2021 Indiana Commercial & Industrial Portfolio EM&V Report

Volume I of II

Prepared for:

Indiana Michigan Power

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1. Introduction

Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., (ADM) performed evaluation, measurement, and verification (EM&V) activities that confirmed the energy savings (kWh) and demand reduction (kW) realized through the energy efficiency programs that I&M implemented in Indiana during the during January 2021 through December 2021 (PY2021).

This chapter provides a summary of evaluation findings for the C&I program portfolio and presents information regarding the organization of the report.

1.1. Summary of Data Collection

Table 1-1 summarizes the number of verification sites reviewed for the ex post gross analysis.

Table 1-1 Number of Sampled Projects

Program	*Number of Sampled Projects*
Work Prescriptive	27
Work Custom	20
Public Efficient Streetlighting	Census

Surveys were administered to collect data on the influence of the programs on the decisions to install the efficient equipment, and on program feedback. Table 1-2 summarizes the survey data collection completed for PY2021.

Table 1-2 Summary of Survey Data Collection

Survey Group	*Mode*	*Time Frame*	*Number of Contacts*	*Number of Survey Completions*
Work Custom/ Prescriptive Rebates Participant Survey	Online	November 2021	140	11
Work Custom/ Prescriptive Rebates Participant Survey	Online	January 2022	105	18
Work Custom/ Prescriptive Rebates Participant Survey	Telephone	January 2022	29	4
Non-Residential Non-Participant Survey	Online	January 2022	9,140	193
Non-Residential Non-Participant Survey	Telephone	December 2021	597	6

1.2. Impact Evaluation Findings

The savings variables presented in this evaluation report are defined in Table 1-3.

Table 1-3 Savings-Related Terminology

Variable	*Definition*
kWh Savings Goal	*kWh Savings Goal* is the energy savings goal cited in the applicable portfolio plan.

Variable	*Definition*
Ex Ante Gross kWh Savings	*Ex Ante Gross kWh Savings* are the annual energy savings reported by I&M and are typically obtained from I&M's DSM/EE Program Scorecard documents.
Gross Audited kWh Savings	*Gross Audited kWh Savings* are determined by reviewing tracking data presenting for any errors and adjusting *Ex Ante Gross kWh Savings* accordingly.
Gross Verified kWh Savings	*Gross Verified kWh Savings* are determined by applying an installation rate to the *Gross Audited kWh Savings*.[1] The installation rate is defined as the ratio of units that were installed (verified) to the number of units reported (claimed).
Ex Post Gross kWh Savings	*Ex Post Gross kWh Savings* are the realized annual gross kWh savings reflecting all adjustments made by ADM, without accounting for free ridership or spillover.
Ex Post Net kWh Savings	*Ex Post Net kWh Savings* are equal to *Ex Post Gross kWh Savings*, adjusted to account for free ridership and spillover.
Ex Post Net Lifetime kWh Savings	*Ex Post Net Lifetime kWh Savings* is the *Ex Post Net kWh Savings* occurring over the course of the applicable measure effective useful life (EUL).
Gross Realization Rate	*Gross Realization Rate* is equal to *Ex Post Gross kWh Savings* divided by *Ex Ante Gross kWh Savings*.
Net-to-Gross Ratio	*Net-to-Gross Ratio* is equal to *Ex Post Net kWh Savings* divided by *Ex Post Gross kWh Savings*.
Free Rider[2]	A *free rider* is a program participant who would have implemented the program measure or practice in the absence of the program. Free riders can be: 1) total, in which the participant's activity would have completely replicated the program measure; 2) partial, in which the participant's activity would have partially replicated the program measure; or 3) deferred, in which the participant's activity would have completely replicated the program measure, but at a future time than the program's timeframe. The free ridership estimate are the savings attributable to free riders.

1 Gross Verified energy impacts will be equal to Gross Audited energy impacts for the Work Prescriptive, Work Custom, and Public Efficient Street Lighting as the in-service rate for these programs is 1.0.

2 Northeast Energy Efficiency Partnerships (NEEP) EMV Glossary version 2.1. https://neep.org/media/4330

Variable	*Definition*
Spillover (Participant and Non-Participant)[3]	*Spillover* effects are reductions in energy consumption and/or demand caused by the presence of an energy efficiency program, beyond the program-related gross savings of the participants and without financial or technical assistance from the program. There can be participant and/or non-participant spillover. *Participant spillover* is the additional energy savings that occur when a program participant independently installs energy efficiency measures or applies energy saving practices after having participated in the efficiency program because of the program's influence. *Non-participant* spillover refers to energy savings that occur when a program non-participant installs energy efficiency measures or applies energy savings practices as a result because of a program's influence.

Based on the definitions presented in Table 1-3, Table 1-4 presents a summary of the components of the impact evaluation that are accounted for in savings variables presented in this report.

Table 1-4 Components of Impact Evaluation Accounted for in Savings Variables

Category	*Tracking Data Review*	*In-Service Rates*	*Ex Post Gross Analysis*	*Net-to-Gross Analysis*
Gross Audited	✓			
Gross Verified	✓	✓		
Ex Post Gross	✓	✓	✓	
Ex Post Net	✓	✓	✓	✓

ADM performed EM&V activities for each of the C&I programs offered by I&M during PY2021. Total C&I portfolio ex post gross energy savings are 34,632,550 kWh, while ex post net energy savings are 27,371,363 kWh, as shown in Table 1-5.

Table 1-5 Summary of Energy Savings – PY2021

Program Name	*Ex Ante Annual kWh Savings*	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Annual Gross kWh Savings*	*Gross Realization Rate*	*Ex Post Annual Net kWh Savings*	*Net-to-Gross Ratio*	*Lifetime Net Ex Post kWh Savings*
Work Prescriptive	13,711,058	13,711,058	11,383,352	11,383,352	83%	10,186,497	89%	124,700,249
Work Custom	21,863,722	21,863,722	20,945,913	20,945,913	96%	14,881,581	71%	163,084,754
Public Efficient Street Lighting	2,303,285	2,303,285	2,303,285	2,303,285	100%	2,303,285	100%	43,112,898
C&I Portfolio Totals	37,878,066	37,878,066	34,632,550	34,632,550	91%	27,371,363	79%	330,897,901

Total C&I portfolio ex post gross peak demand savings are 5,249.82 kW, while ex post net peak demand savings are 3,658.42, as shown in Table 1-6.

3 Ibid.

Table 1-6 Summary of Peak Demand Impacts – PY2021

Program Name	*Ex Ante Gross kW Savings*	*Gross Audited kW Savings*	*Gross Verified kW Savings*	*Ex Post Gross kW Savings*	*Gross Realization Rate*	*Ex Post Net kW Savings*	*Net-to-Gross Ratio*
Work Prescriptive	1,418.63	1,418.63	1,787.37	1,787.37	126%	1,526.95	85%
Work Custom	3,000.75	3,000.75	3,462.45	3,462.45	115%	2,131.46	62%
Public Efficient Street Lighting	-	-	-	-		-	
C&I Portfolio Totals	4,419.38	4,419.38	5,249.82	5,249.82	119%	3,658.42	70%

1.3. Cost Effectiveness Evaluation Findings

ADM performed the following cost effectiveness tests for the programs: Total Resource Cost (TRC) test, Utility Cost Test, Participant Cost Test (PCT), and Ratepayer Impact Measure (RIM) test. A test score above one signifies that, from the perspective of the test, the program benefits were greater than the program costs. Table 1-7 shows the test results for each program.

Table 1-7 Summary of PY2021 Benefit-Cost Ratios

Program	*Program Administrator Cost Test (aka USCRT, or UCT)*	*Total Resource Cost Test*	*Ratepayer Impact Measure*	*Participant Cost Test*
Work Prescriptive	1.62	1.12	0.29	4.46
Work Custom	1.29	1.41	0.29	8.84
Public Efficient Streetlighting	3.78	1.05	0.30	2.42
C&I Portfolio Total	1.51	1.24	0.29	5.39

1.4. Evaluation Findings and Recommendations

1.4.1. Work Custom and Prescriptive

Based on the results of the analysis, ADM identified several key conclusions and recommendations I&M could consider as they implement their efficiency programs for commercial and industrial customers.

The program appears to be noticeably influencing the market. The program has a net-to-gross ratio of 90% for the Work Prescriptive kWh savings, indicating that the program is affecting customer decisions. The net-to-gross ratio was lower for the Work Custom Program, but this may reflect idiosyncratic differences in who participated in the program in 2021 as custom program net-to-gross ratios can be variable.

There are few contractors specializing in non-lighting measures among contractors completing projects and the program team sees opportunities to increase uptake of non-lighting measures. Five of the 21 contractor respondents specialized in a field other than lighting.

They represented architecture firms, air compressor contractors, building controls contractors, and motors suppliers, all key fields that can help save energy for customers in the I&M region.

There are notable opportunities to increase program participation and satisfaction by increasing outreach efforts, especially in-person efforts, as Covid restrictions diminish, and trade meetings and conferences begin being held in-person. Staff noted that in-person visits are key to their outreach efforts and some contractors mentioned that having personal relationships with staff were key to their participation in the program. Furthermore, nonparticipant survey results suggest that there is an opportunity for contractors to promote the market to their customers.

- **Recommendation 1:** Increase outreach to contractors, especially non-lighting contractors, via participating in and supporting trade association meetings and conferences.
- **Recommendation 2:** Expand support for in-person contact for both recruiting new participants and contractors and maintain relationships with existing participants and contractors. The participant survey and contractor interviews reveal demonstrate that there is an opportunity to educate architects and general contractors in particular about program opportunities.

The online application launched in February 2022 may address the shortcomings of the application form used during PY2021. Almost half of respondents specified that the pdf-based form was hard to use and made their processing of applications difficult. Using a pdf-form in 2021 was a step back for contractors used to using the Excel-based application of 2020. I&M launched an online application in February 2022 that may address these concerns.

Multiple sample sites had low realization rates for the projects. Through verification activities and review of project calculations, ADM determined that 6 of 20 Work Custom Program sample sites had realization rates of less than 90%. Two larger projects (expected savings greater 300,000 kWh) had realization rates of 85% and 87%. Both projects were new construction projects and had realization rates of 85% and 87% because of analytical errors.

- **Recommendation 3:** ADM recommends that ADM perform pre-approval reviews for specific sites to ensure that ex ante and ex post savings estimation approaches are in alignment. ADM will work with I&M and its implementation contractor to establish criteria for project pre-approval reviews.

Prescriptive lighting measures used a per unit savings value to estimate ex ante savings. The per unit savings value was the same for all applications of the measure, regardless of building type. This issue was present in 19 of the 21 sampled projects with a realization rate of less than 90% or greater than 110%. Additionally, in many cases, project specific information for lamp and fixture wattages and building hours was collected through the application, but not used in the savings analysis.

- **Recommendation 4:** ADM recommends that ex ante savings estimates for prescriptive lighting measures use project specific data where applicable to improve ex ante savings estimates.

Project application information was frequently incomplete. The prescriptive application form allowed participating customers to partially complete the application with the measure name

without including baseline information, hours of use, and specific information on the new equipment. This additional information is necessary for the EM&V effort and should be required of applicants.

- **Recommendation 5:** Require that the application be complete prior to processing it for submission of payment. The new online application implemented in February 2022 may have addressed this issue, but in the event it has not, program staff should add validation checks to ensure that the form is completely filled out is necessary.

1.5. Organization of Report

ADM prepared two volumes for this report, and they provide information on the impact, process, and cost effectiveness evaluation of the Indiana Michigan Power portfolio of C&I programs implemented in Indiana during the 2021 program year. Volume I is organized as follows:

- Chapter 2: Work Prescriptive
- Chapter 3: Work Custom
- Chapter 4: Public Efficient Streetlighting
- Chapter 5: C&I Non-Participant Survey
- Chapter 6: Cost Effectiveness Evaluation

See report Volume II for chapters that present reports of site-level gross energy impacts, survey instruments and tabulated survey response information.

2. Work Prescriptive

This chapter presents the results of both the impact and process evaluations of the Work Prescriptive Program that Indiana Michigan Power (I&M) offered to its non-residential customers during the period of January 2021 through December 2021.

The objectives of the evaluation were to:

- Establish a pre-approval review procedure;
- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year;
- Document sources of program awareness among participants;
- Assess satisfaction among participating customers; and
- Provide recommendations for program improvement as appropriate.

2.1. Program Description

This program targets non-residential customers eligible for prescriptive measures. These will include commercial, industrial, and institutional customers. For-profit, non-profit, and public agencies (such as schools) are eligible to participate.

Categories of eligible measures for this program include:

- Lighting
- Lighting controls
- HVAC systems
- Variable frequency drives
- Commercial refrigeration equipment
- Commercial kitchen equipment
- Compressed Air – Engineered Nozzle

2.2. Data Collection

2.2.1. Verification of Measures

2.2.1.1. Sampling Plan

ADM selected a sample of all 2021 C&I projects for which ADM performed measurement and verification (M&V) and calculated gross realized kWh savings and kW demand reductions.

ADM used a stratified sampling approach to develop the M&V sample. A stratified sampling approach allowed for a given statistical precision and confidence level target to be met with a smaller sample size than would have been allowed by simple random sampling. Strata boundaries

were based on ex ante kWh energy savings. ADM selected a sample with enough sample units to facilitate estimation of program ex post kWh energy savings with 10% statistical precision at a 90% confidence level.

Completed program projects accumulated over the course of the program year, and sample selection occurred at multiple points in time. The timing of sample selection was contingent upon the timing of the completion of projects during the program year.

The table below shows the number of projects, ex ante gross kWh energy savings, and sampling statistics, by stratum, of the program sample.

Table 2-1 Population Statistics Used for Work Prescriptive Sample Design

Variable	*Stratum 1*	*Stratum 2*	*Stratum 3*	*Stratum 4*	*Stratum 5*	*Totals*
Strata boundaries (kWh)	> 325,000	100,000 – 325,000	40,000 – 100,000	15,000 – 40,000	< 15,000	
Number of projects	3	31	67	98	128	327
Total Ex Ante Annual kWh	1,177,933	5,054,616	4,183,147	2,476,168	819,195	13,711,058
Average kWh Savings	392,644	163,052	62,435	25,267	6,400	649,798
Std. dev. of kWh savings	79,960	47,801	16,912	6,623	3,872	155,166
Coefficient of variation	0.2	0.29	0.27	0.26	0.6	
Final design sample	2	6	6	8	5	27

2.2.1.2. Verification Data Collection Procedures

ADM used remote verifications to collect project specific data. ADM staff accomplished three major tasks with these communications:

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

2.2.2. Participant Survey

ADM administered a survey to Work Prescriptive and Work Custom participants. The responses provided estimated net savings and provided feedback about participants' experience with the program. Table 2-2 summarizes the survey data collection efforts.

Table 2-2 Summary of Work Prescriptive and Work Custom Data Collection

Survey Group	*Mode*	*Time Frame*	*Number of Contacts*	*Number of Survey Completions*
Work Custom/ Prescriptive Rebates Participant Survey	Online	November 2021	140	11
Work Custom/ Prescriptive Rebates Participant Survey	Online	January 2022	105	18
Work Custom/ Prescriptive Rebates Participant Survey	Telephone	January 2022	29	4

2.2.3. Staff Interviews

ADM completed interviews with the I&M program lead and the implementation contractor program manager. The purpose of the interviews was to collect information on changes to program design or operating procedures, as well as to understand any challenges or key successes that occurred during the year.

2.2.4. Trade Ally Interviews

ADM completed interviews with I&M C&I trade allies in November and December 2021. Through the interviews, ADM collected information on the level of program awareness among I&M customers, the trade allies' experience with the program, feedback on program measures and incentives, feedback on training provided through the program, and overall program satisfaction and suggestions for improvements. In total, ADM completed 21 interviews.

2.3. Estimation of Ex Post Gross Savings

2.3.1. Methodology for Estimating Ex Post Gross Savings

2.3.1.1. Review of Documentation

I&M's program implementation contractor provided documentation for the sampled energy efficiency projects undertaken at customer facilities. ADM's first step in the evaluation effort was to review this documentation and other program materials that were relevant to the evaluation effort.

For each sampled project, ADM reviewed the available documentation (e.g., audit reports, savings calculation work papers, etc.) for each rebated measure, with attention given to the calculation procedures and documentation for savings estimates. Reviewed documents included program forms, reports, billing system data, weather data, and any other potentially useful data. For each application, ADM determined if the following types of information was available for each application:

- 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.

In addition to the above activities, ADM completed a review of program tracking data. The purpose of the review was to assess the sufficiency of the tracking data for supporting program implementation and evaluation. To this end, ADM reviewed the program data to verify tracking of the following fields, that the fields were populated (i.e., the data were not missing), and that the values were reasonable.

- Unique customer identifier, such as customer account number;
- Customer specific project data such as contact name and information, building type;
- Project milestone dates such as application submission date, application approval, incentive payment (where applicable);
- Measure specific information such as:
  - type of measure;
  - specific measure;
  - ex ante measure kWh energy savings and peak kW reductions;
  - measure attributes necessary to estimate measure savings (where applicable);
  - unique measure identifier (e.g., numeric or alpha-numeric code);
  - unit serial number (where applicable);
  - incremental costs / project costs
- Vendor/Contractor business name, contact name and information (where applicable);
- Incentive amounts; and
- Application status.

ADM provided recommendations, specifically in regard to tracking measure level information, to the implementation contractor based on this review.

2.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

A breakdown of sampled measures for the Work Prescriptive Program is below in Table 2-3.

Table 2-3 Breakdown of Sampled Prescriptive Measures

Measure Category	*Ex Ante Annual kWh Savings*	*Ex Post Annual Gross kWh Savings*	*Gross Realization Rate*
Commercial ECM Cooler Motors	48,616	116,758	240%
Exterior Area Lighting Fixture - HID to LED	380,661	438,743	115%
Interior Area Lighting Fixture - HID to LED	731,375	798,847	109%
LED Exit Sign	2,241	5,644	252%
LED Recessed Light Fixture/Lamps	859,730	543,786	63%
LED Tube Relamp	250,566	164,292	66%
Lighting Occupancy Sensor	103,079	75,496	73%
Total	2,376,268	2,143,567	90%

ADM calculated a kWh energy savings gross realization rate and a peak kW reduction gross realization rate for each site in the M&V sample. Sites with relatively high or low gross realization rates were analyzed to determine the reasons for the discrepancy between ex ante and ex post energy savings. The site-level gross impact analysis results for each M&V sample site are presented in Volume II of the report. These reports outline the data sources and analytical approaches employed in the calculation of measure impacts.

2.3.2. Results of Ex Post Gross Savings Estimations

The kWh gross realization rate is the ratio of sampled measure ex post gross kWh energy savings to sampled measure ex ante kWh energy savings. The kW gross realization rate is the ratio of sampled measure ex post gross kW demand savings to sampled measure ex ante kW demand savings. Since a stratified sampling approach was employed for this program, stratum-level kWh and kW gross realization rates were developed for each sampling stratum.

Program-level gross ex post gross kWh energy savings are calculated as follows:

- The ex-ante kWh energy savings of non-sampled measures are factored by the applicable stratum-level kWh gross realization rates to calculate ex post gross kWh energy savings for non-sampled measures.
- The ex post gross kWh energy savings of all sampled measures and all non-sampled measures are summed.

Program-level gross ex post gross kW demand savings are calculated as follows:

- The ex-ante kW demand savings of non-sampled measures are factored by the applicable stratum-level kW gross realization rates to calculate ex post gross kW savings for non-sampled measures.
- The ex post gross kW demand savings of all sampled measures and all non-sampled measures are summed.

2.3.2.1. Ex Post Gross kWh Savings

Table 2-4 displays the ex ante and ex post gross kWh savings of the Work Prescriptive Program including gross realization rates for sampled projects.

Table 2-4 Work Prescriptive Project-Level Ex Ante and Ex Post kWh Savings

Stratum	*Project Number*	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Project Gross Realization Rate*
1	107	352,339	386,073	110%
1	120	340,848	494,120	145%
2	122	321,026	121,770	38%
2	110	300,741	299,427	100%
2	117	144,167	78,123	54%
2	108	121,976	109,070	89%
2	116	111,456	61,982	56%
2	126	102,102	88,763	87%
3	106	98,436	45,397	46%
3	113	69,984	58,275	83%
3	101	59,530	39,262	66%
3	115	48,616	116,758	240%
3	104	47,693	21,520	45%
3	103	40,753	43,909	108%
4	111	32,932	34,936	106%
4	112	26,455	17,760	67%
4	105	25,707	18,677	73%
4	124	25,620	23,025	90%
4	121	22,108	13,182	60%
4	102	20,736	26,468	128%
4	125	17,736	12,711	72%
4	109	16,829	11,828	70%
5	114	13,760	5,566	40%
5	119	6,895	6,581	95%
5	118	5,417	4,740	87%
5	100	1,879	2,712	144%
5	123	527	933	177%
All Non-Sample Projects		11,334,790	9,239,785	82%
Total		13,711,058	11,383,352	83%

Twenty-one (21) of the 27 sites had a realization rate that was lower than 90% or higher than 110%. The difference between the ex ante and the ex post savings for 19 of these sites was due to

the ex ante analysis applying a deemed per fixture/lamp kWh savings value that was multiplied by the quantity of measures to estimate the project savings, whereas the ex post analysis used project specific information (wattages, hours of use for the space, appropriate heating and cooling interactive factors). For the remaining two sites, one site applied a single savings value for motors of varying horsepower, and one lighting project used a different hour of use than was determined through the verification activities.

Table 2-5 presents the ex post annual gross kWh savings for the Work Prescriptive Program from January 2021 through December 2021.

Table 2-5 Ex Post Annual Gross kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
13,711,058	13,711,058	11,383,352	11,383,352	83%

2.3.2.2. Ex Post Gross kW Reductions

Table 2-6 presents the ex post peak kW reduction for the Work Prescriptive Program from January 2021 through December 2021.

Table 2-6 Ex Post Peak kW Reduction

Ex Ante Gross kW Savings	*Gross Audited kW Savings*	*Gross Verified kW Savings*	*Ex Post Gross kW Savings*	*Gross Realization Rate*
1,418.63	1,418.63	1,787.37	1,787.37	126%

2.4. Estimation of Ex Post Net Savings

2.4.1. Methodology for Estimating Ex Post Net Savings

The net savings analysis was used to determine what part of the gross energy savings achieved by program participants could be attributed to the effects of the program. The net savings attributed to program participants are the gross savings less free ridership, plus spillover.

2.4.1.1. Methodology for Estimating Free Ridership

A survey of program participants informed the net-to-gross analysis.

ADM considered three factors to determine what percentage of savings may be attributable to free ridership. The three factors are:

- Plans and intentions of firm to install a measure even without support from the program;
- Influence that the program had on the decision to install a measure; and

- A firm's previous experience with a measure installed under the program.

For each of these factors, ADM applied rules to develop binary variables indicating whether a participant's behavior shows free ridership. These rules make use of answers to questions on the decision maker survey questionnaire.

The first factor requires determining if a participant's intention was to install an energy efficiency measure even without the program. The answers to a combination of several questions are used with a set of rules to determine whether a participant's behavior indicates likely free ridership. Two binary variables account for customer plans and intentions: one, based on a more restrictive set of criteria that may describe a high likelihood of free ridership, and a second, based on a less restrictive set of criteria that may describe a relatively lower likelihood of free ridership.

The first, more restrictive criteria indicating customer plans and intentions that likely signify free ridership are as follows:

- The respondent answers "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you completed the [MEASURE] project even if you had not participated in the program?"
- The respondent answers "definitely would have installed" to the following question: "If the financial incentive from the [PROGRAM] had not been available, how likely is it that you would have installed [MEASURE] anyway?"
- The respondent answers "did not affect timing of purchase and installation" to the following question: "How did the availability of information and financial incentives through the [PROGRAM] affect the timing of your purchase and installation of [MEASURE]?"
- The respondent answers "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "Did you purchase and install the [MEASURE] earlier than you otherwise would have without the program?"

The second, less restrictive criteria indicating customer plans and intentions that likely signify free ridership are as follows:

The respondent answers "yes" to the following two questions: "Did you have plans to install the [MEASURE] before participating in the program?" and "Would you completed the [MEASURE] project even if you had not participated in the program?"

- Either the respondent answers "definitely would have installed" or "probably would have installed" to the following question: "If the financial incentive from the [PROGRAM] had not been available, how likely is it that you would have installed [MEASURE] anyway?"
- Either the respondent answers "did not affect timing of purchase and installation" to the question: "Did you purchase and install the [MEASURE] earlier than you otherwise would have without the program?" or the respondent indicates that that while program information and financial incentives did affect the timing of equipment purchase and

installation, in the absence of the program they would have purchased and installed the equipment within the next two years.

- The respondent answers "no, the program did not affect level of efficiency that we chose for equipment" in response to the following question: "Did you choose equipment that was more energy efficient than you would have chosen because of the program?"

The second factor requires determining if a customer reports that a recommendation from a Program representative or experience with the program was influential in the decision to install a particular piece of equipment or measure.

The criterion indicating that program influence may signify a lower likelihood of free ridership is that either of the following conditions is true:

- The respondent answers "very important" to the following question: "How important was previous experience with the [Program Name] in making your decision to install [Equipment/Measure]?
- The respondent answers "yes" to the following question: "Did a representative of the [Program Name] recommend that you install [Equipment/Measure]?"

The third factor requires determining if a participant in the program indicates that he or she had previously installed an energy efficiency measure like the one that they installed under the program without an energy efficiency program incentive during the last three years. A participant indicating that he or she had installed a similar measure is considered to have a likelihood of free ridership.

The criteria indicating that previous experience may signify a higher likelihood of free ridership are as follows:

- The respondent answers "yes" to the following question: "Before participating in the [Program Name], had you installed any equipment or measure similar to [Rebated Equipment/Measure] at your facility?"
- The respondent answers "yes, purchased energy efficient equipment but did not apply for financial incentive." to the following question: "Has your organization purchased any energy efficient equipment in the last three years for which you did not apply for a financial incentive through the [Program Name?"

The four sets of rules just described are used to construct four different indicator variables that address free ridership behavior. For each customer, a free ridership value is assigned based on the combination of variables. With the four indicator variables, there are 11 applicable combinations for assigning free ridership scores for each respondent, depending on the combination of answers to the questions creating the indicator variables. Table 2-7 shows these values.

Table 2-7 Free Ridership Scoring

Indicator Variables				*Free Ridership Score*
Had Plans and Intentions to Install Measure without [Program Name]? (Definition 1)	*Had Plans and Intentions to Install Measure without [Program Name]? (Definition 2)*	*[Program Name] had influence on Decision to Install Measure?*	*Had Previous Experience with Measure?*	
Y	N/A	Y	Y	100%
Y	N/A	N	N	100%
Y	N/A	N	Y	100%
Y	N/A	Y	N	67%
N	Y	N	Y	67%
N	N	N	Y	33%
N	Y	N	N	33%
N	Y	Y	N	0%
N	N	N	N	0%
N	N	Y	N	0%
N	N	Y	Y	0%

The free ridership assessment also includes questions on the participants financial ability to pay for the measures. These questions will be used to assess the consistency of the responses to the questions used to score free ridership.

Responses are considered inconsistent if the respondent indicates that they were not financially able to install the equipment, but state that they have plans to install the equipment and would have installed it without the program incentive.

Specifically, a response is considered inconsistent if the following criteria are met.

- The respondent answers "No" to the question "Would you have been financially able to install the equipment or measures without the financial incentive from the [Program Name]?"
- The respondent answers "Yes" to the question "To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?"
- The respondent answers "Yes" to the question "Did you have plans to install the measure before participating in the program?"
- The respondent answers "Yes" to the question "Would you completed the [MEASURE] project even if you had not participated in the program?"

Respondents that provide inconsistent responses are asked the following consistency-check question:

- Previously you said that your organization had plans to complete the project and would have completed it if you had not participated in the program. You also said that your

organization would not have been financially able to install the equipment without the program incentive. In your own words, can you explain the role that the financial incentive played in your decision to complete this project?

In the event of an inconsistent response, a researcher reviews the response provided to the question. As part of this review, the researcher may determine whether the available information justifies modifying the free ridership score calculated in accordance with the algorithm outlined below. The free ridership score calculated in accordance with the algorithm outlined below may be revised in instances in which there are significant apparent inconsistencies between responses provided by the decision maker or in cases in which the responses are apparently invalidated by other information regarding the project. In some cases in which the decision maker responses are apparently inconsistent, the researcher may drop the sample point. Information on any modifications to the free ridership score along with associated rationale and references to supporting data will be presented in EM&V reporting.

2.4.1.2. Methodology for Estimating Spillover

Program participants could implement additional energy saving measures without receiving a program incentive because of their participation in the program. The energy savings resulting from these additional measures constitute program participant spillover effects.

To assess participant spillover savings, survey respondents are asked whether or not they implemented any additional energy saving measures for which they did not receive a program incentive. Respondents are also asked to provide information on the measures implemented for use in estimating the associated energy savings.

To determine if the savings from the reported measures were attributable to the program, survey respondents were asked questions about the degree to which their experience with the program influenced them to implement the measures and the likelihood of implementing the measures in the absence of the program. Specifically, respondents were asked the following questions:

- SO1: How important was your experience with the [PROGRAM_NAME] in your decision to install this lighting equipment?
- SO2: If you had NOT participated in the [PROGRAM_NAME], how likely is it that your organization would still have installed this lighting equipment?

ADM calculated the spillover score using Equation 2-1.

Equation 2-1

$$Spillover = Average(SO1, 10 - SO2)$$

Savings from measures associated with a spillover score greater than 7 were considered attributable to the program.

All survey response data were systematically reviewed by a researcher who was familiar with the portfolio. As part of this review, the researcher could determine whether the available information justifies modifying the spillover score calculated in accordance with the algorithm outlined below. The spillover score calculated in accordance with the algorithm outlined above could be revised

in instances in which there were significant apparent inconsistencies between responses provided by the decision maker or in cases in which the responses were apparently invalidated by other information regarding the measure(s). Additionally, responses may be dropped in cases where respondents do not report sufficient information to estimate the savings associated with the measure implemented.

2.4.1.3. Methodology for Estimating Non-Participant Spillover

Section 5.3 presents the methodology used to estimate non-participant spillover through a survey of non-participant customers.

2.4.2. Results of Ex Post Net Savings Estimation

Table 2-8 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Work Prescriptive Program.

Table 2-8 Ex Post Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	13,711,058	1,418.63
Gross Audited Savings	13,711,058	1,418.63
Gross Verified Savings	11,383,352	1,787.37
Ex Post Gross Savings	11,383,352	1,787.37
Gross Realization Rate	83%	106%
Ex Post Free Ridership	1,196,856	260.41
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	10,186,497	1,526.95
Net-to-Gross Ratio	89%	88%
Ex Post Net Lifetime Savings	124,700,249	n/a

2.5. Process Evaluation

ADM completed a process evaluation of the PY2021 program. The following research activities informed the process evaluation.

- Interviews and discussions with program staff.
- Review of program documents and tracking data.
- Interviews with participating program trade allies.
- A survey of program participants.
- A survey of I&M customers that did not participate in the program.

2.5.1. Process Evaluation Findings

ADM conducted a process evaluation of the I&M Work Programs, both Prescriptive and Custom, in accordance with the EM&V plans developed and approved in September 2021. The process

evaluation gathered program data, feedback from active trade allies, feedback from program participants, and insights from nonparticipants to inform program managers about customer and trade ally program satisfaction, program awareness, and suggestions for improvement. Additionally, the team interviewed utility program staff and implementer staff at the outset of the process evaluation tasks to better understand the program details, how the program was performing, and what challenges, if any, they were facing.

2.5.1.1. Program Team Perspective

The team interviewed I&M utility and implementation staff in the Fall of 2021. The following themes emerged from those conversations.

The program implementer leads outreach to the market for the program. The implementer works with existing trade allies and participants and recruits new trade allies and participants. Some of the key outreach efforts include:

- Using digital advertisements like Google paid search and LinkedIn advertisements.
- Using utility staff contacts (community relations team and account managers) to generate program leads for the implementer.
- Targeting past participants, especially high energy users, with opportunities that may be attractive to them.
- Targeting customers that elected not to participate in the program in the past to see if they may be interested in participation.
- Field representatives (three based in IN and one based in MI) meeting with customers and contractors to explain the program and measures.
- Targeting distributors with lunch and learn sessions for contractors about new efficient technologies and program information.
- Advertising VFDs and controls opportunities to manufacturers.

There are significant opportunities to increase participation in the program, especially among smaller businesses, very large operations, and manufacturers. According to the implementation team:

- 80% of small businesses[4] have never used an I&M efficiency program.
- Large operations tend to participate in a program and then not come back to I&M for several years, even though they likely have energy saving opportunities available to them.
- Manufactures with process lines concentrate on producing "widgets" and not on efficiency improvements that could help their bottom line.

[4] The team did not define "small" business or "large" operations. However, they did provide an example of a large operations as a paper mill.

In 2021, according to utility staff, the program did not track brand new participants and contractors to the program. In prior years, the implementer kept track of the number of customers new to the program versus repeat program participants. In November 2020, the last month in which this data was available, the program booked 25 new participant projects and 5 new contractors.

Increasing contact with and reengaging with trade associations is a priority for the program in coming months. Contact with trade associations decreased in 2020 and 2021 because of fewer meetings and conferences due to COVID-19 . Implementer staff want to recruit and maintain relationships with contractors by reengaging with trade associations like Building and Owners and Managers Association (BOMA) and identifying new associations to partner with. As COVID-19 restrictions lift and more associations begin holding meetings, the utility and the implementer are poised to attend these meetings and conferences.

The implementer has weekly meetings with utility staff where they receive updates on projects and program outreach efforts. Utility staff reported that they especially appreciated the outreach efforts the implementer field staff had recently undertaken. Utility staff did not specify what those outreach efforts entailed.

The utility program staff are examining their custom projects to identify measures that may be suitable to add to the prescriptive list to make uptake of some measures easier for contractors and participants. Utility program staff are investigating moving about 200 measures onto the prescriptive list including compressed air measures and some HVAC measures. Furthermore, implementer staff reported that volatile prices of materials and supply chain disruptions are affecting availability of energy efficiency equipment, By trying to make some measures prescriptive, and thus less time intensive to apply for, the program is trying to lessen the burden contractors and participants are facing in trying to purchase and install efficient items in the current marketplace.

ADM notes that when making measures prescriptive, utility and implementer staff should address the issue of applying single deemed per measure savings values noted in the gross savings evaluation. Prescriptive measures savings estimates should be partially deemed and use project specific information such as hours of use and actual efficiency/wattage of the installed equipment, where applicable. Additionally, measures moved to the prescriptive program will require pre-approval when the expected incentives exceed $10,000. In comparison, all custom projects require pre-approval. Lowering the requirement for pre-approval may introduce additional evaluation risk, although this risk is relatively small given the $10,000 incentive threshold and if the program only moves typical measures that have consistent savings that are not likely to be highly variable from site-to-site. Lastly, while both programs have a 90-day requirement for submission, the Work Custom Program starts the clock after pre-approval whereas the Work Prescriptive Program starts the clock at the date of final invoice. By allowing submissions for a longer period of time after completion of the final work, the program may introduce greater free ridership risk. We note, however, that free ridership was higher for the Work Custom Program projects than for the Work Prescriptive Program projects.

COVID-19 continued to shape program implementation in 2021. Utility and implementer staff are conducting relatively few in-person site visits since the pandemic began. One utility staff person estimated that the program completes four out of five contacts with customers by a web-based platform like Skype or via phone. Prior to the pandemic staff went onsite more often and staff hope to do more on-site visits to recruit new projects, especially in the agriculture sector. According to this utility representative, "those [onsite] meetings are very valuable to get the point across of the value of what these energy efficiency programs can bring to an organization."

The utility selected a new program implementer for 2021 because of the new implementer's approach to outreach and marketing. The new implementer's approach to increasing program visibility was particularly desirable.

Utility staff reported the program was somewhat "idle" for the first two to three months under the new program implementer and both the utility and implementation team worked to reengage with contractors and customers to promote the program. Transitioning implementers is always hard, according to both utility and implementer respondents, and this "idleness" was a concern for both staffs. Both staffs were working to support, reengage, and build trust with the market using the aforementioned outreach efforts.

As of the Fall of 2021, the new implementer was tracking projects using a SharePoint based Excel sheet and had yet to deliver a more developed and sophisticated web-based Salesforce project tracking tool called DSMT. Utility and implementer staff anticipated the DSMT tool would be ready for use by the end of 2021.[5] Functionality the staff were looking forward to include:

- Seeing "granular" measure data, not just the project level data;
- Identifying project status data easier and communicating that to stakeholders; and
- Better estimating of project savings.

Utility staff are interested in getting more feedback from participants soon after their participation in the program. Doing this would allow the program to adjust the program faster and keep contractors and participants satisfied with the program. Additionally, getting this feedback would allow the staff to identify potential problems with the application process and to ensure the program is providing the right incentives and measures.

Implementation staff have committed to grow the program, especially in expanding interest in non-lighting measures and reaching the manufacturing sector. Utility staff are interested in doing more non-lighting projects and is hoping the new implementer can help drive market interest in non-lighting projects, especially compressed air and HVAC measures. Furthermore, utility staff see significant energy saving opportunities in the agricultural sector.

2.5.1.2. Trade Ally Results

This section of the report provides results of the interviews ADM completed with trade allies in November and December 2021. These interviews focused on:

[5] The tool was made available in February 2022.

- Program awareness
- Program experiences
- Program measures and incentives
- Training and information provided about the program
- Overall program satisfaction including program successes, challenges, and suggestions for improvement.

Using project data supplied by I&M in early November 2021, the ADM team identified 89 contractors that completed a total of 288 projects in 2021. The team interviewed 21 contractors that completed a total of 112 projects.

These allies were largely representative of the population of contractors when examined by the measures they installed, where they completed projects, the type of project, and the location of the contractor's headquarters (Table 2-9).

Table 2-9 Summary of Contractor Interview Data Collection

Measures Installed	*Population Count (n=89)*	*Population Percent*	*Interviewed Count (n=21)*	*Interviewed Percent*
Measure Types Installed				
Lighting Only	73	82%	15	71%
Non-lighting Only	10	11%	3	14%
Lighting and Non-lighting	6	7%	3	14%
Where Projects Completed				
Indiana Only	59	66%	14	67%
Michigan Only	22	25%	5	24%
Indiana and Michigan	8	9%	2	10%
Project Type Completed				
Prescriptive Only	45	51%	8	38%
Custom Only	24	27%	4	19%
Prescriptive and Custom	20	22%	9	43%
Trade Ally Location				
Indiana	44	49%	10	48%
Michigan	17	19%	5	24%
Elsewhere	28	31%	6	29%

Interviews with contractors followed an interview guide and the interviews generally took about 30 minutes to complete. The guide helped facilitate the discussion and the interviewer often had to probe about specific topics or skip other topics because they were not applicable to a respondent. The interviewer took notes during all interviews and recorded, with permission from respondents, most interviews. ADM staff analyzed results using MS Excel.

The following sections describe the results of the interviews.

2.5.1.2.1. Respondent Description

Most respondents focused on lighting projects. As noted in Table 2-9, more than 80% of respondents completed lighting projects and interviews revealed that almost half of contractors (10 of 21) classified themselves as lighting/electrical contractors (7) or distributors (3). Most (8 of 10) of these contractors described their service territory as regional, focusing on the areas of northern Indiana or southern Michigan (Table 2-10).

Table 2-10 Respondent Type by Geographic Scope

Respondent Business Type	*Regional*	*National*	*Total*
Lighting/electrical contractor	5	2	7
Rebate administrator	0	6	6
Lighting distributor	3	0	3
Architect	2	0	2
Building controls contractor	1	0	1
Motors contractor	1	0	1
Air compressor contractor	1	0	1
TOTAL	13	8	21

A notable percentage of respondents classified themselves as rebate administrators or lighting/electrical contractors that work across the country to help their national chain customers identify the most cost-effective places for them to invest in efficiency (Table 2-10). Two lighting/electrical contractors and six self-described rebate administrators reported having national service area scopes meaning they had customers across the country (and in some cases in Canada). These eight contractors reported largely focusing on completing lighting projects for their national chain customers such as fast-food restaurants and auto parts retailers.

Less than one-quarter of respondents reported focusing on non-lighting measures and all these contractors have an Indiana/Michigan regional customer base (Table 2-10). Two of these contractors described themselves as architects, one focused on building controls, one installed and upgraded motors, and one focused on servicing and selling air compressors for industrial applications.

2.5.1.2.2. Program Awareness

About half of contractors learned about the I&M Work programs due to their knowledge of efficiency programs in other regions and sought out the I&M program (Table 2-11). Respondents with a national customer base seek out incentive programs as opposed to learning about a program from any outreach effort from a utility or program administrator**.** The eight contractors with a national customer base reported that being aware of energy efficiency programs is a core aspect of their business and they specialize in delivering efficiency rebates to customers. They work across the country and report helping customers prioritize where they should invest in renovations, partly based on where the customer can get the best rebate. Additionally, three other contractors, a lighting distributor, motors contractor, and air compressor contractor, reported knowing about I&M efficiency programs from working in neighboring jurisdictions like NIPSCO. They then sought out the program when they had a project in I&M territory.

Table 2-11 How contractors became aware of I&M efficiency programs

Respondent business type	*Seek out efficiency programs*	*Could not specify*	*Industry contacts*	*Total*
Lighting/electrical contractor	2	4	1	7
Rebate administrator	6	0	0	6
Lighting distributor	1	2	0	3
Architect	0	0	2	2
Building controls contractor	0	1	0	1
Motors contractor	1	0	0	1
Air compressor contractor	1	0	0	1
TOTAL	11	7	3	21

Seven respondents reported being aware of and participating in the program for many years and could not specify how they became aware of the program. These seven respondents reported being aware of the program "since inception" or provided some other description indicating they have many years of experience using the program. These respondents could not specify a single point of awareness of the program.

Three contractors reported hearing about the program from industry contacts. Both architect respondents reported learning about the program from their public entity customers. One architect respondent that specializes in working with schools reported learning about the program in the last year from a school district they were working with on a renovation project. The other architect respondent reported learning about the program from a City Manager. One lighting/electrical contractor reported learning about the program from their wholesaler.

2.5.1.2.3. Program Experience

The following section describes respondents experience with program outreach to customers, inspections, and training.

2.5.1.2.3.1 Outreach to Customers

Three-quarters of contractors stated they prioritize energy efficiency and the associated benefits like lower energy bills when selling projects to potential customers. All the contractors with a national customer base (n=8) reported focusing on efficiency because that was a core part of their business. And all the non-lighting contractors also focus on efficiency. The remaining one quarter of contractors that reported not focusing on efficiency were lighting distributors or contractors. These respondents provided responses suggesting they emphasize solving a customer's problem. For example, one lighting contractor reported addressing a machine shop's need to improve safety by increasing lighting output. Efficiency of the new equipment was a secondary benefit.

No respondent reported using I&M marketing materials to help promote or sell the program and the benefits of energy efficient equipment to customers. Of all respondents, only one reported having materials to hand out in past years and they reported not having any brochures to use for the last year.

Being listed as a trade ally on the I&M website was not seen as a notable benefit to most trade ally respondents. Thirteen of the 21 respondents appear as trade allies on the I&M website and of those 13, nine reported about the usefulness of that list. Seven of the nine reported that being a listed ally did not help them attract or keep business. One of these seven was not sure they were a trade ally. The remaining two allies, one lighting distributor and one lighting/electrical contractor reported that being a listed ally provided them "credibility" in the marketplace and it helped "distinguish" them from their competition.

2.5.1.2.3.2 Inspections

Contractors reported program inspections were straightforward and often required little involvement from them. Four contractors reported ever having to appear at a project inspection and when they do, they indicated that the inspection process is straightforward, easy to schedule, and easy to understand. One contractor stated they like the inspections because it ensures all contractors are doing quality work. Contractors also reported that the ability to provide pictures as part of the application is helpful and facilitates faster inspections. Furthermore, respondents appreciated the program offering virtual inspections with the customer because it meant less travel time for everyone.

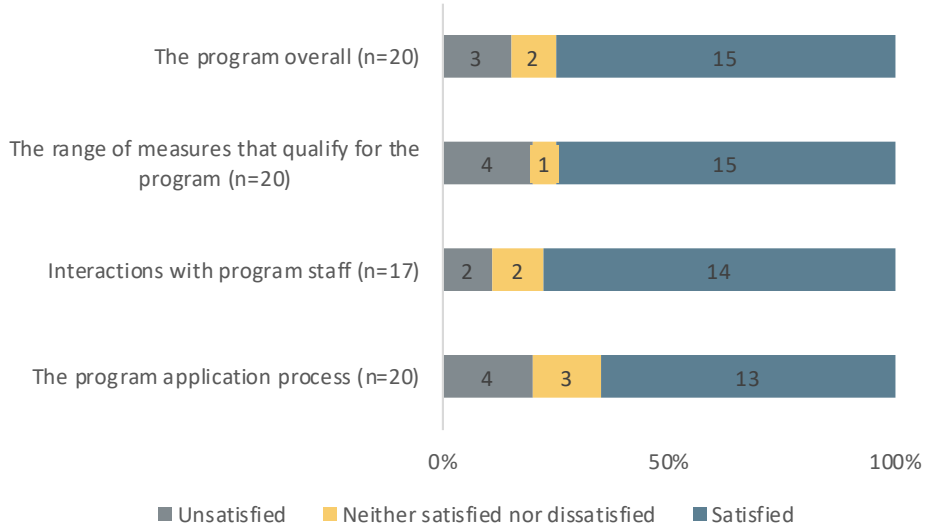
2.5.1.2.3.3 Training

Less than half of contractors reported receiving training or program information in 2021. Eight respondents reported participating in an information session in the Spring of 2021 where they learned about program changes and updates. These respondents indicated the sessions were informative enough but did not cover much new ground. In several instances, respondents noted that the changes program staff were discussing were minor and they already knew about the changes because they already had projects in the 2021 application pipeline by the time of the training.

2.5.1.2.4. Program Satisfaction and Improvement Suggestions

Contractors are largely satisfied with the I&M programs, but some did report dissatisfaction with specific elements When asked to score their satisfaction on a five point scale where one is highly dissatisfied and five is highly satisfied, most respondents were satisfied with the program application process, interactions with program staff, the range of measures offered, and the overall program **(**Figure 2-1**).**

Figure 2-1 Satisfaction Scores



Almost all contractors suggested improvements the program could make to the administration of the program, outreach efforts, or measures and incentives. Twenty of the 21 respondents provided at least one suggestion for program improvement. Fourteen contractors suggested improvements to the administration of the program, nine recommended changes to outreach efforts, and four suggested changes to measures or incentives (Table 2-12).

Table 2-12 Contractor Suggestions for Improvement

Suggestions	*Count of Contractors*
Program Administration	**14**
Provide Excel-based or online application form	10
More regular contact with program staff	5
Design program process to support small projects (<$4,000)	2
Improve incentive payment process	2
Outreach	**10**
Increase outreach to contractors	6
Increase marketing of program to customers	6
Measures and Incentives	**4**
Improve/Offer incentives for specific measures	3
Provide higher incentives for locally sourced equipment	1

2.5.1.2.4.1 Suggested Program Administration Changes

Almost half of all respondents suggested changing the program application form to an Excel-based file or an online portal. These respondents stated that the current pdf-based form requires the contractor to complete savings calculations on their own and requires them to duplicate information across the application. These respondents noted that the applications used in 2020 and earlier were Excel-based which allowed the old form to auto-calculate counts of items and savings

values. Furthermore, three respondents noted liking the online based application forms other utilities offer because they provide the benefits of the Excel-based form like auto-calculating savings with an online submission of applications that show the status of applications. To compensate for the lack of an Excel-based or online form, one respondent reported creating their own Excel-based form, based on the one used in 2020, they use to help them submit current applications.

After conducting the contractor survey, ADM learned that I&M launched an online rebate portal in February 2022.

Five contractors headquartered in the I&M region noted that they have had limited experience with program staff in the last year and four indicated that experience differed from prior years when they had regular interactions. These contractors noted that having contact with program staff and knowing who to call with questions makes participating in the program a notably better experience.

- A lighting distributor stated they "used to have names at the program that I could call" and now they do not know who to reach out to with questions.
- A lighting electrical contractor reported having helpful relationships with program staff in 2020 and earlier and noted having negative interactions in 2021. Specifically, this respondent stated they reached out to program staff in 2021 with questions and suggestions and felt "shut down" and unheard. This respondent was not sure they would continue to submit applications to the program.
- An architect reported emailing program staff with questions but noted a question about replacing a certain light fixture has gone unanswered for several months.
- The motors contractor recalled still knowing the program staff person's name from 2020 but did not have a similar contact and familiarity in 2021.
- The air compressor contractor noted not getting information from staff that they needed in the first half of the year. However, that changed when they started working with a specific program contact mid-year. That staff person has been "instrumental" in making the program easier to participate in.

One lighting distributor and one lighting/electrical contractor suggested making the program process easier for small projects. According to these respondents, going through the application process for projects under about $4,000 can take too much time. And these respondents suggested that these smaller projects can add up to notable savings that the program is not capturing.

Two rebate administrators reported that the processing of incentive payments take longer for I&M than some other utilities and suggested limiting the time from final approval to payment to less than 30 days. One stated that I&M should consider processing incentive payments via ACH instead of issuing checks to facilitate a faster process that is easier to track.

2.5.1.2.4.2 Suggested Program Outreach

Three non-lighting and three lighting contractors suggested the program could conduct more outreach to contractors to keep existing contractors abreast of program developments and do more to recruit non-lighting contractors. For example, the one air compressor contractor respondent stated that it did not appear to them that the program was doing much to recruit air compressor contractors (and promote the benefits of air audits to customers). The building controls contractor reported not receiving any literature about the program in the last year and suggested having more regular contact would be helpful.

Five contractors reported that the program and the contractors would benefit from increased customer awareness of the program. For example, one architect suggested providing an online incentive estimator tool that customers could use and case studies about how a variety of organization types (e.g. retail, municipalities, schools, manufacturing) have used and benefited from the program.

2.5.1.2.4.3 Suggested Changes to Measures and Incentives

Three contractors proposed increasing or offering incentives for specific equipment to be more in line with what other utilities offer. According to these three contractors:

- An Indiana-based lighting distributor suggested that I&M should place the 8-foot LED replacement for fluorescent and high output on the prescriptive list instead of making that light type go through the custom pathway. This respondent stated that 8-foot LEDs are on the prescriptive lists of other utility programs.
- An Indiana-based lighting distributor reported that I&M does not provide incentives for exit lighting and I&M offers notably lower incentives than neighboring utilities, $65 compared to $125, for replacing 400w high bay lighting.

2.5.1.3. Participant Survey Findings

This section of the report provides results of the surveys ADM completed with program participants between November 2021 and January 2022. These surveys covered participants awareness, experience, and satisfaction with the program.

2.5.1.3.1. Respondent Background

Most participant respondents completed lighting projects and owned the property where they made the program upgrades. Additionally, about half of respondents reported having some type of energy policy or practice in place such as having defined energy savings goals or requirements to consider energy efficiency when making building or equipment upgrades (Table 2-13).

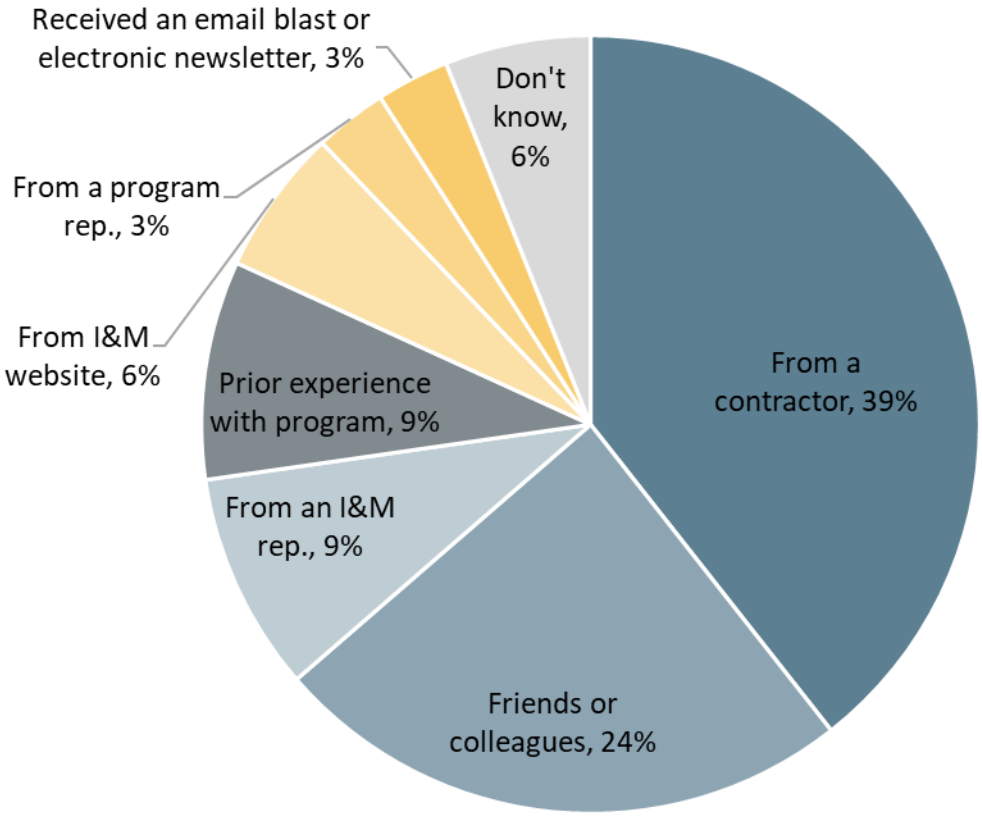
Table 2-13 Respondent Background (n=33)

	Count	*Percent*
Measure		
Lighting	29	88%
HVAC	3	9%
Compressed Air	1	3%
Building Tenure		
Own and occupy	25	78%
Rent	3	9%
Own and rent to someone else	2	6%
Don't know	2	6%
Energy Policies		
Maintain an energy policy or practice	18	55%
A person or persons responsible for monitoring or managing energy usage	12	36%
A specific policy requiring energy efficiency be considered when purchasing equipment	9	27%
Defined energy savings goals	5	15%
Carbon reduction goals	2	6%

2.5.1.3.2. Program Awareness

About 70% of respondents reported learning about the Work program from a source other than I&M. These respondents learned of the program from a trade ally (39%), friends or colleagues (24%), and through experience with the program via a former employer (9%). About one-fifth of respondents learned of the program through contact with I&M and about five percent could not report how they learned of the program (Figure 2-2).

Figure 2-2 How Participants Became Aware of Program in Indiana (n=33)



2.5.1.3.3. Program Experience

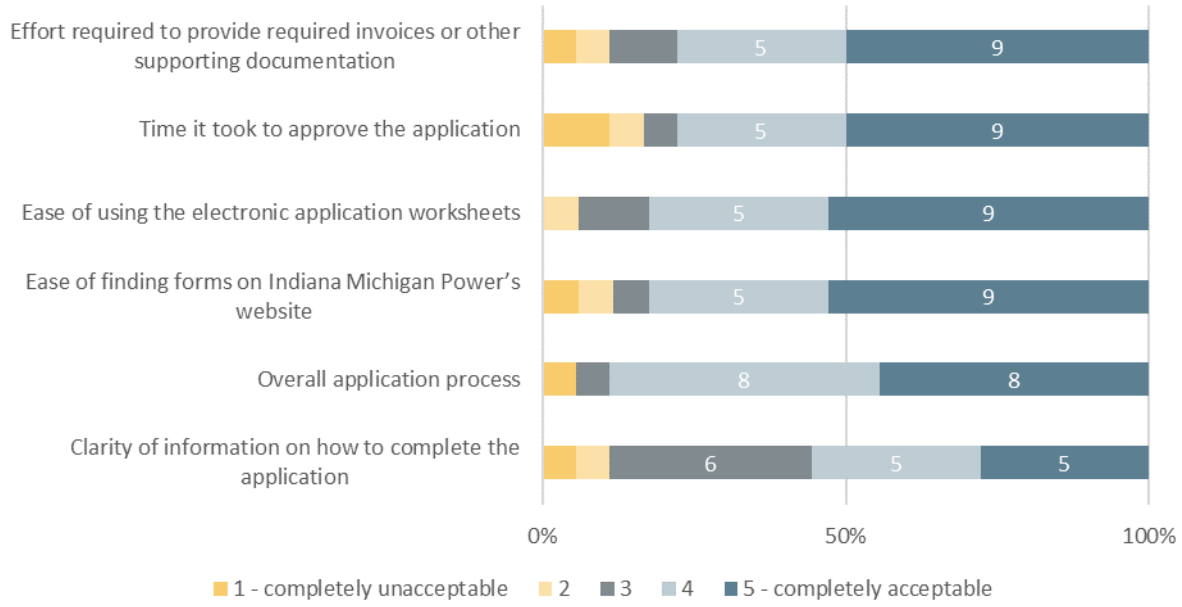
Respondents often rely on contractors and equipment vendors to complete incentive applications on their behalf. Two-fifths of respondents (20 of 33) reported that a contractor or equipment vendor worked on completing their incentive application. The remaining 13 respondents reported that they or a coworker at their facility completed the application (Table 2-14).

Table 2-14 Who completes incentive applications? (n=33)

	Count	Percent
Participant only	13	39%
Participant and contractor	10	30%
Contractor only	10	30%

Of the respondents with experience completing the application, most reported the application materials and process were acceptable. Three-quarters or more of respondents indicated the application process was acceptable. The one exception what that almost half of respondents (8 of 19) indicated some difficulties with the clarity of the information[6] about how to complete the application (Figure 2-3).

Figure 2-3 Incentive application experience (n=19)



Five respondents elaborated on what it was they found unacceptable about the application process.

- Three respondents reported the project application process can take too long from applying to receiving an incentive payment.
- One respondent did not understand the Custom application process and withdrew a project because the application work was too onerous for them to figure out.
- One respondent suggested that some efficient items should not need an application and instead should be rebated at the point of sale. This respondent did not specify these items.

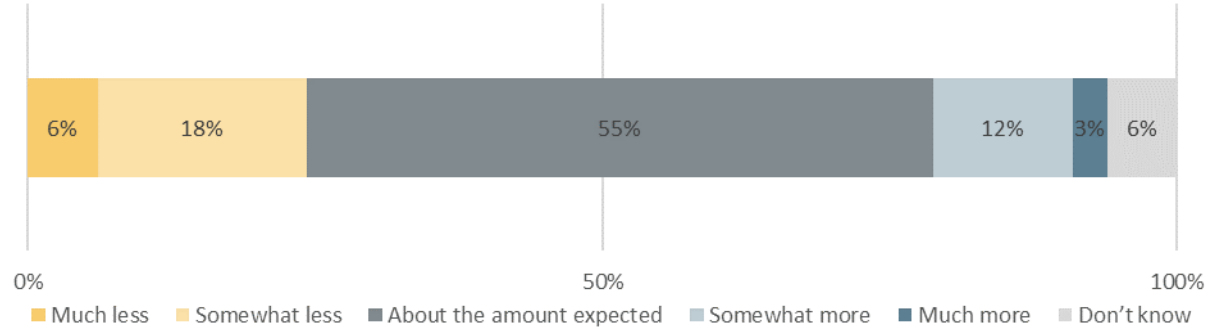
[6] These respondents scored a three or lower on the satisfaction scale.

In most cases, of the respondents that completed their own application, respondents knew who to reach out to if they had questions of the program about their application or project. Fifteen of the 19 respondents reported they knew who to contact with questions and four did not.

Most respondents relied on contractors they had experience with to complete their project. Two-thirds stated they completed their recent I&M project with a contractor they worked with in the past and about one-quarter reported using their own staff to install the equipment. The remaining respondents used a contractor recommended by a colleague (1 mention) or used a contractor recommended by the program (1 mention).

Respondents generally received the incentive they were expecting or close to it. More than four-fifths of respondents indicated that their incentive was about what they expected or slightly less or slightly more than expected. Two (6%) reported the incentive was much less than expected and one (3%) reported the incentives was much more than expected (Figure 2-4).

Figure 2-4 Expectation of incentive (n=33)



2.5.1.3.4. Program Satisfaction

More than two-fifths of respondents (14 of 33) had interactions with program staff regarding their most recent program project and most were satisfied with their interactions. Of those 14, one respondent expressed dissatisfaction with some aspect of their interaction. This respondent reported it took staff too long to address their questions and was dissatisfied with how thoroughly staff addressed questions.

More than one-third of respondents (12 of 33) provided suggestions for improving the program.

- Three suggested increasing incentives with one specifying they would like to see an increase in incentives for bulbs, not just fixtures.
- Three suggested limiting the time it takes to process incentives. None specified what an adequate timeframe would be.

- Two stated it would be helpful if I&M provided an application status update to customers. These two respondents reported that they submitted their application and never knew where their project was in the queue.
- Two suggested improving the clarity of the application. Neither respondent specified about what they found confusing on the application.
- Two suggested increasing awareness of the program among commercial and industrial businesses. One respondent specified that ads in bills are not helpful because, as the Operations Manager, they do not see utility bills. Another respondent reported that they became aware of the program because a sister facility located elsewhere had used a similar program which made them look for opportunities.
- One respondent reported having a good relationship with a specific I&M representative and expressed regret that that person did not appear to be working with the program now.

2.5.1.4. Nonparticipant Survey Findings

In addition to supporting estimations of nonparticipant spillover (see section 5.3), the survey of nonparticipating customers helped the team understand the market's awareness of the program, the use of energy saving related policies and practices, and their satisfaction with I&M as an electricity service provider.

2.5.1.4.1. Methods

ADM administered a survey to non-participating non-residential customers online and by telephone. Chapter 5 provides additional details on the survey sample and procedures for administering the survey.

2.5.1.4.2. Respondent Background

Respondents represented 18 different types of buildings. The most cited buildings were offices and manufacturing facilities **(**Table 2-15).

Nonparticipant respondents tended to own and use their property (as opposed to own and lease), were leaders of their company (e.g. presidents or sole proprietors), occupied relatively small buildings (less than 17,000 square feet), and had some type of energy policy or practice in place (Table 2-15).

Table 2-15 Respondent Background

	Count	*Percent*
Primary Business Activity (n=188)		
Professional services (office)	30	16%
Industrial/manufacturing	25	13%
House of worship	22	12%
Retail	21	11%
Agriculture	15	8%
Restaurant	14	7%
Warehouse	8	4%
Construction and related trades (e.g., contractors)	7	4%
Auto Service (garage, gas, towing, rental)	7	4%
Entertainment	7	4%
Government	6	3%
Healthcare	6	3%
State-certified K-12 school (public or private)	5	3%
Other school type	4	2%
Multifamily	4	2%
Lodging	3	2%
Transportation (trucking, boating, air)	2	1%
Grocery/convenience store	2	1%
Job Title (n=183)		
Proprietor/Owner	84	46%
President/CEO	30	16%
Other financial/administrative position	18	10%
Manager	16	9%
Facilities Manager	15	8%
Chief Financial Officer	14	8%
Other facilities management/maintenance po	4	2%
Energy Manager	2	1%
Square Footage of Property (n=163)		
Less than 2,400 sq ft	42	26%
2,400 to 5,799 sq ft	35	22%
5,800 to 16,999 sq ft	43	26%
17,000 to 11,000,000 sq ft	43	26%
Building Ownership (n=185)		
Own and occupy the entire building	135	73%
Lease the space	31	17%
Own the building and occupy part of it while leasing parts to others	19	10%
Energy Policies and Practices		
Have any energy policy or practice	116	62%
Person(s) responsible for managing energy use (n=180)	*102*	*57%*
Company goals for reducing greenhouse gas emissions (n=174)	*40*	*23%*
Formal purchasing policy requiring energy efficient items (n=182)	*26*	*14%*

2.5.1.4.3. Program Awareness

Almost one-third of respondents reported being aware of any incentives for efficient equipment available through I&M and of those most were aware of the lighting incentives. Extrapolating to the marketplace, one-quarter of respondents were aware of lighting incentives and about one-sixth were aware of incentives for heating and cooling equipment. Less than one in ten were aware of incentives for other equipment and services (Table 2-16).

Table 2-16 Respondents Awareness of Program and Incentives

Incentives for ...	*Count*	*Percent of Aware Respondents (n=60)*	*Percent of All Respondents (n=199)*
Incentives to replace inefficient equipment, including lighting, in existing buildings	50	83%	25%
Incentives for heating and cooling equipment	34	57%	17%
Incentives for refrigeration equipment	20	33%	10%
Incentives to incorporate energy efficiency into new construction designs	17	28%	9%
Incentives for variable frequency drives, efficient pumps, and efficient motors	14	23%	7%
Incentives for cooking equipment	12	20%	6%
Incentives for retro-commissioning projects, which improve how building equipment and systems function together	9	15%	5%
Something else	2	3%	1%

Nonparticipants aware of the I&M incentive programs mostly reported learning about it through some type of I&M source such as a flyer from the utility or an account representative. About two-thirds of nonparticipants indicated they learned of the program via six different methods I&M used to conduct outreach. Less than one-third reported learning of the program via their interactions in the marketplace such as via a trade ally or colleagues (Table 2-17).

Table 2-17 How Respondents Became Aware of Program (n=60)

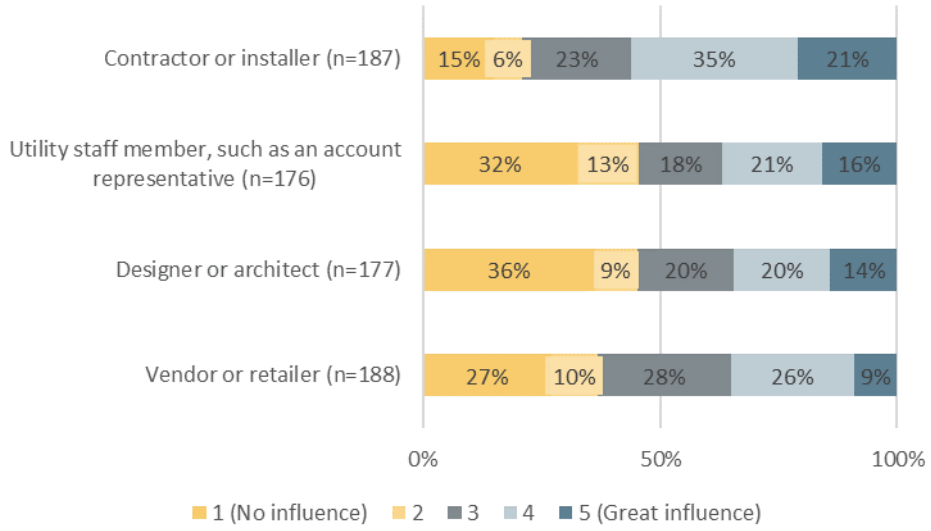
	Count	*Percent of Aware Respondents*
I&M Source	**39**	**65%**
Received an email blast or electronic newsletter	21	35%
From I&M's website	17	28%
Received an informational brochure	11	18%
From an I&M account representative	4	7%
From an I&M program representative	4	7%
From a program sponsored webinar	1	2%
Market Source	**19**	**32%**
From a Trade Ally/contractor/equipment vendor/ energy consultant	*15*	*18%*
Friends or colleagues	*9*	*10%*
From an internet search engine	*7*	*8%*
At an event/tradeshow	*3*	*3%*
Don't know	**12**	**20%**

2.5.1.4.4. Decision Making

Respondents reported that external sources of influence like contractors, utility representatives and other building professionals were only somewhat influential in their company's decisions to replace or upgrade equipment. Contractors were deemed the most influential by respondents with slightly more than half indicating that contractors would be influential.[7] Notably less than half of respondents reported that other professionals like designers, retailers, or utility representatives would influence their decisions (Figure 2-5).

[7] Scored a 4 or 5 on a five-point scale where 1 was not influential and 5 was a great influence.

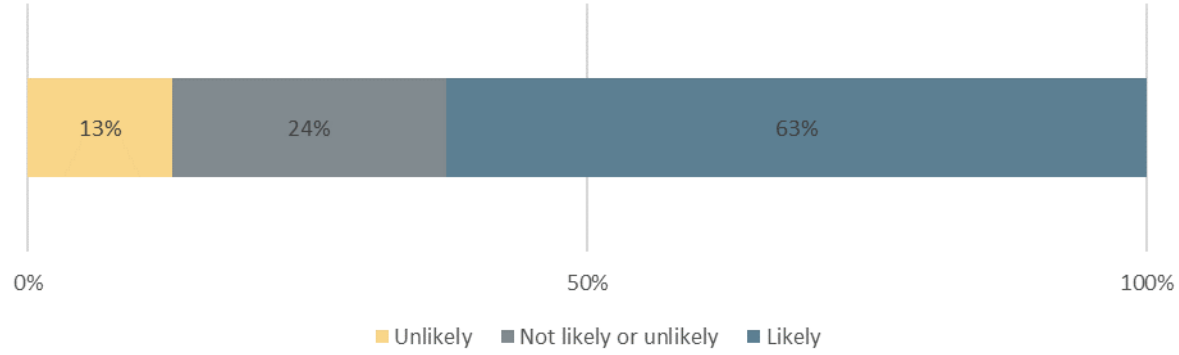
Figure 2-5: Influence on Company's Decisions About Equipment Replacements



Few respondents reported that a contractor ever mentioned I&M incentives to them when discussing past or upcoming equipment replacements. Of all 199 respondents, 11 (7%) indicated a contractor mentioned I&M incentives during the planning of a past or upcoming project.

Almost two-thirds of respondents reported they would be likely to use program incentives for any upcoming upgrades. Additionally, another quarter of respondents were noncommittal about their likelihood of using incentives and 13 percent reported they would be unlikely to use incentives (Figure 2-6).

Figure 2-6 Likelihood of Using Incentives for Next Project (n=147)



According to respondents, the largest barriers to using the incentive programs included lack of awareness of the programs and requirements and the low chance they would replace any equipment soon. Other reasons given for not pursuing incentives included the limited energy savings respondents thought would come from any upgrades, and a perception that seeking incentives would be too much time or trouble (Table 2-18).

Table 2-18 Barriers to Using Incentives (n=114)

	Count	*Percent*
Don't know enough about the incentives	63	55%
Unlikely to replace any equipment in near future	47	41%
Energy savings from equip. replacements not worth the trouble	13	11%
Too much time or trouble	14	12%
Prefer not to deal with utility	4	4%
Moving locations in near future	1	1%
Decisions are made by a property or energy management firm	5	4%

More than one-quarter of respondents reported they are considering a new construction or major renovation project within five years and very few of those that have begun planning their project received information from their building professionals about I&M incentives. Of those 52 respondents (out of 199), more than half (29) reported they are discussing upgrades with some type of building professional and of those, eight noted that the building professional has mentioned using I&M incentives for that project.

Respondents were most likely to trust I&M or equipment manufactures and their representatives for information about replacing or purchasing new energy-using equipment (Table 2-19). A few respondents that mentioned trade association specified industry specific trade groups like the Building Operators and Managers Association (1 mention). Of the few respondents that specified other organizations, two respondents representing houses of worship mentioned the Hoosier Interfaith Power and Light group and one mentioned Purdue University.

Table 2-19 Trusted Sources of Information (n=122)

	Count	*Percent*
I&M	82	67%
Equipment manufacturers	71	58%
Chamber of Commerce	29	24%
Trade associations	19	16%
Other organizations or groups	15	12%

2.6. Findings and Recommendations

Based on the results of the analysis, ADM identified several key conclusions and recommendations I&M could consider as they implement their efficiency programs for commercial and industrial customers.

The program appears to be noticeably influencing the market. The program has a net-to-gross ratio of 90% for the Work Prescriptive kWh savings, indicating that the program is affecting customer decisions. The net-to-gross ratio was lower for the Work Custom Program (presented in section 3.4, but this may reflect idiosyncratic differences in who participated in the program in 2021 as custom program net-to-gross ratios can be variable.

There are few contractors specializing in non-lighting measures among contractors completing projects and the program team sees opportunities to increase uptake of non-lighting measures. Five of the 21 contractor respondents specialized in a field other than lighting. They represented architecture firms, air compressor contractors, building controls contractors, and motors suppliers, all key fields that can help save energy for customers in the I&M region.

There are notable opportunities to increase program participation and satisfaction by increasing outreach efforts, especially in-person efforts, as Covid restrictions diminish, and trade meetings and conferences begin being held in-person. Staff noted that in-person visits are key to their outreach efforts and some contractors mentioned that having personal relationships with staff were key to their participation in the program. Furthermore, nonparticipant survey results suggest that there is an opportunity for contractors to promote the market to their customers.

- **Recommendation 1:** Increase outreach to contractors, especially non-lighting contractors, via participating in and supporting trade association meetings and conferences.
- **Recommendation 2:** Expand support for in-person contact for both recruiting new participants and contractors and maintain relationships with existing participants and contractors. The participant survey and contractor interviews reveal demonstrate that there is an opportunity to educate architects and general contractors in particular about program opportunities.

The online application launched in February 2022 may address the shortcomings of the application form used during PY2021. Almost half of respondents specified that the pdf-based form was hard to use and made their processing of applications difficult. Using a pdf-form in 2021 was a step back for contractors used to using the Excel-based application of 2020. I&M launched an online application in February 2022 that may address these concerns.

Multiple sample sites had low realization rates for the projects. Through verification activities and review of project calculations, ADM determined that 6 of 20 Work Custom Program sample sites had realization rates of less than 90%. Two larger projects (expected savings greater 300,000 kWh) had realization rates of 85% and 87%. Both projects were new construction projects and had realization rates of 85% and 87% because of analytical errors.

- **Recommendation 3:** ADM recommends that ADM perform pre-approval reviews for specific sites to ensure that ex ante and ex post savings estimation approaches are in alignment. ADM will work with I&M and its implementation contractor to establish criteria for project pre-approval reviews.

Prescriptive lighting measures used a per unit savings value to estimate ex ante savings. The per unit savings value was the same for all applications of the measure, regardless of building type.

This issue was present in 19 of the 21 sampled projects with a realization rate of less than 90% or greater than 110%. Additionally, in many cases, project specific information for lamp and fixture wattages and building hours was collected through the application, but not used in the savings analysis.

- **Recommendation 4:** ADM recommends that ex ante savings estimates for prescriptive lighting measures use project specific data where applicable to improve ex ante savings estimates.

Project application information was frequently incomplete. The prescriptive application form allowed participating customers to partially complete the application with the measure name without including baseline information, hours of use, and specific information on the new equipment. This additional information is necessary for the EM&V effort and should be required of applicants.

- **Recommendation 5:** Require that the application be complete prior to processing it for submission of payment. The new online application implemented in February 2022 may have addressed this issue, but in the event it has not, program staff should add validation checks to ensure that the form is completely filled out is necessary.

3. Work Custom

This chapter presents the results of both the impact and process evaluations of the Work Custom Program that Indiana Michigan Power (I&M) offered to its non-residential customers during the period of January 2021 through December 2021.

The objectives of the evaluation are to:

- Establish a pre-approval review procedure
- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year;
- Assess satisfaction among participating customers; and
- Provide recommendations for program improvement as appropriate.

3.1. Program Description

The Work Custom Program targets commercial and industrial accounts and provides incentives to implement efficiency measures not covered by the prescriptive program. The program provides an incentive of $0.06 per kWh saved for lighting measures, and $0.07 per kWh saved for non-lighting measures. The program measures include non-prescriptive lighting and HVAC, and refrigeration measures, compressed air measures, industrial process improvements, and retro-commissioning.

3.2. Data Collection

3.2.1. Verification of Measures

3.2.1.1. Sampling Plan

The sampling approach was combined for all C&I programs in 2021. The approach is described in section 2.2.1.1 of this document on page 7.

The table below shows the number of projects, ex ante gross kWh energy savings, and sampling statistics, by stratum, of the program sample.

Table 3-1 Population Statistics Used for Work Custom Sample Design

Variable	*Stratum 1*	*Stratum 2*	*Stratum 3*	*Stratum 4*	*Stratum 5*	*Totals*
Strata boundaries (kWh)	> 725,000	260,000 – 725,000	100,000 – 260,000	20,000 – 100,000	< 20,000	
Number of projects	3	16	24	47	53	143
Total Ex Ante Annual kWh	7,990,282	6,976,371	3,934,732	2,424,914	537,422	21,863,722
Average kWh Savings	2,663,427	436,023	163,947	51,594	10,140	3,325,132
Std. dev. of kWh savings	1,984,127	147,864	46,130	20,524	5,054	2,203,698
Coefficient of variation	0.74	0.34	0.28	0.4	0.5	
Final design sample	3	4	3	4	6	20

3.2.1.2. Verification Data Collection Procedure

The data collection procedure for the Work Custom Program was the same as the approach described in section 2.2.1.2 of this document on page 8.

3.2.2. Participant Survey

The survey data collection for the Work Custom Program is described in section 2.5.1.3 of this document on page 28.

3.2.3. Staff Interviews

The staff interviews completed for the Work Custom Program is described in section 2.5.1.1 of this document on page 19.

3.2.4. Trade Ally Interviews

The trade ally interviews completed for the Work Custom Program is described in section 2.5.1.2 of this document on page 21.

3.3. Estimation of Ex Post Gross Savings

3.3.1. Methodology for Estimating Ex Post Gross Savings

3.3.1.1. Review of Documentation

The process for reviewing program documentation for the Work Custom Program was the same as the approach described in See section 2.3.1.1 of this document on page 9.

3.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

A breakdown of sampled measures for the Work Custom Program is below in Table 3-2.

Table 3-2 Breakdown of Sampled Custom Measures

Measure Category	*Ex Ante Annual kWh Savings*	*Ex Post Annual Gross kWh Savings*	*Gross Realization Rate*
HVAC Replacement	3,860	3,860	100%
VFD - New Construction	366,555	335,774	92%
Compressed Air Leak Audit And Repair	12,423	13,171	106%
Injection Molding Machine Upgrade/Replacement	425,459	425,459	100%
LED Relamp/Upgrade	5,923,871	5,865,267	99%
New Construction Lighting	3,383,116	3,020,826	89%
Total	10,115,283	9,664,357	96%

ADM calculated a kWh energy savings gross realization rate and a peak kW reduction gross realization rate for each site in the M&V sample. Sites with relatively high or low gross realization

rates were analyzed to determine the reasons for the discrepancy between ex ante and ex post energy savings. The site-level gross impact analysis results for each M&V sample site are presented in Volume II of the report. These reports outline the data sources and analytical approaches employed in the calculation of measure impacts.

3.3.2. Results of Ex Post Gross Savings Estimation

The kWh gross realization rate is the ratio of sampled measure ex post gross kWh energy savings to sampled measure ex ante kWh energy savings. The kW gross realization rate is the ratio of sampled measure ex post gross kW demand savings to sampled measure ex ante kW demand savings. Since a stratified sampling approach was employed for this program, stratum-level kWh and kW gross realization rates were developed for each sampling stratum.

Program-level gross ex post gross kWh energy savings are calculated as follows:

- The ex-ante kWh energy savings of non-sampled measures are factored by the applicable stratum-level kWh gross realization rates to calculate ex post gross kWh energy savings for non-sampled measures.
- The ex post gross kWh energy savings of all sampled measures and all non-sampled measures are summed.

Program-level gross ex post gross kW demand savings are calculated as follows:

- The ex-ante kW demand savings of non-sampled measures are factored by the applicable stratum-level kW gross realization rates to calculate ex post gross kW savings for non-sampled measures.
- The ex post gross kW demand savings of all sampled measures and all non-sampled measures are summed.

3.3.2.1. Ex Post Gross kWh Savings

Table 3-3 displays the ex ante and ex post gross kWh savings of the Work Custom Program including gross realization rates for sampled projects.

Table 3-3 Work Custom Project-Level Ex Ante and Ex Post kWh Savings

Stratum	*Project Number*	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Project Gross Realization Rate*
1	213	4,937,236	4,898,527	99%
1	219	1,739,165	1,477,292	85%
1	204	1,303,615	1,247,776	96%
2	203	425,459	425,459	100%
2	209	366,555	335,774	92%
2	200	340,336	295,758	87%
2	202	331,687	330,905	100%

Stratum	*Project Number*	*Ex Ante kWh Savings*	*Gross Ex Post kWh Savings*	*Project Gross Realization Rate*
3	214	182,983	183,955	101%
3	211	107,826	108,464	101%
3	207	104,323	104,323	100%
4	218	86,373	97,664	113%
4	208	59,333	58,142	98%
4	216	52,155	51,228	98%
4	205	29,860	1,176	4%
5	210	12,423	13,171	106%
5	212	12,315	10,997	89%
5	217	9,918	11,119	112%
5	215	5,672	5,040	89%
5	206	4,188	3,726	89%
5	201	3,860	3,860	100%
All Non-Sample Projects		11,748,439	11,281,555	96%

The realization rate for six of the 20 sample sites was less than 90%. The factors that resulted in the realization rates were idiosyncratic to the project and are summarized below.

- The two largest sample sites with realization rates of less than 90% (Project 200 and Project 219) had lower realization rates because of analytical errors. Both of these projects were new construction lighting projects. One included the savings for occupancy sensors that are required by code and referenced lighting power density values that were different from the values in the COMcheck documentation. The second site limited the lighting power density calculation to the invoiced lighting and excluded additional lighting installed at the facility that was not included in the invoices.
- Three projects (215, 217, 206) misapplied heating cooling interaction factors in the estimate of lighting savings.
- One project used an hours of use value that differed from the hours of use developed through the verification activities.
- One project had a low realization rate of 4% but project documentation did not provide sufficient detail to understand how the ex ante savings were calculated.

Table 3-4 presents the ex post annual gross kWh savings for the Work Custom Program during the period January 2021 through December 2021.

Table 3-4 Ex Post Annual Gross kWh

Ex Ante Gross kWh Savings	Gross Audited kWh Savings	Gross Verified kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
21,863,722	21,863,722	20,945,913	20,945,913	96%

3.3.2.2. Ex Post Gross kW Reductions

Table 3-5 presents the ex post peak kW reduction for the Work Custom Program during the period January 2021 through December 2021.

Table 3-5 Ex Post Peak kW

Ex Ante Gross kW Savings	Gross Audited kW Savings	Gross Verified kW Savings	Ex Post Gross kW Savings	Gross Realization Rate
3,000.75	3,000.75	3,462.45	3,462.45	115%

3.4. Estimation of Ex Post Net Savings

3.4.1. Methodology for Estimating Ex Post Net Savings

The procedure for the estimation of program-level kWh energy savings and program-level kW demand reductions was the same as the approach described in section 2.4.1 of this document on page 13.

3.4.2. Results of Ex Post Net Savings Estimation

Table 3-6 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Work Custom Program.

Table 3-6 Ex Post Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	21,863,722	3,000.75
Gross Audited Savings	21,863,722	3,000.75
Gross Verified Savings	20,945,913	3,462.45
Ex Post Gross Savings	20,945,913	3,462.45
Gross Realization Rate	96%	106%
Ex Post Free Ridership	6,064,332	1,330.99
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	14,881,581	2,131.46
Net-to-Gross Ratio	71%	88%
Ex Post Net Lifetime Savings	163,084,754	n/a

The net-to-gross ratio for the Work Custom Program was lower in PY2021 than it has been in past years. A review of the responses indicated that multiple customers had indicated some degree of free ridership and that it the results are not reflective of a single free rider with a large project.

3.5. Process Evaluation

Methods and findings related to the process evaluation of the Work Custom Program are presented in the Work Prescriptive Chapter in section 2.5 on page 18.

3.6. Findings and Recommendations

Applicable conclusions and recommendation are presented in section 2.6 on page 38.

4. Public Efficient Streetlighting

This chapter presents the results of the impact evaluation of the Public Efficient Streetlighting Program that Indiana Michigan Power (I&M) offered to its local government customers during the period of January 2021 through December 2021.

The objectives of the evaluation are to:

- Assess gross and net energy (kWh) savings and peak demand (kW) reductions that resulted from participation in the program during the program year; and
- Provide recommendations for program improvement as appropriate.

4.1. Program Description

To be eligible to participate in the Public Efficient Street Lighting Program, an eligible customer must convert I&M-owned street lighting systems to more efficient LED street lighting. The Program is targeted at local governments and will seek to convert street lighting to LED technology.

The incentive strategy for the program is to apply 100% of the difference between the cost of a LED streetlight and a baseline high pressure sodium equivalent streetlight. Rebates are calculated based on this cost differential and will offset I&M's capital cost of conversion (material and labor) of the LED streetlight fixture to the high-pressure sodium streetlight fixture. As LED streetlight conversions occur, where LED streetlights are placed in-service, I&M will use the rebate from the Public Efficient Street Lighting Program to offset the capital cost of conversion booked in I&M electric plant in-service streetlight accounts.

The program requires pre-approval for any street lighting projects before purchasing and installing equipment. Once applications are approved, they are sent to I&M for approval as the last step in the implementation process.

4.2. Data Collection

4.2.1. Verification of Measures

ADM completed a desk review of the Public Efficient Street Lighting Program for a census of the completed projects. For the desk review, ADM reviewed the ex ante savings estimate and applied the correct baseline wattage for the fixtures, and the regional hours of use.

4.3. Estimation of Ex Post Gross Savings

The procedure for the estimation of program-level gross kWh energy savings and gross kW demand reductions for the Public Efficient Street Lighting Program.

4.3.1. Methodology for Estimating Ex Post Gross Savings

4.3.1.1. Review of Documentation

The process for reviewing program M&V and due diligence procedures for the Public Efficient Street Lighting Program is the same as the approach described in section 2.3.1.1 of this document on page 9.

4.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

Annual energy savings for each sampled streetlight is determined by the following formula:

$$\text{Annual Energy Savings} = kWh_{baseline} - kWh_{after}$$

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

- Location-specific dusk to dawn hours (3,934).
- Factoring the dusk to dawn hours by the baseline and post-installation demand to calculate the kWh energy consumption.

4.3.2. Results of Ex Post Gross Savings Estimation

4.3.2.1. Ex Post Gross kWh Savings

The realized gross kWh savings of the Public Efficient Street Lighting Program for the sampled projects are summarized in Table 4-1.

Table 4-1 Ex Ante kWh and Ex Post kWh of Sampled Projects

Ex Ante Gross kWh Savings	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
2,303,285	2,303,285	100%

The ex post annual gross kWh savings for the Public Efficient Street Lighting Program during the period January 2021 through December 2021 are presented in Table 4-2.

Table 4-2 Ex Post Annual Gross kWh

Ex Ante Gross kWh Savings	*Gross Audited kWh Savings*	*Gross Verified kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
2,303,285	2,303,285	2,303,285	2,303,285	100%

4.3.2.2. Ex Post Gross kW Reductions

There are no peak kW reductions associated with the streetlighting retrofits.

4.4. Estimation of Ex Post Net Savings

4.4.1. Methodology for Estimating Ex Post Net Energy Savings

The lighting replaced under the streetlighting program is owned and maintained by I&M and municipalities. Consequently, ADM assigned a net-to-gross ratio of 1.0 to the program.

4.4.2. Results of Ex Post Net Savings Estimation

Table 4-3 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Public Efficient Street Lighting Program.

Table 4-3 Ex Post Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	2,303,285	-
Gross Audited Savings	2,303,285	-
Gross Verified Savings	2,303,285	-
Ex Post Gross Savings	2,303,285	-
Gross Realization Rate	100%	n/a
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	2,303,285	-
Net-to-Gross Ratio	100%	n/a

5. C&I Non-Participant Survey

The following sections describe the non-residential non-participant survey objectives, methodology, and findings.

5.1. Survey Objectives

The survey of nonparticipating customers was designed to achieve multiple objectives:

- Characterize levels of program awareness;
- Characterize customer firmographics and internal policies and staffing for supporting efficiency;
- Characterize sources of information used to get information on efficient equipment options; and
- Estimate non-participant spillover.

5.2. Sample Description and Procedures for Fielding the Survey

ADM administered the survey to a random sample of non-participant customers. ADM identified a population of non-program participants by matching current account records to account numbers that participated in the C&I programs in 2019 – 2021 (November). Specifically, accounts were treated as non-participating accounts if the account was not listed in program tracking data for that period.

ADM stratified the population into five strata based on energy usage. Table 5-1 displays the sample design including population size and the number of survey responses.

Table 5-1 Summary of Non-Participant Survey Sample Design

Stratum	*Maximum kWh*	*Minimum kWh*	*Average kWh*	*Population*	*Number of Survey Completions*
1	126,953,800	1,000,416	4,513,757	664	8
2	998,784	500,320	694,701	708	3
3	499,200	100,032	215,104	3,918	27
4	100,000	50,009	70,374	3,443	19
5	50,000	1,001	12,601	27,386	142
Total				36,119	199

The surveys were administered to customers by telephone and online. ADM administered screening questions at the beginning of the survey to:

- Route the survey to a person who makes decisions or provides input to others on decisions about purchases of energy-using equipment; and
- Verify that the organization has not completed any I&M incentive projects in the previous three years.

Table 5-2 summarizes the non-participant survey response by mode of administration.

Table 5-2 Non-participant Survey Response by Mode of Administration

Survey Group	*Mode*	*Time Frame*	*Number of Contacts*	*Number of Survey Completions*
Non-Residential Non-Participant Survey	Online	January 2022	9,140	193
Non-Residential Non-Participant Survey	Telephone	December 2021	597	6

5.3. Estimation of Non-Participation Spillover

The following sections summarize the non-participant spillover estimation procedures and results.

5.3.1. Procedures for Calculating Non-Participant Spillover

Estimates of spillover are based on a series of questions administered to participants. The questions are intended to:

- Identify efficiency measures implemented by program participants;
- Collect measure specific information for use in estimating saving due to the measure; and
- Collect information used to substantiate attribution of the savings to program influence.

The survey administered to participants asked participants about the installation of any energy efficiency measures during the previous 12 months. Specifically, customers will be asked the following questions:

- Has your organization purchased and installed any energy efficient equipment at the [ADDRESS] location in the last 12 months? By energy efficient, this means equipment that uses less energy than the equipment you had in place or the standard equipment that you could have purchased.
- What additional energy efficient equipment have you installed? Which equipment replacements or upgrades exceeded energy efficiency codes and standards?

These questions were followed by additional questions on the measure specifications to estimate energy savings. For the items that are attributable to the program (see below), energy savings are calculated using the Indiana TRM or using other credible sources if needed. To the extent practicable, ADM will make conservative assumptions about the installed equipment or baseline conditions in cases where the information on measure inputs is missing or otherwise insufficient.

Three key survey questions are used to collect information to determine if the savings associated with the measures reported are attributable to I&M's programs:

- SO1: I&M offers incentives and services for energy efficient equipment upgrades and improvements through its Electric Ideas programs. Before installing that equipment, had you heard about the programs?

- SO2: On a scale of 0 to 10, where 0 represents "not at all influential" and 10 represents "extremely influential", how influential was the information or services provided through the Electric Ideas programs in your decision to make the upgrades or replacements that you just mentioned?
- SO3: On a scale of 0 to 10, where 0 represents "not at all likely" and 10 represents "extremely likely" how likely would you have been to make the upgrades or improvements that you mentioned if I&M did not provide rebates or information through its Electric Ideas programs?

Savings are attributable when customers indicate that they are aware of the programs and if the spillover score based on SO2 and SO3 is greater than 7. Equation 5-1 the spillover calculation.

Equation 5-1

$$Spillover\ Score = Average(SO2, 10\text{-}SO3)$$

Based on the application of the above methods, the evaluation team did not identify any non-participant spillover.

5.3.2. NPSO Results

ADM did not identify any non-participant spillover in the survey results.

6. Cost Effectiveness Evaluation

The following cost effectiveness tests were performed for each program: Total Resource Cost (TRC) test, Utility Cost Test (UCT), Participant Cost Test (PCT), and Ratepayer Impact Measure (RIM) test. A score above one signifies that, from the perspective of the test, the program benefits were greater than the program costs. The benefits and costs associated with each test are defined in Table 6-1.

Table 6-1 Summary of Benefits and Costs Included in each Cost Effectiveness Test

Variable	*Definition*	*PCT*		*UCT*		*RIM*		*TRC*	
		Benefit	*Cost*	*Benefit*	*Cost*	*Benefit*	*Cost*	*Benefit*	*Cost*
Incentives	Incentives paid to customers.	✓			✓		✓		
Program Installation Costs	Installation costs paid by program.				✓		✓		✓
Bill Savings / Lost Revenue	Reduction in electricity costs faced by customers as a result of implementation of program measures. Equal to revenue lost to the utility.	✓					✓		
Avoided Energy Costs	Energy-related costs avoided by utility.			✓		✓		✓	
Avoided Capacity Costs	Capacity-related costs avoided by utility, including T&D.			✓		✓		✓	
Incremental Costs	Incremental costs associated with measure implementation, as compared with what would have been done in absence of program.		✓						✓
Program Overhead Costs	Program costs other than incentive or installation costs.				✓		✓		✓

Table 6-2 through Table 6-4 summarize key financial benefit and cost inputs for the various tests along as well as the test results for each commercial and industrial program during PY2021.

The scores presented below are associated with the full 2021 program year. Where applicable, benefits associated with the first two months of program activity are calculated by referencing avoided cost assumptions associated with the previous program plan, and the benefits associated with the last ten months of program activity are calculated by referencing avoided cost assumptions associated with the PY2021 program plan.

Table 6-2 Work Prescriptive Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	$ 693,395			$ 693,395		$ 693,395		
Program Installation Costs				$ -		$ -		$ -
Bill Savings (NPV)	$ 6,031,962							
Lost Revenue (NPV)						$ 8,238,564		
Avoided Energy Costs (NPV)			$ 2,602,830		$ 2,602,830		$ 2,602,830	
Avoided Capacity Costs (NPV)			$ 348,377		$ 348,377		$ 348,377	
Avoided T&D Costs (NPV)			$ -		$ -		$ -	
Incremental Costs		$ 1,508,370						$ 1,508,370
Program Overhead Costs				$ 1,127,552		$ 1,127,552		$ 1,127,552
Total Benefits	$ 6,725,357		$ 2,951,207		$ 2,951,207		$ 2,951,207	
Total Costs	$ 1,508,370		$ 1,820,947		$ 10,059,511		$ 2,635,922	
Test Score	4.46		1.62		0.29		1.12	

Table 6-3 Work Custom Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	$ 1,285,324			$ 1,285,324		$ 1,285,324		
Program Installation Costs				$ -		$ -		$ -
Bill Savings (NPV)	$ 7,784,633							
Lost Revenue (NPV)						$ 10,339,258		
Avoided Energy Costs (NPV)			$ 3,477,573		$ 3,477,573		$ 3,477,573	
Avoided Capacity Costs (NPV)			$ 433,588		$ 433,588		$ 433,588	
Avoided T&D Costs (NPV)			$ -		$ -		$ -	
Incremental Costs		$ 1,025,532						$ 1,025,532
Program Overhead Costs				$ 1,756,624		$ 1,756,624		$ 1,756,624
Total Benefits	$ 9,069,956		$ 3,911,161		$ 3,911,161		$ 3,911,161	
Total Costs	$ 1,025,532		$ 3,041,948		$ 13,381,206		$ 2,782,156	
Test Score	8.84		1.29		0.29		1.41	

Table 6-4 Public Efficient Streetlighting Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	$ 165,844			$ 165,844		$ 165,844		
Program Installation Costs				$ -		$ -		$ -
Bill Savings (NPV)	$ 1,586,907							
Lost Revenue (NPV)						$ 2,471,386		
Avoided Energy Costs (NPV)			$ 813,630		$ 813,630		$ 813,630	
Avoided Capacity Costs (NPV)			$ -		$ -		$ -	
Avoided T&D Costs (NPV)			$ -		$ -		$ -	
Incremental Costs		$ 724,012						$ 724,012
Program Overhead Costs				$ 49,154		$ 49,154		$ 49,154
Total Benefits	$ 1,752,751		$ 813,630		$ 813,630		$ 813,630	
Total Costs	$ 724,012		$ 214,998		$ 2,686,385		$ 773,166	
Test Score	2.42		3.78		0.30		1.05	

2021 Indiana Commercial & Industrial Portfolio EM&V Report

Volume II of II

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Table of Contents

1. Introduction

Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., (ADM) performed evaluation, measurement and verification (EM&V) activities to confirm the energy savings (kWh) and demand reduction (kW) realized through the demand side management programs that I&M implemented in Indiana in 2021.

This report is divided into two volumes providing information on the impact, process, and cost effectiveness evaluation of the I&M portfolio of commercial and industrial programs implemented in Indiana during the 2021 program year. Volume II contains chapters presenting detailed information regarding evaluation methodologies, data collection instruments, and evaluation results. Volume II is organized as follows:

- Chapter 2: Site-Level Estimation of Ex Post Gross Energy Impacts
- Chapter 3: C&I Participant Survey Instrument
- Chapter 4: Non-Participant Survey Instrument
- Chapter 5: C&I Participant Survey Results
- Chapter 6: Non-Participant Survey Results

See report Volume I for narrative and summary information pertaining to the evaluation methods and results.

2. Site-Level Estimation of Ex Post Gross Energy Impacts

Project Number 115

Executive Summary

Under project 115, a program participant received prescriptive incentives from I&M for replacing shaded pole evaporator motors with ECM motors. The ex post annual energy savings are 116,758 kWh and the ex post peak demand reduction is 5.01 kW. The project-level kWh gross realization rate is 240%.

Project Description

The program participant received an incentive for installing (40) ECM motors in medium temperature walk in coolers, and (19) ECM motors in low temperature walk in freezers.

Measurement and Verification Effort

ADM staff reviewed the submitted documentation, product specification and invoices. The savings calculation method was based on that presented in the Illinois TRM V10.0 section relating to *Electronically Commutated Motors for Walk In and Reach In Coolers/Freezers*. The savings stipulated based on the size of the shaded pole motor replaced. The savings equations are:

$$kWh_{Savings} = \frac{kWh_{Savings}}{motor} \times N_{motors}$$

$$kW_{Peak} = \frac{kWh_{Savings}}{Hours}\ x\ CF$$

Where:

$kWh_{savings}$ = *Annual energy savings*

$kWh_{savings}$ = *Motors savings, TRM based*

N_{motors} = *Number of motors*

HOU = *Annual hours, 8760*

Motor Savings Calculations

Location	*Quantity (motors)*	*Motor Size (Hp)*	*Savings per Motor*	*Hours*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
Cooler	40	1/20	1,583	8,760	63,320	192%
Freezer	6	1/20	1,583	8,760	9,498	341%
Freezer	13	1/3	3,380	8,760	43,940	
Total	59				116,758	240%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Cooler ECM Motors	32,960	63,320	192%	3.40
Freezer ECM Motors	15,656	53,438	341%	1.61
Total	59,530	116,758	55%	5.02

The ex post annual energy savings are 116,758 kWh, and the ex post peak demand reduction is 5.02 kW. The energy savings gross realization rate of the project is 240%. The ex ante savings calculation referenced a source indicating energy savings of 824 kWh per year for all motor sizes, whereas the ex post kWh savings calculation was based on Illinois TRM V10.0 and accounted for applicable motor size.

Project Number 207 and 111

Executive Summary

Under project 207 and 111, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient lighting and lighting controls. The ex post annual energy savings are 139,259 kWh with ex post peak demand reduction of 14.69 kW. The project energy savings gross realization rate is 101%.

Project Description

The customer received incentives for replacing (108) 4' 4L T5HO fixtures and (12) 4' 6L T5HO fixtures with (108) 4' LED high bay fixtures with occupancy sensors.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the annual savings of the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4L T5HO to LED High Bay	54	54	234	144	7,488	1.10	36,392	36,392	100%
6L T5HO to LED High Bay	12	0	351	0	7,488	1.10	31,539	31,539	100%
4L T5HO to LED High Bay	54	54	234	144	7,488	1.10	36,392	36,392	100%
Total							104,323	104,323	100%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = Annual energy savings

N = Number of occupancy sensors

W = Wattage controlled by each occupancy sensor

t = Lighting operating hours

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings of the lighting controls installed for which prescriptive incentives were received.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	108	144	7,488	0.30	1.79	32,932	34,936	106%
Total						32,932	34,936	106%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Custom	104,323	104,323	100%	13.41
Lighting Controls - Prescriptive	32,932	34,936	106%	1.28
Total	137,255	139,259	101%	14.69

The ex post annual energy savings are 139,259 kWh and the ex post peak demand reduction is 14.69 kW. The energy gross realization rate is 101%. The ex ante savings estimate for the

occupancy sensors was based on a deemed per unit value, whereas the ex post savings calculation utilized site-specific information.

Project Number 218 and 126

Executive Summary

Under project 218 and 126, a program participant received custom and prescriptive incentives from I&M for a new construction lighting project. The ex post annual energy savings are 186,427 kWh and the ex post peak demand reduction is 41.47 kW. The project-level kWh gross realization rate is 99%.

Project Description

The program participant received an incentive for installing the following LED lighting:

- (109) 13W BR30 lamps
- (9) 2x2 30W panel fixtures
- (59) 15W PAR38 lamps
- (6) 9W corn cob lamps
- (48) 17W BR40 lamps
- (27) 165W high bay fixtures
- (138) 17W PAR38 lamps
- (4) 9W 2' tubes
- (24) 70W round high bay fixtures
- (8) 100W wall packs
- (891) 15W 4' tubes

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
$Allowed\ LPD$	= Allowed lighting power density per square foot per ASHRAE Standard 90.1-2007
$Installed\ LPD$	= Installed lighting power density per square foot
$Footage$	= Square footage of new construction space
HOU	= Indicates hours of usage for the fixture

HCIFe = *Heating and Cooling Interactive Factor*

HCIFd = *Heating and Cooling Interactive Factor during Peak Demand hours*

CF = *Coincidence Factor for Peak Demand hours*

The table shown below presents ex ante and ex post energy savings for the lighting equipment installed in under the project in different areas in the facility.

Lighting Energy Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Heating Cooling Interaction Factor*	*Ex Ante Annual kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
	Baseline	*Efficient*	*Baseline*	*Efficient*					
Custom									
Inc BR to BR LED	18	18	65	13	3,276	1.13	3,066	3,474	113%
CFL to BR LED	38	38	38	13	3,276	1.13	3,112	3,526	113%
CFL to BR LED	53	53	53	13	3,276	1.13	7,119	7,869	113%
Fluorescent (2) to LED 2x2 Panel	9	9	32	30	3,276	1.13	59	67	113%
CFL to PAR38 LED	51	51	54	15	3,276	1.13	6,516	7,383	113%
MH 100W to LED Corn Cob	6	6	128	9	4,300	1.13	3,070	3,479	113%
Inc BR to BR40 LED	48	48	65	17	3,276	1.13	7,548	8,552	113%
Halogen to LED Flat Panel	96	27	150	165	3,276	1.13	32,580	36,913	113%
PAR38 Inc to PAR38 LED	138	138	75	17	2,900	1.13	23,212	26,299	113%
Fluorescent (2) to LED 2' lamp	2	4	32	9	3,276	1.13	92	104	113%
Prescriptive									
HID 250W to LED Round HB	24	24	295	70	3,276	1.13	19,704	20,043	102%
HID 250W to LED Wall Pack	8	8	295	100	3,276	1.13	6,568	5,790	88%
HID 175W to LED PAR38	8	8	210	15	4,300	1.00	2,768	6,708	242%
4' T5 to LED 4' tube	891	891	32	15	3,276	1.13	73,062	56,221	77%
Total							188,476	186,427	99%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Lighting - Custom	83,374	97,664	113%	22.80
Lighting - Prescriptive	102,102	88,762	87%	18.67
Total	188,476	186,427	99%	41.47

The ex post annual energy savings are 186,427 kWh and the ex post peak demand reduction is 41.47 kW. The project-level kWh gross realization rate is 99%.

Project Number 217 & 125

Executive Summary

Under project 217 & 125, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient lighting. The project ex post annual energy savings are 23,830 kWh and the ex post peak demand reduction is 5.09 kW. The project-level kWh gross realization rate is 86%.

Project Description

The program participant received an incentive for installing (56) LED 90W high bay fixtures, (9) LED 32W 4' linear fixtures, and (12) LED 30W 2x4 retrofit kits.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 5L T8 to 4' LED High Bay	13	13	178	90	4,212	1.12	4,818	5,402	112%
4' 5L T8 to 4' LED High Bay	11	11	178	90	4,212	1.12	4,077	4,571	112%
4' 2L T8 to 4' LED Linear	9	9	59	32	4,212	1.12	1,024	1,147	112%
Prescriptive									
4' 4L T8 to 4' LED High Bay	27	27	152	90	4,212	1.12	11,907	7,904	66%
4' 4L T8 to 4' LED High Bay	5	5	152	90	4,212	1.12	2,205	1,464	66%
4' 3L T8 to 2x4 Retrofit Kit	12	12	89	30	4,212	1.12	3,624	3,343	92%
Total							27,654	23,830	86%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting – Custom	9,918	11,119	112%	2.37
Lighting - Prescriptive	17,736	12,711	72%	2.71
Total	27,654	23,830	86%	5.09

The ex post annual energy savings are 23,830 kWh and the ex post peak demand reduction is 5.09 kW. The project-level kWh gross realization rate is 86%.

Unlike the ex post savings calculations, the ex ante savings calculations were premised on a heating and cooling interactive factor of 1.0 (that would be applicable to an unconditioned space) and a coincidence factor of 0.0. For the prescriptive measures, the ex ante savings estimate was based on a deemed value per measure that did not account for space type or participated-reported information, whereas the ex post analysis used project-specific information.

Project Number 104

Executive Summary

Under project 104, a program participant received prescriptive incentives from I&M for completion of an energy efficient lighting project. The ex post annual energy savings are 21,520 kWh and the ex post peak demand reduction is 6.67 kW. The project-level kWh gross realization rate is 45%.

Project Description

The program participant received an incentive for installing (20) LED 2x4 panel fixtures and (30) LED 2x4 high bay fixtures.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
Allowed LPD	= Allowed lighting power density per square foot per ASHRAE Standard 90.1-2007
Installed LPD	= Installed lighting power density per square foot
Footage	= Square footage of new construction space
HOU	= Indicates hours of usage for the fixture
HCIFe	= Heating and Cooling Interactive Factor
HCIFd	= Heating and Cooling Interactive Factor during Peak Demand hours
CF	= Coincidence Factor for Peak Demand hours

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
4' 4L T8 to LED 2x4 Panel	20	20	144	50	2,000	1.00	8,813	3,760	43%
MH(400) to LED 2x4 High Bay	30	30	458	162	2,000	1.00	38,880	17,760	46%
Total							47,693	21,520	45%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	47,693	21,520	45%	6.67
Total	47,693	21,520	45%	6.67

The ex post annual energy savings are 21,520 kWh and the ex post peak demand reduction is 6.67 kW. The project-level kWh gross realization rate is 45%.

The ex ante savings estimate was based on a deemed value per measure that did not account for space type or participated-reported information, whereas the ex post analysis used project-specific information.

Project Number 211

Executive Summary

Under project 211, a program participant received a custom incentive from I&M for completion of an energy efficient lighting project. The ex post annual energy savings are 108,464 kWh and the ex post peak demand reduction is 24.46 kW. The project-level kWh gross realization rate is 101%.

Project Description

The program participant received an incentive for installing (200) LED 39W 2x4 fixtures, (32) LED 24W 1x4 fixtures, (43) LED 24W 2x2 fixtures, and (2) LED 40W strip fixtures.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
Allowed LPD	= Allowed lighting power density per square foot per ASHRAE Standard 90.1-2007
Installed LPD	= Installed lighting power density per square foot
Footage	= Square footage of new construction space
HOU	= Indicates hours of usage for the fixture
HCIFe	= Heating and Cooling Interactive Factor
HCIFd	= Heating and Cooling Interactive Factor during Peak Demand hours
CF	= Coincidence Factor for Peak Demand hours

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 4L T12 to LED 2x4	211	200	144	39	3,744	1.08	93,539	91,319	98%
4' 2L T12 to LED 1x4	31	32	72	24	3,744	1.08	5,751	5,920	103%
2' 2L T12 to LED 2x2	46	43	72	24	3,744	1.08	7,728	9,219	119%
4L Strip to LED Strip	4	2	144	40	3,744	1.08	809	2,006	248%
Total							107,827	108,464	101%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Custom	107,827	108,464	101%	24.46
Total	107,827	108,464	101%	24.46

The ex post annual energy savings are 108,464 kWh and the ex post peak demand reduction is 24.46 kW. The project-level kWh gross realization rate is 101%. The ex ante savings estimate did not account for the difference between base and efficient quantities for three measure types, and it was premised on a heating and cooling interactive factor of 1.0 (that would be applicable to an unconditioned space). The ex post analysis also reflected the finding, based on the invoice provided by the contractor, that the efficient wattage of the fourth measure identified in the *Lighting Energy Savings Calculation* table above was 40W and not 36W.

Project Number 101

Executive Summary

Under project 101, a program participant received prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 39,262 kWh and the ex post peak demand reduction is 8.22 kW. The project-level kWh gross realization rate is 66%.

Project Description

The program participant received an incentive for installing (24) LED 2x4 panels, (4) LED strips, (36) round high bay fixtures.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

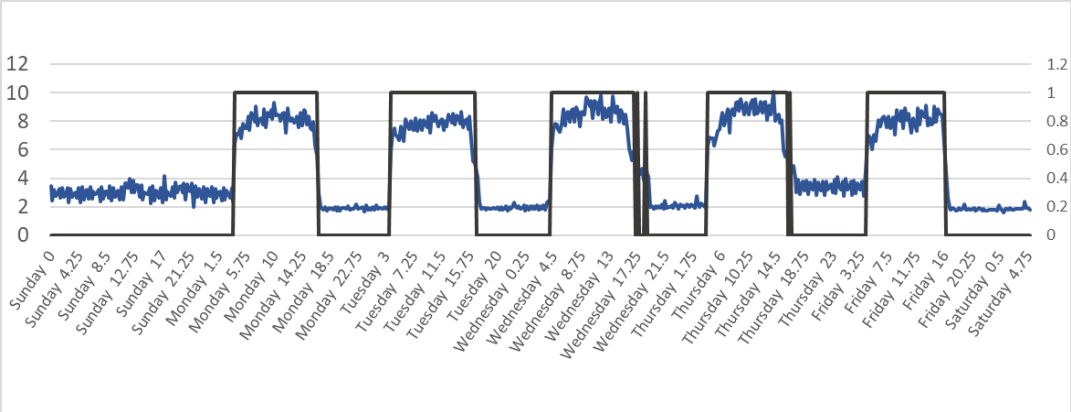
$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

AMI energy usage data was aggregated for a one week interval, with application of a threshold to determine the operating hours of the facility, illustrated in the following figure.

AMI Energy Usage Trend



The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Heating Cooling Interaction Factor*	*Ex Ante Annual kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
	Baseline	*Efficient*	*Baseline*	*Efficient*					
Prescriptive									
4' 4L T8 to LED 2x4 Panel	24	24	144	40	3,630	1.00	10,575	9,060	86%
MH 150 to LED Strip	4	4	190	72	3,630	1.00	2,298	1,713	75%
MH 400 to LED High Bay	36	36	458	240	3,630	1.00	46,656	28,488	61%
Total							59,530	39,262	66%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Lighting - Prescriptive	59,530	39,262	66%	8.22
Total	59,530	39,262	66%	8.22

The ex post annual energy savings are 39,262 kWh and the ex post peak demand reduction is 8.22 kW. The project-level kWh gross realization rate is 66%. The ex ante savings estimate was based on deemed values for the measure type, whereas the ex post analysis used the measure-specific base and efficient quantities and wattages, the facility hours of use, and heating and cooling interactive factors based on the HVAC equipment.

Project Number 116

Executive Summary

Under project 116, a program participant received prescriptive incentives from I&M for LED High Bay lighting. The ex post annual energy savings are 61,982 kWh and the ex post peak demand reduction is 26.49 kW. The project-level kWh gross realization rate is 56%.

Project Description

The program participant received an incentive for installing (86) 150W LED high bay fixtures.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
MH 450W to LED High Bay	86	86	458	150	2,340	1.00	111,456	61,982	56%
Total							111,456	61,982	56%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	111,456	61,982	56%	26.49
Total	111,456	61,982	56%	26.49

The ex post annual energy savings are 61,982 kWh and the ex post peak demand reduction is 26.49 kW. The project-level kWh gross realization rate is 56%. The ex ante savings estimate was based on a deemed savings value per fixture installed. The ex post savings calculations referenced the base and efficient wattages and quantity, and hours of use to determine the energy savings for the installed measures.

Project Number 118, 119, and 212

Executive Summary

Under projects 118, 119, and 212, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 22,318 kWh and the ex post peak demand reduction is 4.89 kW. The project-level kWh gross realization rate is 91%.

Project Description

The program participant received an incentive for installing (150) LED 4' 15W tubes and (175) LED 12W 4-pin lamps.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
119 - Prescriptive									
4' 1L to LED 4' 15W tube	84	84	31	16	4,368	1.09	6,895	6,581	95%
212 - Custom									
CFL 26W to LED 4-pin12W	175	175	26	12	4,004	1.09	12,315	10,997	89%
118 - Prescriptive									
4' 1L to LED 4' 15W tube	66	66	31	15	4004	1.09	5,417	4,740	87%
Total							24,627	22,318	91%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	12,312	11,321	92%	2.42
Lighting - Custom	12,315	10,997	89%	2.47
Total	24,627	22,318	91%	4.89

The ex post annual energy savings are 22,318 kWh and the ex post peak demand reduction is 4.89 kW. The project-level kWh gross realization rate is 91%. The ex post analysis referenced hours of use (4,004 and 4,368) that are lower than the hours of use (4,472) referenced by the ex ante savings estimate. For the ex post analysis, ADM referenced verified lighting hours of operation, which are during the posted hours of business operation plus one additional hour per day.

Project Number 100

Executive Summary

Under project 100, a program participant received prescriptive incentives from I&M for exterior LED lighting. The ex post annual energy savings are 2,713 kWh, with no ex post peak demand reduction. The project-level kWh gross realization rate is 144%.

Project Description

The program participant received an incentive for installing (3) LED 80W wall packs.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
MV 250 to LED Wall Pack	3	3	290	80	4306	1.00	1,879	2,713	144%
Total							1,879	2,713	144%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	1,879	2,713	144%	0.00
Total	1,879	2,713	144%	0.00

The ex post annual energy savings are 2,713 kWh, with no ex post peak demand reduction. The project-level kWh gross realization rate is 144%. The ex ante savings estimate was based on a deemed value per fixture installed. The ex post analysis referenced the base and efficient fixture quantities, wattages, verified lighting hours of operation, and heating and cooling interactive factors for the applicable facility HVAC equipment type. The hours of use in the ex post analysis (4,306) non-daylight hours applicable to the project location. The program participant also installed a photo-eye to control the lighting.

Project Number 216 & 124

Executive Summary

Under project 216 and 124, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 74,252 kWh and the ex post peak demand reduction is 12.77 kW. The project-level kWh gross realization rate is 95%.

Project Description

The program participant received an incentive for removal of (35) 8' 2 lamp fixtures, (12) 4' 4 lamp fixtures, and (1) 4' 2 lamp fixtures, and installing (64) LED 221W high bay fixtures and (20) LED 161W high bay fixtures.

Measurement and Verification Effort

During the remote verification, ADM field staff verified the installation of the lighting, as well as the lighting hours of operation, the presence of lighting controls, and the HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating cooling and factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 4L to LED High Bay 221W	53	64	234	221	4420	1.00	(7,839)	(7,700)	98%
MH458W to LED High Bay 161W	4	20	458	161	4420	1.00	(6,246)	(6,135)	98%
Removal of 8' 2 lamp fixture	21	0	380	0	4420	1.00	35,910	35,272	98%
Removal of 8' 2 lamp fixture	14	0	227	0	4420	1.00	14,301	14,047	98%
Removal of 4' 4 lamp fixture	12	0	290	0	4420	1.00	15,660	15,382	98%
Removal of 4' 2 lamp fixture	1	0	82	0	4420	1.00	369	362	98%
Total	105	84					52,155	51,228	98%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	64	221	4420	0.30	1.76	25,620	18,755	90%
Occupancy Sensor	20	161	4420	0.30	1.76		4,270	
Total						25,620	23,025	90%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Custom	52,155	51,228	98%	8.81
Lighting - Prescriptive	25,620	23,025	90%	3.96
Total	77,775	74,252	95%	12.77

The ex post annual energy savings are 74,252 kWh and the ex post peak demand reduction is 12.77 kW. The project-level kWh gross realization rate is 95%. The ex post analysis was based on verified hours of operation (4,420) that are lower than the estimated hours of operation (4,500) upon which the ex ante savings estimate was premised. In addition, the ex post analysis accounted for the building being heated with natural gas, whereas the ex ante savings estimate was based on the assumption that there is no space conditioning. For the occupancy sensors, the ex ante savings estimate was based on a deemed value per sensor. The ex post analysis referenced the data for the fixtures to conduct the sensor analysis.

Project Number 109

Executive Summary

Under project 109, a program participant received prescriptive incentives from I&M for completing an energy efficient LED lighting retrofit. The ex post annual energy savings are 11,828 kWh and the ex post peak demand reduction is 2.37 kW. The project-level kWh gross realization rate is 70%.

Project Description

The program participant received an incentive for installing (75) LED 25W lamps and (18) occupancy sensors.

Measurement and Verification Effort

Through remote data collection, ADM field staff verified the installation of the lighting equipment and the lighting hours of operation. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
N	= Number of fixtures
$Watts$	= Watts of each fixture
HOU	= Indicates hours of usage for the fixture
$HCIFe$	= Heating and Cooling Interactive Factor
$HCIFd$	= Heating and Cooling Interactive Factor during Peak Demand hours
CF	= Coincidence Factor for Peak Demand hours
$base$	= denotes pre-installation state
eff	= denotes post-installation state

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factor associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
4' 59W to LED 4' 25W lamp	25	25	59	25	3,800	1.00	3,780	3,230	85%
4'59W to LED 4'25W lamp	50	50	59	25	3,800	1.00	7,560	6,460	85%
Total							11,340	11,828	85%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	18	100	3,800	0.30	1.00	5,489	2,138	39%
Total						5,489	2,138	39%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	16,829	11,828	70%	2.37
Total	16,829	11,828	70%	2.37

The ex post annual energy savings are 11,828 kWh and the ex post peak demand reduction is 2.37 kW. The project-level kWh gross realization rate is 70%. The ex ante savings estimate was based on a deemed value per fixture installed, whereas the ex post analysis used the base and efficient

quantities and wattages, facility hours of use, and interactive factors applicable to the facility HVAC equipment to determine the project energy savings.

Project Number 122

Executive Summary

Under project 122, a program participant received prescriptive incentives from I&M for an energy efficient LED lighting retrofit project. The ex post annual energy savings are 121,770 kWh and the ex post peak demand reduction is 35.88 kW. The project-level kWh gross realization rate is 38%.

The program participant received an incentive for installing (653) LED 2x4 panels, (180) LED 1x4 panels, (114) LED 4' lamps, and (26) LED exit signs.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
4' 4L to LED 2x4 Panel	642	642	112	32	3,068	0.64	282,891	101,477	36%
4' 4L to LED 2x4 Panel	11	11	112	32	3,068	0.64	4,847	1,739	36%
2L U-tube to 1x4 Panel	180	180	59	32	3,068	0.64	21,773	9,602	44%
4' 1L to LED 17W lamps	75	75	32	17	3,068	0.64	6,156	2,223	36%
4' 1L to LED 17W lamps	39	39	32	17	3,068	0.64	3,201	1,156	36%
Incan. Exit to LED Exit	26	26	40	2	8,760	0.64	2,158	5,574	258%
Total							321,026	121,770	38%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	321,026	121,770	38%	35.88
Total	321,026	121,770	38%	35.88

The ex post annual energy savings are 121,770 kWh and the ex post peak demand reduction is 35.88 kW. The project-level kWh gross realization rate is 38%. The ex ante savings estimate was based on a deemed value per fixture, while the ex post analysis used the base and efficient quantities and wattages, hours of use, and the heating and cooling interactive factors to produce the energy savings.

Project Number 205

Executive Summary

Under project 205, a program participant received a custom incentive from I&M for installing LED lighting equipment. The ex post annual energy savings are 1,176 kWh, with no ex post peak demand reduction. The project-level kWh gross realization rate is 4%.

Project Description

The program participant received an incentive for installing (40) fluorescent 32W lamps in their paint booth.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
Allowed LPD	= *Allowed lighting power density per square foot per ASHRAE Standard 90.1-2007*
Installed LPD	= *Installed lighting power density per square foot*
Footage	= *Square footage of new construction space*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 4L T12 to 4' 4L – 130W	10	10	164	130	3,460	1.00	29,860	1,176	4%
Total							29,860	1,176	4%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Custom	29,860	1,176	4%	0.00
Total	29,860	1,176	4%	0.00

The ex post annual energy savings are 1,176 kWh, with no ex post peak demand reduction. The project-level kWh gross realization rate is 4%. Project documentation does not contain information to indicate hours of use or wattage reduction assumptions associated with the ex ante savings estimate.

Project Number 110

Executive Summary

Under project 110 a program participant received prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 299,427 kWh and the ex post peak demand reduction is 46.87 kW. The project-level kWh gross realization rate is 100%.

Project Description

The program participant received an incentive for installing (87) LED 2x2 fixtures, (865) LED 2x4 fixtures, and (65) LED 8' strip fixtures.

Measurement and Verification Effort

Through remote data collection, ADM field staff verified the installation of the lighting equipment. An interview with the site contact was performed to verify the lighting hours of operation. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
N	= Number of fixtures
$Watts$	= Watts of each fixture
HOU	= Indicates hours of usage for the fixture
$HCIFe$	= Heating and Cooling Interactive Factor
$HCIFd$	= Heating and Cooling Interactive Factor during Peak Demand hours
CF	= Coincidence Factor for Peak Demand hours
$base$	= denotes pre-installation state
eff	= denotes post-installation state

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
2x2 U to LED 2x2 15.5W	54	54	49.28	15.5	6,120	1.10	6,532	12,291	188%
2x2 U to LED 2x2 15.5W	9	9	49.28	15.5	3,978	1.10	1,089	1,332	1225
2x2 U to LED 2x2 15.5W	5	5	49.28	15.5	5,814	1.10	605	1,081	179%
2x2 U to LED 2x2 15.5W	7	7	49.28	15.5	5,508	1.10	847	1,434	169%
2x2 U to LED 2x2 15.5W	12	12	49.28	15.5	4,896	1.10	1,452	2,185	151%
4' 3L to LED 2x4 27.3W	47	47	73.92	27.3	3,978	1.10	14,213	9,597	68%
4' 3L to LED 2x4 27.3W	43	43	73.92	27.3	4,896	1.10	13,003	10,806	83%
4' 3L to LED 2x4 27.3W	32	32	73.92	27.3	5,508	1.10	9,677	9,047	93%
4' 3L to LED 2x4 27.3W	16	16	73.92	27.3	5,814	1.10	4,838	4,775	99%
4' 3L to LED 2x4 27.3W	727	727	73.92	27.3	6,120	1.10	219,845	228,373	104%
4'4L to LED 8' strip 48.85W	65	65	98.56	48.85	5,202	1.10	28,642	18,506	65%
Total							300,741	299,427	100%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	300,741	299,427	100%	46.87
Total	300,741	299,427	100%	46.87

The ex post annual energy savings are 299,427 kWh and the ex post peak demand reduction is 46.87 kW. The project-level kWh gross realization rate is 100%. The ex ante savings estimate was based on deemed per fixture savings values. The ex post analysis referenced the measure and facility-specific information to estimate savings.

Project Number 102

Executive Summary

Under project 102, a program participant received prescriptive incentives from I&M for exterior LED fixtures. The ex post annual energy savings are 26,468 kWh. There was no peak demand reduction. The project's energy savings gross realization rate is 128%.

Project Description

The program participant received an incentive for installing (8) LED 105W area lights and (4) LED 250W area lights.

Measurement and Verification Effort

Through remote data collection, ADM field staff verified the installation of the lighting equipment. An interview with the site contact was performed to verify the lighting hours of operation. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
MH 458W to LED Area 105W	8	8	458	105	4308	1.00	8,640	12,166	141%
MH 1080 to LED Area 250W	4	4	1080	250	4308	1.00	12,096	14,303	118%
Total							20,736	26,468	128%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	20,736	26,468	128%	0.00
Total	20,736	26,468	128%	0.00

The ex post annual energy savings are 26,468 kWh with a peak demand reduction of 0.0 kW. The project-level kWh gross realization rate is 128%. The ex ante savings estimate was based on deemed per fixture values. The ex post analysis referenced the base and post wattages, and Indiana daylighting hours to determine energy savings.

Project Number 213 and 120

Executive Summary

Under project 213 and 120, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 5,392,647 kWh and the ex post peak demand reduction is 724.71 kW. The project-level kWh gross realization rate is 102%.

Project Description

The program participant received an incentive for removing (271) 1080W metal halide fixtures and installing (143) LED 356W high bay fixtures, (263) LED 181W high bay fixtures, (14) LED 43.9W strip fixtures, (139) LED 465W high bay fixtures, and (15) LED 190W high bay fixtures.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
MH 1080W to LED HB 356W	49	49	1080	456	6,200	1.10	242,622	242,622	99%
Removal of MH 1080W	41	0	1080	0	6,200	1.10	302,833	300,891	99%
MH 1080W to LED HB 181W	5	5	1080	181	6,200	1.10	30,741	30,741	99%
Fluorescent to LED Strip	10	10	117	43.9	2,080	1.10	4,999	4,999	33%
Fluorescent to LED Strip	4	4	82	43.9	2,080	1.10	1,042	1,042	33%
MH 1080W to LED HB 356W	67	67	1080	356	6,200	1.10	331,748	329,622	99%
Removal of MH 1080W	61	0	1080	0	6,200	1.10	450,556	450,556	99%
MH 1080W to LED HB 455W	144	74	1080	455	6,200	1.10	833,337	827.995	99%
Removal of MH 1080W	70	0	1080	0	6,200	1.10	517,031	517,031	99%
MH 1080W to LED HB 465W	238	139	1080	465	6,200	1.10	1,315,865	1,307,430	99%
Removal of MH 1080W	00	0	1080	0	6,200	1.10	731,230	731,230	99%
MH 1080W to LED HB 181W	6	6	1080	181	6,200	1.10	36,890	36,653	99%
MH 1080W to LED HB 181W	4	4	1080	181	2,080	1.10	4,651	4,651	33%
MH 1080W to LED HB 356W	12	12	1080	356	6,200	1.10	59,418	59,418	99%
MH 1080W to LED HB 356W	15	15	1080	356	6,200	1.10	74,272	74,272	99%
Prescriptive									
MH 458W to LED HB 181W	75	75	458	181	6,200	1.10	97,200	170,497	145%
MH 458W to LED HB 181W	78	78	458	181	6,200	1.10	101,088	177,317	145%
MH 458W to LED HB 181W	95	95	458	181	6,200	1.10	123,120	215,963	145%
MH 458W to LED HB 190W	15	15	458	190	6,200	1.10	19,440	32,992	145%
Total							5,278,084	5,392,647	102%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting – Custom	4,937,236	4,898,527	99%	658.39
Lighting - Prescriptive	340,848	494,120	145%	62.65
Total	5,278,084	5,392,647	102%	724.71

The ex post annual energy savings are 5,392,647 kWh and the ex post peak demand reduction is 724.71 kW. The project-level kWh gross realization rate is 102%. The ex ante savings estimate for the prescriptive measures referenced per fixture deemed values. The ex post analysis referenced the data for base and efficient quantities and wattages as well as heating and cooling interactive factors. During the client verification interview, hours of use per area were confirmed (6,200 for

the production and warehouse areas and 2,080 hours for the office) and were less than the hours referenced by the ex ante savings estimate (production and office areas at 6,240 and warehouse at 7,488).

Project Number 202 and 103

Executive Summary

Under project 202 and 103, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 374,814 kWh and the ex post peak demand reduction is 52.30 kW. The project-level kWh gross realization rate is 101%.

Project Description

The program participant received an incentive for installing the following measures:

- (9) LED 109W high bay fixtures with occupancy sensors
- (418) LED 50.3W retrofit kits
- (32) LED 9W BR30 lamps
- (26) LED 24.9W retrofit kits
- (3) LED 13.3W retrofit kits
- (382) LED 11W 4' tubes
- LED 2W exit signs
- LED 36W strip fixture

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*

eff = *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	*Quantity (Fixtures)*		*Wattage*		*Hours*	*Heating Cooling Interaction Factor*	*Ex Ante Annual kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
	Baseline	*Efficient*	*Baseline*	*Efficient*					
Custom									
4' 6L to LED High Bay	4	4	351	109	4,368	1.00	4,228	4,228	100%
8' 2L to LED Retrofit Kit	418	418	173	50.3	6,240	1.00	320,823	320,041	100%
Incandescent to LED BR30	20	20	64	9	520	1.00	582	582	100%
CFL to LED BR30	6	6	34	9	2,600	1.00	390	390	100%
CFL to LED BR30	6	6	34	9	2,600	1.00	390	390	100%
4' 2L to LED Retrofit Kit	23	23	59	24.9	6,240	1.00	4,894	4,894	100%
4' 2L to LED Retrofit Kit	2	2	72	24.9	1,040	1.00	98	98	100%
4' 2L to LED Retrofit Kit	1	1	72	24.9	1,040	1.00	49	49	100%
4' 1L to LED Retrofit Kit	3	3	43	13.2	2,600	1.00	232	232	100%
Prescriptive									
MH 458W to LED High Bay	5	5	458	109	6,240	1.00	6,480	10,889	168%
4' lamp to LED 4' tube	368	368	43	11	2,600	1.00	30,176	30,618	101%
4' lamp to LED 4' tube	14	14	31	11	2,600	1.00	1,148	728	63%
Exit sign to LED Exit Sign	1	1	10	2	8,760	1.00	83	70	84%
U-tube 2L to LED Strip	1	1	59	36	580	1.00	121	13	11%
Total							369,695	373,223	101%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	*Quantity (Controls)*	*Controlled Wattage*	*Baseline Hours*	*Controls Factor*	*Heating Cooling Interaction Factor*	*Ex Ante Annual kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
Occupancy Sensor	4	109	4,368	0.30	1.00	1.220	571	47%
Occupancy Sensor	5	109	6,240	0.30	1.00	1,525	1,020	67%
Total						2,745	1,592	58%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Lighting – Custom	331,687	330,905	100%	41.57
Lighting - Prescriptive	38,008	42,318	111%	10.51
Lighting – Prescriptive -Controls	2,745	1,592	58%	0.22
Total	372,440	374,814	101%	52.30

The ex post annual energy savings are 374,814 kWh and the ex post peak demand reduction is 52.30 kW. The project-level kWh gross realization rate is 101%. The ex ante savings estimate for the prescriptive measures was based on per fixture deemed values. The ex post analysis referenced the project-specific data for base and efficient quantities, hours of use, and wattages as well as heating and cooling interactive factors. For custom measures, ADM's review of the product specifications found that the efficient wattages for the second row and thirteenth row in the table above (50.3W and 2W, respectively) differed from the wattages referenced by the ex ante savings estimate (50W and 4.5W, respectively). The hours of use for all measures except the exit signs ranged from 580 to 6,240, whereas the ex ante savings estimate was premised on assumed annual lighting operation of 4,370 hours for all the custom measure calculations.

Project Number 214 and 121

Executive Summary

Under project 214 and 121, a program participant received custom and prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 197,137 kWh and the ex post peak demand reduction is 42.68 kW. The project-level kWh gross realization rate is 96%.

Project Description

The program participant received an incentive for installing the following measures:

- (28) LED 109W high bay fixtures with occupancy sensors
- (34) LED 137W high bay fixtures with occupancy sensors
- (9) LED 24.9W retrofit kits
- (141) LED 50.3W retrofit kits
- (3) LED 47W wall packs
- (2) LED 67W flood fixtures

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment and interviewed the site contact to collect data on the lighting hours of operation. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 4L to LED High Bay	19	19	217	109	4,160	1.00	7,392	8,536	115%
4' 6L to LED High Bay	9	9	351	109	4,160	1.00	9,060	9,060	100%
MH 1080 to LED High Bay	34	34	1080	137	2,912	1.00	93,365	93,365	100%
4' 2L to LED Retrofit Kit	9	9	59	24.9	4,160	1.00	1,277	1,277	100%
4' 4L to LED Retrofit Kit	1	1	112	50.3	4,160	1.00	257	257	100%
8' 2L to LED Retrofit Kit	140	140	173	50.3	4,160	1.00	71,460	71,460	100%
Prescriptive									
MH 190W to LED Wall Pack	3	3	190	47	4,380	1.00	1,038	1,879	181%
MH 458W to LED Flood	2	2	458	67	4,380	1.00	2,160	3,425	159%
Total							204,919	197,137	96%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	28	109	4,160	0.30	1.00	8,540	3,809	45%
Occupancy Sensor	34	137	2,912	0.30	1.00	10,370	4,069	39%
Total						18,910	7,878	42%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting – Custom	182,811	183,955	101%	40.92
Lighting - Prescriptive	3,198	5,304	166%	0.00
Lighting – Prescriptive -Controls	18,910	7,878	42%	1.76
Total	204,919	197,137	96%	42.68

The ex post annual energy savings are 197,137 kWh and the ex post peak demand reduction is 42.68 kW. The project-level kWh gross realization rate is 96%.

The hours of use used in the ex post savings analysis for the first custom measure referenced in the *Lighting Energy Savings Calculations* table above (8,536) are greater than the hours of use referenced by the ex ante savings estimate (7,392). However, based on review of project documentation, ADM was unable to recreate the ex ante savings estimate to specify the sources of difference between the ex ante and ex post savings values.

The ex ante savings estimate for the prescriptive measures was based on per unit deemed values. The ex post analysis referenced the applicable values for the base and efficient quantities and wattages, heating and cooling interactive factors, and hours of use.

Project Number 105

Executive Summary

Under project 105, a program participant received prescriptive incentives from I&M for installation of energy efficient LED lighting. The ex post annual energy savings are 18,676 kWh and the ex post peak demand reduction is 3.70 kW. The project-level kWh gross realization rate is 73%.

Project Description

The program participant received an incentive for installing (21) LED 14W lamps, (67) LED 14W lamps with occupancy sensors, (45) LED 2x4 38W fixtures, and (1) LED 2x4 38W fixture with occupancy sensor.

Measurement and Verification Effort

Through remote data co ADM field staff verified the installation of the lighting equipment. An interview with the site contact was performed to verify the lighting hours of operation. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
N	= Number of fixtures
$Watts$	= Watts of each fixture
HOU	= Indicates hours of usage for the fixture
$HCIFe$	= Heating and Cooling Interactive Factor
$HCIFd$	= Heating and Cooling Interactive Factor during Peak Demand hours
CF	= Coincidence Factor for Peak Demand hours
$base$	= denotes pre-installation state
eff	= denotes post-installation state

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
4' 1L to LED 4' lamp	21	21	32	14	4,200	1.10	7,223	1,672	97%
	67	67	32	14	4,200	1.10		5,334	
4' 3L to LED 2x4 fixture	45	45	89	38	4,200	1.10	13,910	10,150	75%
	1	1	89	38	4,200	1.10		226	
Total							21,133	17,381	82%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	14	67	4,200	0.30	1.10	4,574	1,245	28%
	1	53	4,200	0.30	1.10		50	
Total						4,574	1,295	28%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	21,133	17,381	82%	3.44
Lighting – Prescriptive -Controls	4,574	1,295	28%	0.26
Total	25,707	18,676	73%	3.70

The ex post annual energy savings are 18,676 kWh and the ex post peak demand reduction is 3.70 kW. The project-level kWh gross realization rate is 73%. The ex ante savings estimate was based on deemed values. The ex post analysis referenced the data for base and efficient quantities and wattages, heating and cooling interactive factors, and hours of use.

Project Number 106

Executive Summary

Under project 106, a program participant received prescriptive incentives from I&M for the LED lighting. The ex post annual energy savings are 45,397 kWh and the ex post peak demand reduction is 15.03 kW. The project-level kWh gross realization rate is 46%.

Project Description

The program participant received an incentive for installing (16) LED 38W 2x2 Troffers and (219) LED 38W 2x4 Troffers.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment and an interview with the site contact was performed to verify the lighting hours of operation. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
U-tube 2L to LED 2x2	16	16	55	38	2,500	1.10	1,935	749	39%
4' 4L to LED 2x4	219	219	112	38	2,500	1.10	96,500	44,648	46%
Total							98,436	45,397	46%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	98,436	45,397	46%	15.03
Total	98,436	45,397	46%	15.03

The ex post annual energy savings are 45,397 kWh and the ex post peak demand reduction is 15.03 kW. The project-level kWh gross realization rate is 46%. The ex ante savings estimate was based on per fixtured deemed values. The ex post analysis referenced the project-specific data for base and efficient quantities and wattages, heating and cooling interactive factors, and hours of use.

Project Number 107

Executive Summary

Under project 107, a program participant received prescriptive incentives from I&M for a LED lighting retrofit. The project ex post annual energy savings are 386,073 kWh and the ex post peak demand reduction is 2.67 kW. The project-level kWh gross realization rate is 110%.

Project Description

The program participant received an incentive for installing (110) LED 300W area pole fixtures, (2) LED 80W wall packs, (33) LED 90W high bay fixtures, (9) 65W high bay fixtures, and (28) 14W 4' lamps.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factor associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
MH 1080W to LED Area	110	110	1080	300	4,308	1.00	332,640	369,626	111%
MH 458W to LED Wall Pack	2	2	458	80	4,308	1.00	2,160	3,257	151%
4' 6L to LED High Bay	33	33	175	90	3,068	1.00	11,975	8,606	72%
4' 6L to LED High Bay	9	9	175	65	3,068	1.00	3,266	3,037	93%
4' 1L to LED 4' lamp	28	28	32	14	3,068	1.00	2,298	1,546	67%
Total							352,339	386,073	110%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	352,339	386,073	110%	2.67
Total	352,339	386,073	110%	2.67

The ex post annual energy savings are 386,073 kWh and the ex post peak demand reduction is 2.67 kW. The project kWh gross realization rate is 110%. The ex ante savings estimate was based on per fixture deemed values. The ex post analysis referenced the project-specific base and efficient quantities and wattages, and hours of use to estimate energy savings.

Project Number 108

Executive Summary

Under project 108, a program participant received prescriptive incentives from I&M for installation of energy efficient LED lighting. The project ex post annual energy savings are 109,070 kWh and the ex post peak demand reduction is 14.43 kW. The project-level kWh gross realization rate is 89%.

Project Description

The program participant received an incentive for installing (14) LED 93W wall packs, (48) LED 40W 2x4 panels, (42) 100W high bay fixtures with occupancy sensors, and (2) LED 150W area lights.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
MH 458W to LED Wall Pack	14	14	458	93	4,308	1.00	15,120	22,014	146%
4' 4L to LED 2x4 Panel	48	48	96	40	4,446	1.00	37,454	11,951	32%
MH 458W to LED High Bay	42	42	458	100	4,446	1.00	54,432	66,850	123%
MH 458W to LED Area Light	2	2	458	150	4,308	1.00	2,160	2,654	123%
Total							109,166	103,469	95%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	42	100	4,446	0.30	1.76	12,810	5,602	44%
Total						12,810	5,602	44%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	109,166	103,469	95%	13.47
Lighting Controls - Prescriptive	12,976	5,602	44%	0.96
Total	121,976	109,070	89%	14.43

The project ex post annual energy savings are 109,070 kWh and the ex post peak demand reduction is 14.43 kW. The project-level kWh gross realization rate is 89%. The ex post savings estimate was based on per unit deemed values. The ex post analysis referenced the project-specific base and efficient quantities and wattages, and hours of use for each measure.

Project Number 206

Executive Summary

Under project 206, a program participant received a custom incentive from I&M for a LED lighting retrofit project. The project ex post annual energy savings are 3,726 kWh and the ex post peak demand reduction is 0.86 kW. The project-level kWh gross realization rate is 89%.

Project Description

The program participant received an incentive for installing (20) LED 43W 8' lamps.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
8' T12 to 8' LED lamp	20	20	112	43	2,700	1.00	4,188	3,726	89%
Total							4,188	3,726	89%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Custom	4,188	3,726	89%	0.86
Total	4,188	3,726	89%	0.86

The project ex post annual energy savings are 3,726 kWh and the ex post peak demand reduction is 0.86 kW. The project-level kWh gross realization rate is 89%. The ex ante savings estimate was based on the assumption that site had air conditioning and natural gas heating, whereas the area in which the lighting was installed is not conditioned, causing ex post savings to be lower than the ex ante savings estimate.

Project Number 113

Executive Summary

Under project 113, a program participant received prescriptive incentives from I&M for an interior LED lighting retrofit. The ex post annual energy savings are 58,275 kWh and the ex post peak demand reduction is 12.77 kW. The project-level kWh gross realization rate is 83%.

Project Description

The program participant received an incentive for installing (54) LED 150W high bay fixtures.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment and an interview with the site contact was performed to verify the lighting hours of operation, and the areas involved in this project. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
MH 458W to LED High Bay	54	54	458	150	3,120	1.12	69,984	58,275	83%
Total							69,984	58,275	83%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	69,984	58,275	83%	12.77
Total	69,984	58,275	83%	12.77

The ex post annual energy savings of the prescriptive project are 58,275 kWh and the ex post peak demand reduction is 12.77 kW. The project-level kWh gross realization rate is 83%. The ex ante savings estimate was based on per unit deemed savings values. The ex post analysis referenced project-specific base and efficient quantities and wattages, hours of use, and heating and cooling interactive factors.

Project Number 114

Executive Summary

Under project 114, a program participant received prescriptive incentives from I&M for an LED lighting retrofit project. The project ex post annual energy savings are 5,566 kWh and the ex post peak demand reduction is 1.88 kW. The project-level kWh gross realization rate is 40%.

Project Description

The program participant received an incentive for installing (25) LED 38.6W 2x4 panels with (9) occupancy sensors.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
4' 4L T12 to LED 2x4 Panel	25	25	120	38.6	2,340	1.00	11,016	4,943	45%
Total							11,016	4,943	45%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	9	98.6	2,340	0.30	1.00	2,744	623	23%
Total						2,744	623	23%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting -Prescriptive	11,016	4,943	45%	1.67
Lighting Controls - Prescriptive	2,744	623	23%	0.21
Total	13,760	5,566	40%	1.88

The project ex post annual energy savings are 5,566 kWh and the ex post peak demand reduction is 1.88 kW. The project-level kWh gross realization rate is 40%. The difference between ex post and ex ante savings estimates is attributable to the following factors.

- The ex ante savings estimate was based on per fixture deemed savings values, whereas the ex post analysis used the project-specific base and efficient quantities and wattages, and hours of use.
- The hours of use (2,340) were determined to be lower than the hours referenced by the ex ante savings estimate (4,200). It was determined that the project lighting is operated 45 hours per week and that there were 10 holidays during the year during which the lighting is not operated.
- The efficient wattage (38.6) presented in the product specification is greater than the provided calculation document wattage (36W).
- Additionally, ADM applied heating and cooling interactive factors applicable to the space in which the lighting was installed.

Project Number 117

Executive Summary

Under project 117, a program participant received prescriptive incentives from I&M for an LED lighting retrofit. The project ex post annual energy savings are 78,123 kWh and the ex post peak demand reduction is 17.11 kW. The project-level kWh gross realization rate is 54%.

Project Description

The program participant received an incentive for installing (1,668) LED 16W tubes and (48) LED 24W tubes.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Prescriptive									
4' T8 to LED 4' Lamp	1,668	1,668	32	16	2,500	1.10	136,909	73,125	53%
4' T5HO to LED 4' Lamp	49	48	62	24	2,500	1.10	7,258	4,998	69%
Total							144,167	78,123	54%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Prescriptive	144,167	78,123	54%	17.11
Total	144,167	78,123	54%	17.11

The project ex post annual energy savings are 78,123 kWh and the ex post peak demand reduction is 17.11 kW. The project-level kWh gross realization rate is 54%.

The ex ante savings estimate was based on per fixture deemed savings values, whereas the ex post analysis used the project-specific base and efficient quantities and wattage, hours of use, and heating cooling interaction factor.

Project Number 208 and 112

Executive Summary

Under project 208 and 112, a program participant received custom and prescriptive incentives from I&M for a LED lighting retrofit. The project ex post annual energy savings are 75,902 kWh and the ex post peak demand reduction is 17.56 kW. The project-level kWh gross realization rate is 88%.

Project Description

The program participant received an incentive for installing (78) LED 174W high bay fixtures with occupancy sensors, (2) LED 30W 2x2 panels, and (4) LED 40W 2 x 4 panels with occupancy sensors.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 6L to LED High Bay	79	78	351	174	3,824	1.07	59,333	58,142	98%
Prescriptive									
U-tube 2L to LED 2x2 Panel	2	2	59	30	3,200	1.07	242	199	82%
4' 3L to LED 2x4 Panel	4	4	89	40	3,200	1.07	1210	674	56%
Total							60,785	59,015	97%

Lighting occupancy sensor energy savings are calculated as:

$$kWh_{Savings} = \sum_{Area} [HCIF \times W \times N \times (t_{base} - t_{as-built})/1000]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

N = *Number of occupancy sensors*

W = *Wattage controlled by each occupancy sensor*

t = *Lighting operating hours*

HCIF = Heating cooling interaction factor

The table shown below presents ex ante and ex post energy savings for the lighting controls installed under the prescriptive project.

Lighting Controls Savings Calculations

Measure	Quantity (Controls)	Controlled Wattage	Baseline Hours	Controls Factor	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Occupancy Sensor	4	40	3,200	0.30	1.07	1,220	165	14%
Occupancy Sensor	78	174	3,824	0.30	1.07	23,784	16,722	70%
Total						25,004	16,887	68%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Lighting – Custom	59,333	58,142	98%	13.42
Lighting – Prescriptive	1,452	873	60%	0.23
Lighting Controls - Prescriptive	25,004	16,887	68%	3.90
Total	85,789	75,902	88%	17.56

The project ex post annual energy savings are 75,902 kWh and the ex post peak demand reduction is 17.56 kW. The project-level kWh gross realization rate is 88%. The ex ante savings estimate was based on per unit deemed savings values while the ex post analysis used project-specific base and efficient quantities and wattages, hours of use, and heating cooling interaction factors.

Project Number 201

Executive Summary

Under project 201, a program participant received a custom incentive from I&M for a replace on burnout HVAC project. The ex post annual energy savings are 3,860 kWh and the ex post peak demand reduction is 3.53 kW. The project-level kWh gross realization rate is 100%.

Project Description

The program participant received an incentive for a replace on burnout HVAC project in which a new 30-ton single package rooftop Trane DX Air Conditioner was installed to replace an older unit that was inefficient and operating poorly.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the new air conditioner, hours of operation, and facility type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{1}{IEER_{Base}} - \frac{1}{IEER_{EE}}\right) \times Btuh \times \frac{EFLH}{1000}$$

$$kW_{Peak} = \left(\frac{1}{EER_{Base}} - \frac{1}{EER_{EE}}\right) \times Btuh \times \frac{CF}{1000}$$

Where:

$kWh_{savings}$	= *Annual energy savings*
Btuh	= *Net cooling capacity of the air conditioner*
$IEER_{Base}$	= *Integrated Energy Efficiency Ratio of baseline unit*
$IEER_{EE}$	= *Integrated Energy Efficiency Ratio of as-built unit*
EER_{Base}	= *Energy Efficiency Ratio of baseline unit*
EER_{EE}	= *Energy Efficiency Ratio of as-built unit*
EFLH	= *Equivalent Full Load Hours of air conditioner operation*
CF	= *Coincidence Factor for Peak Demand hours*

The table shown below presents ex ante and ex post energy savings for the air conditioner installed under the project.

HVAC Savings Calculations

Measure	*Building Type*	*Baseline IEER / EER*	*Installed IEER / EER*	*EFLH*	*CF*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
HVAC - Air Conditioner	Light Industrial	9.9 / 9.0	12.0 / 10.3	642	1.74	3,860	3,860	100%
Total						3,860	3,860	100%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
HVAC	3,860	3,860	100%	3.53
Total	3,860	3,860	100%	3.53

The ex post annual energy savings are 3,860 kWh and the ex post peak demand reduction is 3.53 kW. The project-level kWh gross realization rate is 100%.

The ex post peak demand reduction differed from the ex ante peak demand reduction. The ex ante savings estimate was based on IEER to calculate peak demand savings, which is incorrect as IEER is a rating of unit efficiency across various part-loads whereas EER is the rating of unit efficiency only at peak loading.

Project Number 210

Executive Summary

Under project 210, a program participant received a custom incentive from I&M for completion of a compressed air system leak repair project. The ex post annual energy savings are 13,171 kWh and the ex post peak demand reduction is 5.07 kW. The project-level kWh gross realization rate is 106%.

Project Description

The program participant received an incentive for a completion of compressed air leak repair project through which five leaks were detected within the compressed air delivery system using ultrasound detection technology. The repairs were completed for a total of 26.2 cubic feet per minute (CFM) reduction in compressed air losses. This loss prevention reduces the energy consumption of the on-site air compressor by reducing the total amount of air it is required to deliver. Air compressor details are shown below:

- Kaeser ASD 25 (25 hp)
  - Air Delivery: 115 CFM at 125 psig
  - Specific Power: 0.1932 kW/CFM

Measurement and Verification Effort

Through remote data collection, ADM staff verified the completion of the leak repair project, hours of operation, and the energy profile and operation of the on-site air compressor. ADM then used the *UE Systems Compressed Gas Flow Rate Curves* to calculate the air loss rate at each leak based on the ultrasonic decibel (dB) reading at each leak. This calculated air loss was used, along with compressor-specific power and annual hours of operation, to calculate the annual energy consumption reduction. The following equations were used to calculate the annual energy savings from the leak repairs:

$$CFM = 0.02 \times dB^{1.3399}$$

$$kWh_{Savings} = CFM \times Specific_{power} \times HOU$$

$$kW_{Peak} = \frac{kWh_{Savings}}{HOU}$$

Where:

CFM	= Air loss reduction in cubic feet per minute, CFM
$kWh_{savings}$	= Annual energy savings, kWh
dB	= Decibel reading at the site of the leak using ultrasonic detector, dB
$Specific_{Power}$	= Air compressor energy consumption per CFM of air produced, 0.1932 kW/CFM

HOU = *Annual hours of compressor operation, hrs*

The table shown below presents ex ante and ex post energy savings for the leaks repaired under the project.

Compressed Air Savings Calculations

Measure	*CFM Repaired*	*Compressor kW / CFM*	*HOU*	*Expected kWh Savings*	*Realized kWh Savings*	*Realization Rate*
Compressed Air	26.2	0.1932	2,600	12,423	13,171	106%
Total	26.2	0.1932	2,600	12,423	13,171	106%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Compressed Air	12,423	13,171	106%	5.07
Total	12,423	13,171	106%	5.07

The ex post annual energy savings are 13,171 kWh and the ex post peak demand reduction is 5.07 kW. The project-level kWh gross realization rate is 106%.

The reason for the difference in ex post savings is due to the ex ante calculations using a different calculation methodology. The ex ante calculations used a specific power value that was calculated without the use of a power factor, and calculated savings using a generic reference compressor efficiency and fraction of power at no production value. The use of this fraction of power at no production value underestimates the energy savings since the compressor saves energy only when it is operating, so it is incorrect to reduce kW savings based on the fraction of power when the unit is not producing air.

The ex post analysis referenced the CAGI spec sheet for a comparable compressor of the same model and operating pressure. This provides more accurate energy consumption data upon which to base the calculations instead of a nameplate calculated kW with a rule-of-thumb compressor efficiency value.

Project Number 209

Executive Summary

Under project 209, a program participant received a custom incentive from I&M for installation of energy efficient LED lighting, variable frequency drives (VFDs) on manure pumps, ventilation fans, dairy vacuum pumps, an efficient scroll compressor for dairy refrigeration, and an efficient air compressor. The project ex post annual energy savings are 335,774 kWh and the ex post peak demand reduction is 44.2 kW. The project-level kWh gross realization rate is 92%.

Project Description

The program participant received an incentive for installing (100) LED 150W high bay fixtures and the following equipment to be used for dairy production:

- 2 – 30 hp manure pumps with VFDs
- 32 – 3 hp ventilation fans with VFDs
- 2 – Scroll compressors with plate cooler
- 2 – 25 hp load/unload air compressors
- 2 – 30 hp dairy vacuum pumps with VFDs

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the new construction lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. Additionally, ADM verified the installed non-lighting equipment using provided site photos and submitted calculations to verify hours of use and operation parameters. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$\Delta kWh = (WSFbase\text{-}WSFeffic)/1000 * SF * Hours * WHFe$$

Where:

WSFbase	*= Baseline lighting watts per square foot as determined by building or space type.*
WSFeffic	*= The actual installed lighting watts per square foot*
SF	*= Provided by customer based on square footage of the building area applicable to the lighting design for new building.*
Hours	*= Annual site-specific hours of operation of the lighting equipment collected from the customer.*
WHFe	*= Waste Heat Factor for Energy to account for cooling savings from efficient lighting is as provided by building type. If building is not cooled WHFe is 1.*

The table shown below presents the energy savings for the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	*Square Footage*	*Lighting Power Density*	*Quantity*	*Wattage*	*Hours*	*Heating Cooling Interaction Factor*	*Ex Ante Annual kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
Custom New Construction									
LPD to LED High Bay	94,608	0.5	100	150	4308	1.00	138,907	137,425	99%
Total							138,907	137,425	99%

The following Indiana TRM V2.2 measures and workpapers associated with the Michigan Energy Measures Database (MEMD) were referenced to support estimation of savings of the non-lighting measures implemented through the project:

- VFD Manure Pumps – FES – M2: VFDs for Pumps
- VFD Ventilation Fans – FES – M8: VFDs for Process Fans
- Dairy Scroll Compressors – FES – A11: Scroll Compressor for Dairy Refrigeration
- Load/Unload Compressors – IN TRM: Efficient Air Compressors
- VFD Vacuum Pumps - FES – A16: VSDs for Dairy Vacuum Pumps

Non-Lighting Energy Savings Calculations

Measure	*Quantity*	*HP*	*Hours*	*Ex Ante Annual kWh Savings*	*Ex Post Gross kWh Savings*	*Gross Realization Rate*
VFD's for Pumps	2	30	2,920	39,488	51,521	130%
VFD for Process Fans	32	3	5,076	119,605	78,273	65%
Scroll Compressor for Dairy Refrigeration	2	--	--	14,534	14,534	100%
Efficient Air Compressor	2	25	4,380	18,153	18,153	100%
VSD for Dairy Vacuum Pump	2	30	--	35,868	35,868	100%
Total				227,648	198,349	87%

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Lighting	138,907	137,425	99%	0.0
VFD's for Pumps	39,488	51,521	130%	13.9
VFD's for Process Fans	119,605	78,273	65%	12.0
Scroll Compressor for Dairy Refrigeration	14,534	14,534	100%	5.0
Efficient Air Compressor	18,153	18,153	100%	1.6
VSD for Dairy Vacuum Pump	35,868	35,868	100%	11.7
Total	366,555	335,774	92%	44.2

The project ex post annual energy savings are 335,774 kWh and the ex post peak demand reduction is 44.2 kW. The project-level kWh gross realization rate is 92%.

The lighting hours of operation (4,308) referenced in the ex post analysis are non-daylighting hours applicable to the project location, and are slightly higher than the hours of operation referenced by the ex ante savings estimate (4,300).

The difference in verified savings for the VFD manure pump measure is due to the ex ante savings estimate using a custom bin analysis using historical meteorological weather, assumptions about operating loads at different outdoor air temperatures, and a pump affinity law to calculate the baseline and as-built kW at each weather bin. This use of an affinity law instead of a part-load power factor curve resulted in overestimating as-built kW at part loads. The ex post analysis referenced the applicable calculated hours of use to calculate savings for VFD pumps, resulting in a 130% kWh gross realization rate for this measure. Further, the ex ante estimate for the ventilation fans erroneously input the fan quantity as 62 when the installed quantity was 32. This error accounts for the 65% kWh gross realization rate for this measure.

Project Number 200

Executive Summary

Under project 200, a program participant received custom new construction incentives from I&M for energy efficient design and installation of LED lighting. The project ex post annual energy savings are 295,758 kWh and the ex post peak demand reduction is 30.87 kW. The project-level kWh gross realization rate is 87%.

Project Description

The program participant received an incentive for designing and installing efficient lighting in the renovation of an existing building.

Measurement and Verification Effort

ADM staff reviewed the design drawings, a set of revised drawings for the common areas, lighting invoices and verified the usage type of the building. Staff reviewed the local building code, and determined the Indiana state building code applicable to the project. The building code references the Lighting Power Densities (LPD) from the ASHRAE 90.1 2007 handbook tables. The building contact declined to provide occupancy rates for the hotel, so the Indiana TRM was referenced for estimated annual operating hours. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
Allowed LPD	= *Allowed lighting power density per square foot per ASHRAE Standard 90.1-2007*
Installed LPD	= *Installed lighting power density per square foot*
Footage	= *Square footage of new construction space*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*

The table shown below summarizes the energy savings analysis for the lighting equipment installed under the project.

Lighting Savings Input Summary and Savings

Variable	*Ex Ante*	*Ex Post*
LPD	1.0	1.0
Area	95.765	88,861
Lighting Types – Design Reference	GR-A,GR-B,GR-C,GR-D,GR-E,GR-V	GR-A,GR-B,GR-C,GR-D,GR-E,GR-V,A,a,B,B,C,c,D,d,E,e,F,f,H4,H8,h,J,j,K,L,M,T,WS3,V1,m
Whf_energy	0.12	0.133
Whf_demand	0.20	0.20
CF	0.37	0.37
kWh Savings	340,336	295,758
kW Savings	36.10	30.87

The following table details the lighting fixtures, quantities, by the general location.

Lighting Power Density Inputs

Area	*Design Code*	*Quantity*	*Wattage*
First Floor Common	a	1	32
First Floor Common	A	20	18
First Floor Common	B	19	56
First Floor Common	b	4	144
First Floor Common	C	7	14
First Floor Common	c	6	20
First Floor Common	D	41	23
First Floor Common	d	3	14
First Floor Common	E	4	14
First Floor Common	e	5	12
First Floor Common	F	10	8
First Floor Common	f	7	25
First Floor Common	G	8	30
First Floor Common	g	5	18
First Floor Common	h	15	30
First Floor Common	H4	2	41
First Floor Common	H8	2	81
First Floor Common	J	8	100
First Floor Common	j	1	80
First Floor Common	K	7	19
First Floor Common	L	3	19
First Floor Common	M	1	40
First Floor Common	T	17	19
Guest Rooms	GR-C	93	12
Guest Rooms	GR-A	144	44
Guest Rooms	GR-V	93	16
Guest Rooms	GR_B	93	15.158
Guest Rooms	GR-D	16	15.158
Guest Rooms	GR-E	22	15.158
Guest Rooms	WS3	16	20
Guest Rooms	V1	52	9
Guest Rooms	m	15	4
Total Watts	19,324		

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Interior Lighting	340,335	295,758	87%	30.87
Total	340,335	295,758	87%	30.87

The project ex post annual energy savings are 295,758 kWh and the ex post peak demand reduction is 30.87 kW. The project-level kWh gross realization rate is 87%.

The ex ante savings estimate determined the installed lighting power density by only considering those lighting fixtures from the lighting drawing for which there were product invoices.

The ex post savings analysis determined the installed lighting power density from the invoiced items and their respective wattages for the 6" recessed lighting, bathroom vanity lights, bathroom ceiling lights, closet lights and recessed entry ceiling light on some room types. The ex post analysis also included the lighting fixtures referenced in the drawings for the room floor corridors, and the first floor common areas. The lower floor which did not have invoiced lighting, was excluded from the area calculation and LPD calculation.

Project Number 204

Executive Summary

Under project 204, a program participant received custom new construction incentives from I&M for energy efficient design and LED lighting. The project ex post annual energy savings are 1,247,776 kWh and the ex post peak demand reduction is 82.59 kW. The project-level kWh gross realization rate is 96%.

Project Description

The program participant received an incentive for designing and installing efficient lighting in the renovation of an existing building.

Measurement and Verification Effort

ADM staff reviewed the design drawings, a set of revised drawings for the common areas, lighting invoices and verified the usage type of the building. Staff reviewed the local building code, and determined the Indiana state building code applied to the project. The building code references the Lighting Power Densities (LPD) from the ASHRAE 90.1 2007 handbook tables. The building contact declined to provide occupancy rates for the hotel, so the Indiana TRM was referenced for standard annual hours. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$\Delta kWh = (WSFbase - WSFeffic)/1000 * SF * Hours * WHFe$$

Where:

WSFbase	*= Baseline lighting watts per square foot as determined by building*
WSFeffic	*= The actual installed lighting watts per square foot*
SF	*= Square footage of the building area applicable to the lighting design for new building.*
Hours	*= Annual site-specific hours of operation of the lighting equipment collected from the customer.*
WHFe	*= Waste Heat Factor for Energy to account for cooling savings from efficient lighting is as provided by building type..*

The tables shown below summarize energy savings of the lighting equipment installed under the project.

Interior Lighting Savings Input Summary and Savings

Variable	*Ex Ante*	*Ex Post*
LPD Interior	0.9-1.3 W/SF	0.9-1.3 W/SF
Area	133,246 SF	133,246 SF
Hours	2,857-3,253	2,857-3,253
Whf_energy	0.12	0.133
Whf_demand	0.20	0.20
CF	0.37	0.37
kWh Savings	196,804	200,660
kW Savings	48.00	83.00

Interior Lighting Reduced Watts by Fixture

Fixture	*Code*	*HOURS*	*Qty*	*Watt/Fixt*	*Area*	*Total watts*	*LPD*	*Code Watts*	*Watts reduced*
High Bay LED	A1	2857	281	193	111,044	54233	0.9	99,940	44,321
High Bay LED	A2	2857	18	77		1386	0.9		
Recessed 2'x4' LED	C	3253	12	41.4	5,011	496.8	1.0	5,011	2,939
Recessed 2'x2' LED	D1	3253	23	38.3		880.9	1.0		
Recessed 2'x2' LED	D2	3253	20	20.7		414	1.0		
Linear Strip LED	F	3253	8	35		280	1.0		
Recessed 2'x2' LED	D1	3253	2	38	1,277	76	1.0	1,277	921
Recessed 1'x4' LED	E	3253	11	25.5		280.5	1.0		
High Bay Vapor LED	Bvapor	2857	35	160	15,914	5600	1.3	20,688	15,088

The inputs for the exterior lighting are summarized in the following table.

Exterior Lighting Savings Input Summary and Savings

Variable	*Ex Ante*	*Ex Post*
LPD Exterior	1.0	1.0
Hours	3,395	4,308
Area	95,765	88,861
Whf_energy	0	0
Whf_demand	0	0
CF	0.37	0.37
kWh Savings	1,106,811	1,046,980
kW Savings	0	0

Exterior Lighting Reduced Watts by Fixture

Fixture	*Code*	*HOURS*	*Qty*	*Watt/ Fixt*	*Area*	*Total watts*	*LPD*	*Code Watts*	*Watts reduced*
LED pole fixture, 4 heads	OA	4,308	48	475	1,871,676	22,800	1.0	280,751	243,041
LED pole fixture, 2 heads	OB	4,308	8	292		2,336			
LED pole fixture, 1 head	OC	4,308	28	292		8,176			
LED wallpack	OE	4,308	38	116		4,408			

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Interior Lighting	196,804	200,797	101%	82.59
Exterior Lighting	1,106,811	1,046,980	95%	0
Total	1,303,615	1,247,777	96%	82.59

The project ex post energy savings are 1,247,777 kWh and the ex post peak demand reduction is 82.59 kW. The project-level kWh gross realization rate is 96%.

The ex post interior lighting savings analysis included the heating cooling interactive factor of 1.133, accounting for applicable HVAC equipment and location, compared with value of 1.12 referenced by the ex ante savings estimate.

The ex post exterior lighting savings calculation was based on operation of 4,308 hours annually for the dusk-to-dawn lighting fixtures, while the ex ante estimate is based on 3,398 annual operating hours. The ex post savings were lower ex ante savings because the area used to determine the code based lighting power density was lower – 88,861 SF compared to 95,765 SF referenced in by the ex ante savings estimate. The area referenced in the ex post analysis only included the areas in the design where the installed fixtures could provide illumination.

Project Number 203

Executive Summary

Under project 203, a program participant received a custom incentive from I&M for a process equipment upgrade project. The ex post annual energy savings are 425,459 kWh and the ex post peak demand reduction is 43.61 kW. The project-level kWh gross realization rate is 100%.

Project Description

The program participant received an incentive for replacing (3) plastic injection molding machine with (3) servo hydraulic plastic injection molding machines.

Measurement and Verification Effort

ADM staff collected the pre and post monitoring data completed by the equipment contractor, annual production data and the savings calculations. The pre- and post-implementation monitoring data included voltage, amps, and power factor for a period of seven days. Production data was collected during the same period and aggregated with the power data. The savings were determined by the formula:

$$kWh_{Savings} = \left[\frac{kWh_{pre}}{production\ units_{pre}} - \frac{kWh_{post}}{production\ units_{post}}\right] x\ Annual\ Production$$

$$kW_{Peak} = \left[kW_{average-pre} - kW_{average-post}\right]$$

Where:

$kWh_{savings}$ = *Annual energy savings*

kWh_{pre} = *Energy used during seven day metering period, existing machine*

kWh_{post} = *Energy used during seven-day metering period, new machine*

$production\ units_{pre}$ = *Injection molded product by weight*

$production\ units_{post}$ = *Injection molded product by weight*

Annual Production = *Typical year production by one machine*

kW_{pre} = *Peak energy demand, excluding current rush*

kW_{post} = *Peak energy demand, excluding current rush*

The table below presents the results of the pre- and post-implementation monitoring periods and annual energy savings.

Servo Hydraulic Plastic Injection Energy Savings Calculations

Measure	kWh/unit		Production rate	kWh/year		Ex Post Gross kWh Savings	Gross Realization Rate
	Pre	Post		Pre	Post		
Servo hydraulic molder 1	0.62	0.22	595899	371,352	132,719	238,633	100%
Servo hydraulic molder 2	0.46	0.36	595899	275,277	88,451	186,826	100%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Servo hydraulic molder	425,459	425,459	100%	43.61
Total	425,459	425,459	100%	43.61

The ex post annual energy savings are 425,459 kWh and peak demand reduction is 43.61 kW, at a 100% realization rate. The Ex Ante documentation provided pre monitoring and post monitoring, applied to historical production data, to provide an estimate with high certainty of savings.

Project Number 215 and 123

Executive Summary

Under projects 215 and 123, a program participant received custom and prescriptive incentives from I&M for an LED lighting retrofit. The project ex post annual energy savings are 5,973 kWh and the ex post peak demand reduction is 0.63 kW. The project-level kWh gross realization rate is 96%.

Project Description

The program participant received an incentive for installing (23) LED 40W 1x4 panels, (3) LED 60W 2x4 panels, (2) LED 12W 4' lamps, and (3) LED 40W 2x2 panels.

Measurement and Verification Effort

Through remote data collection, ADM staff verified the installation of the lighting equipment, the lighting hours of operation, the type of lighting control employed (switch, occupancy sensor, photocell, etc.), and facility HVAC type. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Watts_{base} \times N_{base} - Watts_{eff} \times N_{eff}}{1000}\right) \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= *Annual energy savings*
N	= *Number of fixtures*
Watts	= *Watts of each fixture*
HOU	= *Indicates hours of usage for the fixture*
HCIFe	= *Heating and Cooling Interactive Factor*
HCIFd	= *Heating and Cooling Interactive Factor during Peak Demand hours*
CF	= *Coincidence Factor for Peak Demand hours*
base	= *denotes pre-installation state*
eff	= *denotes post-installation state*

The table below presents ex ante and ex post energy savings, verified lighting hours of operation, and heating and cooling interactive factors associated with the lighting equipment installed under the project.

Lighting Energy Savings Calculations

Measure	Quantity (Fixtures)		Wattage		Hours	Heating Cooling Interaction Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Baseline	Efficient	Baseline	Efficient					
Custom									
4' 2L T8 to LED 1x4 Panel	23	23	59	40	8736	1.10	4,818	4,203	87%
4' 3L T8 to LED 2x4 Panel	3	3	89	60	8736	1.10	854	837	98%
Prescriptive									
4' T8 to LED 4' tube	2	2	32	12	8736	1.10	164	385	234%
U-tube 2L T8 to LED 2x2 Panel	3	3	59	40	8736	1.10	363	548	151%
Total							6,199	5,973	96%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting - Custom	5,672	5,040	89%	0.53
Lighting - Prescriptive	527	933	177%	0.10
Total	6,199	5,973	96%	0.63

The project ex post annual energy savings are 5,973 kWh and the ex post peak demand reduction is 0.63 kW. The project-level kWh gross realization rate is 96%. The difference between the ex ante and ex post savings results for the custom project is because the ex ante savings estimate did not include the heating and cooling interactive factor in their calculation and the ex post did use this value. For the prescriptive measures, the savings estimates differed because the ex ante analysis used per unit deemed savings values, whereas the ex post analysis used the project-specific data for the base and efficient quantities and wattages, hours of use, and heating and cooling interactive factor.

Project Number 219

Executive Summary

Under project 219, a program participant received Custom new construction incentives from I&M for energy efficient design and LED lighting and installation of a chiller in a criminal justice facility. The project ex post annual energy savings are 1,477,292 kWh and the ex post peak demand reduction is 167.63 kW. The project-level kWh gross realization rate is 85%.

Project Description

The program participant received an incentive for designing and installing efficient lighting in the renovation and expansion of an existing building. The project included installation of a 322-ton water cooled chiller with an efficiency rating exceeding the building code required value.

Measurement and Verification Effort

ADM staff reviewed the design drawings, a set of revised drawings for the common areas, lighting invoices and verified the usage type of the building. Staff reviewed the local building code and determined the Indiana state building code applied to the project. The building code references the Lighting Power Densities (LPD) from the ASHRAE 90.1 2007 handbook tables. The following equations were used to calculate the energy and demand savings from the lighting measures:

$$kWh_{Savings} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times HOU \times (HCIF_e)$$

$$kW_{Peak} = \left(\frac{Allowed\ LPD - Installed\ LPD}{1000}\right) \times Footage \times CF \times (HCIF_d)$$

Where:

$kWh_{savings}$	= Annual energy savings
Allowed LPD	= Allowed lighting power density per square foot per ASHRAE Standard 90.1-2007
Installed LPD	= Installed lighting power density per square foot
Footage	= Square of new construction space
HOU	= Indicates hours of usage for the fixture
HCIFe	= Heating and Cooling Interactive Factor
HCIFd	= Heating and Cooling Interactive Factor during Peak Demand hours
CF	= Coincidence Factor for Peak Demand hours

The table below summarizes information relating to the new construction energy savings of the lighting equipment installed under the project, including differences between ex ante and ex post savings calculations.

Lighting Savings Input Summary and Savings

Variable	*Ex Ante*	*Ex Post*
Allowable Lighting Powe Density	1.3	1.3
Area (Square Feet)	222,240	222,240
Lighting Hours of Use (Renovation Area)	8,760	Police area - 8,760
		Pod Nightlights - 8,760
		Courts, Offices - 6,067
Lighting Hours of Use-courthouse	4,408	4,247
Lighting Controls Savings	Yes	No; code requirement.
CF	0.37	0.37
kWh Savings	1,698,383	1,429,292
kW Savings	145.37	153.91

The detention pods, in which project lighting was installed, have similar lighting and controls in each of the sections of the building. The following table lists the lighting in a living pod.

Lighting Power Density Summary

Design Code	*Quantity*		*Wattage*
	Reg	*Nightlight*	
SF1	1		75
SF2	46	9	50
SF3	49	6	38
SF4	15	7	75
F2	23		85
SW1	1		40
F3P	2		42
C3	4		40
F1	1		54
Total Watts	8,818		

The project also included installation of a chiller. Chiller savings were determined through application of the following equation that compares the installed part load to the code required part load, specified by ASHRAE 90.1 2007.

$$kWh = tons\ x(IPLV_{code} - \ IPLV_{installed})x\ EFLH$$

$$kW = \frac{kWh_{savings}}{hours}\ x\ CF$$

Where:

Tons = *Rated capacity of chiller, tons*
IPLVcode = *Integrated part load value, code required*
IPLVinstalled = *Integrated part load value, installed*
EFLH = *Effective full load hours*

Water Cooled Chiller Savings Summary

Area	*EFLH*	*IPLV*		*kWh Savings*
		Code	*Installed*	
322 ton chiller, WC	1,554	0.57	0.468	48,000

Results

Gross Energy Impacts Summary

Measure Category	*kWh Savings*			*Ex Post Gross kW Savings*
	Ex Ante	*Ex Post*	*Realization Rate*	
Lighting - NC	1,739,165	1,429,292	85%	167.63
Lighting – NC (water cooled chiller)		48,000		
Total	1,739,165	1,477,292	85%	167.63

The project ex post annual energy savings are 1,477,292 kWh and the ex post peak demand reduction is 167.63 kW. The project-level kWh gross realization rate is 85%. The support savings analysis the installed wattage was determined by summing the quantities of each lighting type and determining the manufacturer wattages through review of the specification sheets. The lighting power density in the living pods was higher than the values expressed in the COMcheck documentation. The values pre-dated construction and may not have reflected as-built conditions. The ex post savings did not include savings for occupancy controls because the controls are code required in ASHRAE 90.1 2007 for new construction. The renovation portion of the project also met the new construction threshold, with replacement of over 50% of the existing lighting load. For the ex post analysis, the lighting hours were assigned by applicable usage area. The nightlight circuits in the detention living pods operate continuously (8,760 hours annually), but the surrounding lights would have been controlled separately. Internal energy usage data was also used to determine the building startup time and unoccupied schedule time for each day of the week.

For the chiller, the ex ante and ex post analyses both applied the same method to estimate energy savings compared to a code baseline chiller.

3. C&I Participant Survey Instrument

SCREENING AND BACKGROUND

1. Our records indicate that you are the main contact for the [FR_MEAS1] project completed at [FR_LOC1].

   Were you involved in the decision to complete this project?

   1. Yes
   2. No

[DISPLAY IF LIGHTING = 1]

2. We have a few questions about how many the lighting project that you implemented at [LIGHTING_LOCATION].

   Are all the lights for that project turned on about that same amount of time each day or are the lights installed in different locations with different hours of use?

   1. Hours of use are about the same for all lights
   2. Hours of use are not the same for all lights

[DISPLAY IF Q2 = 2]

3. For the next few questions, please think of the area that has the most lighting.

   Thinking about that space, what type of space is it?

[DISPLAY IF Q2 = 1 OR 2]

4. Please enter how many hours for each of the following days the building is open and the lights are on.

   1. Monday
   2. Tuesday
   3. Wednesday
   4. Thursday
   5. Friday
   6. Saturday
   7. Sunday

[DISPLAY IF Q2 = 1 OR 2]

5. Select all of the 2021 holidays the site is closed and the lighting turned off. **[MULTISELECT]**

1. New Year's Day (Tuesday 1/1/2021)
2. Martin Luther King Day (Monday 1/18/2021)
3. President's Day (Monday 2/15/2021)
4. Memorial Day (Monday 5/31/2021)
5. Independence Day (Thursday 7/4/2021)
6. Labor Day (Monday 9/6/2021)
7. Columbus Day (Monday 10/11/2021)
8. Veterans Day (Monday 11/11/2021)
9. Thanksgiving Day (Thursday 11/25/2021)
10. Christmas Eve (Tuesday 12/24/2021)
11. Christmas Day (Wednesday 12/25/2021)

6. Please enter the total number of additional days, if any, that the site is closed and the lighting is turned off. Do not count any of the days listed in the last question.

7. Does your company have any of the following policies or procedures in place at [FR_LOC1]?

   [FOR EACH, 1 = Yes, 2 = No, 98 = Don't know]

   a. A person or persons responsible for monitoring or managing energy usage
   b. Defined energy savings goals
   c. A specific policy requiring that energy efficiency be considered when purchasing equipment
   d. Carbon reduction goals

PROGRAM AWARENESS

8. How did you FIRST learn about Indiana Michigan Power's incentives for efficient equipment upgrades? **[RANDOMIZE 1 – 10, FIX 11 and 98]**

   1. From a Trade Ally/contractor/equipment vendor/ energy consultant
   2. From an Indiana Michigan Power Account Representative
   3. From a program representative / Lockheed Martin
   4. From a search engine (Google, Yahoo, Bing)
   5. At an event/trade show
   6. Received an email blast or electronic newsletter
   7. Received an informational brochure
   8. From a program sponsored webinar
   9. From *Indiana Michigan*'s website
   10. Friends or colleagues
   11. Some other way (please explain) [OPEN]
   98. Don't know

PROGRAM DELIVERY EFFICIENCY

[DISPLAY Q9 IF SBDI= 1]

9. When your contractor first approached you about the program, did you have any concerns about participating or was it an easy decision?

    1. I had some concerns
    2. It was an easy decision
    98. Don't know

[DISPLAY Q10 IF Q9= 1]

10. What were your concerns?

    1. Upfront costs
    2. Time for return on investment
    3. Performance of new equipment
    4. Business disruption
    5. Legitimacy of the offer
    4. Other: Specify [OPEN]
    98. Don't know

[DISPLAY Q11 IF Q9= 1]

11. Why did you decide to participate despite your concerns?

    1. [OPEN]

[DISPLAY Q12 IF SBDI = 1]

12. Using the scale below, please indicate how much you agree or disagree with the following statements regarding your experience with your contractor:

[SCALE: 1 = 1 (Completely disagree), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Completely agree), 98 = Don't know]

[RANDOMIZE A – D]

a. My contractor was professional

b. My contractor's recommendations made sense for my business

c. My contractor could answer most of my questions

d. I would recommend my contractor as a contractor to consider

[DISPLAY Q13 IF Q12A, Q12B, Q12C, OR Q12E < 3]

13. What could your contractor have done differently that would have improved your opinion of the service they provided?

    1. [OPEN]

[DISPLAY Q14 IF SBDI = 0]

14. Which of the following people worked on completing your application for program incentives (including gathering required documentation)?

[MULTI SELECT]

1. Yourself
2. Another member of your company
3. A contractor
4. An equipment vendor
5. A designer or architect

[DISPLAY Q15 IF Q14 = 1]

15. Using a 5-point scale, where 1 means "completely unacceptable" and 5 means "completely acceptable," how would you rate . . .

[SCALE: 1 = 1 (Completely unacceptable), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Completely acceptable agree), 98 = Don't know, 99 = Not applicable]

a. the ease of finding forms on Indiana Michigan Power's website

b. the ease of using the electronic application worksheets

c. the time it took to approve the application

d. the clarity of information on how to complete the application

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

f. the overall application process

[DISPLAY Q16 IF Q15a-f < 3]

16. How could the application process be improved?

[TEXT BOX]

[DISPLAY Q17 IF Q14 = 1]

17. Did you have a clear sense of whom you could go to for assistance with the application process?
1. Yes
2. No
98. Don't know

[DISPLAY Q18 IF SBDI = 1]

18. How long did you have to wait for the equipment to be installed after the onsite assessment was performed? Would you say…

1. Less than 1 week

2. 1-2 weeks
3. 3-4 weeks
4. 5-6 weeks
5. More than 6 weeks
6. All equipment was installed the same day
98. Don't know

[DISPLAY Q19 IF SBDI = 0]

19. Who installed your program-qualified equipment or efficiency upgrades? Was it…

1. Your own staff
2. A contractor you've worked with before
3. A contractor recommended by the Indiana Michigan program (registered trade ally)
4. A new contractor that someone else recommended
5. Someone else (Please specify)
98. Don't know

[DISPLAY Q20 IF SBDI =0]

20. How did the incentive amount compare to what you expected? Would you say…

1. It was much less
2. It was somewhat less
3. It was about the amount expected
4. It was somewhat more
5. It was much more
98. Don't know

[DISPLAY Q21 IF SBDI = 1]

21. How did the project cost compare to what you expected?

1. It was much less
2. It was somewhat less
3. It was about the amount expected
4. It was somewhat more
5. It was much more
98. Don't know

DECISION MAKING AND EQUIPMENT SELECTION

22. Has your organization purchased any significant energy efficient equipment in the last three years without applying for a financial incentive through an energy efficiency program at the [FR_LOC1] location?

    1. Yes. Our organization purchased energy efficient equipment but did not apply for incentive.
    2. No. Our organization purchased significant energy efficient equipment and applied for an incentive.
    3. No significant energy efficient equipment was purchased by our organization.
    98. Don't know

[DISPLAY Q23 IF Q22 = 1 OR 2]

23. Which of the following financial methods, if any, does your organization typically use to evaluate energy efficiency improvements? [**MULTISELECT**]

    1. Initial Cost
    2. Simple payback
    3. Internal rate of return
    4. Life cycle cost
    5. We don't use any of these
    98. Don't know

[DISPLAY Q24 IF Q23= 2]

24. What payback period do you typically require to approve an efficiency project?

    [OPEN]

[DISPLAY Q25 IF Q23= 3]

25. What internal rate of return do you typically use to approve an efficiency project?

    [OPEN]

26. Before participating in the [PROGRAM_NAME] Program, had you implemented any equipment or measure similar to the [FR_MEAS1] [INSTALLED_FR1] at the [FR_LOC1] location?

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

27. When did you first learn about I&M's energy efficiency programs? Was it BEFORE or AFTER you finalized the specifications of your [FR_MEAS1] project, including the efficiency level and the scope of the project?

    1. Before
    2. After
    98. Don't know

28. Did you have plans to [INSTALL_FR1] the [FR_MEAS1] at the [FR_LOC1] location before participating in the program?

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

29. Would you have completed the [FR_MEAS1] project even if you had not participated in the program?

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

30. Did you have experience with I&M's incentive program before completing the [FR_MEAS1] project?

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

[DISPLAY Q31 IF Q30 = 1]

31. How important was your previous experience with Indiana-Michigan-offered programs in making your decision to [INSTALL_FR1] the [FR_MEAS1] at the [FR_LOC1] location?

    1. Very important
    2. Somewhat important
    3. Only slightly important
    4. Not at all important
    98. Don't know

[DISPLAY Q32 IF SBDI = 0]

32. Did a [PROGRAM_NAME] Program representative or other I&M representative recommend that you [INSTALL_FR1] the [FR_MEAS1] at the [FR_LOC1] location?

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

[DISPLAY Q33 IF Q32 = 1]

33. If the [PROGRAM_NAME] program representative had not recommended [INSTALLING_FR1] the [FR_MEAS1], how likely is it that you would have [INSTALLED_FR1] it anyway?

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

[DISPLAY Q34 IF SBDI = 1]

34. If the [PROGRAM_NAME] program contractor that provided the energy assessment of your facility had not recommended [INSTALLING_FR1] the [FR_MEAS1], how likely is it that you would have [INSTALLED_FR1] it anyway?

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

35. Would your organization have been financially able to [INSTALL_FR1] the [FR_MEAS1] at the [FR_LOC1] without the financial incentive from the program?

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

[DISPLAY Q36 IF Q35 = 2]

36. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

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

37. If the financial incentive from the [PROGRAM_NAME] Program had not been available, how likely is it that you would have [INSTALLED_FR1] the [FR_MEAS1] at the [FR_LOC1] location anyway?

    1. Definitely would have [INSTALLED_FR1]
    2. Probably would have [INSTALLED_FR1]
    3. Probably would not have [INSTALLED_FR1]
    4. Definitely would not have [INSTALLED_FR1]
    98. Don't know

[DISPLAY Q38 IF Q35 = 2 AND Q36 = 1 AND Q28 = 1AND Q29 = 1]

38. Previously you said that your organization had plans to complete the project and would have completed it if you had not participated in the program. You also said that your organization would not have been financially able to install the equipment without the program incentive.

    In your own words, can you explain the role that the financial incentive played in your decision to complete this project?

[DISPLAY Q39 IF MEASURE_QUANT > 1]

39. We would like to know whether the availability of information and the financial incentive provided through the [PROGRAM_NAME] program affected the quantity (or number of units) of [FR_MEAS1] that you purchased and [INSTALLED_FR1] at the [FR_LOC1].

    Did you purchase and install more [FR_MEAS1] than you otherwise would have without the program?

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

[DISPLAY Q40 IF ENERGY_EQUIP = YES]

40. We would like to know whether the availability of information and financial incentive provided through the [PROGRAM_NAME] program affected the level of energy efficiency you chose for the [FR_MEAS1B] at the [FR_LOC1] location.

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

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

[DISPLAY Q41 IF Q40 = 1]

41. What kind of equipment, if any, would you have installed if the program was not available?

    1. [OPEN]
    98. Don't know

42. We would like to know whether the availability of information and the financial incentive provided through the program affected the timing of the [FR_MEAS1] project at the [FR_LOC1] location.

    Did you [INSTALL_FR1] the [FR_MEAS1] earlier than you otherwise would have without the program?

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

[DISPLAY Q43 IF Q42 = 1]

43. When would you otherwise have completed the project?

1. Less than 6 months later
2. 6-12 months later
3. 1-2 years later
4. 3-5 years later
5. More than 5 years later
98. Don't know

[DISPLAY Q44 IF MULTIPLE_MEASURE =1]

44. Our records indicate you [INSTALLED_FR2] [FR_MEAS2] at the [FR_LOC2] location in addition to [FR_MEAS1] at the [FR__LOC1] location. Did both of these projects go through the same decision making process or was a separate decision made for each?

1. The same decision making process applies to both projects.
2. A different decision making process applies to each project.
3. We did not [INSTALL_FR2] [FR_MEAS2] at the [FR_LOC2] location.
98. Don't know

[IF Q44 = 2, REPEAT Q26 THROUGH Q43 WITH FR_MEAS2]

MEASUREMENT AND VERIFICATION

[DISPLAY Q45 IF INCENTIVE = 1]

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

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

[DISPLAY Q46 IF Q45=1]

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

[SCALE: 1 = 1 (Strongly disagree), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Strongly agree), 98 = Don't know]

a. The inspector was courteous

b. The inspector was efficient

SPILLOVER

[NOTE: THESE QUESTIONS SERVE TO COLLECT DATA TO QUANTIFY SPILLOVER EFFECTS FROM the INCENTIVE PROGRAMS AND DIRECT IMPACTS OF THE ENERGY ASSESSMENT TOOL]

47. Since you completed the incentive project, have you installed any energy efficient equipment at a facility that receives electrical service from I&M and that you DID NOT get a rebate or discount for from I&M?

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

[DISPLAY Q48 if Q47 = 1]

48. What additional energy efficient equipment have you installed? [MULTI SELECT]

    1. Lighting
    2. Lighting controls or occupancy sensors
    3. Unitary or split air conditioning system or chiller
    4. ENERGY STAR Room air conditioners
    5. Efficient motors
    6. Refrigeration equipment (including LED case lighting)
    7. Kitchen equipment
    8. Something else [OPEN ENDED]
    96. Didn't implement any measures [SKIP TO CUSTOMER SATISFACTION]
    98. Don't know

[DISPLAY Q49 IF Q47= 1]

49. Why didn't you receive incentives for those items? [MULTI SELECT RANDOMIZE ORDER, BUT FIX OTHER AND DON'T KNOW]

    1. Didn't know whether equipment qualified for financial incentives
    2. Equipment did not qualify for financial incentives
    3. Too much paperwork for the financial incentive application
    4. Financial incentive was insufficient
    5. Didn't have time to complete paperwork for financial incentive application
    6. Didn't know about financial incentives until after equipment was purchased
    7. We did receive an incentive **[SKIP TO FIRMOGRAPHICS]**
    8. Other (Please specify) [OPEN ENDED]
    98. Don't know

[DISPLAY Q50 IF Q47= 1]

50. Did you work with a contractor to install that efficient equipment or did your company's staff install the equipment?

    1. Worked with a contractor
    2. Company self-installed the equipment
    3. Both
    98. Don't know

Lighting [DO NOT DISPLAY]

[DISPLAY Q51 IF Q47 = 1]

51. What type of lighting did you install? **[MULTI-SELECT]**

1. T8 Fluorescent linear lamps – Single (1) lamps
2. T8 Fluorescent linear lamps – 2 lamp fixtures
3. T8 Fluorescent linear lamps – 4 lamp fixtures
4. T8 Fluorescent linear lamps – 6 lamp fixtures
5. T5 Fluorescent linear lamps – Single (1) lamps
6. T5 Fluorescent linear lamps – 2 lamp fixtures
7. T5 Fluorescent linear lamps – 4 lamp fixtures
8. T5 Fluorescent linear lamps – 6 lamp fixtures
9. LED Screw-in BAR/R/ER bulbs
10. LED Screw-in Interior PAR/MR bulbs
11. LED Screw-in omnidirectional A-line bulbs
12. LED 2-foot linear replacement lamps
13. LED 4-foot linear replacement lamps
14. LED exterior flood or spot luminaires
15. LED 1x4 panel or troffer
16. LED 2x2 panel or troffer
17. LED 2x4 panel or troffer
18. LED high-bay lighting
19. Another type
98. Don't know

[DISPLAY Q52 IF Q51 = 19]

52. What other type of lighting equipment did you install?

[TEXT BOX] Lamps/Bulbs

SPILLOVER

[REPEAT Q53 - Q56 FOR EACH TYPE SELECTED IN Q51]

53. How many [Q51 RESPONSE] did you install?

[TEXT BOX] Watts

54. What was the average wattage of the [Q51 RESPONSE]?

[TEXT BOX]

55. Were the [Q51 RESPONSE] installed inside or outside?

1. Inside
2. Outside
3. Parking garage
98. Don't know

[DISPLAY Q56 IF Q55 = 1]

56. What type of building did you install the [Q51 RESPONSE] in?

1. Food Sales
2. Food Service
3. Health Care
4. Hotel/Motel
5. Office
6. Public Assembly
7. Public Services (non-food)
8. Retail
9. Warehouse
10. School
11. College
12. Industrial – 1 Shift
13. Industrial – 2 Shift
14. Industrial – 3 Shift
15. Other (Please describe)
98. Don't know

[DISPLAY Q57 IF Q55 = 1]

57. Is the inside space heated, cooled, or both?

1. Heated
2. Cooled
3. Both
98. Don't know

58. What type of lighting did the [Q51 RESPONSE] replace?

1. T12s (linear fluorescents)
2. T8s (linear fluorescents)
3. Metal-halide / High-intensity discharge
4. Incandescent
5. Compact fluorescent (CFL)
5. Something else [OPEN]
98. Don't know

59. What was the average wattage of the old lamps or bulbs?

60. How many of the old lamps or bulbs did you remove?

[DISPLAY Q61 IF Q48 =1]

61. How important was your experience with the program in your decision to install this lighting equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q62 IF Q48 =1]

62. If you had NOT participated in the program, how likely is it that your organization would still have installed this lighting equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"]
98. Don't know

[DISPLAY Q63 IF [Q61=0,1,2,3 AND Q62=0,1,2,3]

OR IF [Q61=8,9,10 AND Q62=8,9,10]

63. You scored the importance of your program experience to your decision to implement additional lighting measures with [Q61 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing additional lighting measures if your organization had not participated in the program with [Q62 RESPONSE] out of 10 possible points.

Can you please explain the role the program made in your decision to implement this measure?

Lighting Controls [DO NOT DISPLAY]

[DISPLAY Q64 IF Q48 = 2]

64. How many fixtures are being controlled by the lighting controls?

[TEXT BOX]

[DISPLAY Q65 IF Q48 = 2]

65. On average, how many lamps or bulbs does each fixture contain?

[TEXT BOX]

[DISPLAY Q66 IF Q48 = 2]

66. What is the average wattage of these lamps?

[TEXT BOX]

[DISPLAY Q67 IF Q48 = 2]

67. Are any of the lighting controls that you installed central time clock controls?

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

[DISPLAY Q68 IF Q67 = 1]

68. How many of the fixtures are controlled by the central time clock?

[TEXT BOX]

[DISPLAY Q69 IF Q48 = 2]

69. What type of building did you install the lighting controls in?

1. Food Sales
2. Food Service
3. Health Care
4. Hotel/Motel
5. Office
6. Public Assembly
7. Public Services (non-food)
8. Retail
9. Warehouse
10. School
11. College
12. Industrial – 1 Shift
13. Industrial – 2 Shift
14. Industrial – 3 Shift
16. Other (Please specify)
98. Don't know

[DISPLAY Q70 IF Q48 = 2]

70. How important was your experience with the program in your decision to install lighting controls?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q71 IF Q48 = 2]

71. If you had NOT participated in the program, how likely is it that your organization would still have installed lighting controls?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q72 IF [Q70=0,1,2,3 AND Q71=0,1,2,3]

OR [Q70=8,9,10 AND Q71=8,9,10]]

72. You scored the importance of your program experience to your decision to implement lighting controls with [Q70 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing lighting controls if your organization had not participated in the program with [Q71 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

HVAC Measures [DO NOT DISPLAY]

[DISPLAY Q73 IF Q48 = 3]

73. What types of energy efficient equipment did you install as part of the HVAC project? [MULTI SELECT]

    1. Split air conditioning system (An A/C system that has an evaporator indoors and the compressor and condenser outdoors.)
    2. Packaged air conditioning system (A type of central air conditioning that contains both the air handler fan, compressor, and condenser in a single unit. These are typically mounted on the roof.)
    3. Heat pump (An electric heating and cooling system)
    4. Air cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
    5. Water cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities)
    6. Another type
    98. Don't know

[DISPLAY Q74 IF Q73 = 6]

74. What other type of HVAC equipment did you install?

    [TEXT BOX]

[REPEAT Q75 – Q77 FOR EACH SELECTED IN Q73]

75. We would like to know more about the rated efficiency and number of units of the [Q73 RESPONSE](s) that you installed.

    For each level of efficiency of the equipment you installed, please provide the rated efficiency and the number of units.

76. What type of building did you install the heating/cooling equipment in?

    1. Grocery
    2. High School
    3. Hospital
    4. Light Industrial
    5. Office - Large
    6. Office - Small
    7. Primary School
    8. Religious Worship
    9. Restaurant - Fast Food
    10. Restaurant - Full Service
    11. Retail - Big Box
    12. Retail - Large
    13. Retail - Small
    14. University
    15. Warehouse
    16. Other (Please specify)

98. Don't know

77. What city is the building where you installed the heating/cooling equipment located in?

[TEXT BOX]

[DISPLAY Q78 IF Q73 = 1-7]

78. How important was your experience with the program in your decision to install the energy efficient HVAC equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q79 IF Q73 = 1-7]

79. If you had NOT participated in the program, how likely is it that your organization would still have installed the energy efficient HVAC equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q80 IF [Q78=0,1,2,3 AND Q79=0,1,2,3] OR [Q78=8,9,10 AND Q79=8,9,10]]

80. You scored the importance of your program experience to your decision to implement energy efficient HVAC equipment with [Q78 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the energy efficient HVAC equipment if your organization had not participated in the program with [Q79 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

[DISPLAY Q81 IF Q48 = 4]

81. How many ENERGY STAR room air conditioners did you install?

[TEXT BOX]

[DISPLAY Q82 IF Q48 = 4]

82. What type of building did you install the heating/cooling equipment in?

1. Grocery
2. High School
3. Hospital
4. Light Industrial
5. Office - Large
6. Office - Small
7. Primary School
8. Religious Worship

9. Restaurant - Fast Food
10. Restaurant - Full Service
11. Retail - Big Box
12. Retail - Large
13. Retail - Small
14. University
15. Warehouse
16. Other
98. Don't know

[DISPLAY Q83 IF Q48 = 4]

83. What city is the building where you installed the room air conditioners located in?

[TEXT BOX]

[DISPLAY Q84 IF Q48 = 4]

84. How important was your experience with the program in your decision to install the heating/cooling equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q85 IF Q48 = 4]

85. If you had NOT participated in the program, how likely is it that your organization would still have installed the heating/cooling equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q86 IF [Q84=0,1,2,3 AND Q85=0,1,2,3] OR [Q84=8,9,10 AND Q85=8,9,10]]

86. You scored the importance of your program experience to your decision to install the energy efficient air conditioners with [Q84 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of installing the energy efficient air conditioners if your organization had not participated in the program with [Q85 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

Efficient Motors [DO NOT DISPLAY]

[DISPLAY Q87 IF Q48 = 5]

87. How many efficient motors did you install?

[TEXT BOX]

[DISPLAY Q88 IF Q48 = 5]

88. What is the approximate average horsepower of the new motors? That is, what is the average across all the motors you installed without an incentive?

[TEXT BOX]

[DISPLAY Q89 IF Q48 = 5]

89. What is the approximate average efficiency of the new motors? That is, what is the average efficiency across all the new motors?

[TEXT BOX] Rated efficiency (%)

[DISPLAY Q90 IF Q48 = 5]

90. On average, how many hours per day do the motors operate? That is, what the average number of hours the motors you installed operate?

[TEXT BOX] hours per day

[DISPLAY Q91 IF Q48 = 5]

91. How important was your experience with the program in your decision to install efficient motors?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q92 IF Q48 = 5]

92. If you had NOT participated in the program, how likely is it that your organization would still have installed the efficient motors?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q93 IF [Q91=0,1,2,3 AND Q92=0,1,2,3] OR [Q91=8,9,10 AND Q92=8,9,10]]

93. You scored the importance of your program experience to your decision to implement efficient motors with [Q91 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing the efficient motors if your organization had not participated in the program with [Q92 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

Commercial Refrigeration Equipment [DO NOT DISPLAY]

[DISPLAY Q94 IF Q48 = 6]

94. What types of energy efficient refrigeration equipment did you install?

1. ENERGY STAR Commercial freezer
2. ENERGY STAR Commercial refrigerator
3. Anti-sweat heater controls
4. LED refrigerated case lighting
5. Refrigerated case covers
6. Some other type of refrigeration equipment
98. Don't know

[DISPLAY Q95 IF Q94 = 6]

95. What other type of energy efficient refrigeration equipment did you install?

[TEXT BOX]

[DISPLAY Q96 IF Q94 = 1]

96. How many ENERGY STAR commercial freezers did you install?

[TEXT BOX]

[DISPLAY Q97 IF Q96 = 1, REPEAT FOR EACH UP TO THREE TIMES]

97. What is the volume in cubic feet of the first freezer?

[TEXT BOX]

[DISPLAY Q98 IF Q96 = 1, REPEAT FOR EACH UP TO THREE TIMES]

98. Does this freezer have a solid door or a glass door?

1. Solid door
2. Glass door
98. Don't know

[DISPLAY Q99 IF Q96 = 1, REPEAT FOR EACH UP TO THREE TIMES]

99. Is this a vertical freezer or a chest type freezer?

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q100 IF Q94 = 2]

100. How many ENERGY STAR commercial refrigerators did you install?

[TEXT BOX] refrigerators

[DISPLAY Q101 IF Q100 = 2, REPEAT FOR EACH UP TO THREE TIMES]

101. What is the volume in cubic feet of the first refrigerator?

[TEXT BOX] cubic feet

[DISPLAY Q102 IF Q100 = 2, REPEAT FOR EACH UP TO THREE TIMES]

102. Does this refrigerator have a solid door or a glass door?

1. Solid door
2. Glass door
98. Don't know

[DISPLAY Q103 IF Q100 = 2, REPEAT FOR EACH UP TO THREE TIMES]

103. Is this a vertical refrigerator or a chest type refrigerator?

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q104 IF Q94 = 3]

104. Did you install humidity-based controls or conductivity-based controls, or both types?

1. Humidity-based controls
2. Conductivity-based controls
3. Both types
98. Don't know

[DISPLAY Q105 IF Q104= 1 OR 3]

105. How many humidity-based controls did you install?

[TEXT BOX]

[DISPLAY Q106 IF Q104= 1 OR 3]

106. What is the total number of freezer or refrigerator doors controlled by the humidity-based controls?

[TEXT BOX]

[DISPLAY Q107 IF Q104= 2 OR 3]

107. How many conductivity-based controls did you install?

[TEXT BOX]

[DISPLAY Q108 IF Q104= 2 OR 3]

108. What is the total number of freezer or refrigerator doors controlled by the conductivity-based controls?

[TEXT BOX]

[DISPLAY Q109 IF Q104 = 98]

109. How many anti-sweat heater controls did you install?

[TEXT BOX]

[DISPLAY Q110 IF Q104 = 98]

110. What is the total number of freezer or refrigerator doors controlled by the anti-sweat heater controls?

[TEXT BOX]

[DISPLAY Q111 IF Q94 = 4]

111. How many linear feet in total of LED case lighting did you install?

[TEXT BOX]

[DISPLAY Q112 IF Q94 = 5]

112. How many linear feet of refrigerated case covers did you install?

[TEXT BOX]

[DISPLAY Q113 IF Q48=6]

113. How important was your experience with the program in your decision to install the energy efficient refrigeration equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q114 IF Q48=6]

114. If you had NOT participated in the program, how likely is it that your organization would still have installed this energy efficient refrigeration equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q115 IF [Q113=0,1,2,3 AND Q114=0,1,2,3] AND [Q113=8,9,10 AND Q114=8,9,10]]

115. You scored the importance of your program experience to your decision to implement energy efficient refrigeration equipment with [Q113 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing energy efficient refrigeration equipment if your organization had not participated in the program with [Q114 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

Commercial Kitchen Equipment [DO NOT DISPLAY]

[DISPLAY Q116 IF Q48 = 7]

116. What type of kitchen equipment did you install?

1. Low flow pre-rinse spray valves
2. ENERGY STAR Commercial fryers
3. ENERGY STAR Commercial steam cookers
4. ENERGY STAR hot food holding cabinets
5. ENERGY STAR commercial griddles
6. ENERGY STAR commercial convection ovens
7. ENERGY STAR commercial combination ovens
8. Some other type of kitchen equipment
98. Don't know

[DISPLAY Q117 IF Q116 = 8]

117. What other type of kitchen equipment did you install?

[TEXT BOX]

[DISPLAY Q118 IF Q116 = 1]

118. Is the flow rate for any of the spray valves you installed equal to or less than 1.6 gallons per minute?

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

[DISPLAY Q119 IF Q116 = 1]

119. How many pre-rinse spray valves with a flow rate equal to or less than 1.6 gallons per minute did you install?

[TEXT BOX]

[DISPLAY Q120 IF Q116 = 1]

120. Did you install the pre-rinse spray valves that the [LOCATION] location?

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

[DISPLAY Q121 IF Q120= 2]

121. In what city is the building where you installed the pre-rinse spray valves located in?

[TEXT BOX]

[DISPLAY Q122 IF Q116 = 2]

122. How many ENERGY STAR commercial fryers did you install?

[TEXT BOX]

[DISPLAY Q123 IF Q116 = 3]

123. How many ENERGY STAR commercial steam cookers did you install?

1. Number of 3 pan steam cookers [NUMERIC]
2. Number of 4 pan steam cookers [NUMERIC]
3. Number of 5 pan steam cookers [NUMERIC]
4. Number of 6 pan steam cookers [NUMERIC]
98. Don't know

[DISPLAY Q124 IF Q116 = 4]

124. How many ENERGY STAR hot food holding cabinets did you install?

[TEXT BOX]

[DISPLAY Q125 IF Q116 = 5]

125. How many ENERGY STAR commercial griddles did you install?

[TEXT BOX]

[DISPLAY Q126 IF Q116 = 6]

126. How many ENERGY STAR commercial convection ovens did you install?

[TEXT BOX]

[DISPLAY Q127 IF Q116 = 7]

127. How many ENERGY STAR commercial combination ovens did you install?

[TEXT BOX]

[DISPLAY Q128 IF Q48= 1 AND Q116=1-8]

128. How important was your experience with the program in your decision to install this kitchen equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

[DISPLAY Q129 IF Q48= 1 AND Q116=1-8]

129. If you had NOT participated in the program, how likely is it that your organization would still have installed this kitchen equipment?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"
98. Don't know

[DISPLAY Q130 IF [Q128=0,1,2,3 AND Q129=0,1,2,3] OR [Q128=8,9,10 AND Q129=8,9,10]]

130. You scored the importance of your program experience to your decision to implement energy efficient kitchen equipment with [Q128 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing energy efficient kitchen equipment if your organization had not participated in the program with [Q129 RESPONSE] out of 10 possible points.

Can you please explain the role the program made in your decision to implement this measure?

[TEXT BOX]

CUSTOMER SATISFACTION

131. Not including any contractors that you hired, in the course of doing this project did you have any interactions with program staff about questions or concerns that you had?

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

132. Using the scale below, please rate how dissatisfied or satisfied you are with each of the following ….

[SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Very satisfied), 98 = Don't know]

For each:

[A AND B FIRST, RANDOMIZE C - M, ASK N LAST]

a. **[DISPLAY IF Q131 = 1]** How long it took program staff to address your questions or concerns

b. **[DISPLAY IF Q131 = 1]** How thoroughly they addressed your questions or concerns

c. **[DISPLAY IF SBDI = 1]** The proposal you received from your contractor

d. **[DISPLAY IF SBDI = 1]** The amount of time between the onsite audit and the installation of the equipment

e. **[DISPLAY IF SBDI = 1]** The equipment that was installed

f. **[DISPLAY IF SBDI = 1 OR Q19 = 2,3,4]** The quality of the installation

g. **[DISPLAY IF SBDI = 0]** The steps you had to take to get through the program

h. **[DISPLAY IF SBDI = 0]** The amount of time it took to get your rebate or incentive

i. **[DISPLAY IF SBDI = 0]** The range of equipment that qualifies for incentives

j. **[DISPLAY IF SBDI = 1]** The amount of time it took to install the program equipment

k. **[DISPLAY IF SBDI = 1]** How well your contractor explained the program rules and processes

l. **[DISPLAY IF SBDI = 1]** The types of equipment that you were able to get through the small business program

m. **[DISPLAY IF SBDI = 1]** The energy assessment of your facility

n. The program overall

[DISPLAY Q133 IF ANY IN Q131 < 3]

133. Why were you dissatisfied with those parts of the program you mentioned?

1. [OPEN]

134. If you could change one thing about the program, what would it be?

1. [OPEN]

135. Using the same scale, how dissatisfied or satisfied are you with I&M as your electricity service provider?

[SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 =3, 4 = 4, 5 = 5 (Very satisfied), 98 = Don't know]

FIRMOGRAPHIC

136. Does your organization own or occupy, own and rent to someone else, or rent the facility where the project(s) took place?

1. Own and occupy
2. Own and rent to someone else
3. Rent
98. Don't know

137. Do you have any other comments that you would like to relay to I&M about energy efficiency in the commercial and industrial sector or about their programs?

4. Non-Participant Survey Instrument

SCREENING / BACKGROUND

1. According to our records, I&M provides electricity service to the facility located at [ADDRESS]. Is that correct?

    1. Yes
    2. No **[THANK AND TERMINATE AND TALLY]**
    98. Don't know **[THANK AND TERMINATE AND TALLY]**

2. To the best of your knowledge, has your company or organization replaced or upgraded equipment that requires electricity to operate in the past three years? This could have been for lighting, motors, computers, or HVAC equipment.

    1. Yes
    2. No

[DISPLAY Q3 IF Q2 = 1]

3. Did you receive an incentive from I&M for any of that equipment?

    1. Yes **[THANK AND TERMINATE AND TALLY]**
    2. No

4. To the best of your knowledge, has your company or organization completed any other electricity saving projects that you received an incentive from I&M for in the past three years?

    1. Yes **[THANK AND TERMINATE AND TALLY]**
    2. No

5. When it comes to purchasing energy-using equipment for your facilities/sites, do you …?

    1. Make those decisions
    2. Provide input to others who make those decisions
    3. Have no involvement with those decisions [TERMINATE]

PROGRAM AWARENESS AND SOURCES OF AWARENESS

6. Before taking this survey, were you aware that I&M provides cash incentives for energy efficient equipment purchases and upgrades for existing and new buildings?

    1. Yes
    2. No

[DISPLAY Q7 IF Q6 = 1]

7. Which of the following types of incentives were you aware of? Please select all that apply. [MULTISELECT]

1. Incentives to replace inefficient equipment, including lighting, in existing buildings
2. Incentives to incorporate energy efficiency into new construction designs
3. Incentives for retro-commissioning projects, which improve how building equipment and systems function together
4. Incentives for heating and cooling equipment
5. Incentives for variable frequency drives, efficient pumps, and efficient motors
6. Incentives for refrigeration equipment
7. Incentives for cooking equipment
8. Something else (Please specify)
9. Not aware of any incentives

[DISPLAY Q8 IF Q6 = 1]

8. In the past year, from what sources have you gotten information about the energy efficiency incentives from I&M? Please select all that apply. [MULTISELECT]

1. From a Trade Ally/contractor/equipment vendor/ energy consultant
2. From an I&M account representative
3. From an I&M program representative
4. From an internet search engine
5. At an event/trade show
6. Received an email blast or electronic newsletter
7. Received an informational brochure
8. From a program sponsored webinar
10. From I&M's website
12. Friends or colleagues
13. Some other way (please explain) [OPEN]
98. Don't know

EQUIPMENT DECISION MAKING

9. In general, how much does input from each of the following types of people influence your company or organization's decisions about equipment replacements and upgrades? Please answer on a scale from 1 to 5, where 1 means "no influence" and 5 means "great influence."

[INSERT 1-5 SCALE WITH 98=DK, RANDOMIZE ORDER OF ITEMS 1-4]

1. Vendor or retailer
2. Contractor or installer
3. Designer or architect
4. Utility staff member, such as an account representative

10. When discussing past or planned equipment replacements, has your contractor mentioned the energy-efficiency incentives available from I&M?

1. Yes
2. No
3. Not applicable—organization has not yet talked to a contractor
98. Don't know

11. Thinking about any planned equipment replacements or upgrades as well as potential equipment failures, how likely is it that you will use I&M incentives to increase the energy efficiency level of any equipment replacements or upgrades you will make in the next two years?

Please answer on a scale from 1 to 10, where 1 means "not at all likely" and 10 means "extremely likely".

[INSERT 1-10 SCALE WITH 98 = DK]

[DISPLAY Q12 IF Q11 < 9]

12. What might keep your company from using I&M incentives to increase the energy efficiency level of any equipment replacements or upgrades you will make in the next two years?

1. Don't know enough about the incentives
2. Unlikely to replace any equipment
3. Energy savings from equipment replacements not worth the trouble
4. Too much time or trouble
5. Prefer not to deal with utility
6. Other - specify: [OPEN-ENDED RESPONSE]
97. Not applicable – all such decisions are made by a property or energy management firm
98. Don't know

13. Is your firm considering undertaking any new construction or major building renovation projects within the next five years? This could include adding a new wing, gutting an existing building, or building an entirely new building.

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

[DISPLAY Q14 IF Q13= 1]

14. Has your firm begun discussing the project design with an architect, design engineer, or other type of contractor?

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

[DISPLAY Q15 IF Q14= 1]

15. In those discussions, has anyone brought up the possibility of using energy-efficiency incentives from I&M?

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

UPGRADES TO ENERGY-USING EQUIPMENT

The following questions are about any recent or planned equipment purchases.

16. Has your organization purchased and installed any energy efficient equipment at the [ADDRESS] location in the last 12 months? By energy efficient, this means equipment that uses less energy than the equipment you had in place or the standard equipment that you could have purchased.

1. Yes
2. No [SKIP TO PEAK DEMAND SECTION]
98. Don't know [SKIP TO PEAK DEMAND SECTION]

[DISPLAY Q17 IF Q16= 1]

17. Did you receive an incentive from I&M for that equipment?

1. Yes [SKIP TO PEAK DEMAND SECTION]
2. No
98. Don't know [SKIP TO PEAK DEMAND SECTION]

[DISPLAY Q18 IF Q16= 1]

18. What additional energy efficient equipment have you installed? [MULTI SELECT]

1. Lighting
2. Lighting controls or occupancy sensors
3. LED exit signs
4. Unitary or split air conditioning system or chiller
5. ENERGY STAR Room air conditioners
6. Efficient motors
7. Refrigeration equipment (including LED case lighting)
8. Kitchen equipment
9. Something else [OPEN ENDED]
96. Didn't implement any measures [SKIP TO PEAK DEMAND]
98. Don't recall

[DISPLAY Q19 IF Q16= 1 AND Q18 = 1 – 9]

19. Why didn't you receive incentives for those items? [MULTI SELECT RANDOMIZE ORDER, FIX OTHER AND DON'T KNOW]

1. Didn't know whether equipment qualified for financial incentives
2. Equipment did not qualify for financial incentives
3. Too much paperwork for the financial incentive application
4. Financial incentive was insufficient
5. Didn't have time to complete paperwork for financial incentive application
6. Didn't know about financial incentives
7. We did receive an incentive [SKIP TO PEAK DEMAND SECTION]
8. The program was out of funds
9. Other (Please specify) [OPEN ENDED]

LIGHTING

[DISPLAY Q20 IF Q18 = 1]

20. What type of lighting did you install? [MULTI-SELECT]

1. T8 Fluorescent linear lamps – Single (1) lamps
2. T8 Fluorescent linear lamps – 2 lamp fixtures
3. T8 Fluorescent linear lamps – 4 lamp fixtures
4. T8 Fluorescent linear lamps – 6 lamp fixtures
5. T5 Fluorescent linear lamps – Single (1) lamps
6. T5 Fluorescent linear lamps – 2 lamp fixtures
7. T5 Fluorescent linear lamps – 4 lamp fixtures
8. T5 Fluorescent linear lamps – 6 lamp fixtures
9. LED Screw-in BAR/R/ER bulbs
10. LED Screw-in Interior PAR/MR bulbs
11. LED Screw-in omnidirectional A-line bulbs
12. LED 2-foot linear replacement lamps
13. LED 4-foot linear replacement lamps
14. LED exterior flood or spot luminaires
15. LED 1x4 panel or troffer
16. LED 2x2 panel or troffer
17. LED 2x4 panel or troffer
18. LED high-bay lighting
20. Another type

[DISPLAY Q21 IF Q20 = 20]

21. What other type of lighting equipment did you install?

[TEXT BOX]

[REPEAT Q22 – Q33. FOR EACH TYPE SELECTED IN Q20]

22. How many [Q20 RESPONSE] did you install?

[TEXT BOX]

23. What was the average wattage of the [Q20 RESPONSE]?

[TEXT BOX] Watts

24. Were the [Q20 RESPONSE] installed inside or outside?

1. Inside
2. Outside
3. Parking garage
98. Don't know

[DISPLAY Q25 IF Q24 = 1]

25. What type of building did you install the [Q20 RESPONSE] in?

1. Food sales
2. Food service
3. Health care
4. Hotel/motel
5. Office
6. Public Assembly
7. Public Services (non-food)
8. Retail
9. Warehouse
10. School
11. College
12. Industrial – 1 Shift
13. Industrial – 2 Shift
14. Industrial – 3 Shift
16. Other (Please specify)
98. Don't know

[DISPLAY Q26 IF Q24 = 1]

26. Is the inside space heated, cooled, or both?

1. Heated
2. Cooled
3. Both
4. Neither
98. Don't know

27. What type of lighting did the [Q20 RESPONSE] replace?

1. T12s (linear fluorescents)
2. T8s (linear fluorescents)
3. Metal-halide/high-intensity discharge
4. Incandescent
5. Compact fluorescent (CFL)
6. Something else [OPEN]
98. Don't know

28. What was the average wattage of the old lamps or bulbs?

[TEXT BOX] Watts

29. How many of the old lamps or bulbs did you remove?

[TEXT BOX]

[DISPLAY Q30 IF Q18 =1]

30. Did your organization consider any information or receive any services provided by I&M when deciding to install the lighting equipment?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q31 IF Q30 =1]

31. How important was any information or services provided by I&M in your decision to install this lighting equipment?

[SCALE: 0 = "Not at all important" – 10 = "Very important", 98 = Don't know]

[DISPLAY Q32 IF Q30 =1]

32. How likely is it that your organization would still have installed the lighting equipment if I&M did not provide information and services to help businesses save energy?

[SCALE: 0 = "Definitely would not have installed" – 10 = "Definitely would have installed", 98 = Don't know]

[DISPLAY Q33 IF [Q31 = 0,1,2,3 AND Q32 = 0,1,2,3] OR IF [Q31 =8,9,10 AND Q32 =8,9,10]

33. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

LED EXIT SIGNS

[DISPLAY Q34 IF Q18 =3]

34. Did you install single-sided or double-sided exit signs? Select all that apply [MULTI SELECT]

1. Single-sided
2. Double-sided
98. Don't know

[DISPLAY Q35 IF Q34 =1]

35. How many single-sided LED exit signs did you install?

[TEXT BOX]

[DISPLAY Q36 IF Q34 =2]

36. How many double-sided LED exit signs did you install?

[TEXT BOX]

[DISPLAY Q37 IF Q34 =98]

37. How many LED exit signs did you install?

[TEXT BOX]

[DISPLAY Q38 IF Q18 =3]

38. Which of the following best describes the type of exit sign the new LED exit signs replaced?

1. Incandescent
2. CFL (Dual Sided)
3. CFL (Single Sided)
98. Don't Know

[DISPLAY Q39 IF Q18 =3]

39. Did your organization consider any information or receive any services provided by I&M when deciding to install the LED exit signs?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q40 IF Q39 =1]

40. How important was any information or services provided by I&M in your decision to install the LED exit signs?

[SCALE 0 "Not at all important" - 10 "Very important", 98 = Don't know]

[DISPLAY Q41 IF Q39 =1]

41. How likely is it that your organization would still have installed the LED exit signs if I&M did not provide information and services to help businesses save energy?

[SCALE: 0 = "Definitely would not have installed" – 10 = "Definitely would have installed", 98 = Don't know]

[DISPLAY Q42 IF [Q39 =0,1,2,3 AND Q41=0,1,2,3] OR IF [Q39=8,9,10 AND Q41=8,9,10]

42. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

LIGHTING CONTROLS

[DIPLAY IF Q18 = 2]

43. How many fixtures are being controlled by the lighting controls?

[TEXT BOX]

44. On average, how many lamps or bulbs does each fixture contain?

[TEXT BOX]

45. What is the average wattage of these lamps?

[TEXT BOX] Watts

46. Are any of the lighting controls that you installed central time clock controls?

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

[DISPLAY Q47 IF Q46 = 1]

47. How many of the fixtures are controlled by the central time clock?

[TEXT BOX]

48. What type of building did you install the lighting controls in?

1. Food sales
2. Food service
3. Healthcare
4. Hotel/motel
5. Office
6. Public assembly
7. Public Services (non-food)
8. Retail
9. Warehouse
10. School
11. College
12. Industrial – 1 shift
13. Industrial – 2 shift
14. Industrial – 3 shift
16. Other (Please specify)
98. Don't know

49. Did your organization consider any information or receive any services provided by I&M when deciding to install the lighting controls?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q50 IF Q49 = 1]

50. How important was any information or services provided by I&M in your decision to install the lighting controls?

[SCALE: 0 = "Not at all important" – 10 = "Very important", 98 = Don't know]

[DISPLAY Q51 IF Q49 = 1]

51. How likely is it that your organization would still have installed the lighting controls if I&M did not provide information and services to help businesses save energy?

[SCALE: 0 = "Definitely would not have installed" – 10 = "Definitely would have installed", 98 = Don't know]

[DISPLAY Q52 IF [Q50=0,1,2,3 AND Q51=0,1,2,3] OR [Q50=8,9,10 AND Q51=8,9,10]]

52. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

[TEXT BOX]

HVAC MEASURES

[DISPLAY Q53 IF Q18 = 3]

53. What types of energy efficient equipment did you install as part of the HVAC project? [MULTI SELECT]

1. Split air conditioning system (An A/C system that has an evaporator indoors and the compressor and condenser outdoors.)
2. Packaged air conditioning system (A type of central air conditioning that contains both the air handler fan, compressor and condenser in a single unit. These are typically mounted on the roof.)
3. Heat pump (An electric heating and cooling system.)
4. Air cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities.)
5. Water cooled chiller (A system that produces cold liquid sent around to individual spaces used for cooling air usually found in larger facilities.)
6. Another type
98. Don't know

[DISPLAY Q54 IF Q53 = 6]

54. What other type of HVAC equipment did you install?

[TEXT BOX]

[REPEAT Q55 – Q57 FOR EACH SELECTED IN Q53]

55. We would like to know more about the rated efficiency and number of units of the [Q53 RESPONSE](s) that you installed. For each level of efficiency of the equipment you installed, please provide the rated efficiency and the number of units.

[TEXT BOX]

56. What type of building did you install the [Q53 RESPONSE](s) equipment in?

1. Grocery
2. High school
3. Hospital
4. Light industrial
5. Office - large
6. Office - small
7. Primary school
8. Religious Worship
9. Restaurant - Fast Food
10. Restaurant - Full Service
11. Retail - Big Box
12. Retail - Large
13. Retail - Small
14. University
15. Warehouse
16. Other (Please specify)
98. Don't know

57. What city is the building where you installed the [Q53 RESPONSE](s) located in?

[TEXT BOX]

[DISPLAY Q58 IF Q53 = 1-7]

58. Did your organization consider any information or receive any services provided by I&M when deciding to install the efficient HVAC equipment?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q59 IF Q58 = 1]

59. How important was any information or services provided by I&M in your decision to install the energy efficient HVAC equipment?

[SCALE: 0 = "Not at all important" – 10 = "Very important", 98 = Don't know]

[DISPLAY Q60 IF Q58 = 1]

60. How likely is it that your organization would still have installed the energy efficient HVAC equipment if I&M did not provide information and services to help businesses save energy?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed", 98 = Don't know]

[DISPLAY Q61 IF [Q59=0,1,2,3 AND Q60 =0,1,2,3] OR [Q59=8,9,10 AND Q60 =8,9,10]]

61. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

[TEXT BOX]

ROOM AC

[DISPLAY IF Q18 = 4]

[DISPLAY Q62 IF Q18 = 4]

62. How many ENERGY STAR room air conditioners did you install?

[TEXT BOX]

[DISPLAY Q63 IF Q18 = 4]

63. What type of building did you install the heating/cooling equipment in?

1. Grocery
2. High School
3. Hospital
4. Light Industrial
5. Office - Large
6. Office - Small
7. Primary School
8. Religious Worship
9. Restaurant - Fast Food
10. Restaurant - Full Service
11. Retail - Big Box
12. Retail - Large
13. Retail - Small
14. University
15. Warehouse
16. Other (Please describe) [TEXT BOX]

[DISPLAY Q64 IF Q18 = 4]

64. What city is the building where you installed the room air conditioners located in?

[TEXT BOX]

[DISPLAY Q65 IF Q18 = 4]

65. Did your organization consider any information or receive any services provided by I&M when deciding to install the ENERGY STAR room air conditioners?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q66 IF Q65 = 1]

66. How important was any information or services provided by I&M in your decision to install the ENERGY STAR room air conditioners?

[SCALE 0 "Not at all important" - 10 "Very important", 98 = Don't know]

[DISPLAY Q67 IF Q65 = 1]

67. How likely is it that your organization would still have installed the ENERGY STAR room air conditioners if I&M did not provide information and services to help businesses save energy?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed", 98 = Don't know]

[DISPLAY Q68 IF [Q66 =0,1,2,3 AND Q67 =0,1,2,3] OR [Q66 =8,9,10 AND Q67 =8,9,10]]

68. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

[TEXT BOX]

EFFICIENT MOTORS

[DISPLAY IF Q18 = 5]

69. How many efficient motors did you install?

[TEXT BOX]

70. What is the approximate average horsepower of the new motors? That is, what is the average across all of the motors you installed without an incentive?

[TEXT BOX]

71. What is the approximate average efficiency of the new motors? That is, what is the average efficiency across all of the new motors?

[TEXT BOX] Rated efficiency (%)

72. On average, how many hours per day do the motors operate? That is, what the average number of hours the motors you installed operate?

[TEXT BOX] hours per day

[DISPLAY Q73 IF Q18 = 5]

73. Did your organization consider any information or receive any services provided by I&M when deciding to install the efficient motors?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q74 IF Q73= 1]

74. How important was any information or services provided by I&M in your decision to install efficient motors?

[SCALE 0 "Not at all important" - 10 "Very important", 98 = Don't know]

[DISPLAY Q75 IF Q73= 1]

75. How likely is it that your organization would still have installed the efficient motors if I&M did not provide information and services to help businesses save energy?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed", 98 = Don't know]

[DISPLAY Q76 IF [Q74=0,1,2,3 AND Q75=0,1,2,3] OR [Q74=8,9,10 AND Q75=8,9,10]]

76. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

[TEXT BOX]

COMMERCIAL REFRIGERATION EQUIPMENT

[DISPLAY Q77 IF Q18 = 6]

77. What types of energy efficient refrigeration equipment did you install?

1. ENERGY STAR Commercial freezer
2. ENERGY STAR Commercial refrigerator
3. Anti-sweat heater controls
4. LED refrigerated case lighting
5. Refrigerated case covers
6. Some other type of refrigeration equipment
98. Don't know

78. What other type of energy efficient refrigeration equipment did you install?

[TEXT BOX]

[DISPLAY Q79 IF Q77 = 1]

79. How many ENERGY STAR commercial freezers did you install?

1. 1
2. 2
3. 3 or more

[DISPLAY Q80 IF Q77 = 1, REPEAT FOR EACH UP TO THREE TIMES]

80. What is the volume in cubic feet of the first freezer?

[TEXT BOX]

[DISPLAY Q81 IF Q77 = 1, REPEAT FOR EACH UP TO THREE TIMES]

81. Does this freezer have a solid door or a glass door?

1. Solid door
2. Glass door
98. Don't know

[DISPLAY Q82 IF Q77 = 1, REPEAT FOR EACH UP TO THREE TIMES]

82. Is this a vertical freezer or a chest freezer?

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q83 IF Q77 = 2]

83. How many ENERGY STAR commercial refrigerators did you install?

1. 1
2. 2
3. 3 or more

[DISPLAY Q84 IF Q77 = 2, REPEAT FOR EACH UP TO THREE TIMES]

84. What is the volume in cubic feet of the first refrigerator?

[TEXT BOX] cubic feet

[DISPLAY Q85 IF Q77 = 2, REPEAT FOR EACH UP TO THREE TIMES]

85. Does this refrigerator have a solid door or a glass door?

1. Solid door
2. Glass door
98. Don't know

[DISPLAY Q86 IF Q77 = 2, REPEAT FOR EACH UP TO THREE TIMES]

86. Is this a vertical refrigerator or a chest refrigerator?

1. Vertical
2. Chest
98. Don't know

[DISPLAY Q87 IF Q77 = 3]

87. Did you install humidity-based controls or conductivity-based controls, or both types?

1. Humidity-based controls
2. Conductivity-based controls
3. Both types
98. Don't know

[DISPLAY Q88 IF Q87= 1 OR 3]

88. How many humidity-based controls did you install?

[TEXT BOX]

[DISPLAY Q89 IF Q87 = 1 OR 3]

89. What is the total number of freezer or refrigerator doors controlled by the humidity-based controls?

[TEXT BOX]

[DISPLAY Q90 IF Q87 = 2 OR 3]

90. How many conductivity-based controls did you install?

[TEXT BOX]

[DISPLAY Q91 IF Q87 = 2 OR 3]

91. What is the total number of freezer or refrigerator doors controlled by the conductivity-based controls?

[TEXT BOX]

[DISPLAY Q92 IF Q87 = 98]

92. How many anti-sweat heater controls did you install?

[TEXT BOX]

[DISPLAY Q93 IF Q87 = 98]

93. What is the total number of freezer or refrigerator doors controlled by the anti-sweat heater controls?

[TEXT BOX]

[DISPLAY Q94 IF Q77 = 4]

94. How many linear feet in total of LED case lighting did you install?

[TEXT BOX]

[DISPLAY Q95 IF Q77 = 5]

95. How many linear feet of refrigerated case covers did you install?

[TEXT BOX]

[DISPLAY Q96 IF Q18=6]

96. Did your organization consider any information or receive any services provided by I&M when deciding to install the refrigeration equipment?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q97 IF Q18=6]

97. How important was any information or services provided by I&M in your decision to install the refrigeration equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]

[DISPLAY Q98 IF Q18=6]

98. How likely is it that your organization would still have installed the refrigeration equipment if I&M did not provide information and services to help businesses save energy?

[SCALE: 0 = "Definitely would not have installed" - 10 = "Definitely would have installed", 98 = Don't know]

[DISPLAY Q99 IF [Q97 =0,1,2,3 AND Q98 =0,1,2,3] AND [Q97 =8,9,10 AND Q98 =8,9,10]]

99. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

[TEXT BOX]

COMMERCIAL KITCHEN EQUIPMENT

[DISPLAY Q100 IF Q18 = 7]

100. What type of kitchen equipment did you install?

1. Low flow pre-rinse spray valves
2. ENERGY STAR Commercial fryers
3. ENERGY STAR Commercial steam cookers
4. ENERGY STAR hot food holding cabinets
5. ENERGY STAR commercial griddles
6. ENERGY STAR commercial convection ovens
7. ENERGY STAR commercial combination ovens
8. Some other type of kitchen equipment
98. Don't know

[DISPLAY Q101 IF Q100 = 8]

101. What other type of kitchen equipment did you install?

[TEXT BOX]

[DISPLAY Q102 IF Q100 = 1]

102. Is the flow rate for any of the spray valves you installed equal to or less than 1.6 gallons per minute?

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

[DISPLAY Q103 IF Q100 = 1]

103. How many pre-rinse spray valves with a flow rate equal to or less than 1.6 gallons per minute did you install?

[TEXT BOX]

[DISPLAY Q104 IF Q100 = 1]

104. What city is the building where you installed the pre-rinse spray valves located in?

[TEXT BOX]

[DISPLAY Q105 IF Q100 = 1]

105. Does the building where you have installed the pre-rinse spray valves have electric water heating?

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

[DISPLAY Q106 IF Q100 = 2]

106. How many ENERGY STAR commercial fryers did you install?

[TEXT BOX]

[DISPLAY Q107 IF Q100 = 3]

107. How many ENERGY STAR commercial steam cookers did you install?

1. Number of 3 pan steam cookers [NUMERIC]
2. Number of 4 pan steam cookers [NUMERIC]
3. Number of 5 pan steam cookers [NUMERIC]
4. Number of 6 pan steam cookers [NUMERIC]

[DISPLAY Q108 IF Q100 = 4]

108. How many ENERGY STAR hot food holding cabinets did you install?

[TEXT BOX]

[DISPLAY Q109 IF Q100 = 5]

109. How many ENERGY STAR commercial griddles did you install?

[TEXT BOX]

[DISPLAY Q110 IF Q100 = 6]

110. How many ENERGY STAR commercial convection ovens did you install?

[TEXT BOX]

[DISPLAY Q111 IF Q100 = 7]

111. How many ENERGY STAR commercial combination ovens did you install?

[TEXT BOX]

[DISPLAY Q112 IF Q18= 1 AND Q100=1-8]

112. Did your organization consider any information or receive any services provided by I&M when deciding to install the kitchen equipment?

1. Yes
2. No/Not that you are aware of

[DISPLAY Q113 IF Q112=1]

113. How important was any information or services provided by I&M in your decision to install the kitchen equipment?

[SCALE 0 "Not at all important" - 10 "Very important"]
98. Don't know

DISPLAY Q114 IF Q112=1]

114. How likely is it that your organization would still have installed the kitchen equipment if I&M did not provide information and services to help businesses save energy?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed", 98 = Don't know]

[DISPLAY Q115 IF [Q113 = 0,1,2,3 AND Q114 =0,1,2,3] OR [Q113 = 8,9,10 AND Q114 =8,9,10]]

115. In your own words, can you explain how the information or services provided by I&M influenced your decision to install that equipment?

[TEXT BOX]

[DISPLAY Q116 IF Q18= 1-8]

116. I&M offers incentives and services for energy efficient equipment upgrades and improvements through its Electric Ideas programs. Before installing these measures, had you heard about the programs?

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

[DISPLAY Q117 IF Q116 = 1]

117. Why didn't you receive incentives for those items? [MULTI SELECT RANDOMIZE ORDER, BUT FIX OTHER AND DON'T KNOW]

1. Didn't know whether equipment qualified for financial incentives
2. Equipment did not qualify for financial incentives
3. Too much paperwork for the financial incentive application
4. Financial incentive was insufficient
5. Didn't have time to complete paperwork for financial incentive application
6. Didn't know about financial incentives until after equipment was purchased
7. We did receive an incentive
8. Other (Please specify) [OPEN ENDED]
98. Don't know

PEAK DEMAND

118. Demand for electricity is often highest during summer afternoons when the weather is hottest. Thinking about those times, how easy or difficult is it for your organization to reduce your electricity during times when electricity demand is highest?

[SCALE: 1 = VERY EASY, 2 = 2, 3 = 3, 4 = 4, 5 = VERY DIFFICULT, 98 = DON'T KNOW]

119. How much do you agree or disagree that reducing your electricity use during times when electricity demand is highest will have the following effects?

[SCALE: 1 (STRONGLY DISAGREE) – 5 (STRONGLY AGREE)] [RANDOMIZE ORDER]

a. Lower your utility costs
b. Reduce greenhouse gas emissions
c. Help make the grid more reliable

FIRMOGRAPHICS

We would like to ask you just a few final questions about your company.

121. Is there a specific person or group of persons at your company who are responsible for monitoring or managing energy usage?

1. Yes
2. No
99. I prefer not to state

122. Does your company have a formal policy requiring that energy efficiency be considered when purchasing equipment?

1. Yes
2. No
99. I prefer not to state

123. Does your company have goals for reducing greenhouse gas emissions?

1. Yes
2. No
99. I prefer not to state

124. What is the approximate total square footage of the facility or facilities that your company or organization owns or leases in I&M territory? Your best guess is fine. [TEXT BOX]

125. What is your job title?

1. Facilities Manager
2. Energy Manager
3. Other facilities management/maintenance position
4. Chief Financial Officer
5. Other financial/administrative position
6. Proprietor/Owner
7. President/CEO
8. Manager
9. Other (Specify)
99. I prefer not to state

126. Thinking about the facility at your location, does your organization…

1. Own and occupy the entire building,
2. Own the building and occupy part of it while leasing parts to others,
3. Lease the space,
4. Other (Specify)
99. I prefer not to state

127. Aside from trade professionals like vendors or contractors, are there any organizations or groups, including community or cultural organizations, that you would trust for information about replacing or purchasing new energy-using equipment? If so, what are they? (Please select all that apply)

[MULTISELECT]

1. Chamber of Commerce
2. Equipment manufacturers
3. Equipment manufacturer sales representatives
4. Trade associations
5. I&M
6. Other organizations or groups
99. I prefer not to state

[DISPLAY Q128 IF Q127 = 4]

128. What trade associations do you trust for information about replacing or purchasing new energy-using equipment?

[DISPLAY Q129 IF Q127 = 5]

129. What other organizations or groups do you trust for information about replacing or purchasing new energy-using equipment?

130. Do you have any other comments that you would like to relay to I&M about energy efficiency in the commercial and industrial sector or about their programs?

5. C&I Participant Survey Results

Q1 - Our records indicate that you are the main contact for the [Field-FR_MEAS1] project completed at [Field-LOCATION]. Were you involved in the decision to complete this project?

#	Answer	%	Count
1	Yes	100.00%	33
2	No	0.00%	0
	Total	100%	33

Q3 - We have a few questions about how many the lighting project that you implemented at [Field-LIGHTING_LOCATION]. Are all the lights for that project turned on about that same amount of time each day or are the lights installed in different locations with different hours of use?

#	Answer	%	Count
1	Hours of use are about the same for all lights	72.41%	21
2	Hours of use are not the same for all lights	27.59%	8
	Total	100%	29

Q4 - For the next few questions, please think of the area that has the most lighting. Thinking about that space, what type of space is it?

For the next few questions, please think of the area that has the most lighting. Thinking about that space, what type of space is it?
Outside Parking lot and around the building
Indoors
A breakroom
Classrooms and Hallways
Hallways and under balcony
Exterior lighting
Church sanctuary
Industrial & office

Q6 - Select all of the 2021 holidays the site is closed and the lighting turned off.

#	Answer	%	Count
1	New Year's Day (Tuesday 1/1/2021)	13.64%	24
4	Martin Luther King Day (Monday 1/18/2021)	5.11%	9
5	President's Day (Monday 2/15/2021)	3.41%	6
6	Memorial Day (Monday 5/31/2021)	11.93%	21
7	Independence Day (Thursday 7/4/2021)	13.07%	23
8	Labor Day (Monday 9/6/2021)	12.50%	22
9	Columbus Day (Monday 10/11/2021)	1.70%	3
10	Veterans Day (Monday 11/11/2021)	1.70%	3
11	Thanksgiving Day (Thursday 11/25/2021)	13.64%	24
12	Christmas Eve (Tuesday 12/24/2021)	9.66%	17
13	Christmas Day (Wednesday 12/25/2021)	13.64%	24
	Total	100%	176

Q8 - Does your company have any of the following policies or procedures in place at [Field-LOCATION]?

#	Question	Yes		No		Don't know		Total
1	A person or persons responsible for monitoring or managing energy usage	36.36%	12	51.52%	17	12.12%	4	33
2	Defined energy savings goals	15.15%	5	72.73%	24	12.12%	4	33
3	A specific policy requiring that energy efficiency be considered when purchasing equipment	27.27%	9	63.64%	21	9.09%	3	33
4	Carbon reduction goals	6.06%	2	69.70%	23	24.24%	8	33

Q9 - How did you FIRST learn about Indiana Michigan Power's incentives for efficient equipment upgrades?

#	Answer	%	Count
1	From a Trade Ally/contractor/equipment vendor/ energy consultant	30.30%	10
2	From an Indiana Michigan Power Account Representative	9.09%	3
3	From a program representative / Lockheed Martin	3.03%	1
4	From a search engine (Google, Yahoo, Bing)	0.00%	0
5	At an event/trade show	0.00%	0
6	Received an email blast or electronic newsletter	3.03%	1
7	Received an informational brochure	0.00%	0
8	From a program sponsored webinar	0.00%	0
9	From Indiana Michigan's website	6.06%	2
10	Friends or colleagues	24.24%	8
11	Some other way (please explain)	18.18%	6
98	Don't know	6.06%	2
	Total	100%	33

Q10 - When your contractor first approached you about the program, did you have any concerns about participating or was it an easy decision?

#	Answer	%	Count
1	I had some concerns	0.00%	0
2	It was an easy decision	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q11 - What were your concerns?

#	Answer	%	Count
1	Upfront costs	0.00%	0
2	Time for return on investment	0.00%	0
3	Performance of new equipment	0.00%	0
4	Business disruption	0.00%	0
5	Legitimacy of the offer	0.00%	0
6	Other: Specify	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q13 - Using the scale below, please indicate how much you agree or disagree with the following statements regarding your experience with [Field-TRADE%20ALLY%20NAME]:

#	Question	Completely disagree1		2		3		4		Completely agree5		Don't know		Total
1	My contractor was professional	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
2	My contractor's recommendations made sense for my business	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
3	My contractor could answer most of my questions	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
4	I would recommend my contractor as a contractor to consider	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0

Q15 - Which of the following people worked on completing your application for program incentives (including gathering required documentation)?

#	Answer	%	Count
1	Yourself	39.58%	19
2	Another member of your company	16.67%	8
3	A contractor	27.08%	13
4	An equipment vendor	16.67%	8
5	A designer or architect	0.00%	0
	Total	100%	48

Q16 - Using a 5-point scale, where 1 means "completely unacceptable" and 5 means "completely acceptable," how would you rate . . .

#	Question	1		2		3		4		5		Don't know		Not applicable		Total
1	the ease of finding forms on Indiana Michigan Power's website	5.26%	1	5.26%	1	5.26%	1	26.32%	5	47.37%	9	10.53%	2	0.00%	0	19
2	the ease of using the electronic application worksheets	0.00%	0	5.26%	1	10.53%	2	26.32%	5	47.37%	9	10.53%	2	0.00%	0	19
3	the time it took to approve the application	10.53%	2	5.26%	1	5.26%	1	26.32%	5	47.37%	9	5.26%	1	0.00%	0	19
4	the clarity of information on how to complete the application	5.26%	1	5.26%	1	31.58%	6	26.32%	5	26.32%	5	5.26%	1	0.00%	0	19
5	the effort required to provide required invoices or other supporting documentation	5.26%	1	5.26%	1	10.53%	2	26.32%	5	47.37%	9	5.26%	1	0.00%	0	19
6	the overall application process	5.26%	1	0.00%	0	5.26%	1	42.11%	8	42.11%	8	5.26%	1	0.00%	0	19

Q18 - Did you have a clear sense of whom you could go to for assistance with the application process?

#	Answer	%	Count
1	Yes	78.95%	15
2	No	15.79%	3
98	Don't know	5.26%	1
	Total	100%	19

Q19 – How long did you have to wait for the equipment to be installed after the onsite assessment was performed?

#	Answer	%	Count
1	Less than 1 week	0.00%	0
2	1-2 weeks	0.00%	0
3	3-4 weeks	0.00%	0
4	5-6 weeks	0.00%	0
5	More than 6 weeks	0.00%	0
6	All equipment was installed the same day	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q20 - Who installed your program-qualified equipment or efficiency upgrades? Was it…

#	Answer	%	Count
1	Your own staff	27.27%	9
2	A contractor you've worked with before	66.67%	22
3	A contractor recommended by the Indiana Michigan program (registered trade ally)	3.03%	1
4	A new contractor that someone else recommended	3.03%	1
5	Someone else (Please specify)	0.00%	0
98	Don't know	0.00%	0
	Total	100%	33

Q21 - How did the incentive amount compare to what you expected? Would you say…

#	Answer	%	Count
1	It was much less	6.06%	2
2	It was somewhat less	18.18%	6
3	It was about the amount expected	54.55%	18
4	It was somewhat more	12.12%	4
5	It was much more	3.03%	1
98	Don't know	6.06%	2
	Total	100%	33

Q22 - How did the project cost compare to what you expected?

#	Answer	%	Count
1	It was much less	0.00%	0
2	It was somewhat less	0.00%	0
3	It was about the amount expected	0.00%	0
4	It was somewhat more	0.00%	0
5	It was much more	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q23 - Has your organization purchased any significant energy efficient equipment in the last three years without applying for a financial incentive through an energy efficiency program at [Field-LOCATION]?

#	Answer	%	Count
1	Yes. Our organization purchased energy efficient equipment but did not apply for incentive.	27.27%	9
2	No. Our organization purchased significant energy efficient equipment and applied for an incentive.	18.18%	6
3	No significant energy efficient equipment was purchased by our organization.	24.24%	8
98	Don't know	30.30%	10
	Total	100%	33

Q24 - Which of the following financial methods, if any, does your organization typically use to evaluate energy efficiency improvements? (Select all that apply.)

#	Answer	%	Count
1	Initial Cost	19.05%	4
2	Simple payback	23.81%	5
3	Internal rate of return	14.29%	3
4	Life cycle cost	9.52%	2
5	We don't use any of these	19.05%	4
98	Don't know	14.29%	3
	Total	100%	21

Q25 - What payback period do you typically require to approve an efficiency project?

What payback period do you typically require to approve an efficiency project?
3 years
Unsure
5 years
3-5 years
1 year

Q27 - Before participating in the [Field-PROGRAM_NAME] Program, had you implemented any equipment or measure similar to the [Field-FR_MEAS1] [Field-INSTALLED_FR1] at [Field-LOCATION]?

#	Answer	%	Count
1	Yes	36.36%	12
2	No	39.39%	13
98	Don't know	24.24%	8
	Total	100%	33

Q28 - When did you first learn about I&M's energy efficiency programs? Was it BEFORE or AFTER you finalized the specifications of your [Field-FR_MEAS1] project, including the efficiency level and the scope of the project?

#	Answer	%	Count
1	Before	68.75%	22
2	After	9.38%	3
98	Don't know	21.88%	7
	Total	100%	32

Q29 - Did you have plans to [Field-INSTALL_FR1] the [Field-FR_MEAS1] at [Field-LOCATION] before participating in the program?

#	Answer	%	Count
1	Yes	63.64%	21
2	No	33.33%	11
98	Don't know	3.03%	1
	Total	100%	33

Q30 - Would you have completed the [Field-FR_MEAS1] project even if you had not participated in the program?

#	Answer	%	Count
1	Yes	39.39%	13
2	No	30.30%	10
98	Don't know	30.30%	10
	Total	100%	33

Q31 - Did you have experience with I&M's incentive program before completing the [Field-FR_MEAS1] project?

#	Answer	%	Count
1	Yes	33.33%	11
2	No	60.61%	20
98	Don't know	6.06%	2
	Total	100%	33

Q32 - How important was your previous experience with Indiana-Michigan-offered programs in making your decision to [Field-INSTALL_FR1] the [Field-FR_MEAS1] at [Field-LOCATION]?

#	Answer	%	Count
1	Very important	45.45%	5
2	Somewhat important	36.36%	4
3	Only slightly important	9.09%	1
4	Not at all important	9.09%	1
98	Don't know	0.00%	0
	Total	100%	11

Q33 - Did an [Field-PROGRAM_NAME] Program representative or other I&M representative recommend that you [Field-INSTALL_FR1] the [Field-FR_MEAS1] at [Field-LOCATION]?

#	Answer	%	Count
1	Yes	9.09%	3
2	No	78.79%	26
98	Don't know	12.12%	4
	Total	100%	33

Q34 - If the [Field-PROGRAM_NAME] program representative had not recommended [Field-INSTALLING_FR1] the [Field-FR_MEAS1], how likely is it that you would have [Field-INSTALLED_FR1] it anyway?

#	Answer	%	Count
1	Definitely would have	0.00%	0
2	Probably would have	33.33%	1
3	Probably would not have	0.00%	0
4	Definitely would not have	0.00%	0
98	Don't know	66.67%	2
	Total	100%	3

Q35 - If the [Field-PROGRAM_NAME] program contractor that provided the energy assessment of your facility had not recommended [Field-INSTALLING_FR1] the [Field-FR_MEAS1], how likely is it that you would have [Field-INSTALLED_FR1] it anyway?

#	Answer	%	Count
1	Definitely would have	0.00%	0
2	Probably would have	0.00%	0
3	Probably would not have	0.00%	0
4	Definitely would not have	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q36 - Would your organization have been financially able to [Field-INSTALL_FR1] the [Field-FR_MEAS1] at [Field-LOCATION] without the financial incentive from the program?

#	Answer	%	Count
1	Yes	60.61%	20
2	No	3.03%	1
98	Don’t know	36.36%	12
	Total	100%	33

Q37 - To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

#	Answer	%	Count
1	Yes	100.00%	1
2	No	0.00%	0
98	Don't know	0.00%	0
	Total	100%	1

Q38 - If the financial incentive from the [Field-PROGRAM_NAME] Program had not been available, how likely is it that you would have [Field-INSTALLED_FR1] the [Field-FR_MEAS1] at [Field-LOCATION] anyway?

#	Answer	%	Count
1	Definitely would have ${e://Field/INSTALLED_FR1}	18.18%	6
2	Probably would have ${e://Field/INSTALLED_FR1}	33.33%	11
3	Probably would not have ${e://Field/INSTALLED_FR1}	30.30%	10
4	Definitely would not have ${e://Field/INSTALLED_FR1}	6.06%	2
98	Don't know	12.12%	4
	Total	100%	33

Q40 - We would like to know whether the availability of information and the financial incentive provided through the [Field-PROGRAM_NAME] program affected the quantity (or number of units) of [Field-FR_MEAS1] that you purchased and [Field-INSTALLED_FR1] at [Field-LOCATION]. Did you purchase and install more [Field-FR_MEAS1] than you otherwise would have without the program?

#	Answer	%	Count
1	Yes	39.39%	13
2	No, program did not affect quantity purchased and installed.	48.48%	16
98	Don't know	12.12%	4
	Total	100%	33

Q41 - We would like to know whether the availability of information and financial incentive provided through the [Field-PROGRAM_NAME] program affected the level of energy efficiency you chose for the [Field-FR_MEAS1B] at [Field-LOCATION]. Did you choose equipment that was more energy efficient than you would have chosen because of the program?

#	Answer	%	Count
1	Yes	40.63%	13
2	No, program did not affect level of efficiency chosen for equipment.	40.63%	13
98	Don’t know	18.75%	6
	Total	100%	32

Q42 - What kind of equipment, if any, would you have installed if the program was not available?

#	Answer	%	Count
1	Please specify	38.46%	5
98	Don't know	61.54%	8
	Total	100%	13

Q43 - We would like to know whether the availability of information and the financial incentive provided through the program affected the timing of the [Field-FR_MEAS1] project at [Field-LOCATION]. Did you [Field-INSTALL_FR1] the [Field-FR_MEAS1] earlier than you otherwise would have without the program?

#	Answer	%	Count
1	Yes	36.36%	12
2	No, program did not affect timing of project.	45.45%	15
98	Don’t know	18.18%	6
	Total	100%	33

Q44 - When would you otherwise have completed the project?

#	Answer	%	Count
1	Less than 6 months later	8.33%	1
2	6-12 months later	25.00%	3
3	1-2 years later	25.00%	3
4	3-5 years later	16.67%	2
5	More than 5 years later	0.00%	0
98	Don’t know	25.00%	3
	Total	100%	12

Q45 - Our records indicate you [Field-INSTALL_FR2] [Field-FR_MEAS2] at [Field-LOCATION] in addition to [Field-FR_MEAS1] at [Field-LOCATION]. Did both of these projects go through the same decision making process or was a separate decision made for each?

#	Answer	%	Count
1	The same decision making process applies to both projects.	0.00%	0
2	A different decision making process applies to each project.	0.00%	0
3	We did not ${e://Field/INSTALL_FR2} ${e://Field/FR_MEAS2} at the ${e://Field/LOCATION}	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q46 - Before participating in the [Field-PROGRAM_NAME] Program, had you implemented any equipment or measure similar to the [Field-FR_MEAS2] [Field-INSTALLED_FR2] at [Field-LOCATION]?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q47 - When did you first learn about I&M's energy efficiency programs? Was it BEFORE or AFTER you finalized the specifications of your [Field-FR_MEAS2] project, including the efficiency level and the scope of the project?

#	Answer	%	Count
1	Before	0.00%	0
2	After	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q48 - Did you have plans to [Field-INSTALL_FR2] the [Field-FR_MEAS2] at [Field-LOCATION] before participating in the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q49 - Would you have completed the [Field-FR_MEAS2] project even if you had not participated in the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q50 - Did you have experience with I&M's incentive program before completing the [Field-FR_MEAS2] project?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q51 - How important was your previous experience with Indiana-Michigan-offered programs in making your decision to [Field-INSTALL_FR2] the [Field-FR_MEAS2] at [Field-LOCATION]?

#	Answer	%	Count
1	Very important	0.00%	0
2	Somewhat important	0.00%	0
3	Only slightly important	0.00%	0
4	Not at all important	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q52 - Did an [Field-PROGRAM_NAME] Program representative or other I&M representative recommend that you [Field-INSTALL_FR2] the [Field-FR_MEAS2] at [Field-LOCATION]?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q53 - If the [Field-PROGRAM_NAME] program representative had not recommended [Field-INSTALLING_FR2] the [Field-FR_MEAS2], how likely is it that you would have [Field-INSTALLED_FR2] it anyway?

#	Answer	%	Count
1	Definitely would have	0.00%	0
2	Probably would have	0.00%	0
3	Probably would not have	0.00%	0
4	Definitely would not have	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q54 - If the [Field-PROGRAM_NAME] program contractor that provided the energy assessment of your facility had not recommended [Field-INSTALLING_FR2] the [Field-FR_MEAS2], how likely is it that you would have [Field-INSTALLED_FR2] it anyway?

#	Answer	%	Count
1	Definitely would have	0.00%	0
2	Probably would have	0.00%	0
3	Probably would not have	0.00%	0
4	Definitely would not have	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q55 - Would your organization have been financially able to [Field-INSTALL_FR2] the [Field-FR_MEAS2] at [Field-LOCATION] without the financial incentive from the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q56 - To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program incentive was not available. Is that correct?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q57 - If the financial incentive from the [Field-PROGRAM_NAME] Program had not been available, how likely is it that you would have [Field-INSTALLED_FR2] the [Field-FR_MEAS2] at [Field-LOCATION] anyway?

#	Answer	%	Count
1	Definitely would have ${e://Field/INSTALLED_FR1}	0.00%	0
2	Probably would have ${e://Field/INSTALLED_FR1}	0.00%	0
3	Probably would not have ${e://Field/INSTALLED_FR1}	0.00%	0
4	Definitely would not have ${e://Field/INSTALLED_FR1}	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q59 - We would like to know whether the availability of information and the financial incentive provided through the [Field-PROGRAM_NAME] program affected the quantity (or number of units) of [Field-FR_MEAS2] that you purchased and [Field-INSTALLED_FR2] at [Field-LOCATION]. Did you purchase and install more [Field-FR_MEAS2] than you otherwise would have without the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No, program did not affect quantity purchased and installed.	0.00%	0
98	Don't know	0.00%	0
	Total		0

Q60 - We would like to know whether the availability of information and financial incentive provided through the [Field-PROGRAM_NAME] program affected the level of energy efficiency you chose for the [Field-FR_MEAS2B] at [Field-LOCATION]. Did you choose equipment that was more energy efficient than you would have chosen because of the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No, program did not affect level of efficiency chosen for equipment.	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q61 - What kind of equipment, if any, would you have installed if the program was not available?

#	Answer	%	Count
1	Please specify	0.00%	0
	Total		0

Q62 - We would like to know whether the availability of information and the financial incentive provided through the program affected the timing of the [Field-FR_MEAS2] project at [Field-LOCATION]. Did you [Field-INSTALL_FR2] the [Field-FR_MEAS2] earlier than you otherwise would have without the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No, program did not affect timing of project.	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q63 - When would you otherwise have completed the project?

#	Answer	%	Count
1	Less than 6 months later	0.00%	0
2	6-12 months later	0.00%	0
3	1-2 years later	0.00%	0
4	3-5 years later	0.00%	0
5	More than 5 years later	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q64 - After your project was completed, did a program representative inspect the work done through the program?

#	Answer	%	Count
1	Yes	0.00%	0
2	No	0.00%	0
98	Don’t know	0.00%	0
	Total		0

Q65 - Using the following scale, please rate your agreement with the following statements:

#	Question	Strongly disagree1		2		3		4		Strongly agree5		Don't know		Total
1	The inspector was courteous	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
2	The inspector was efficient	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0

Q66 - Since you completed the incentive project, have you installed any energy efficient equipment at a facility that receives electrical service from I&M and that you DID NOT get a rebate or discount for from I&M?

#	Answer	%	Count
1	Yes	12.12%	4
2	No	69.70%	23
98	Don't know	18.18%	6
	Total	100%	33

Q67 - What additional energy efficient equipment have you installed?

#	Answer	%	Count
1	Lighting	80.00%	4
2	Lighting controls or occupancy sensors	20.00%	1
3	LED exit signs	0.00%	0
4	Unitary or split air conditioning system or chiller	0.00%	0
5	ENERGY STAR Room air conditioners	0.00%	0
6	Efficient motors	0.00%	0
7	Refrigeration equipment (including LED case lighting)	0.00%	0
8	Kitchen equipment	0.00%	0
9	Something else	0.00%	0
10	Didn’t implement any measures	0.00%	0
11	Don’t know	0.00%	0
	Total	100%	5

Q68 - Why didn't you receive incentives for those items?

#	Answer	%	Count
1	Didn't know whether equipment qualified for financial incentives	0.00%	0
2	Equipment did not qualify for financial incentives	0.00%	0
3	Too much paperwork for the financial incentive application	0.00%	0
4	Financial incentive was insufficient	0.00%	0
5	Didn't have time to complete paperwork for financial incentive application	25.00%	1
6	Didn't know about financial incentives until after equipment was purchased	0.00%	0
7	We did receive an incentive	0.00%	0
8	The program was out of funds	0.00%	0
96	Other (Please specify)	75.00%	3
	Total	100%	4

Q69 - Who installed the efficient equipment?

#	Answer	%	Count
1	Worked with a contractor	25.00%	1
2	Company self-installed the equipment	50.00%	2
3	Both	25.00%	1
98	Don't know	0.00%	0
	Total	100%	4

Q158 - Not including any contractors that you hired, in the course of doing this project did you have any interactions with program staff about questions or concerns that you had?

#	Answer	%	Count
1	Yes	43.75%	14
2	No	46.88%	15
98	Don't know	9.38%	3
	Total	100%	32

Q159 - Using the scale below, please rate how dissatisfied or satisfied you are with each of the following ….

#	Question	1		2		3		4		5		Don't know		Total
1	How long it took program staff to address your questions or concerns	7.14%	1	0.00%	0	14.29%	2	0.00%	0	78.57%	11	0.00%	0	14
2	How thoroughly they addressed your questions or concerns	0.00%	0	0.00%	0	14.29%	2	7.14%	1	78.57%	11	0.00%	0	14
3	The proposal you received from your contractor	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
4	The amount of time between the onsite audit and the installation of the equipment	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
5	The equipment that was installed	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
6	The quality of the installation	0.00%	0	0.00%	0	4.35%	1	13.04%	3	69.57%	16	13.04%	3	23
7	The steps you had to take toget through the program	3.13%	1	0.00%	0	12.50%	4	21.88%	7	53.13%	17	9.38%	3	32
8	The amount of time it took to get your rebate or incent	6.25%	2	3.13%	1	6.25%	2	18.75%	6	59.38%	19	6.25%	2	32
9	The range of equipment that qualifies for incentives	0.00%	0	0.00%	0	9.68%	3	25.81%	8	54.84%	17	9.68%	3	31
10	The amount of time it took to install the program equipment	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
11	How well your contractor explained the program rules processes	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
12	The types of equipment that you were able to get through the small business program	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
13	The energy assessment of your facility	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0	0
14	The program overall	0.00%	0	3.13%	1	3.13%	1	25.00%	8	59.38%	19	9.38%	3	32

Q162 - Using the same scale, how dissatisfied or satisfied are you with I&M as your electricity service provider?

#	Answer	%	Count
1	Very dissatisfied	0.00%	0
2	2	0.00%	0
3	3	0.00%	0
4	4	40.63%	13
5	Very satisfied	53.13%	17
98	Don't know	6.25%	2
	Total	100%	32

Q163 - Does your organization own or occupy, own and rent to someone else, or rent the facility where the project(s) took place?

#	Answer	%	Count
1	Own and occupy	78.13%	25
2	Own and rent to someone else	6.25%	2
3	Rent	9.38%	3
98	Don’t know	6.25%	2
	Total	100%	32

6. Non-Participant Survey Results

Q2 - According to our records, I&M provides electricity service to the facility located at [Field-ADDRESS]. Is that correct?

#	Answer	%	Count
1	Yes	100.0%	199
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	199

Q3 - To the best of your knowledge, has your company or organization replaced or upgraded equipment that requires electricity to operate in the past three years? This could have been for lighting, motors, computers, or HVAC equipment.

#	Answer	%	Count
1	Yes	57.3%	114
2	No	42.7%	85
	Total	100%	199

Q4 - Did you receive an incentive from I&M for any of that equipment?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	100.0%	114
	Total	100%	114

Q5 - To the best of your knowledge, has your company or organization completed any other electricity saving projects that you received an incentive from I&M for in the past three years?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	100.0%	199
	Total	100%	199

Q6 - When it comes to purchasing energy-using equipment for your facilities/sites, do you …?

#	Answer	%	Count
1	Make those decisions	68.3%	136
2	Provide input to others who make those decisions	31.7%	63
3	Have no involvement with those decisions	0.0%	0
	Total	100%	199

Q7 - Before taking this survey, were you aware that I&M provides cash incentives for energy efficient equipment purchases and upgrades for existing and new buildings?

#	Answer	%	Count
1	Yes	31.7%	63
2	No	68.3%	136
	Total	100%	199

Q8 - Which of the following types of incentives were you aware of? Please select all that apply

#	Answer	%	Count
1	Incentives to replace inefficient equipment, including lighting, in existing buildings	79.4%	50
2	Incentives to incorporate energy efficiency into new construction designs	27.0%	17
3	Incentives for retro-commissioning projects, which improve how building equipment and systems function together	14.3%	9
4	Incentives for heating and cooling equipment	54.0%	34
5	Incentives for variable frequency drives, efficient pumps, and efficient motors	22.2%	14
6	Incentives for refrigeration equipment	31.7%	20
7	Incentives for cooking equipment	19.0%	12
8	Something else (Please specify)	3.2%	2
9	Not aware of any incentives	4.8%	3
	Total	100%	63

Q9 - In the past year, from what sources have you gotten information about the energy efficiency incentives from I&M? Please select all that apply

#	Answer	%	Count
1	From a Trade Ally/contractor/equipment vendor/ energy consultant	17.5%	11
2	From an I&M account representative	6.3%	4
3	From an I&M program representative	6.3%	4
4	From an internet search engine	9.5%	6
5	At an event/trade show	4.8%	3
6	Received an email blast or electronic newsletter	34.9%	22
7	Received an informational brochure	17.5%	11
8	From a program sponsored webinar	1.6%	1
9	From I&M's website	27.0%	17
10	Friends or colleagues	12.7%	8
11	Some other way (please explain)	4.8%	3
98	Don't know	19.0%	12
	Total	100%	63

Q10 - In general, how much does input from each of the following types of people influence your company or organization's decisions about equipment replacements and upgrades?

Please answer on a scale from 1 to 5, where 1 means "no influence" and 5 means "great influence."

#	Question	1 (No influence)		2		3		4		5 (Great influence)		Don't know		Total
1	Vendor or retailer	25.6%	51	9.0%	18	26.6%	53	24.6%	49	8.5%	17	5.5%	11	199
2	Contractor or installer	14.2%	28	5.6%	11	21.8%	43	33.5%	66	19.8%	39	5.1%	10	197
3	Designer or architect	32.8%	64	8.2%	16	18.5%	36	18.5%	36	12.8%	25	9.2%	18	195
4	Utility staff member, such as an account representative	29.4%	57	11.9%	23	16.0%	31	19.1%	37	14.4%	28	9.3%	18	194

Q11 - When discussing past or planned equipment replacements, has your contractor mentioned the energy-efficiency incentives available from I&M?

#	Answer	%	Count
1	Yes	5.6%	11
2	No	48.0%	95
3	Not applicable—organization has not yet talked to a contractor	39.4%	78
98	Don't know	7.1%	14
	Total	100%	198

Q12 - Thinking about any planned equipment replacements or upgrades as well as potential equipment failures, how likely is it that you will use I&M incentives to increase the energy efficiency level of any equipment replacements or upgrades you will make in the next two years? Please answer on a scale from 1 to 10, where 1 means "not at all likely" and 10 means "extremely likely".

#	Answer	%	Count
0	1 (Not at all likely)	10.1%	20
1	1	2.0%	4
2	2	5.0%	10
3	3	2.5%	5
4	4	2.5%	5
5	5	9.5%	19
6	6	6.0%	12
7	7	10.1%	20
8	8	12.6%	25
9	9	6.5%	13
10	10 (Extremely likely)	17.1%	34
98	Don't know	16.1%	32
	Total	100%	199

Q13 - What might keep your company from using I&M incentives to increase the energy efficiency level of any equipment replacements or upgrades you will make in the next two years?

#	Answer	%	Count
1	Don't know enough about the incentives	42.5%	51
2	Unlikely to replace any equipment	27.5%	33
3	Energy savings from equipment replacements not worth the trouble	7.5%	9
4	Too much time or trouble	5.8%	7
5	Prefer not to deal with utility	2.5%	3
6	Other - specify	9.2%	11
97	Not applicable – all such decisions are made by a property or energy management firm	0.0%	0
98	Don't know	5.0%	6
	Total	100%	120

Q14 - Is your firm considering undertaking any new construction or major building renovation projects within the next five years? This could include adding a new wing, gutting an existing building, or building an entirely new building.

#	Answer	%	Count
1	Yes	26.3%	52
2	No	56.6%	112
98	Don't know	17.2%	34
	Total	100%	198

Q15 - Has your firm begun discussing the project design with an architect, design engineer, or other type of contractor?

#	Answer	%	Count
1	Yes	55.8%	29
2	No	42.3%	22
3	Don't know	1.9%	1
	Total	100%	52

Q16 - In those discussions, has anyone brought up the possibility of using energy-efficiency incentives from I&M?

#	Answer	%	Count
1	Yes	13.8%	4
2	No	69.0%	20
98	Don't know	17.2%	5
	Total	100%	29

Q18 - Has your organization purchased and installed any energy efficient equipment at the [Field-ADDRESS] location in the last 12 months? By energy efficient, this means equipment that uses less energy than the equipment you had in place or the standard equipment that you could have purchased.

#	Answer	%	Count
1	Yes	32.7%	65
2	No	59.8%	119
98	Don't know	7.5%	15
	Total	100%	199

Q19 - Did you receive an incentive from I&M for that equipment?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	89.2%	58
3	Don't know	10.8%	7
	Total	100%	65

Q20 - What additional energy efficient equipment have you installed?

#	Answer	%	Count
1	Lighting	72.4%	42
2	Lighting controls or occupancy sensors	8.6%	5
3	LED exit signs	12.1%	7
4	Unitary or split air conditioning system or chiller	13.8%	8
5	ENERGY STAR Room air conditioners	8.6%	5
6	Efficient motors	8.6%	5
7	Refrigeration equipment (including LED case lighting)	15.5%	9
8	Kitchen equipment	12.1%	7
9	Something else	22.4%	13
96	Didn't implement any measures	1.7%	1
98	Don't recall	1.7%	1
	Total	100%	58

Q21 - Why didn't you receive incentives for those items?

#	Answer	%	Count
1	Didn't know whether equipment qualified for financial incentives	34.5%	19
2	Equipment did not qualify for financial incentives	7.3%	4
3	Too much paperwork for the financial incentive application	1.8%	1
4	Financial incentive was insufficient	1.8%	1
5	Didn't have time to complete paperwork for financial incentive application	0.0%	0
6	Didn't know about financial incentives	45.5%	25
7	We did receive an incentive	0.0%	0
8	The program was out of funds	0.0%	0
9	Other (Please specify)	9.1%	5
	Total	100%	55

Q22 - Demand for electricity is often highest during summer afternoons when the weather is hottest. Thinking about those times, how easy or difficult is it for your organization to reduce your electricity during times when electricity demand is highest?

#	Answer	%	Count
1	1(Very difficult)	21.8%	43
2	2	14.2%	28
3	3	22.3%	44
4	4	17.8%	35
5	5(Very easy)	13.2%	26
98	Don't know	10.7%	21
	Total	100%	197

Q23 - How much do you agree or disagree that reducing your electricity use during times when electricity demand is highest will have the following effects?

#	Question	1(Strongly disagree)		2		3		4		5(Strongly agree)		Total
1	Lower your utility costs	8.8%	17	6.7%	13	29.0%	56	25.9%	50	29.5%	57	193
2	Reduce greenhouse gas emissions	12.0%	23	13.0%	25	27.1%	52	25.0%	48	22.9%	44	192
3	Help make the grid more reliable	6.3%	12	7.8%	15	31.3%	60	30.7%	59	24.0%	46	192

Q25 - What is your company or organization's primary business or activity?

#	Answer	%	Count
1	Professional services (office)	12.2%	24
2	Transportation (trucking, boating, air)	1.0%	2
3	Construction and related trades (e.g., contractors)	3.0%	6
4	Retail	7.1%	14
5	Restaurant	5.6%	11
6	Grocery/convenience store	1.0%	2
7	Government	2.5%	5
8	Warehouse	2.5%	5
9	Healthcare	3.0%	6
10	Auto Service (garage, gas, towing, rental)	2.0%	4
11	Industrial/manufacturing	8.6%	17
12	State-certified K-12 school (public or private)	1.5%	3
13	Other school type	1.5%	3
14	Entertainment	0.5%	1
15	Lodging	1.5%	3
16	Agriculture	7.1%	14
17	Other (please describe)	36.5%	72
99	I prefer not to state	2.5%	5
	Total	100%	197

Q26 - Is there a specific person or group of persons at your company who are responsible for monitoring or managing energy usage?

#	Answer	%	Count
1	Yes	52.3%	102
2	No	40.0%	78
99	I prefer not to state	7.7%	15
	Total	100%	195

Q27 - Does your company have a formal policy requiring that energy efficiency be considered when purchasing equipment?

#	Answer	%	Count
1	Yes	13.5%	26
2	No	80.8%	156
99	I prefer not to state	5.7%	11
	Total	100%	193

Q28 - Does your company have goals for reducing greenhouse gas emissions?

#	Answer	%	Count
1	Yes	20.6%	40
2	No	69.1%	134
99	I prefer not to state	10.3%	20
	Total	100%	194

Q30 - What is your job title?

#	Answer	%	Count
1	Facilities Manager	6.2%	12
2	Energy Manager	0.5%	1
3	Other facilities management/maintenance po	0.0%	0
4	Chief Financial Officer	4.1%	8
5	Other financial/administrative position	5.6%	11
6	Proprietor/Owner	37.9%	74
7	President/CEO	13.8%	27
8	Manager	7.7%	15
9	Other (Specify)	19.0%	37
99	I prefer not to state	5.1%	10
	Total	100%	195

Q31 - Thinking about the facility at your location, does your organization…

#	Answer	%	Count
1	Own and occupy the entire building	68.0%	134
2	Own the building and occupy part of it while leasing parts to others	9.6%	19
3	Lease the space	15.2%	30
4	Other (Specify)	3.0%	6
99	I prefer not to state	4.1%	8
	Total	100%	197

Q32 – Aside from trade professionals like vendors or contractors, are there any organizations or groups, including community or cultural organizations, that you would trust for information about replacing or purchasing new energy-using equipment? If so, what are they? (Please select all that apply)

#	Answer	%	Count
1	Chamber of Commerce	15.3%	29
2	Equipment manufacturers	30.2%	57
3	Equipment manufacturer sales representatives	19.0%	36
4	Trade associations	10.1%	19
5	I&M	43.4%	82
6	Other organizations or groups	7.9%	15
99	I prefer not to state	35.4%	67
	Total	100%	189