

APPENDIX G

2011 Evaluation of EnergySaveOhio  
Commercial and Industrial Energy Efficiency  
Incentive Programs

Evaluation Report

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Prepared for the FirstEnergy Ohio Companies:

*Ohio Edison Company*  
*The Cleveland Electric Illuminating Company*  
*The Toledo Edison Company*

Prepared by:



ADM Associates, Inc.

3239 Ramos Circle  
Sacramento, CA 95827  
916.363.8383

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# 1. Executive Summary

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This report presents the results of the impact and process evaluations of the EnergySaveOhio commercial and industrial program activity occurring during 2011. These programs (collectively “C/I Equipment Programs”) include the following:

- Large Enterprise C/I Equipment Program (Large Enterprise Equipment Program)
- Small Enterprise C/I Equipment Program (Small Enterprise Equipment Program)
- Motors and Drives Program

After a delay in the planned launch, the Ohio Operating companies The Cleveland Electric Illuminating Company (“CEI”), Ohio Edison (“OE”), and The Toledo Edison Company (“TE”) (collectively “Companies”) C/I Equipment Programs became available in April of 2011. When launched the programs offered an incentive of \$0.80 per kWh. However, due to a high level of interest in the programs and subsequent budget concerns, the incentives were reduced at the end of September to \$0.05 per kWh and capped at 50% of the total project cost.

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 Equipment 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 129 projects, for which on-site measurements and verification data were collected, account for approximately 65% of the Large Enterprise Equipment Program’s ex ante kWh savings, 24% of the Small Enterprise Equipment Program’s ex ante kWh savings, and 100% of the Motors and Drives Program’s ex ante kWh savings.
- Customer surveys provided the information for process evaluation. A total of 395 customer decision makers and 95 trade allies 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 Enterprise</i>	<i>Small Enterprise</i>	<i>Motors and Drives</i>	<i>Total</i>
Project On-Site Measurement and Verification	46	81	2	129
Customer Decision Maker Survey	71	324	0	395
Trade Ally Survey	95			95

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 Enterprise	100,016,848	113,389,605	113%	16,397	16,768	102%
Small Enterprise	148,821,790	144,585,350	97%	29,157	31,101	107%
Motors & Drives	2,276,460	718,286	32%	35	70	198%
Total	251,115,099	258,693,242	103%	45,590	47,939	105%

The realized energy savings of the 2011 Large Enterprise Equipment Program from the three service territories are summarized in Table 1-3. For the entire program, the realized gross energy savings totaled 113,389,605 kWh. The gross realization rate for the program is 113%.

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

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	27,483,966	32,314,387	118%
OE	50,369,764	55,149,441	109%
TE	22,163,119	25,925,777	117%
Total Companies	100,016,848	113,389,605	113%

The realized gross peak kW reductions of the 2011 Large Enterprise Equipment Program from the three service territories are summarized in Table 1-4. The achieved gross peak demand savings for the program are 16,768.18 kW. The gross realization rate for the program is 102%

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

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	4,135.41	4,409.16	107%
OE	9,085.15	8,844.04	97%
TE	3,176.83	3,514.99	111%
Total Companies	16,397.39	16,768.18	102%

After the date of implementation for a measure under the Large Enterprise Equipment Program, the number of months remaining in 2011 for which annual savings could be attributed is referred to as first year pro rata savings. The first year pro rata ex post kWh savings for the Large Enterprise Equipment Program is summarized in Table 1-5. For the first year pro rata, the realized gross energy savings totaled 26,695,944 kWh.

*Table 1-5 Summary of First Year Pro Rata kWh Savings for Large Enterprise Equipment Program*

<i>Operating Company</i>	<i>First Year Ex Post Pro Rata kWh Savings</i>
CEI	6,306,297
OE	13,727,140
TE	6,662,507
Total Companies	26,695,944

The realized energy savings of the 2011 Small Enterprise Equipment Program from the three service territories are summarized in Table 1-6. For the entire program, the realized gross energy savings totaled 144,585,350 kWh. The gross realization rate for the program is 97%.

*Table 1-6 Summary of Annualized kWh Savings for Small Enterprise Equipment Program*

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	75,775,972	70,684,534	93%
OE	64,185,524	65,214,144	102%
TE	8,860,294	8,686,672	98%
Total Companies	148,821,790	144,585,350	97%

The realized gross peak kW reductions of the 2011 Small Enterprise Equipment Program from the three service territories are summarized in Table 1-7. The achieved gross peak demand savings for the program are 31,100.94 kW. The gross realization rate for the program is 107%

*Table 1-7 Summary of Annualized Peak kW Savings for Small Enterprise Equipment Program*

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	14,597.81	15,301.02	105%
OE	12,890.01	14,037.63	109%
TE	1,669.49	1,762.28	106%
Total Companies	29,157.31	31,100.94	107%

The accrued savings during the remaining months in 2011, after the date of implementation for a measure under the Small Enterprise Equipment Program, is referred to as first year pro rata savings. The first year pro rata ex post kWh savings for the Small Enterprise Equipment Program is summarized in Table 1-8. For the first year pro rata, the realized gross energy savings totaled 32,981,190 kWh.

*Table 1-8 Summary of First Year kWh Pro Rata Savings for Small Enterprise Equipment Program*

<i>Operating Company</i>	<i>First Year Ex Post Pro Rata kWh Savings</i>
CEI	15,631,178
OE	15,714,276
TE	1,635,736
Total Companies	32,981,190

The realized energy savings of the 2011 Motors and Drives Program from the three service territories are summarized in Table 1-1. For the entire program, the realized gross energy savings totaled 718,286 kWh. The gross realization rate for the program is 32%.

*Table 1-9 Summary of Annualized kWh Savings for Motors and Drives Program*

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	6,351	418	7%
OE	2,270,109	717,868	32%
Total Companies	2,276,460	718,286	32%

The realized gross peak kW reductions of the 2011 Motors and Drives Program from the three service territories are summarized in Table 1-4. The achieved gross peak demand savings for the program are 69.90 kW. The gross realization rate for the program is 198%

*Table 1-10 Summary of Annualized Peak kW Savings for Motors and Drives Program*

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	0.31	0.05	15%
OE	35.03	69.85	199%
Total Companies	35.34	69.90	198%

After the date of implementation for a measure under the Motors and Drives Program, the number of months remaining in 2011 for which annual savings could be attributed is referred to as first year pro rata savings. The first year pro rata ex post kWh savings for the Large Enterprise Equipment Program is summarized in Table 1-5. For the first year pro rata, the realized gross energy savings totaled 243,929 kWh.

*Table 1-11 Summary of First Year Pro Rata kWh Savings for Motors and Drives Program*

<i>Operating Company</i>	<i>First Year Ex Post Pro Rata kWh Savings</i>
CEI	50
OE	243,879
Total Companies	243,929

The first year of operation of the C/I Equipment Programs was atypical, principally because of the large number of applications submitted immediately following the launch of the programs. The strong interest in the incentive programs strained program resources and made processing of applications difficult. In response, the program incentives were decreased in order to keep it operating within budget. Many of the responses to the interviews and surveys conducted with trade allies, participants, and program staff reflected these events. However, they also highlighted program successes and improvements made to operations during the 2011 Program Year and point to areas where continued improvement is needed.

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

- Progress in Overcoming Market Barriers:** Interviews and surveys with customers and trade allies suggest that progress has been made in overcoming traditional market barriers to the adoption of energy efficiency equipment. Trade allies reported that the programs led them to offer more energy efficient products, increase inventories of energy efficient products and focus more on the energy savings aspect of projects, all of which point to increased availability and customer access to energy efficient products. Furthermore, nearly all customers felt the equipment met their expectations and that they were satisfied with it. Satisfaction with the equipment may lead participants to adopt similar equipment

in the future as well as lead them to discuss the benefits of energy efficient equipment with colleagues.

Although the programs have been successful in overcoming barriers to participation, some types of commercial and industrial organizations have been less active in the programs than others. In particular, smaller organizations that utilize less energy have not been as active in the programs in comparison to more energy intensive organizations such as manufacturing firms. The lower level of participation suggests that these organizations face additional barriers. The barriers faced by smaller organizations include less expertise in energy efficiency equipment, financial constraints that prevent the adoption of energy efficient equipment, and reduced benefits from improvements because they often rent or lease the space they occupy. Survey responses also suggest that smaller businesses are less likely to have policies and procedures for managing energy efficiency improvements and less likely to have the resources to dedicate to personnel to make decisions about energy efficiency improvements. Also, some trade allies suggested that larger businesses were more frequently the target of sales calls because of the potential scale of projects.

- **Program Services are Comprehensive:** The types of equipment covered by the programs is comprehensive and similar to the options available through other utility programs. Surveys of program participants also suggest that the programs met their needs. A fairly small share of participant survey respondents (17%) stated that there was additional equipment that they wanted to install that was not covered by the programs. Additionally, most of the equipment that trade allies reported noticing that customers were interested in was covered by the incentive programs. One possible exception is that trade allies reported that customers are interested in LED lighting but this is not currently an option under the standard lighting application.
- **Lighting Measures Account for Most of the kWh Savings:** There was a strong emphasis on high payback measures during the 2011 Program Year. Most of the savings generated in the 2011 Program Year were from lighting measures, which generally have lower costs relative to the savings potential. Additionally, the majority of customers reported using simple payback to evaluate the implementation of efficiency measures and most require a short payback period. The preference for short payback periods among customers suggests that there will be continued focus on high-payback projects in the coming year.
- **Programs Benefitted Customers:** Customer participation has been strong since the program launched. Additionally, customers have been generally satisfied with the program overall. Customers also expressed high levels of satisfaction with the performance of the equipment they installed and with the



savings on their monthly bills. However, participants expressed dissatisfaction with the elapsed time until rebates were received.

- **Some Evidence that Program has Promoted Energy Efficiency Behaviors and Awareness:** There is evidence that the programs have improved energy efficiency awareness and behavior. Among trade allies, approximately 20% said that the program had affected the equipment or services that they offer. These trade allies said that because of the program they had become more aware of the energy savings aspects of projects or that they had expanded their inventories of energy efficient equipment.

Among program participants, nearly all survey respondents said that the equipment they installed through the program remained installed, that the equipment met or exceeded their expectations, and that they were satisfied with the equipment. The positive experience with the equipment suggests that the equipment will remain installed in the future. Furthermore, the experience may foster positive attitudes towards energy efficient equipment that leads to additional adoption of efficient equipment. In fact, 13% of survey respondents said that they had implemented additional equipment that they did not receive incentives for as a result of participating in the programs.

- **Communication and Collaboration among Parties has been Fair:** Based on interviews with the Companies and SAIC program staff, communications between the parties are assessed as fair. Neither party felt that they were very problematic, but both felt that improvements could be made. A significant factor affecting the communications between the parties was the unusually high level of responses to the programs when they launched. This strained both parties and hindered effective communication and collaboration. It is likely that as the program operations become stable and the parties continue to work together, they will develop stronger communication processes.
- **Dissatisfaction among Trade Allies:** In their interview and survey responses a number of trade allies expressed dissatisfaction with the program. Much of the dissatisfaction stemmed from the change in the incentive levels that negatively impacted trade allies' businesses. While some trade allies remain dissatisfied with the program and have expressed disinterest in participating in the future, the majority remain engaged in the program. Among participants who said they were dissatisfied with the program, a clear majority said they market the program to their customers and nearly half expect to be as active or more active in the coming year.

Trade allies also felt that program operations could be more efficient. They were displeased with the length of time required to receive the incentive payments, a lack of communication status of and problems, and unclear communications

about problems with applications. However, some of these issues reflect the strains placed on the program by the large number of applications submitted shortly after launch.

While program organization and efficiency have improved during the program year, recommendations have been developed based on survey and interview findings and overall analysis of program processes. While the program will likely meet the savings goals for the coming year without difficulty, these recommendations may provide strategic advantage during the future program cycle:

- **Streamline Application Process:** Trade allies and customers expressed dissatisfaction with the application process and with the length of time for payment of the incentives in particular. Steps have been taken by the Companies and SAIC to improve the processing of applications such as increased automation of processing of applications, implementation of an online tool for applicants to check the status of their applications and submit documentation, and decreasing the application review time. However, additional progress will benefit the program.
- **Foster Greater Trust among Trade Allies and Customers:** Program staff recognizes that the rocky launch of the program has damaged the programs credibility amongst trade allies and customers. In order for the program to continue to influence businesses to adopt energy efficiency measures, credibility will have to be reestablished. The more steps the program can take to operate without big changes and to operate with greater transparency, the greater likelihood that the trust of trade allies and business owners will be regained.
- **Continue Developing Trade Ally Network:** More than 200 trade allies have assisted businesses in implementing energy efficient equipment through the program. However, the program website shows a smaller list of registered trade allies and a member of the program staff expressed concern that the network was underdeveloped for this stage of the program cycle. Additionally, some trade allies expressed a desire for greater communication about the program and a closer working relationship. Growing the network and keeping trade allies informed of program changes will serve as a valuable resource in the future program cycle.
- **Increase Focus on Program Marketing:** The high level of initial response to the program has precluded the need for extensive program marketing. In future program cycles, greater attention to program marketing will likely be needed. One of the functions of energy efficiency programs is the packaging of knowledge to help promote the adoption of energy efficient technologies. To this end, programs often develop materials such as case studies and other materials to help prospective customers understand the benefits of the implementing

efficient technology. These materials are of particular importance for reaching smaller businesses that typically do not have the resources to expend on developing in-house expertise of energy efficient equipment. In reaching future program cycles, reaching smaller businesses will be particularly important because they dominate the commercial and industrial market. Additionally, the market evaluation suggested that program participation rates are lower among smaller businesses and some trade allies mentioned that greater outreach to smaller businesses was needed.

## 2. Introduction and Purpose of Study

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This report presents the results of the impact and process evaluations of the Large Enterprise Equipment Program, the Small Enterprise Equipment Program, and the Motors and Drives Program (collectively “C/I Equipment Programs”) for activity during the 2011 program year.

### 2.1 Overview of Evaluation Approach

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The overall objective for the impact evaluation of the Large Enterprise Equipment Program, the Small Enterprise Equipment Program, and the Motors and Drives Program was to verify the gross energy savings and peak demand (kW) reduction resulting from participation in the program during the 2011 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 of a sample of program participants to gather information on their decision making, and their likes and dislikes of the program.

### 3. Description of Programs

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#### 3.1 Description of Large Enterprise Equipment Program and Small Enterprise Equipment Program

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To be eligible to participate in the Large Enterprise 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 Enterprise 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>
GPD	Large
GPF	Large
GSD	Small
GSF	Small
GSMAND	Large
GSMANF	Large
GSSF	Small
GSUD	Large
GSUF	Large
GTD	Large
GTF	Large

The energy efficiency measures (EEMs) that were implemented by the Large Enterprise Equipment Program and the Small Enterprise Equipment Program are organized into three categories: standard measures, non-standard measures, and custom measures.

Standard measures include lighting equipment for which the program uses “deemed” or “partially deemed” protocols with stipulated algorithms and assumptions to estimate measure gross energy savings and peak load reductions. Non-standard measures capture lighting projects that are not included in the list of standard lighting measures. Both non-standard and custom measures were evaluated on an implementation-by-implementation basis, using site-specific data and algorithms tailored to the nature of the EEM and its implementation.

Standard and non-standard measures were targeted at customers that will purchase lighting equipment that will result in energy efficiency and/or peak demand reductions. Incentives for custom measures also require a payback between one and seven years.

There are six forms which can be completed for the Large Enterprise Equipment Program. These forms are for standard lighting, nonstandard lighting, refrigeration/food service, specialty equipment, HVAC, and custom incentives. There are seven forms which can be completed for the Small Enterprise Equipment Program. These forms are for standard lighting, nonstandard lighting, HVAC, motors and drives, refrigeration/food service, specialty equipment, and custom incentives.

For the standard and non-standard lighting measures, any projects with incentive amounts totaling \$3,000 or more required pre-approval before equipment was purchased and installed. Projects with total incentives which are less than \$3,000 only needed to submit an application and implement the project. For custom incentives, all projects underwent pre-approval. Once applications were approved, they were sent to the Companies for approval as the last step in the implementation process.

For the Large Enterprise Equipment Program, the expected gross savings by measure type are shown in Table 3-2. There were 211 projects in the program which were expected to provide savings of 100,016,848 kWh.

*Table 3-2 Ex Ante Annual Energy Savings of 2011 Large Enterprise Equipment Program*

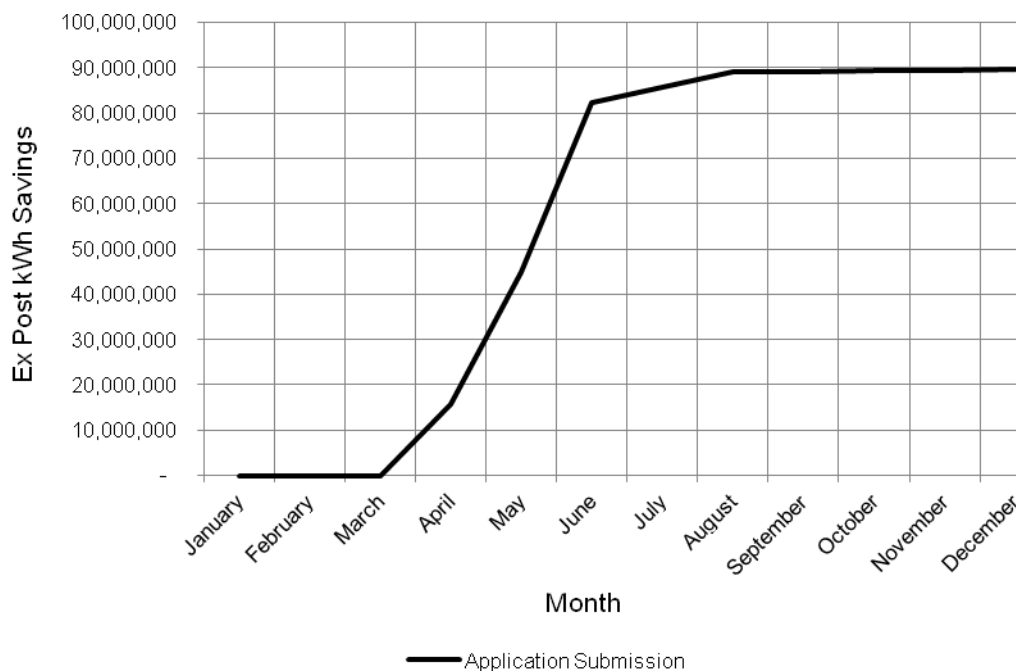
<i>Measure Type</i>	<i>Ex Ante kWh Savings</i>			
	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>
Non-Standard Lighting	27,479,633	50,248,512	21,674,762	99,402,907
Standard Lighting	4,333	121,252	488,357	613,941
Total	27,483,966	50,369,764	22,163,119	100,016,848

For the Small Enterprise Equipment Program, the expected gross savings by measure type are shown in Table 3-3. There were 2,039 projects in the program which were expected to provide savings of 148,821,790 kWh.

*Table 3-3 Ex Ante Annual Energy Savings of 2011 Small Enterprise Equipment Program*

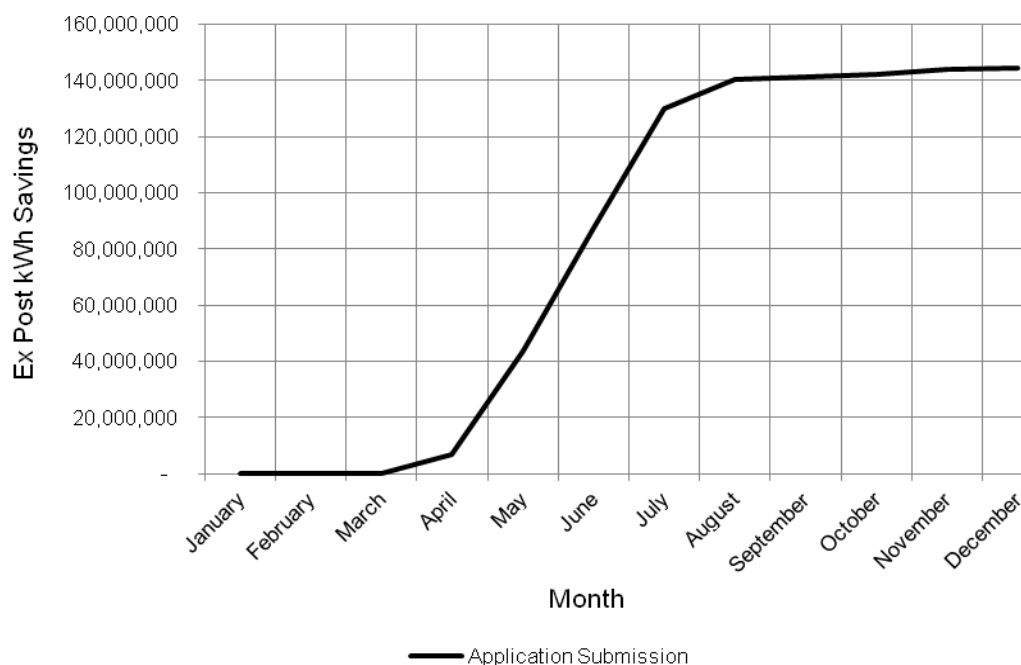
<i>Measure Type</i>	<i>Ex Ante kWh Savings</i>			
	<i>CEI</i>	<i>OE</i>	<i>TE</i>	<i>Total Companies</i>
Non-Standard Lighting	74,905,018	61,676,975	7,953,909	144,535,902
Standard Lighting	722,235	2,015,753	417,168	3,155,156
Motor	124,993	492,796	118,479	736,267
Custom	22,497	-	369,612	392,109
Refrigeration	1,229	-	-	1,229
HVAC	-	-	1,127	1,127
Total	75,775,972	64,185,524	8,860,294	148,821,790

Figure 3-1 shows the Large Enterprise Equipment Program's ex post kWh savings by the date of application submission. A large spike in application submissions occurred during April through July of 2011.



*Figure 3-1 Large Enterprise Equipment Program Cumulative Ex Post kWh Savings by Date of Application Submission (Note: The rising slope in March is due to savings accrued in April)*

Figure 3-2 shows the Small Enterprise Equipment Program's ex post kWh savings by the date of application submission. A large spike in application submissions occurred during April through July of 2011.



*Figure 3-2 Small Enterprise Equipment Program Cumulative Ex Post kWh Savings by Date of Application Submission (Note: The rising slope in March is due to savings accrued in April)*

### 3.2 Description of the Motors and Drives Program

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

The EDCs offered the Motors and Drives Program in Ohio to encourage the company’s commercial and industrial customers to:

- Upgrade their existing motors to NEMA Premium® motors when switching out old motors due to breakdowns and or programmed replacements; and
- Install variable speed drives on motors that do not always operate at the same load.

The Motors and Drives Program is designed for commercial and industrial energy customers whose motors are utilized for high operating hours (i.e., over 3,000 hours) and have a higher variability of loads on the system (e.g., centrifugal pumps and fans) or the application of use includes mechanical throttling (valves, dampers, etc). This is because variable speed drives match the speed of the motor-driven equipment to the process requirement. Applications with low variability of loads such as vibrating



conveyors, punch presses, rock crushers, machine tools and other applications where the motor runs at constant speed were not good candidates for a variable-speed drive.

Incentives were available to customers through motor distributors as a rebate per unit replaced on a first come first serve basis and were limited to the Company's motor upgrade budget.

To have been eligible to participate in the Motors and Drives Program, a customer must have met the following criteria:

- Motor(s) must operate a minimum of 2,000 hours annually.
- Projects must be a "one-for-one" replacement of a motor with a new, NEMA Premium® motor. The sizes (hp) of the existing and new motors may vary, but the project must involve replacing a quantity of motors for the same quantity of new motors. For new construction, the "existing" motor should be a code-compliant option that is less efficient than the NEMA Premium® motor that is being installed.
- Project does not involve a change in annual run hours.
- Project includes the installation of a new NEMA Premium® motor of up to 200hp.
- The motor upgrade program's individual incentives per motor start at \$25 for a 1HP.
- The variable-speed drive incentive is \$35 per horsepower (up to 500hp) of the motor being used.
- Variable Frequency Drives (VFDs) incentives were available only for the installation of a new VFD on applications where no existing speed control existed on applications controlling a maximum of 500 hp.

Standard motor and drive measures include equipment for which the program uses "deemed" or "partially deemed" protocols with stipulated algorithms and assumptions to estimate measure gross energy savings and peak load reductions. The measures were evaluated on an implementation-by-implementation basis, using site-specific data and algorithms tailored to the nature of the EEM and its implementation.

Measures were targeted at customers that have purchased motor or drive equipment which will result in energy efficiency and/or peak demand reductions. Incentives for custom measures require a payback between one and seven years.

Any projects with incentive amounts totaling \$3,000 or more required pre-approval before equipment was purchased and installed. Projects with total incentives which were less than \$3,000 only needed to submit an application and implement the project. Once applications were approved, they were sent to the Companies for approval as the last step in the implementation process.

There were two projects in the program which were expected to provide savings of 2,276,460 kWh.

## 4. Methodology

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ADM's evaluation of the 2011 C/I Equipment 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

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

#### 4.1.1 Sampling Plans - Large Enterprise Equipment Program and Small Enterprise Equipment Program

Data used to estimate the gross savings achieved through the Large Enterprise Equipment Program were collected for samples of projects completed during the 2011 program year. Data provided by the implementation contractor showed that during 2011, there were 211 projects for the program, which were expected to provide savings of 100,016,848 kWh annually.

Data used to estimate the gross savings achieved through the Small Enterprise Equipment Program were collected for samples of projects completed during the 2011 program year. Data provided by the implementation contractor showed that during 2011, there were 2,039 projects for the program, which were expected to provide savings of 148,821,790 kWh annually.

For both 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 Enterprise Equipment Program sample, the actual precision is  $\pm 6.7\%$ . For the Small Enterprise Equipment Program sample, the actual precision is  $\pm 9.7\%$ .

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 the sampled projects by stratum for the Large Enterprise Equipment Program. Table 4-2 shows the number of projects and expected energy savings of the sampled projects by stratum for the Small Enterprise Equipment Program.

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

	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Stratum 4</i>	<i>Stratum 5</i>	<i>Totals</i>
Strata boundaries (kWh) Savings	< 61,780	61,780 – 121,359	121,360 – 262,579	262,580 – 738,129	> 738,130	
Number of projects	45	33	39	59	35	211
Total kWh savings	1,067,868	2,835,653	7,032,699	26,614,368	62,466,260	100,016,848
Average kWh Savings	23,730	85,929	180,326	451,091	1,784,750	474,013
Standard deviation of kWh savings	16,001	19,008	40,528	137,950	1,646,475	902,322
Coefficient of variation	0.67	0.22	0.22	0.31	0.92	1.90
Final design sample	2	3	2	5	34	46

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

	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Stratum 4</i>	<i>Stratum 5</i>	<i>Totals</i>
Strata boundaries (kWh) Savings	< 20,050	20,050 – 80,859	80,860 – 230,389	230,390 – 523,879	> 523,880	
Number of projects	782	736	373	120	28	2039
Total kWh savings	6,649,982	31,771,176	49,579,976	38,487,471	22,333,186	148,821,790
Average kWh Savings	8,504	43,167	132,922	320,729	797,614	72,988
Standard deviation of kWh savings	5,605	17,635	40,738	69,937	418,851	128,215
Coefficient of variation	0.66	0.41	0.31	0.22	0.53	1.76
Final design sample	2	3	22	26	28	81

As shown in Table 4-3, the Large Enterprise Equipment Program sample projects account for approximately 65% of the expected kWh savings. As shown in Table 4-4, the Small Enterprise Equipment Program sample projects account for approximately 24% of the expected kWh savings.

*Table 4-3 Expected kWh Savings for Sampled Projects by Stratum for Large Enterprise Equipment Program*

<i>Stratum</i>	<i>Ex Ante kWh Savings (Population)</i>	<i>Ex Ante kWh Savings (Sample)</i>	<i>Percent of Ex Ante Peak kWh Savings in Sample</i>
5	62,466,260	61,220,250	98%
4	26,614,368	3,078,869	12%
3	7,032,699	489,202	7%
2	2,835,653	290,017	10%

Stratum	Ex Ante kWh Savings (Population)	Ex Ante kWh Savings (Sample)	Percent of Ex Ante Peak kWh Savings in Sample
1	1,067,868	92,133	9%
Total	100,016,848	65,170,471	65%

*Table 4-4 Expected kWh Savings for Sampled Projects by Stratum for Small Enterprise Equipment Program*

Stratum	Ex Ante kWh Savings (Population)	Ex Ante kWh Savings (Sample)	Percent of Ex Ante Peak kWh Savings in Sample
5	22,333,186	22,333,186	100%
4	38,487,471	8,274,393	21%
3	49,579,976	4,238,067	9%
2	31,771,176	178,087	1%
1	6,649,982	39,733	1%
Total	148,821,790	35,063,466	24%

As shown in Table 4-5, the Large Enterprise Equipment Program sample projects account for approximately 63% of the expected peak kW savings. As shown in Table 4-6, the Small Enterprise Equipment Program sample projects account for approximately 21% of the expected peak kW savings.

*Table 4-5 Expected Peak Demand kW Savings for Sampled Projects by Stratum for Larger Enterprise Equipment Program*

Stratum	Ex Ante Peak kW Savings (Population)	Ex Ante Peak kW Savings (Sample)	Percent of Ex Ante Peak kW Savings in Sample
5	9,634	9,479	98%
4	4,638	682	15%
3	1,321	136	10%
2	570	53	9%
1	235	25	11%
Total	16,397	10,376	63%

*Table 4-6 Expected Peak Demand kW Savings for Sampled Projects by Stratum for Small Enterprise Equipment Program*

Stratum	Ex Ante Peak kW Savings (Population)	Ex Ante Peak kW Savings (Sample)	Percent of Ex Ante Peak kW Savings in Sample
5	3,495	3,495	100%
4	6,275	1,598	25%

<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>
3	9,935	863	9%
2	7,530	51	1%
1	1,922	7	0%
Total	29,157	6,015	21%

#### 4.1.2 Sampling Plan - Motors and Drives Program

Due to the fact that only two projects were completed under the Motors and Drives Program during the 2011 program year, data for estimating the gross savings were collected for both projects. These projects were expected to provide a savings of 2,276,460 kWh annually.

#### 4.1.3 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.

#### 4.1.4 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.

#### 4.1.5 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

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 4-7.

*Table 4-7 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 4-7 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 rates<sup>1</sup> were calculated for each project for which on-site data collection and engineering analysis/building simulations are conducted. Sites with 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.

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



ADM uses per-fixture baseline demand, retrofit demand, and appropriate post-retrofit operating hours to calculate peak capacity 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 demand is calculated by dividing the total kWh usage calculated peak period of the day by the number of hours in the peak period. The PUCO established summer on-peak period occurs during the months of June through August, on weekdays from 3:00-6:00 p.m.

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, per the following formula:

$$\text{Peak Capacity Savings} = kW_{\text{Before}} - kW_{\text{After}}$$

The baseline and post-installation average 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 monitored sample are used to calculate the average operating hours of the metered lights in each costing period for every unique building type/usage area.
2. These average operating hours are then applied to the baseline and post-installation average demand for each usage area to calculate the respective energy usage and peak period demand for each usage area.
3. The annual baseline energy usage is the sum of the baseline kWh for each costing period 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

**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. 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.
- 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:

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

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

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

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

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

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

$\text{Amps}_{\text{ave}}$  = 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.<sup>2</sup>

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

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

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.<sup>3</sup>

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.

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.<sup>4</sup>

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, scrap, and other key performance indicators,

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

<sup>4</sup>As 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:

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

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.

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 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 obtain 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.

ADM used AirMaster+ to calculate the savings due to the energy efficiency measures installed within each compressed air system. The AirMaster+ as-built and baseline compressor types were inputted into the model using data points collected during on-site verification. The as-built model was then calibrated to a typical daily schedule, derived from at least two weeks of trending data. Project energy savings were calculated by subtracting the as-built from the baseline energy consumption.

**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.



## 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 Equipment Programs during the 2011 Program Year. Figure 4-1 provides an overview of the evaluation process, including the specific research activities performed.

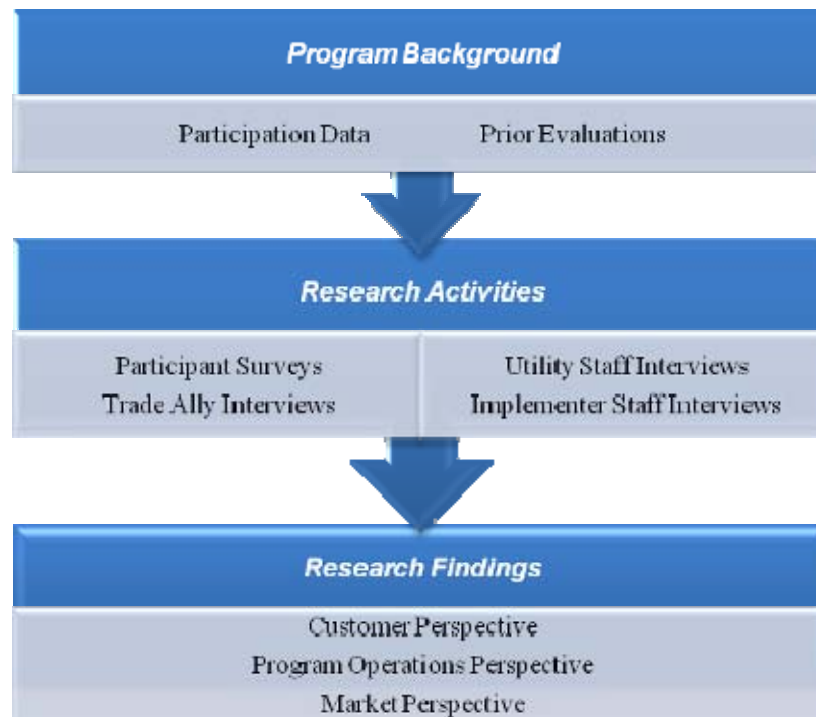


Figure 4-1. Process Evaluation Overview

Key research questions to be addressed by this evaluation of the 2011 Program Year activity include:

*Where was the C/I Equipment Programs delivery effective and successful?*

*Are there areas of the C/I Equipment Programs that could be improved?*

*Did the C/I Equipment Programs reduce barriers to increased energy efficiency project implementation?*

During the evaluation, data and information from numerous sources were analyzed to achieve the stated research objectives. Insight into the customer experience with the C/I Equipment Programs was developed from an online and telephone survey of program participants. The market perspective was developed through in-depth interviews with trade allies that market the program to their customers, worked with participants to

prepare incentive applications, and assisted with project implementation. Lastly, the internal organization and operational efficiency of program delivery is examined through analysis of interviews conducted with the Companies' program managers and program implementation contractor staff.



## 5. Detailed Evaluation Findings

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This chapter reports ADM's impact evaluation findings and process evaluation findings for the Large Enterprise Equipment Program, the Small Enterprise Equipment Program, and the Motors and Drives Program during the 2011 program year.

### 5.1 Impact Evaluation Findings

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This section provides the results of gross savings for the Large Enterprise Equipment Program, the Small Enterprise Equipment Program, and the Motors and Drives Equipment Program during the 2011 program year. Table 5-1 summarizes the gross savings for each program.

*Table 5-1 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 Enterprise	100,016,848	113,389,605	113%	16,397	16,768	102%
Small Enterprise	148,821,790	144,585,350	97%	29,157	31,101	107%
Motors & Drives	2,276,460	718,286	32%	35	70	198%
Total	251,115,099	258,693,242	103%	45,590	47,939	105%

#### 5.1.1 Gross Savings

To estimate gross kWh savings and peak kW reductions for the Large Enterprise Equipment Program, data were collected and analyzed for samples of 46 incentive projects. To estimate gross kWh savings and peak kW reductions for the Small Enterprise Equipment Program, data were collected and analyzed for samples of 81 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 both programs. The results of that analysis are reported in this section.

#### 5.1.2 Realized Gross kWh Savings

The gross kWh savings of the 2011 Large Enterprise Equipment Program are summarized by sampling stratum in Table 5-2. Overall, the achieved gross savings of 113,389,605 kWh were equal to 113% of the expected savings.

The gross kWh savings of the 2011 Small Enterprise Equipment Program are summarized by sampling stratum in Table 5-3. Overall, the achieved gross savings of 144,585,350 kWh were equal to 97% of the expected savings.

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

<i>Stratum</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
5	62,466,260	68,548,721	110%
4	26,614,368	25,103,439	94%
3	7,032,699	16,425,209	234%
2	2,835,653	2,413,948	85%
1	1,067,868	898,287	84%
Total	100,016,848	113,389,605	113%

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

<i>Stratum</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
5	22,333,186	23,706,655	106%
4	38,487,471	33,058,353	86%
3	49,579,976	46,620,620	94%
2	31,771,176	34,646,311	109%
1	6,649,982	6,553,411	99%
Total	148,821,790	144,585,350	97%

Table 5-4 shows the expected and realized energy savings by project for the Large Enterprise Equipment Program. Table 5-5 shows the expected and realized energy savings by project for the Small Enterprise Equipment Program.

*Table 5-4. Expected and Gross Realized kWh Savings for Large Enterprise Equipment Program by Project*

<i>Project ID</i>	<i>Expected kWh Savings</i>	<i>Realized Gross kWh Savings</i>	<i>Project Gross Realization Rate</i>
OH-NSLB12991	1,203,056	1,453,405	121%
OH-NSLB4317	1,126,382	1,099,013	98%
OH-NSLB4335	738,131	415,411	56%
OH-NSLB4517	5,951,299	5,691,850	96%
OH-NSLB4522	6,425,995	8,586,675	134%
OH-NSLB4630	1,005,965	1,417,266	141%
OH-NSLB5153	890,567	763,344	86%
OH-NSLB5199	3,046,593	3,267,853	107%
OH-NSLB5203	5,434,791	8,015,618	147%
OH-NSLB5284	2,158,740	1,641,433	76%
OH-NSLB5514	789,537	758,637	96%
OH-NSLB5755	6,267,391	6,772,459	108%
OH-NSLB6137	772,366	615,580	80%
OH-NSLB6143	3,155,725	2,818,035	89%
OH-NSLB6215	833,462	411,642	49%
OH-NSLB6226	971,233	553,818	57%

<i>Project ID</i>	<i>Expected kWh Savings</i>	<i>Realized Gross kWh Savings</i>	<i>Project Gross Realization Rate</i>
OH-NSLB6238	1,406,667	1,488,537	106%
OH-NSLB6242	795,327	886,871	112%
OH-NSLB6439	796,099	1,100,758	138%
OH-NSLB6446	934,804	1,662,471	178%
OH-NSLB6542	806,042	850,274	105%
OH-NSLB6552	1,422,490	1,063,080	75%
OH-NSLB6566	1,197,527	1,575,693	132%
OH-NSLB6574	1,251,659	492,400	39%
OH-NSLB6722	1,038,860	2,024,828	195%
OH-NSLB6744	928,176	734,499	79%
OH-NSLB6771	908,082	925,459	102%
OH-NSLB6913	1,087,750	1,106,281	102%
OH-NSLB6919	1,872,649	1,916,211	102%
OH-NSLB6947	1,502,830	1,512,393	101%
OH-NSLB6967	1,167,777	1,388,163	119%
OH-NSLB6999	1,116,990	1,183,528	106%
OH-NSLB7127	808,172	1,213,404	150%
OH-NSLB7454	1,407,116	1,774,496	126%
OH-NSLB4543	608,421	445,941	73%
OH-NSLB4603	699,014	634,414	91%
OH-NSLB5154	675,081	857,246	127%
OH-NSLB5287	583,205	273,159	47%
OH-NSLB5868	513,148	693,318	135%
OH-NSLB7038	242,057	447,464	185%
OH-NSLB7421	247,145	695,091	281%
OH-NSLB6440	92,305	37,805	41%
OH-NSLB7069	90,389	110,189	122%
OH-NSLB7138	107,323	98,893	92%
OH-NSLB12492	44,462	37,654	85%
OH-NSLB7103	47,671	39,848	84%
Non-Sample Projects	34,846,377	41,837,198	120%
Total	100,016,848	113,389,605	113%

*Table 5-5 Expected and Gross Realized kWh Savings for Small Enterprise Equipment Program by Project*

<i>Project ID</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
OH-NSLB11878	811,971	1,163,510	143%
OH-NSLB12289	1,318,476	1,538,015	117%
OH-NSLB4303	529,770	421,764	80%
OH-NSLB4535	535,246	293,009	55%

<i>Project ID</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
OH-NSLB4847	898,430	492,577	55%
OH-NSLB4866	676,032	701,537	104%
OH-NSLB5127	888,971	553,961	62%
OH-NSLB5181	523,876	518,082	99%
OH-NSLB5187	565,067	770,603	136%
OH-NSLB5196	1,117,606	937,068	84%
OH-NSLB5718	669,334	1,879,283	281%
OH-NSLB5719	659,424	1,851,461	281%
OH-NSLB5758	530,806	1,490,339	281%
OH-NSLB5839	659,890	453,375	69%
OH-NSLB5841	575,124	351,633	61%
OH-NSLB6064	550,677	282,475	51%
OH-NSLB6260	575,776	323,368	56%
OH-NSLB6612	787,311	657,222	83%
OH-NSLB6613	953,957	945,605	99%
OH-NSLB6617	815,284	552,773	68%
OH-NSLB6934	599,849	628,280	105%
OH-NSLB6972	1,227,521	1,078,784	88%
OH-NSLB7351	726,408	859,688	118%
OH-NSLB7418	670,249	344,486	51%
OH-NSLB7929	561,895	358,337	64%
OH-NSLB8150	2,635,812	3,333,774	126%
OH-NSLB8531	725,287	700,276	97%
OH-NSLB8584	543,137	225,370	41%
OH-NSLB3700	345,558	286,283	83%
OH-NSLB4328	253,312	133,023	53%
OH-NSLB4330	338,992	269,694	80%
OH-NSLB4334	246,591	123,047	50%
OH-NSLB4337	268,899	220,203	82%
OH-NSLB4339	336,757	401,966	119%
OH-NSLB4519	461,452	344,050	75%
OH-NSLB4530	233,286	151,722	65%
OH-NSLB4613	285,217	243,101	85%
OH-NSLB4615	426,638	363,812	85%
OH-NSLB4786	249,891	264,534	106%
OH-NSLB4808	294,576	198,918	68%
OH-NSLB4842	270,876	209,967	78%
OH-NSLB5142	325,812	312,329	96%
OH-NSLB5155	299,217	250,473	84%
OH-NSLB5510	254,918	226,526	89%
OH-NSLB5701	433,379	432,992	100%
OH-NSLB5703	358,415	360,104	100%
OH-NSLB5705	442,890	444,978	100%
OH-NSLB5706	345,361	346,989	100%

<i>Project ID</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
OH-NSLB5708	410,815	357,968	87%
OH-NSLB5710	308,997	269,248	87%
OH-NSLB5848	230,387	164,841	72%
OH-NSLB5860	292,698	255,108	87%
OH-NSLB6239	238,791	171,437	72%
OH-NSLB6995	320,668	303,878	95%
OH-NSLB4325	204,656	153,338	75%
OH-NSLB4545	205,379	332,006	162%
OH-NSLB4617	200,814	153,265	76%
OH-NSLB5161	177,255	109,904	62%
OH-NSLB5175	195,797	204,200	104%
OH-NSLB5219	172,450	92,597	54%
OH-NSLB5286	172,093	108,913	63%
OH-NSLB5499	212,205	183,388	86%
OH-NSLB5521	180,645	230,435	128%
OH-NSLB5707	210,349	187,344	89%
OH-NSLB5712	223,030	198,171	89%
OH-NSLB5724	181,788	158,442	87%
OH-NSLB5738	163,649	157,105	96%
OH-NSLB5877	188,908	181,976	96%
OH-NSLB6050	169,824	181,249	107%
OH-NSLB6912	202,531	216,184	107%
OH-NSLB6925	189,066	164,819	87%
OH-NSLB6996	172,987	198,447	115%
OH-NSLB7033	205,939	248,605	121%
OH-NSLB7088	220,811	294,966	134%
OH-NSLB7796	203,710	99,295	49%
OH-NSLB7904	184,181	130,454	71%
OH-NSLB5952	79,269	100,175	126%
OH-NSLB6553	60,317	80,659	134%
OH-NSLB7485	38,501	13,369	35%
OH-NSLB4813	19,832	16,812	85%
OH-NSLB6603	19,901	22,344	112%
Non-Sample Projects	113,758,324	109,553,042	96%
Total	148,821,790	144,585,350	97%

Gross realized kWh savings of the Large Enterprise Equipment Program are shown by building type in Table 5-6. Among discrete building types, manufacturing facilities account for the largest percentage of incentive gross energy - 63%.

Gross realized kWh savings of the Small Enterprise Equipment Program are shown by building type in Table 5-7. Among discrete building types, manufacturing facilities account for the largest percentage of incentive gross energy - 43%.

**Table 5-6 Realized Gross kWh Savings by Facility Type for Large Enterprise Equipment Program**

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	10,575,622	37,545,104	13,145,453	61,266,179	12,431,042	41,754,192	17,295,026	71,480,260	63%	117%
Other	7,308,662	1,135,412	6,267,391	14,711,465	7,698,725	785,920	6,772,459	15,257,104	13%	104%
Warehouse	3,882,361	5,174,733	2,167,048	11,224,141	4,737,016	5,937,673	1,331,931	12,006,620	11%	107%
Office	690,265	3,094,999	35,806	3,821,070	363,470	2,831,481	30,120	3,225,071	3%	84%
Hospital	2,865,475	50,915	-	2,916,390	4,139,540	42,830	-	4,182,370	4%	143%
Community College	1,295,424	747,207	-	2,042,631	1,215,386	704,787	-	1,920,173	2%	94%
Retail	443,789	889,257	75,664	1,408,710	946,586	1,181,392	64,412	2,192,390	2%	156%
K-12 Education	-	1,029,643	30,935	1,060,578	-	952,882	26,022	978,904	1%	92%
University	287,349	400,164	332,183	1,019,696	467,278	673,118	313,325	1,453,721	1%	143%
Grocery	-	302,330	108,639	410,969	-	285,166	92,483	377,649	0%	92%
Food Service	135,019	-	-	135,019	315,343	-	-	315,343	0%	234%
<b>Total</b>	<b>27,483,966</b>	<b>50,369,764</b>	<b>22,163,119</b>	<b>100,016,848</b>	<b>32,314,387</b>	<b>55,149,441</b>	<b>25,925,777</b>	<b>113,389,605</b>	<b>100%</b>	<b>113%</b>

**Table 5-7 Realized Gross kWh Savings by Facility Type for Small Enterprise Equipment Program**

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	36,210,869	27,255,281	3,747,284	67,213,434	32,957,383	25,984,008	3,771,789	62,713,181	43%	93%
Warehouse	13,243,202	12,886,038	1,303,705	27,432,945	12,224,924	15,660,010	1,214,706	29,099,639	20%	106%
Retail	6,746,196	8,526,275	1,517,361	16,789,832	6,632,647	8,631,621	1,500,507	16,764,775	12%	100%
Office	7,848,832	3,996,528	557,110	12,402,470	7,458,205	3,806,412	521,057	11,785,674	8%	95%
Other	4,221,569	6,209,820	1,130,296	11,561,685	4,095,102	5,938,722	1,077,547	11,111,372	8%	96%
Food Service	2,548,501	1,661,365	162,649	4,372,514	2,533,119	1,707,067	160,331	4,400,518	3%	101%
K-12 Education	1,720,745	877,564	221,094	2,819,403	1,717,596	916,575	224,166	2,858,337	2%	101%
Grocery	88,069	1,315,812	59,609	1,463,490	96,039	1,248,158	65,003	1,409,200	1%	96%
Hospital	855,485	170,664	161,187	1,187,336	846,578	160,477	151,566	1,158,622	1%	98%
Medical Clinic	674,988	462,212	-	1,137,200	628,549	411,905	-	1,040,454	1%	91%
Lodging	530,381	427,338	-	957,719	470,926	393,479	-	864,405	1%	90%
University	732,988	61,132	-	794,120	680,767	66,664	-	747,431	1%	94%
Community College	354,147	328,569	-	682,716	342,698	282,220	-	624,918	0%	92%
Multi-Family Common Areas	-	6,926	-	6,926	-	6,825	-	6,825	0%	99%
<b>Total</b>	<b>75,775,972</b>	<b>64,185,524</b>	<b>8,860,294</b>	<b>148,821,790</b>	<b>70,684,534</b>	<b>65,214,144</b>	<b>8,686,672</b>	<b>144,585,350</b>	<b>100%</b>	<b>97%</b>

### 5.1.3 Realized Gross Peak kW Savings

The realized gross peak kW reductions of the 2011 Large Enterprise Equipment Program are shown in Table 5-8. The achieved gross peak demand savings for the program are 16,768 kW.

*Table 5-8 Expected and Gross Realized Peak kW Savings for Large Enterprise Equipment Program*

<i>Stratum</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
5	9,634	10,065	104%
4	4,638	4,248	92%
3	1,321	1,662	126%
2	570	547	96%
1	235	246	105%
Total	16,397	16,768	102%

The realized gross peak kW reductions of the 2011 Small Enterprise Equipment Program are shown in Table 5-9. The achieved gross peak demand savings for the program are 31,101 kW.

*Table 5-9 Expected and Gross Realized Peak kW Savings for Small Enterprise Equipment Program*

<i>Stratum</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
5	3,495	3,813	109%
4	6,275	7,113	113%
3	9,935	11,212	113%
2	7,530	7,052	94%
1	1,922	1,911	99%
Total	29,157	31,101	107%

### 5.1.4 Discussion of Gross Savings Analysis

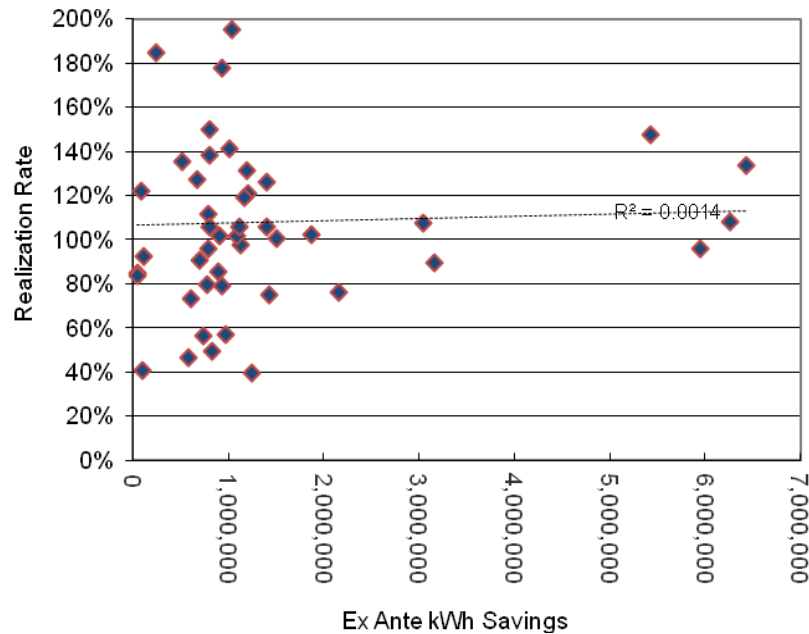
The project realization rates were reviewed to assess whether there were factors that were causing systematic differences in the realization rates. An analysis was conducted to determine whether realization rates for projects differed systematically by expected kWh savings for the Large Enterprise Equipment Program and the Small Enterprise Equipment Program.

For the Large Equipment Program, 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 the Small Enterprise Equipment Program, 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.

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 Enterprise Equipment Program*



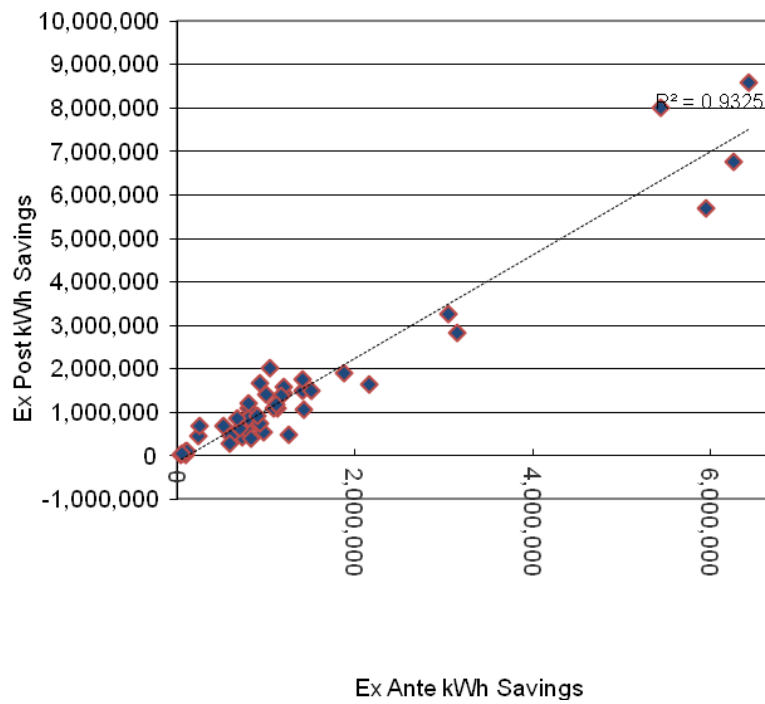


Figure 5-2 Sample Project Realized kWh Savings versus Expected kWh Savings for Large Enterprise Equipment Program

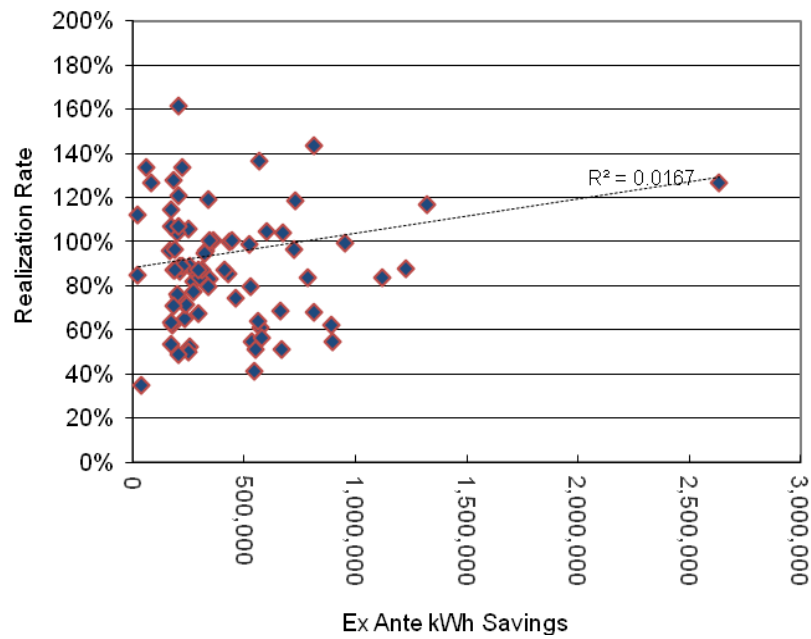
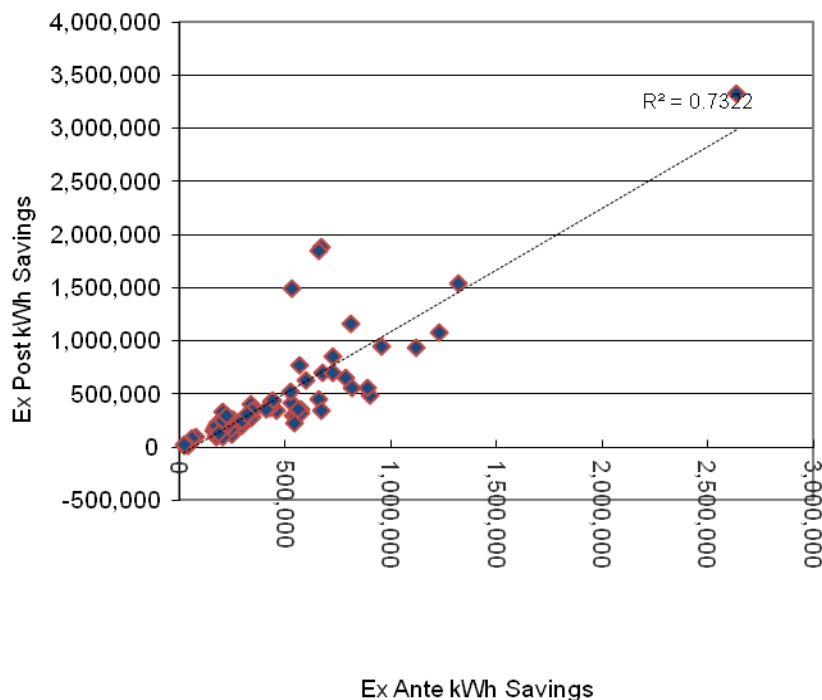


Figure 5-3 Sample Project Realization Rate versus Expected kWh Savings for Small Enterprise Equipment Program



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

The gross savings by measure type and company for the Large Enterprise Equipment Program are summarized in *Table 5-11*. Non-standard lighting accounts for most (99%) of the ex post kWh savings.

The gross savings by measure type and company for the Small Enterprise Equipment Program are summarized in *Table 5-10*. Non-standard lighting accounts for most (97%) of the ex post kWh savings.

**Table 5-11 Realized kWh Savings by Measure Type and Company for Large Enterprise Equipment Program**

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		
Non-Standard Lighting	27,479,633	50,248,512	21,674,762	99,402,907	32,310,742	55,046,407	25,275,179	112,632,328	99%	113%
Standard Lighting	4,333	121,252	488,357	613,941	3,645	103,034	650,598	757,277	1%	123%
<b>Total</b>	<b>27,483,966</b>	<b>50,369,764</b>	<b>22,163,119</b>	<b>100,016,848</b>	<b>32,314,387</b>	<b>55,149,441</b>	<b>25,925,777</b>	<b>113,389,605</b>	<b>100%</b>	<b>113%</b>

**Table 5-10 Realized kWh Savings by Measure Type and Company Small Enterprise Equipment Program**

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		
Non-Standard Lighting	74,905,018	61,676,975	7,953,909	144,535,902	69,772,290	62,678,468	7,842,256	140,293,014	97%	97%
Standard Lighting	722,235	2,015,753	417,168	3,155,156	750,196	2,065,010	414,426	3,229,631	2%	102%
Motor	124,993	492,796	118,479	736,267	136,304	470,666	111,407	718,377	0%	98%
Custom Refrigeration	22,497	-	369,612	392,109	24,533	-	317,474	342,007	0%	87%
HVAC	1,229	-	-	1,229	1,211	-	-	1,211	0%	99%
<b>Total</b>	<b>75,775,972</b>	<b>64,185,524</b>	<b>8,860,294</b>	<b>148,821,790</b>	<b>70,684,534</b>	<b>65,214,144</b>	<b>8,686,672</b>	<b>144,585,350</b>	<b>100%</b>	<b>97%</b>

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## 5.2 Process Evaluation Findings

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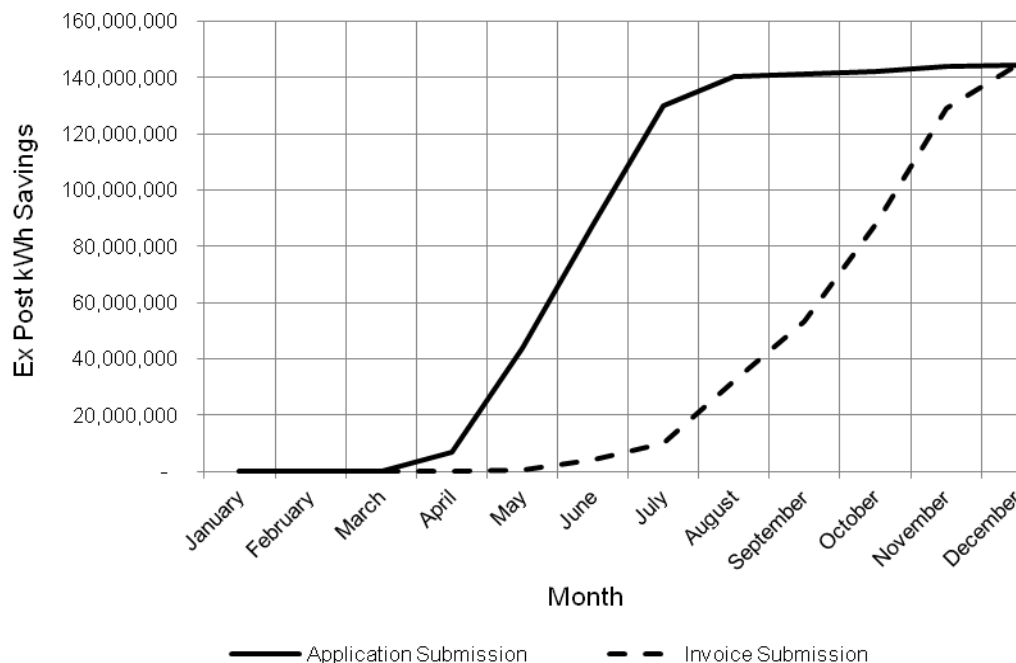
This section presents the results of the process evaluation for the Companies' C/I Equipment Programs during the 2011 Program Year. The process evaluation focuses on the effectiveness of program policies and organization, as well as the program delivery framework. The purpose of the process evaluation 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 and interviews and surveys of participating customers, trade allies, energy efficiency staff, program implementation contractor staff, and program tracking data.

### 5.2.1 Summary of Primary Data Collection

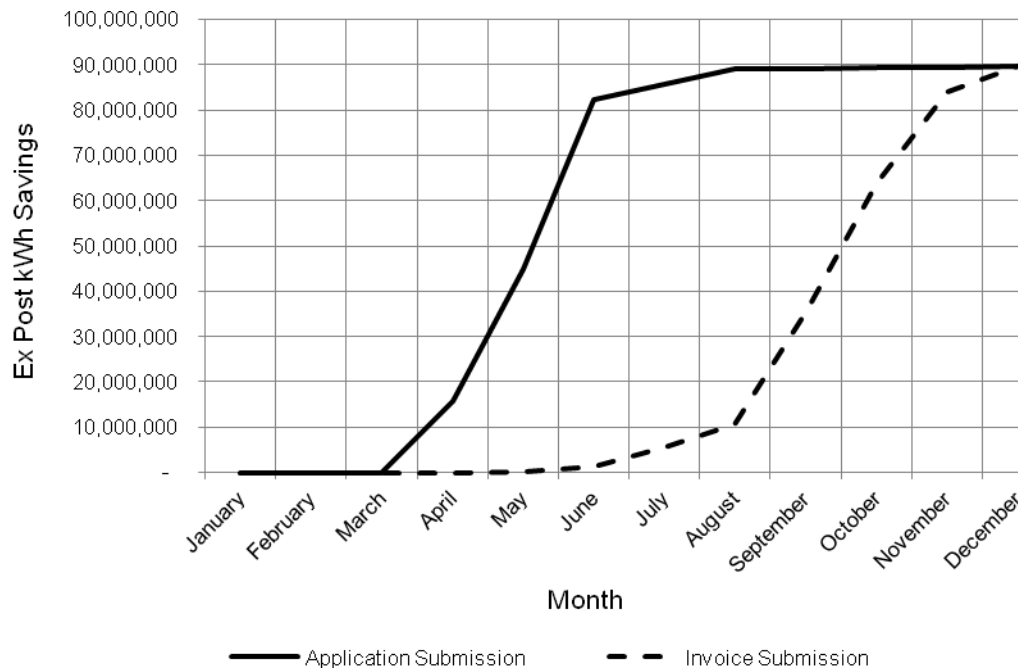
- **Participant surveys:** Participant surveys are the primary data source for many components of this process evaluation, and serve as the foundation for understanding the customer perspective. The participant surveys provide customer feedback and insight regarding customer experiences with the C/I Equipment Programs. Respondents report on their satisfaction with the program, detail their motivations and the factors affecting their decision making process, and provide recommendations related to improving the program.
- **Trade ally surveys:** Interviews and surveys with trade allies provide data with which the program was analyzed from the market perspective. The objective of the interviews and surveys is to gain insight into the application and project implementation process and to develop a sense of program satisfaction levels. Trade allies report on their experiences with customers, program marketing strategies, and provide opinions of how the program could be improved.
- **Interviews with the Companies' staff members:** Interviews with various Ohio staff members, including program managers and key account executives, 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 SAIC staff members:** Interviews with SAIC program implementation staff members provide information regarding program progress and observations regarding trade allies and customers. SAIC staff members report on recent program changes and future plans to improve program operational efficiency.

### 5.2.2 High Level of Activity at Program Launch

The first year of operation of the C/I Equipment Programs was atypical for an energy efficiency incentive program. When the program was launched, a large number of applications were submitted, as shown in Figure 5-5 and Figure 5-6. It should be noted that because these figures only reflect approved projects, they do not reflect the high levels of activity associated with applications that were submitted but did not proceed beyond preapproval.



*Figure 5-5 Cumulative Savings Associated with Application and Invoice Submissions by Month during 2011 for the Small Enterprise C/I Equipment Program (Note: The rising slope in March is due to savings accrued in April)*



*Figure 5-6 Cumulative Savings Associated with Application and Invoice Submissions by Month during 2011 for the Large Enterprise C/I Equipment Program (Note: The rising slope in March is due to savings accrued in April)*

The high level of activity strained program resources and the timely processing of applications became difficult. In response, the program incentives were decreased at the end of September 2011 in order to keep it operating within budget. Many of the responses to the interviews and surveys conducted with trade allies, participants, and program staff reflected these events. As discussed, trade allies in particular were dissatisfied with the slow processing of applications and the change in incentive levels. However, responses from trade allies and participants also highlighted program successes and improvements made to operations during the 2011 Program Year and pointed to areas where continued improvement is needed.

### 5.2.3 Lighting Measures Account for Most Program Activity

There was a strong emphasis on high payback measures during the 2011 Program Year. Lighting measures, which generally have lower costs relative to the savings potential, were the most frequently implemented measure during 2011 Program Year.

**Table 5-12 Small Enterprise C/I Equipment Program Incentive Characteristics by Equipment Type**

<i>Equipment Type</i>	<i>Number of Applications</i>	<i>Average</i>	<i>Median</i>	<i>Range</i>
Non-Standard Lighting	1,686	\$14,311	\$7,294	\$45 - \$383,315
Standard Lighting	342	\$1,339	\$936	\$20 - \$3,000
Motors and Drives	7	\$1,800	\$2,025	\$750 - \$3,000
Custom	2	\$15,684	\$15,684	\$1,800 - \$29,569
HVAC	1	\$500	\$500	-
Refrigeration and Food Service	1	\$200	\$200	-
Total	2,039	\$12,079	\$5,316	\$20 - \$383,315

**Table 5-13 Large Enterprise C/I Equipment Program Incentive Characteristics by Equipment Type**

<i>Equipment Type</i>	<i>Number of Applications</i>	<i>Average</i>	<i>Median</i>	<i>Range</i>
Non-Standard Lighting	204	\$70,970	\$36,079	\$331 - \$1,134,128
Standard Lighting	7	\$2,422	\$2,948	\$800 - \$3,000
Total	211	\$68,696	\$34,380	\$331 - \$1,134,128

Customer survey responses also support the importance of high payback measures among participants. As shown in Table 5-14 and Table 5-15, the majority of customers reported using simple payback to evaluate the implementation of efficiency measures. Additional analysis of customers stated payback period requirement found that most required a relatively short period of time, typically less than two or three years.

**Table 5-14 Financial Methods to Evaluate Energy Efficiency Improvements, Small Enterprise C/I Equipment Programs**

Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility?	<i>Response</i>	<i>(n=324)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
	Simple payback		165	51%
Initial Cost		121	37%	33%
Life cycle cost		94	29%	24%
Internal rate of return		87	27%	33%
Don't know		13	4%	3%
None of these		9	3%	1%

*Table 5-15 Financial Methods to Evaluate Energy Efficiency Improvements, Large Enterprise C/I Equipment Programs*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility?	Simple payback	53	75%	79%
	Initial Cost	30	42%	31%
	Internal rate of return	21	30%	28%
	Life cycle cost	20	28%	20%
	None of these	1	1%	3%
	Don't know	1	1%	0%

#### 5.2.4 Communication and Collaboration among Parties

Based on interviews with the Companies and SAIC program staff, communications between the parties are assessed as fair. Neither party felt that they were very problematic, but both felt that improvements could be made. A significant factor affecting the communications between the parties was the unusually high level of responses to the programs when they launched. This strained both parties and hindered effective communication and collaboration. It is likely that as the program operations become stable and the parties continue to work together, they will develop stronger communication processes.

#### 5.2.5 Program Marketing

Respondents were asked where they get information about energy efficient equipment, materials, and design features. The results for the Small Enterprise C/I Equipment Program participants are shown in Table 5-16. Decision makers most heavily relied upon equipment vendors or building contractors (65%), friends and colleagues (41%), an architect, engineer, or energy consultant (25%), trade associations or business groups (22%), trade journals or magazines (21%), and brochures and advertisements (21%). Between 13% and 17% of the respondents get information from the Companies (“EDC”), either the EDC website, an account representative, or an energy specialist.



**Table 5-16 Where Decision Makers get Information about Energy Efficient Equipment, Materials, and Design Features, Small Enterprise C/I Equipment Program**

What are the sources your organization relies on for information about energy efficient equipment, materials, and design features?	Response	(n=324)	Percent of Respondents	Percent of Ex Post kWh Savings
	Equipment vendors or building contractors	211	65%	66%
Friends and colleagues	134	41%	37%	
An architect, engineer or energy consultant	81	25%	34%	
Trade associations or business groups you belong to	71	22%	22%	
Trade journals or magazines	69	21%	23%	
Brochures or advertisements	68	21%	20%	
[EDC] website	56	17%	20%	
[EDC] Account Representative	48	15%	13%	
[EDC] Energy Specialist	41	13%	14%	
Other	20	6%	7%	

As shown in Table 5-17, similar results were found for participants in the Large Enterprise C/I Equipment Program. Decision makers relied upon a variety of sources, but most heavily upon equipment vendors or building contractors (76%). Other common sources for information were EDC account representatives (37%) and friends and colleagues (37%).

**Table 5-17 Where Decision Makers get Information about Energy Efficient Equipment, Materials, and Design Features, Large Enterprise C/I Equipment Program**

What are the sources your organization relies on for information about energy efficient equipment, materials, and design features?	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
	Equipment vendors or building contractors	54	76%	66%
[EDC] Account Representative	26	37%	43%	
Friends and colleagues	26	37%	41%	
Trade journals or magazines	19	27%	30%	
An architect, engineer or energy consultant	18	25%	29%	
Trade associations or business groups you belong to	17	24%	35%	
Brochures or advertisements	15	21%	29%	
[EDC] Energy Specialist	14	20%	26%	
[EDC] website	12	17%	28%	
Other	6	8%	21%	

The findings show that decision makers tend to rely on multiple sources of information and that they most heavily rely upon non-EDC sources such as vendors, contractors,

friends, and colleagues. The reliance upon vendors and contractors fits well with the program marketing model that utilizes trade allies to promote the program. The reliance on friends and colleagues points to the importance of social networks for learning about energy efficient equipment, materials, and design features. Given the importance of these networks, positive experiences with the program and the energy efficiency equipment implemented through it, may drive additional interest as participants discuss their experiences with friends and colleagues.

To further understand the effectiveness of program marketing, trade allies were asked whether or not the programs could be marketed more effectively, if they actively market them, and how aware customers were of the programs. The results are shown in Table 5-18.

*Table 5-18 Trade Ally's Views of Program Marketing and Customer Awareness*

Question	Percentage of Respondents Saying Yes	
	Percent of Respondents	Percent of Ex Post kWh Savings
Are there ways in which [EDC] could market the business incentive programs more effectively? (n=95)	57%	73%
Do you actively market [EDC]'s business incentive programs to your customers? (n=95)	77%	89%
Do you find that customers are generally aware of [EDC]'s business incentive programs? (n=73)	30%	36%

Fifty-seven percent of the trade allies thought that the Companies could market the programs more effectively. Of the trade allies who thought that the utilities could market the programs more effectively, a majority suggested that improvements to the programs would help market it (e.g., faster application processing, consistent incentive levels). Sixteen trade allies made suggestions related to keeping the programs consistent or improving program transparency, such as keeping the incentives consistent or providing more information on timeframes and the processing of applications. A number of respondents suggested increasing involvement with trade allies, improving communications with them, or helping them market the programs. Some specific comments made were:

*“Provide training for the electrical professional with a stable program that can be marketed, currently it seems to change weekly.”*

*“Better communication with trade allies that are marketing the program naturally.”*

*“Closer working relationship with trade allies...help us help you.”*

Nine trade allies suggested some marketing channels or methods that could be used to promote the programs. Specifically, allies suggested the use of mailings, literature that explains the programs, email, billboards, television advertisements, and newspaper advertisements. Additionally, one trade ally suggested using case studies to market the programs, another suggested targeting the most commonly used systems in commercial buildings and explain energy savings of energy efficient equipment, and a third suggested providing more information to small and medium sized customers.

Seventy-seven percent of trade allies said they marketed the incentive programs to their customers. These trade allies said that they marketed the programs in a variety of ways. Twenty-seven trade allies said that they discussed the programs with customers or made presentations about the programs. Another approach, mentioned by 12 allies, was marketing the programs through fliers, brochures, or mailings. Other trade allies stated that they marketed the programs by email or a website. Eleven allies also noted that they marketed the programs via word of mouth or that new customers were referred to them.

Some trade allies described the content of their marketing approaches. Most of these focused on explaining how much of an incentive customers would get, the energy savings involved or performed energy audits, or pointing out equipment that could be retrofitted through the programs.

Trade allies that marketed the programs were asked whether their customers were generally aware of the programs or if it was more frequently something they brought to their attention. Only about a third thought that customers were generally aware of the programs. The low level of awareness suggests that not knowing about the programs is a potential barrier to increased participation.

#### 5.2.6 Adequacy of Incentives

Trade allies were asked about their perspectives on the impact of the incentives on customers' decision making. Responses are shown in Table 5-19. A minority of trade allies (34%) thought the incentive levels were adequate to encourage customers to select energy efficient equipment options. It is likely that the views of trade allies' who thought the incentives were inadequate were shaped by comparing the current incentive levels with the original higher incentive levels. Undoubtedly, the lower incentive levels have made it more difficult for allies to sell customers on energy efficiency projects. Throughout the survey, however, some trade allies commented that the original incentives were too high. They noted that the high incentive levels led to a number of negative effects such as the wasteful use of the incentive funds (i.e., changing the lighting in a vacant building) or that they brought in unscrupulous or incompetent contractors that charged excessive markups, installed cheap equipment, or only changed part of the equipment in a building. Thus, although trade allies have been

unhappy with the change in incentive levels, several recognized that the original levels were too high.

*Table 5-19 Trade Allies Perspective on Incentive Levels*

Question	Percentage of Respondents Saying Yes	
	Percent of Respondents	Percent of Ex Post kWh Savings
Are the incentive levels adequate to encourage customers to select energy efficient equipment options?	34%	21%
Are there specific technologies or measures for which incentives should be higher?	55%	34%
Are there any energy efficient technologies or measures that customers would generally install even without the incentive?	53%	55%

Trade allies were also asked if there were specific technologies or measures for which the incentives should be higher. About half of the trade allies thought that there were and they gave a variety of suggestions. Most frequently, respondents thought that LEDs, which are not currently covered by the programs, should have higher incentives. Higher incentives for exterior lighting were also mentioned by multiple trade allies (these comments may have been influenced by the change in exterior lighting incentives that occurred in January 2012).

In some of their responses, trade allies stated or implied a rationale for why certain types of equipment should be higher. The most frequently mentioned explanation was that incentives should be higher for more expensive equipment. This explanation was often mentioned in regard to higher incentives for LEDs, but it was also used to justify higher incentives for other types of equipment (e.g., motors and drives). Other explanations were that incentives should be higher for equipment that saves more energy or that they should be higher for mandated equipment changes (i.e., regulations eliminating T12 fluorescent).

A few trade allies thought that the incentive levels should be differentiated on the basis of the business. Two allies suggested that the programs should be targeted towards specific industries (e.g., higher levels for schools or government) and one ally thought that businesses with financial difficulties should be eligible for higher incentives.

### 5.2.7 Program Services are Comprehensive

The type of equipment covered by the program is comprehensive and similar to the options available through other utility programs. Surveys of program participants suggest that the programs met their needs. As shown in Table 5-20 and Table 5-21, a fairly small share of participant survey respondents (17%) stated that there was additional equipment that they wanted to install that was not covered by the programs.

*Table 5-20 Equipment not Covered by Incentives, Small Enterprise C/I Equipment Program*

	Response	(n=323)	Percent of Respondents	Percent of Ex Post kWh Savings
Was there any additional energy efficient equipment you wanted to install, but didn't because no financial incentive was offered by [EDC]?	Yes	55	17%	22%
	No	225	70%	65%
	Don't Know	43	13%	13%

*Table 5-21 Equipment not Covered by Incentives, Large Enterprise C/I Equipment Program*

	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
Was there any additional energy efficient equipment you wanted to install, but didn't because no financial incentive was offered by [EDC]?	Yes	12	17%	14%
	No	48	68%	80%
	Don't Know	11	15%	6%

When asked what kind of equipment they wanted to install, many respondents referred to equipment that was covered by the programs (e.g., lighting equipment, although air conditioning, motors, and air compressors). Equipment that participants mentioned that was not covered by the programs included solar, wind, geothermal systems, natural gas powered equipment and a power quality system.

Additionally, most of the equipment that trade allies reported noticing that customers were interested in was covered by the incentive programs. One possible exception is that trade allies reported that customers are interested in LED lighting but this is not currently an option through the programs.

### 5.2.8 Energy Efficiency Attitudes, Behaviors, and Decision Making

Program participant survey respondents were asked what policies and procedures they had for energy efficiency improvements. The percentage of Small Enterprise C/I Equipment Program survey respondents shown in Table 5-22 indicates that 37% of respondents' organizations did not have any policies or procedures in place regarding energy efficiency improvements.

*Table 5-22 Policies and Procedures Regarding Energy Efficiency Improvements, Small Enterprise C/I Equipment Program*

	Response	(n=324)	Percent of Respondents	Percent of Ex Post kWh Savings
Which of the following policies or procedures does your organization have in place regarding energy efficiency improvements at this	None	120	37%	27%
	Corporate policies that incorporate energy efficiency in operations and	77	24%	23%

facility?	Response	(n=324)	Percent of Respondents	Percent of Ex Post kWh Savings
	procurement			
	A numeric goal for energy savings	54	17%	20%
	A numeric goal for energy cost reduction	53	16%	24%
	An energy management plan	53	16%	18%
	Active training of staff	52	16%	21%
	Other	27	8%	14%

Participants in the Large Enterprise C/I Equipment program were more likely to say that they had policies or procedures in place regarding energy efficiency improvements. As shown Table 5-23, the most common were policies that incorporate energy efficiency in operations and procurement. Additionally, approximately a quarter of respondents indicated that they had a numeric goal for energy savings, a numeric goal for energy cost reduction, an energy management plan, or active training of staff.

*Table 5-23 Policies and Procedures Regarding Energy Efficiency Improvements, Large Enterprise C/I Equipment Program*

Which of the following policies or procedures does your organization have in place regarding energy efficiency improvements at this facility?	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
		Corporate policies that incorporate energy efficiency in operations and procurement	29	41%
	A numeric goal for energy savings	20	28%	17%
	A numeric goal for energy cost reduction	20	28%	26%
	An energy management plan	19	27%	38%
	Active training of staff	17	24%	15%
	None	12	17%	16%
	Other	7	10%	2%

Respondents were asked to rate a list of factors in terms of importance for their decision making about energy efficient improvements. Their responses are shown in Table 5-24 and Table 5-25. Although respondents considered all of the factors to be important, the most important factor for Small Enterprise and Large Enterprise C/I Equipment Program participants was incentive payments from their EDC. Ninety-seven percent of Small Enterprise participants and 99% of Large Enterprise participants said that incentive payments were very or somewhat important to their decision making. This finding attests to the importance of the C/I Equipment programs for encouraging the adoption of energy efficiency measures.

*Table 5-24 Factors Influencing the Decision to Participate, Small Enterprise C/I Equipment Program*

<i>Energy Efficiency Decision Factor</i>	<i>Very important</i>	<i>Somewhat important</i>	<i>Only slightly important</i>	<i>Not important at all</i>	<i>Don't know</i>	<i>n</i>
Incentive payments from [EDC]	80%	17%	2%	0%	1%	324
Past experience with energy efficient equipment	65%	25%	4%	3%	3%	324
Advice and/or recommendations from [EDC]	43%	39%	9%	4%	4%	324
Advice and/or recommendations from equipment vendors	45%	46%	5%	3%	1%	324

*Table 5-25 Factors Influencing the Decision to Participate, Large Enterprise C/I Equipment Program*

<i>Energy Efficiency Decision Factor</i>	<i>Very important</i>	<i>Somewhat important</i>	<i>Only slightly important</i>	<i>Not important at all</i>	<i>Don't know</i>	<i>n</i>
Incentive payments from [EDC]	79%	20%	1%	0%	0%	71
Past experience with energy efficient equipment	48%	44%	3%	1%	4%	71
Advice and/or recommendations from [EDC]	54%	28%	10%	3%	6%	71
Advice and/or recommendations from equipment vendors	39%	49%	8%	3%	0%	71

### 5.2.9 Customers Satisfied with Program

Overall, customers were generally satisfied with the Small Enterprise C/I Equipment Program and the Large Enterprise C/I Equipment Program. Table 5-26 shows participant satisfaction with the Small Enterprise C/I Equipment Program and Table 5-27 shows satisfaction with the Large Enterprise C/I Equipment Program. Participants in both programs were least satisfied with the time elapsed until the incentive payment was received.



*Table 5-26 Participant Satisfaction, Small Enterprise C/I Equipment Program*

	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>	<i>Don't know</i>
Performance of the equipment installed	82%	14%	1%	1%	0%	2%
Savings on your monthly bill	39%	32%	5%	2%	0%	22%
Incentive amount	67%	20%	3%	2%	2%	5%
The effort required for the application process	48%	27%	12%	6%	2%	4%
Information provided by [EDC] account representative	31%	20%	22%	3%	1%	22%
Elapsed time until you received the incentive -	21%	26%	8%	15%	18%	11%
The [EDC]'s energy efficiency website	23%	24%	20%	1%	0%	32%
The overall experience with the programs	61%	29%	4%	2%	2%	3%

*Table 5-27 Participant Satisfaction, Large Enterprise C/I Equipment Program*

	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>	<i>Don't know</i>
Performance of the equipment installed	83%	17%	0%	0%	0%	0%
Savings on your monthly bill	46%	35%	8%	0%	0%	10%
Incentive amount	65%	21%	6%	1%	3%	4%
The effort required for the application process	38%	30%	17%	7%	4%	4%
Information provided by [EDC] account representative	38%	23%	17%	4%	6%	13%
Elapsed time until you received the incentive -	8%	25%	14%	15%	23%	14%
The [EDC]'s energy efficiency website	18%	31%	24%	0%	0%	27%
The overall experience with the programs	45%	39%	4%	8%	3%	0%

### 5.2.10 Progress in Overcoming Market Barriers

Interviews and surveys with customers and trade allies suggest that progress has been made in overcoming traditional market barriers to the adoption of energy efficiency equipment. A fifth of the trade allies said that the programs affected the types of equipment or services they offer. These impacts included offering more energy efficient products, increasing inventories of energy efficient products, focusing more on the energy savings aspect of a project, targeting low efficiency systems for upgrades, and



learning more about energy efficient equipment. These types of changes should increase customers' access to energy efficient equipment. Some examples of the trade allies' remarks were:

*"[The incentive programs] allowed us to write more energy efficient lighting business and expand our "green" dept."*

*"We have become more sensitive to the energy savings aspect when reviewing and ultimately following thru with a customer's request."*

*"We are a much greener company, with an enhanced focus on energy savings."*

Although the programs have been successful in overcoming barriers to participation, some types of commercial and industrial organizations have been less active in the programs than others. In particular, smaller organizations that utilize less energy were less active in the programs in comparison to more energy intensive organizations such as manufacturing firms. Figure 5-7 displays the share of projects completed by facility type for customers in the C/I Equipment Programs. For both programs, projects implemented by manufacturing facilities accounted for most of the program activity.

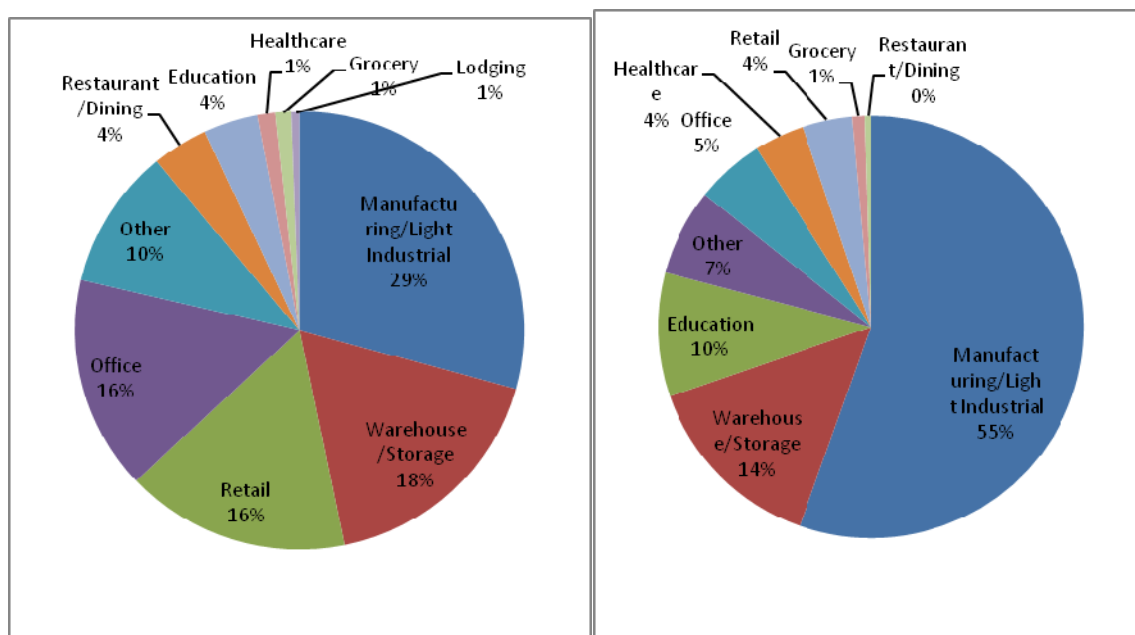
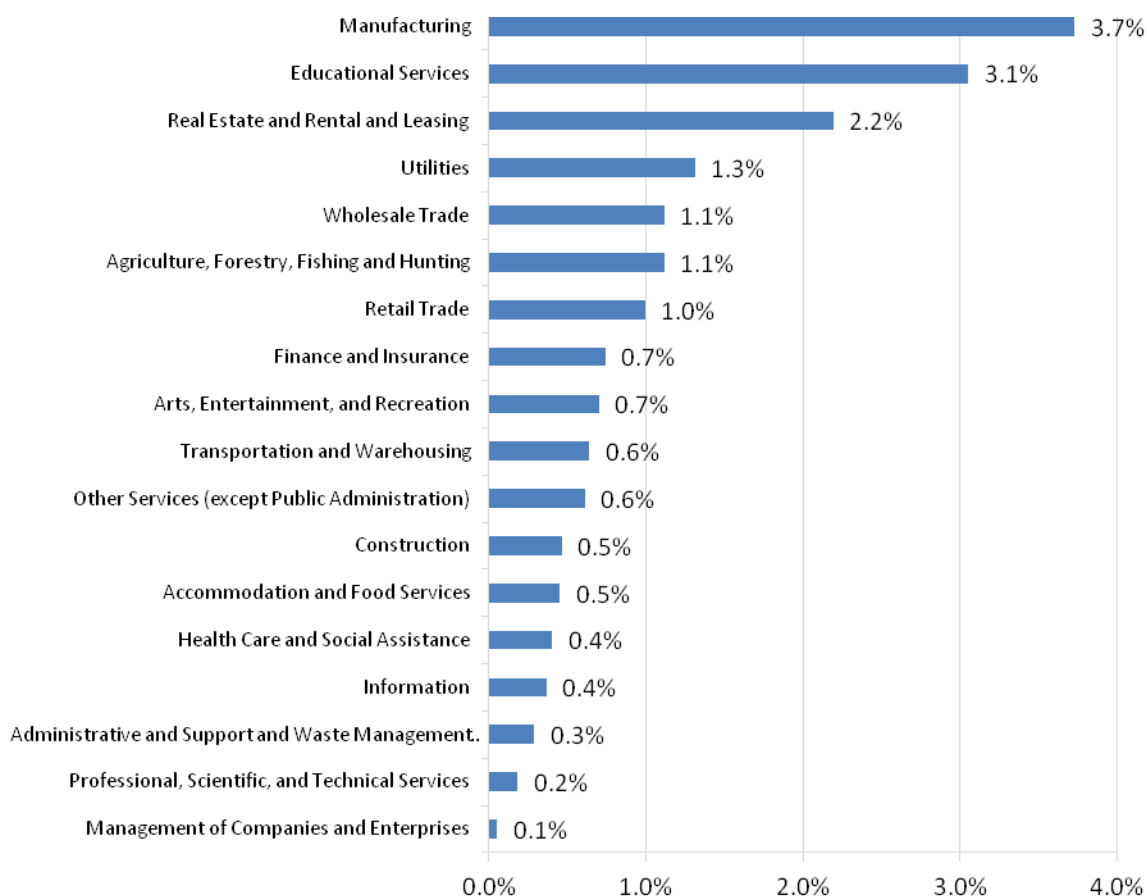


Figure 5-7 Projects by Facility Type, Small (Left Side) and Large (Right Side) Enterprise C/I Equipment Program

To further understand the level of participation by different types of firms, we analyzed the market saturation rate for business sectors. In order to represent the total potential

market, the Companies customer pool was weighted based on the distribution of business across sectors in the counties served by the Companies.<sup>5</sup>

Figure 5-8 shows the saturation rate for each business sector that had at least one participant in the C/I Equipment Programs. The percentages are based on the total number of unique premise numbers that completed at least one incentive project. Because the County Business Patterns data are not available for the public administration sector, these projects and premise numbers are not included in the figure.



Based on 2,159 premises and a customer population of 228,821

*Figure 5-8 Market Saturation based on Total Number of Premises*

A similar analysis was performed based on customer size (as determined by rate class). Table 5-28 displays the saturation rate for the Companies large and small rate-class customers. Although they accounted for many fewer total projects, the rate of program

<sup>5</sup> Industry data are taken from *2009 County Business Patterns*, the most recent year available at the time of this report. See <http://www.census.gov/econ/cbp/download/index.htm>.

participation has been much greater among large enterprise customers than among small enterprise customers.

*Table 5-28 Market Saturation by Customer Size*

		<i>Participating Premises</i>		<i>Projects Completed</i>	
<i>Customer Size</i>	<i>Number of Premises in Service Territories</i>	<i>Count</i>	<i>Saturation Rate</i>	<i>Count</i>	<i>Saturation Rate</i>
Large	2,687	203	7.6%	222	8.3%
Small	226,134	1,943	0.9%	2,027	0.9%

The lower level of participation among smaller customers suggests that these organizations face additional barriers. The barriers faced by smaller organizations include less expertise in energy efficiency equipment, financial constraints that prevent the adoption of energy efficient equipment, and reduced benefits from improvements because they often rent or lease the space they occupy. Program participant survey responses also suggest that smaller businesses are less likely to have policies and procedures for managing energy efficiency improvements and less likely to have the resources to dedicate to personnel to make decisions about energy efficiency improvements. Also, some trade allies suggested that larger businesses were more frequently the target of sales calls because of the potential scale of projects.

#### 5.2.11 Promotion of Energy Efficiency Behaviors and Awareness

There is evidence that the programs have improved energy efficiency awareness and behavior. Among trade allies, approximately 20% said that the program had affected the equipment or services that they offer. These trade allies said that because of the program they had become more aware of the energy savings aspects of projects or that they had expanded their inventories of energy efficient equipment.

Among program participants, nearly all survey respondents in the C/I Equipment Programs said that the equipment they installed through the program remained installed, that the equipment met or exceeded their expectations, and that they were satisfied with the equipment. The positive experience with the equipment suggests that the equipment will remain installed in the future. Furthermore, the experience may foster positive attitudes towards energy efficient equipment that leads to additional adoption of efficient equipment. In fact, 11% of the Small Enterprise C/I Equipment Program respondents and 17% of the Large Enterprise C/I Equipment Program respondents said that they had implemented additional equipment that they did not receive incentives for as a result of participating in the programs.

### 5.2.12 Dissatisfaction among Trade Allies

In their interview and survey responses, a number of trade allies expressed dissatisfaction with the program. As shown in Table 5-29, roughly one-third of trade allies were either satisfied or very satisfied with their experience in working with the programs, while about half were dissatisfied or very dissatisfied with the programs. Satisfaction was a little higher among the most active trade allies. In depth responses from trade allies indicated that much of the dissatisfaction stemmed from the change in the incentive levels that had negatively impacted their businesses. However, trade allies also felt that program operations could be more efficient. They were displeased with the length of time required to receive the incentive payments, a lack of communication status of and problems, and unclear communications about problems with applications. Some of these complaints may have been related to the program operation problems caused by the large number of applications submitted when the program launched.

*Table 5-29 Trade Ally Satisfaction by Level of Program Activity*

	<i>Very Satisfied</i>	<i>Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Dissatisfied</i>	<i>Very Dissatisfied</i>
Most Active Trade Allies (n=29)	7%	28%	21%	21%	24%
Moderately Active Trade Allies (n=28)	4%	25%	18%	25%	29%
Least Active Trade Allies (n=37)	5%	24%	14%	38%	19%
All Trade Allies (n=94)	5%	26%	17%	29%	23%

\* Trade Ally activity was based on the ex post kWh savings associated with applications submitted. Specifically, the savings associated with each activity level were: most active trade allies (>750,000 kWh), moderately active trade allies (200,000-750,000 kWh), and least active trade allies (<200,000 kWh).

Given the level of dissatisfaction with the programs expressed by trade allies and their importance in getting businesses to participate in the programs, it is important to assess whether or not this dissatisfaction has led to disengagement from the programs. To assess this, responses of satisfied and dissatisfied trade allies to questions about their marketing of the programs and their expected level of activity in the programs were compared. The results are shown Table 5-30. Although the share that said they actively marketed the program was similar between satisfied and dissatisfied trade allies, a smaller share of dissatisfied trade allies said they expect to be as active as or more active in the programs than was the case among satisfied trade allies. However, nearly half of the dissatisfied trade allies thought they would be as active or more active in the programs during the next year.

*Table 5-30 Satisfied and Dissatisfied Trade Allies' Engagement in the C/I Equipment Programs*

	<i>Among those Satisfied with Programs (n=30)</i>	<i>Among those Dissatisfied with Programs (n=48)</i>
Do you actively market [EDC]'s business incentive programs to your customers?	77%	71%
Expects to be as active or more active in the business incentive programs during the next year	73%	45%

\* Satisfied trade allies were those who said they were either satisfied or very satisfied with the programs. Dissatisfied trade allies were those who said they were either dissatisfied or very dissatisfied with the programs.

When asked to elaborate on their overall impression of the programs, several trade allies provided suggestions as to how they would improve the programs. Many of these suggestions focused on issues already discussed such as improve application processing times, improve communications about the status of applications and changes being made to the programs, and increase the rebate amount. However, a few trade allies did make some additional recommendations about the types of equipment covered by the programs. Allies made suggestions such as taking steps to insure the quality of the products covered by the programs, and including additional technologies. Some comments related to the additional technologies:

*"We sell and install a product which improves the power factor on large industrial motors but it isn't included in the incentive program."*

*"I would like to see more prescriptive for LED, induction and cooler door lights and controllers."*

A couple of trade allies thought that the 90 days to complete a project was too short of a time frame. As one ally put it:

*"The major problem I had was with the 90 day time frame. We lost some nice jobs because the time factor ran out and some corporations take so much time with internal approval process. During these busy times equipment takes between 30 to 60 days to receive. Scheduling installers also takes some time. Between all of these challenges the 90 day time limit is not enough."*

Another suggestion made was to give higher incentives to small businesses that are struggling financially.

## 6. Summary and Conclusions

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The interviews that were conducted over the course of the program cycle provided insight on program operations and effectiveness. The first year of operation of the C/I Equipment Programs was atypical, principally because of the large number of applications submitted immediately following the launch of the programs. The strong interest in the incentive programs strained program resources and made processing of applications difficult. In response, the program incentives were decreased in order to keep it operating within budget. Many of the responses to the interviews and surveys conducted with trade allies, participants, and program staff reflected these events. However, they also highlighted program successes and improvements made to operations during the 2011 Program Year and point to areas where continued improvement is needed.

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

- **Progress in Overcoming Market Barriers:** Interviews and surveys with customers and trade allies suggest that progress has been made in overcoming traditional market barriers to the adoption of energy efficiency equipment. Trade allies reported that the programs had led them to offer more energy efficient products, increase inventories of energy efficient products and focus more on the energy savings aspect of projects, all of which point to increased availability and customer access to energy efficient products. Furthermore, nearly all customers felt the equipment met their expectations and that they were satisfied with it. Satisfaction with the equipment may lead participants to adopt similar equipment in the future as well as lead them to discuss the benefits of energy efficient equipment with colleagues.

Although the programs have been successful in overcoming barriers to participation, some types of commercial and industrial organizations have been less active in the programs than others. In particular, smaller organizations that utilize less energy have not been as active in the programs in comparison to more energy intensive organizations such as manufacturing firms. The lower level of participation suggests that these organizations face additional barriers. The barriers faced by smaller organizations include less expertise in energy efficiency equipment, financial constraints that prevent the adoption of energy efficient equipment, and reduced benefits from improvements because they often rent or lease the space they occupy. Survey responses also suggest that smaller businesses are less likely to have policies and procedures for managing energy efficiency improvements and less likely to have the resources to dedicate to personnel to make decisions about energy efficiency improvements. Also, some

trade allies suggested that larger businesses were more frequently the target of sales calls because of the potential scale of projects.

- **Program Services are Comprehensive:** The types of equipment covered by the programs is comprehensive and similar to the options available through other utility programs. Surveys of program participants also suggest that the programs met their needs. A fairly small share of participant survey respondents (17%) stated that there was additional equipment that they wanted to install that was not covered by the programs. Additionally, most of the equipment that trade allies reported noticing that customers were interested in was covered by the incentive programs. One possible exception is that trade allies reported that customers are interested in LED lighting but this is not currently an option under the standard lighting application. However, the equipment options allowed during the current program cycle are restricted by the PUCO approved plans and the TRM. .

Program staff reported that they are developing plans to add additional services in the next program cycle. During the 2011 Program Year, the programs may have benefitted from an audit program that helped firms identify energy savings. This need will be met in 2012, as an audit program was recently launched.

- **Lighting Measures Account for Most of the kWh Savings:** There was a strong emphasis on high payback measures during the 2011 Program Year. Most of the savings generated in the 2011 Program Year were from lighting measures, which generally have lower costs relative to the savings potential. Additionally, the majority of customers reported using simple payback to evaluate the implementation of efficiency measures and most require a short payback period. The preference for short payback periods among customers suggests that there will be continued focus on high-payback projects in the coming year.
- **Programs Benefitted Customers:** Customer participation has been strong since the program launched. Additionally, customers have been generally satisfied with the program overall. Customers also expressed high levels of satisfaction with the performance of the equipment they installed and with the savings on their monthly bills. However, participants expressed higher levels of dissatisfaction with the elapsed time until rebates were received.
- **Some Evidence that Program has Promoted Energy Efficiency Behaviors and Awareness:** There is evidence that the programs have improved energy efficiency awareness and behavior. Among trade allies, approximately 20% said that the program had affected the equipment or services that they offer. These trade allies said that because of the program they had become more aware of the energy savings aspects of projects or that they had expanded their inventories of energy efficient equipment.



Among program participants, nearly all survey respondents said that the equipment they installed through the program remained installed, that the equipment met or exceeded their expectations, and that they were satisfied with the equipment. The positive experience with the equipment suggests that the equipment will remain installed in the future. Furthermore, the experience may foster positive attitudes towards energy efficient equipment that leads to additional adoption of efficient equipment. In fact, 13% of survey respondents said that they had implemented additional equipment that they did not receive incentives for as a result of participating in the programs.

- **Communication and Collaboration among Parties has been Fair:** Based on interviews with FirstEnergy Ohio and SAIC program staff, communications between the parties are assessed as fair. Neither party felt that they were very problematic, but both felt that improvements could be made. A significant factor affecting the communications between the parties was the unusually high level of responses to the programs when they launched. This strained both parties and hindered effective communication and collaboration. It is likely that as the program operations become stable and the two parties continue to work together, they will develop stronger communication processes.
- **Dissatisfaction among Trade Allies:** In their interview and survey responses a number of trade allies expressed dissatisfaction with the program. Much of the dissatisfaction stemmed from the change in the incentive levels that had negatively impacted trade allies' businesses. While some trade allies remain dissatisfied with the program and have expressed disinterest in participating in the future, the majority remain engaged in the program. Among participants who said they were dissatisfied with the program, a clear majority said they market the program to their customers and nearly half expect to be as active or more active in the coming year.

Trade allies also felt that program operations could be more efficient. They were displeased with the length of time required to receive the incentive payments, a lack of communication status of and problems, and unclear communications about problems with applications.

While program organization and efficiency have improved during the program year, recommendations have been developed based on survey and interview findings and overall analysis of program processes. While the program will likely meet the savings goals for the coming year without difficulty, these recommendations may provide strategic advantage during the future program cycle:

- **Streamline Application Process:** Trade allies and customers expressed dissatisfaction with the application process and with the length of time for payment of the incentives in particular. Steps have been taken by FirstEnergy



and SAIC to improve the processing of applications such as increased automation of processing of application, implementation of an online tool for applicants to check the status of their applications and submit documentation, and decreasing the application review time. However, additional progress will benefit the program. Extended wait times for rebate checks can lead businesses to be less willing to participate in the program, particularly for small businesses that have less capital to invest in energy efficiency improvements.

- **Foster Greater Trust among Trade Allies and Customers:** Program staff recognizes that the rocky launch of the program has damaged the programs credibility amongst trade allies and customers. In order for the program to continue to influence businesses to adopt energy efficiency measures, credibility will have to be reestablished. The more steps the program can take to operate without big changes and to operate with greater transparency, the greater likelihood that the trust of trade allies and business owners will be regained.
- **Continue Developing Trade Ally Network:** More than 200 trade allies have assisted businesses in implementing energy efficient equipment through the program. However, the program website shows a smaller list of registered trade allies and a member of the program staff expressed concern that the network was underdeveloped for this stage of the program cycle. Additionally, some trade allies expressed a desire for greater communication about the program and a closer working relationship. Growing the network and keeping trade allies informed of program changes will serve as a valuable resource in the future program cycle.
- **Increase Focus on Program Marketing:** The high level of initial response to the program has precluded the need for extensive program marketing. In future program cycles, greater attention to program marketing will likely be needed. One of the functions of energy efficiency programs is the packaging of knowledge to help promote the adoption of energy efficient technologies. To this end, programs often develop materials such as case studies and other materials to help prospective customers understand the benefits of the implementing efficient technology. These materials are of particular importance for reaching smaller businesses that typically do not have the resources to expend on developing in-house expertise of energy efficient equipment. In reaching future program cycles, reaching smaller businesses will be particularly important because they dominate the commercial and industrial market. Additionally, the market evaluation suggested that program participation rates are lower among smaller businesses and some trade allies mentioned that greater outreach to smaller businesses was needed.

## Appendix A: Required Savings Tables

This appendix contains annualized gross kWh savings, first year gross kWh savings, and peak demand savings for the Large Enterprise Equipment Program, the Small Enterprise Equipment Program, and the Motors and Drives Program.

*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 Enterprise	100,016,848	113,389,605	113%	16,397	16,768	102%
Small Enterprise	148,821,790	144,585,350	97%	29,157	31,101	107%
Motors & Drives	2,276,460	718,286	32%	35	70	198%
Total	251,115,099	258,693,242	103%	45,590	47,939	105%

*Table A-2 Summary of Annualized kWh Savings for Large Enterprise Equipment Program*

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	27,483,966	32,314,387	118%
OE	50,369,764	55,149,441	109%
TE	22,163,119	25,925,777	117%
Total Companies	100,016,848	113,389,605	113%

*Table A-3 Summary of Annualized Peak kW Savings for Large Enterprise Equipment Program*

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	4,135.41	4,409.16	107%
OE	9,085.15	8,844.04	97%
TE	3,176.83	3,514.99	111%
Total Companies	16,397.39	16,768.18	102%

*Table A-4 Summary of First Year Pro Rata kWh Savings for Large Enterprise Equipment Program*

<i>Operating Company</i>	<i>First Year Ex Post Pro Rata kWh Savings</i>
CEI	6,306,297
OE	13,727,140
TE	6,662,507
Total Companies	26,695,944

*Table A-5 Summary of Annualized kWh Savings for Small Enterprise Equipment Program*

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	75,775,972	70,684,534	93%
OE	64,185,524	65,214,144	102%
TE	8,860,294	8,686,672	98%
Total Companies	148,821,790	144,585,350	97%

*Table A-6 Summary of Annualized Peak kW Savings for Small Enterprise Equipment Program*

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	14,597.81	15,301.02	105%
OE	12,890.01	14,037.63	109%
TE	1,669.49	1,762.28	106%
Total Companies	29,157.31	31,100.94	107%

*Table A-7 Summary of First Year kWh Pro Rata Savings for Small Enterprise Equipment Program*

<i>Operating Company</i>	<i>First Year Ex Post Pro Rata kWh Savings</i>
CEI	15,631,178
OE	15,714,276
TE	1,635,736
Total Companies	32,981,190

*Table A-8 Summary of Annualized kWh Savings for Motors and Drives Program*

<i>Operating Company</i>	<i>Ex Ante kWh Savings</i>	<i>Ex Post kWh Savings</i>	<i>Realization Rate</i>
CEI	6,351	418	7%
OE	2,270,109	717,868	32%
Total Companies	2,276,460	718,286	32%

*Table A-9 Summary of Annualized Peak kW Savings for Motors and Drives Program*

<i>Operating Company</i>	<i>Ex Ante Peak kW Savings</i>	<i>Ex Post Peak kW Savings</i>	<i>Realization Rate</i>
CEI	0.31	0.05	15%
OE	35.03	69.85	199%
Total Companies	35.34	69.90	198%

*Table A-10 Summary of First Year Pro Rata kWh Savings for Motors and Drives Program*

<i>Operating Company</i>	<i>First Year Ex Post Pro Rata kWh Savings</i>
CEI	50
OE	243,879
Total Companies	243,929

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## Appendix B: In-Depth Process Evaluation

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This appendix presents the results of the process evaluation for the Companies' Ohio C/I Equipment Programs during the 2011 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 and interviews and surveys of participating customers, trade allies, energy efficiency staff, program implementation contractor staff, and program tracking data.

The appendix begins with a discussion of the overall progress of the program. This is followed by an examination of certain issues that are critical to the future success of the program. This appendix also presents strategic planning and process recommendations and highlights key findings from the interviews of customer participants, trade allies, and program operations staff. The appendix concludes with a market evaluation of the program that analyzes the overall success of the program in reaching various business sectors.

### B.1 Summary of Primary Data Collection

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- **Participant surveys:** Participant surveys are the primary data source for many components of this process evaluation, and serve as the foundation for understanding the customer perspective. The participant surveys provide customer feedback and insight regarding customer experiences with the C/I Equipment Programs. Respondents report on their satisfaction with the program, detail their motivations and the factors affecting their decision making process, and provide recommendations related to improving the program.
- **Trade ally surveys:** Interviews and surveys with trade allies provide data with which the program was analyzed from the market perspective. The objective of the interviews and surveys is to gain insight into the application and project implementation process and to develop a sense of program satisfaction levels. Trade allies report on their experiences with customers, program marketing strategies, and provide opinions of how the program could be improved.
- **Interviews with the Companies' staff members:** Interviews with various staff members, including program managers and key account executives, 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 SAIC staff members:** Interviews with SAIC program implementation staff members provide information regarding program progress and observations regarding trade allies and customers. SAIC staff members report on recent program changes and future plans to improve program operational efficiency.

## B.2 Summary of Conclusions and Recommendations

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The first year of operation of the C/I Equipment Programs was atypical for an energy efficiency incentive program. When the program was launched, a large number of applications were submitted. The level of activity strained program resources and the timely processing of applications became difficult. In response, the program incentives were decreased at the end of September 2011 in order to keep it operating within budget. Many of the responses to the interviews and surveys conducted with trade allies, participants, and program staff reflected these events. Trade allies in particular were dissatisfied with the slow processing of applications and the change in incentive levels. However, responses from trade allies and participants also highlighted program successes and improvements made to operations during the 2011 Program Year and pointed to areas where continued improvement is needed.

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

- **Progress in Overcoming Market Barriers:** Interviews and surveys with customers and trade allies suggest that progress has been made in overcoming traditional market barriers to the adoption of energy efficiency equipment. Trade allies reported that the programs led them to offer more energy efficient products, increase inventories of energy efficient products and focus more on the energy savings aspect of projects, all of which point to increased availability and customer access to energy efficient products. Furthermore, nearly all customers felt the equipment met their expectations and that they were satisfied with it. Satisfaction with the equipment may lead participants to adopt similar equipment in the future as well as lead them to discuss the benefits of energy efficient equipment with colleagues.

Although the programs have been successful in overcoming barriers to participation, some types of commercial and industrial organizations have been less active in the programs than others. In particular, smaller organizations that utilize less energy have not been as active in the programs in comparison to more energy intensive organizations such as manufacturing firms. The lower level of participation suggests that these organizations face additional barriers. The barriers faced by smaller organizations include less expertise in energy efficiency equipment, financial constraints that prevent the adoption of energy efficient equipment, and reduced benefits from improvements because they often

rent or lease the space they occupy. Survey responses also suggest that smaller businesses are less likely to have policies and procedures for managing energy efficiency improvements and less likely to have the resources to dedicate to personnel to make decisions about energy efficiency improvements. Also, some trade allies suggested that larger businesses were more frequently the target of sales calls because of the potential scale of projects.

- **Program Services are Comprehensive:** The types of equipment covered by the programs is comprehensive and similar to the options available through other utility programs. Surveys of program participants also suggest that the programs met their needs. A fairly small share of participant survey respondents (17%) stated that there was additional equipment that they wanted to install that was not covered by the programs. Additionally, most of the equipment that trade allies reported noticing that customers were interested in was covered by the incentive programs. One possible exception is that trade allies reported that customers are interested in LED lighting but this is not currently an option under the standard lighting application.
- **Lighting Measures Account for Most of the kWh Savings:** There was a strong emphasis on high payback measures during the 2011 Program Year. Most of the savings generated in the 2011 Program Year were from lighting measures, which generally have lower costs relative to the savings potential. Additionally, the majority of customers reported using simple payback to evaluate the implementation of efficiency measures and most require a short payback period. The preference for short payback periods among customers suggests that there will be continued focus on high-payback projects in the coming year.
- **Programs Benefitted Customers:** Customer participation has been strong since the program launched. Additionally, customers have been generally satisfied with the program overall. Customers also expressed high levels of satisfaction with the performance of the equipment they installed and with the savings on their monthly bills. However, participants expressed dissatisfaction with the elapsed time until rebates were received.
- **Some Evidence that Program has Promoted Energy Efficiency Behaviors and Awareness:** There is evidence that the programs have improved energy efficiency awareness and behavior. Among trade allies, approximately 20% said that the program had affected the equipment or services that they offer. These trade allies said that because of the program they had become more aware of the energy savings aspects of projects or that they had expanded their inventories of energy efficient equipment.

Among program participants, nearly all survey respondents said that the equipment they installed through the program remained installed, that the



equipment met or exceeded their expectations, and that they were satisfied with the equipment. The positive experience with the equipment suggests that the equipment will remain installed in the future. Furthermore, the experience may foster positive attitudes towards energy efficient equipment that leads to additional adoption of efficient equipment. In fact, 13% of survey respondents said that they had implemented additional equipment that they did not received incentives for as a result of participating in the programs.

- **Communication and Collaboration among Parties has been Fair:** Based on interviews with the Companies' and SAIC program staffs, communications between the parties are assessed as fair. Neither party felt that they were very problematic, but both felt that improvements could be made. A significant factor affecting the communications between the parties was the unusually high level of responses to the programs when they launched. This strained both parties and hindered effective communication and collaboration. It is likely that as the program operations become stable and the parties continue to work together, they will develop stronger communication processes.
- **Dissatisfaction among Trade Allies:** In their interview and survey responses a number of trade allies expressed dissatisfaction with the program. Much of the dissatisfaction stemmed from the change in the incentive levels that had negatively impacted trade allies' businesses. While some trade allies remain dissatisfied with the program and have expressed disinterest in participating in the future, the majority remain engaged in the program. Among participants who said they were dissatisfied with the program, a clear majority said they market the program to their customers and nearly half expect to be as active or more active in the coming year.

Trade allies also felt that program operations could be more efficient. They were displeased with the length of time required to receive the incentive payments, a lack of communication status of and problems, and unclear communications about problems with applications.

While program organization and efficiency have improved during the program year, recommendations have been developed based on survey and interview findings and overall analysis of program processes. While the program will likely meet the savings goals for the coming year without difficulty, these recommendations may provide strategic advantage during the future program cycle:

- **Streamline Application Process:** Trade allies and customers expressed dissatisfaction with the application process and with the length of time for payment of the incentives in particular. Steps have been taken by the Companies and SAIC to improve the processing of applications such as increased automation of processing of application, implementation of an online tool for



applicants to check the status of their applications and submit documentation, and decreasing the application review time. However, additional progress will benefit the program.

- **Foster Greater Trust among Trade Allies and Customers:** Program staff recognizes that the rocky launch of the program has damaged the programs credibility amongst trade allies and customers. In order for the program to continue to influence businesses to adopt energy efficiency measures, credibility will have to be reestablished. The more steps the program can take to operate without big changes and to operate with greater transparency, the greater likelihood that the trust of trade allies and business owners will be regained.
- **Continue Developing Trade Ally Network:** More than 200 trade allies have assisted businesses in implementing energy efficient equipment through the program. However, the program website shows a smaller list of registered trade allies and a member of the program staff expressed concern that the network was underdeveloped for this stage of the program cycle. Additionally, some trade allies expressed a desire for greater communication about the program and a closer working relationship. Growing the network and keeping trade allies informed of program changes will serve as a valuable resource in the future program cycle.
- **Increase Focus on Program Marketing:** The high level of initial response to the program has precluded the need for extensive program marketing. In future program cycles, greater attention to program marketing will likely be needed. One of the functions of energy efficiency programs is the packaging of knowledge to help promote the adoption of energy efficient technologies. To this end, programs often develop materials such as case studies and other materials to help prospective customers understand the benefits of the implementing efficient technology. These materials are of particular importance for reaching smaller businesses that typically do not have the resources to expend on developing in-house expertise of energy efficient equipment. In reaching future program cycles, reaching smaller businesses will be particularly important because they dominate the commercial and industrial market. Additionally, the market evaluation suggested that program participation rates are lower among smaller businesses and some trade allies mentioned that greater outreach to smaller businesses was needed.

### B.3 Small Enterprise C/I Equipment Program Process Evaluation Findings

Table B-1 shows the number of applications and the average, median, lowest, and highest amount of the incentive received by equipment type for customers. Most applications were for non-standard lighting equipment. The average incentive paid for non-standard lighting equipment was \$14,311 and ranged from \$45 to \$383,315. A

handful of customers completed projects that did not involve lighting equipment. One customer completed an HVAC project that paid an incentive of \$500. Two customers completed a custom project; one received an incentive of \$1,800 and the other received an incentive of \$29,569.

*Table B-1 Incentive Characteristics by Equipment Type*

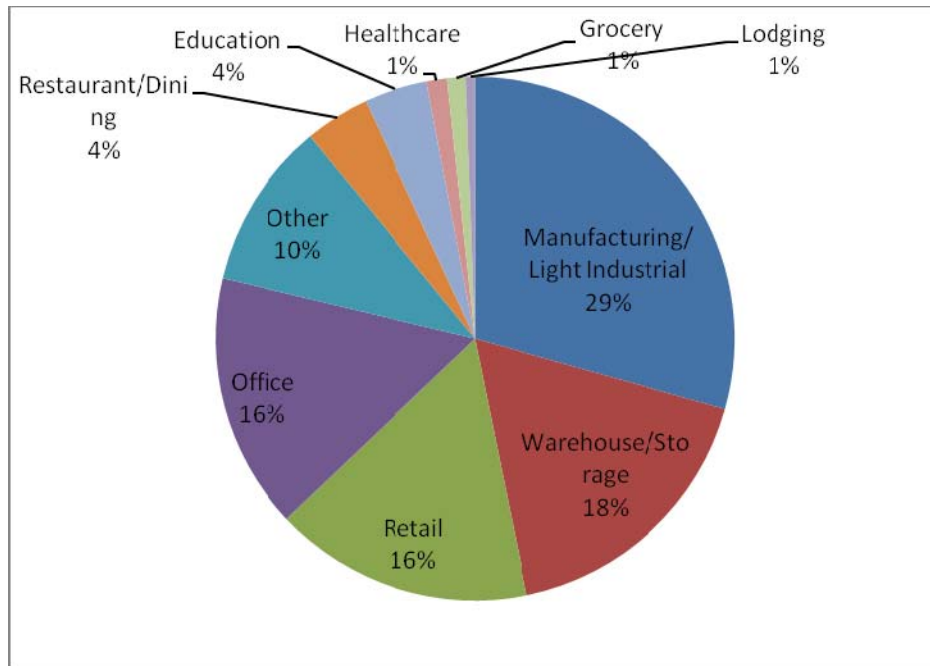
<i>Equipment Type</i>	<i>Number of Applications</i>	<i>Average</i>	<i>Median</i>	<i>Range</i>
Non-Standard Lighting	1,686	\$14,311	\$7,294	\$45 - \$383,315
Standard Lighting	342	\$1,339	\$936	\$20 - \$3,000
Motors and Drives	7	\$1,800	\$2,025	\$750 - \$3,000
Custom	2	\$15,684	\$15,684	\$1,800 - \$29,569
HVAC	1	\$500	\$500	-
Refrigeration and Food Service	1	\$200	\$200	-
Total	2,039	\$12,079	\$5,316	\$20 - \$383,315

Table B-2 shows the incentive characteristics for each distribution company. The average incentive paid varied from \$10,817 for TE to \$13,036 for CEI.

*Table B-2 Incentive Characteristics by Distribution Company*

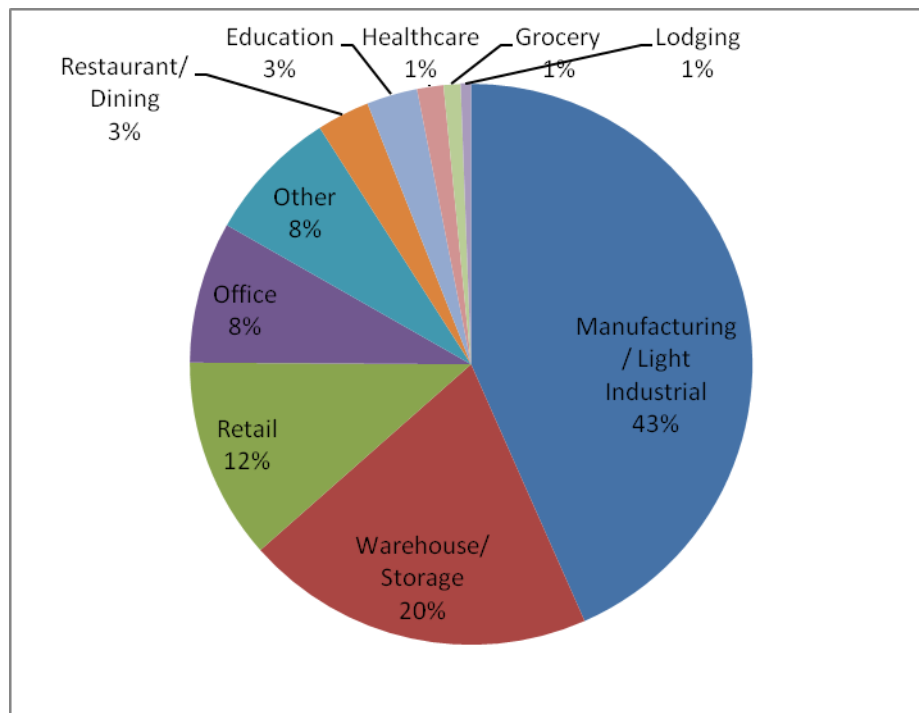
<i>EDC</i>	<i>Number of Applications</i>	<i>Average</i>	<i>Median</i>	<i>Range</i>
CEI	946	\$13,036	\$5,944	\$36 - \$185,723
TE	131	\$10,817	\$3,000	\$20 - \$143,397
OE	962	\$11,297	\$4,617	\$22 - \$383,315
Total Companies	2,039	\$12,073	\$5,301	\$20 - \$383,315

A diverse array of customers participated in the incentive program. Figure B-1 displays the share of projects completed by facility type for customers. Projects in manufacturing and light industrial facilities accounted for nearly a third of the projects completed by customers. Additionally, warehouse and storage (18%), retail (16%), and office facilities (16%) accounted for sizable shares of the projects completed among customers.



*Figure B-1 Projects by Facility Type*

The distribution of energy savings differed somewhat from the distribution of the number of projects, but as with the number of projects, a few of the facility types accounted for most of the program activity. Manufacturing and light industrial facilities accounted for a little less than half of the savings, while warehouse and storage accounted for a fifth of the savings. Retail, office, and other facilities accounted for an additional 28% of the savings.



*Figure B-2 Ex-Post Energy Savings by Facility Type*

The savings associated with applications submitted by month is shown in Figure B-3. As shown in the figure, the level of savings associated with applications rose quickly after the program launched and then flattened during the July to August period. The rapid increase in savings after program launch demonstrates both the success of the program and provides context for some of the issues raised by trade allies and participants discussed later in the report. It should be noted that because this figure only reflects approved projects, it does not reflect the high levels of activity associated with applications that were submitted but did not proceed beyond preapproval.

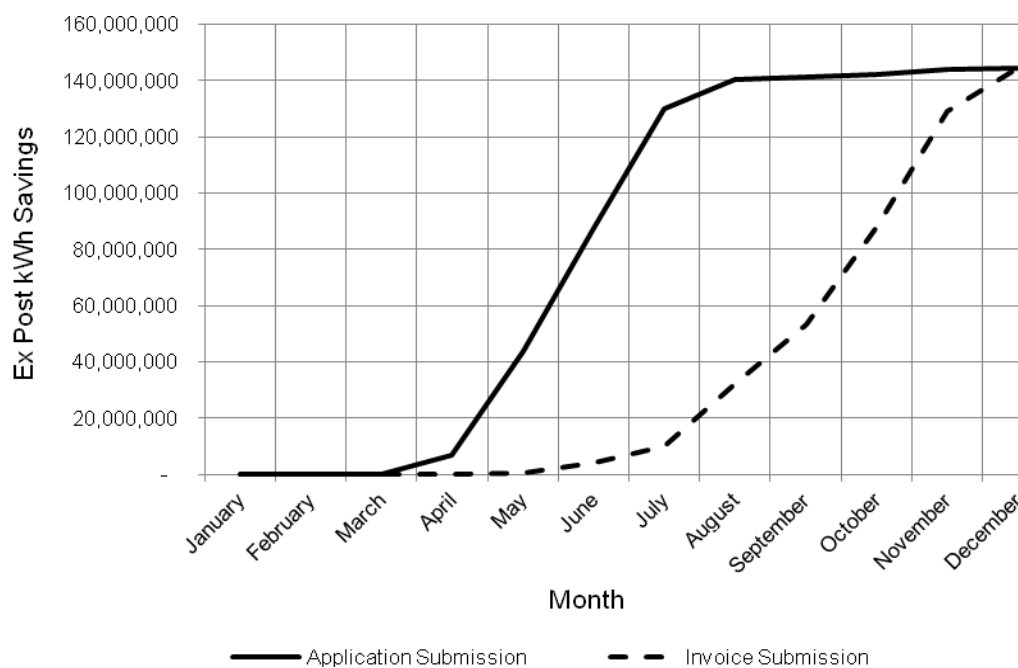


Figure B-3 Cumulative Savings Associated with Application and Invoice Submissions by Month during 2011 (Note: The rising slope in March is due to savings accrued in April)

### B.3.1 Customer Outcomes

An online and telephone survey was conducted to collect data about customer decision-making, preferences, and opinions of the Small Enterprise C/I Equipment Program. The program offered a variety of measures for commercial and industrial facilities, including lighting, HVAC, and motor measures. In total, 324 customers who implemented a project through the program responded to the survey. The percent of respondents and the percent of savings associated with the survey responses are shown below. Most of the discussion refers to the percent of respondents but the percent of savings is discussed when the findings are noteworthy. As shown in Table B-3, about two-thirds of the respondents were the main decision maker while about another third assisted with the decision.

Table B-3 Respondents Role in the Decision Making Process

	Response	(n=323)	Percent of Respondents	Percent of Ex Post kWh Savings
What was your role in the decision making process to install [energy efficient equipment/measure]?	Main decision maker	211	65%	63%
	Assisted with the decision to install the equipment	102	32%	35%
	Was not part of the decision process	10	3%	1%

### B.3.2 How Customers Learn About the Program

Customers were asked how they learned about the program. As shown in Table B-4. About two-thirds of customers heard about the program from an equipment vendor or building contractor. Another common means of hearing about the program was from friends or colleagues. In comparison, relatively few participants found out about the program from information or representatives of the Company (“EDC”). These findings show the importance of trade allies and social and business networks for promoting the program.

*Table B-4 How Customers Learned about the Program*

	<i>Response</i>	<i>(n=324)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
How did you learn of [EDC]'s business incentive programs?	An equipment vendor or building contractor	210	65%	69%
	Friends or colleagues	79	24%	20%
	An architect, engineer or energy consultant	51	16%	21%
	Other	41	13%	14%
	Received an information brochure on [EDC] incentive programs	25	8%	7%
	[EDC] website	20	6%	6%
	Approached directly by representative of [EDC] incentive programs	18	6%	3%
	Representative of [EDC] mentioned it	19	6%	5%
	Past experience with the programs	10	3%	4%

The share of respondents who heard about the program from a representative of the EDC or from the EDC website is shown by EDC in Table B-5.

*Table B-5 EDC Sources for Learning about the Program by EDC*

	<i>Response</i>	<i>OE (n=166)</i>	<i>TE (n=19)</i>	<i>CEI (n=149)</i>
How did you learn of [EDC]'s business incentive programs?	Representative of [EDC] mentioned it	9%	0%	3%
	[EDC] website	6%	16%	7%

### B.3.3 The Decision Makers

To understand decision making processes among customers, respondents were asked how their organizations made decisions about energy efficiency improvements. Respondents most frequently reported that decisions were made by one or two key people, as shown in Table B-6. Other common responses were that the decision

depends on how much the investment is and that the decision is made by a group or committee.

*Table B-6 Decision Maker Characteristics*

	<i>Response</i>	<i>(n=324)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
How does your organization typically decide to make energy efficiency improvements for this facility? Is the decision:	Made by one or two key people	205	63%	59%
	Depends on how much the investment is	45	14%	14%
	Made by a group or committee	44	14%	21%
	Based on staff recommendations to a decision maker	27	8%	6%
	Made in some other way	2	1%	0%
	Don't know	1	0%	0%

A cross-tabulation of industry by decision maker characteristics found that organizations in the construction and health care and social assistance industries were more likely to have one or two key people making decisions about energy efficiency improvements. In comparison, manufacturing, transportation and warehousing, and accommodation and food services organizations were more likely to make decisions based on staff recommendations to a decision maker or by a group or committee. It is likely that these latter organizations are larger and are therefore more likely to assign decisions about energy efficiency improvements to groups or committees of staff members. In fact, participants whose organizations employed more people were less likely to have decisions about energy efficiency improvements made by one or two people and more likely to have decisions made by a group or committee or based on staff recommendations.

#### B.3.4 Where Decision Makers Get Their Information

Respondents were asked where they get information about energy efficient equipment, materials, and design features. The results are shown in Table B-7. Decision makers most heavily relied upon equipment vendors or building contractors (65%), friends and colleagues (41%), an architect, engineer, or energy consultant (25%), trade associations or business groups (22%), trade journals or magazines (21%), and brochures and advertisements (21%). Between 13% and 17% of the respondents get information from their EDC, either the EDC website, account representative, or energy specialist. The findings show that decision makers tend to rely on multiple sources of information and that they most heavily rely upon non-EDC sources such as vendors, contractors, friends, and colleagues. The reliance upon vendors and contractors fits well with the program marketing model that utilizes trade allies to promote the program.

*Table B-7 Where Decision Makers get Information about Energy Efficient Equipment, Materials, and Design Features*

	<i>Response</i>	<i>(n=324)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
What are the sources your organization relies on for information about energy efficient equipment, materials, and design features?	Equipment vendors or building contractors	211	65%	66%
	Friends and colleagues	134	41%	37%
	An architect, engineer or energy consultant	81	25%	34%
	Trade associations or business groups you belong to	71	22%	22%
	Trade journals or magazines	69	21%	23%
	Brochures or advertisements	68	21%	20%
	[EDC] website	56	17%	20%
	[EDC] Account Representative	48	15%	13%
	[EDC] Energy Specialist	41	13%	14%
	Other	20	6%	7%

Respondents' use of EDC resources for information about energy efficient equipment, materials, and design features is shown for each EDC in Table B-8.

*Table B-8 Utilization of EDC Resources for Information about Energy Efficient Equipment, Materials, and Design Features by EDC*

	<i>Response</i>	<i>OE (n=166)</i>	<i>TE (n=19)</i>	<i>CEI (n=149)</i>
What are the sources your organization relies on for information about energy efficient equipment, materials, and design features?	[EDC] Energy Specialist	12%	5%	14%
	[EDC] Account Representative	13%	26%	17%
	[EDC] website	18%	16%	17%

### B.3.5 Energy Efficiency Attitudes, Behaviors, and Decision Making

Respondents were asked what policies and procedures they had for energy efficiency improvements. The percentage of respondents shown in

Table B-9 indicates that 37% of respondents' organizations did not have any policies or procedures in place regarding energy efficiency improvements. However, when weighted by the amount of energy saved, the share drops to 27%. The difference in the percent of respondents and the percent of savings occurred because organizations that had large energy savings were more likely to have policies and procedures for energy efficiency improvements than organizations with smaller savings.

*Table B-9 Policies and Procedures Regarding Energy Efficiency Improvements*



Which of the following policies or procedures does your organization have in place regarding energy efficiency improvements at this facility?	Response	(n=324)	Percent of Respondents	Percent of Ex Post kWh Savings
	None	120	37%	27%
	Corporate policies that incorporate energy efficiency in operations and procurement	77	24%	23%
	A numeric goal for energy savings	54	17%	20%
	A numeric goal for energy cost reduction	53	16%	24%
	An energy management plan	53	16%	18%
	Active training of staff	52	16%	21%
	Other	27	8%	14%

Respondents were asked to rate a list of factors in terms of importance for their decision making about energy efficient improvements. The percent of respondents and the percent of savings responses are shown in Table B-10 and

Table B-11, respectively. Although respondents considered all of the factors to be important, the most important factor for respondents was incentive payments from their EDC, which 80% of respondents said were very important and 17% said were somewhat important. The least important factor was advice and/or recommendations from the EDC, but this factor was also considered important or very important by 82% of respondents. These results suggest that the incentives from the Companies' programs were influential for decision makers.

*Table B-10 Factors Influencing the Decision to Participate, Percent of Respondents*

Energy Efficiency Decision Factor	Very important	Somewhat important	Only slightly important	Not important at all	Don't know	n
Incentive payments from [EDC]	80%	17%	2%	0%	1%	324
Past experience with energy efficient equipment	65%	25%	4%	3%	3%	324
Advice and/or recommendations from [EDC]	43%	39%	9%	4%	4%	324
Advice and/or recommendations from equipment vendors	45%	46%	5%	3%	1%	324

*Table B-11 Factors Influencing the Decision to Participate, Percent of Ex Post kWh Savings*

<i>Energy Efficiency Decision Factor</i>	<i>Very important</i>	<i>Somewhat important</i>	<i>Only slightly important</i>	<i>Not important at all</i>	<i>Don't know</i>	<i>n</i>
Incentive payments from [EDC]	81%	17%	1%	0%	0%	324
Past experience with energy efficient equipment	66%	26%	3%	2%	4%	324
Advice and/or recommendations from [EDC]	43%	42%	8%	3%	4%	324
Advice and/or recommendations from equipment vendors	35%	59%	3%	3%	0%	324

As shown in Table B-12, advice or recommendations from their EDCs did not vary substantially across EDCs in terms of influence on energy efficiency decision making. Most respondents considered this advice and/or recommendations to be very important or somewhat important.

*Table B-12 influence of Advice and/or Recommendations from EDC Decision to Participate by EDC*

	<i>Response</i>	<i>OE (n=166)</i>	<i>TE (n=19)</i>	<i>CEI (n=148)</i>
How important is advice and/or recommendations from [EDC] for your decision making regarding energy efficiency improvements?	Very important	48%	37%	36%
	Somewhat important	39%	42%	41%
	Only slightly important	7%	11%	14%
	Not important at all	4%	11%	4%
	Don't know	3%	0%	5%

Participants in the Small Enterprise C/I Equipment Program were asked whether or not they had implemented any energy efficient equipment measures before participating in the incentive program. The majority of participants had not previously implemented similar energy efficient equipment, but as shown in

Table B-13, a third of respondents said they had. Furthermore, most of these participants said they had not received an incentive to so implement this equipment. These findings suggest that while some participants were willing to implement some equipment on their own, the incentive program encouraged them to adopt additional equipment at their facilities.

*Table B-13 Previous Experience with Similar Energy Efficient Equipment or Measures*

	<i>Response</i>	<i>(n=323)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Before participating in [EDC]'s business incentive programs, had you installed any equipment or measure similar to the energy efficient [energy efficient equipment/measure] at this facility?	Yes	105	33%	38%
	No	212	66%	60%
	Don't Know	6	2%	1%

As shown in Table B-14, only 17% of respondents said that there was energy efficient equipment that they did not install because there was not an incentive, although a similar percentage did not know. When asked what kind of equipment they wanted to install, many respondents referred to equipment that was covered by the program. Most frequently they mentioned lighting equipment, but lighting controls and refrigeration equipment were also mentioned. It is unclear if participants were misinformed about what equipment is eligible, if they were referring to equipment that is outside of the Companies' service territory, or if they misunderstood the survey question. Equipment that participants mentioned that is not covered by the program included solar, wind, and geothermal systems.

*Table B-14 Equipment Respondents Wanted to Install*

	<i>Response</i>	<i>(n=323)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Was there any additional energy efficient equipment you wanted to install, but didn't because no financial incentive was offered by [EDC]?	Yes	55	17%	22%
	No	225	70%	65%
	Don't Know	43	13%	13%

### B.3.6 Financial Methods Used by Decision Makers

Nearly all customer decision makers said they used some type of financial method to evaluate energy efficiency improvements. Simple payback was the most commonly mentioned method with 51% of the respondents saying that is how they evaluate energy efficiency improvements. The initial cost was another commonly used method that was used by 37% of participants. Life cycle costs and the internal rate of return were each used by a little more than a quarter of the respondents.

*Table B-15 Financial Methods to Evaluate Energy Efficiency Improvements*

	<i>Response</i>	<i>(n=324)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility?	Simple payback	165	51%	57%
	Initial Cost	121	37%	33%
	Life cycle cost	94	29%	24%

	Response	(n=324)	Percent of Respondents	Percent of Ex Post kWh Savings
	Internal rate of return	87	27%	33%
	Don't know	13	4%	3%
	None of these	9	3%	1%

Figure B-4 shows the required payback period given by respondents. Most participants indicated that they required a relatively short payback period with more than half requiring a payback period of two years or less. The payback period requirement shows the importance of energy efficient measures with a high payback and the importance of the incentives for reducing the payback period. These conclusions are substantiated by other data, namely the large share of lighting measures (which tend to have relatively quick payback periods) implemented through the program and the importance given to incentives in deciding on energy efficiency improvements by decision makers in this survey.

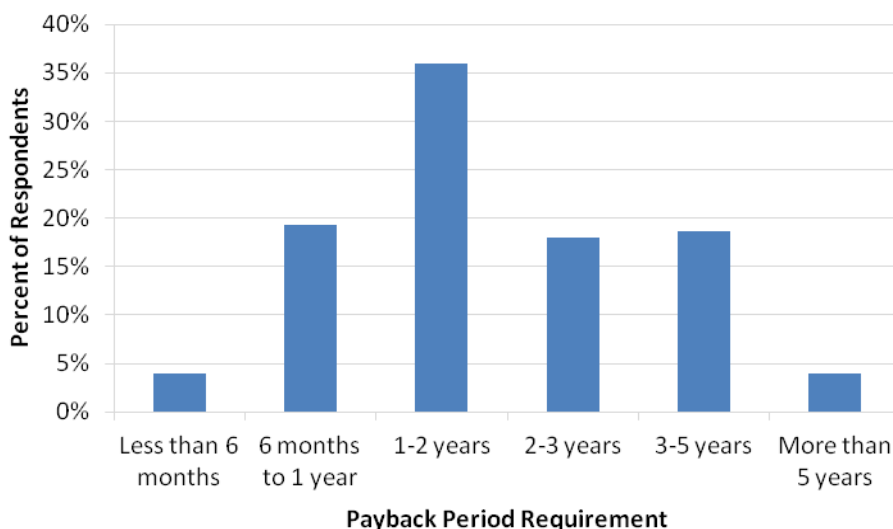


Figure B-4 Required Payback Period (n=150)

### B.3.7 Customer Satisfaction with the Program

Overall, customers were generally satisfied with the Small Enterprise C/I Equipment Program. Sixty-one percent of respondents said that they were very satisfied with their overall experience with the program and another 29% said they were satisfied. The area of least satisfaction was the time elapsed until the incentive payment was received. About a third of participants said that they were somewhat dissatisfied or very dissatisfied with the amount of time required to receive the incentive checks.

Decision makers who reported being dissatisfied with the program were asked why they were dissatisfied. Most said that they were dissatisfied because of the length of time it took to receive the incentive check but a few others said they had issues with the

application process, such as having to resubmit documents or problems with the application forms.

*Table B-16 Participant Satisfaction, Percent of Respondents*

	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>	<i>Don't know</i>
Performance of the equipment installed	82%	14%	1%	1%	0%	2%
Savings on your monthly bill	39%	32%	5%	2%	0%	22%
Incentive amount	67%	20%	3%	2%	2%	5%
The effort required for the application process	48%	27%	12%	6%	2%	4%
Information provided by [EDC] account representative	31%	20%	22%	3%	1%	22%
Elapsed time until you received the incentive -	21%	26%	8%	15%	18%	11%
The [EDC]'s energy efficiency website	23%	24%	20%	1%	0%	32%
The overall experience with the programs	61%	29%	4%	2%	2%	3%

*Table B-17 Participant Satisfaction, Percent of Ex Post kWh Savings*

	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>	<i>Don't know</i>
Performance of the equipment installed	75%	22%	1%	0%	0%	2%
Savings on your monthly bill	44%	32%	3%	2%	0%	20%
Incentive amount	65%	28%	2%	1%	1%	2%
The effort required for the application process	39%	32%	20%	5%	1%	3%
Information provided by [EDC] account representative	26%	29%	21%	2%	0%	22%
Elapsed time until you received the incentive -	20%	28%	5%	15%	23%	9%
The [EDC]'s energy efficiency website	20%	34%	16%	0%	1%	30%
The overall experience with the programs	57%	33%	4%	1%	1%	4%

Table B-18 displays the average level of satisfaction with the program overall and with different elements. Levels of satisfaction were disaggregated by ex post savings. Specifically, respondent's ex post kWh savings were stratified into quartiles. Those with the largest savings were placed into the first quartile and those with the smallest savings were placed into the fourth quartile. There was not a clear relationship between the level of savings and satisfaction ratings, however, respondents with energy savings in the third quartile had the highest ratings for most elements and those with savings in the second quartile had the lowest ratings for most elements. Additionally, respondents

in each of the quartiles expressed less satisfaction with the time elapsed until the incentive was received compared with their satisfaction with the other elements.

*Table B-18 Average Satisfaction Ratings by Ex Post kWh Savings*

<i>Satisfaction Element</i>	<i>Quartile 1 - Greatest Energy Savings</i>	<i>Quartile 2</i>	<i>Quartile 3</i>	<i>Quartile 4 - Least Energy Savings</i>
Satisfaction with performance of the equipment installed	3.7	3.7	3.8	3.7
Satisfaction with savings on your monthly bill	2.3	3.0	3.3	2.6
Satisfaction with incentive amount	3.5	3.3	3.9	3.4
Satisfaction with the effort required for the application process	3.0	2.6	3.2	3.1
Satisfaction with information provided by [EDC] account representative	2.4	2.2	2.4	2.3
Satisfaction with the elapsed time until you received the incentive	1.9	1.9	2.4	1.9
Satisfaction with the [EDC]'s energy efficiency website	2.1	1.6	2.3	2.0
Satisfaction with overall experience with the programs	3.5	2.8	3.7	3.4

Average satisfaction ratings disaggregated by EDC are shown in Table B-19. Ratings were fairly consistent across EDCs, although respondents serviced by TE had lower levels of satisfaction with all elements.

*Table B-19 Average Satisfaction Ratings by EDC*

<i>Satisfaction Element</i>	<i>OE (n=166)</i>	<i>TE (n=19)</i>	<i>CEI (n=148)</i>
Satisfaction with performance of the equipment installed	3.8	3.5	3.7
Satisfaction with savings on your monthly bill	2.6	2.5	2.8
Satisfaction with incentive amount	3.5	3.1	3.3
Satisfaction with the effort required for the application process	3.1	2.5	3.1
Satisfaction with information provided by [EDC] account representative	2.5	1.8	2.3
Satisfaction with the elapsed time until you received the incentive	1.9	1.6	2.0
Satisfaction with the [EDC]'s energy efficiency website	2.1	1.9	2.0
Satisfaction with overall experience with the programs	3.5	3.0	3.3

### B.3.8 Paperwork, Installation, and Incentives

Participants were asked whether or not they had any issues with the process required to receive the financial incentive. The results are shown in Table B-20. A minority of participants (16%) said that they had issues with the process. These issues included having to submit paperwork or documentation multiple times, delays in receiving the incentive check, difficulty completing the application forms, and problems with the contractor such as the contractor completing the paperwork incorrectly. Most of those who had to resubmit the paperwork resolved the problem by submitting the paperwork multiple times. Many of those who complained of delays in receiving the check said that they still had not received the check. Other ways decision makers said the problems were resolved included multiple phone calls or that their account representative solved the problem.

*Table B-20 Decision Maker Experience with the Process to Receive Incentives*

	<i>Response</i>	<i>(n=322)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Did you have any issues with the process required to receive the financial incentive (e.g., paperwork) for your energy efficiency project?	Yes	51	16%	20%
	No	245	76%	74%
	Don't Know	26	8%	7%

Most decision makers felt that the equipment they installed through the Small Enterprise C/I Equipment Program met or exceeded their expectations. As shown in Table B-21,

25% said their expectations were exceeded and another 62% said their expectations were met. The reasons given by those whose expectations were not met (2%) were that savings were not as large as they expected, the lighting did not dim properly, or the lighting is not as bright as expected.

*Table B-21 Decision Maker Satisfaction with Equipment Installed*

	<i>Response</i>	<i>(n=322)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Did the energy efficient equipment you installed through [EDC]'s business incentive programs meet your expectations?	My expectations were exceeded	82	25%	24%
	My expectations were met	200	62%	66%
	My expectations were mostly met	23	7%	6%
	My expectations were not met	5	2%	0%
	Don't know	12	4%	3%

Nearly a third of decision makers reported that there were issues in receiving the incentive check, as shown in Table B-22. Most of these respondents said they had not received the check or that it took a long time to receive it. Additionally, a few respondents said the incentive amount was changed.

*Table B-22 Issues in Receiving the Incentive Check*

	<i>Response</i>	<i>(n=323)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Were there any issues receiving the incentive check?	Yes	99	31%	35%
	No	180	56%	50%
	Don't Know	44	14%	14%

### B.3.9 Pre- and Post-Inspections

Program participants were asked whether or not there were pre- and post-inspections of the facilities where they implemented the equipment. A few of the decision makers reported that there was a pre-inspection performed (11%). Most of the respondents who did have a pre-inspection take place said the inspection consisted of counting and identifying light fixtures and some said that they involved advice about what equipment could be changed. Six percent of respondents said that changes occurred because of the pre-inspection. These respondents said that additional lights were added.

Similarly, few of the respondents said that a post-inspection had taken place (12%). These inspections consisted of verifying that the equipment was in place and installing monitoring equipment or documenting the installation with photographs. Only one respondent said that anything changed as a result of the inspection. The respondent said that the incentive amount decreased because fixtures were added and power consumption was higher than planned.



*Table B-23 Pre- and Post-Installation Inspections*

<i>Question</i>	<i>n</i>	<i>Percent of Respondents (n=323)</i>	<i>Percent of Ex Post kWh Savings</i>
Someone from [EDC] or SAIC came to this facility to do a pre-inspection ( <i>n=323</i> )	36	11%	9%
Something changed in the project design as a result of the pre-inspection ( <i>n=36</i> )	2	6%	15%
Someone from [EDC] or SAIC came to this facility to do a post-inspection ( <i>n=323</i> )	39	12%	25%
Something changed in the project design as a result of the post-inspection ( <i>n=39</i> )	1	3%	5%

### B.3.10 Subsequent Energy Efficiency Plans

As shown in

Table B-24, 11% of respondents reported that they installed additional equipment at the facility for which they did not apply for incentives. Most respondents said that they did not apply for incentives because the project was ineligible for reasons such as the facility was not in the service territory or the measure was not covered. However, a few decision makers said that they did not apply for the incentive because they were frustrated with the program.

*Table B-24 Subsequent Energy Efficiency Plans*

	<i>Response</i>	<i>(n=323)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
As a result of your experience with these programs, have you installed any equipment at this or other facilities for which you haven't applied for a financial incentive through [EDC]?	Yes	36	11%	17%
	No	278	86%	81%
	Don't Know	9	3%	2%

### B.3.11 Customer Recommendations and Overall Impressions

When responding to open-ended questions regarding their experiences with the program, participants provided some recommendations for program improvement. Several of these comments suggested that the program should be promoted better. One participant suggested that a representative of the Companies contact industrial customers to inform them of what programs are available to them. Several other participants recommended that the time to receive the incentive check should be decreased. Some other recommendations that were made included sending an energy specialist to companies to help them identify areas for savings, keep the information about the program up to date or improve communications, increase the incentive amount, and do a better job screening the contractors working with the program.

A number of comments expressed praise and gratitude for the program. Participants said the program made it possible for their organizations to implement more efficient equipment, hoped that the program continued, and hoped similar programs will be run in the future. However, some participants did express dissatisfaction over delays in receiving the incentive payment, the change in the incentive levels, or the performance of the equipment.

#### B.4 Large Enterprise C/I Equipment Program Process Evaluation Findings

Table B-25 shows the number of applications and the average, median, lowest, and highest amount of the incentive received by equipment type for customers. All applications were for lighting projects and most were non-standard applications. The average incentive paid for non-standard lighting equipment was \$70,970. Custom lighting incentives ranged from \$331 to \$1,134,128. Additionally, there were seven standard lighting projects that paid an average incentive was \$2,422.

*Table B-25 Incentive Characteristics by Equipment Type*

<i>Equipment Type</i>	<i>Number of Applications</i>	<i>Average</i>	<i>Median</i>	<i>Range</i>
Non-Standard Lighting	204	\$70,970	\$36,079	\$331 - \$1,134,128
Standard Lighting	7	\$2,422	\$2,948	\$800 - \$3,000
Total	211	\$68,696	\$34,380	\$331 - \$1,134,128

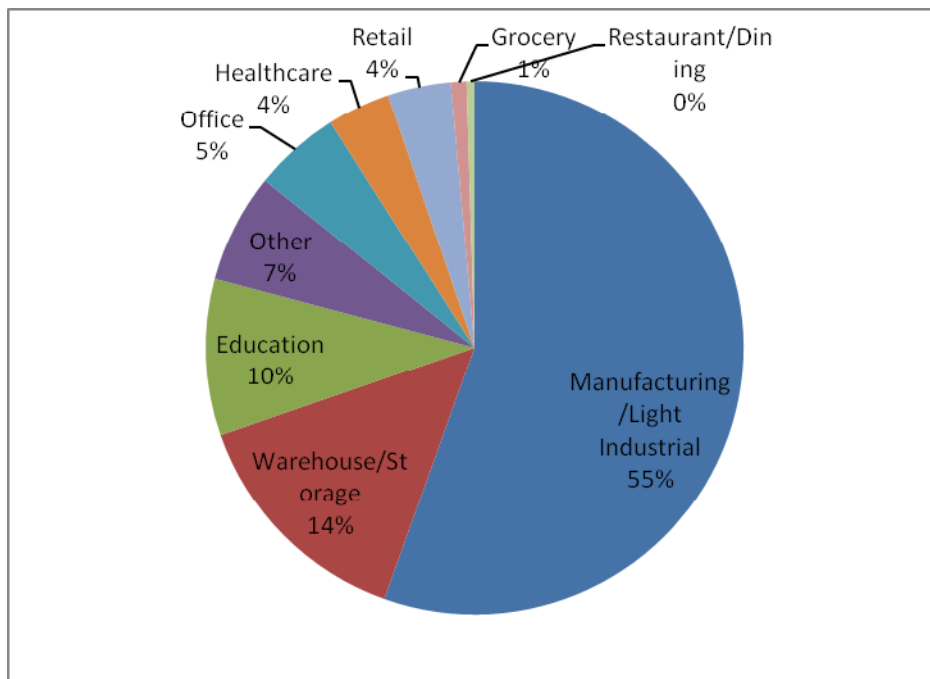
Table B-26 shows the incentive characteristics for each distribution company. The average incentive paid varied from \$61,151 for CEI to \$97,104 for TE.

*Table B-26 Incentive Characteristics by Distribution Company*

<i>EDC</i>	<i>Number of Applications</i>	<i>Average</i>	<i>Median</i>	<i>Range</i>
The Illuminating Company	63	\$61,151	\$38,150	\$764 - \$560,065
Toledo Edison	29	\$97,104	\$29,185	\$800 - \$784,171
Ohio Edison	119	\$65,767	\$33,932	\$331 - \$1,134,128
Total	211	\$68,696	\$34,380	\$331 - \$1,134,128

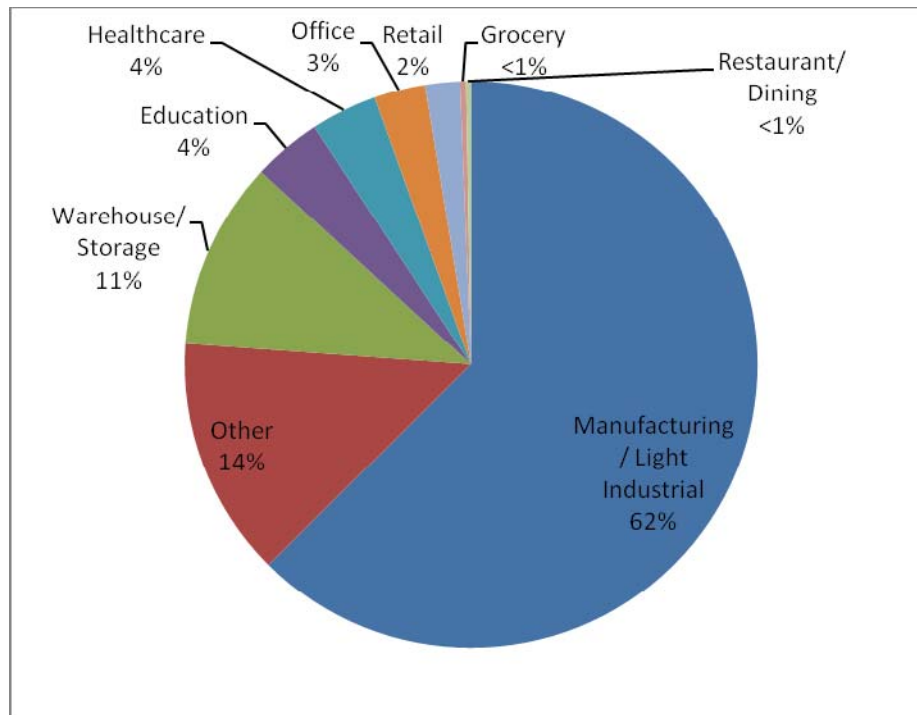
A diverse array of customers participated in the incentive program. Figure B-1 display the share of projects completed by facility type. Projects in manufacturing and light industrial facilities accounted for more than half of the projects completed. Additionally, warehouse and storage, education, and other facility types accounted for large shares

of the projects completed, each accounting for between 7% and 14% of the projects completed.



*Figure B-5 Projects by Facility Type*

The distribution of energy savings differed somewhat from the distribution of the number of projects but as before, a few of the facility types accounted for most of the program activity. Manufacturing and light industrial facilities accounted for nearly two-thirds of the savings. Projects completed in other facility types accounted for 14% of the savings, while warehouse and storage accounted for 11% of the savings.



*Figure B-6 Ex-Post Energy Savings by Facility Type*

The savings associated with applications submitted by month is shown in Figure B-7. As shown in the figure, the level of savings associated with applications rose quickly after the program launched and then flattened during the July to August period. The rapid increase in savings after program launch demonstrates both the success of the program and provides context for some of the issues raised by trade allies and participants discussed later in the report. It should be noted that because this figure only reflects approved projects, it does not reflect the high levels of activity associated with applications that were submitted but did not proceed beyond preapproval.

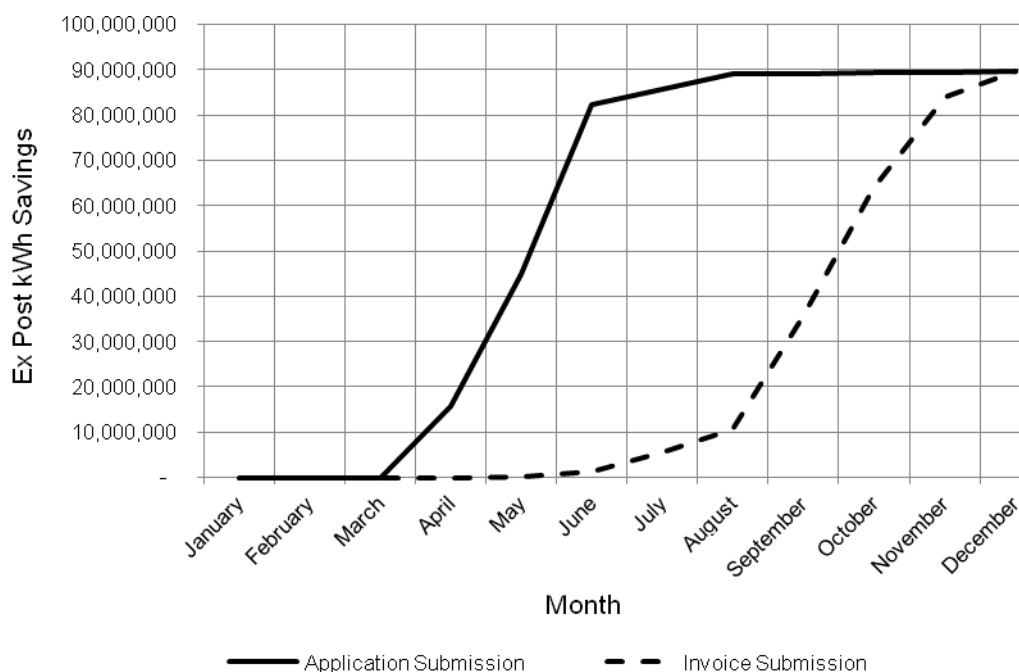


Figure B-7 Cumulative Savings Associated with Application and Invoice Submissions by Month during 2011 (Note: The rising slope in March is due to savings accrued in April)

#### B.4.1 Customer Outcomes

An online and telephone survey was conducted to collect data about customer decision-making, preferences, and opinions of the Large Enterprise C/I Equipment Program. The program offered a variety of measures for commercial and industrial facilities, including lighting, HVAC, and motor measures. In total, 71 customers who implemented a project under the program responded to the survey. The percent of respondents and the percent of savings associated with the survey responses are shown below. Most of the discussion refers to the percent of respondents but the percent of savings is discussed when the findings are noteworthy. As shown in Table B-27, about half of the respondents were the main decision maker and about half assisted with the decision.

Table B-27 Respondents Role in the Decision Making Process

	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
What was your role in the decision making process to install [energy efficient equipment/measure]?	Main decision maker	35	49%	45%
	Assisted with the decision to install the equipment	32	45%	52%
	Was not part of the decision process	4	6%	3%

### B.4.2 How Customers Learn About the Program

Customers were asked how they learned about the incentive program. As shown in Table B-28, about two-thirds of respondents heard about the program from an equipment vendor or building contractor. The large share of customers who heard about the program from vendors or building contractors demonstrates the importance of trade allies for promoting the program. Another common means of hearing about the program was from a representative of the decision maker's EDC (25%). Several decision makers reported hearing about the program from a program representative (17%), an architect, engineer, or energy consultant (17%), or from friends and colleagues (14%).

*Table B-28 How Customers Learned about the Incentive Program*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
How did you learn of [EDC]'s business incentive programs?	An equipment vendor or building contractor	47	66%	57%
	Representative of [EDC] mentioned it	18	25%	28%
	Approached directly by representative of [EDC] incentive programs	12	17%	19%
	An architect, engineer or energy consultant	12	17%	11%
	Friends or colleagues	10	14%	7%
	[EDC] website	7	10%	23%
	Received an information brochure on [EDC] incentive programs	6	8%	15%
	Other	6	8%	19%
	Past experience with the programs	3	4%	2%

The share of respondents who heard about the program from a representative of the EDC or from the EDC website is shown by EDC in Table B-29.

*Table B-29 EDC Sources for Learning about the Program by EDC, Percent of Respondents*

	<i>Response</i>	<i>Ohio Edison (n=47)</i>	<i>Toledo Edison (n=10)</i>	<i>The Illuminating Company (n=14)</i>
How did you learn of [EDC]'s business incentive programs?	Representative of [EDC] mentioned it	8%	16%	1%
	[EDC] website	4%	5%	0%

### B.4.3 The Decision Makers

Program participants were asked how their organizations made decisions about energy efficiency improvements. As shown in Table B-30, respondents most frequently reported

that decisions are made by one or two key people (44%). Other common responses were that decisions are based on staff recommendations to a decision maker (24%), that it depends on how much the investment is (17%), or that decisions are made by a group or committee (15%). The percent of respondents and percent of savings associated with the responses differed sizably for the “made by one or two key people” and “depends on how much the investment is” response options. These differences reflect the fact that respondents with the largest energy savings were less likely to say that decisions were made by one or two people and more likely to say that decision making depended on the size of the investment.

*Table B-30 Decision Maker Characteristics*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
How does your organization typically decide to make energy efficiency improvements for this facility? Is the decision:	Made by one or two key people	31	44%	30%
	Based on staff recommendations to a decision maker	17	24%	28%
	Depends on how much the investment is	12	17%	33%
	Made in some other way	0	0%	0%
	Made by a group or committee	11	15%	9%
	Don't know	0	0%	0%

Three-quarters of respondents said their businesses were in the manufacturing industry, while the remainder was distributed across a number of other industries. Because of this, it is difficult to draw conclusions about how decision making varied by industry. However, a cross-tabulation of the number of employees and the decision maker characteristics found that fewer respondents from larger organizations said decisions were made by one or two key people and more said that decisions were made by a group or committee or that it depends on how much the investment is. The greater utilization of groups and committees most likely reflects the fact that larger organizations have more resources to dedicate to energy efficiency decisions.

#### B.4.4 Where Decision Makers Get Their Information

Respondents were asked where they get information about energy efficient equipment, materials, and design features. The results are shown in Table B-31. Decision makers relied upon a variety of sources, but most heavily upon equipment vendors or building contractors (76%). Other common sources for information were EDC account representatives (37%) and friends and colleagues (37%). The reliance upon vendors and contractors fits well with the program marketing model that utilizes trade allies to promote the program. The reliance on friends and colleagues points to the importance of social networks for learning about energy efficient equipment, materials, and design features. Given the importance of these networks, positive experiences with the

program and the energy efficiency equipment implemented through it, may drive additional interest as participants discuss their experiences with friends and colleagues.

*Table B-31 Where Decision Makers get Information about Energy Efficient Equipment, Materials, and Design Features*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
What are the sources your organization relies on for information about energy efficient equipment, materials, and design features?	Equipment vendors or building contractors	54	76%	66%
	[EDC] Account Representative	26	37%	43%
	Friends and colleagues	26	37%	41%
	Trade journals or magazines	19	27%	30%
	An architect, engineer or energy consultant	18	25%	29%
	Trade associations or business groups you belong to	17	24%	35%
	Brochures or advertisements	15	21%	29%
	[EDC] Energy Specialist	14	20%	26%
	[EDC] website	12	17%	28%
	Other	6	8%	21%

Respondents use of EDC resources for information about energy efficient equipment, materials, and design features are shown in Table B-32 disaggregated by EDC. Respondents from all EDCs reported using account representatives more than the other EDC resources.

*Table B-32 Utilization of EDC Resources for Information about Energy Efficient Equipment, Materials, and Design Features by EDC, Percent of Respondents*

	<i>Response</i>	<i>Ohio Edison (n=47)</i>	<i>Toledo Edison (n=10)</i>	<i>The Illuminating Company (n=14)</i>
What are the sources your organization relies on for information about energy efficient equipment, materials, and design features?	[EDC] Energy Specialist	19%	30%	14%
	[EDC] Account Representative	34%	60%	29%
	[EDC] website	17%	30%	7%

#### B.4.5 Energy Efficiency Attitudes, Behaviors, and Decision Making

Respondents were asked what policies and procedures they had in place for energy efficiency improvements. The responses shown in Table B-33 indicate that most respondent's organizations had one or more energy efficiency improvement policies or procedures in place. The most common were policies that incorporate energy efficiency in operations and procurement. Additionally, approximately a quarter of respondents indicated that they had a numeric goal for energy savings, a numeric goal for energy cost reduction, an energy management plan, or active training of staff.



*Table B-33 Policies and Procedures Regarding Energy Efficiency Improvements*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Which of the following policies or procedures does your organization have in place regarding energy efficiency improvements at this facility?	Corporate policies that incorporate energy efficiency in operations and procurement	29	41%	42%
	A numeric goal for energy savings	20	28%	17%
	A numeric goal for energy cost reduction	20	28%	26%
	An energy management plan	19	27%	38%
	Active training of staff	17	24%	15%
	None	12	17%	16%
	Other	7	10%	2%

Respondents were asked how important different factors were in their decisions about energy efficiency improvements. The percent of respondents and percent of savings associated with the responses are shown in Table B-34 and

Table B-35, respectively. Although respondents considered all of the factors to be important, the most important factor for respondents was incentive payments from their EDC. Seventy-nine percent of respondents said the incentive payments were very important and 20% said they were somewhat important. This finding highlights the importance of the incentives from the Large Enterprise C/I Equipment Program for decision makers. Although advice and/or recommendations from the EDC was the least important factor for decision makers, 82% thought it was somewhat or very important.

*Table B-34 Factors Influencing the Decision to Participate, Percent of Respondents*

<i>Energy Efficiency Decision Factor</i>	<i>Very important</i>	<i>Somewhat important</i>	<i>Only slightly important</i>	<i>Not important at all</i>	<i>Don't know</i>	<i>n</i>
Incentive payments from [EDC]	79%	20%	1%	0%	0%	71
Past experience with energy efficient equipment	48%	44%	3%	1%	4%	71
Advice and/or recommendations from [EDC]	54%	28%	10%	3%	6%	71
Advice and/or recommendations from equipment vendors	39%	49%	8%	3%	0%	71

*Table B-35 Factors Influencing the Decision to Participate, Percent of Savings*

<i>Energy Efficiency Decision Factor</i>	<i>Very important</i>	<i>Somewhat important</i>	<i>Only slightly important</i>	<i>Not important at all</i>	<i>Don't know</i>	<i>n</i>
Incentive payments from [EDC]	86%	11%	2%	0%	0%	71
Past experience with energy efficient equipment	48%	46%	5%	0%	1%	71
Advice and/or recommendations from [EDC]	57%	32%	6%	3%	2%	71
Advice and/or recommendations from equipment vendors	40%	48%	7%	5%	0%	71

As shown in Table B-36, the level of influence advice and/or recommendations from their EDCs did not vary substantially across EDCs. Most respondents considered this advice and/or recommendations to be very important or somewhat important.

*Table B-36 Influence of Advice and/or Recommendations from EDC Decision to Participate by EDC, Percent of Respondents*

	<i>Response</i>	<i>Ohio Edison (n=47)</i>	<i>Toledo Edison (n=10)</i>	<i>The Illuminating Company (n=14)</i>
How important is advice and/or recommendations from [EDC] for your decision making regarding energy efficiency improvements?	Very important	57%	50%	43%
	Somewhat important	23%	40%	36%
	Only slightly important	11%	10%	7%
	Not important at all	2%	0%	7%
	Don't know	6%	0%	7%

Participants in the incentive program were asked whether or not they had implemented any energy efficient equipment measures before participating in the Large Enterprise C/I Equipment Program. As shown in Table B-37, 45% of respondents had previously implemented similar energy efficient equipment, while 52% of respondents said that their participation in the program was the first time they implemented equipment of that type. Decision makers who had implemented similar energy efficient equipment were asked if they had received an incentive for the equipment and nearly all said they had not.

*Table B-37 Previous Experience with Similar Energy Efficient Equipment or Measures*

	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
Before participating in [EDC]'s business incentive programs, had you installed any equipment or measure similar to the energy efficient [energy efficient equipment/measure] at this facility?	Yes	32	45%	53%
	No	37	52%	46%
	Don't Know	2	3%	2%

As shown in Table B-38, only 17% of respondents said that there was energy efficient equipment that they did not install because there was not an incentive, although a similar percentage did not know. When asked what kind of equipment they wanted to install, many respondents stated equipment that was covered by the program. Most frequently they mentioned lighting equipment, although air conditioning, motors, and air compressors were also mentioned. It is unclear if participants were misinformed about what equipment is eligible, if they were referring to equipment that is outside of the Companies' service territories, or if they misread the survey question. Equipment that participants mentioned that is not covered by the program included natural gas powered equipment and a power quality system.

*Table B-38 Equipment Respondents Wanted to Install*

	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
Was there any additional energy efficient equipment you wanted to install, but didn't because no financial incentive was offered by [EDC]?	Yes	12	17%	14%
	No	48	68%	80%
	Don't Know	11	15%	6%

#### B.4.6 Financial Methods Used by Decision Makers

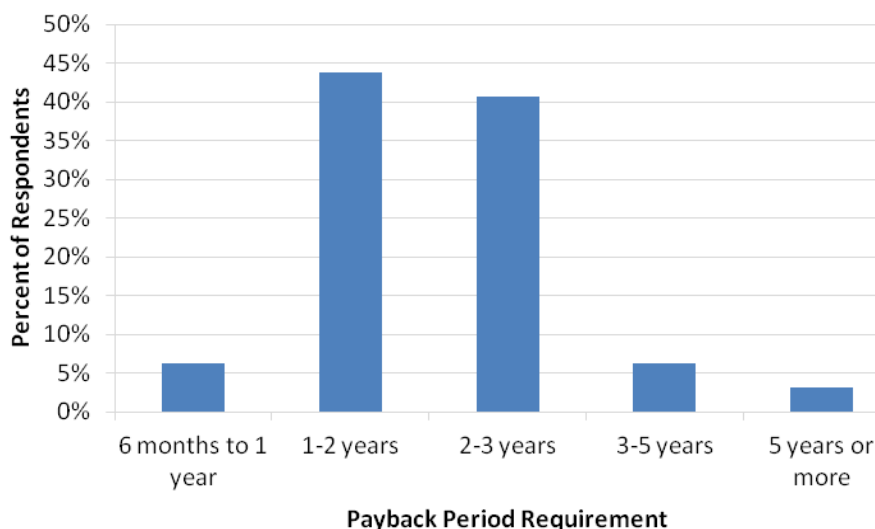
Nearly all decision makers said they used some type of financial method to evaluate energy efficiency improvements. The most commonly mentioned method, cited by 75% of the respondents, was simple payback. The initial cost was also a common method that was used by 42% of participants. Life cycle costs and the internal rate of return were each used by more than a quarter of the respondents.

*Table B-39 Financial Methods to Evaluate Energy Efficiency Improvements*

	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
Which financial methods does your organization typically use to evaluate energy efficiency improvements for this facility?	Simple payback	53	75%	79%
	Initial Cost	30	42%	31%
	Internal rate of return	21	30%	28%
	Life cycle cost	20	28%	20%

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
	None of these	1	1%	3%
	Don't know	1	1%	0%

Figure B-8 shows the payback period required by respondents. Most participants indicated that they required a relatively short payback period with half requiring a payback period of two years or less. The short payback period requirement shows the importance of energy efficient measures with a high payback and the importance of the incentives for reducing the payback period. These conclusions are substantiated by other data, namely that all equipment implemented was lighting equipment (which tend to have relatively quick payback periods) and the importance given to incentives in deciding on energy efficiency improvements by decision makers in this survey.



*Figure B-8 Required Payback Period (n=32)*

#### B.4.7 Customer Satisfaction with the Program

Overall, customers were generally satisfied with the Large Enterprise C/I Equipment Program. Forty-five percent of respondents said that they were very satisfied with their overall experience with the program and another 39% said they were satisfied. The area of least satisfaction was the time elapsed until the incentive payment was received. More than a third of participants said that they were somewhat dissatisfied or very dissatisfied with the amount of time required to receive the incentive checks.

Decision makers who reported being dissatisfied with the program were asked why they were dissatisfied. The most frequently mentioned source of dissatisfaction was the slow processing of applications and payment of the incentive. Some respondents were dissatisfied with the application process for reasons such as difficulty submitting the

forms or supporting documentation and difficulty working with SAIC staff on problems. Another issue mentioned was the change in the incentive level. One respondent was dissatisfied because they did not hear of the program through their account representative.

*Table B-40 Participant Satisfaction, Percent of Respondents*

	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>	<i>Don't know</i>
Performance of the equipment installed	83%	17%	0%	0%	0%	0%
Savings on your monthly bill	46%	35%	8%	0%	0%	10%
Incentive amount	65%	21%	6%	1%	3%	4%
The effort required for the application process	38%	30%	17%	7%	4%	4%
Information provided by [EDC] account representative	38%	23%	17%	4%	6%	13%
Elapsed time until you received the incentive -	8%	25%	14%	15%	23%	14%
The [EDC]'s energy efficiency website	18%	31%	24%	0%	0%	27%
The overall experience with the programs	45%	39%	4%	8%	3%	0%

*Table B-41 Participant Satisfaction, Percent of Savings*

	<i>Very Satisfied</i>	<i>Somewhat Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Somewhat Dissatisfied</i>	<i>Very Dissatisfied</i>	<i>Don't know</i>
Performance of the equipment installed	88%	12%	0%	0%	0%	0%
Savings on your monthly bill	60%	32%	5%	0%	0%	3%
Incentive amount	70%	23%	2%	3%	2%	1%
The effort required for the application process	43%	15%	27%	5%	6%	4%
Information provided by [EDC] account representative	42%	30%	14%	4%	7%	4%
Elapsed time until you received the incentive -	7%	25%	20%	17%	16%	16%
The [EDC]'s energy efficiency website	28%	38%	12%	0%	0%	23%
The overall experience with the programs	41%	43%	3%	9%	3%	0%

Table B-42 displays the average level of satisfaction with the program overall and with different elements. Levels of satisfaction were disaggregated by ex post savings. Specifically, respondent's ex post kWh savings were stratified into quartiles. Those with the largest savings were placed into the first quartile and those with the smallest savings were placed into the fourth quartile. There was not a clear relationship between the level of savings and satisfaction ratings. However, respondents in each of the quartiles were least satisfied with the time elapsed until the incentive was received.

*Table B-42 Average Satisfaction Ratings by Ex Post kWh Savings*

<i>Satisfaction Element</i>	<i>Quartile 1 - Greatest Energy Savings</i>	<i>Quartile 2</i>	<i>Quartile 3</i>	<i>Quartile 4 - Least Energy Savings</i>
Satisfaction with performance of the equipment installed	3.8	3.8	3.8	3.9
Satisfaction with savings on your monthly bill	3.7	3.3	2.2	3.2
Satisfaction with incentive amount	3.7	3.4	3.2	3.1
Satisfaction with the effort required for the application process	2.6	2.7	2.9	3.1
Satisfaction with information provided by [EDC] account representative	2.7	2.9	2.4	2.2
Satisfaction with the elapsed time until you received the incentive	1.5	1.2	1.7	1.8
Satisfaction with the [EDC]'s energy efficiency website	2.3	2.1	2.0	2.2
Satisfaction with overall experience with the programs	2.9	3.0	3.2	3.5

Average satisfaction ratings disaggregated by EDC are shown in Table B-43. Ratings were fairly consistent across EDCs. Across all EDCs, respondents were least satisfied with the elapsed time to receive incentives.

*Table B-43 Average Satisfaction Ratings by EDC*

<i>Satisfaction Element</i>	<i>Ohio Edison (n=47)</i>	<i>Toledo Edison (n=10)</i>	<i>The Illuminating Company (n=14)</i>



<i>Satisfaction Element</i>	<i>Ohio Edison (n=47)</i>	<i>Toledo Edison (n=10)</i>	<i>The Illuminating Company (n=14)</i>
Satisfaction with performance of the equipment installed	3.9	3.7	3.8
Satisfaction with savings on your monthly bill	3.1	3.3	3.0
Satisfaction with incentive amount	3.4	2.9	3.4
Satisfaction with the effort required for the application process	2.7	3.0	3.0
Satisfaction with information provided by [EDC] account representative	2.7	3.0	1.9
Satisfaction with the elapsed time until you received the incentive	1.5	2.1	1.2
Satisfaction with the [EDC]'s energy efficiency website	2.3	2.2	1.7
Satisfaction with overall experience with the programs	3.2	2.8	3.1

#### B.4.8 Paperwork, Installation, and Incentives

Participants were asked whether or not they had any issues with the process required to receive the financial incentive. As shown in Table B-44, a quarter of participants said that they did. Most of the respondents referred to delays in the receipt of payment or the change in incentive levels. Other issues raised were confusion over how to complete the application and having to submit information multiple times. A few respondents said their issues were resolved through repeated communications or that it took time. Several respondents said their issues were not resolved and these comments generally referred to delays in receiving the check or receiving an incentive amount that was different than what was expected.

*Table B-44 Decision Maker Experience with the Process to Receive Incentives*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Did you have any issues with the process required to receive the financial incentive (e.g., paperwork) for your energy efficiency project?	Yes	18	25%	33%
	No	47	66%	57%
	Don't Know	6	8%	10%

Most decision makers felt that the equipment they installed through the Large Enterprise C/I Equipment Program met or exceeded their expectations. As shown in Table B-45, 27% said their expectations were exceeded and another 59% said their expectations were met. One decision maker's expectations were not met but that was because the project was not yet complete.

*Table B-45 Decision Maker Satisfaction with Equipment Installed*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Did the energy efficient equipment you installed through [EDC]'s business incentive programs meet your expectations?	My expectations were exceeded	19	27%	20%
	My expectations were met	42	59%	69%
	My expectations were mostly met	7	10%	10%
	My expectations were not met	1	1%	1%
	Don't know	2	3%	0%

More than a third of decision makers reported that there were issues in receiving the incentive check as shown in Table B-46. Most of the respondents who had issues said they had not received the check or that it took a long time to receive it. Additionally, a few respondents said the incentive amount was different than what they were expecting.

*Table B-46 Issues in Receiving the Incentive Check*

	<i>Response</i>	<i>(n=71)</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
Were there any issues receiving the incentive check?	Yes	26	37%	49%
	No	31	44%	31%
	Don't Know	14	20%	20%

#### B.4.9 Pre- and Post-Inspections

Program participants were asked whether or not there were pre- and post-inspections of the facilities where they implemented the equipment. Few of the decision makers reported that there was a pre-inspection performed (8%). Those that had pre-inspections said they involved facility inspection and documentation of the current equipment and measures planned. A third of those who had a pre-inspection said changes occurred as a result of the pre-inspection. These changes consisted of adding lighting to the project.

Similarly, few of the respondents indicated that a post-inspection had taken place (17%). Those that had inspections said they consisted of verifying that the equipment was in place and installed correctly. One respondent said the incentive amount changed as a result of the post-inspection because the space-type was changed to refrigerated space.

*Table B-47 Pre- and Post-Installation Inspections*

<i>Question</i>	<i>n</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
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Question	n	Percent of Respondents	Percent of Ex Post kWh Savings
Someone from [EDC] or SAIC came to this facility to do a pre-inspection (n=71)	6	8%	11%
Something changed in the project design as a result of the pre-inspection (n=6)	2	33%	67%
Someone from [EDC] or SAIC came to this facility to do a post-inspection (n=71)	12	17%	27%
Something changed in the project design as a result of the post-inspection (n=12)	1	8%	3%

#### B.4.10 Subsequent Energy Efficiency Plans

As shown in Table B-48, 17% of respondents reported that they installed additional equipment at the facility for which they did not apply for incentives. Some of the respondents said they planned to apply for incentives or that the project was not applicable to the program. About half said that it was not worth the effort going through the application because the incentive levels would be small. One respondent said that they didn't apply because the incentive level dropped.

*Table B-48 Subsequent Energy Efficiency Plans*

	Response	(n=71)	Percent of Respondents	Percent of Ex Post kWh Savings
As a result of your experience with these programs, have you installed any equipment at this or other facilities for which you haven't applied for a financial incentive through [EDC]?	Yes	12	17%	26%
	No	54	76%	68%
	Don't Know	5	7%	6%

#### B.4.11 Customer Recommendations and Overall Impressions

When responding to open-ended questions regarding their experiences with the program, participants provided some recommendations for program improvement. The suggestions that were made included continuing to offer the program or offer more programs, increasing the incentive level, improving the program infrastructure, and improving communications about what programs are available.

A number of comments expressed praise and gratitude for the program. Participants said the program made it possible for their organizations to implement more efficient equipment, said it was easy to work with, and offered praise for specific account representatives or SAIC staff. However, some participants did express dissatisfaction over delays in receiving the incentive payment, the change in the incentive levels, or difficulty in getting applications through the approval process.

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## B.5 Market Perspective Data Collection

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Interviews were conducted with trade allies and program staff in order to gain perspectives regarding program operation and overall market trends. The interviews were designed to center on topics related to experiences with the programs and with other groups involved in managing or promoting the programs. Interview topics also included program recommendations, program satisfaction, and recent trends in the energy efficiency market environment.

These interviews were performed with the following three groups:

- **C/I Equipment Programs Trade Allies:** Telephone interviews and online surveys were conducted with 95 trade allies.
- **SAIC staff members:** Interviews were conducted with program management staff of the C/I Equipment Programs implementation contractor, SAIC.
- **The Companies' staff members:** Interviews were conducted with members of the Companies C/I Equipment Programs management.

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## B.6 Trade Ally Outcomes

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ADM conducted 95 telephone interviews or online surveys with trade allies. Most of the projects completed by trade allies were nonstandard lighting or standard lighting projects. Trade allies were asked questions on a number of topics including:

- Their views of the application process;
- Effects of the programs on their businesses;
- Program marketing and customer awareness;
- Their views of the incentives;
- Trends in equipment choices; and
- Their overall satisfaction with the incentive programs.

### B.6.1 Views of the Application Process

To understand if there were any issues or problems with the application process, trade allies were asked if they thought there were any aspects of the process that should be modified. Sixty-eight percent of trade allies thought that there were. However, many of the trade allies' comments addressed the change in the incentive levels and how the change impacted them. Eleven trade allies remarked on the negative impacts this change had on their business, such as customers pulling out of projects that they had submitted an application for or that customers were upset about the change. Another

issue mentioned by nine trade allies was a belief that they were misled about the incentive change or that applications were being held while decisions about the incentive levels were being made.

Aside from issues stemming from the incentive change, several trade allies raised other concerns about the application process. Communications about the status of submitted applications was mentioned as a problem by twelve trade allies. Most of these comments reflected frustration about not knowing the status of applications that had been submitted. For example, one trade ally stated:

*“Better communication throughout the pre-approval process and final approval. I have applications that are 5+ months old, and I still don’t know if or when they will be approved. I also have projects that have been completed and submitted for final review that are months old without any feedback.”*

One trade ally suggested that improvement in communication could be made by implementing an online dashboard display showing the entire application process as a series of steps and showing at which step in the process the application was currently in. Recognizing this need, SAIC recently implemented an online system for participants to check the status of their applications. One trade ally responded to the survey after the status check was implemented and thought it was a big improvement, but made a number of suggestions for making it better.

Other communication issues were also noted by trade allies. One of these, mentioned by seven trade allies, was a lack of response or a slow response to telephone and email inquiries. Another issue noted by some trade allies was a lack of clarity or specificity in the communications about submitted applications. For example, one trade ally discussed a situation where application materials were submitted multiple times in response to nonspecific emails about a problem with the application. The problem was eventually resolved when the ally spoke with a supervisor and learned that the supporting documentation was illegible.

Several trade allies stated that the application processing time should be improved. Respondents generally felt that the application time was slow through all phases of the approval process and some gave estimates of four to six months or more before an incentive check was cut. One trade ally suggested that:

*“Consistent time estimations for each stage need to be established like the current attempt to get pre-approvals turned around in 30 days. Something similar needs to be put in place for FINALS, and checks being cut and mailed, as well.”*

However, a few respondents said that processing time seems to have improved with recent applications.

A few respondents expressed uncertainty about when the 90 day clock for receiving the incentives began (i.e., does it begin once the application is submitted or once payment is approved?).

Trade allies raised a few other concerns about how applications were processed aside from communication problems and the slow processing of applications. Eight respondents stated that submitted documentation, such as cut sheets or invoices, were lost and had to be resubmitted. One respondent found this particularly frustrating because he believed that after the information was resubmitted, the application would “go to the end of the line,” and it could take months before he heard anything further. Some other issues with the application process noted by respondents were the belief that applications for large projects took longer to be approved, that they received repeated requests for additional information for submitted applications, and that the people processing the applications were not knowledgeable or that the level of their knowledge varied.

Some problems with the application form or the submission of supporting documentation were raised by trade allies. Eighteen respondents stated that completing the nonstandard application or submitting supporting documentation was difficult. Some of the issues raised were not knowing what documentation to submit or how to submit it, difficulty in using the excel spreadsheet for the nonstandard lighting application, inadequate coverage of lamps in the coding system (e.g., 6 lamp T8 high bay using HBF ballasts, full wattage T8 lamps, as well as 575W, 775W, and 875W pulse start metal halide systems), and difficulty in calculating watts saved.

Two respondents stated that the submission requirements did not fit with their business processes, specifically, one ally stated that their invoices show their part numbers rather than the manufacturer’s (as required for the application form) while the other ally stated that the final application paperwork forces them to bill in a way that doesn’t fit their business practice. The remaining comments that mentioned specific issues were a preference to be able to submit all documentation at once instead of by separate emails, better instructions on selecting fixtures, not having to enter the same information in multiple spots, and not defining lighting requirement and replacement fixture type by reference code on the standard application.

#### B.6.2 Effects of C/I Equipment Programs on Trade Allies’ Businesses

Trade allies were asked whether or not the delays in the roll-out of the programs impacted their business. While 49% responded “Yes” to the question, about half of these respondents discussed the impact of the delays in the processing of applications and the incentive change rather than the delay in the programs implementation. This suggests that only about a quarter of trade allies were impacted by the delays in the programs’ roll-out. Of those that discussed an impact from the implementation delay on their business, eight said that they lost projects or had other negative impacts on their business (e.g., lost credibility with customers). Additionally, one respondent thought the

delay nearly resulted in lost business. Six other respondents said that the delay in the start of the programs pushed projects back because customers wanted to wait for the incentives. This behavior among trade allies and their customers probably led to pent-up demand for the programs.

Trade allies were asked about the impact of participating in the C/I Equipment Programs on their businesses. The results are shown in Table B-49. Most respondents stated that the incentive programs helped them sell the types of equipment or services that they provide, although eleven allies stated that the new incentives were less effective than the old incentives. When asked how the programs helped them sell their equipment or services, a majority said that they helped by lowering the cost to customers. However, a few trade allies stated other ways in which the incentive programs help their businesses, namely, that the programs create awareness about energy efficient technologies, they provide allies an opportunity to talk with customers about energy efficient equipment, and they create a sense of urgency because the incentives are not permanent.

*Table B-49 Impact of Incentive Programs on Trade Allies' Businesses*

Question	Percentage of Respondents Saying "Yes"	
	Percent of Respondents	Percent of Ex Post kWh Savings
Do [EDC]'s business incentive programs help you to sell your services or products?	82%	91%
Has your involvement in [EDC]'s business incentive programs affected the types of equipment or services that you provide?	20%	9%

A fifth of the trade allies said that the programs affected the types of equipment or services they offer. Of those who said the programs affected their business, ten stated that their business had become more focused on energy efficiency in a variety of ways such as offering more energy efficient products, increasing inventories of energy efficient products, focusing more on the energy savings aspect of a project, and targeting low efficiency systems for upgrades. Some examples of these remarks were:

*"[The incentive programs] allowed us to write more energy efficient lighting business and expand our "green" dept."*

*"We have become more sensitive to the energy savings aspect when reviewing and ultimately following thru with a customer's request."*

*"We are a much greener company, with an enhanced focus on energy savings."*



Additionally, five respondents said they focused on selling equipment that complies with the programs or they seek to maximize customers' rebates. One trade ally stated that he or she learned more about energy efficient equipment.

Looking forward, trade allies gave estimates about their level of activity in the programs over the next year. As shown in Table B-50, about half of the trade allies thought they would be as active or more active in the programs in the coming year.

*Table B-50 Trade Allies Level of Expected Activity in 2012*

<i>How active do you expect your firm to be in [EDC]'s business incentive programs during the next year?</i>	<i>Percent of Respondents</i>	<i>Percent of Ex Post kWh Savings</i>
More active	20%	7%
About the same level of activity	32%	36%
Less active	40%	55%
Don't know	7%	1%

When asked to estimate the percentage of the projects they sell or install in 2012 for which they will apply for incentives, a majority thought that they would apply for the incentives for a substantial share of the projects they completed. Specifically, 18 respondents said that they would apply for incentives for most or all of the projects they completed. Another 13 allies gave a more qualified statement; that they would apply for all projects that were applicable to the incentive programs. However, 22 respondents said that they would apply for incentives on few (i.e., between 0% and 20%) of their projects in the current year. Most of the remaining respondents fell somewhere in the middle and said that they would apply for incentives for between 20% and 80% of their 2012 projects, though a few respondents said the number of incentive projects they do will depend on what the incentives are this next year.

Trade allies gave a variety of reasons for why they would not apply for incentives. The most frequently given reason for not applying for incentives (mentioned by 28 respondents) was that some projects they will do are not covered by the programs. These projects may not be covered by the programs because they are out of the Companies' service area or because they do other kinds of electrical work not covered by the rebate (e.g., fire alarm systems). Some examples of these types of comments are:

*"I would say most of the projects we do in your territory would apply for an incentive. The only ones that would not apply would be because the customer is interested in more light more than energy savings."*

*"We do other projects that do not involve lighting."*



*“Our company deals with all types of installs and some might not require that program.”*

A number of trade allies said they would not apply for incentives because of problems with the incentive programs or how they were administered. Twenty respondents said the rebates were not high enough for customers, and seven respondents thought the incentives were too low to justify the effort involved in applying for them. The long processing time was another reason eleven allies gave for not applying for the incentive. Another six respondents said that they would not apply for the incentives because they were frustrated with the programs and four said they thought the programs had ended or run out of money. Two respondents stated uncertainty over what the incentives would be once the project was complete as a reason for not applying for them. Some comments related to these issues were:

*“The reduction in project incentive will not allow the customer to reach the ROI or payback they require.”*

*“Unknowns, like whether or not the "Pre-Approved" rebate amounts will be available.”*

*“Can't wait for pre-approval, incentive amount isn't worth waiting for.”*

*“See all the comments above. Very, very displeased with this program. I'm owed approximately \$350K in rebates that I haven't been paid for yet!”*

### B.6.3 Marketing and Customer Awareness

Trade allies were asked about the marketing of the C/I Equipment Programs and customers' level of awareness of it. The results are shown in Table B-51.

*Table B-51 Trade Ally's Views of Program Marketing and Customer Awareness*

Question	Percentage of Respondents Saying Yes	
	Percent of Respondents	Percent of Ex Post kWh Savings
Are there ways in which [EDC] could market the business incentive programs more effectively? (n=95)	57%	73%
Do you actively market [EDC]'s business incentive programs to your customers? (n=95)	77%	89%
Do you find that customers are generally aware of [EDC]'s business incentive programs? (n=73)	30%	36%

Fifty-seven percent of the respondents thought that the Companies could market the programs more effectively. Of the trade allies who thought that the utilities could market

the programs more effectively, a majority suggested that improvements to the programs would help market it. Sixteen trade allies made suggestions related to keeping the programs consistent or improving program transparency, such as keeping the incentives consistent or providing more information on timeframes and the processing of applications. A number of respondents suggested increasing involvement with trade allies, improving communications with them, or helping them market the programs. Some specific comments made were:

*“Provide training for the electrical professional with a stable program that can be marketed, currently it seems to change weekly.”*

*“Better communication with trade allies that are marketing the program naturally.”*

*“Closer working relationship with trade allies...help us help you.”*

Other suggestions made by trade allies were to process applications faster, increase the incentives or provide bonus incentives for specific types of projects, and keep the website current.

Nine trade allies suggested some marketing channels or methods that could be used to promote the programs. Specifically, allies suggested the use of mailings, literature that explains the programs, email, billboards, television advertisements, and newspaper advertisements. Additionally, one trade ally suggested using case studies to market the programs, another suggested targeting the most commonly used systems in commercial buildings and explain energy savings of energy efficient equipment, and a third suggested providing more information to small and medium sized customers.

Seventy-seven percent of trade allies said they marketed the incentive programs to their customers, although seven of these trade allies stated that they stopped marketing the programs because of the incentive level change or because of the slow processing of the applications. The trade allies that marketed the programs did so in a variety of ways. Twenty-seven trade allies said that they discussed the programs with customers or made presentations about the programs. Another approach, mentioned by 12 allies, was marketing the programs through fliers, brochures, or mailings. Other trade allies stated that they marketed the programs by email or a website. Eleven allies also noted that they marketed the programs via word of mouth or that new customers were referred to them.

Some trade allies described the content of their marketing approaches. Most of these focused on explaining the savings associated with participating in the programs. Seven of the trade allies said that they explained how much of an incentive customers would get and seven said they talked about the energy savings involved or performed energy audits. Two trade allies mentioned that their approach was to point out specific equipment at a facility that could be replaced under the programs.

One ally discussed a particularly aggressive approach to marketing the programs that involved the development of a marketing campaign. The marketing campaign involved hiring a company to find a pool of potential customers based on certain characteristics, sending the customers letters explaining the programs, and following up on the letters. By the trade allies account the campaign was very successful, a statement that is supported by the large amount of expected savings associated with applications submitted by the ally.

Trade allies that marketed the programs were asked whether their customers were generally aware of the programs or if it was more frequently something they brought to their attention. Only about a third thought that customers were generally aware of the programs. The low level of awareness suggests that not knowing about the programs is a potential barrier to increased participation.

#### B.6.4 Trade Ally Views on Program Incentives

Trade allies were asked about their perspectives on the impact of the incentives on customers' decision making. Responses are shown in Table B-52. Given the large majority of trade allies that thought that the incentives helped them sell their services or equipment, it is surprising that a minority (34%) of them thought the incentive levels were adequate to encourage customers to select energy efficient equipment options. One possible explanation for this difference is that trade allies may have had the old incentive levels in mind when asked about the effect on their businesses but had the new incentive levels in mind when asked about their adequacy for encouraging customers to select energy efficient equipment options.

It is likely that the views of trade allies' who thought the incentives were inadequate were shaped by comparing the current incentive levels with the original higher incentive levels. Undoubtedly, the lower incentive levels have made it more difficult for allies to sell customers on energy efficiency projects. Throughout the survey, however, some trade allies commented that the original incentives were too high. They noted that the high incentive levels led to a number of negative effects such as the wasteful use of the incentive funds (i.e., changing the lighting in a vacant building) or that they brought in unscrupulous or incompetent contractors that charged excessive markups, installed cheap equipment, or only changed part of the equipment in a building. Thus, although trade allies have been unhappy with the change in incentive levels, several recognized that the original levels were too high.

*Table B-52 Trade Allies Perspective on Incentive Levels*

Question	Percentage of Respondents Saying Yes	
	Percent of Respondents	Percent of Ex Post kWh Savings
Are the incentive levels adequate to encourage customers to select energy efficient equipment options?	34%	21%

Are there specific technologies or measures for which incentives should be higher?	55%	34%
Are there any energy efficient technologies or measures that customers would generally install even without the incentive?	53%	55%

Trade allies were also asked if there were specific technologies or measures for which the incentives should be higher. About half of the trade allies thought that there were and they gave a variety of suggestions. Most frequently, respondents thought that LEDs should have higher incentives. Higher incentives for exterior lighting were also mentioned by multiple trade allies (these comments may have been influenced by the change in exterior lighting incentives that occurred in January 2012). Several other types of equipment or applications of equipment that were mentioned were:

- High bay fixtures;
- Exterior fluorescents;
- T5 fluorescents;
- T12 to T8 fluorescent conversions;
- Replacing fluorescent troffers;
- Induction lighting;
- Metal halide;
- Sensors/controls;
- Motors;
- HVAC;
- Heat pumps;
- Drives;
- Chillers/refrigeration equipment;
- Office lighting; and
- Screw and pin-based CFL lamps and fixture replacements.

Some trade allies stated that they thought that the incentives should be increased in general rather than for a specific type of technology or equipment.

In some of their responses, trade allies stated or implied a rationale for why certain types of equipment should be higher. The most frequently mentioned explanation was that incentives should be higher for more expensive equipment. This explanation was often mentioned in regard to higher incentives for LEDs, but it was also used to justify higher incentives for other types of equipment (e.g., motors and drives). Other explanations were that incentives should be higher for equipment that saves more

energy or that they should be higher for mandated equipment changes (i.e., regulations eliminating T12 fluorescent).

A few trade allies thought that the incentive levels should be differentiated on the basis of the business. Two allies suggested that the programs should be targeted towards specific industries (e.g., higher levels for schools or government) and one ally thought that businesses with financial difficulties should be eligible for higher incentives.

Approximately half of the trade allies thought that there was equipment that customers would install without the incentives while the remaining allies were evenly split between thinking there wasn't any such equipment and not knowing. Among those allies that thought there was equipment that customers would install without incentives, several said that customers would be willing to install specific types of higher efficiency lighting. For example, allies mentioned that customers would replace metal halide, high pressure sodium lamps, or T12 fluorescent lighting with T8 or T5 fluorescent lighting. A few allies mentioned other types of equipment like HVAC, sensors, or LED exit signs. Several allies gave their reasoning as to when customers would install equipment without an incentive. Ten trade allies stated that customers would replace equipment when the savings from the new equipment justified the cost. Six stated that customers would install energy efficient equipment for maintenance purposes such as replacing broken equipment and five said customers would replace equipment in response to regulation changes, namely, replacing T12 fluorescents. Additionally, five trade allies thought that customers with sufficient financial resources or those more knowledgeable about energy efficient equipment would be willing to implement it.

#### B.6.5 Trends in Customer's Equipment Choices

Trade allies were asked whether or not they had noticed any recent trends in equipment choices made by customers and about half said they had. The most frequently mentioned trend was interest in LEDs. However, several allies noted that the higher cost of LEDs and the rapid change in the technology remain barriers to implementing it. For example, one ally said:

*"More and more are wanting to go with LED lighting until they find out that either technology not quit there for what they want to do or it is too costly."*

A number of allies noted that customers are interested in fluorescent lighting. As one ally noted,

*"They are replacing metal halide high bays with T5 high bays due to efficiency as well as the instant start on the T5's as opposed to the delay in the restrike for the metal halide."*

Other equipment trends noted were installing induction lighting, anti-sweat controls, motors and drives and HVAC units.

In addition to noting trends in specific types of equipment, some allies offered more general observations such as customers are showing more interest in energy efficient equipment or that they tend to do what the contractor recommends.

### B.6.6 Overall Satisfaction

Overall, trade allies' level of satisfaction with the programs was somewhat low. Table B-53 displays the level of satisfaction for trade allies based on how active they were in the incentive programs. Roughly one third of trade allies were either satisfied or very satisfied with their experience in working with the programs, while about half were dissatisfied or very dissatisfied with the programs. Satisfaction with the programs was similar across levels of program activity.

*Table B-53 Trade Ally Satisfaction by Level of Program Activity*

	<i>Very Satisfied</i>	<i>Satisfied</i>	<i>Neither Satisfied nor Dissatisfied</i>	<i>Dissatisfied</i>	<i>Very Dissatisfied</i>
Most Active Trade Allies (n=31)	6%	26%	13%	29%	26%
Moderately Active Trade Allies (n=32)	9%	22%	16%	34%	19%
Least Active Trade Allies (n=31)	0%	29%	23%	23%	26%
All Trade Allies (n=95)	5%	26%	17%	28%	23%

\* Trade Ally activity was based on the savings associated with applications submitted. Specifically, the savings associated with each activity level were: most active trade allies (>1,198,040 kWh), moderately active trade allies (343,683-1,198,040 kWh), and least active trade allies (<343,683 kWh).

The most commonly given reasons for dissatisfaction with the programs were the long application processing times and the change in the incentive levels, which a few trade allies said led to lost business. Some allies referred to hassles in applying for incentives including information that they submitted that was lost as a reason for dissatisfaction.

Given the level of dissatisfaction with the programs expressed by trade allies and their importance in getting businesses to participate in the programs, it is important to assess whether or not this dissatisfaction has led to disengagement from the programs. To assess this, responses of satisfied and dissatisfied trade allies to questions about their marketing of the programs and their expected level of activity in the programs were compared. The results are shown

Table B-54. Although the share that said they actively marketed the program was similar between satisfied and dissatisfied trade allies, a smaller share of dissatisfied trade allies said they expect to be as active as or more active in the programs than was the case among satisfied trade allies. However, nearly half of dissatisfied trade allies thought they would be as active or more active in the programs during the next year.

*Table B-54 Satisfied and Dissatisfied Trade Allies' Engagement in the C/I Equipment Programs*

	<i>Among those Satisfied with Programs (n=30)</i>	<i>Among those Dissatisfied with Programs (n=48)</i>
Do you actively market [EDC]'s business incentive programs to your customers?	77%	71%
Expects to be as active or more active in the business incentive programs during the next year	73%	45%

\* Satisfied trade allies were those who said they were either satisfied or very satisfied with the programs. Dissatisfied trade allies were those who said they were either dissatisfied or very dissatisfied with the programs.

Several dissatisfied trade allies made comments relating to their disengagement from the incentive programs. The reasons given for their lack of interest in working with the programs were that the lower incentives were uncertainty in what the incentives will be, that the incentives are not worth time spent promoting them or completing applications, or because of general frustration with the programs. Some comments related to these themes are:

*"Past experience throughout the incentive program shows it is a large risk, and could be costly in man-hours. We have multiple customers who do not ask us to try for any additional incentives outside of the lighting, for similar reasons."*

*"Can't wait for pre-approval, incentive amount isn't worth waiting for."*

*"We did use this as a tool to go after new customers but we have since stopped due to the extremely long wait times for rebates to be approved."*

Although some trade allies are likely to remain disengaged with the programs, comments such as these suggest that trade allies willingness to participate in and promote the programs may increase if steps are taken to improve the credibility and efficiency of the programs. In particular, quicker processing of applications and improving the consistency of the incentive levels may help to encourage allies to reengage with it.

#### B.6.7 Trade Ally Recommendations for the Programs

When asked to elaborate on their overall impression of the programs, several trade allies provided suggestions as to how they would improve the programs. Many of these suggestions focused on issues already discussed such as improve application processing times, improve communications about the status of applications and changes being made to the programs, and increase the rebate amount. However, a few trade allies did make some additional recommendations about the types of equipment covered by the programs. Allies made suggestions such as taking steps to insure the quality of the products covered by the programs, and including additional technologies. Some comments related to the additional technologies:



*“We sell and install a product which improves the power factor on large industrial motors but it isn't included in the incentive program.”*

*“Changes in the lighting industry are evolving at a very fast rate. I belong to IESNA and we were presented a video showing plasma lighting that will, when it is marketed will help in lowering the costs of LED's. I also feel that Ohio Edison should look at all the sources available and give higher incentives for quality products rather than some of the products that I have seen on the market that do not perform as well as the Philips, Sylvania and GE products that are out there. I feel that there should be higher incentives for products that are US made. I have at least 50% of my customers that inquire as to where the product is made and the majority, if they have a choice, opt for the US product.”*

*“I would like to see more prescriptive for LED, induction and cooler door lights and controllers.”*

A couple of trade allies thought that the 90 days to complete a project was too short of a time frame. As one ally put it:

*“The major problem I had was with the 90 day time frame. We lost some nice jobs because the time factor ran out and some corporations take so much time with internal approval process. During these busy times equipment takes between 30 to 60 days to receive. Scheduling installers also takes some time. Between all of these challenges the 90 day time limit is not enough.”*

Another suggestion made was to give higher incentives to small businesses that are struggling financially.

#### B.6.8 Summary of Trade Ally Interview Findings

The interviews and surveys of trade allies help inform an understanding of how well the C/I Equipment Programs are operating from the trade ally perspective, how successful the programs has been at establishing a network of trade allies who will promote the programs, the adequacy of the incentives, and how successful the programs have been at increasing knowledge about energy efficiency options.

Trade allies' expressed some concerns about how the programs have operated. One of the most frequently mentioned concerns was the application processing time. Several trade allies expressed frustration at how long it has taken for applications to receive preapproval and final approval. However, a few trade allies noted that it seemed that the processing times were getting shorter with more recent application submissions.

Another concern about program operations raised by trade allies was perceived problems in communications. One of the most frequently mentioned communication shortfalls concerned the status of submitted applications. SAIC has recently implemented an online “self status check” which will hopefully alleviate this concern. However, other trade allies relayed concerns about not having emails and phone calls



returned or a lack of clarity about communications about problems with communications. It is important that these issues are addressed in order to ensure trade allies satisfaction and continued active participation in the programs.

Another operational issue raised by trade allies was that supporting documentation was lost or that they received multiple requests for information that seemed unnecessary. Some of these issues may have arisen from the large volume of applications submitted under the higher incentive levels.

Trade allies are a key partner in the promotion of energy efficiency measures for commercial and industrial customers. Consequently, an important outcome of the incentive programs is the development of a network of trade allies who will promote the incentives and encourage customers to install energy efficient equipment. The incentive change and the slow processing of applications have hindered the development of a network of trade allies willing to promote the incentives. Some trade allies said they expected that they would not apply for incentives in the coming year on some projects because of problems with the programs. Additionally, there was a fairly high level of dissatisfaction among trade allies. However, while there has been some level of disengagement among trade allies, the majority are still interested in promoting the programs and expect to be as or more active in the following year. Continued stable operation of the programs should help foster improved satisfaction and greater engagement going forward.

Trade allies expressed mixed views about the adequacy of the current incentive levels. On the one hand, most trade allies thought that the incentives helped them sell their services or products. On the other hand, more than half thought the incentives should be higher in general or for specific equipment and a minority thought the levels were adequate to encourage customers to select more energy efficient options. It is likely that these perceptions of inadequacy were shaped by comparisons to the considerably higher original incentive levels. Several trade allies stated that the original incentives would cover all or nearly all of a project, while the new incentives cover a much smaller share and make it harder to sell their services and equipment to prospective customers. That contrast makes the incentives appear to be unusually low to trade allies and potential participants even though they are similar to the incentive levels provided under other commercial and industrial energy efficiency programs.

Another outcome of the incentive programs that the trade ally interviews inform is the success of the programs in increasing awareness and knowledge about energy efficient equipment options and the incentive programs. There were some indications that the programs have achieved this to at least a limited extent. Specifically, some trade allies mentioned that their participation in the programs increased their understanding of energy efficient equipment or led to increases in the energy efficient equipment they supplied. Additionally, about a third of trade allies said their customers were generally aware of the programs and some allies mentioned that they had customers who were referred to them or that they market the programs via word of mouth. These findings

suggest that knowledge of the programs and energy efficient equipment options is growing in the commercial and industrial market.

## B.7 Program Operations Perspective

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This section summarizes the core findings of interviews conducted with program staff of the Companies and SAIC for the purposes of developing market environment and internal program management perspectives.

In order to gain insight into the C/I Equipment Programs' operation and delivery, interviews were conducted with key members of the utility and implementer program staff. These interviews focused on the overall effectiveness of the program process and the identification of areas for future program improvement.

Respondents shared their perspective on the program launch and how it has taken shape during its first year of implementation. Interview questions related the respondents' individual roles in administering the programs as well as their perceptions of overall program strengths, weaknesses, and opportunities for the future.

### B.7.1 Summary of Interview Findings

Key trends and issues addressed by respondents include:

- **Overwhelming Initial Response:** All respondents from both utility and implementer perspectives indicated that a significant challenge to the programs was the very large number of applications that were submitted once the programs launched. Two factors were involved in the high level of response. First, the initial incentive levels were set at a high rate of \$0.80 per kW saved to attract attention to the programs. Second, there was a delay of approximately one year in the program launch after the program filing had been submitted to the Public Utilities Commission of Ohio. During this period, several trade allies were actively marketing the programs and essentially placing customers in a queue for participation. Consequently, when the programs became available there were already hundreds of applications to be submitted.

The effect of the high level of response was that the capacity to process applications was overwhelmed. SAIC staff was unable to meet the high level of demand and long delays in approving applications began to accrue. Soon, the budgets set for the program year were at risk of being overspent and the approval of applications was frozen until a strategy could be devised to handle the demand for the programs. At the end of September 2011, it was announced that the programs would continue but the incentive levels would decrease to \$0.05 per annual kWh saved. This change did not affect applications that had been preapproved but did impact others that were submitted under the higher rate but not yet preapproved. Unsurprisingly, program applicants, and trade allies in particular, were disappointed and upset by this chain of events. Furthermore,

respondents noted that the level of program activity has declined since the change in the incentive levels.

- **Steps Taken to Improve Process:** Respondents from SAIC reported that efforts were made during the first year of program operation to improve processing capacity and other issues. One of these was to increase the automation of application processing to expedite the initial screening and acceptance of applications. A second change that was implemented by SAIC was to include an online “Self Status Check.” The Self Status Check is essentially an internet portal where applicants can log in to check the status of their applications, determine if any documentation is missing, and submit any missing documentation. The Self Status Check should alleviate concerns raised by trade allies and participants about not knowing the status of applications. Additionally, it frees up SAIC resources to address more productive program tasks.
- **Long Application Times Remain a Concern:** Customers, trade allies, and Company staff raised concerns about the length of time required to receive incentive checks. Although processing times have improved since program launch, additional steps may need to be taken. Of particular concern is the time required for customers to receive the incentive payment after the project has been approved. The Companies and SAIC have taken steps to reduce the required length of time but the application states that payment can take up to 90 days for approval.
- **Effective Communication and Coordination:** While neither the Companies nor SAIC found the working relationships between the parties to be extremely problematic, both sides suggested that there was room for improvement. Concerns were raised about a lack of transparency, understanding the perspective of the other party, and the relaying of information in a timely fashion. Undoubtedly, the overwhelming response to the programs at launch and the process of managing that response placed strain on both parties that likely reduced their capacity to effectively communicate and coordinate with one another. As such, these issues are likely to continue to subside somewhat on their own. Furthermore, both parties will likely continue to adapt to working with one another and this will facilitate effective program management.
- **Future of the Programs:** Although the initial response was overwhelming, the upside is that the programs are well on track to meeting their goals for this program cycle and have done so with relatively little marketing effort. Furthermore, any savings over their goal for 2012 will count towards the first year of the next program cycle. However, meeting savings targets beyond 2013 may be more difficult. Both the Companies and SAIC recognize that the rocky program launch has damaged the credibility of the programs in the eyes of the trade allies and are aware that steps need to be taken to repair that damage.

Furthermore, since the programs have not been heavily promoted since the incentive levels changed in September 2011, respondents felt that there is a need to rebuild some momentum and excitement about the programs going forward. Respondents stated that they are developing strategies and plans to ensure the success of the next program cycle. These strategies include seeking greater flexibility to adjust incentive levels in response to market needs.

## B.8 Market Evaluation

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This section presents the results of the market evaluation for the C/I Equipment Programs.

### B.8.1 Introduction

The market evaluation focuses on the effectiveness of the C/I Equipment Programs in terms of market penetration and evaluates the distribution of program activity across business sectors. This analysis demonstrates in which sectors the programs are performing most effectively, in terms of the level of program activity relative to the total available market and identifies potential opportunities and areas of improvement.

The market evaluation section begins with a discussion of the general distribution of firms across business sectors in the FirstEnergy Ohio service territory, and then continues with an analysis of how these sectors are currently being served by the incentive programs. The market evaluation continues by comparing business sector-level participation with specific categories of energy efficiency projects to provide a more detailed comparison of sector-level opportunities. Finally, the section concludes with an examination of market segments that the programs may be able to further engage in the future.

### B.8.2 Market Segmentation

The Companies' business customers are distributed across a wide array of business types that adopt different decision making approaches with regard to energy efficiency. The most effective way to analyze and account for various customer attitudes is to disaggregate the data into segments that each share aspects of their preferences, purchasing decisions, and needs. In terms of energy efficiency measures, some customer needs are based upon their facility type (i.e. warehouse lighting vs. office lighting), and other needs arise from the business type (i.e. agricultural well motors vs. hotel elevator motors). Customers with similar facility and business types will often be eligible candidates for similar measures, and may have some of the same decision-making behavior. Therefore, these forms of segmentation can be used to analyze past participant data, identifying tendencies in participation behavior and project outcomes.

While the process evaluation includes a report of customer attitudes and decision-making procedures, this section examines currently available data to characterize the participating business and facility types in the context of the business market as a

whole. Though conclusions based on a single program year will be limited due to sample size, historical program data will become more robust over time and can assist in estimating market response to program measures in future years.

This section is intended to provide information that may be used to support market segmentation considerations during future program years.

### B.8.3 Business Sector Distribution

The Companies' service territory covers many cities with varying levels of commercial activity. By referencing NAICS codes within U.S. Census Bureau County Business Patterns data, it is possible to break down the market by business sector.<sup>6</sup> Customer counts by their respective rate class (i.e., large or small) are shown in Table B-55. In order to represent the total potential market, this FirstEnergy Ohio customer pool will be weighted based on statewide business sector totals from County Business Patterns data.

*Table B-55 Commercial and Industrial Customers by Operating Company and Rate Class*

<i>Operating Company and Customer Size</i>	<i>Number of Premises</i>
CEI	79,766
Large	709
Small	79,057
OE	114,915
Large	1,499
Small	113,416
TE	34,140
Large	479
Small	33,661
Total	228,821

Table B-56 displays the total market in the business sectors that have at least one participant in the programs during the 2011 Program Year. These sectors are the major contributors to the market and offer substantial energy savings opportunities. The population of the Companies' customers was distributed across NAICS based on weights taken from census data of counties served by the Companies' operating companies.

<sup>6</sup> Industry data are taken from *2009 County Business Patterns*, the most recent year available at the time of this report. See <http://www.census.gov/econ/cbp/download/index.htm>.

*Table B-56 Total Available Market*

<i>NAICS Category</i>	<i>Percent of Total</i>	<i>Customer Count</i>
Retail Trade	14%	32,185
Other Services (except Public Administration)	11%	24,622
Health Care and Social Assistance	11%	24,229
Professional, Scientific, and Technical Services	10%	22,357
Accommodation and Food Services	9%	20,695
Construction	8%	19,216
Finance and Insurance	7%	16,276
Manufacturing	7%	14,972
Wholesale Trade	6%	14,112
Administrative and Support and Waste Management and Remediation Services	6%	12,690
Real Estate and Rental and Leasing	4%	8,611
Transportation and Warehousing	3%	6,231
Arts, Entertainment, and Recreation	2%	3,555
Information	1%	3,261
Educational Services	1%	2,715
Management of Companies and Enterprises	0.8%	1,874
Utilities	0.2%	456
Agriculture, Forestry, Fishing and Hunting	0.1%	179

NAICS codes include several sublevels of firm classifications within each of the higher level business sectors. For example, the healthcare and social assistance sector includes hospitals, medical laboratories, and therapy firms, while the accommodation and food services sector includes hotels and restaurants. In order to obtain a better understanding of the available market, it is useful to outline the major business sectors in the Companies' service territory. This may facilitate targeting the largest groups of firms similar in building type and potential prospective energy efficiency project implementations.

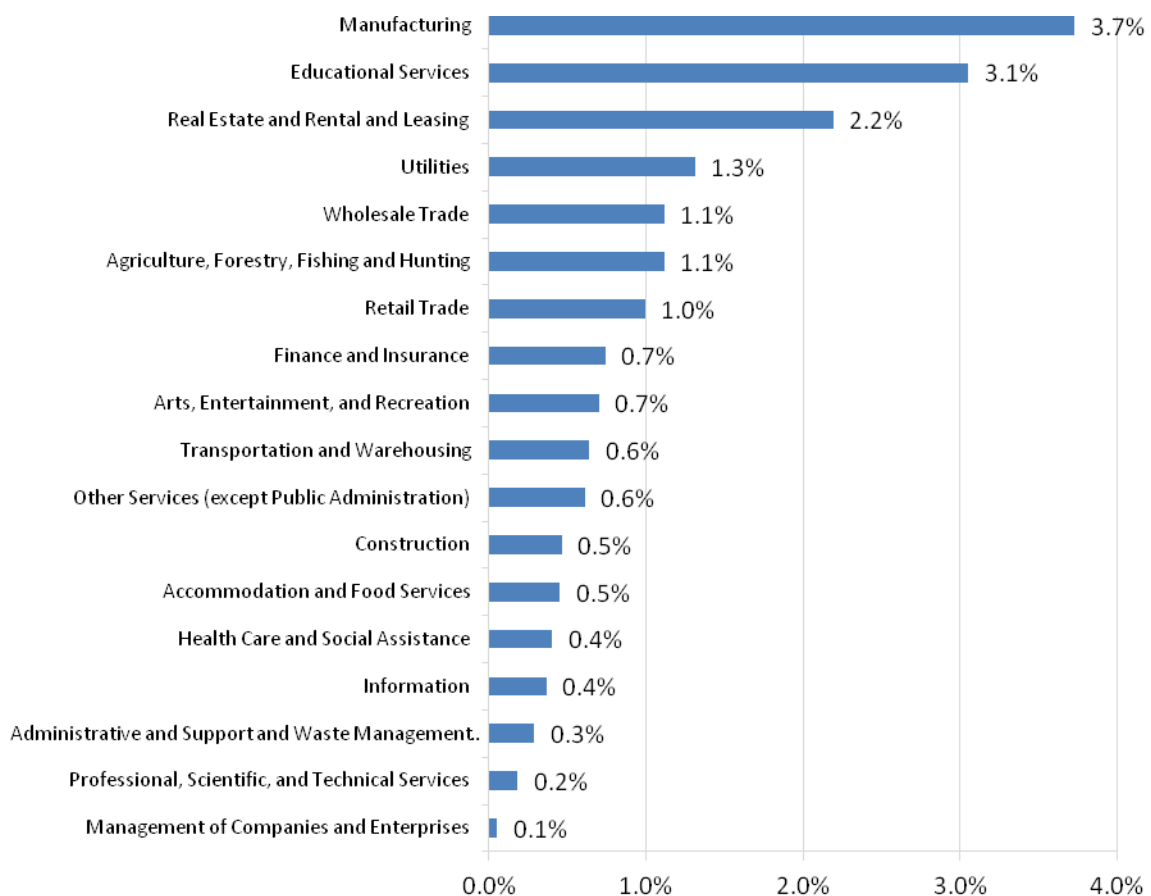
The businesses that make up the largest shares of the retail trade sector are food and beverage stores, clothing and clothing accessories stores, and motor vehicle and parts dealers. The health care and social assistance sector is largely represented by ambulatory health care services such as offices of physicians and dentists and by social assistance organizations such as those that provide child day care services or individual and family services. A diverse group of business types comprise the other services sector. These businesses include religious organizations, automotive repair and maintenance firms, and personal and laundry services firms. Legal services; accounting, tax preparation, bookkeeping, and payroll services; and management, scientific, and technical consulting services make up a sizable portion of the professional, scientific, and technical services sector.

#### B.8.4 Market Saturation

To assess how effectively the C/I Equipment Programs are at reaching various facility types and business sectors, it is important to assess program participation compared to the total available market. Figure B-9 shows the saturation rate for each business sector that had at least one participant in the C/I Equipment Programs. The percentages are based on the total number of unique premise numbers that completed at least one incentive project. Because the County Business Patterns data are not available for the public administration sector, these projects and account numbers are not included in the figure.

As the C/I Equipment Programs do not directly compete with other similar programs for the same target markets, there is not a specific level of saturation that would indicate market leadership. Therefore, this evaluation focuses on relative saturation levels and identification of potential opportunities for prospective program activity. This may allow for specific areas of improvement to be identified and acted upon in order to make program improvements.





Based on 2,159 premises and a customer population of 228,821

*Figure B-9 Market Saturation based on Total Number of Premises*

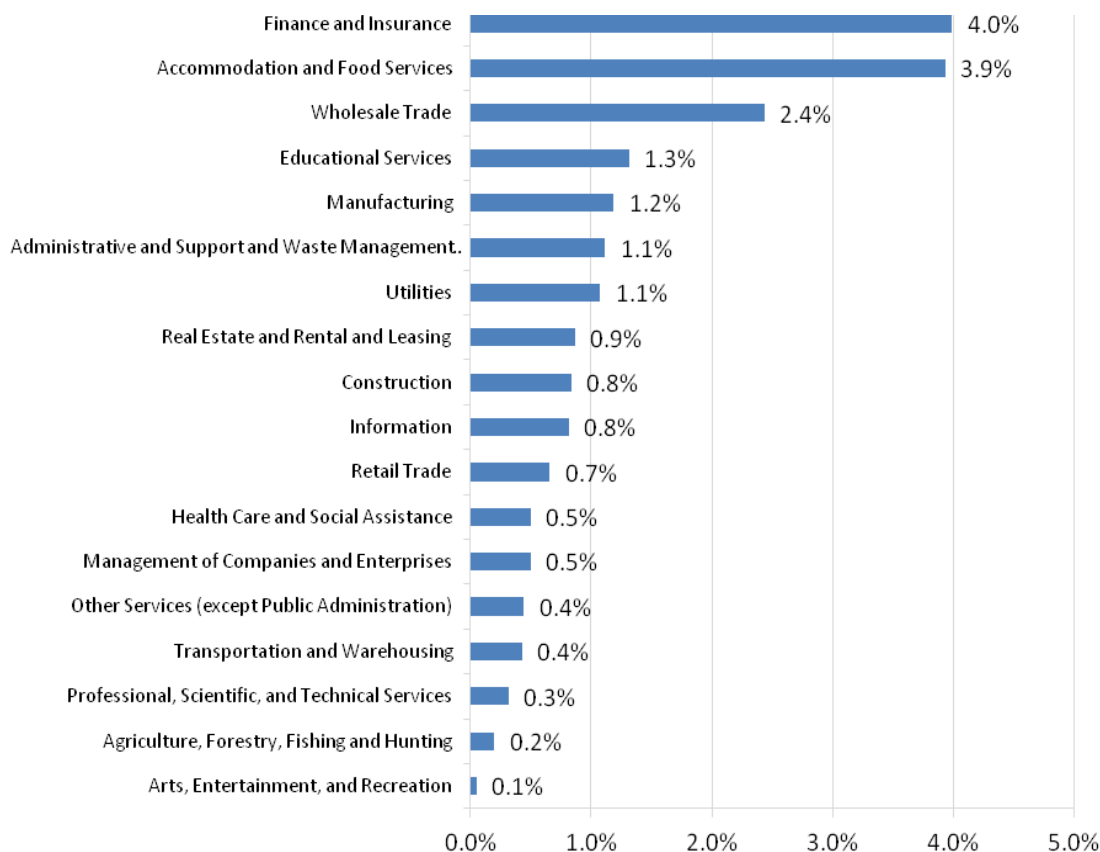
The highest saturation is in the manufacturing sector with nearly 3.7% saturation, followed by the educational services sector with 3.1% saturation. Real estate also saw relatively high levels of saturation.

One sector with low program representation is professional, scientific, and technical services, with approximately 0.2% saturation. This sector also represents a large share of the market in the Companies' territory (10%). Among other business types, this sector includes small business offices offering legal, consulting, or advertising services. As many of the firms in this sector are located in rental spaces of office buildings, they may not be the decision makers for their firms. In rental units the building owner is often the person who would decide whether to participate in an energy efficiency retrofit. Based on the saturation data, there are likely a large number of office parks and business centers that have decision makers who would be responsible for retrofitting several businesses at a time; these may offer significant potential for future program years. Another business sector with many remaining nonparticipants is healthcare and social assistance. At 11% of the available market and a saturation rate of 0.4%, health



care and social assistance also represents a large share of the businesses in the Companies’ service territory with relatively low market saturation. This sector includes both large healthcare facilities and many smaller businesses such as medical clinics.

Figure B-10 presents a similar analysis at the level of individual projects completed. The sector level participation is based on the total number of completed projects for each NAICS classification as compared to the size of the sector firm population. The findings for this analysis are similar to those of the premise level analysis. Again, saturation levels are highest in the manufacturing and educational services sectors.



Based on 2,226 projects and a customer population of 228,821

*Figure B-10 Market Saturation based on Total Number of Projects*

Table B-57 displays the saturation rate for FirstEnergy Ohio’s large and small rate-class customers. Although they accounted for many fewer total projects, the rate of program participation has been much greater among large enterprise customers than among small enterprise customers.

*Table B-57 Market Saturation by Customer Size*

	<i>Participating Premises</i>	<i>Projects Completed</i>

<i>Customer Size</i>	<i>Number of Premises in Service Territories</i>	<i>Count</i>	<i>Saturation Rate</i>	<i>Count</i>	<i>Saturation Rate</i>
Large	2,687	203	7.6%	222	8.3%
Small	226,134	1,943	0.9%	2,027	0.9%

Manufacturing was the leading sector in terms of total number of projects completed, as shown in Table B-58. Manufacturing firms, which completed 577 projects, are a diverse group of organizations that includes businesses such as metal fabricators, paper mills, printers, and food processors. Manufacturing firms also accounted for a disproportionately large share of the energy savings, reflecting the high level of energy savings achieved at each participating facility. Retail trade firms followed manufacturing in participation with 338 projects completed. Real estate firms also completed a large number of projects. However, the large number of projects complete by real estate firms may also reflect the fact that real estate firms lease space that is used by businesses of other sectors.

*Table B-58 Number of Projects Completed and Share of Energy Savings by Business Sector*

<i>Business Sector</i>	<i>Participant Projects</i>	<i>Percentages of Ex Post kWh Savings</i>
Manufacturing	577	54%
Retail Trade	338	10%
Real Estate and Rental and Leasing	198	6%
Wholesale Trade	160	8%
Other Services (except Public Administration)	157	3%
Finance and Insurance	129	1%
Health Care and Social Assistance	104	3%
Educational Services	95	3%
Accommodation and Food Services	97	2%
Construction	93	2%
Public Administration	59	1%
Transportation and Warehousing	50	3%
Professional, Scientific, and Technical Services	43	1%
Administrative and Support and Waste Mgmt and Remediation Services	38	1%
Arts, Entertainment, and Recreation	28	1%
Information	13	0%
Utilities	6	0%
Agriculture, Forestry, Fishing and Hunting	2	0%
Management of Companies and Enterprises	1	0%
Unknown Business Sector	64	2%
Total	2252	100%

### B.8.5 Business Sectors and Facility Types

Program tracking data categorized program participants by facility type. Participant facility type was analyzed in terms of implemented end uses and was compared with customer NAICS classification. Several of the 2011 Program Year participant facility types are concentrated within a single NAICS business sector. These include education facilities which are classified in the education services sector, and restaurants, which are classified in the accommodation and food services sector. However, some facility types are less concentrated in a single NAICS business sector. In order to illustrate how the relevant business sectors relate to specific building types listed in program tracking data, Table B-59 presents the distribution of facility types across business sector groups for all of the 2011 Program Year participants. This table does not include grocery, restaurants, education, and healthcare facility categories, as these types were heavily concentrated in one business sector.<sup>7</sup>

*Table B-59 Business Sector by Facility Type*

<i>Business Sector</i>	<i>Facility Type</i>					
	<i>Manufacturing / Light Industrial</i>	<i>Warehouse/ Storage</i>	<i>Retail</i>	<i>Office</i>	<i>Lodging</i>	<i>Other</i>
Accommodation and Food Services	0%	0%	0%	1%	83%	50%
Administrative and Support and Waste Management and Remediation Services	2%	3%	1%	2%	0%	0%
Agriculture, Forestry, Fishing and Hunting	0%	0%	0%	0%	0%	0%
Arts, Entertainment, and Recreation	0%	0%	0%	4%	0%	0%
Construction	6%	5%	3%	4%	8%	0%
Educational Services	0%	1%	0%	0%	0%	0%
Finance and Insurance	0%	2%	16%	12%	0%	0%
Health Care and Social Assistance	1%	2%	1%	11%	0%	0%
Information	0%	1%	0%	2%	0%	0%
Management of Companies and Enterprises	0%	0%	0%	0%	0%	0%
Manufacturing	60%	25%	1%	8%	0%	0%
Other Services (except Public Administration)	7%	2%	7%	12%	8%	0%
Professional, Scientific, and Technical Services	1%	2%	0%	5%	0%	0%
Public Administration	1%	4%	0%	6%	0%	0%
Real Estate and Rental and Leasing	3%	19%	4%	15%	0%	50%
Retail Trade	6%	9%	59%	7%	0%	0%
Transportation and Warehousing	1%	6%	0%	3%	0%	0%
Utilities	0%	1%	0%	1%	0%	0%

<sup>7</sup> Restaurant facilities are classified under accommodation and food services, grocery under retail trade, education facilities were classified under educational services, and healthcare facilities were classified under health care and social assistance.

Wholesale Trade	8%	16%	4%	5%	0%	0%
Grand Total	715	386	337	558	12	2

A large portion of facilities categorized as office spaces were in the real estate sector (15%). This is in part due to real estate companies leasing business offices to other firms, with a building manager or owner being responsible for energy efficiency improvements for all of the offices and businesses contained in the building. This trend is true for each of the facility type categories, which causes real estate firms to be represented within most of the participant facility types shown.

More than half of the retail facilities were concentrated in the retail trade sector. Retail facilities were also concentrated in the finance and insurance sector. Lodging facilities were concentrated in the accommodation and food services sector (83%) and manufacturing/light industrial facilities were concentrated in the manufacturing sector (60%). Warehouse and storage facilities were concentrated in the manufacturing (25%), real estate (19%), and wholesale trade (16%) sectors.

It is recommended that in the future, program participants are categorized by NAICS code as well as facility type in order to facilitate analysis of market program penetration.

#### B.8.6 Distribution of Projects by Business Sector

The distribution of projects by equipment type across the business sectors are shown in Table B-60. For each sector, nearly all projects were lighting projects. During the 2011 Program Year, only the accommodation and food services sector implemented an HVAC project. Custom projects were implemented by businesses in the information sector but not by any of the other sectors. Several business sectors including information, educational services and public administration implemented motors projects.

*Table B-60 Distribution of Equipment Types across Business Sectors*

<i>Business Sector</i>	<i>Equipment Type</i>						<i>N</i>
	<i>Custom Lighting</i>	<i>Standard Lighting</i>	<i>HVAC</i>	<i>Custom Project</i>	<i>Motors</i>	<i>Specialty</i>	
Accommodation and Food Services	92%	6%	1%	0%	0%	0%	97
Administrative and Support and Waste Management and Remediation Services	95%	5%	0%	0%	0%	0%	38
Agriculture, Forestry, Fishing and Hunting	100%	0%	0%	0%	0%	0%	2
Arts, Entertainment, and Recreation	75%	25%	0%	0%	0%	0%	28
Construction	59%	41%	0%	0%	0%	0%	93
Educational Services	93%	6%	0%	0%	1%	0%	95
Finance and Insurance	22%	78%	0%	0%	0%	0%	129
Health Care and Social Assistance	85%	14%	0%	0%	1%	0%	104
Information	85%	8%	0%	8%	0%	0%	13
Management of Companies and Enterprises	100%	0%	0%	0%	0%	0%	1
Manufacturing	93%	7%	0%	0%	0%	0%	577

Business Sector	Equipment Type						N
	Custom Lighting	Standard Lighting	HVAC	Custom Project	Motors	Specialty	
Other Services (except Public Administration)	83%	17%	0%	0%	0%	0%	157
Professional, Scientific, and Technical Services	86%	14%	0%	0%	0%	0%	43
Public Administration	86%	12%	0%	0%	2%	0%	59
Real Estate and Rental and Leasing	94%	6%	0%	0%	0%	0%	198
Retail Trade	85%	14%	0%	0%	1%	0%	338
Transportation and Warehousing	90%	10%	0%	0%	0%	0%	50
Utilities	67%	33%	0%	0%	0%	0%	6
Wholesale Trade	93%	7%	0%	0%	0%	0%	160

The distribution of lighting projects across business sectors is shown in Figure B-11. The distribution parallels the distribution of all projects completed because the majority of projects were lighting projects. Manufacturing firms completed the most lighting projects followed by the retail and real estate sectors.

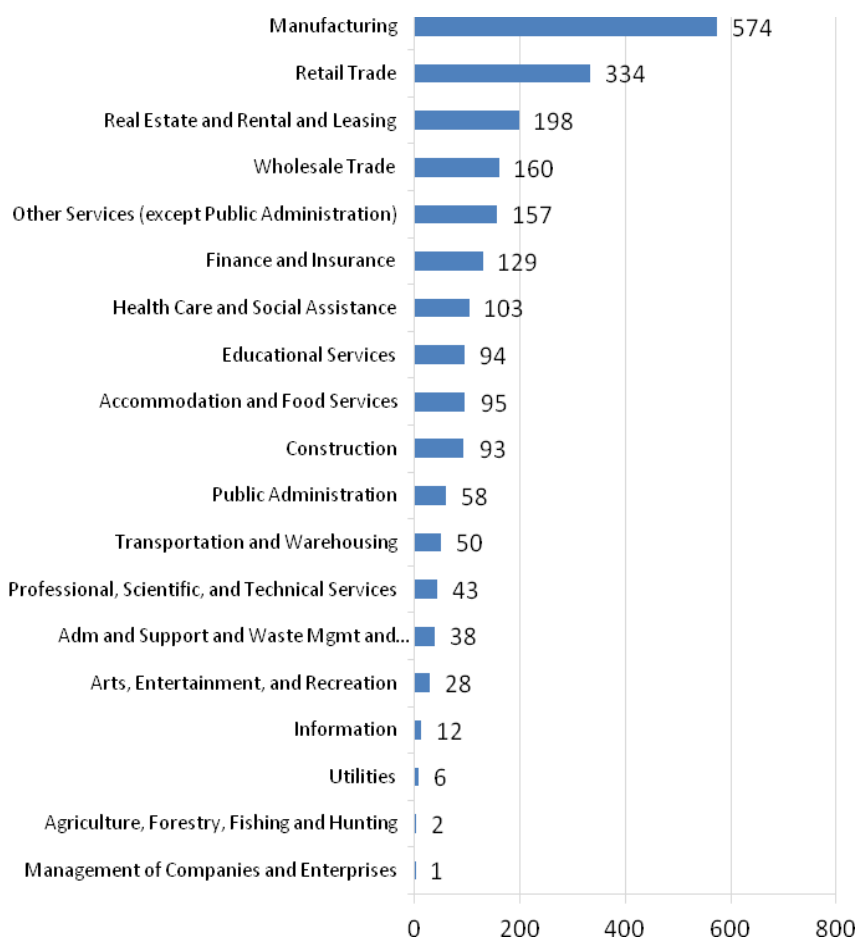


Figure B-11 Distribution of Lighting Projects across Business Sectors

### B.8.7 Distribution of Savings by Business Sector

Projects were classified into groups based on the energy savings associated with them and compared to the business sectors. As show in Table B-61, the manufacturing sector had the projects with the largest energy savings. Nearly half of the projects completed by manufacturing firms were in excess of 100,000 annual kWh. Wholesale trade also had projects with larger energy savings with more than a third in excess of 100,000 kWh. For all other sectors, more than half of the projects were less than 50,000 kWh.

*Table B-61 Projects by Ex Post Energy Savings with Projects by Business Sector*

<i>Business Sector</i>	<i>Ex Post kWh Savings Level</i>					<i>N</i>
	<i>&lt; 50,000</i>	<i>50,001 - 100,000</i>	<i>100,001 - 500,000</i>	<i>500,001 - 1,000,000</i>	<i>&gt; 1,000,000</i>	
Accommodation and Food Services	54%	35%	11%	0%	0%	97
Administrative and Support and Waste Management and Remediation Services	68%	11%	21%	0%	0%	38
Agriculture, Forestry, Fishing and Hunting	100%	0%	0%	0%	0%	2
Arts, Entertainment, and Recreation	61%	18%	21%	0%	0%	28
Construction	81%	9%	11%	0%	0%	93
Educational Services	61%	20%	19%	0%	0%	95
Finance and Insurance	93%	2%	5%	0%	0%	129
Health Care and Social Assistance	69%	14%	14%	0%	2%	104
Information	77%	8%	15%	0%	0%	13
Management of Companies and Enterprises	0%	100%	0%	0%	0%	1
Manufacturing	37%	19%	37%	3%	3%	577
Other Services (except Public Administration)	71%	19%	10%	0%	0%	157
Professional, Scientific, and Technical Services	65%	14%	19%	0%	2%	43
Public Administration	71%	27%	2%	0%	0%	59
Real Estate and Rental and Leasing	60%	24%	14%	2%	0%	198
Retail Trade	57%	25%	17%	1%	0%	338
Transportation and Warehousing	48%	26%	18%	0%	8%	50
Utilities	100%	0%	0%	0%	0%	6
Wholesale Trade	47%	18%	33%	3%	0%	160

The share of energy savings associated with different project types is shown in Table B-62. Nearly all business sectors achieved most of their energy savings through lighting projects. The one exception is the information sector, for which 46% of the energy savings were attributable to custom projects. However, this sector completed relatively few projects and accounted for a small share of the total savings.

*Table B-62 Energy Savings by Equipment Type for Each Business Sector*

Industry Group	Equipment/Project Type				Ex Post kWh Savings
	Custom Lighting	Standard Lighting	Custom Project	Motors	
Accommodation and Food Services	100%	0%	0%	0%	5,335,216
Administrative and Support and Waste Management and Remediation Services	100%	0%	0%	0%	2,496,276
Agriculture, Forestry, Fishing and Hunting	100%	0%	0%	0%	29,318
Arts, Entertainment, and Recreation	96%	4%	0%	0%	1,785,024
Construction	89%	11%	0%	0%	4,043,859
Educational Services	95%	5%	0%	0%	8,030,651
Finance and Insurance	91%	9%	0%	0%	2,448,684
Health Care and Social Assistance	97%	2%	0%	1%	7,400,724
Information	51%	3%	46%	0%	800,457
Management of Companies and Enterprises	100%	0%	0%	0%	64,109
Manufacturing	98%	1%	0%	2%	135,457,141
Other Services (except Public Administration)	96%	4%	0%	0%	7,134,470
Professional, Scientific, and Technical Services	99%	1%	0%	0%	3,428,544
Public Administration	91%	6%	0%	3%	1,874,373
Real Estate and Rental and Leasing	99%	1%	0%	0%	13,915,186
Retail Trade	96%	2%	0%	2%	24,793,253
Transportation and Warehousing	99%	1%	0%	0%	7,116,811
Utilities	85%	15%	0%	0%	125,364
Wholesale Trade	99%	1%	0%	0%	20,656,679

\*The percentage of savings from HVAC and specialty equipment are not shown because they do not round to a full percentage point.

### B.8.8 Trade Ally Distribution

The Companies' C/I Equipment Programs have garnered considerable attention from trade allies during the first program year. Based on comments made during interviews, much of this attention came from the initially high incentive levels.

A clear majority of projects had a trade ally associated with them (91%), accounting for 89% of the total the 2011 Program Year savings. These projects were distributed across 276 trade allies in total. The total amount of savings associated with each trade ally firm varied substantially with half of the annualized kWh savings associated with the top fifteen allies.

Given the level of savings attributable to trade allies during the 2011 Program Year, it is clear that they have been an important factor in promoting participation in the programs. Their importance to the program makes the level of dissatisfaction among trade allies discussed previously is concerning. However, as discussed, many dissatisfied trade allies still appear to be engaged in the programs.

### B.8.9 Barriers to Small Business Program Participation

The market analysis shows that there remains a large pool of commercial customers who have not yet participated in the programs, many of them small businesses. As these customers are made up of a wide range of industry functions and facility types, it can be difficult to successfully target this sector with a single strategy. While a primary barrier to energy efficiency program participation is likely a lack of awareness of program offerings, there are several other barriers that may influence a small business customer's decision making process. The following issues are presented as potential barriers to small business participation, and have been common to other energy efficiency programs.<sup>8</sup>

- **Building Owners with Tenants:** In the case of commercial customers who are leasing buildings or offices, participation in energy efficiency projects may be influenced by whether the decision to make the improvements is made by the building manager or by the tenant itself. Building operators with renting tenants may be inclined to pursue energy saving projects in order to obtain incentives, while tenants may work to reduce monthly utility bills, depending on how the lease is structured. However, building owners sometimes pay a certain fixed amount of the utility bill per month, and charge tenants if their usage rises above the fixed threshold. In this case, the owner would have less of an incentive to implement projects unless they brought energy usage below the fixed threshold, as the tenant is already paying for the marginal cost of high energy usage.<sup>9</sup> It is unclear to what extent this may be a factor for the current program, but it should be noted that many smaller commercial customers typically lease business spaces and may experience this issue.
- **Financial Capabilities:** Although energy efficiency programs are designed to financially assist customers who choose to participate, a difficult economic environment can cause decision makers to refrain from making investments in new technology and processes. Additionally, smaller businesses are often less able to borrow capital for such projects and might only implement measures that are low-cost with high returns. This can be seen from customer survey data, where the majority of customers were concerned with simple payback and indicated that the financial incentive was very influential in their decision to participate.
- **Initial Cost of Non-Lighting Equipment:** For most business sectors, nearly all of the energy savings accrued during the 2011 Program Year was from lighting

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<sup>8</sup> Thollander, P., Palm, J., & Rohdin, P. (2010). Categorizing barriers to energy efficiency: An interdisciplinary perspective. In Energy Efficiency, SCIYO Books.

<sup>9</sup> Golove, H., & Eto, J. (1996). Market barriers to energy efficiency. Energy & Environment Division, University of California, Berkeley, CA.



equipment. This is probably due in to the relatively low initial capital costs of lighting equipment. Despite potentially large savings over the long term, large initial capital requirements can be difficult for small businesses in particular to make. The dissatisfaction expressed about the time required to receive the incentive payment among participants may limit further participation because businesses are unwilling or unable to wait for very long before receiving the incentive payment.

- **Lack of Expertise:** It is important for customers to be presented with program offerings, but it is also important for the customer to have some level of technical understanding of energy efficiency. A high level of in-house energy efficiency expertise can enable a customer to seek out energy efficiency improvements for its entire facility and all qualifying equipment, while a lack of this expertise can prevent customers from understanding which measures would be most useful to them. This is particularly a concern among smaller businesses because few have staff dedicated to energy efficiency, these companies are less likely to have a level of expertise that optimizes their participation in energy efficiency programs.
- **Attitude towards Energy Efficiency:** Customers have a variety of opinions regarding the benefits of energy efficiency, all of which can be highly influential in the decision whether to participate. While some customers are enthusiastic about saving energy and reducing utility costs, other customers are not willing to calculate the financial benefits of becoming more efficient, or believe that energy efficiency is not a responsibility of their company. This can lead to skepticism among customers who may not believe that the utility company intends to benefit them. The strategy of using trade allies to market the programs likely alleviates this problem for some customers, as customer-to-contractor relationships appear to be strong for this customer base. It is likely that as more customers choose to participate in the programs, their competitors will become more interested in the programs and may decide that energy reduction will be an overall benefit to their company.