the project ID, the site address or other premise identification, and the respective contact information for the customer representative ADM intended to contact in order to schedule an appointment.

Typically, for customers with CSRs, notification was provided at least two weeks prior to ADM contacting customers in order to schedule M&V visits. Upon CSR request, ADM coordinated its scheduling and M&V activities with the CSR.

During an on-site visit, the field staff accomplished three major tasks:

- First, they verified the implementation status of all measures for which customers received incentives. They verified that the energy efficiency measures were indeed installed, that they were installed correctly and that they still functioned properly.
- Second, they collected the physical data needed to analyze the energy savings that have been realized from the installed improvements and measures. Data were collected using a form that was prepared specifically for the project in question after an in-house review of the project file.
- Third, they interviewed the contact personnel at a facility to obtain additional information on the installed system to complement the data collected from other sources.

At some sites, monitoring was conducted to gather more information on the operating hours of the installed measures. Monitoring was conducted at sites where it was judged that the monitored data would be useful for further refinement and higher accuracy of savings calculations. Monitoring was not considered necessary for sites where project documentation allowed for sufficiently detailed calculations.

4.1.4 Procedures for Estimating Savings from Measures

The method ADM employs to determine gross savings impacts depends on the types of measures being analyzed. Categories of measures include the following:

- Lighting
- HVAC
- Motors

- VFDs
- Compressed-Air
- Refrigeration
- Process Improvements
- Kits

ADM uses a specific set of methods to determine gross savings for projects that depend on the type of measure being analyzed. These typical methods are summarized in Table 4-10.

Table 4-10 Typical Methods to Determine Savings for Custom Measures

<i>Type of Measure</i>	<i>Method to Determine Savings</i>
Compressed Air Systems	Engineering analysis, with monitored data on load factor and schedule of operation
Lighting	Custom-designed lighting evaluation model, which uses data on wattages before and after installation of measures and hours-of-use data from field monitoring.
HVAC (including packaged units, chillers, cooling towers, controls/EMS)	eQUEST model using DOE-2 as its analytical engine for estimating HVAC loads and calibrated with site-level billing data to establish a benchmark.
Motors and VFDs	Measurements of power and run-time obtained through monitoring
Refrigeration	Simulations with EQuest engineering analysis model, with monitored data
Process Improvements	Engineering analysis, with monitored data on load factor and schedule of operation

The activities specified in Table 4-13 produced two estimates of gross savings for each sample project: an expected gross savings estimate (as reported in the project documentation and program tracking system) and the verified gross savings estimates developed through the M&V procedures employed by ADM. ADM developed estimates of program-level gross savings by applying a ratio estimation procedure in which achieved savings rates estimated for the sample projects were applied to the program-level expected savings.

Energy savings realization rates¹ were calculated for each project for which on-site data collection and engineering analysis/building simulations are conducted. Sites with

¹ The savings realization rate for a project is calculated as the ratio of the achieved savings (ex post) for the project (as measured and verified through the M&V effort) to the expected savings (ex ante) (as determined through the project application procedure and recorded in the tracking system for the program).

relatively high or low realization rates were further analyzed to determine the reasons for the discrepancy between expected and realized energy savings.

The following discussion describes the basic procedures used for estimating savings from various measure types.

Plan for Analyzing Savings from Lighting Measures: Lighting measures examined include retrofits of existing fixtures, lamps and/or ballasts with energy efficient fixtures, lamps and/or ballasts. These types of measures reduce demand, while not affecting operating hours. Any proposed lighting control strategies are examined that might include the addition of energy conserving control technologies such as motion sensors or daylighting controls. These measures typically involve a reduction in hours of operation and/or lower current passing through the fixtures.

Analyzing the savings from such lighting measures requires data for retrofitted fixtures on (1) wattages before and after retrofit and (2) hours of operation before and after the retrofit. Fixture wattages are taken from a table of standard wattages, with corrections made for non-operating fixtures. Hours of operation are determined from metered data collected after measure installation for a sample of fixtures.

To determine baseline and post-retrofit demand values for the lighting efficiency measures, ADM uses in-house data on standard wattages of lighting fixtures and ballasts to determine demand values for lighting fixtures. These data provide information on wattages for common lamp and ballast combinations.

As noted, ADM collects data with which to determine average operating hours for retrofitted fixtures by using Time-of-Use (TOU) data loggers to monitor a sample of “last points of control” for unique usage areas in the sites where lighting efficiency measures have been installed. Usage areas are defined to be those areas within a facility that are expected to have comparable average operating hours. For industrial customers, expected usage areas include fabrication areas, clean rooms, office space, hallways/stairways, and storage areas. Typical usage areas are designated in the forms used for data collection.

ADM uses per-fixture baseline demand, retrofit demand, and appropriate post-retrofit operating hours to calculate peak demand savings and annual energy savings for sampled fixtures of each usage type.

The on-off profile and the fixture wattages are used to calculate post-retrofit kWh usage. Fixture peak demand is calculated by dividing the total kWh usage calculated peak period of the day by the number of hours in the peak period.

Peak Period Demand Savings are calculated as the difference between peak period baseline demand and post-installation peak period demand of the affected lighting equipment.

The baseline and post-installation peak period demands are calculated by dividing the total kWh usage during the Peak Period by the number of hours in the peak period.

ADM calculates annual energy savings for each sampled fixture per the following formula:

$$\text{Annual Energy Savings} = kWh_{\text{Before}} - kWh_{\text{After}}$$

The values for insertion in this formula are determined through the following steps:

- 1) Results from the monitoring data are used to calculate the average operating hours of the metered lights for every unique building type/usage area. The monitoring data are extrapolated to develop the annual operating profile of the lighting.
- 2) These average operating hours are then applied to the baseline and post-installation average demand for each usage area to calculate the energy usage and peak period demand for each usage area.
- 3) The annual baseline energy usage is calculated as the sum of the annual baseline kWh for all of the usage areas. The post-retrofit energy usage is calculated similarly. The energy savings are calculated as the difference between baseline and post-installation energy usage.
- 4) Savings from lighting measures in conditioned spaces are factored by the region-specific, building type-specific heating cooling interaction factors in order to calculate total savings attributable to lighting measures, inclusive of impacts on HVAC operation. These factors were calculated using DEER prototypical models and Typical Meteorological Year 3 (TMY3) weather data.

Plan for Analyzing Savings from HVAC Measures: Savings estimates for HVAC measures installed at a facility are derived by using the energy use estimates developed through DOE-2 simulations and engineering calculations. The HVAC simulations also allow calculation of the primary and secondary effects of lighting measures on energy usage. Each simulation produces estimates of HVAC energy and demand usage to be expected under different assumptions about equipment and/or construction conditions. There may be cases in which DOE-2 simulation is inappropriate because data are not available to properly calibrate a simulation model, and engineering analysis provides more accurate M&V results.

For the analysis of HVAC measures, the data collected through on-site visits and monitoring are utilized. Using these data, ADM prepares estimates of the energy savings for the energy efficient equipment and measures installed in each of the participant facilities. ADM Engineering staff develop independent estimates of the savings through engineering calculations or through simulations with energy analysis models. By using energy simulations for the analysis, the energy use associated with the end use affected by the measure(s) being analyzed can be quantified. With these quantities in hand, it is a simple matter to determine what the energy use would have been without the measure(s).

Before making the analytical runs for each site with sampled project HVAC measures, engineering staff prepared a model calibration run. This is a base case simulation to ensure that the energy use estimates from the simulations have been reconciled against

actual data on the building's energy use. This run is based on the information collected in an on-site visit pertaining to types of equipment, their efficiencies and capacities, and their operating profiles. Current operating schedules are used for this simulation, as are local (TMY) weather data covering the study period. The model calibration run is made using actual weather data for a time period corresponding to the available billing data for the site.

The goal of the model calibration effort is to have the results of the DOE-2 simulation come within approximately 10% of the patterns and magnitude of the energy use observed in the billing data history. In some cases, it may not be possible to achieve this calibration goal because of idiosyncrasies of particular facilities (e.g., multiple buildings, discontinuous occupancy patterns, etc.).

Once the analysis model has been calibrated for a particular facility, ADM performs three steps in calculating estimates of energy savings for HVAC measures installed or to be installed at the facility.

- First, an analysis of energy use at a facility under the assumption that the energy efficiency measures are not installed is performed. If the measure involves replacement of equipment on failure, the required minimum efficiencies given by the appropriate energy efficiency standard would be used. This methodology holds true for all programs/measures being considered.
- Second, energy use at the facility with all conditions the same but with the energy efficiency measures now installed is analyzed.
- Third, the results of the analyses from the preceding steps are compared to determine the energy savings attributable to the energy efficiency measure.

Plan for Analyzing Savings from Motors: Estimates of the energy savings from use of high efficiency motors on HVAC and non-HVAC applications are derived through an "after-only" analysis. With this method, energy use is measured only for the high efficiency motor and only after it has been installed. The data thus collected are then used in estimating what energy use would have been for the motor application *if the high efficiency motor had not been installed*. In effect, the after-only analysis is a reversal of the usual design calculation used to estimate the savings that would result from installing a high efficiency motor. That is, at the design stage, the question addressed is how would energy use change for an application if an high efficiency motor is installed, whereas the after-only analysis addresses what the level of energy use would have been had the high efficiency motor not been installed.

For the "after only" analysis, it is not possible to use a comparison of direct measurements to determine savings, since measured data are collected only for the high efficiency motor. However, savings attributable to installation of the high efficiency motor can be estimated using information on the efficiencies of the high efficiency motor and on the motor it replaced. In particular, demand and energy savings can be calculated as follows:

$$\text{Demand Savings} = \text{kW}_{\text{peak}} \times (1/\text{Eff}_{\text{old}} - 1/\text{Eff}_{\text{new}})$$

where $\text{kW}_{\text{peak}} = \text{Volts} \times \text{Amps}_{\text{peak}} \times \text{Power Factor}$, and $\text{Amps}_{\text{peak}}$ is the interval with the maximum recorded Amps during the monitoring period

$$\text{Energy Savings} = \text{kW}_{\text{ave}} \times (1/\text{Eff}_{\text{old}} - 1/\text{Eff}_{\text{new}}) \times \text{Hours of use}$$

where $\text{kW}_{\text{ave}} = \text{Volts} \times \text{Amps}_{\text{ave}} \times \text{Power Factor}$ and Amps_{ave} is the average measured Amps for the duration of the monitored period.

$$\text{Annual Energy Savings} = \text{kW}_{\text{ave}} \times (1/\text{Eff}_{\text{old}} - 1/\text{Eff}_{\text{new}}) \times (\text{days of operation per year/ days metered}) \times \text{Annual Adjustment Factor}$$

where $\text{kW}_{\text{ave}} = \text{Volts} \times \text{Amps}_{\text{ave}} \times \text{Power Factor}$ for the monitoring period

Amps_{ave} = the average measured Amps for the duration of the monitored period, and use factor is determined from interviews with site personnel.

Annual Adjustment Factor is 1 if the monitoring period is typical for the yearly operation, less than 1 if the monitoring period is expected to be higher use than typical for the rest of the year, and more than 1 if the monitoring period is expected to be lower than typical for the rest of the year.²

The information on motor efficiencies needed for the calculation of savings is obtained from different sources.

Data on the efficiencies of high efficiency motors installed under the program should be available from program records.

Care must be taken using nameplate efficiency ratings of replaced motors, unless the company maintains good documentation of their equipment. If a motor has been rewound it may not operate as originally rated. However, if the efficiencies of the old motors are not directly available, the efficiency values can be imputed by using published data on average efficiency values for motors of given horsepower. If the motor replacement is for normal replacement, the baseline efficiency is established as the efficiency of a new, standard efficiency motor. However, in cases of early replacement, the efficiency of the old motor is used for the length of the remaining life.³

Because most motors monitored run only under full load conditions, some adjustments must be made from the “industry averages” of full load efficiencies. Motor efficiency curves of typical real motors that have the same full load efficiencies are used for determining part load efficiencies.

Like motor efficiency, the power factor varies with motor loading. Motor power factor curves of typical real motors that have the same full load power factor are used for determining part load power factor.

² Current year weather data were compared with the *Typical Meteorological Year* from the National Oceanic & Atmospheric Administration (NOAA).

³ Assumptions regarding measure expected useful life were taken from the most recent Database for Energy Efficiency Resources (DEER). See <http://www.deeresources.com/>.

Another factor to consider in demand and energy savings comparisons of motor change out programs is the rotor slip. Full load RPM ratings of motors vary. For centrifugal loads such as fans and pumps, the power supplied is dependent on the speed of the driven equipment. The power is theoretically proportional to the cube of the speed, but in practice acts more like the square of the speed. In general high efficiency motors have slightly higher full load RPM ratings (lower slip) than standard motors. Where nameplate ratings of full load RPM are available for replaced motors, a de-rating factor can be applied.⁴

The data needed to carry out these plans for determining savings are collected from several sources.

- The first source of data is the information from each project's documentation. This information is expected to include aggregate energy used at a site, disaggregated energy usage data for certain targeted processes (if available), before (actual) and after (projected) data on production and other key performance indicators, and final reports (which include process improvement recommendations, analyses, conclusions, performance targets, etc.).
- The second source of data is the energy use data that the Companies collect for these customers.
- The third source is information collected through on-site inspections of the facilities. ADM staff collects the data during on-site visits using a form that is comprehensive in addressing a facility's characteristics, its modes and schedules of operation, and its electrical and mechanical systems. The form also addresses various energy efficiency measures, including high efficiency lighting (both lamps and ballasts), lighting occupancy sensors, lighting dimmers and controls, air conditioning, high efficiency motors, etc.
- As a fourth source of data, selected end-use equipment are monitored to develop information on operating schedules and power draws.

Plan for Analyzing Savings from VFDs: A variable-frequency drive (VFD) is an electronic device that controls the speed of a motor by varying the magnitude of the voltage, current, or frequency of the electric power supplied to the motor. The factors that make a motor load a suitable application for a VFD are (1) variable speed requirements and (2) high annual operating hours. The interplay of these two factors can be summarized by information on the motor's duty cycle, which essentially shows the percentage of time during the year that the motor operates at different speeds. The duty cycle should show good variability in speed requirements, with the motor operating at reduced speed a high percentage of the time.

⁴As an example, take the case where a new motor has a full load RPM rating of 1770 and the old motor had a full load RPM rating of 1760. The derating factor would be:

$$\text{Derating factor} = (\text{RPM}_{\text{old}})^2 / (\text{RPM}_{\text{new}})^2 = 1760^2 / 1770^2 = 0.989$$

Potential energy savings from the use of VFDs are usually most significant with variable-torque loads, which have been estimated to account for 50% to 60% of total motor energy use in the non-residential sectors. Energy saving VFDs may be found on fans, centrifugal pumps, centrifugal blowers, and other centrifugal loads, most usually where the duty cycle of the process provided a wide range of speeds of operation.

ADM's approach to determining savings from installation of VFDs involves (1) making one-time measurements of voltage, current, and power factor of the VFD/motor and (2) conducting continuous measurements of amperage over a period of time in order to obtain the data needed to develop VFD load profiles and calculate demand and energy savings. VFDs are generally used in applications where motor loading changes when the motor speed changes. Consequently the true power drawn by a VFD is recorded in order to develop VFD load shapes. One-time measurements of power are made for different percent speed settings. Power and percent speed or frequency (depending on VFD display options) are recorded for as wide a range of speeds as the customer allows the process to be controlled; field staff attempt to obtain readings from 40 to 100% speed in 10 to 15% increments.

Plan for Analyzing Savings from Compressed Air Measures: Measures to improve the efficiency of a compressed air system include the reduction of air leaks, resizing of compressors, installing more efficient compressors, improved controls, or a complete system redesign. Savings from such measures are evaluated through engineering analysis of compressor performance curves, supported by data collected through short-term metering.

ADM field staff obtains nameplate information for the pre-retrofit equipment either from the project file or during the on-site survey. Performance curve data are obtained from manufacturers. Engineering staff then conducts an engineering analysis of the performance characteristics of the pre-retrofit equipment. During the on-site survey, field staff inspects the as-built system equipment, take pressure and load readings, and interview the system operator to identify seasonal variations in load. Potential interactions with other compressors are assessed and it is verified that the rebated compressor is being operated as intended.

When appropriate, short-term measurements are performed to reduce the uncertainty in defining the load on the as-built system. These measurements may be taken either with a multi-channel logger, which can record true power for several compressors, with current loggers, which can provide average amperage values, or with motor loggers to record operating hours. The appropriate metering equipment is selected by taking into account variability in load and the cost of conducting the monitoring.

Plan for Analyzing Savings from Refrigeration and Process Improvements: Analysis of savings from refrigeration and process improvements is inherently project-specific. Because of the specificity of processes, analyzing the processes through simulations is generally not feasible. Rather, reliance is made on engineering analysis of the process affected by the improvements. Major factors in ADM's engineering analysis

of process savings are operating schedules and load factors. Information on these factors is developed through short-term monitoring of the affected equipment, be it pumps, heaters, compressors, etc. The monitoring is done after the process change, and the data gathered on operating hours and load factors are used in the engineering analysis to define “before” conditions for the analysis of savings.

Plan for Analyzing Savings from CFL Kit Measures: For this measure, energy savings impacts come from shipped kits containing compact fluorescent light bulbs, smart strip plug outlets, and LED night lights that are mailed directly to participants’ facilities. The baseline lighting connected load was determined in accordance with methodology outlined in the Ohio TRM. Energy savings for smart strip plug outlets were determined in accordance with the methodology outlined in the Ohio TRM, while energy savings for LED night lights were determined in accordance with the methodology outlined in the Pennsylvania TRM. The four parameters that are determined from tracking data are the hours of operation, heating cooling interaction factors, coincidence factors, and in-service rate (ISR). Hours of operation used in the analysis are determined using Ohio TRM deemed values and building type-specific information found in the program tracking data. Heating cooling interaction factors and coincidence factors are region-specific and building type-specific and were calculated using DEER prototypical models and TMY3 weather data. The ISR is estimated based on survey data collected from a random sample of program participants; furthermore, using methodology outlined in the Ohio TRM, the ISR is adjusted to include CFLs anticipated to be installed in the future.

4.2 Process Evaluation Methodology

The purpose of the process evaluation is to examine program operations and results throughout the program operating year, and to identify potential program improvements that may prospectively increase program efficiency or effectiveness in terms of customer participation and satisfaction levels. This process evaluation was designed to document the operations and delivery of the C/I Programs during the 2013 Program Year. Figure 4-1 provides an overview of the evaluation process, including the specific research activities performed.

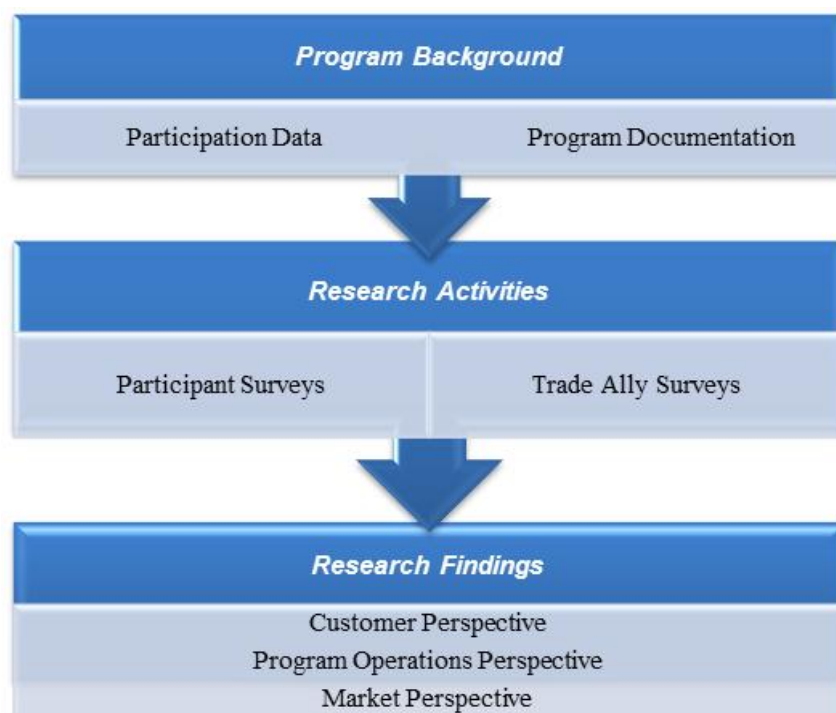


Figure 4-1. Process Evaluation Overview

Key research questions to be addressed by this evaluation of the 2013 Program Year activity include:

- *Where was the C/I Programs delivery effective and successful?*
- *Are there areas of the C/I Programs that could be improved?*
- *Did the C/I Programs reduce barriers to increased energy efficiency project implementation?*

During the evaluation, data and information from multiple sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the C/I Programs was developed from an online and telephone survey of program participants. The market perspective was developed through interviews with trade allies that market the program to their customers, worked with participants to prepare incentive applications, and assisted with project implementation. Trade allies are contractors who assist with the completion of customer projects. Customer and trade ally surveys also provide insight into the effectiveness of program operations.

5. Detailed Evaluation Findings

This chapter reports ADM's impact evaluation findings and process evaluation findings for the Large Equipment, Small Equipment, Small Buildings, and Government Lighting Programs during the 2013 program year.

5.1 Impact Evaluation Findings

This section provides the results of gross savings for the Large Equipment, Small Equipment, Small Buildings, and Government Lighting Programs during the 2013 program year. Table 5-1 summarizes the gross savings for each program.

Table 5-1 Gross Savings by Program

	Ex Ante kWh Savings	Ex Post kWh Savings	Realization Rate	Ex Ante Peak kW Savings	Ex Post Peak kW Savings	Realization Rate
Large Equipment	79,230,083	71,446,442	90%	10,659.14	10,274.94	96%
Small Equipment	80,230,947	78,850,049	98%	14,549.66	14,802.08	102%
Small Buildings	74,177,680	60,501,647	82%	15,623.19	14,616.35	94%
Government Lighting	632,101	631,282	100%	60.97	58.48	96%
Total	234,270,810	211,429,420	90%	40,892.96	39,751.85	97%

5.1.1 Gross Savings

To estimate gross kWh savings and peak kW reductions for Large Equipment, data were collected and analyzed for samples of 27 incentive projects. To estimate gross kWh savings and peak kW reductions for Small Equipment, data were collected and analyzed for samples of 45 incentive projects. To estimate gross kWh savings and peak kW reductions for Small Buildings, data were collected and analyzed from a sample of 372 program participants. To estimate gross kWh savings and peak kW reductions for Government Lighting, data were collected and analyzed for a census of 4 incentive projects.

The data were analyzed using the methods described in section 4.1 to estimate project energy savings and peak kW reductions and to determine realization rates for the programs. The results of that analysis are reported in this section.

5.1.2 Realized Gross kWh Savings

The gross kWh savings of the 2013 Large Equipment Program are summarized by sampling stratum in Table 5-2. Overall, the achieved gross savings of 71,446,442 kWh were equal to 90% of the expected savings.

The gross kWh savings of the 2013 Small Equipment Program are summarized by sampling stratum in Table 5-3. Overall, the achieved gross savings of 78,850,049 kWh were equal to 98% of the expected savings.

The gross kWh savings of the 2013 Small Buildings Program are summarized by Kit Type in Table 5-4. Overall, the achieved gross savings of 60,501,647 kWh were equal to 82% of the expected savings.

The gross kWh savings of the 2013 Government Lighting Program are summarized by census in Table 5-5. Overall, the achieved gross savings of 631,282 kWh were equal to 100% of the expected savings.

Appendix 1 contains project-level M&V reports providing information regarding the factors determining ex post energy savings and variances between ex post and ex ante energy savings.

Table 5-2 Expected and Gross Realized kWh Savings for Large Equipment by Sample Stratum

<i>Stratum</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
5	35,158,216	32,051,521	91%
4	19,570,133	15,670,694	80%
3	17,587,654	18,599,219	106%
2	6,075,077	4,325,242	71%
1	839,003	799,766	95%
Total	79,230,083	71,446,442	90%

Table 5-3 Expected and Gross Realized kWh Savings for Small Equipment by Sample Stratum

<i>Stratum</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
5	11,831,801	10,575,748	89%
4	23,998,649	24,217,795	101%
3	20,650,465	22,806,078	110%
2	17,983,659	16,226,027	90%
1	5,568,556	4,872,894	88%
0	197,816	151,507	77%
Total	80,230,947	78,850,049	98%

Table 5-4 Expected and Gross Realized kWh Savings for Small Buildings by Kit Type

<i>Kit Type</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
Kit A	49,658,518	40,646,676	82%
Kit B	17,158,220	13,775,885	80%
Kit C	4,589,673	3,558,776	78%
Kit D	905,224	743,093	82%
Kit E	453,697	376,708	83%
Kit F	163,895	136,844	83%
MultiFamily	1,248,453	1,263,664	101%
Total	74,177,680	60,501,647	82%

Table 5-5 Expected and Gross Realized kWh Savings for Government Lighting by Sample Stratum

<i>Stratum</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
Census	632,101	631,282	100%
Total	632,101	631,282	100%

Table 5-6 shows the expected and realized energy savings by project for the Large Equipment Program. Table 5-7 shows the expected and realized energy savings by project for the Small Equipment Program. Table 5-8 shows the expected and realized energy savings by project for the Government Lighting Program.

Table 5-6 Expected and Gross Realized kWh Savings for Large Equipment by Project

<i>Project ID</i>	<i>Expected kWh Savings</i>	<i>Realized Gross kWh Savings</i>	<i>Project Gross Realization Rate</i>
FOCUPS1526217302	12,081,374	11,830,746	98%
FOCUPS1526661634	4,027,999	3,604,315	89%
FOMDPS1525782492	2,692,661	1,541,922	57%
FONLPS1525486090	1,894,434	1,733,124	91%
FONLPS1525993027	2,429,897	2,436,573	100%
FONLPS1526068856	783,137	748,508	96%
FONLPS1526327894	890,971	457,774	51%
FONLPS1526844933	1,242,495	855,002	69%
FONLPS1526844958	1,097,893	979,478	89%
FONLPS1526844973	121,820	106,566	87%
FONLPS1526939888	865,794	850,854	98%
FONLPS1526939977	1,055,509	857,300	81%
FOSIPS1527758124	764,963	962,985	126%
FOSIPS1527758157	12,183	10,345	85%
FOSIPS1527758207	1,999,676	1,834,341	92%
FOSIPS1527758297	413,336	877,843	212%
FOSIPS1527758336	420,287	342,242	81%
FOSIPS1527758364	1,026,578	934,823	91%
FOSIPS1527758495	161,899	129,595	80%
FOSIPS1527803543	681,142	227,778	33%
FOSIPS1527853562	21,386	19,050	89%
FOSIPS1527867374	15,355	17,241	112%
FOSIPS1528536838	2,433,211	2,753,036	113%
FOSIPS1528536867	6,910,508	5,998,360	87%
FOSQPS1527758666	1,102,187	557,759	51%
FOSQPS1527758691	147,975	71,190	48%
FOSQPS1528536917	2,582,890	2,052,228	79%
Non-Sample Projects	31,352,523	28,655,464	91%
Total	79,230,083	71,446,442	90%

Table 5-7 Expected and Gross Realized kWh Savings for Small Equipment by Project

<i>Project ID</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
FOCTPS1527802349	2,488	1,906	77%
FOCTPS1527983034	2,752	2,108	77%
FOCTPS1528699686	2,874	2,201	77%
FOCTPS1528722748	2,620	2,007	77%
FONLPS1525718109	344,481	346,577	101%
FONLPS1525718193	159,126	239,395	150%
FONLPS1525782602	331,564	534,676	161%
FONLPS1525782792	279,247	138,955	50%
FONLPS1526217273	1,625,873	1,422,741	88%
FONLPS1526217293	1,980,677	1,559,711	79%
FONLPS1526435745	131,544	130,185	99%
FONLPS1526661641	1,876,024	2,106,287	112%
FONLPS1526844947	756,647	780,748	103%
FONLPS1527083155	74,349	50,810	68%
FOSFPS1528566745	45,875	54,719	119%
FOSHPS1527758621	1,150	743	65%
FOSIPS1527758086	491,233	512,814	104%
FOSIPS1527758090	73,554	102,149	139%
FOSIPS1527758189	227,806	203,842	89%
FOSIPS1527758195	4,335	7,915	183%
FOSIPS1527758269	230,068	219,254	95%
FOSIPS1527758309	802,813	811,223	101%
FOSIPS1527758352	2,360,359	2,325,942	99%
FOSIPS1527758360	92,396	90,735	98%
FOSIPS1527758390	208,093	126,174	61%
FOSIPS1527758403	52,392	50,096	96%
FOSIPS1527758420	556,885	597,919	107%
FOSIPS1527758471	120,518	148,339	123%
FOSIPS1527758480	248,501	243,449	98%
FOSIPS1527803529	110,127	107,623	98%
FOSIPS1527803532	78,442	51,200	65%
FOSIPS1527803541	66,306	40,712	61%
FOSIPS1527979899	9,516	9,003	95%
FOSIPS1527993203	94,583	119,337	126%
FOSIPS1527997350	275,968	238,605	86%
FOSIPS1527999067	812,952	291,593	36%
FOSLPS1528536815	9,922	5,739	58%
FOSLPS1528557229	3,638	1,593	44%
FOSQPS1527758664	1,490,897	1,269,699	85%
FOSQPS1527758689	214,300	261,877	122%
FOSQPS1527758694	494,209	500,566	101%
FOSQPS1527758756	49,896	6,678	13%
FOSQPS1527758771	447,074	527,049	118%

<i>Project ID</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
FOSQPS1527803347	237,983	405,015	170%
FOSQPS1527978823	289,552	127,914	44%
Non-Sample Projects	62,459,337	62,072,227	99%
Total	80,230,947	78,850,049	98%

Table 5-8 Expected and Gross Realized kWh Savings for Government Lighting by Project

<i>Project ID</i>	<i>Expected kWh Savings</i>	<i>Realized Gross kWh Savings</i>	<i>Project Gross Realization Rate</i>
FOTSPS1527802987	509,180	496,316	97%
FONLPS1526939905	56,456	63,394	112%
FONLPS1526939904	41,569	46,677	112%
FOTSPS1527757746	24,895	24,895	100%
Non-Sample Projects	0	0	0%
Total	632,101	631,282	100%

Gross realized kWh savings of the Large Equipment Program are shown by building type in Table 5-9. Among discrete building types, manufacturing facilities account for the largest percentage of incentive gross energy - 67%.

Gross realized kWh savings of the Small Equipment Program are shown by building type in Table 5-10. Among discrete building types, manufacturing facilities account for the largest percentage of incentive gross energy - 26%.

Gross realized kWh savings of the Small Buildings Program are shown by building type in Table 5-11. Among discrete building types, office facilities account for the largest percentage of incentive gross energy - 29%.

The Government Lighting Program does not contain discrete building types.

Table 5-9 Realized Gross kWh Savings by Facility Type for Large Equipment

<i>Facility Type</i>	<i>Ex Ante kWh Savings</i>				<i>Ex Post kWh Savings</i>				<i>Percent of Total Ex Post kWh Savings</i>	<i>Realization Rate</i>
	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>		
Manufacturing	8,091,221	40,332,505	5,054,138	53,477,863	7,938,894	35,321,843	4,628,403	47,889,140	67%	90%
Other	3,102,856	6,908,725	3,359,936	13,371,517	3,064,038	6,765,609	2,786,233	12,615,881	18%	94%
Office	1,100,457	691,234		1,791,692	1,151,086	628,235		1,779,322	2%	99%
Warehouse	457,569	2,186,717	1,841,813	4,486,099	483,886	1,975,599	1,474,823	3,934,309	6%	88%
K-12 Education	157,207	1,140,621	1,212,266	2,510,094	111,926	1,030,752	767,131	1,909,808	3%	76%
Medical Clinic	94,057	879,852	40,893	1,014,802	66,965	1,051,636	38,980	1,157,582	2%	114%
Retail	89,697		13,626	103,323	63,861		12,989	76,850	0%	74%
Hospital		1,496,202	16,881	1,513,083		1,174,565	16,092	1,190,657	2%	79%
Grocery		115,436	846,174	961,610		110,037	782,857	892,894	1%	93%
Total	13,093,064	53,751,292	12,385,727	79,230,083	12,880,658	48,058,277	10,507,508	71,446,442	100%	90%

Table 5-10 Realized Gross kWh Savings by Facility Type for Small Equipment

Facility Type	Ex Ante kWh Savings				Ex Post kWh Savings				Percent of Total Ex Post kWh Savings	Realization Rate
	CEI	OE	TE	Total Companies	CEI	OE	TE	Total Companies		
Manufacturing	11,384,650	8,103,865	770,023	20,258,537	11,357,988	8,256,763	746,963	20,361,714	26%	101%
Other	8,923,694	8,797,950	2,550,149	20,271,793	8,589,283	9,155,456	2,460,784	20,205,524	26%	100%
Retail	7,749,895	4,553,519	2,147,326	14,450,740	7,489,572	4,266,738	2,109,843	13,866,153	18%	96%
Hospital	3,822,187	1,253,729		5,075,916	3,451,879	1,341,838		4,793,717	6%	94%
Warehouse	2,405,595	2,312,235	1,293,609	6,011,439	1,886,531	2,278,045	1,317,771	5,482,347	7%	91%
Office	1,579,543	1,636,849	1,265,238	4,481,630	1,489,757	1,826,525	1,350,155	4,666,438	6%	104%
Grocery	732,559	1,709,240	170,598	2,612,397	717,682	1,635,267	152,056	2,505,005	3%	96%
Medical Clinic	675,979	1,101,127	621,066	2,398,172	761,782	1,154,793	623,948	2,540,524	3%	106%
Food Service	643,933	751,137	173,686	1,568,756	538,204	675,711	175,001	1,388,916	2%	89%
K-12 Education	638,214	1,295,822	86,926	2,020,962	637,388	1,323,492	77,687	2,038,567	3%	101%
Multi-Family Common Areas	358,918	183,333	133,612	675,863	362,513	165,010	120,553	648,076	1%	96%
Lodging	4,949	368,450		373,399	4,331	320,457		324,788	0%	87%
Community College			31,344	31,344			28,281	28,281	0%	90%
Total	38,920,116	32,067,254	9,243,576	80,230,947	37,286,911	32,400,096	9,163,043	78,850,049	100%	98%

Table 5-11 Realized Gross kWh Savings by Facility Type for Small Buildings

Facility Type	Ex Ante kWh Savings				Ex Post kWh Savings				Percent of Total Ex Post kWh Savings	Realization Rate
	CEI	OE	TE	Total Companies	CEI	OE	TE	Total Companies		
Office	6,249,686	10,883,987	4,034,674	21,168,346	4,877,479	8,439,024	3,151,907	16,468,410	29%	78%
Retail	4,564,806	7,661,588	2,800,534	15,026,928	4,312,575	7,160,285	2,644,192	14,117,053	20%	94%
Other	2,817,249	6,047,659	2,163,075	11,027,984	1,926,278	4,227,087	1,495,305	7,648,669	15%	69%
Warehouse	2,142,854	3,853,046	1,558,486	7,554,386	1,554,283	2,841,863	1,125,672	5,521,818	10%	73%
Lodging	1,832,252	2,962,946	2,654,881	7,450,078	1,448,448	2,291,250	2,107,629	5,847,326	10%	78%
Food Service	1,349,597	2,167,325	795,494	4,312,415	1,347,829	2,144,340	792,306	4,284,474	6%	99%
Manufacturing	1,066,931	1,279,603	563,902	2,910,436	918,224	1,063,774	456,360	2,438,359	4%	84%
Medical Clinic	590,651	302,981	354,821	1,248,453	597,837	309,782	356,045	1,263,664	2%	101%
Multi-Family Common Areas	477,444	1,160,397	358,610	1,996,452	385,648	940,480	288,132	1,614,260	3%	81%
K-12 Education	224,923	426,214	171,305	822,442	128,327	239,628	108,614	476,569	1%	58%
Grocery	191,834	375,326	92,599	659,759	240,395	464,733	115,916	821,044	1%	124%
Total	21,508,226	37,121,073	15,548,380	74,177,680	17,737,324	30,122,245	12,642,078	60,501,647	100%	82%

5.1.3 Realized Gross Peak kW Savings

The realized gross peak kW reductions of the 2013 Large Equipment Program are shown in Table 5-12. The achieved gross peak demand savings for the program are 10,274.94 kW.

The realized gross peak kW reductions of the 2013 Small Equipment Program are shown in Table 5-13. The achieved gross peak demand savings for the program are 14,802.08 kW.

The realized gross peak kW reductions of the 2013 Small Buildings Program are shown in Table 5-14. The achieved gross peak demand savings for the program are 14,616.35 kW.

The realized gross peak kW reductions of the 2013 Government Lighting Program are shown in Table 5-15. The achieved gross peak demand savings for the program are 58.50 kW.

Table 5-12 Expected and Gross Realized Peak kW Savings for Large Equipment

<i>Stratum</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
5	4,035.40	4,357.55	108%
4	2,912.07	2,201.99	76%
3	2,538.18	3,189.73	126%
2	1,027.85	420.41	41%
1	145.63	105.27	72%
Total	10,659.14	10,274.94	96%

Table 5-13 Expected and Gross Realized Peak kW Savings for Small Equipment

<i>Stratum</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
5	1,479.64	1,237.73	84%
4	4,545.56	4,501.96	99%
3	3,749.22	4,049.03	108%
2	3,455.27	3,559.45	103%
1	1,275.71	1,433.23	112%
0	44.26	20.67	47%
Total	14,549.66	14,802.08	102%

Table 5-14 Expected and Gross Realized Peak kW Savings for Small Buildings

<i>Stratum</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
Kit A	10,592.21	9,861.59	93%
Kit B	3,618.87	3,439.07	95%
Kit C	937.36	877.80	94%
Kit D	197.66	177.54	90%
Kit E	99.07	93.03	94%
Kit F	35.79	34.19	96%
MultiFamily	142.24	133.15	94%
Total	15,623.19	14,616.35	94%

Table 5-15 Expected and Gross Realized Peak kW Savings for Government Lighting

<i>Stratum</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
Census	60.97	58.48	96%
Total	60.97	58.48	96%

5.1.4 Discussion of Gross Savings Analysis

The project realization rates were reviewed to assess whether there were factors that were causing systematic differences in the realization rates. An analysis was conducted

to determine whether realization rates for projects differed systematically by expected kWh savings for Large Equipment and Small Equipment Programs.

For Large Equipment, sample project realization rates and expected kWh savings are plotted in Figure 5-1. There is not a strong association between realization rates and expected kWh savings. Figure 5-2 plots the project realized energy savings against the expected energy savings for each sample point.

For Small Equipment, sample project realization rates and expected kWh savings are plotted in Figure 5-3. There is not a strong association between realization rates and expected kWh savings. Figure 5-4 plots the project realized energy savings against the expected energy savings for each sample point.

For Government Lighting, sample project realization rates and expected kWh savings are plotted in Figure 5-5. There is not a strong association between realization rates and expected kWh savings. Figure 5-6 plots the project realized energy savings against the expected energy savings for each sample point.

Case-by-case examination showed that project-specific factors were more likely to cause realized kWh savings to differ from expected savings. Project-specific factors include type of measure implemented, building type, facility operating schedule, and other parameters that may affect energy efficiency measure savings.

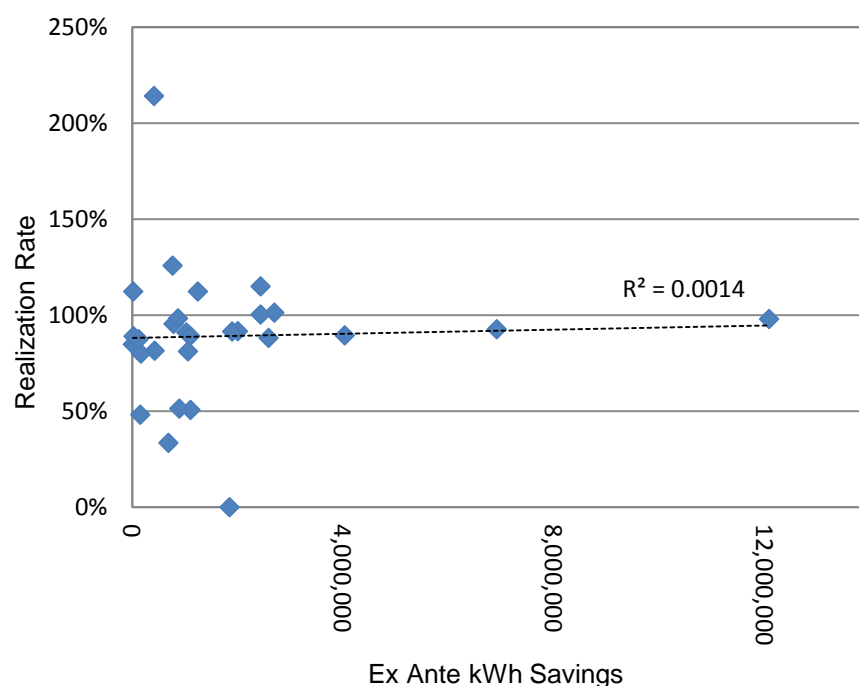


Figure 5-1 Sample Project Realization Rate versus Expected kWh Savings for Large Equipment

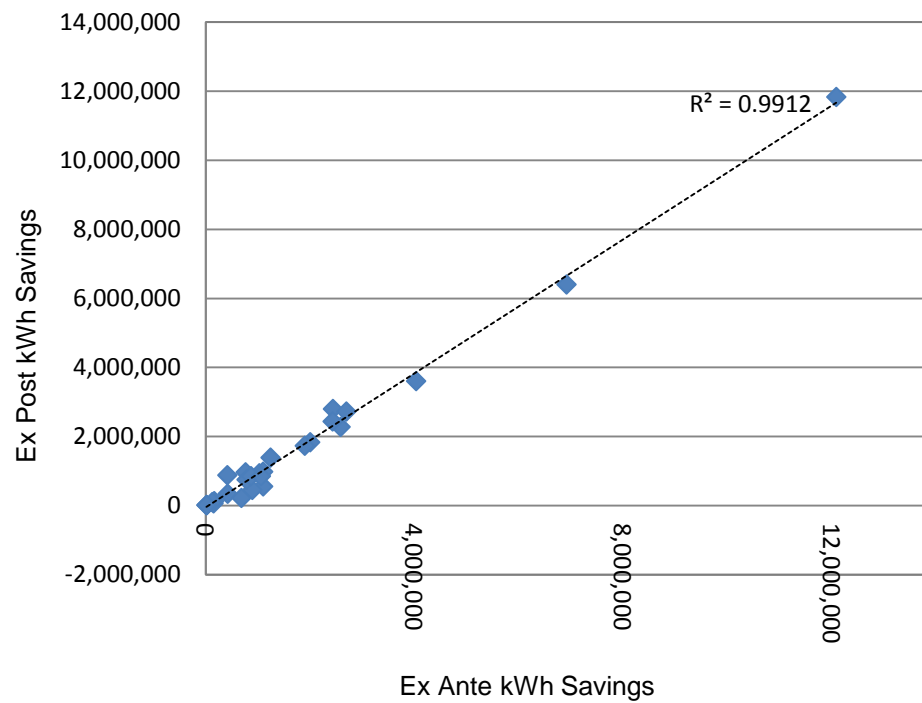


Figure 5-2 Sample Project Realized kWh Savings versus Expected kWh Savings for Large Equipment

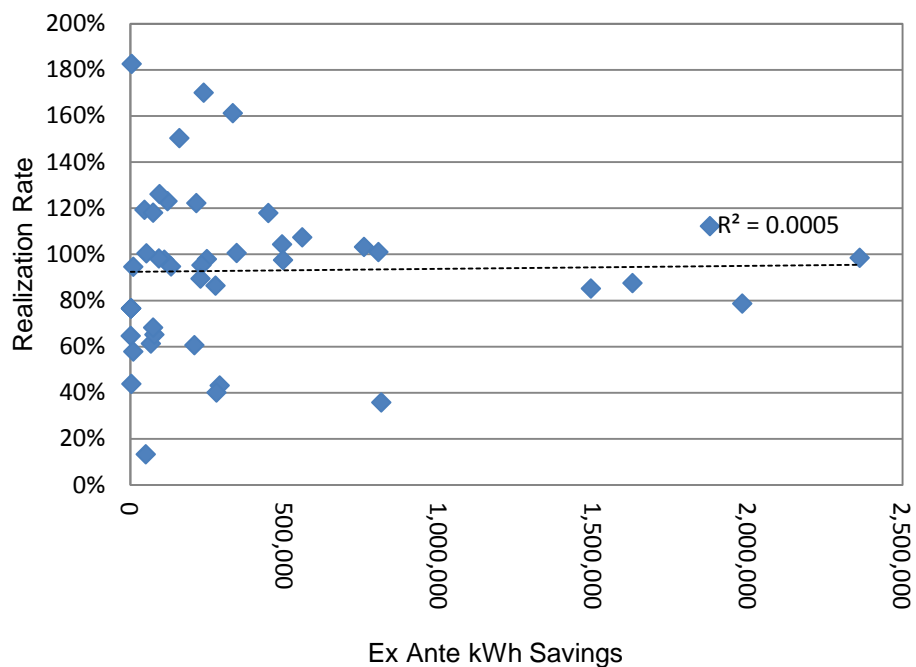


Figure 5-3 Sample Project Realization Rate versus Expected kWh Savings for Small Equipment

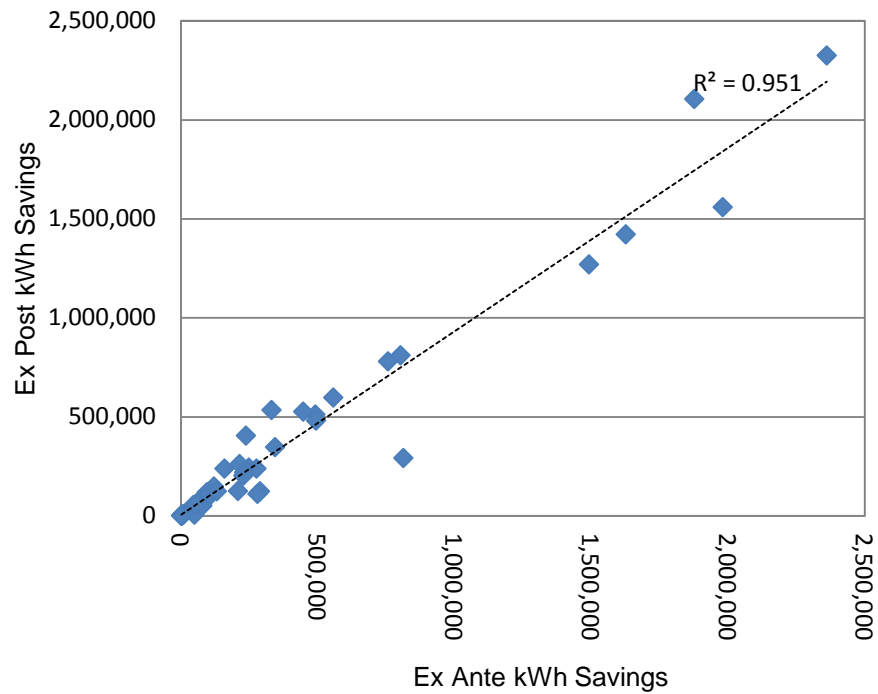


Figure 5-4 Sample Project Realized kWh Savings versus Expected kWh Savings for Small Equipment

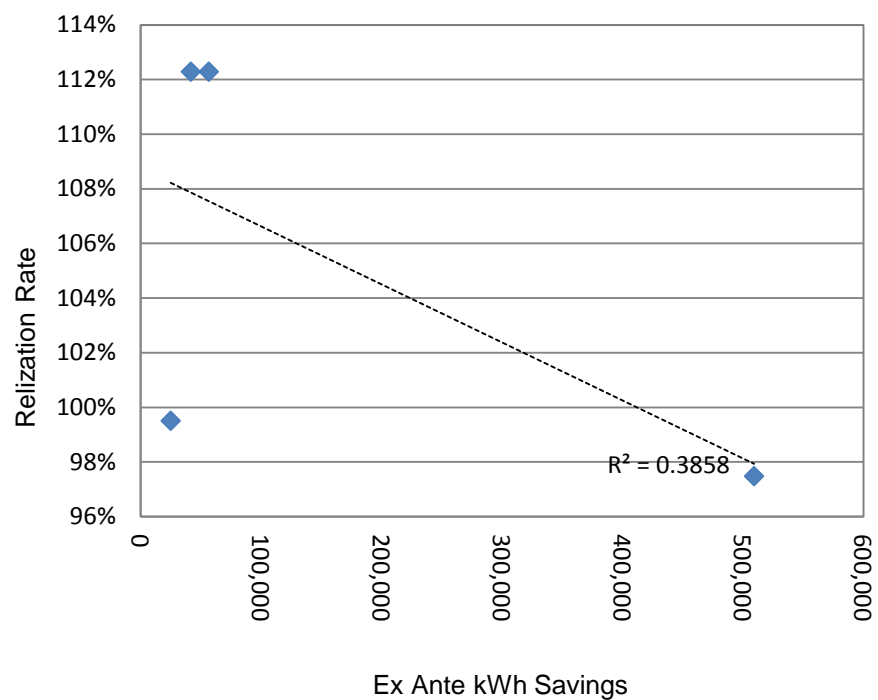


Figure 5-5 Sample Project Realization Rate versus Expected kWh Savings for Government Lighting

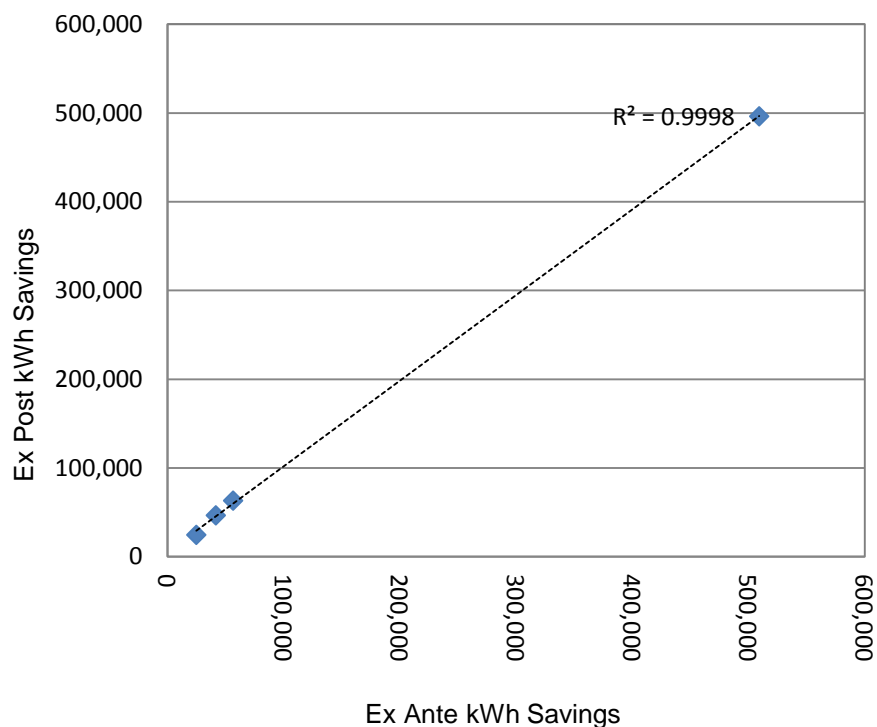


Figure 5-6 Sample Project Realized kWh Savings versus Expected kWh Savings for Government Lighting

The gross savings by measure type and company for the Large Equipment Program are summarized in *Table 5-16*. Non-standard lighting accounts for most (62%) of the ex post kWh savings.

The gross savings by measure type and company for the Small Equipment Program are summarized in *Table 5-17*. Non-standard lighting accounts for most (87%) of the ex post kWh savings.

Table 5-16 Realized kWh Savings by Measure Type and Company for Large Equipment

Measure Type	Ex Ante kWh Savings				Ex Post kWh Savings				Percent of Total Ex Post kWh Savings	Realization Rate
	CEI	OE	TE	Total Companies	CEI	OE	TE	Total Companies		
Lighting	10,834,341	26,837,821	9,947,420	47,619,583	10,691,680	24,773,717	8,577,135	44,042,532	62%	92%
Custom Equipment	2,258,723	26,908,708	2,419,048	31,586,480	2,188,978	23,280,020	1,912,015	27,381,013	38%	87%
HVAC	-	4,762	19,258	24,020	-	4,540	18,357	22,897	0%	95%
Total	13,093,064	53,751,292	12,385,727	79,230,083	12,880,658	48,058,277	10,507,508	71,446,442	100%	90%

Table 5-17 Realized kWh Savings by Measure Type and Company Small Equipment

Measure Type	Ex Ante kWh Savings				Ex Post kWh Savings				Percent of Total Ex Post kWh Savings	Realization Rate
	CEI	OE	TE	Total Companies	CEI	OE	TE	Total Companies		
Lighting	34,643,759	27,305,568	7,700,019	69,649,346	33,435,638	27,455,586	7,660,705	68,551,928	87%	98%
Custom Equipment	3,773,211	4,475,029	1,409,574	9,657,813	3,402,264	4,704,718	1,387,800	9,494,782	12%	98%

Measure Type	Ex Ante kWh Savings				Ex Post kWh Savings				Percent of Total Ex Post kWh Savings	Realization Rate
	CEI	OE	TE	Total Companies	CEI	OE	TE	Total Companies		
Food Service HVAC & Water Heating	322,936	113,149	49,135	485,219	297,167	99,013	42,997	439,177	1%	91%
	113,846	74,665	52,241	240,752	101,014	65,074	46,567	212,655	0%	88%
Appliances	66,364	98,844	32,608	197,816	50,828	75,705	24,974	151,507	0%	77%
Total	38,920,116	32,067,254	9,243,576	80,230,947	37,286,911	32,400,096	9,163,043	78,850,049	100%	98%

5.2 Process Evaluation Findings

This section presents the results of the process evaluation for the Companies' C/I Programs during the 2013 Program Year. The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework. The purpose of the process evaluation is to assess the design and recent results of the program in order to determine how effectively it is achieving its intended outcomes. This evaluation is based upon analysis of program structure, surveys of participating customers and trade allies, and analysis of program tracking data.

5.2.1 Summary of Primary Data Collection

- **Participant surveys:** Surveys of participants who completed projects through the Sodexo-managed programs are the primary data source for many components of this process evaluation. These data serve as the foundation for understanding the customer perspective, as the participant surveys provide customer feedback and insight regarding customer experiences with the Small and Large Equipment Programs. Respondents report on their satisfaction with the program, detail their motivations and decision making process, and provide suggestions related to improving the program.

Surveys were administered to participants online and telephone. All decision makers who completed a project through the Sodexo-managed programs, and for whom names and contact information were available, were contacted to complete the survey. Of this population, 43 customers who completed projects through the Small and Large Equipment Programs completed the survey.

Data were also collected from 372 participants in the Small Buildings Program who received the energy efficiency kits containing CFLs and smart power strips. The survey was primarily designed to inform the impact analysis, but responses pertaining to the effectiveness of the program process are discussed below.⁵

⁵ A planned near-participant survey was rescheduled for the coming program year to allow sufficient time for a pool of participants who initiated projects and did not reapply for similar projects in the future to develop. Additionally, because no projects were completed through the Large Equipment Program or the Sodexo-managed Government Lighting Program, no participant or near-participant surveys were administered for these programs.

- **Trade ally surveys :** Trade allies are third party vendors or contractors that assist customers in completing projects. Interviews with trade allies offer insight into the project implementation process. Surveys were administered to trade allies online and by telephone. All of the trade allies that completed projects through the Sodexo implemented programs were contacted to complete the survey. In total, 35 trade allies completed the survey.
- **Interviews with the utility's staff members:** Interviews with two utility staff members provide insight into various aspects of the program and its organization. Staff members also provide information regarding recent organizational and procedural improvements that have been implemented in order to enhance program efficiency and effectiveness.
- **Interviews with implementer's staff members:** Interviews with four Sodexo program implementation staff members provide information regarding program progress and observations regarding trade allies and customers. Sodexo staff members report on recent program changes and future plans to improve program operational efficiency.

5.2.2 Steady Activity throughout Program Year

Figure 5-7 and Figure 5-8 display program activity in terms of ex post kWh savings associated with the month applications and invoices were submitted. The figures show that savings generally increased steadily throughout the program year and indicated that the transition from the previous implementer, SAIC, to the new implementer, Sodexo, was largely seamless in terms of the continuity of program activity. However, there was somewhat less activity in the middle of the year for Large Equipment.

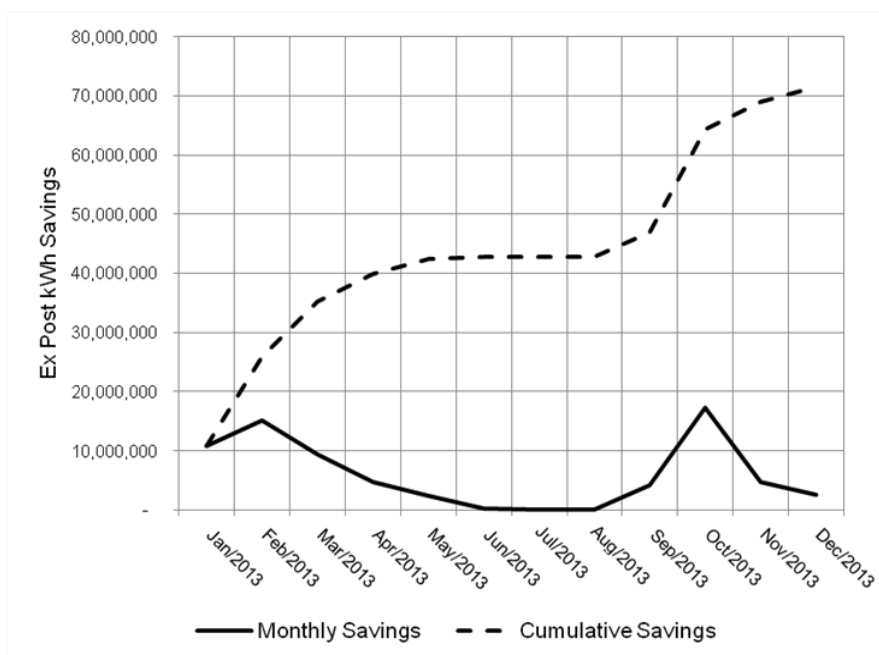


Figure 5-7 Cumulative Savings Associated with Installation Date by Month during 2013 for Large Equipment

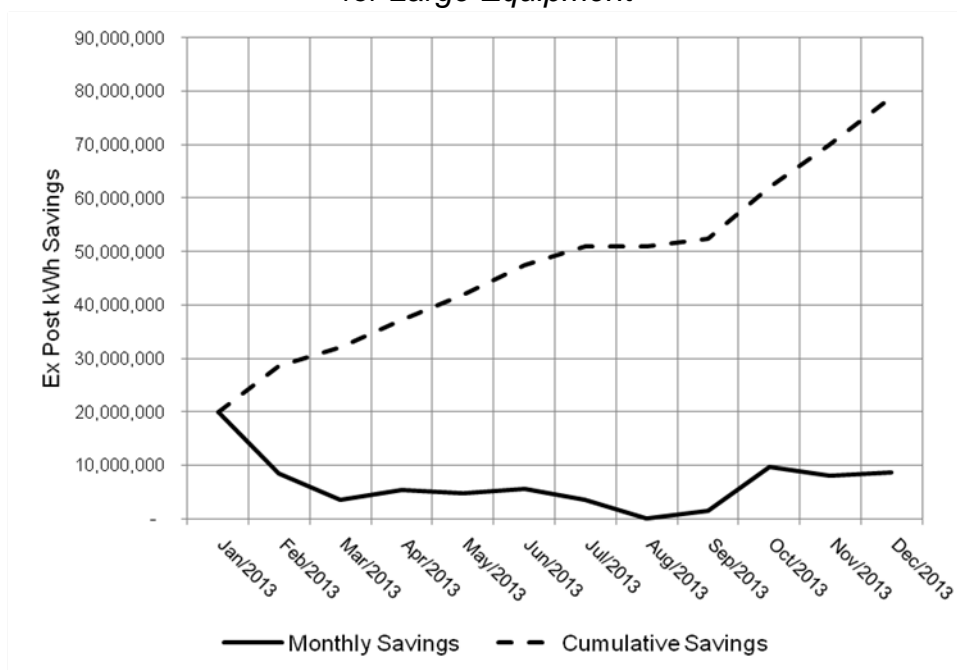


Figure 5-8 Cumulative Savings Associated with Installation Date by Month during 2013 for Small Equipment

5.2.3 Distribution of Equipment Projects

Figure 5-9 displays the distribution of projects completed during 2013 across the Companies' Ohio service territory.

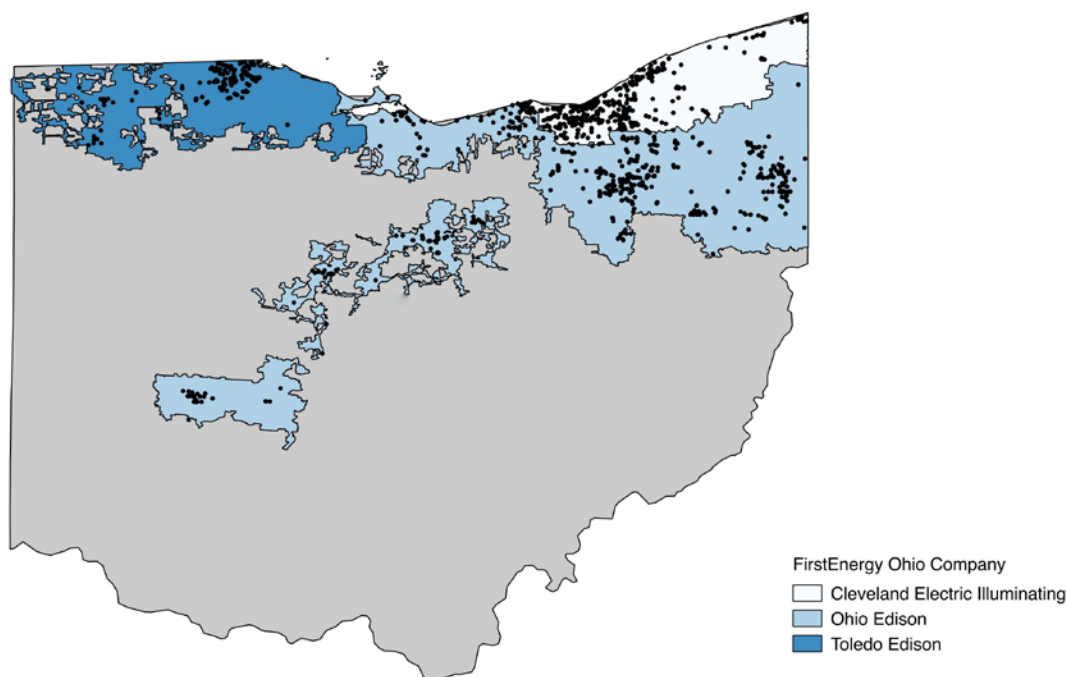


Figure 5-9 Distribution of Large and Small Equipment Programs Projects across Service Territory

Figure 5-10 compares the distribution of energy savings by building types in comparison to the technical potential by Commercial Buildings Energy Consumption Survey (CBECS) building type identified in the market potential study completed for the Companies.⁶ This figure excludes manufacturing because it is not a CBECS building type. However, manufacturing facilities accounted for 46% of the savings achieved through the Large and Small Equipment Programs.

The largest difference between the distribution of technical potential and program savings was for the other building type. However, this difference may be a function of the other category being broadly applied to project sites. Aside from this, the analysis suggests that, relative to the technical potential, the programs may be able to generate additional savings in education, office, and health care facilities.

⁶ Black & Veatch (2012). Market potential study: Energy savings and demand reduction for Ohio Edison, Toledo Edison, and The Illuminating Company.

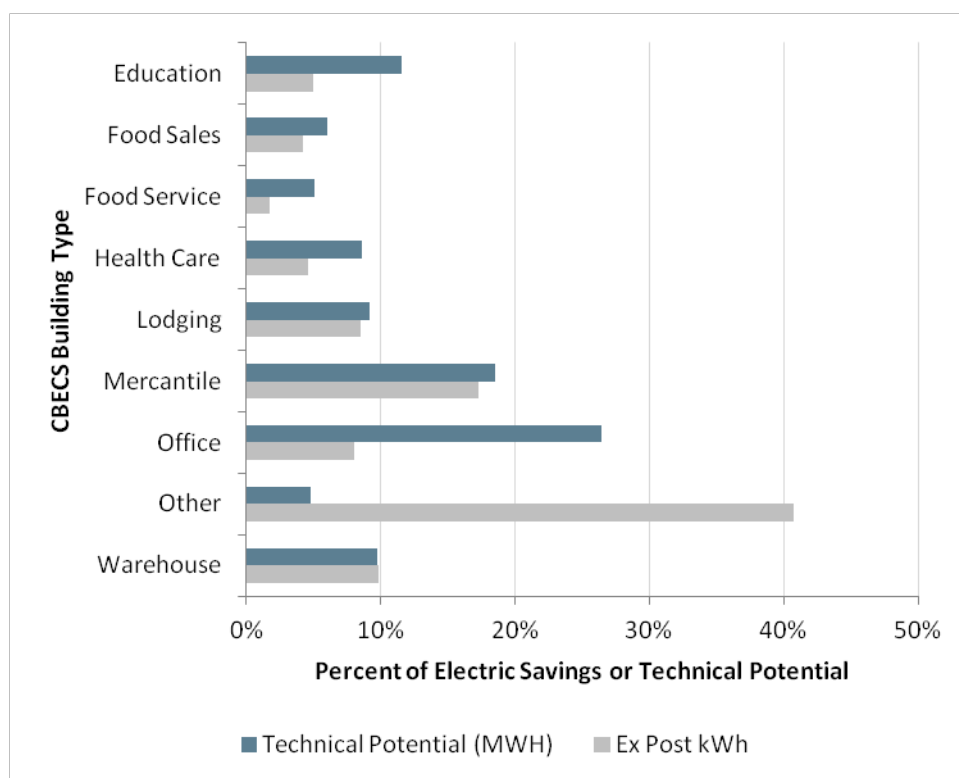


Figure 5-10 Technical Potential and Large and Small Equipment Ex Post Savings by Building Type

5.2.4 Evaluate Quantity of CFLs Distributed

Customers who receive an energy efficiency kit through the Small Buildings Program are screened for their ability to immediately install the CFLs distributed through the program. However, 61% of the surveyed program participants reported that they did not install all of the CFLs they received.

Table 5-18 below shows the reasons survey respondents gave for not installing all of the bulbs in the Small Buildings program. The most common reason given for not installing all of the bulbs, mentioned by 51% of respondents, was that the respondent did not have enough fixtures for all of the bulbs or did not need them. Although these respondents did not mention specifically why they did not have enough fixtures, it is likely that in many cases they meant that the fixture they have already have a functioning incandescent, CFL, or LED light bulb. Of the respondents who gave this reason for not installing all of the bulbs, 87% reported that they had installed some of the CFLs. This finding suggests that several customers had a need for fewer of the CFLs than were sent, rather than they did not need the bulbs at all.

The second most frequently mentioned reason for not installing the bulbs was that the customer was waiting for the bulbs to burn out before installing the CFLs. These comments reflect customers' reluctance to replace functioning equipment. Seven percent

of respondents reported the bulbs did not fit their fixtures. Likewise, another 7% reported that they did not have time to install the bulbs yet.

Table 5-18 Reasons Given for Not Installing All CFLs

<i>Reason for Not Installing All CFLs</i>	<i>Percent of Respondents (n=226)*</i>	<i>Example Comments</i>
Did not have enough fixtures or did not need them	51%	"I ran out of places to put them." "[For] the other three, I had no other places to put them." "No space right now to install." "The old bulbs have not gone bad yet." "I figured I would wait until the other ones break down."
Waiting for bulbs to burn out	17%	"There is no room for bulbs--did not want to pitch working bulbs." "Saving for later use." "To use as spares."
Storing for future use	11%	"We don't have the fixtures to utilize all of them. We have the rest in storage."
Had not had time or inconvenient to install	7%	"Haven't had time to install." "I haven't had the chance to use them yet." "It was the inconvenience of replacing it."
Did not fit fixture or had no use	7%	"We don't have use for the 13 watt CFL's." "The fixtures were different." "I don't have use for them in the restaurant."
Does not like them	1%	"The 13 watts aren't bright enough for me to really use."
Bulbs were broken	1%	"All of them arrived broken."
Other	1%	

**Totals may exceed 100% because respondents could provide more than one reason for not installing all of the CFLs*

5.2.5 Lighting Measures Account for Most Small and Large Equipment Program Activity

Lighting projects accounted for much of the program savings during the 2013 Program Year, as shown in Table 5-19 and Table 5-20. In addition to lighting, custom equipment projects also contributed to a large portion of the program savings.

Table 5-19 Incentive Characteristics by Equipment Type, Large Equipment

<i>Measure Type</i>	<i>Ex Ante kWh Savings</i>			
	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>
Custom Equipment	2,258,723	26,908,708	2,419,048	31,586,480
HVAC		4,762	19,258	24,020
Lighting	10,834,341	26,837,821	9,947,420	47,619,583
Total	13,093,064	53,751,292	12,385,727	79,230,083

Table 5-20 Incentive Characteristics by Equipment Type, Small Equipment

<i>Measure Type</i>	<i>Ex Ante kWh Savings</i>			
	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>
Appliances	66,364	98,844	32,608	197,816
Custom Equipment	3,773,211	4,475,029	1,409,574	9,657,813
Food Service	322,936	113,149	49,135	485,219
HVAC & Water Heating	113,846	74,665	52,241	240,752
Lighting	34,643,759	27,305,568	7,700,019	69,649,346
Total	38,920,116	32,067,254	9,243,576	80,230,947

5.3 Robust Program Marketing Effort

The program has developed multi-channel marketing efforts to promote the program. A key component of the program marketing is the program website which provides a variety of information such as quick reference guides, information on incentive levels, and application instructions. The implementer uses Google Analytics to learn where interested customers are located. Based on this information, they host events to connect with customers. The Large Equipment Program staff also receives contact information for large customers from the Companies. Sodexo uses dedicated outreach staff to promote the program with customers.

Trade allies are a key component of marketing commercial and industrial programs and Sodexo is developing additional marketing collateral to support their efforts. Specifically, they are developing quick reference cards, case studies, and registered trade ally logos.

The program also contracts with organizations referred to as Administrators. Administrators educate and promote the program with their membership, assist their membership with completing applications and gathering required documentation, screen potential projects, track energy savings and peak demand reductions, and assist the Companies in the preparation of Commission filings.

The efforts to market the program are reflected in the survey results, as shown in Table 5-21 and Table 5-22 for the Large and Small Equipment Programs, respectively. The two most frequently mentioned sources for learning of the program were program representatives and trade allies.

Table 5-21 How Customers Learned about the Incentive Program, Large Equipment

	<i>Response</i>	<i>(n=14)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
How did you learn about [EDC's] incentives for efficient equipment or upgrades?	Approached directly by representative of [EDC] incentive programs	4	29%	8%
	Received an information brochure on [EDC] incentive programs	0	0%	0%
	Representative of [EDC] mentioned it	2	14%	60%
	[EDC] website	1	7%	15%
	Friends or colleagues	0	0%	0%
	An architect, engineer or energy consultant	0	0%	0%
	An equipment vendor or building contractor	4	29%	1%
	Past experience with the programs	0	0%	0%
	Other (please explain)	3	21%	15%

Table 5-22, How Customers Learned about the Incentive Program, Small Equipment

	<i>Response</i>	<i>(n=31)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
How did you learn about [EDC's] incentives for efficient equipment or upgrades?	Approached directly by representative of [EDC] incentive programs	4	13%	1%
	Received an information brochure on [EDC] incentive programs	2	6%	26%
	Representative of [EDC] mentioned it	2	6%	3%
	[EDC] website	1	3%	40%
	Friends or colleagues	4	13%	1%
	An architect, engineer or energy consultant	2	6%	3%
	An equipment vendor or building contractor	9	29%	7%
	Past experience with the programs	1	3%	0%
	Other (please explain)	6	19%	19%

*The total percent of respondents displayed does not equal 100% because of rounding error.

To further understand the effectiveness of program marketing, trade allies were asked if they market the problems and whether or not the programs could be marketed more effectively. The results are shown in Table 5-23.

Table 5-23 Trade Ally's Views of Program Marketing and Customer Awareness

<i>Question</i>	<i>Percentage of Respondents Saying "Yes"</i>	<i>n</i>
Do you actively market [EDC]'s business incentive programs to your customers?	91%	34
Are there ways in which [EDC]'s could market the business incentive programs more efficiently?	9%	33

Only 9% of the trade allies thought that the companies could market the programs more effectively, an improvement from 34% last year.

Ninety-one percent of trade allies said they marketed the incentive programs to their customers. The trade allies noted that they market the program in various ways. The most pervasive method of marketing was via word of mouth on phone calls or in person. Others used email to distribute information about the incentive programs. Many of the trade allies created estimates taking into account incentives for their customers. Discussion of the incentive programs also often arose during energy audits.

5.3.1 Motivations for Implementing Energy Savings Projects

The majority of participants indicated that their organizations had policies and procedures in place for energy efficiency improvements. As shown in Table 5-24, employing people to manage energy use and having policies that require that energy efficiency be considered when making a new purchase were the most common responses for Large Equipment Program participants. The most commonly given response for Small Equipment Program participants was employing people responsible for managing energy use, as shown in Table 5-25.

Table 5-24 Policies and Procedures Regarding Energy Efficiency Improvements, Large Equipment

	<i>Response</i>	<i>(n=14)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Which of the following, if any, does your company have in place at [LOCATION] location?	A person or persons responsible for monitoring or managing energy usage	6	43%	82%
	Defined energy savings goals	5	36%	90%
	A specific policy requiring that energy efficiency be considered when purchasing equipment	8	57%	91%
	Carbon reduction goals	5	36%	93%
	Other policies or procedures regarding energy efficiency or use (please describe)	4	29%	15%
	None of the above	2	14%	1%
	Don't know	0	0%	0%

Table 5-25 Policies and Procedures Regarding Energy Efficiency Improvements, Large Equipment

	<i>Response</i>	<i>(n=31)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Which of the following, if any, does your company have in place at [LOCATION] location?	A person or persons responsible for monitoring or managing energy usage	14	45%	31%
	Defined energy savings goals	5	16%	62%
	A specific policy requiring that energy efficiency be considered when purchasing equipment	5	16%	63%
	Carbon reduction goals	3	10%	60%
	Other policies or procedures regarding energy efficiency or use (please describe)	5	16%	23%
	None of the above	13	42%	27%
	Don't know	0	0%	0%

As shown in Table 5-26 and Table 5-27, vendors, contractors, designers and architects were influential to the respondents' decisions to make the energy efficiency improvements for more than half of the respondents. The role that utility representatives played in customer decision-making was greater for large customers than for small customers. As noted in the staff interviews, the Companies and Sodexo representatives work closely with large customers to help encourage them to develop energy efficiency projects.

Table 5-26 Influences on Decision Making, Large Equipment

How did each of the following types of people affect your decision to implement the energy saving equipment:	<i>Provided no input</i>	<i>Input did not affect decision</i>	<i>Small effect on decision</i>	<i>Moderate to large effect on decision</i>	<i>Critical effect - could not have made decision without it</i>	<i>Don't know</i>	<i>n</i>
Vendor	14%	14%	14%	36%	7%	14%	14
Contractor (Installer)	43%	21%	14%	14%	0%	7%	14
Designer or architect	50%	21%	14%	7%	0%	7%	14
Utility staff member, such as an account representative	31%	15%	15%	23%	0%	8%	14

Table 5-27 Influences on Decision Making, Small Equipment

How did each of the following types of people affect your decision to implement the energy saving equipment:	<i>Provided no input</i>	<i>Input did not affect decision</i>	<i>Small effect on decision</i>	<i>Moderate to large effect on decision</i>	<i>Critical effect - could not have made decision without it</i>	<i>Don't know</i>	<i>n</i>
Vendor	23%	16%	23%	19%	19%	0%	31
Contractor (Installer)	35%	10%	16%	23%	16%	0%	31
Designer or architect	58%	3%	13%	16%	3%	6%	31
Utility staff member, such as an account representative	76%	7%	10%	3%	0%	3%	31

5.3.2 The Application Process

Overall, a large majority of survey respondents reported that the application process was acceptable and that the information provided was clear.

Fifty-seven percent of Large Equipment respondents and 45% of Small Equipment respondents indicated that they worked on the program applications. These respondents were asked a series of follow-up questions about their experience in completing the applications. As shown in Table 5-28 and Table 5-29, the majority of Large (58%) and nearly half of Small Equipment (40%) respondents indicated that the information on how to complete the application was mostly or completely clear.

Table 5-28 Clarity of Application Instructions, Large Equipment

	<i>Response</i>	<i>(n=14)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Thinking back to the application process, please rate the clarity of information on how to complete the application.	Not at all clear	0	0%	0%
	Somewhat clear	1	13%	43%
	Mostly clear	4	50%	56%
	Completely clear	3	38%	2%
	Don't know	0	0%	0%

Table 5-29 Clarity of Application Instructions, Small Equipment

	<i>Response</i>	<i>(n=14)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Thinking back to the application process, please rate the clarity of information on how to complete the application.	Not at all clear	2	14%	0%
	Somewhat clear	1	7%	59%
	Mostly clear	4	29%	34%
	Completely clear	7	50%	6%
	Don't know	0	0%	0%

Respondents who found aspects of the instructions to be unclear were asked what was confusing. The following commentary summarizes what types of things that were most confusing to participants:

“The custom incentive wattage table is a bit confusing. I understand it from using it many times, but it can be more user-friendly.”

“I think you have to be familiar with the whole process in general or it can be confusing.”

Respondents were also asked to rate the acceptability of various aspects of the application process. As shown in Table 5-30 and Table 5-31, a large majority of respondents found each aspect acceptable. One respondent who participated in the Small Equipment Program noted that all of the aspects of the application process were completely unacceptable.

Table 5-30 Assessment of Application Process, Large Equipment Program

Rate...	Completely acceptable	Somewhat acceptable	Somewhat unacceptable	Completely unacceptable	Don't know	n
The ease of finding how to apply for incentives on [EDC]'s website	88%	13%	0%	0%	0%	8
The ease of using the electronic application	63%	38%	0%	0%	0%	8
The time it took to have the application approved	63%	25%	13%	0%	0%	8
The effort required to provide required invoices or other supporting documentation	57%	43%	0%	0%	0%	7
The overall application process	63%	25%	13%	0%	0%	8

Table 5-31 Assessment of Application Process, Small Equipment

Rate...	Completely acceptable	Somewhat acceptable	Somewhat unacceptable	Completely unacceptable	Don't know	n
The ease of finding how to apply for incentives on [EDC]'s website	50%	36%	0%	7%	7%	14
The ease of using the electronic application	57%	21%	0%	7%	14%	14
The time it took to have the application approved	57%	21%	14%	7%	0%	14
The effort required to provide required invoices or other supporting documentation	43%	36%	7%	7%	7%	14
The overall application process	50%	29%	14%	7%	0%	14

5.3.3 Customer Satisfaction with Program Staff

A large majority of the respondents who had interactions with program staff indicated that the staff were knowledgeable and that the interactions were satisfying.

Seventy-nine percent of Large Equipment Program respondents and 45% of Small Equipment Program respondents reported that they had interactions with the program staff. As shown in Table 5-32 and Table 5-33, most of these customers reported that the program staff was very or fairly knowledgeable. Additionally, as shown in Table 5-34 and Table 5-35, more than 80% of survey respondents indicated that they were satisfied or very satisfied with timeliness and thoroughness of staff responses to their questions or concerns.

One participant in the Small Equipment Program noted that he or she was very dissatisfied with how long it took program staff to address their questions or concerns and how thoroughly program staff addressed their questions. This respondent was the same that indicated the application process was unacceptable. Because most respondents indicated that they were satisfied with their interactions with program staff and thought that the application process was acceptable, it is likely that this customer's responses reflect an atypical experience with the program.

Table 5-32 Knowledge of Program Staff, Large Equipment

	<i>Response</i>	<i>(n=11)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
On the scale provided, please indicate how knowledgeable were program staff about the issues you discussed with them?	Not at all knowledgeable	0	0%	0%
	Slightly knowledgeable	0	0%	0%
	Somewhat knowledgeable	0	0%	0%
	Fairly knowledgeable	1	9%	16%
	Very knowledgeable	10	91%	84%
	Not sure	0	0%	0%

Table 5-33 Knowledge of Program Staff, Small Equipment

	<i>Response</i>	<i>(n=14)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
On the scale provided, please indicate how knowledgeable were program staff about the issues you discussed with them?	Not at all knowledgeable	0	0%	0%
	Slightly knowledgeable	1	7%	0%
	Somewhat knowledgeable	1	7%	0%
	Fairly knowledgeable	3	21%	72%
	Very knowledgeable	9	64%	27%
	Not sure	0	0%	0%

Table 5-34 Satisfaction with Program Staff Interactions, Large Equipment

Indicate how satisfied or dissatisfied you are with...	<i>Very satisfied</i>	<i>Satisfied</i>	<i>Neither dissatisfied nor satisfied</i>	<i>Dissatisfied</i>	<i>Very dissatisfied</i>	<i>Don't know</i>	<i>n</i>
How long it took program staff to address your questions or concerns	64%	18%	9%	9%	0%	0%	11
How thoroughly program staff addressed your questions or concerns	64%	18%	9%	9%	0%	0%	11

Table 5-35 Satisfaction with Program Staff Interactions, Small Equipment

Indicate how satisfied or dissatisfied you are with...	<i>Very satisfied</i>	<i>Satisfied</i>	<i>Neither dissatisfied nor satisfied</i>	<i>Dissatisfied</i>	<i>Very dissatisfied</i>	<i>Don't know</i>	<i>n</i>
How long it took program staff to address your questions or concerns	57%	29%	0%	7%	7%	0%	14
How thoroughly program staff addressed your questions or concerns	57%	29%	0%	7%	7%	0%	14

5.3.4 Customer Satisfaction with Equipment

Most of the Large and Small Equipment Program participants who responded to the survey indicated that they were satisfied or very satisfied with the equipment and its installation, as shown in Table 5-36 and Table 5-37. However, the same Small Equipment Program participant that was dissatisfied with program staff interactions and the application process noted that they were very dissatisfied with the equipment implemented and the quality of the implementation.

Additionally, all survey respondents indicated that the equipment was still installed and operating.

Table 5-36 Satisfaction with Equipment & Implementation, Large Equipment

Satisfaction element	<i>Very satisfied</i>	<i>Satisfied</i>	<i>Neither satisfied nor dissatisfied</i>	<i>Dissatisfied</i>	<i>Very dissatisfied</i>	<i>Not sure</i>	<i>n</i>
Equipment implemented	79%	7%	7%	0%	0%	7%	14
Quality of implementation	69%	15%	8%	0%	0%	8%	13

Table 5-37 Satisfaction with Equipment & Implementation, Small Equipment

Satisfaction element	<i>Very satisfied</i>	<i>Satisfied</i>	<i>Neither satisfied nor dissatisfied</i>	<i>Dissatisfied</i>	<i>Very dissatisfied</i>	<i>Not sure</i>	<i>n</i>
Equipment implemented	68%	23%	3%	0%	3%	3%	31
Quality of implementation	65%	23%	3%	3%	3%	3%	31

5.3.5 Customer Satisfaction with the Program

Seventy-seven percent of Large Equipment Program respondents and 74% of Small Equipment Program respondents indicated that they were satisfied or very satisfied with the program overall, as shown in Table 5-38 and Table 5-39. The reasons given for dissatisfaction included the length of time to receive the rebates and having to resubmit documentation. It should be noted that more than 70% of the Large and Small Equipment respondents reported that they had to submit additional information, most typically additional supporting documentation. The same Small Equipment Program respondent that was very dissatisfied was the application process, interactions with program staff, and equipment was also dissatisfied with the steps to get through the program, the amount of time to get rebate/incentive, the range of equipment that qualifies for incentives, and the overall program.

Table 5-38 Satisfaction with Overall Program Elements, Large Equipment

Indicate how satisfied or dissatisfied you are with...	<i>Very satisfied</i>	<i>Satisfied</i>	<i>Neither dissatisfied nor satisfied</i>	<i>Dissatisfied</i>	<i>Very dissatisfied</i>	<i>Not sure</i>	<i>n</i>
The steps you had to take to get through the program	31%	31%	23%	15%	0%	0%	13
The amount of time it took to get your rebate or incentive	31%	46%	15%	8%	0%	0%	13
The range of equipment that qualifies for incentives	15%	54%	15%	0%	0%	15%	13
The overall program	31%	46%	15%	8%	0%	0%	13

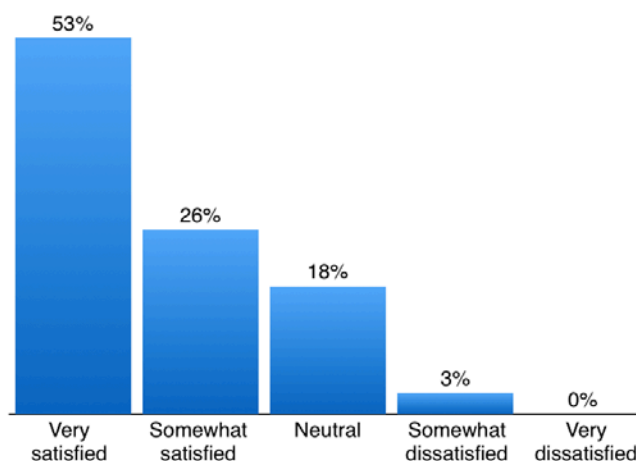
Table 5-39 Satisfaction with Overall Program Elements, Small Equipment

Indicate how satisfied or dissatisfied you are with...	<i>Very satisfied</i>	<i>Satisfied</i>	<i>Neither dissatisfied nor satisfied</i>	<i>Dissatisfied</i>	<i>Very dissatisfied</i>	<i>Not sure</i>	<i>n</i>
The steps you had to take to get through the program	32%	39%	10%	6%	3%	10%	31
The amount of time it took to get your rebate or incentive	29%	42%	3%	10%	10%	6%	31
The range of equipment that qualifies for incentives	29%	48%	6%	3%	3%	10%	31
The overall program	32%	42%	13%	0%	3%	10%	31

5.3.6 Improved Satisfaction among Trade Allies

In comparison to the prior two years, a larger share of trade allies reported that they were satisfied with the program. Specifically, 79% of the trade allies indicated that they were very or somewhat satisfied, up from approximately one-half of the trade allies last year, as shown in Figure 5-11.

Overall, how satisfied are you with your experiences in working with the business incentive programs?

*Figure 5-11 Trade Ally Satisfaction*

6. Summary and Conclusions

The following presents a selection of key conclusions from the 2013 year of program operations:

- **Smooth Transition to New Implementer:** The C&I Program implementer changed from SAIC to Sodexo in August of 2013. The transition from SAIC to Sodexo appears to have created little disruption for the program. Project savings accrued at a fairly consistent rate during the year, although there was somewhat less activity during the middle portion of the year for the Large Enterprise Equipment Program. Additionally, the Companies are generally satisfied with Sodexo's performance. In comparison to the previous implementation staff, the Companies felt that Sodexo was much improved with regard to speed, ease, and timeliness. Sodexo's weekly, monthly and ad hoc activity reports to the Companies were also useful. Additionally, a larger share of trade allies reported that they were satisfied with the programs than in prior years. Specifically, 79% of the trade allies indicated that they were very or somewhat satisfied, up from approximately one-half of the trade allies last year.

Because SAIC implemented the C&I Program for 7 months, many of the issues that were reported during 2013 are either resolved or are currently being addressed by Sodexo. Steps taken by Sodexo to improve the programs include: online application processing and tracking as well as increased interactions with customers and trade allies.

- **Large and Small Customers Generally Satisfied with Program:** Both large and small customers expressed high levels of satisfaction with the overall program. Few customers reported dissatisfaction with the program participation process, the implemented equipment, the range of the equipment offered, or the program overall.

Survey respondents who completed projects through the Sodexo managed programs in 2013 reported similar levels of satisfaction with the program overall as 2012 program participants. The largest difference in reported satisfaction between 2012 and 2013 participants was with the time it took to receive the incentive. Seventy-six percent of the participants in the Sodexo-managed 2013 programs reported that they were satisfied or very satisfied with this aspect of the program compared to 51% of 2012 survey respondents. The increased satisfaction with the time it takes to receive the incentive may encourage repeat participation in the program.

- **Robust Marketing Effort:** Sodexo maintains primary responsibility for the marketing of the program. They promote the program through the website, trade ally network, open houses, telephone and direct communication with customers. Trade allies also promote the program during in-person and telephone discussions with potential customers. Sodexo is currently developing materials to help trade allies promote the program including case studies, reference cards, and logos. Administrators, which are organizations contracted with the Companies to assist with the implementation of the program, also play an important role in promoting the programs. These organizations

promote the programs through webinars, energy summits, and at conferences. Additionally, Administrators market the program to their members in face-to-face meetings and through phone calls. Administrators also distribute printed materials about the program to customers including case studies, success stories, and newsletters. The Companies also assist with promoting the program. Specifically, the Companies distribute email newsletters to commercial customers and customer service representatives are in contact with customers and inform them of the incentive opportunities available.

- **Trade Allies Felt Supported in Program:** Trade allies were supported by both the Companies and Sodexo in many ways. Trade allies are given access to sales and outreach staff at both organizations. They also receive technical support and assistance in completing applications. In addition, they are invited to in-person events focused on maintaining engagement in the program, developing new relationships and strengthening former relationships with program staff. In future program years, trade allies will also be supported in their marketing efforts. They will be provided with co-branded materials such as quick reference cards and case studies.
- **Incentive Levels and Program Offerings are Adequate:** Most trade allies thought that the incentives were adequate to encourage customers to select energy efficient equipment options. Additionally, the prescriptive and custom equipment incentives cover a wide variety of equipment types.
- **Few Customers Reported Problems with Application Process:** A large majority of surveyed participants who worked on completing the applications found the materials to be clear and acceptable. However, a few participants indicated that they had to submit materials more than once. Sodexo has made changes to the online application process to reduce the need for participants to resubmit application materials. Additionally, a few participants noted that some of the application materials were difficult to understand, such as how to use the wattage table. However, these infrequent anecdotal comments likely reflect the individual experiences of participants rather than a broader problem with the program or its materials.
- **Programs are Changing What Equipment Trade Allies Offer Customers:** Participation in the program encouraged trade allies to offer more energy efficient products and services. Many trade allies noted that they market equipment that complies with the program to maximize their customers' rebates. Further, the incentives made energy efficient products more appealing to customers. The rebates help to mitigate the out of pocket and upfront costs for customers, so they can make larger purchases earlier than they otherwise would.
- **Current Online Tracking and Application System Adequate for Program Staff and Participants but Trade Allies Suggested Improvements:** Staff members from the Companies and Sodexo felt that the Applied Energy's Groups (AEG) Vision software system was adequately meeting their needs. Built-in quality control functions flag applications that need further review, and the system enables staff members to

run reports as needed. Further, the system can be used by trade allies and customers to submit online applications.

A few trade allies made suggestions for improving the online application system. These suggestions include displaying more information on the website (e.g., pre-approved and final approved incentive amounts), allow documents to be uploaded to the website rather than through email submissions, and include a checklist on the website for what needs to be submitted. Sodexo continues to make enhancements to address trade allies concerns about the online application process.

- **Data Quality Issues Noted in Tracking Data:** Some data quality issues were noted when analyzing the program tracking data and preparing it for use in surveys of participants and trade allies. These included inconsistencies in formatting and use of fields and missing names and contact information for participating customers. These issues have been communicated to Sodexo and are being addressed.
- **Customers received more CFLs than they Installed Despite Screening Protocol:** While the majority of CFLs shipped to customers were installed and the installation rate was not unusually low, sixty-one percent of respondents indicated that they did not install all of the kit components they received due to lack of fixtures, waiting for existing bulbs to burn out, or otherwise saving the bulbs for future installation.

Recommendations have been developed based on survey and interview findings and overall analysis of program processes. These recommendations may provide strategic advantage during the future program years.

- **Better Match Kits Contents to Need for CFLs:** The C&I Kits contain an assortment of compact fluorescent lamps (CFLs) and power strips and are available to small enterprise customers. The kits vary in the types and quantities of measures that are included, allowing a degree of customization to the customers need. The process to receive the CFL kits includes a screening protocol that asks customers to estimate how many CFLs they “can install immediately.” However, a little less than two-third of the respondents reported that they did not install all of the CFLs sent in the kits. Although the in-service rate is not unusually low, it may be possible to increase it by better matching kit contents to customers’ need and willingness to install the CFLs immediately. Program staff may want to consider a more detailed screening protocol that clarifies whether or not they are willing to replace the incandescent lamps that are still operating or if they will wait until they burn out, asking for a clear commitment from the customer indicating how many CFLs the intend to install immediately, and ensuring that the total number of CFLs sent is equal to or less than this amount. These changes may produce a marginal increase in the in-service rate.
- **Continue to Utilize C&I Kits to Reach a Wide Array of Customers:** In addition to delivering energy savings, the C&I Kits are useful from a marketing perspective because they appeal to a broad array of customers and allow the Companies to reach a large number of smaller businesses. Small businesses can be a challenging

segment of the market for efficiency programs to reach. Small businesses face barriers to implementing efficiency improvements such as a lack of program awareness, a lack of information about ways to save energy, and insufficient resources for planning and implementing energy saving projects. The C&I Kits program provide an opportunity to connect with small businesses and inform them about how energy efficiency and the Companies programs can impact their energy usage.

- **Consider Modifications to the Online Application System:** Although most participants and trade allies found the online application process to be adequate, a few trade allies suggested improvements to the online application system that would improve the experience from their perspective. These suggestions include displaying more information on the website (e.g., pre-approved and final approved incentive amounts), allow documents to be uploaded to the website rather than through email submissions, and include a checklist on the website for what needs to be submitted. Additionally, a few trade allies suggested that the calculators online could potentially be simplified. However, they did not elaborate on which specific calculators they were referring to.
- **Utilize Webinars to Inform Trade Allies of the Application Process:** Nearly half of the trade allies who responded to the survey indicated that they had participated in the trade ally webinar. A few of these trade allies noted that the website was only somewhat useful, namely because they were previously familiar with the program or because the webinar did not discuss how to complete the application materials. Additionally, some of the trade allies who reported that they sought assistance from program staff indicated that they needed assistance with completing the application or using the online system. Consequently, there may be an opportunity to provide further information through the webinars regarding how to utilize the online application system and submit the required documentation. Furthermore, training to avoid any common errors that program staff finds during the application review process could also be incorporated into the trade ally webinar.

Appendix A: Required Savings Tables

This appendix contains gross kWh savings, and peak demand savings for Large Equipment, Small Equipment, Small Buildings, and the Government Lighting Programs.

Table A-1 Gross Savings by Program

<i>Program</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
Large Equipment	79,230,083	71,446,442	90%	10,659.14	10,274.94	96%
Small Equipment	80,230,947	78,850,049	98%	14,549.66	14,802.08	102%
Small Buildings	74,177,680	60,501,647	82%	15,623.19	14,616.35	94%
Government	632,101	631,282	100%	60.97	58.48	96%
Total	234,270,810	211,429,420	90%	40,892.96	39,751.85	97%

Table A-2 Summary of kWh Savings for Large Equipment

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	13,093,064	12,880,658	98%
OE	53,751,292	48,058,277	89%
TE	12,385,727	10,507,508	85%
Total Companies	79,230,083	71,446,442	90%

Table A-3 Summary of Peak kW Savings for Large Equipment

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	2,028.46	2,100.28	104%
OE	6,789.74	6,749.51	99%
TE	1,840.94	1,425.16	77%
Total Companies	10,659.14	10,274.94	96%

Table A-4 Summary of Lifetime kWh Savings for Large Equipment

<i>Operating Company</i>	<i>Lifetime Ex Post kWh Savings</i>
CEI	193,209,863
OE	720,874,153
TE	157,612,613
Total Companies	1,071,696,629

Table A-5 Summary of kWh Savings for Small Equipment

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	38,920,116	37,286,911	96%
OE	32,067,254	32,400,096	101%
TE	9,243,576	9,163,043	99%
Total Companies	80,230,947	78,850,049	98%

Table A-6 Summary of Peak kW Savings for Small Equipment

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	7,272.78	7,168.94	99%
OE	5,561.43	5,861.44	105%
TE	1,715.46	1,771.70	103%
Total Companies	14,549.66	14,802.08	102%

Table A-7 Summary of Lifetime kWh Savings for Small Equipment

<i>Operating Company</i>	<i>Lifetime Ex Post kWh Savings</i>
CEI	559,303,665
OE	486,001,435
TE	137,445,642
Total Companies	1,182,750,742

Table A-8 Summary of kWh Savings for Small Buildings

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	21,508,226	17,737,324	82%
OE	37,121,073	30,122,245	81%
TE	15,548,380	12,642,078	81%
Total Companies	74,177,680	60,501,647	82%

Table A-9 Summary of Peak kW Savings for Small Buildings

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	4,505.14	4,246.76	94%
OE	7,850.36	7,338.32	93%
TE	3,267.68	3,031.27	93%
Total Companies	15,623.19	14,616.35	94%

Table A-10 Summary of Lifetime kWh Savings for Small Buildings

<i>Operating Company</i>	<i>Lifetime Ex Post kWh Savings</i>
CEI	56,759,435
OE	96,391,185
TE	40,454,651
Total Companies	193,605,271

Table A-11 Summary of kWh Savings for Government Lighting

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	632,101	631,282	100%
Total Companies	632,101	631,282	100%

Table A-12 Summary of Peak kW Savings for Government Lighting

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	60.97	58.48	96%
Total Companies	60.97	58.48	96%

Table A-13 Summary of Lifetime kWh Savings for Government Lighting

<i>Operating Company</i>	<i>Lifetime Ex Post kWh Savings</i>
CEI	6,312,820
Total Companies	6,312,820

Appendix B: Survey Instruments

2013 Incentive Programs Participant Survey

1. What is your job title or role?
 1. Facilities Manager
 2. Energy Manager
 3. Other facilities management/maintenance position
 4. Chief Financial Officer
 5. Other financial/administrative position
 6. Proprietor/Owner
 7. President/CEO
 8. Manager
 9. Other (please specify)
2. Which of the following, if any, does your company have in place at the [LOCATION]?
(Select all that apply)
 1. A person or persons responsible for monitoring or managing energy usage
 2. Defined energy savings goals
 3. A specific policy requiring that energy efficiency be considered when purchasing equipment
 4. Carbon reduction goals
 5. Other policies or procedures regarding energy efficiency or use (please describe)
 6. None of the above
 98. Don't know
3. How did you learn about [EDC(s)] incentives for efficient equipment or upgrades?
(Select all that apply)
 1. Approached directly by representative of [EDC] incentive programs
 2. Received an information brochure on [EDC] incentive programs
 3. Representative of [EDC] mentioned it
 4. [EDC] website
 5. Friends or colleagues
 6. An architect, engineer or energy consultant

7. An equipment vendor or building contractor
8. Past experience with the programs
9. Other (please explain)

[DISPLAY Q4 ONLY IF INCENTIVE TYPE NOT EQUAL CUSTOM]

4. In addition to the incentives for specific prescriptive equipment upgrades you received, did you know you could qualify for incentives by proposing a custom energy-upgrade project that fits your specific facility needs?
 1. Yes
 2. No
 98. Don't know

[DISPLAY Q5 ONLY IF Q4 = 1]

5. Why didn't you choose the custom option that offers incentives for non-prescriptive equipment? (Please select all that apply)
 1. All of the equipment I was interested in was listed on the Prescriptive application.
 2. I'm interested in other equipment, but didn't want to do two applications (a custom one in addition to the prescriptive incentive application).
 3. The custom application seems too complicated.
 97. Some other reason (please specify)

[DISPLAY Q6 ONLY IF NEW CONSTRUCTION = NO]

6. Is your firm considering undertaking any new construction or major building renovation projects within the next five years? [Such as adding a new wing, gutting an existing building, or building an entirely new building.]
 1. Yes
 2. No
 98. Don't know

[DISPLAY Q7 IF Q6 = 2]

7. Are you in the design phase now?

[DISPLAY Q 8 IF Q6 =1]

8. Are you familiar with [EDC] incentives for new construction or major building renovation projects?
 1. Yes
 2. No
 98. Don't know

[DISPLAY Q9 ONLY IF PROJECT = NEW CONSTRUCTION]

9. How well did the range of new construction or major building renovation incentive options fit your needs?

Not at all	Somewhat	Mostly	Completely	Don't know
1	2	3	4	98

[DISPLAY Q10 ONLY IF Q8 < 4]

10. What caused the range of incentive options offered to fail to meet your needs completely?

[DISPLAY Q10 and Q11 ONLY IF PROJECT = RETRO-COMMISSIONING]

11. You recently received incentives for a retro-commissioning project. Which of these other business incentive program incentives are you aware of?

1. New Construction and major building renovation incentives
2. Prescriptive incentives for specific measures such as lighting, HVAC, refrigeration, and water heating equipment
3. Custom incentives for non-prescriptive measures
4. None of the above

12. How well did the Retro-commissioning program's range of incentive options fit your needs?

Not at all	Somewhat	Mostly	Completely	Don't know
1	2	3	4	98

[DISPLAY Q13 ONLY IF Q12 < 4]

13. In what way did the range of incentive options offered fail to meet your needs completely?

14. Regarding your organization's decision to participate in the incentive program, who initiated the discussion about the incentive opportunity? Would you say...

1. Your organization initiated it
2. Your vendor or contractor initiated it
3. The idea arose in discussion between your organization and your vendor or contractor

97. Some other way (please specify)

98. Don't Know

15. Which of the following people worked on completing your application for program incentives (including gathering required documentation)? (Select all that apply)

1. Yourself
2. Another member of your company

3. A contractor
4. An equipment vendor
5. A designer or architect
6. Someone else (please define)
98. Don't know

[DISPLAY Q16 ONLY IF Q15= 1]

16. Thinking back to the application process, please rate the clarity of information on how to complete the application...

Not at all clear	Somewhat clear	Mostly clear	Completely clear	Don't know
1	2	3	4	98

[DISPLAY Q16 ONLY IF Q15 = <4]

17. What information, including instructions on forms, needs to be further clarified?

[DISPLAY Q17 ONLY IF Q14 = 1]

18. Using a scale of *completely unacceptable*, *somewhat unacceptable*, *somewhat acceptable*, *completely acceptable*, how would you rate the following...

a. ...the ease of finding how to apply for incentives on [EDC]'s website

Completely unacceptable	Somewhat unacceptable	Somewhat acceptable	Completely acceptable	Don't know
1	2	3	4	98

b. ...the ease of using the electronic application

Completely unacceptable	Somewhat unacceptable	Somewhat acceptable	Completely acceptable	Don't know
1	2	3	4	98

c. ...the time it took to have the application approved

Completely unacceptable	Somewhat unacceptable	Somewhat acceptable	Completely acceptable	Don't know
1	2	3	4	98

d. ...the effort required to provide required invoices or other supporting documentation

Completely unacceptable	Somewhat unacceptable	Somewhat acceptable	Completely acceptable	Don't know
1	2	3	4	98

e. ...the overall application process

Completely unacceptable	Somewhat unacceptable	Somewhat acceptable	Completely acceptable	Don't know
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1 2 3 4 98

[DISPLAY Q19 IF Q14 = 1]

19. Did you have a clear sense of whom you could go to for assistance with the application process?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q20 ONLY IF PROJECT = RETRO-COMMISSIONING]

20. Did you have a clear sense of who you could go to for assistance in finding a Retro-commissioning Service provider?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q21 ONLY IF INCENTIVE TYPE = CUSTOM OR PROGRAM =RETRO-COMMISSIONING]

21. After initial submission, were you (or anyone acting on your behalf) required to resubmit or provide additional documentation before your application was approved?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q22 ONLY IF Q21=1]

22. Which of the following were reasons that you had to resubmit your application?
(Please select all that apply)

- 1. Issues related to how energy savings were calculated
- 2. [DISPLAY IF PROJECT=RETRO-COMMISSIONING] Other issues related to the Audit
- 3. Issues related to additional supporting documentation such as invoices
- 97. Other issues (please specify)
- 98. Don't know

23. How did the incentive amount compare to what you expected?

- 1. It was much less
- 2. It was somewhat less
- 3. It was about the amount expected
- 4. It was somewhat more

5. It was much more

98. Don't know

[DISPLAY Q24 and Q25 IF PROJECT=EQUIPMENT]

24. How did each of the following types of people affect your decision to install the efficient equipment? (Select all that apply)

	Provided no input	Input did not affect decision	Small effect on decision	Moderate to large effect on decision	Critical effect – could not have made decision without it	Don't know
a. Vendor (retailer)	1	2	3	4	5	98
b. Contractor (installer)	1	2	3	4	5	98
c. Designer or architect	1	2	3	4	5	98
d. Utility staff member, such as an account representative	1	2	3	4	5	98

25. Was there anyone else who affected your decision to implement the energy saving equipment?

1. Yes, who? _____

2. No

3. Don't know

[DISPLAY Q26 IF ANY RESPONSES TO Q24 = 4 or 5 OR RESPONSE TO Q25 = 1]

26. What did they do that affected your decision?

[DISPLAY Q27 IF PROGRAM = RETRO-COMMISSIONING]

27. How did each of the following types of people effect your decision to install the efficient equipment? (Select all that apply)

	Provided no input	Input did not affect decision	Small effect on decision	Moderate to large effect on decision	Critical effect – could not have made decision	Don't know
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					without it	
a. Audit results	1	2	3	4	5	98
b. Contractor (installer)	1	2	3	4	5	98
c. Your Retro-commissioning Service Provider	1	2	3	4	5	98
d. [EDC] staff member, such as an account representative	1	2	3	4	5	98

28. Was there anyone else who affected your decision to implement the energy saving equipment?

1. Yes, who? _____
2. No
3. Don't know

[DISPLAY Q29 IF ANY RESPONSES TO Q27 = 4 or 5]

29. What did they do that affected your decision?

[DISPLAY IF PROJECT = NEW CONSTRUCTION]

30. How did each of the following types of people effect your decision to install the efficient equipment? (Select all that apply)

	Provided no input	Input did not affect decision	Small effect on decision	Moderate to large effect on decision	Critical effect – could not have made decision without it	Don't know
a. The project design process	1	2	3	4	5	98
b. General Contractor	1	2	3	4	5	98
c. Designer or architect	1	2	3	4	5	98

d.[EDC] staff member, 1 2 3 4 5 98
such as an account
representative

31. Was there anyone else who affected your decision to implement the energy saving equipment?

1. Yes, who? _____
2. No
3. Don't know

[DISPLAY Q32 IF ANY RESPONSES TO Q30 = 4 or 5]

32. What did they do that affected your decision?

[DISPLAY Q33 ONLY IF PROJECT = EQUIPMENT]

33. Did you work directly with a retailer to purchase the incentivized equipment?

1. Yes
2. No
98. Don't know

[DISPLAY Q34 IF (Q33= 1 AND PROJECT = EQUIPMENT) OR (PROGRAM = NEW CONSTRUCTION)]

34. How long did you have to wait for the program-qualified equipment?

1. Readily available
2. Less than 1 week
3. 1-2 weeks
4. 3-4 weeks
5. 5-6 weeks
6. More than 6 weeks
98. Don't Know

35. Please rate your satisfaction or dissatisfaction with

	Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied	Not sure	Not applicabl e – no equipme nt installed
a.... the equipment that	1	2	3	4	5	98	99

was
installed

b.... the	1	2	3	4	5	98	99
quality of							
the							
installatio							
n							

[DISPLAY Q36 IF PROGRAM = RETRO-COMMISSIONING OR
PROJECT=EQUIPMENT]

36. Who implemented your program-qualified equipment or efficiency upgrades?

1. Your own staff
2. A contractor you've worked with before
3. A contractor recommended by [EDC]'s business incentive program
(registered trade ally)
4. A new contractor that someone else recommended
97. Other (please specify)
98. Don't know

[DISPLAY Q37 IF PROJECT=EQUIPMENT]

37. Is the equipment that you implemented through the business incentive program still
in place and operating?

1. Yes
2. No
98. Don't know

[DISPLAY Q38 IF Q37 = 2]

38. Why is the equipment no longer installed or operating?

39. After your project was completed, did a program representative inspect the work
done through the program?

1. Yes
2. No
98. Don't know

[DISPLAY Q40 If Q39=1]

40. Using the scale provided, please rate your agreement with the following statements:

	Completely disagree	Somewhat disagree	Neither disagree or agree	Somewhat agree	Completely agree	Don't know
a. The inspector was courteous	1	2	3	4	5	98
b. The inspector was efficient	1	2	3	4	5	98

The following few questions pertain to your communications with the program staff. Program staff are anyone that reviewed your application, conducted site inspections, determined your incentive amount, or processed your incentive check. Program staff are not anyone hired by you to conduct an audit, design your system, or install your hardware.

41. In the course of doing this project did you have any interactions with program staff?

1. Yes

2. No

98. Don't know

[DISPLAY Q42 AND Q43 If Q41 = 1]

42. On the scale provided, please indicate how knowledgeable were program staff about the issues you discussed with them?

Not at all knowledgeable	Slightly knowledgeable	Somewhat knowledgeable	Fairly knowledgeable	5 – Very knowledgeable	Not sure
1	2	3	4	5	98

43. On the scale provided, please indicate how satisfied or dissatisfied are you with:

	Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied	Not sure
a. how long it took program staff to address your	1	2	3	4	5	98

questions or
concerns

b.how thoroughly program staff addressed your question or concern	1	2	3	4	5	98
--	---	---	---	---	---	----

44.How satisfied or dissatisfied are you with:

	Very Dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very Satisfied	Not sure
a.the steps you had to take to get through the program	1	2	3	4	5	98
b.the amount of time it took to get your rebate or incentive	1	2	3	4	5	98
c.the range of equipment that qualifies for incentives	1	2	3	4	5	98
d.the program, overall	1	2	3	4	5	98

[DISPLAY Q45 If any of Q43a or b, or Q44a, b, c, or d = 1 or 2

45.Please describe the ways in which you were not satisfied with the aspects of the program mentioned above?

46.Before you knew about the business incentive program, had you purchased and installed any energy efficient equipment at the [LOCATION]?

1. Yes

2. No

98.Don't know

47.Has your organization purchased any significant energy efficient equipment in the last three years for which you did not apply for a financial incentive through an energy efficiency program at the [LOCATION]?

1. Yes. Our organization purchased energy efficient equipment but did not apply for incentive.

2. No. Our organization purchased significant energy efficient equipment and applied for an incentive. No significant energy efficient equipment was purchased by our organization.

98. Don't know

48. Before participating in the business incentive program, had you installed any equipment or measure similar to energy efficient [Measure/Equipment type] at the [LOCATION]?

1. Yes

2. No

98. Don't know

49. Did you have plans to install energy efficient [Measure/Equipment type] at the [LOCATION] before participating in the business incentive program?

1. Yes

2. No

98. Don't know

[DISPLAY Q50 IF Q49= 1]

50. Would you have gone ahead with this planned installation even if you had not participated in the program?

1. Yes

2. No

98. Don't know

51. How important was previous experience with the business incentive program in making your decision to install energy efficient [Measure/Equipment type] at the [LOCATION]?

1. Did not have previous experience with program

2. Very important

3. Somewhat important

4. Only slightly important

5. Not at all important

98. Don't know

52. Did a business incentive program or other [EDC] representative recommend that you install energy efficient [Measure/Equipment type] at the [LOCATION]?

1. Yes

2. No

98. Don't know

[DISPLAY Q53 IF Q52 = 1]

53. If the business incentive program representative had not recommended installing the equipment, how likely is it that you would have installed it anyway?

1. Definitely would have installed
2. Probably would have installed
3. Probably would not have installed
4. Definitely would not have installed
98. Don't know

54. Would you have been financially able to install energy efficient [Measure/Equipment type] at the [LOCATION] without the financial incentive from the business incentive program?

1. Yes
2. No
98. Don't know

55. If the financial incentive from the business incentive program had not been available, how likely is it that you would have installed energy efficient [Measure/Equipment type] at the [LOCATION] anyway?

1. Definitely would have installed
2. Probably would have installed
3. Probably would not have installed
4. Definitely would not have installed
98. Don't know

56. We would like to know whether the availability of information and financial incentives through the business incentive program affected the quantity (or number of units) of energy efficient [Measure/Equipment Type] that you purchased and installed at the [LOCATION].

Did you purchase and install more [Measure/Equipment Type] than you otherwise would have without the program?

1. Yes
2. No, program did not affect quantity purchased and installed.
98. Don't know

[DISPLAY Q57 IF INSTALLED ENERGY CONSUMING EQUIPMENT]

57. We would like to know whether the availability of information and financial incentives through the business incentive program affected the level of energy efficiency you chose for energy efficient [Measure/Equipment Type] at the [LOCATION].

Did you choose equipment that was more energy efficient than you would have chosen because of the program?

1. Yes
2. No, program did not affect level of efficiency chosen for equipment.
98. Don't know

[DISPLAY Q58 IF Q57 = 1]

58. How much more efficient was the equipment? (i.e., "xx% more efficient")

59. We would like to know whether the availability of information and financial incentives through the business incentive program affected the timing of your purchase and installation of energy efficient [Measure/Equipment Type] at the [LOCATION].

Did you purchase and install energy efficient [Measure/Equipment Type] earlier than you otherwise would have without the program?

1. Yes
2. No, program did not affect did not affect timing of purchase and installation.
98. Don't know

[DISPLAY Q60 IF Q59 = 1]

60. When would you otherwise have installed the equipment?

1. Less than 6 months later
2. 6 months to less than 1 year
3. 1 year to less than 2 years
4. 2 years to less than 5 years
5. 5 or more years

61. Because of your experience with the business incentive program, have you bought, or are you likely to buy, energy efficient equipment without applying for a financial incentive or rebate?

1. Yes, have already bought non-incentivized efficiency equipment because of the experience with the program.
2. Yes, likely to buy efficiency equipment because of the experience with the program.
3. No
98. Don't know

[DISPLAY Q62 IF Q61 = 2 or 98]

62. We'd like to call you in a few months for a very short follow-up about other efficiency equipment purchases, if that would be all right. please provide us with the best person to contact and their phone number

Name:

Phone number:

[DISPLAY Q63-Q66 IF Q61 = 1]

63. What energy efficient equipment did you purchase?

64. What motivated you to purchase this equipment?

65. Have you installed the equipment?

1. Yes

2. No

98. Don't know

[DISPLAY Q66 IF Q65= 1]

66. Was this equipment installed, or will it be installed, at the same facility (or facilities) as the equipment for which you received a rebate?

1. Yes

2. No; Where was (or will be) the equipment installed?

98. Don't know

67. How important was your experience with the program to your decision to implement the additional energy efficiency measures?

1. Very important

2. Somewhat important

3. Only slightly important

4. Not at all important

98. Don't know

68. How important was your past participation in any programs offered by [EDC] to your decision to implement the additional energy efficiency measures?

1. Very important

2. Somewhat important

3. Only slightly important

4. Not at all important

98. Don't know

69. Why didn't you apply for or receive incentives for those items?

1. Didn't know whether equipment qualified for financial incentives

2. Equipment did not qualify for financial incentives

3. Too much paperwork for the financial incentive application

4. Financial incentive was insufficient

5. Didn't have time to complete paperwork for financial incentive application
 6. Didn't know about financial incentives until after equipment was purchased
 97. Other reason (please describe)
70. Which of the following best describes the type of work that your firm or organization does at the [LOCATION]?
1. Industrial
 2. Restaurant (not fast food)
 3. Fast food restaurant
 4. Retail
 5. Office
 6. Grocery and convenience
 7. School
 8. Lodging
 9. Warehouse
 97. Other (please specify)
 98. Not sure
71. Including all the properties, how many separate work locations does your organization own or lease space in, in the First Energy Ohio Companies' territory? (A work location may consist of multiple buildings in close proximity to each other, such as a university campus – please indicate the number of locations)
72. How many square feet (indoor space) is the part of the property at the [LOCATION] that your firm or organization occupies? (If your firm or organization occupies the entire property, indicate the total size of that property.)
1. Less than 5,000
 2. 5,001 to 10,000
 3. 10,001 to 20,000
 4. 20,001 to 50,000
 5. 50,001 to 75,000
 6. 75,001 to 100,000
 7. 100,001 to 250,000
 8. 250,001 to 500,000
 9. 500,001 to 1,000,000
 10. More than 1,000,000
 98. Not sure

2013 Incentive Programs Trade Ally Survey

1. Approximately how many employees work at your firm?
 1. 1 to 4 employees
 2. 5 to 9 employees
 3. 10 to 19 employees
 4. 20 to 99 employees
 5. 100 to 499 employees
 6. 500 or more employees
2. How would you characterize your type of business?
 1. Architect
 2. Contractor –Electrical
 3. Contractor – Mechanical
 4. Distributor
 5. Engineer
 6. Manufacturer
 7. Manufacturer representative
 8. Vendor / Retailer
 97. Other (please specify)
3. How would you characterize the types of services and products that you provide to your customers and clients? (Select all the apply)
 1. Building design
 2. Commissioning
 3. Compressed air systems
 4. Controls
 5. Energy analysis
 6. Foodservice equipment
 7. Grocery equipment
 8. HVAC
 9. Insulation
 10. Lighting
 11. Motors/drives
 12. Windows
 97. Other (please specify)
4. How did you find out about [EDC(s) Associated with Applications]'s business incentive program?

5. Has your firm completed or assisted in the completion of any business incentive program project applications?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q6 and Q7 IF Q5 = 1]

6. How many incentive applications has your firm completed, or assisted in the completion of any [EDC(s) Associated with Applications] project incentive applications?

7. Are there any aspects of the business incentive application process that you would recommend be modified?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q8 IF Q7 = 1]

8. In what ways would you recommend the application process be changed?

9. Did you participate in a The Companies Utilities trade ally webinar?

- 1. Yes
- 2. No
- 98. Don't know

[DISPLAY Q10 IF Q9 = 1]

10. How useful was the webinar for understanding the programs?

- 1. Very useful
- 2. Somewhat useful
- 3. Not at all useful
- 98. Don't know

[DISPLAY Q11 IF Q10 = 2 OR 3]

11. What would have made the webinar more useful to you?

12. Have you sought any assistance from [EDC(s) Associated with Applications] or Sodexo staff for incentive projects you were working on?

- 1. Yes
- 2. No
- 3. Don't know

[DISPLAY Q13, Q14, and Q15 IF Q12 = 1]

13. What did you need help with?

14. With whom did you speak?

1. [EDC(s) Associated with Applications] staff
2. Sodexo staff
3. Don't know

15. Did you get the assistance that you needed?

1. Yes
2. No
3. Don't know

[DISPLAY Q16 IF Q15 = 2]

16. What additional help would you have liked?

17. Does the business incentive program help you to sell your services or products?

1. Yes
2. No
3. Don't know

[DISPLAY Q18 IF Q17 = 1]

18. In what ways does the program help you to sell your services or products?

19. Has your involvement in the [EDC(s) Associated with Applications] business incentive program affected the types of equipment or services that you provide?

1. Yes
2. No
3. Don't know

[DISPLAY Q20 IF Q19 = 1]

20. In what ways has your involvement in the business incentive programs affected the types of equipment or services that you provide?

21. Are the incentive levels adequate to encourage customers to select energy efficient equipment options?

1. Yes
2. No
3. Don't know

22. Are there specific technologies or measures for which incentives should be higher?

1. Yes
2. No
3. Don't know

[DISPLAY Q23 and Q24 IF Q22 = 1]

23. Which technologies or measures should have a higher incentive?

24. How much higher should the incentive be for the technologies or measures you mentioned above?

25. Are there specific technologies or measures for which customers should receive incentives, but incentives are not offered by the program?

1. Yes
2. No
3. Don't know

[DISPLAY Q26 IF Q25 = 1]

26. For which technologies or measures should customers receive incentives that are not currently incentivized?

27. Have you noticed any recent trends relating to equipment choices that customers are making?

1. Yes
2. No
3. Don't know

[DISPLAY Q28 IF Q27 = 1]

28. What trends relating to equipment choices that customers are making have you noticed?

29. Are there ways in which [EDC(s) Associated with Applications] could market the business incentive programs more effectively?

1. Yes
2. No
3. Don't know

[DISPLAY Q30 IF Q29= 1]

30. Please describe how [EDC(s) Associated with Applications] could more effectively market the business incentive program.

31. Do you actively market [EDC(s) Associated with Applications] business incentive programs to your customers?

1. Yes
2. No
3. Don't know

[DISPLAY Q32 IF Q31 = 1]

32. Through what means do you actively market the business incentive program to your customers?

33. About what percentage of your customers were aware that they could get incentives from [EDC(s) Associated with Applications] business incentive programs for upgrading energy –using equipment—that is before you mentioned it to them?

34. Then, can you provide me with a best guess of the percentage of your customers that were aware of incentives from [EDC Associated with Application] before you mentioned it to them?

35. In which types of businesses or building types you work with is awareness of the incentives highest?

36. In which types of businesses or building types you work with is awareness of the incentives lowest?

37. Do you have any suggestions for how awareness could be improved with these businesses or building types?

38. Have you had customers decline to complete incentive projects through the business incentive program?

1. Yes
2. No
3. Don't know

[DISPLAY Q39 IF Q38 = 1]

39. What reasons do these customers give for not completing the projects?

40. How active do you expect your firm to be in [EDC(s) Associated with Applications]'s business incentive programs during the next year?

1. More active
2. About the same level of activity
3. Less active

4. Don't know

41. Based on your experience this year, approximately what percentage of the projects that you sell or install in 2014 do you estimate will apply for project incentives?
42. In that case, can you give your best guess as to the percentage of customers that will apply for incentives in 2014?
43. What would be the main reasons for not applying for incentives for some projects?
44. Overall, how satisfied or dissatisfied are you with your experiences in working with the business incentive programs?
1. Very Satisfied
 2. Satisfied
 3. Neither Satisfied nor Dissatisfied
 4. Very Dissatisfied
 5. Dissatisfied

[DISPLAY Q45 IF Q42 = 1 OR 2]

45. Please describe why you were not satisfied with the program.
46. Is there anything else you would like to tell us about your experience with [EDC(s) Associated with Applications]'s business incentive programs?
47. Do you have any other comments that you would like to relay to [EDC(s) Associated with Applications] about energy efficiency in commercial and industrial facilities or about their programs?

THANK YOU!

Thank you for taking this survey of trade allies assisting implementation of projects for [EDC(s) Associated with Applications]'s business incentive programs.

Your response is very important to us.

If you have any questions regarding this survey, please contact David Diebel of ADM Associates at 916-363-8383.

2013 CFL Kits Recipient Survey

(IF [PARTICIPANT NAME] is a business name):

Hello. My name is _____ and I'm calling on behalf of [UTILITY (*CEI – The Illuminating Company; OE – Ohio Edison; TE – Toledo Edison*)] regarding the CFL Kits for Energy Efficient Buildings Program. Our records indicate that you or your business received free CFL light bulbs by mail from [UTILITY] sometime in 2013. Are you the person who would be most familiar with receiving these light bulbs?

(IF NOT RIGHT PERSON) May I please speak to the person who would know the most about the CFL Kits program?

(IF [PARTICIPANT NAME] is a person's name):

Hello. May I please speak with [PARTICIPANT NAME]: _____)?

Hello. My name is ____ and I'm calling on behalf of [UTILITY (*CEI – The Illuminating Company; OE – Ohio Edison; TE – Toledo Edison*)] regarding the CFL Kits for Energy Efficient Buildings Program. Our records indicate that you or your business received free CFL light bulbs by mail from [UTILITY] sometime in 2013. Are you the person who would be most familiar with receiving these light bulbs?

(IF NOT RIGHT PERSON) May I please speak to the person who would know the most about the CFL Kits program?

(IF RIGHT PERSON) We are conducting a study on behalf of [UTILITY] to evaluate the energy savings resulting from the free CFL light bulbs mailed out as part of the CFL Kits for Energy Efficient Buildings Program. [UTILITY] will use the results of this evaluation to determine the effectiveness of the program and to make improvements. We would like to include your insight about the program in our evaluation. The interview will take approximately 10 minutes. May I ask you a few questions?

1. Yes
 2. No [THANK RESPONDENT AND TERMINATE INTERVIEW]
-
1. According to our records, [NUMBER OF KITS] were sent to a facility located at [ADDRESS]? Do you recall receiving energy saving CFL light bulbs in the mail from [UTILITY] during 2013?
 1. Yes
 2. No [THANK RESPONDENT AND TERMINATE INTERVIEW]
 2. Our records indicate that you received [KIT TYPE] at the facility located at [ADDRESS]. Is this correct?
 1. Yes
 2. No
 98. Don't know

[DIPSLAY Q3 IF Q2 = 2]

3. How many 13 Watt CFLs did you receive?

1. _____ # of 13W CFLs

98. Don't know

[DIPSLAY Q4 IF Q2 = 2]

4. How many 26 Watt CFLs did you receive?

1. _____ # of 26W CFLs

98. Don't know

[DIPSLAY Q4 IF Q2 = 2]

5. Can you give an approximation of how many CFLs you received?

1. _____ Approximation of total CFLs

98. Don't know

6. Did you install all of the CFLs that you received in your kit?

1. Yes

2. No

98. Don't know

[DIPSLAY Q7 IF Q6 = 98]

7. Of the CFLs that you received how many did you install? (*Ask to specify wattage*)

1. _____ # of 13w CFLs

2. _____ # of 26w CFLs

98. Don't know

[DIPSLAY Q8 IF Q7 = 98]

8. Can you give an approximation of the total number of CFLs you installed from the kits you received in the mail?

1. _____ Approximation of total CFLs installed

98. Don't know

[DIPSLAY Q9 IF Q6 = 1 OR Q7 = 1, 2, OR Q8 = 1]

9. Were the CFL's installed at the [ADDRESS] location?

1. Yes

2. No

98. Don't know

[DISPLAY Q10 IF Q9 = 2]

10. What is the address of the location where the CFLs were installed?
12. How many of the 13 Watt CFLs *replaced incandescent bulbs*?
1. _____ # of 13w CFLs
98. Don't know
13. How many of the 26 Watt CFLs *replaced incandescent bulbs*?
1. _____ # of 26w CFLs
98. Don't know
14. How many of the 13 Watt CFLs *replaced other CFLs*?
1. _____ # of 13w CFLs
98. Don't know
15. How many of the 26 Watt CFLs *replaced other CFLs*?
1. _____ # of 26w CFLs
98. Don't know
16. How many of the 13 Watt CFLs *were installed into a new fixture*?
1. _____ # of 13w CFLs
98. Don't know
17. How many of the 26 Watt CFLs *were installed into a new fixture*?
1. _____ # of 26w CFLs
98. Don't know
19. Please specify facility type where the light bulbs were installed (Do not read list):
1. Education
 2. Grocery
 3. Lodging-Common Area
 4. Lodging-Guest Room
 5. Manufacturing
 6. Medical
 7. Municipal
 8. Office
 9. Religious
 10. Restaurant
 11. Residence
 12. Retail
 13. Service
 14. University/College
 15. Warehouse
 99. Other

20. Of the installed light bulbs, how many are in areas that have air conditioning?

1. # of bulbs _____
98. Don't know

[DISPLAY Q21-Q24 IF Q6 = 2]

21. Why did you choose not to install the remaining light bulbs you received? (*E.g. arrived broken, didn't have time, didn't like a specific light bulb, storing for future use, etc.*)

22. For the lighting that you did not install, how many do you think you will install over the next year?

1. _____ # of lighting
98. Don't know

23. How many of the remaining light bulbs will replace incandescent lighting once they are installed?

1. _____ # of lighting
98. Don't know

24. How many of the remaining light bulbs will be installed in new fixtures that did not previously have a bulb?

1. _____ # of lighting
98. Don't know

25. Approximately how many hours are the CFL lights in use during a typical weekday?

1. _____ # of hours - weekday
98. Don't know

26. Approximately how many hours are the CFL lights in use during a typical weekend day?

1. _____ # of hours - weekday
98. Don't know

[DISPLAY Q27 IF POWERSTRIP = YES]

27. Are you using the smart plug power strips included in the kit?

1. Yes, all of them

- 2. Yes, some of them
- 3. No
- 98. Don't know

[DISPLAY Q28 IF Q27=2]

28. How many of the [NUMBER OF POWER STRIPS] power strips sent are currently in use?

- 1. _____ # of smart strips in use
- 98 Don't know

This completes the survey. Your responses are greatly appreciated and will be used to help improve [UTILITY]'s CFL Kits for Energy Efficient Buildings Program in the future. Thank you very much for your time!