

STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

IN THE MATTER OF THE VERIFIED PETITION OF)
INDIANA MICHIGAN POWER COMPANY FOR)
APPROVAL OF: (1) DEMAND SIDE)
MANAGEMENT (DSM) PLAN, INCLUDING)
ENERGY EFFICIENCY (EE) PROGRAMS,)
DEMAND RESPONSE PROGRAMS, AND) CAUSE NO. 45701
ENHANCED CONSERVATION VOLTAGE; AND)
(2) ASSOCIATED ACCOUNTING AND)
RATEMAKING TREATMENT, INCLUDING)
TIMELY RECOVERY THROUGH I&M'S DSM/EE)
PROGRAM COST RIDER OF ASSOCIATED)
COSTS, INCLUDING PROGRAM OPERATING)
COSTS, NET LOST REVENUE, AND FINANCIAL)
INCENTIVES.)

**SUBMISSION OF INDIANA MICHIGAN POWER COMPANY'S
2025 EVALUATION, VERIFICATION, AND MEASUREMENT (EM&V) REPORTS**

Petitioner, Indiana Michigan Power Company, by counsel, and pursuant to the Commission's Order in Cause No. 45701, hereby submits the following 2025 Evaluation, Verification, and Measurement (EM&V) Reports:

Exhibit A: 2025 I&M Indiana Residential Portfolio EM&V Report (Vols 1 & 2)

Exhibit B: 2025 I&M Indiana C&I Portfolio EM&V Report (Vols 1 & 2)

Exhibit C: 2025 I&M Indiana Conservation Voltage EM&V Report

Exhibit D: 2025 I&M Indiana Demand Response Portfolio EM&V Report

The 2025 EM&V Reports are also available on the I&M website at:

<https://www.indianamichiganpower.com/community/improving-our-community/projects/dsm/>

Respectfully submitted,



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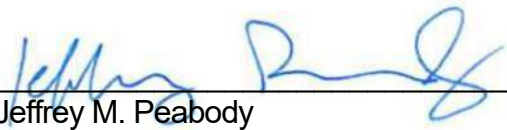
CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing was served this 1st day of May, 2026, by email transmission, hand delivery or United States Mail, first class, postage prepaid to:

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2025 Indiana Residential Portfolio EM&V Report

Volume I of II

Prepared for:

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April 30, 2026

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1. Introduction

Under contract with Indiana Michigan Power (I&M), ADM Associates, Inc., a Qualus Company, (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 from January 2025 through December 2025 (PY2025).

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

1.1. Summary of Data Collection

Table 1-1 summarizes data collection activities that supported the PY2025 evaluation of I&M's residential programs.

Table 1-1 Summary of Data Collection

<i>Survey</i>	<i>Mode</i>	<i>Time Frame</i>	<i>Number of Contacts</i>	<i>Number of Completions</i>	<i>Completion Rate</i>
Online Marketplace Participant	Email	October 2025, December 2025	140	17	12.1%
Home Energy Reports - Treatment Group Survey	Email	January 2026, January 2026	38,552	577	1.5%
Income Qualified Weatherproofing Participant Survey - Kits	Email	January 2026	136	6	4.4%
Income Qualified Weatherproofing Participant Survey - In Home Participant	Email or phone	January 2026	165	11	6.7%
Residential Midstream HVAC Customer Survey	Mailed letter and phone follow up	October 2026	61	14	23.0%
Residential Midstream HVAC Distributor Interviews	Phone	December 2026	7	3	42.9%

1.2. Impact Evaluation Findings

The savings variables presented in this evaluation report are defined in Table 1-2.

Table 1-2 Savings-Related Terminology

<i>Variable</i>	<i>Definition</i>
kWh Savings Goal	kWh Savings Goal is the energy savings goal cited in the applicable portfolio plan.
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 and looking for any errors and adjusting Ex Ante Gross kWh Savings accordingly.

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<i>Variable</i>	<i>Definition</i>
Gross Verified kWh Savings	Gross Verified kWh Savings are determined by applying an installation rate to the Gross Audited kWh Savings. 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	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.
Spillover (Participant and Non-Participant)	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 1-2, Table 1-3 presents a summary of the components of the impact evaluation that are accounted for in savings variables presented in this report.

Table 1-3 Components of Impact Evaluation Accounted for in Savings Variables

<i>Category</i>	<i>Tracking Data Review</i>	<i>In-Service Rates</i>	<i>Ex Post Gross Analysis</i>	<i>Net-to-Gross Analysis</i>
Gross Audited	✓			
Gross Verified	✓	✓		
Ex Post Gross	✓	✓	✓	
Ex Post Net	✓	✓	✓	✓

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ADM performed EM&V activities for six residential programs offered by I&M during PY2025. Total residential portfolio ex post gross energy savings are 19,018,982 kWh, while ex post net energy savings are 17,420,311 kWh.

Table 1-4 Summary of Energy Savings – PY2025

<i>Program Name</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Annual Net kWh Savings</i>	<i>Net-to-Gross Ratio</i>	<i>Lifetime Net Ex Post kWh Savings</i>
Residential Online Energy Check-up	4,251,780	4,251,780	3,044,764	4,367,864	103%	4,118,272	94%	38,283,524
Home Energy Reports Program	9,135,235	9,135,235	9,135,235	7,123,240	78%	7,123,240	100%	7,123,240
Residential Income Qualified Weatherproofing	656,377	656,377	525,101	889,450	136%	889,450	100%	7,936,138
Home Energy Products - ENERGY STAR Appliances	2,267,034	2,267,034	2,267,034	2,183,224	96%	999,761	46%	14,897,457
Home HVAC Midstream	200,051	200,051	200,051	232,322	116%	131,912	57%	2,013,212
Home Energy Products - Retail	6,219,661	6,219,661	5,550,181	4,222,883	68%	4,157,677	98%	9,051,102
Residential Portfolio Totals	22,730,138	22,730,138	20,722,368	19,018,982	84%	17,420,311	92%	79,304,674

Total residential portfolio ex post gross peak demand savings are 2,299.21 kW, while ex post net peak demand savings are 2,088.37 kW.

Table 1-5 Summary of Peak Demand Impacts – PY2025

<i>Program Name</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Net kW Savings</i>	<i>Net-to-Gross Ratio</i>
Residential Online Energy Check-up	331.12	331.12	239.26	476.95	144%	449.70	94%
Home Energy Reports Program	765.68	765.68	765.68	915.26	120%	915.26	100%
Residential Income Qualified Weatherproofing	65.95	65.95	52.76	97.12	147%	97.12	100%
Home Energy Products - ENERGY STAR Appliances	264.00	264.00	264.00	238.40	90%	109.17	46%
Home HVAC Midstream	47.34	47.34	47.34	108.06	228%	61.34	57%
Home Energy Products - Retail	20.58	20.58	16.02	463.41	2252%	455.77	98%
Residential Portfolio Totals	1,494.66	1,494.66	1,385.06	2,299.21	154%	2,088.37	91%

1.3. Cost Effectiveness Evaluation Findings

The following cost effectiveness tests were performed for the programs: Total Resource Cost (TRC) test, Utility Cost Test (UCT), 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. The test results for each program are presented in Table 1-6.

Table 1-6 Summary of PY2025 Benefit-Cost Ratios

<i>Program</i>	<i>Program Administrator Cost Test</i>	<i>Total Resource Cost Test</i>	<i>Ratepayer Impact Measure</i>	<i>Participant Cost Test</i>
Residential Online Energy Check-up	1.82	1.82	0.40	N/A
Home Energy Reports Program	1.16	1.16	0.30	N/A
Residential Income Qualified Weatherproofing	0.37	0.37	0.21	N/A
Home Energy Products - ENERGY STAR® Appliances	1.61	0.66	0.41	1.39
Home HVAC Midstream	0.20	0.24	0.18	9.97
Home Energy Products - Retail	0.16	0.20	0.12	33.84

1.4. Evaluation Findings and Recommendations

1.4.1. Home Online Energy Checkup

Program savings increased substantially for the Online Energy Checkup Program in 2025. Kit distribution rose from 11,188 in 2024 to 21,177 in 2025, and ex post net energy savings increased from 2,059,627 kWh to 4,118,272 kWh. The higher participation volume was the primary driver of the increase in savings.

1.4.2. Home Energy Report

Across all waves, the Home Energy Report program produced 7.1 million kWh of realized savings, equal to an average reduction of 0.50% per customer. Earlier waves generally achieved higher per-customer savings and higher savings rates, while the most recent wave contributed the largest share of total savings due to its size. Several waves produced statistically significant results, indicating that the program continues to generate measurable energy reductions across participating customers.

High engagement with the Home Energy Reports suggest that the reports hold customer attention and are viewed throughout the year. Most customers reported reading their most recent report either fully (41.3%) or by skimming the main sections (46.3%), with only a very small share not engaging. Long-term behavior aligns with this pattern: more than three-quarters read all or most reports they receive, and none reported never reading the reports. This indicates that the HER format and delivery channels are successfully capturing customer interest.

Seasonal usage information and peer comparisons provide the greatest value to customers, while incentives and some personalized content resonate less strongly. A majority (51.7%) selected seasonal energy usage patterns as the most useful content, and peer comparisons were also highly valued (42.5%). Action-oriented tips and personalized insights had moderate appeal, while rebates and incentives were selected less often (20.8%). A small but notable segment (12.5%) found none of the features helpful, suggesting that segments of the population may not perceive the reports as relevant.

Customers generally view the reports as easy to understand, trustworthy, and accurate, though perceptions of learning and insight are more mixed. Ease of understanding received the strongest sentiment, with 86% rating the reports somewhat or very easy to comprehend. Perceived accuracy of electricity usage (81%) and peer comparisons (72%) also trended positive, though comparison accuracy had a larger share of negative responses (17%). Trust levels were high, with 83% expressing at least somewhat strong trust. However, learning outcomes were distributed: only 31% learned “quite a bit” or more, and nearly half (45%) learned little or nothing. Understanding outcomes were stronger (42% rating “quite a bit” or “very much”) but still showed room for improvement.

- **Recommendation 1:** Strengthen the educational value of HER content by integrating clearer explanations of usage drivers, contextual narrative about seasonal changes, and simplified “what this means for you” summaries. Improving learning outcomes increases the long-term behavioral impact of the reports.
- **Recommendation 2:** Improve the clarity of peer comparison methodology or provide optional detail via QR code or link. Transparency can help address the minority reporting concerns about accuracy.

1.4.3. Residential Income Qualified Weatherproofing

First-year gross ex post savings decreased from 2,176,101 kWh in 2024 to 889,450 kWh in 2025, a reduction of about 59%. In contrast, lifetime savings increased from 7,514,409 kWh to 7,936,138 kWh, an increase of about 6%. The increase in lifetime kWh despite the decline in first-year kWh indicates that the 2025 portfolio delivered fewer immediate savings but from measures with longer expected service lives.

Overall, the change in the ratio of lifetime-to-first-year savings indicates that the program shifted toward longer-EUL measures in 2025, driven by higher contributions from equipment such as heat pump water heaters and packaged terminal heat pumps and reduced installation of short-life weatherization kit items that were common in 2024.

1.4.4. Home Energy Products ENERGY STAR Appliances

The evaluation found that ESRPP generated measurable above-baseline product sales in several categories. Using the regression-based counterfactual model, statistically significant net increases were identified for basic and advanced refrigerators (100% and 123% above baseline, respectively), air purifiers (58%), freezers (26%), and basic washers (13%). Dryers and advanced washers showed statistically significant declines relative to the modeled baseline, resulting in net program impacts of zero for those categories. These findings indicate that the program is influencing sales in categories where incentives, product availability, and market conditions support customer uptake.

Interview and MPI assessment data provide additional context on retailer practices. Retailers reported that incentives and the ESRPP portal influence routine merchandising activities, including

maintaining ENERGY STAR stock levels, updating online product displays, using ENERGY STAR filters in online search tools, and featuring qualified products in promotions. Retailers also described internal training and the use of incentive information as part of ongoing merchant processes. These reported practices are consistent with the activities documented in the 2023 MPI report, which noted increased staff training, clearer online ENERGY STAR visibility, and regular presentation of ENERGY STAR products in marketing materials. These findings describe retailer engagement with the program but do not imply long-term structural changes absent additional evidence.

The MPI assessment also documents that NEEA and program partners participated in national specification and test-procedure development processes for several product categories. While the report describes program partner involvement, it does not establish the extent to which these contributions influenced the final specifications.

- **Recommendation 1:** Reassess investments by product category based on observed net impacts. Given the variation in net effects across categories, program administrators may wish to maintain or expand support for categories with consistent, statistically significant above-baseline sales (e.g., refrigerators, air purifiers, and freezers). For categories with zero or negative net effects (e.g., dryers and advanced washers), administrators could consider adjusting incentives or eligibility criteria, refining targeting strategies, or temporarily reducing emphasis on these categories until market conditions or product availability improve. Aligning program activities with empirically demonstrated impacts will help ensure efficient use of program resources.

1.4.5. Home HVAC Midstream

Participation in the Midstream HVAC program declined in 2025 compared to 2024. The number of air source heat pumps dropped from 212 units in 2024 to 69 units in 2025, and ductless heat pumps decreased from 100 to 64 units. Installations of central air conditioners increased from 3 to 13 units, but this did not offset the broader decline. Smart thermostat participation also fell from 39 units to 16 units.

Participation was lowest during the first three months of 2025 when the program transitioned to a new implementation contractor, averaging 3 units per month, and increased to an average of 17 units per month for the remainder of the year.

Distributors described the program’s influence as occurring primarily at the point of sale through the instant discount mechanism. They consistently identified upfront cost as the main barrier to adoption of higher-efficiency HVAC equipment and explained that incentives reduce the effective price difference between standard- and high-efficiency options. Several respondents noted that the instant discount helps contractors “close the deal” by making higher-efficiency equipment more financially competitive at the time the purchase decision is made. This description is consistent with the program requirement that at least 60% of the incentive be passed through as

an immediate price reduction and with end-user survey results indicating that 52.4% of respondents were aware that a discount was provided by I&M.

Distributors have discretion over incentive dollars, which allows multiple promotional approaches but creates variation in how incentives are used. Distributors are permitted to retain up to 40% of incentive dollars and have flexibility in how these funds are applied, including marketing activities, sales bonuses, or other internal efforts to promote high-efficiency equipment. Distributors may also choose to provide additional incentives beyond the required contractor pass-through, resulting in variation across distributors in how incentive dollars are deployed.

Documentation and workflow controls support data quality, with some friction from detailed requirements and internal reconciliation. The program relies on a multi-step review process in which distributors verify sales details and the program implementer confirms customer and equipment eligibility. Quality control measures include address-based eligibility checks using CIS data, duplicate checks on model and serial numbers, and verification of equipment specifications through an AHRI API. While distributors generally described the process as workable once staff became familiar with it, some noted challenges related to reconciling payments internally and the level of detail required in submissions relative to other utility programs.

- **Recommendation 1: Streamline documentation and payment reconciliation while preserving data quality.** To reduce administrative friction while maintaining strong quality assurance, the program could pursue targeted system enhancements focused on automation and traceability.

First, the program could expand use of the existing AHRI API to auto-populate equipment and measure details in the application portal once a model or AHRI reference number is entered. Distributors noted that I&M requires more detailed equipment information than many other programs, and automating population of fields such as efficiency ratings and system attributes would reduce manual entry, lower the risk of data entry errors, and ease the learning curve for sales and administrative staff.

Second, the program could include the application ID on all incentive payment documentation, including checks and credit memos issued to distributors. Distributors identified internal reconciliation as a challenge due to the use of multiple identifiers across systems. Adding the application ID would improve traceability between payments and approved applications, reduce time spent investigating discrepancies, and support more efficient internal accounting without altering the underlying review or approval process.

Initial delays in payments were described as temporary and resolved. Distributors noted early-year payment timing issues during program startup but indicated these issues were temporary and have since been resolved, with current payment timelines viewed as acceptable.

Cost is the primary barrier to higher-efficiency HVAC adoption identified by distributors. Across distributor interviews, higher upfront cost was consistently identified as the main barrier to adoption of high-efficiency equipment. Respondents explained that customers often default to

the lowest-cost option unless contractors are able to clearly frame efficiency in terms of expected bill savings or comfort improvements. Respondents emphasized the importance of “kitchen table” discussions and noted that contractors who lack confidence in communicating these benefits are less likely to promote higher-efficiency options.

- **Recommendation 2: Strengthen contractor-facing sales training and tools to increase confidence in promoting high-efficiency options.** To address cost-driven customer hesitation and improve the ability of contractors to communicate the value of high-efficiency HVAC equipment, the program could enhance its contractor support resources. The program could develop targeted sales-training modules, contractor job aids, and simple customer-facing materials (e.g., ROI calculators, bill-savings estimates, comfort comparison one-pagers) to help contractors frame efficiency benefits clearly and consistently. Providing these tools would strengthen contractor confidence, improve the quality of customer conversations, and increase the likelihood that high-efficiency options are presented and accepted.

Distributors and end users align on the benefits that resonate most -- lower energy bills and improved comfort. Distributors described high-efficiency equipment as easier to sell when benefits are framed around operating cost savings and comfort rather than technical efficiency metrics. End-user survey results align with this perspective: lower energy bills were the most frequently cited benefit (68.4%), followed by better performance or comfort (47.4%).

Training and support are generally viewed as sufficient, with program staff responsiveness cited as a strength. Distributors and contractors reported that onboarding, training, and ongoing support adequately prepared them to participate in the program. Training covered eligibility requirements, submission processes, and use of the online portal, with additional technical and sales-oriented support provided over time. Respondents highlighted the accessibility and responsiveness of program staff as particularly valuable, especially during early participation and periods of program change.

1.4.6. Home Energy Products Retail

Ex post gross savings increased from 1,136,919 kWh in 2024 to 4,222,883 kWh in 2025, driven by a shift toward retail discounts for weatherization materials and the continued distribution of weatherization kits. In 2025, retail discounts contributed 3,309,600 kWh (78.4%), kits contributed 819,439 kWh (19.4%), and marketplace measures contributed 93,845 kWh (2.2%). Although savings from marketplace measures also increased significantly, from 31,353 kWh to 93,845 kWh, this component remained less than 3% of ex post gross savings.

The program rebated water heaters that met the federal minimum efficiency standard, but the last rebates were issued in May. The water heaters rebated through the program had a Uniform Energy Factor (UEF) value equal to that of a standard efficiency water heater (.92). The program increased the efficiency requirement in May.

1.5. Organization of Report

This report is divided into two volumes that provide information on the impact, process, and cost effectiveness evaluation of the Indiana Michigan Power portfolio of residential programs implemented in Indiana during the 2025 program year. Volume I is organized as follows:

- Chapter 2: Home Online Energy Checkup
- Chapter 3: Home Energy Report
- Chapter 4: Residential Income Qualified Weatherproofing
- Chapter 5: Home Energy Products ENERGY STAR Appliances
- Chapter 6: Home HVAC Midstream
- Chapter 7: Home Energy Products Retail
- Chapter 8: Cost Effectiveness Evaluation

See report Volume II for chapters presenting survey instruments and tabulated survey response information.

2. Home Online Energy Checkup

This chapter presents the results of both the impact and process evaluations of the 2025 Home Online Energy Checkup Program that Indiana Michigan Power (I&M) offered to its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

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

2.1. Program Description

The Home Online Energy Check-Up (OEC) program identifies energy saving opportunities through a web-based self-service assessment tool where customers answer basic questions about their homes and how they use energy in it. Upon completion of the questions online, the program generates a printable report that includes:

- Useful details about customer home's energy consumption;
- Customized energy-saving recommendations;
- Potential savings from making the suggested improvement; and
- Environmental impact of implementing suggested improvements.

In addition, the customer is mailed a kit of low-cost energy efficiency measures dependent on their water heater type. Kits are limited to one per account every three years. The kit contents are displayed in Table 2-1.

Table 2-1 Home Online Energy Checkup Kit Contents

<i>Kit</i>	<i>Measure</i>	<i>Quantity</i>
Electric Water Heater	0.5 W LED night light	1
	1.5 GPM kitchen faucet aerator	1
	1.0 GPM bathroom faucet aerator	2
	1.5 GPM showerhead	1
Gas Water Heater	Tier 1 advanced power strip (7 outlets)	1

2.2. Data Collection

2.2.1. Participant Survey

ADM referenced data collected during the PY2023 and PY2024 evaluations to estimate the in-service rate for the kit measures and the net savings resulting from them.

Table 2-2 Historical In-Service Rates Used to Estimate 2025 Program Impacts

<i>Measure</i>	<i>2024</i>	<i>2023</i>	<i>Average</i>
Advanced Power Strip	81%	69%	75%
Bathroom Faucet Aerator	68%	74%	71%
Kitchen Faucet Aerator	64%	75%	70%
LED Nightlight	56%	37%	46%
Showerhead	66%	77%	71%

2.3. Estimation of Ex Post Gross Savings

2.3.1. Methodology for Estimating Ex Post Gross Energy Savings

2.3.1.1. Review of Documentation

I&M maintains program tracking information that includes a list of customers that received the efficiency kit and the kit type. The first aspect of conducting measurements of program activity was to verify that the tracking data report of participants and measures were accurate. To this end, ADM reviewed the program data to verify that the fields required for performing the evaluation are tracked and populated (i.e., the data is not missing) and that the values are reasonable. ADM took several steps in verifying the number of kit measures installed, which consist of the following:

- Validating program tracking data by checking for duplicate or erroneous entries; and
- Conducting verification surveys with a sample of program participants in PY2023 and PY2024 to verify that customers listed in the program tracking database installed the measures listed.

2.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

Table 2-3 presents information on savings calculation formulas, savings calculation inputs, incremental cost, and effective useful life values and data sources applicable to the Home Online Energy Checkup Program.

Table 2-3 Home Online Energy Checkup Program Calculation Input Information

Variable Type	Variable Name	Variable Value	Variable Value Source
Measure Name: Advanced Power Strip			
Savings	ΔkWh		kWh
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	kWh	Varies	Illinois TRM V10 Vol. 3, p. 64.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		7	Illinois TRM V10 Vol. 3, p. 63.
Measure Name: Bathroom Faucet Aerator			
Savings	ΔkWh		$(GPMbase\_as\_used * L\_base - GPMlow\_as\_used * L\_low) * Household * 365.25 * DF / FPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPMbase_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_base	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	GPMlow_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_low	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	DF	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	FPH	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 226.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10 Vol. 3, p. 222.
Measure Name: Kitchen Faucet Aerator			
Savings	ΔkWh		$(GPMbase\_as\_used * L\_base - GPMlow\_as\_used * L\_low) * Household * 365.25 * DF / FPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPMbase_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_base	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	GPMlow_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_low	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	DF	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	FPH	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 226.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10 Vol. 3, p. 222.
Measure Name: Showerhead			
Savings	ΔkWh		$(GPM\_base * L\_base - GPM\_low * L\_low) * Household * SPCD * 365.25 / SPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPM_base	2.35	Illinois TRM 10.0 Vol. 3, p. 233. Efficiency kits.
Input	L_base	7.8	Illinois TRM 10.0 Vol. 3, p. 234.

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Input	<i>GPM_low</i>	1.5	Illinois TRM 10.0 Vol. 3, p. 233.
Input	<i>L_low</i>	7.8	Illinois TRM 10.0 Vol. 3, p. 234.
Input	<i>SPCD</i>	0.6	Illinois TRM V10 Vol. 3, p. 234.
Input	<i>Household</i>	Varies	Illinois TRM V10 Vol. 3, p. 234
Input	<i>SPH</i>	Varies	Illinois TRM V10 Vol. 3, p. 234
Input	<i>EPG_electric</i>	Varies	Illinois TRM V10 Vol. 3, p. 235.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM 10.0 Vol. 3, p. 232.
Measure Name: LED Nightlight			
Savings	ΔkWh		$(WattsBase - WattsEE) * Hours / 1000 * (WHFe + IF)$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	<i>WattsBase</i>	7	Illinois TRM V10 Vol. 3, p. 310. Unknown.
Input	<i>WattsEE</i>	0.5	Program tracking data.
Input	<i>Hours</i>	4380	Illinois TRM V10 Vol. 3, p. 311.
Input	<i>WHFe</i>	Varies	Illinois TRM V10 Vol. 3, p. 311.
Input	<i>IF</i>	Varies	Illinois TRM V10 Vol. 3, p. 312.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		Varies	Illinois TRM 10.0 Vol. 3, p. 310.

2.3.1.3. In-Service Rates

Table 2-4 shows the in-service rates for program measures provided through the Home Online Energy Checkup Program. The in-service rates were developed from surveys completed with PY2023 and PY2024 participants.

Table 2-4 Historical In-Service Rates Used to Estimate 2025 Program Impacts

<i>Measure</i>	<i>2024</i>	<i>2023</i>	<i>Average</i>
Advanced Power Strip	81%	69%	75%
Bathroom Faucet Aerator	68%	74%	71%
Kitchen Faucet Aerator	64%	75%	70%
LED Nightlight	56%	37%	46%
Showerhead	66%	77%	71%

2.3.2. Results of Ex Post Gross Savings Estimation

Table 2-5 summarizes the ex post gross kWh savings of the Home Online Energy Checkup Program by measure. The ex post annual gross energy savings for the program were 4,367,864 kWh with a realization rate of 103%.

Table 2-5 Measure-Level Annual Gross kWh Savings

<i>Measure Type</i>	<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Advanced Power Strip	1,042,692	1,042,692	780,921	957,557	92%
1.5 GPM Kitchen Faucet Aerator	984,474	984,474	687,263	1,371,367	139%
1.0 GPM Bathroom Faucet Aerator	330,576	330,576	233,348	326,975	99%
1.5 GPM Showerhead	1,856,880	1,856,880	1,326,074	1,656,883	89%
0.5w LED night light	37,158	37,158	17,159	55,081	148%
Total	4,251,780	4,251,780	3,044,764	4,367,864	103%

Table 2-6 summarizes the per kit gross kWh savings.

Table 2-6 Kit-Level Annual Gross kWh Savings

<i>Kit Type</i>	<i>Kit Quantity</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Electric	8,764	2,273,893	2,273,893	1,604,114	2,431,766	107%
Gas	12,413	1,977,887	1,977,887	1,440,651	1,936,097	98%
Total	21,177	4,251,780	4,251,780	3,044,764	4,367,864	103%

Table 2-7 summarizes the gross peak demand reduction of the Home Online Energy Checkup Program. The gross peak demand reduction for the program was 476.95 kW, with a realization rate of 144%.

Table 2-7 Measure-Level Annual Gross kW Savings

<i>Measure Type</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Advanced Power Strip	130.34	130.34	97.62	104.56	80%
1.5 GPM Kitchen Faucet Aerator	61.60	61.60	43.00	149.75	243%
1.0 GPM Bathroom Faucet Aerator	20.68	20.68	14.60	35.70	173%
1.5 GPM Showerhead	116.18	116.18	82.97	180.93	156%
0.5w LED night light	2.32	2.32	1.07	6.01	259%
Total	331.12	331.12	239.26	476.95	144%

Table 2-8 summarizes the kit gross kW savings.

Table 2-8 Kit-Level Annual Gross kW Savings

<i>Kit Type</i>	<i>Kit Quantity</i>	<i>Ex Ante Annual kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Annual Gross kW Savings</i>	<i>Gross Realization Rate</i>
Electric	8,764	142.27	142.27	100.37	265.54	187%
Gas	12,413	188.85	188.85	138.89	211.41	112%
Total	21,177	331.12	331.12	239.26	476.95	144%

2.3.3. Estimation of Ex Post Net Savings

ADM estimated free ridership and participant spillover based on surveys of PY2023 and PY2024 program participants. The net-to-gross ratios used to estimate PY2025 net savings reflect the average of values from both years and are summarized in Table 2-9.

Table 2-9 Historical Net-to-Gross Ratios

<i>Measure</i>	<i>2024</i>	<i>2023</i>	<i>Average</i>
Advanced Power Strip	97%	98%	98%
Bathroom Faucet Aerator	90%	101%	96%
Kitchen Faucet Aerator	89%	100%	95%
LED Nightlight	85%	93%	89%
Showerhead	89%	95%	92%

2.3.4. Results of Ex Post Net Savings Estimation

Table 2-10 summarizes the ex post annual net kWh and kW savings of the Home Online Energy Checkup Program. The annual net savings totaled 4,118,272 kWh and 449.70 kW.

Table 2-10 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	4,251,780	331.12
Gross Audited Savings	4,251,780	331.12
Gross Verified Savings	3,044,764	239.26
Ex Post Gross Savings	4,367,864	476.95
Gross Realization Rate	103%	144%
Ex Post Free Ridership	249,592	27.25
Ex Post Non-Participant Spillover	0	0.00
Ex Post Participant Spillover	0	0.00
Ex Post Net Savings	4,118,272	449.70
Net-to-Gross Ratio	94%	94%
Ex Post Net Lifetime Savings	38,283,524	N/A

2.3.5. Process Evaluation

ADM did not complete a process evaluation of the Online Energy Checkup Program.

2.4. Findings and Recommendations

Program savings increased substantially for the Online Energy Checkup Program in 2025.

Kit distribution rose from 11,188 in 2024 to 21,177 in 2025, and ex post net energy savings increased from 2,059,627 kWh to 4,118,272 kWh. The higher participation volume was the primary driver of the increase in savings.

3. Home Energy Report

This chapter presents the results of both the impact and process evaluations of the Residential Home Energy Report Program I&M provided to customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

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

3.1. Program Description

The Home Energy Reports Program provides residential customers with information on their household energy use to encourage them to alter their electricity using habits. The reports compare the participants' energy usage with similar homes to motivate the customer to take action to save energy and maintain those savings. Customers may receive paper and email reports, or paper-only reports if they do not have an email in I&M's billing information system. Customers can also access the online web portal, which allows customers to analyze and explore their energy usage, get energy efficiency tips, and manage their home energy profile.

3.1.1. Participant Survey

ADM completed three surveys of program participants to collect data to verify that the recorded measures were installed.

To determine the minimum sample size needed to meet this precision requirement, ADM assumed a CV of .5, as is typically used in residential program evaluations. The sample size requirement was estimated using the following formula:

$$n = \left(\frac{1.645 * CV}{TP} \right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

TP = Targeted Precision, 10% in this evaluation

With 10% targeted precision (TP), this called for a minimum sample of 68 participants.

ADM administered the survey to a random sample of 9,555 participants in the Home Online Energy Checkup Program. Participants were contacted by email to complete the survey and

received up to three emails invitations. Table 3-1 summarizes the results of the survey data collection effort.

Table 3-1 Home Online Energy Checkup Survey

<i>Survey</i>	<i>Mode</i>	<i>Time Frame</i>	<i>Number of Contacts</i>	<i>Number of Completions</i>	<i>Completion Rate</i>
Home Energy Reports - Treatment Group Survey	Email	January 2026	38,552	577	1.5%

3.2. Estimation of Ex Post Net Savings

3.2.1. Methodology for Estimating Ex Post Net Energy Savings

3.2.1.1. Data Used in Estimation of Ex Post Net Energy Savings

The analysis of the Home Energy Report ex post net energy savings used the following data:

- Billing data with customer account energy use.
- Records of customer assignments to treatment and control groups.
- Records of communications with customers including reports sent and any auxiliary communications such as high bill alerts.

3.2.1.2. Calculation of Net Energy Impacts

A free rider in the program was defined as a customer who would have reduced energy consumption regardless of the program's influence. The HER Program was evaluated using a randomized controlled trial (RCT) design, in which customers were randomly assigned to either a treatment group (received reports) or a control group (did not). This design enabled an unbiased comparison of average energy use between groups, isolating the program's impact from external factors. The estimate of the program effect was adjusted to account for any observed uplift in energy efficiency participation among control group customers—that is, the tendency of treatment group customers to participate in energy efficiency programs at a higher rate than control group customers. This approach yielded an estimate of net savings attributable to the program.

3.2.1.2.1. Data Preparation and Cleaning

ADM cleaned and prepared the data prior to analysis. This process included evaluating the availability and completeness of daily AMI data, identifying outliers, and applying pre-defined inclusion and exclusion criteria. Customers or records were excluded from the analysis based on the following:

- Post-Move-Out Days: All days following a customer's recorded move-out date were excluded.

- **Outlier Daily Usage:** Individual customer-days with unusually high energy usage were excluded. A threshold (e.g., >300 kWh per day) was applied to flag and remove extreme values likely to reflect data errors or atypical consumption.
- **Pre-Treatment Observation Window:** For newly developed treatment and control groups, the pre-treatment period was defined as the 12 months (365 days) immediately preceding each cohort's treatment start date.
- **Minimum Data Coverage Requirement:** Customers were required to have a minimum level of data availability:
 - At least eight months of valid pre-treatment data within the 365-day pre-period (for newly developed treatment and control groups).
 - At least eight months of valid post-treatment data within the post-period.
- **Post-Period Extension for Stability:** While the post-treatment period was anchored in the 2025 calendar year, daily data from early 2026 were referenced to improve the reliability of post-treatment estimates. However, reported impacts were restricted to the 2025 period.

3.2.1.2.2. Regression Modeling Approach

ADM estimated the effects of the Home Energy Reports (HER) Program using regression analysis applied to monthly billing data for program participants and a randomly selected control group. ADM used a difference-in-differences (DiD) mixed-effects panel regression model. This model leveraged pre-treatment data to improve the precision of estimated treatment effects. The model specification was:

$$kWh_{i,t} = \beta_1 HDD_{i,t} + \beta_2 CDD_{i,t} + \beta_3 Post_{i,t} + \beta_4 (Post_{i,t} * HDD_{i,t}) + \beta_5 (Post_{i,t} * CDD_{i,t}) + \beta_6 (Post_{i,t} * Treatment_i) + \alpha_i Customer_i + \varepsilon_{i,t}$$

Where,

$Post_{i,t}$ indicates if the observation is during the post-treatment period.

$Treatment_i$ indicates assignment to the treatment group.

$HDD_{i,t}$ and $CDD_{i,t}$ are the cooling and heating degree days to account for weather effects.

$\alpha_i Customer_i$ is the customer-level effect.

3.2.1.2.3. Double Counting / Uplift Analysis

The HER Program billing analysis may capture savings attributable not only to the Home Energy Reports themselves, but also to increased participation in other energy efficiency programs among treatment group customers. To assess the potential for overlap between HER savings and

savings claimed by other programs, ADM reviewed program participation for both treatment and control group customers during the study period.

ADM cross-referenced account IDs for treatment and control group customers with participation records from other I&M energy efficiency programs. For each group, ADM calculated the total gross kWh savings associated with participation in these other programs. Because the treatment and control groups differed in size, these totals were normalized on a per-household basis to allow for a consistent comparison between groups. The per-customer difference in gross kWh savings from other programs was then multiplied by the total number of treatment group customers to estimate total uplift.

Based on this analysis, the estimated uplift was 24,182 kWh.

3.2.2. Results of Ex Post Net Energy Savings Estimation

Realized savings varied across the Home Energy Report waves (see Table 3-2). Earlier waves generally produced higher per-customer savings and higher savings rates than more recent waves. The 7/1/2012 wave achieved 2.6 million kWh of realized savings, with an average of 113 kWh per customer and a 1.18% savings rate. A smaller 12/1/2017 cohort also showed relatively high per-customer savings (178 kWh) and the highest savings rate observed (2.53%).

More recent waves delivered lower per-customer impacts but contributed substantially to total savings because of their larger enrollment. The 6/1/2025 wave accounted for more than half of all treatment customers and produced 2.5 million kWh of realized savings. Per-customer savings for this wave averaged 23 kWh, with a savings rate of 0.37%. Other mid-period waves, including those initiated in 2015 and 2017, showed moderate per-customer savings ranging from 33 to 64 kWh.

Across all waves combined, realized savings totaled 7,123,240 kWh, corresponding to a gross realization rate of 78% and with an average reduction 0.50% per customer.

Table 3-2 Summary of Savings by Wave

<i>Wave Initiation Date</i>	<i>Count of Treatment Group Customers</i>	<i>Ex Ante kWh Savings</i>	<i>Realized kWh Savings</i>	<i>Gross Realization Rate</i>	<i>Realized kWh Savings per Customer</i>	<i>Realized kWh Savings Rate</i>	<i>Statistical Precision (t-statistic)</i>
6/1/2025	109,759	2,708,408	2,505,331	93%	23	0.37%	-2.52
7/1/2012	22,947	2,960,790	2,554,045	86%	113	1.18%	-3.03
1/1/2015	7,030	739,624	440,969	60%	64	0.88%	-1.60
6/1/2015	30,061	1,562,789	971,996	62%	33	0.75%	-3.30
2/15/2017	3,720	223,498	148,754	67%	41	1.26%	-1.60
12/1/2017	4,518	636,254	252,721	40%	57	0.82%	-1.56
12/1/2017	1,580	303,873	273,605	90%	178	2.53%	-2.80
Uplift Adjustment	n/a	0	-24,182	n/a	n/a	n/a	n/a
Total	179,615	9,135,235	7,123,240	78%	40	0.50%	

Table 3-3 summarizes the ex post annual net kWh and kW savings of the Home Energy Report Program. The annual net savings totaled 7,123,240 kWh and 915.26 kW.

Table 3-3 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	9,135,235	765.68
Gross Audited Savings	9,135,235	765.68
Gross Verified Savings	9,135,235	765.68
Ex Post Gross Savings	7,123,240	915.26
Gross Realization Rate	78%	120%
Ex Post Free Ridership	0	0
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	7,123,240	915.26
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	7,123,240	N/A

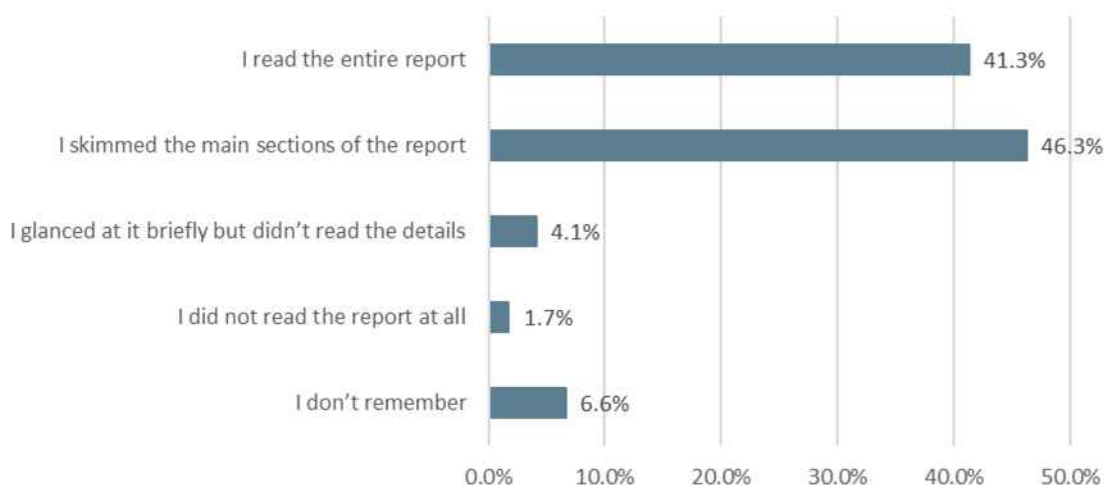
3.3. Survey Findings

ADM surveyed customers who are in the home energy treatment group to get their feedback on the reports that they receive.

3.3.1.1. Report Engagement

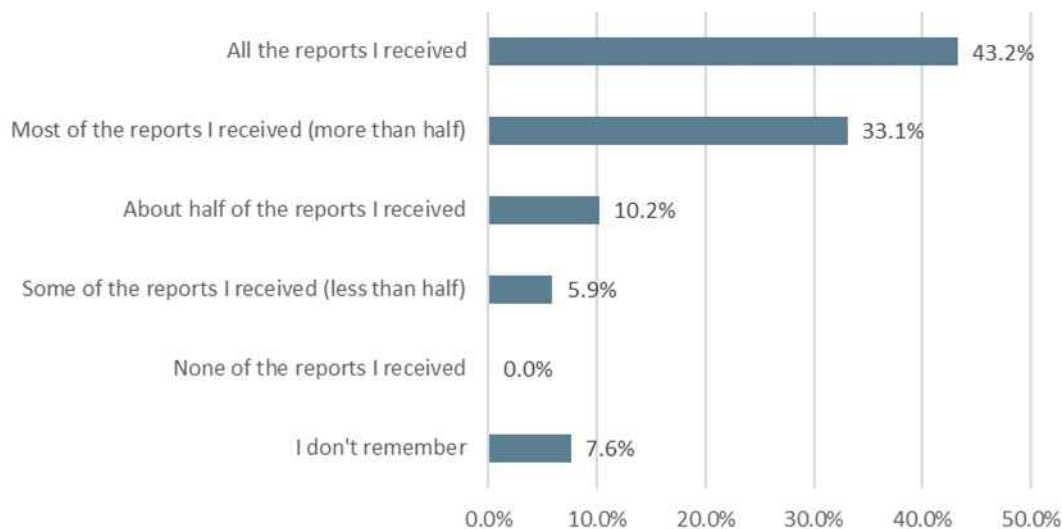
A large majority of respondents engaged meaningfully with the most recent Home Energy Report. Nearly nine in ten either read the full report (41.3%) or skimmed its main sections (46.3%). A small share showed limited engagement: 4.1% glanced at the report without reading details, and 1.7% did not read it at all. Another 6.6% did not recall whether they reviewed the report.

Figure 3-1 Engagement with Most Recent Report (n = 121)



Most participants reported consistently engaging with their Home Energy Reports over time, with more than three-quarters indicating they read at least most of the reports they received. Specifically, 43.2% said they read all of the reports and 33.1% said they read most of them (more than half). Another 10.2% reported reading about half of their reports, and 5.9% said they read some of them (less than half). No respondents reported never reading any reports. A small share, 7.6%, did not remember how many reports they had read.

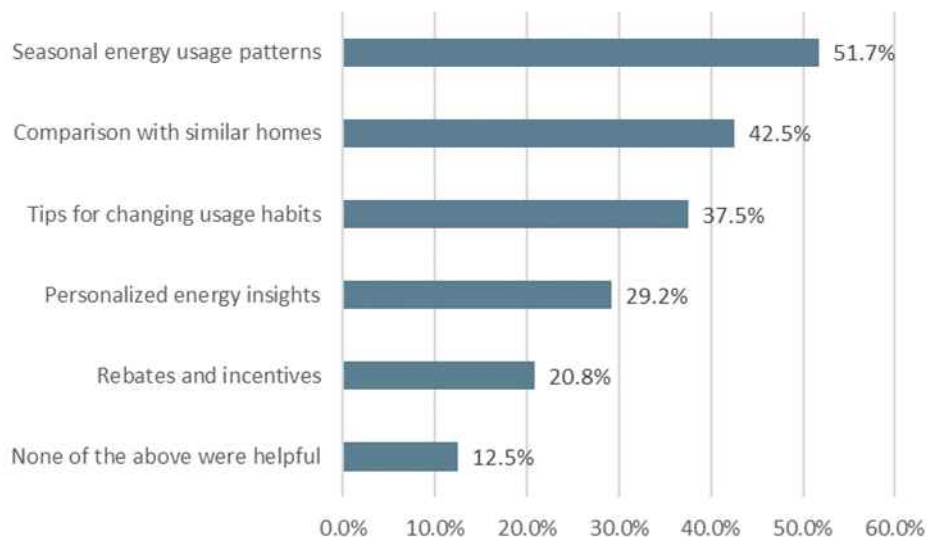
Figure 3-2 Frequency of Reading Reports (n = 118)



3.3.1.2. Report components perceived as most useful

Seasonal energy usage patterns and peer comparisons emerged as the most valued elements of the Home Energy Reports, while a minority of customers reported that none of the listed features were helpful. More than half of respondents (51.7%) selected seasonal energy usage patterns, indicating strong interest in understanding how their consumption changes across the year. Comparison with similar homes was also frequently selected (42.5%), suggesting that contextualizing usage against peers remains a key driver of perceived value. Content that supports action and personalization was also important: tips for changing usage habits were selected by 37.5% of respondents, and personalized energy insights by 29.2%. Rebates and incentives were less frequently selected (20.8%), which may indicate that financial offers are either less visible, less relevant, or less compelling than informational content for this audience. A notable minority (12.5%) indicated that none of the listed features were helpful, pointing to an opportunity to refine report content or targeting for this segment.

Figure 3-3 Most Useful Parts of the Report (n = 120)



3.3.1.3. Assessment of the quality and usefulness of the reports

To facilitate comparison across questions that used different response scales, each item was standardized to a common five-point polarity scale reflecting sentiment toward the Home Energy Report. Responses were grouped as follows:

- Very negative and Somewhat negative responses were classified as negative and displayed on the left side of the diverging bar charts.
- Midpoint responses (such as “Neither easy nor difficult” or “Neither accurate nor inaccurate”) were classified as neutral and displayed separately to avoid implying directionality.
- Somewhat positive and Very positive responses were classified as positive and displayed on the right side of the charts.

Where individual questions used different wording (for example, “Very accurate” to “Very inaccurate” or “A great deal” to “Not at all”), response options were mapped to this common framework based on their underlying positive or negative orientation. Questions with four-point scales (such as “How much do you trust the information in the Home Energy Report?”) were aligned to the same framework by assigning responses proportionally to positive or negative categories, leaving the neutral category blank for that item.

Overall, respondents expressed positive views of the Home Energy Report. About 86% of respondents said the report was very easy or somewhat easy to understand, and only 4% indicated it was somewhat or very difficult. Perceptions of the accuracy of household electricity use were also positive: about 81% rated the information as somewhat or very accurate, while 9% rated it

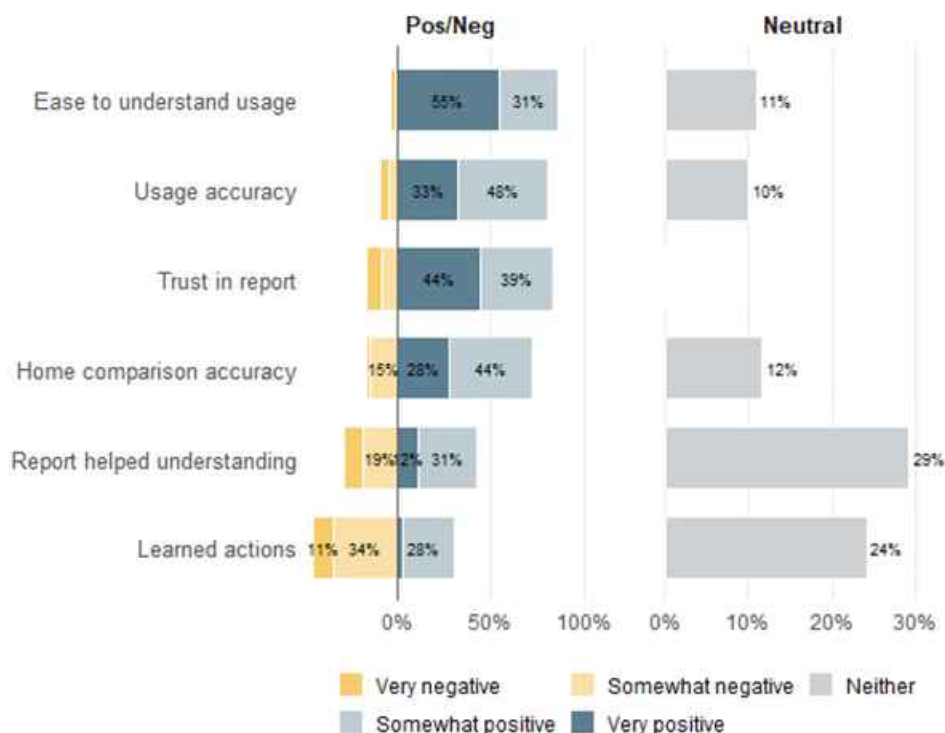
somewhat or very inaccurate. Views of the comparison to similar homes were more mixed but still leaned positive, with about 72% selecting very or somewhat accurate and about 17% selecting somewhat or very inaccurate.

Trust in the information presented in the report remained strong. About 83% reported trusting the information at least somewhat (“a great deal” or “somewhat”), while 17% selected “a little” or “not at all.”

Learning and understanding outcomes were more distributed across the scale. About 31% reported learning quite a bit or a great deal from the reports, while 45% reported learning a little or nothing. Understanding outcomes were somewhat higher, with about 42% saying the reports helped them quite a bit or very much in understanding their household energy usage, and about 28% reporting “a little” or “not at all.”

In summary, customer sentiment toward the Home Energy Reports was favorable, especially regarding comprehension, trust, and perceived accuracy. Items related to learning and understanding showed more varied responses and may represent opportunities to strengthen educational value in future report iterations. We also assessed whether views differed by homeownership status, housing type, or space-heating fuel and did not identify any differences.

Figure 3-4 Summary of Reports



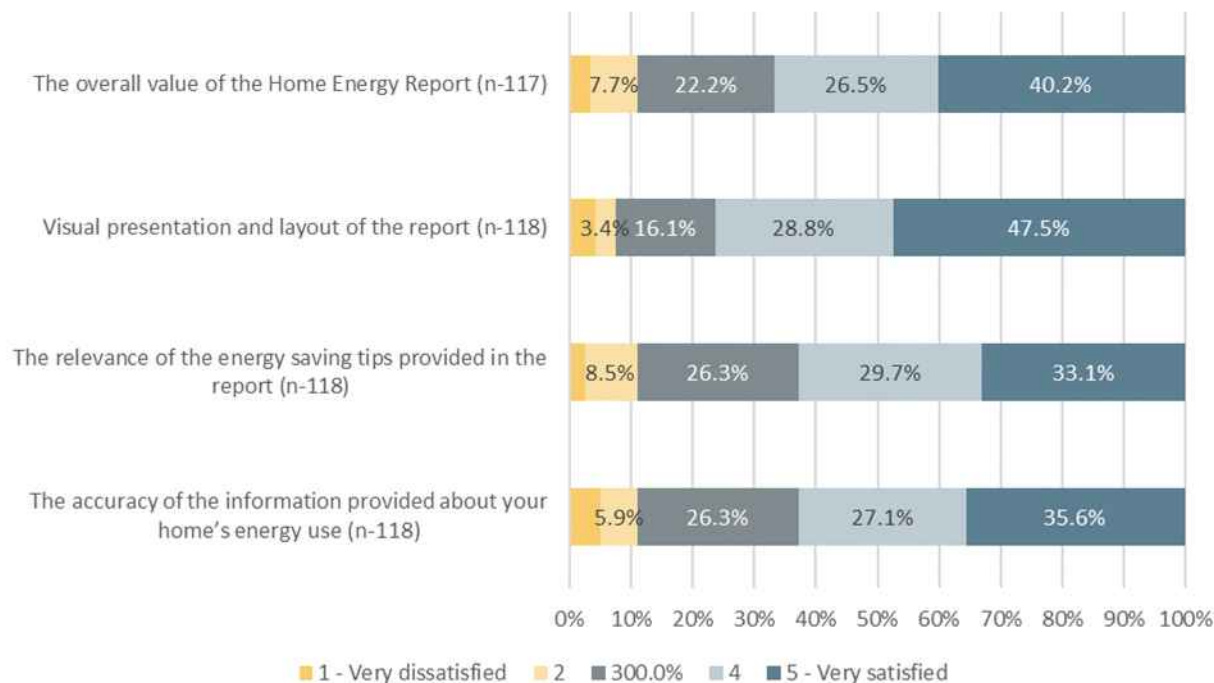
No differences were found between customers who rented their home or owned their home. This may be due to the small number of renters in the sample (n = 9 vs. n = 109 for owners).

We also looked for differences by whether or not the residence was a primary residence but only two customers reported it was not their primary residence.

3.3.1.4. Satisfaction with Reports

Overall satisfaction with the Home Energy Report was high across all dimensions, with most respondents selecting ratings of 4 or 5, though opportunities remain to strengthen perceived relevance and informational accuracy. Across all four satisfaction metrics, between 60% and 80% of respondents reported being satisfied (rating 4) or very satisfied (rating 5). Visual presentation received the strongest results, with 76% rating it a 4 or 5 and nearly half (48%) rating it a 5. Overall value also scored strongly, with 67% providing a top-two rating. Perceived accuracy of home energy information showed the widest distribution of responses, with 31% providing ratings of 1–2 or the mid-point rating of 3, indicating more mixed experiences with data quality. Perceived relevance of energy-saving tips showed similar patterns, with 37% rating this area a 1–3.

Figure 3-5 Satisfaction with Reports



3.4. Findings and Recommendations

Across all waves, the Home Energy Report program produced 7.1 million kWh of realized savings, equal to an average reduction of 0.50% per customer. Earlier waves generally achieved higher per-customer savings and higher savings rates, while the most recent wave contributed the largest share of total savings due to its size. Several waves produced statistically significant results, indicating that the program continues to generate measurable energy reductions across participating customers.

High engagement with the Home Energy Reports suggest that the reports hold customer attention and are viewed throughout the year. Most customers reported reading their most recent report either fully (41.3%) or by skimming the main sections (46.3%), with only a very small share not engaging. Long-term behavior aligns with this pattern: more than three-quarters read all or most reports they receive, and none reported never reading the reports. This indicates that the HER format and delivery channels are successfully capturing customer interest.

Seasonal usage information and peer comparisons provide the greatest value to customers, while incentives and some personalized content resonate less strongly. A majority (51.7%) selected seasonal energy usage patterns as the most useful content, and peer comparisons were also highly valued (42.5%). Action-oriented tips and personalized insights had moderate appeal, while rebates and incentives were selected less often (20.8%). A small but notable segment (12.5%) found none of the features helpful, suggesting that segments of the population may not perceive the reports as relevant.

Customers generally view the reports as easy to understand, trustworthy, and accurate, though perceptions of learning and insight are more mixed. Ease of understanding received the strongest sentiment, with 86% rating the reports somewhat or very easy to comprehend. Perceived accuracy of electricity usage (81%) and peer comparisons (72%) also trended positive, though comparison accuracy had a larger share of negative responses (17%). Trust levels were high, with 83% expressing at least somewhat strong trust. However, learning outcomes were distributed: only 31% learned “quite a bit” or more, and nearly half (45%) learned little or nothing. Understanding outcomes were stronger (42% rating “quite a bit” or “very much”) but still showed room for improvement.

- **Recommendation 1:** Strengthen the educational value of HER content by integrating clearer explanations of usage drivers, contextual narrative about seasonal changes, and simplified “what this means for you” summaries. Improving learning outcomes increases the long-term behavioral impact of the reports.
- **Recommendation 2:** Improve the clarity of peer comparison methodology or provide optional detail via QR code or link. Transparency can help address the minority reporting concerns about accuracy.

4. Residential Income Qualified Weatherproofing

This chapter presents the results of both the impact and process evaluations of the 2025 Income Qualified Weatherproofing Program that Indiana Michigan Power (I&M) offered to its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year.
- Review and assess the quality of program documentation and quality control procedures.
- Provide recommendations for program improvement.

4.1. Program Description

The Income Qualified Weatherproofing Program is offered to residential customers who would not otherwise have the ability to make energy efficiency improvements on their own. The program provides energy audits, direct install measures, and weatherization services to qualifying customers at no cost to the customer.

The program provides energy efficiency measures through four primary methods:

- In-Home Energy Assessment: This includes direct installation of energy efficiency measures and more extensive weatherization improvements, such as air sealing.
- Energy Efficiency Kits: Customers can receive these kits through one of the following ways (Table 4-1 describes the contents of the kits):
 - Virtual Checkup Kits: After completing a virtual audit, customers are sent a kit of energy efficiency measures to install in their homes.
 - Community Events: Kits are distributed during community events where program representatives discuss home energy use with customers. Customer information is collected and recorded in the program records.
 - Multifamily Properties: Kits are sent to property staff for distribution to tenants.
- Food Bank Distributions: Weatherization measures are provided to customers through distributions at food banks.

For customers receiving a home energy audit, the first step to participate in the program is for customers to sign up and receive a Home Energy Assessment. During the assessment, the auditor identifies energy efficiency improvements, conducts direct installation of some measures, and records which additional weatherization measures need to be implemented. Customers may receive a virtual audit instead of an in-person audit.

Table 4-1 Kit Measures

Electric Water Heater Kit		Gas Water Heater Kit	
Item	Quantity	Item	Quantity
Tier 1 Advanced Power Strip (7 Plug)	1	Advanced Power Strip (7 Plug)	1
High efficiency showerheads (1.5 gpm)	1	LED night lights (.33 W)	2
Kitchen faucet aerator (1.5 gpm)	1	9W LED	8
Bathroom faucet aerators (1 gpm)	1		
LED night lights (.33 W)	2		

4.2. Data Collection

4.2.1. Participant Survey

ADM completed three surveys of program participants to collect data to verify that the recorded measures were installed.

To determine the minimum sample size needed to meet this precision requirement, ADM assumed a CV of .5, as is typically used in residential program evaluations. The sample size requirement was estimated using the following formula:

$$n = \left(\frac{1.645 * CV}{TP} \right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

TP = Targeted Precision, 10% in this evaluation

With 10% targeted precision (TP), this called for a minimum sample of 68 participants.¹ As shown in Table 4-2, ADM did not achieve those response counts. For this reason, ADM combined PY2023 and PY2025 responses to estimate the in-service rates for the program measures.

ADM administered the survey to a census of unique contacts with contact information available at the time the two surveys were fielded. Participants that received a virtual audit kit were contacted up to three times, by email, to complete the survey. In home participants were contacted by telephone and up to three calls were placed for each contact.

¹ This count excludes the installations of PTACs in multifamily projects.

Table 4-2 Income Qualified Weatherproofing Survey Data Collection

Survey	Mode	Time Frame	Number of Contacts	Number of Completions	Completion Rate
Income Qualified Weatherproofing Participant Survey - Kits	Email	January 2026	136	6	4.4%
Income Qualified Weatherproofing Participant Survey - In Home Participant	Email or phone	January 2026	165	11	6.7%

4.3. Estimation of Ex Post Gross Savings

4.3.1. Methodology for Estimating Ex Post Gross Energy Savings

4.3.1.1. Review of Documentation

I&M maintains program tracking information that includes a list of all participants, the measures that were installed in their homes, and the kWh and kW savings associated with each measure. The first aspect of conducting measurements of program activity was to verify that the tracking data report of participants and measures was accurate. To this end, ADM reviewed the program data to verify that the fields required for performing the evaluation are tracked and populated (i.e., the data is not missing) and that the values are reasonable. ADM took several steps in verifying the number of weatherproofing measures installed, which consist of the following:

- Validating program tracking data by checking for duplicate or erroneous entries; and
- Conducting verification surveys with a sample of program participants to verify that customers listed in the program tracking database did indeed participate and that the number of measures were installed.

4.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

Table 4-3 presents information on savings calculation formulas, savings calculation inputs, incremental cost, and effective useful life values and data sources applicable to the Income Qualified Weatherproofing Program.

Table 4-3 Income Qualified Weatherization Calculation Input Information

Variable Type	Variable Name	Variable Value	Variable Value Source
Measure Name: 9W LED - Kit			
Savings	ΔkWh		$(WattsBase - WattsEE) * Hours * (WHFe + IF) / 1000$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	WattsBase	Varies	Illinois TRM V10 Vol. 3, p. 289. 9W equiv
Input	WattsEE	Varies	Program tracking data.
Input	Hours	Varies	Illinois TRM V10 Vol. 3, p. 291

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Input	WHFe	Varies	Illinois TRM V10 Vol. 3, p. 291
Input	IF	Varies	Illinois TRM V10 Vol. 3, p. 293
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		3	Indiana TRM 2023 Workbook, 5.5.6 and 5.5.9, Income Eligible
Measure Name: LED Nightlight - Kit			
Savings	ΔkWh		$(WattsBase - WattsEE) * Hours / 1000 * (WHFe + IF)$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	WattsBase	7	Illinois TRM V10 Vol. 3, p. 310. Unknown.
Input	WattsEE	0.33	Program tracking data.
Input	Hours	4380	Illinois TRM V10 Vol. 3, p. 311
Input	WHFe	Varies	Illinois TRM V10 Vol. 3, p. 311
Input	IF	Varies	Illinois TRM V10 Vol. 3, p. 312
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		Varies	Illinois TRM V10.0 Vol. 3, p. 310
Measure Name: Showerhead - Kit			
Savings	ΔkWh		$(GPM\_base * L\_base - GPM\_low * L\_low) * Household * SPCD * 365.25 / SPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPM_base	2.35	Illinois TRM V10.0 Vol. 3, p. 233. Efficiency kits.
Input	L_base	7.8	Illinois TRM V10.0 Vol. 3, p. 234.
Input	GPM_low	1.5	Illinois TRM 10.0 Vol. 3, p. 233.
Input	L_low	7.8	Illinois TRM V10.0 Vol. 3, p. 234.
Input	SPCD	0.6	Illinois TRM V10 Vol. 3, p. 234.
Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 234
Input	SPH	Varies	Illinois TRM V10 Vol. 3, p. 234
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 235.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10.0 Vol. 3, p. 232.
Measure Name: Advanced Power Strip - Kit			
Savings	ΔkWh		$kWh\_savings$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	kWh_savings	Varies	Illinois TRM V10 Vol. 3, p. 64
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		7	Illinois TRM V10 Vol. 3, p. 63
Measure Name: Kitchen Faucet Aerator - Kit			
Savings	ΔkWh		$(GPMbase\_as\_used * L\_base - GPMlow\_as\_used * L\_low) * Household * 365.25 * DF / FPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPMbase_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_base	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	GPMlow_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_low	Varies	Illinois TRM V10 Vol. 3, p. 224.

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Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	DF	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	FPH	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 226.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10 Vol. 3, p. 222.
Measure Name: Bathroom Faucet Aerator - Kit			
Savings	ΔkWh		$(GPM_{base\_as\_used} * L_{base} - GPM_{low\_as\_used} * L_{low}) * Household * 365.25 * DF / FPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPMbase_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_base	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	GPMlow_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_low	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	DF	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	FPH	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 226.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10 Vol. 3, p. 222.
Measure Name: Advanced Power Strip			
Savings	ΔkWh		kWh_savings
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	kWh_savings	Varies	Illinois TRM V10 Vol. 3, p. 64
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		7	Illinois TRM V10 Vol. 3, p. 63
Measure Name: LED Night Light			
Savings	ΔkWh		$(WattsBase - WattsEE) * Hours / 1000 * (WHFe + IF)$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	WattsBase	7	Illinois TRM V10 Vol. 3, p. 310.
Input	WattsEE	0.33	Program tracking data.
Input	Hours	4380	Illinois TRM V10 Vol. 3, p. 311.
Input	WHFe	Varies	Illinois TRM V10 Vol. 3, p. 311.
Input	IF	Varies	Illinois TRM V10 Vol. 3, p. 312.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		Varies	Illinois TRM 10.0 Vol. 3, p. 310.
Measure Name: Direct Install LED			
Savings	ΔkWh		$(WattsBase - WattsEE) * Hours * (WHFe + IF) / 1000$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	WattsBase	Varies	Varies on lamp type: Illinois TRM V10 Vol. 3, p. 289, p. 272-274, or p. 310.
Input	WattsEE	Varies	Program tracking data.

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Input	Hours	Varies	Varies on lamp type: Illinois TRM V10 Vol. 3, p. 291, p.276 , or p. 311.
Input	WHFe	Varies	Illinois TRM V10 Vol. 3, p. 291.
Input	IF	Varies	Illinois TRM V10 Vol. 3, p. 293
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		3	Indiana TRM 2023 Workbook, 5.5.6 and 5.5.9, Income Eligible.
Measure Name: Kitchen Faucet Aerator			
Savings	ΔkWh		$(GPM_{base\_as\_used} * L_{base} - GPM_{low\_as\_used} * L_{low}) * Household * 365.25 * DF / FPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPMbase_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_base	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	GPMlow_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_low	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	DF	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	FPH	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 226.
Input			0
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10 Vol. 3, p. 222.
Measure Name: Bathroom Faucet Aerator			
Savings	ΔkWh		$(GPM_{base\_as\_used} * L_{base} - GPM_{low\_as\_used} * L_{low}) * Household * 365.25 * DF / FPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPMbase_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_base	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	GPMlow_as_used	Varies	Illinois TRM V10 Vol. 3, p. 223.
Input	L_low	Varies	Illinois TRM V10 Vol. 3, p. 224.
Input	Household	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	DF	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	FPH	Varies	Illinois TRM V10 Vol. 3, p. 225.
Input	EPG_electric	Varies	Illinois TRM V10 Vol. 3, p. 226.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10 Vol. 3, p. 222.
Measure Name: Showerhead			
Savings	ΔkWh		$(GPM_{base} * L_{base} - GPM_{low} * L_{low}) * Household * SPCD * 365.25 / SPH * EPG\_electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	GPM_base	Varies	Illinois TRM 10.0 Vol. 3, p. 233. Direct install.
Input	L_base	7.8	Illinois TRM 10.0 Vol. 3, p. 234.
Input	GPM_low	Varies	Illinois TRM 10.0 Vol. 3, p. 233.
Input	L_low	7.8	Illinois TRM 10.0 Vol. 3, p. 234.

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Input	<i>SPCD</i>	0.6	Illinois TRM V10 Vol. 3, p. 234.
Input	<i>Household</i>	Varies	Illinois TRM V10 Vol. 3, p. 234
Input	<i>SPH</i>	Varies	Illinois TRM V10 Vol. 3, p. 234
Input	<i>EPG_electric</i>	Varies	Illinois TRM V10 Vol. 3, p. 235.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		10	Illinois TRM V10.0 Vol. 3, p. 232.
Measure Name: Refrigerator			
Savings - 1	ΔkWh Baseline 1		$(kWh_{exist} - kWh_{ee}) * 365.25$
Savings - 2	ΔkW Baseline 1		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Savings - 2	ΔkWh (Baseline 2)		$(kWh_{base} - kWh_{ee}) * 365.25$
Savings - 2	ΔkW (Baseline 2)		$per\_unit\_gross\_ex\_post\_kwh\_savings\_second\_baseline * cdf$
Input	<i>kWh_{exist}</i>	Varies	PY2021 ADM review of pre-existing units.
Input	<i>kWh_{base}</i>	Varies	Illinois TRM V10.0 Vol. 3, p. 29
Input	<i>kWh_{ee}</i>	Varies	Energy Star database
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL - 1		6	Illinois TRM V10.0 Vol. 3, p. 30
EUL - 2		11	Illinois TRM V10.0 Vol. 3, p. 30
Measure Name: Heat Pump Water Heater			
Savings	ΔkWh		$(1 / UEF_{base} - 1 / UEF_{new}) * 17.6 GPD * Household * 365.25 * 8.33 lbs / gallon * (T_{out} - T_{in}) / 3412 + kWh_{cooling} - kWh_{heating} + Dehumidification$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	<i>UEF_{base}</i>	Varies	Federal appliance standard.
Input	<i>UEF_{new}</i>	Varies	Tracking data. Characteristics of applicable equipment.
Input	<i>17.6 GPD</i>	17.6	Illinois TRM V10.0 Vol. 3, p. 217
Input	<i>Household</i>	Varies	Illinois TRM V10.0 Vol. 3, p. 217
Input	<i>T_{out}</i>	125	Illinois TRM V10.0 Vol. 3, p. 217
Input	<i>T_{in}</i>	50.7	Illinois TRM V10.0 Vol. 3, p. 217
Input	<i>kWh_{cooling}</i>	Varies	$(((((17.6 GPD * Household * 365.25 * 8.33 lbs / gallon * (T_{out} - T_{in}) * 1) / 3412 - ((1 / UEF_{new} * 17.6 GPD * Household * 365.25 * 8.33 lbs / gallon * (T_{out} - T_{in}) * 1) / 3412))) * LF * CoolLoadFactor) / (COP_{cool} * LM))$
Input	<i>kWh_{heating}</i>	Varies	$(((((17.6 GPD * Household * 365.25 * 8.33 lbs / gallon * (T_{out} - T_{in}) * 1) / 3412 - ((1 / UEF_{new} * 17.6 GPD * Household * 365.25 * 8.33 lbs / gallon * (T_{out} - T_{in}) * 1) / 3412))) * LF * HeatLoadFactor) / (COP_{heat}))$
Input	<i>Dehumidification</i>	359	Illinois TRM V10.0 Vol. 3, p. 219. Dehumidifier in use.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		15	Illinois TRM V10.0 Vol. 3, p. 215
Measure Name: Wall Insulation			

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Savings	ΔkWh		$\left(\left(\left(1 / (R_{exist} + wall\_assembly\_r\_value) \right) - 1 / (R_{new} + wall\_assembly\_r\_value) \right) * a\_wall * (1 - framing\_factor) \right) * 24 * CDD * DUA / (1000 * \eta_{Cool}) * ADJ_{cool} * \%Cool + \left(\left(1 / (R_{exist} + wall\_assembly\_r\_value) \right) - 1 / (R_{new} + wall\_assembly\_r\_value) \right) * a\_wall * (1 - framing\_factor) \right) * 24 * HDD / (\eta_{Heat} * 3412) * ADJ_{heat} * \%ElectricHeat$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	R_{exist}	Varies	Tracking data.
Input	R_{new}	Varies	Tracking data.
Input	$framing\_factor$	0.25	Illinois TRM 10.0 Vol. 3, p. 353.
Input	CDD	Varies	Illinois TRM 10.0 Vol. 3, p. 353.
Input	DUA	0.75	Illinois TRM 10.0 Vol. 3, p. 354.
Input	a_wall	Varies	Area insulated in square feet.
Input	η_{Cool}	Varies	Illinois TRM 10.0 Vol. 3, p. 354.
Input	$\%Cool$	Varies	Equals 1 if cooling present; otherwise 0.
Input	ADJ_{cool}	0.8	Illinois TRM 10.0 Vol. 3, p. 354.
Input	HDD	Varies	Illinois TRM 10.0 Vol. 3, p. 355.
Input	η_{Heat}	Varies	Illinois TRM 10.0 Vol. 3, p. 355.
Input	$\%ElectricHeat$	Varies	Equals 1 if electric heating present; otherwise 0.
Input	ADJ_{heat}	0.6	Illinois TRM 10.0 Vol. 3, p. 356.
Input	$wall\_assembly\_r\_value$	5	Illinois TRM 10.0 Vol. 3, p. 353.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		20	Illinois TRM 10.0 Vol. 3, p. 352.
Measure Name: Air Sealing			
Savings	ΔkWh		$(CFM50\_before - CFM50\_after) / N\_cool * 60 * 24 * CDD * DUA * 0.018 / (1000 * \eta_{Cool}) * Adj\_airsealingcool * IE\_net correction + (CFM50\_before - CFM50\_after) / N\_heat * 60 * 24 * HDD * 0.018 / (3412 * \eta_{Heat})$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	$CFM50\_before$	Varies	Tracking data.
Input	$CFM50\_after$	Varies	Tracking data.
Input	CDD	Varies	Illinois TRM V10.0 Vol. 3, p. 322. Indiana TRM Workbook V1 climate zone mapping.
Input	HDD	Varies	Illinois TRM V10.0 Vol. 3, p. 324. Indiana TRM Workbook V1 climate zone mapping.
Input	N_cool	Varies	Illinois TRM V10.0 Vol. 3, p. 321. Indiana TRM Workbook V1 climate zone mapping.
Input	N_heat	Varies	Illinois TRM V10.0 Vol. 3, p. 324. Indiana TRM Workbook V1 climate zone mapping.
Input	DUA	0.75	Illinois TRM V10.0 Vol. 3, p. 322.
Input	η_{Cool}	Varies	Illinois TRM 10.0 Vol. 3, p. 322.
Input	η_{Heat}	Varies	Illinois TRM 10.0 Vol. 3, p. 324.
Input	$Adj\_airsealingcool$	1	Illinois TRM V10.0 Vol. 3, p. 323. No attic insulation.
Input	$IE\_net correction$	1	Illinois TRM V10.0 Vol. 3, p. 323. No attic insulation.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.

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EUL		20	Illinois TRM V10.0 Vol. 3, p. 320
Measure Name: Ductless Heat Pump			
Savings - 1	ΔkWh Baseline 1		$\frac{(((Capacity\_heat / HSPF2\_base) - (Capacity\_heat / HSPF2\_ee)) / 1000 * EFLH\_heat) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / SEER2\_ee)) / 1000 * EFLH\_cool) + ((Heating\_kwh\_exist - ((Capacity\_heat / HSPF2\_base) / 1000 * EFLH\_heat)) * ER\_factor) + (((Capacity\_cool\_exist / SEER2\_exist) - (Capacity\_cool\_ee / SEER2\_base)) / 1000 * ER\_factor * EFLH\_cool)}$
Savings - 2	ΔkW Baseline 1		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Savings - 2	ΔkWh (Baseline 2)		$\frac{(((Capacity\_heat / HSPF2\_base) - (Capacity\_heat / HSPF2\_ee)) / 1000 * EFLH\_heat) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / SEER2\_ee)) / 1000 * EFLH\_cool)}$
Savings - 2	ΔkW (Baseline 2)		$per\_unit\_gross\_ex\_post\_kwh\_savings\_second\_baseline * cdf$
Input	Capacity_cool_exist	Varies	Assumed equivalent to new equipment.
Input	Capacity_cool_ee	Varies	Tracking data.
Input	EFLH_cool	Varies	Illinois TRM V10.0 Vol. 3, p. 157. Indiana TRM Workbook V1.
Input	SEER2_exist	Varies	Illinois TRM V10.0 Vol. 3, p.76.
Input	SEER2_base	13.4	2023 Indiana TRM Workbook, '5.3.12 Ductless Heat Pumps' worksheet.
Input	SEER2_ee	Varies	AHRI. Characteristics of applicable equipment.
Input	Capacity_heat	Varies	Tracking data.
Input	EFLH_heat	Varies	Illinois TRM V10.0 Vol. 3, p. 158. Indiana TRM Workbook V1.
Input	HSPF2_base	Varies	Illinois TRM V10.0 Vol. 3, p. 159. Indiana TRM Workbook V1.
Input	HSPF2_ee	Varies	AHRI. Characteristics of applicable equipment.
Input	Heating_kwh_exist	Varies	Pre-project annual electric energy usage. Based on econometric analysis of interval meter data and capped at estimate of electric resistance baseline usage.
Input	ER_factor	1	Assume early replacement with income-qualified program.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL - 1		6	Illinois TRM V10.0 Vol. 3, p.72
EUL - 2		12	Illinois TRM V10.0 Vol. 3, p.72
Measure Name: Hot Water Pipe Insulation			
Savings	ΔkWh		$((1 / R\_Exist) - (1 / R\_New)) * ((L\_effective * C\_inside * delta\_T * 8766) / (n\_DHW * 3412))$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	R_Exist	0.521	Illinois TRM V10.0 Vol. 3, p. 205. 0.75" copper pipe.
Input	R_New	4	Illinois TRM 10.0 Vol. 3, p. 205
Input	L_effective	1	Quantity variable accounts for length in feet for applicable project.
Input	C_inside	0.2055	Illinois TRM V10.0 Vol. 3, p. 205. 0.75" pipe.
Input	delta_T	60	Illinois TRM 10.0 Vol. 3, p. 205
Input	n_DHW	Varies	Illinois TRM 10.0 Vol. 3, p. 205
Input		0	0
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		15	Illinois TRM 10.0 Vol. 3, p. 204

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Measure Name: Ceiling Insulation			
Savings	ΔkWh		$\left(\left(\left(1 / (R_{exist} + roof\_assembly\_r\_value) - 1 / (R_{new} + roof\_assembly\_r\_value) \right) * a\_attic * (1 - framing\_factor) \right) * 24 * CDD * DUA \right) / (1000 * \eta_{Cool}) * ADJ_{cool} * \%Cool + \left(\left(1 / (R_{exist} + roof\_assembly\_r\_value) - 1 / (R_{new} + roof\_assembly\_r\_value) \right) * a\_attic * (1 - framing\_factor) \right) * 24 * HDD / (\eta_{Heat} * 3412) * ADJ_{heat} * \%ElectricHeat$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	R_{exist}	Varies	Tracking data.
Input	R_{new}	Varies	Tracking data.
Input	$framing\_factor$	0.07	Illinois TRM 10.0 Vol. 3, p. 362.
Input	CDD	Varies	Illinois TRM 10.0 Vol. 3, p. 362.
Input	DUA	0.75	Illinois TRM 10.0 Vol. 3, p. 363.
Input	a_attic	Varies	Area insulated in square feet.
Input	η_{Cool}	Varies	Illinois TRM 10.0 Vol. 3, p. 363.
Input	$\%Cool$	Varies	Equals 1 if cooling present; otherwise 0.
Input	ADJ_{cool}	1.21	Illinois TRM 10.0 Vol. 3, p. 363.
Input	HDD	Varies	Illinois TRM 10.0 Vol. 3, p. 364.
Input	η_{Heat}	Varies	Illinois TRM 10.0 Vol. 3, p. 364.
Input	$\%ElectricHeat$	Varies	Equals 1 if electric heating present; otherwise 0.
Input	ADJ_{heat}	0.6	Illinois TRM 10.0 Vol. 3, p. 365.
Input	$roof\_assembly\_r\_value$	3	Illinois TRM 10.0 Vol. 3, p. 362.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		20	Illinois TRM 10.0 Vol. 3, p. 361.
Measure Name: Window Film			
Savings	ΔkWh		$\left((kWh_{per\_sf\_elec\_resistance} * \%elec\_resistance + kWh_{per\_sf\_heat\_pump} * \%heat\_pump) * ADJ_{RxAirSealing} \right) + ((\Delta CFM50 / N_{cool} * 60 * 24 * CDD * DUA * 0.018) / (1000 * \eta_{Cool} * LM * \%Cool)) * Window\_sf$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	$kWh_{per\_sf\_elec\_resistance}$	3.9	Illinois TRM V10 Vol. 3, p. 327.
Input	$kWh_{per\_sf\_heat\_pump}$	2	Illinois TRM V10 Vol. 3, p. 327.
Input	$\%elec\_resistance$	0.24119598	2020 RECS Midwest Census Region data.
Input	$\%heat\_pump$	0.08229724	2020 RECS Midwest Census Region data.
Input	$\Delta CFM50$	0.639	Illinois TRM V10 Vol. 3, p. 329.
Input	N_{cool}	39.5	Illinois TRM V10 Vol. 3, p. 321.
Input	CDD	820	Illinois TRM V10 Vol. 3, p. 322.
Input	DUA	0.75	Illinois TRM V10 Vol. 3, p. 322.
Input	η_{Cool}	10.5	Illinois TRM V10 Vol. 3, p. 322.
Input	LM	3.3	Illinois TRM V10 Vol. 3, p. 323.
Input	$ADJ_{RxAirSealing}$	0.8	Illinois TRM V10 Vol. 3, p. 328.
Input	$\%Cool$	0.52	Indiana TRM 2023 Workbook, 5.6.1.

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Input	Window_sf	Varies	Product characteristics.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		1	Illinois TRM 10.0 Vol. 3, p. 320.
Measure Name: Packaged Terminal Heat Pump			
Savings - 1	ΔkWh Baseline 1		$((Capacity\_heat / COP\_base) - (Capacity\_heat / COP\_ee)) / 1000 * EFLH\_heat / 3.412) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / EER\_ee)) / 1000 * EFLH\_cool) + ((Heating\_kwh\_exist - ((Capacity\_heat / COP\_base) / 1000 * EFLH\_heat)) * ER\_factor * 3.412) + (((Capacity\_cool\_exist / SEER2\_exist) - (Capacity\_cool\_ee / SEER2\_base)) / 1000 * ER\_factor * EFLH\_cool)$
Savings - 2	ΔkW Baseline 1		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	Capacity_cool_exist	Varies	Assumed equivalent to new equipment.
Input	Capacity_cool_ee	Varies	Tracking data.
Input	EFLH_cool	Varies	Illinois TRM V10.0 Vol. 3, p. 157. Indiana TRM Workbook V1.
Input	SEER2_exist	Varies	Illinois TRM V13.0 Vol. 2, p.342.
Input	SEER2_base	Varies	Illinois TRM V13.0 Vol. 2, p.342.
Input	EER_ee	Varies	AHRI. Characteristics of applicable equipment.
Input			
Input			
Input			
Input			
Input	Capacity_heat	Varies	Tracking data.
Input	EFLH_heat	Varies	Illinois TRM V10.0 Vol. 3, p. 158. Indiana TRM Workbook V1.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL - 1		5	Illinois TRM V13.0 Vol. 2, p.349.

4.3.1.3. Verification and In-Service Rates

Table 4-4 shows the verification rates for program measures installed through the income-qualified program for in-home participants. The results are based on data collected during the PY2023 and PY2025 evaluations. For donated items, ADM referenced the Illinois TRM 12.0

For the kit items, some respondents reported that they had not installed and were not planning to install the items in the next six months.

Table 4-4 Summary of Measure In-Service Rates

Measure	Number of Measure Responses	Verification/ In Service Rate	Stratum/Source	Stratum Sample Size
9W LED - Kit	33	78%	Average LED -Kit (2023 and 2025 Survey Results) Value	33

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<i>Measure</i>	<i>Number of Measure Responses</i>	<i>Verification/ In Service Rate</i>	<i>Stratum/Source</i>	<i>Stratum Sample Size</i>
Advanced Power Strip - Kit	38	82%	Average Advanced Power Strip - Kit (2023 and 2025 Survey Results) Value	38
Bathroom Faucet Aerator - Kit	13	77%	Average Bathroom Faucet Aerator - Kit (2023 and 2025 Survey Results) Value	13
Kitchen Faucet Aerator - Kit	12	75%	Average Kitchen Faucet Aerator - Kit (2023 and 2025 Survey Results) Value	12
LED Nightlight - Kit	37	35%	Average LED Nightlight - Kit (2023 and 2025 Survey Results) Value	37
Showerhead - Kit	13	92%	Average Showerhead - Kit (2023 and 2025 Survey Results) Value	13
Advanced Power Strip	11	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
Bathroom Faucet Aerator	9	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
Direct Install LED	6	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
Kitchen Faucet Aerator	8	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
LED Night Light	11	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
Refrigerator	4	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Showerhead	6	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
Heat Pump Water Heater	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Package Terminal Heat Pump	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Air Sealing	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Ductless Heat Pump	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Pipe Insulation	0	65%	Average DI Measures (2023 and 2025 Survey Results) Value	51
Ceiling Insulation	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Air Source Heat Pump	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Wall Insulation	0	100%	Average Major Measures (2023 and 2025 Survey Results) Value	4
Window Insulation Kit	0	57%	IL TRM v12.0, Vol 3, p. 384	0
Door Sweep	0	57%	IL TRM v12.0, Vol 3, p. 384	0
Weatherstripping	0	63%	IL TRM v12.0, Vol 3, p. 384	0

4.3.2. Results of Ex Post Gross Savings Estimation

Table 4-5 summarizes the gross kWh savings of the Income Qualified Weatherproofing Program by measure. The ex post annual energy savings for the program were 889,450 kWh with a realization rate of 136%.

Table 4-5 Measure-Level Annual Gross kWh Savings

<i>Measure</i>	<i>Quantity of Measures Incented</i>	<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
LED Night Light	523	4,377	4,377	3,501	12,951	296%
Direct Install LED	1,102	36,569	36,569	29,255	44,779	122%
Kitchen Faucet Aerator	45	6,080	6,080	4,864	8,228	135%
Bathroom Faucet Aerator	53	1,255	1,255	1,004	1,057	84%
Showerhead	57	13,982	13,982	11,185	11,385	81%
Heat Pump Water Heater	34	64,538	64,538	51,631	75,136	116%
Advanced Power Strip	240	20,841	20,841	16,673	19,776	95%
Hot Water Pipe Insulation	297	9,742	9,742	7,793	12,821	132%
Ceiling Insulation	1	614	614	491	539	88%
Air Sealing	49	6,534	6,534	5,227	5,242	80%
Ductless Heat Pump	5	34,834	34,834	27,867	37,388	107%
Packaged Terminal Heat Pump	65	119,849	119,849	95,879	256,042	214%
9W LED - Kit	4,048	96,354	96,354	77,083	92,062	96%
LED Nightlight - Kit	1,012	7,443	7,443	5,954	18,160	244%
Showerhead - Kit	738	147,906	147,906	118,325	171,484	116%
Advanced Power Strip - Kit	506	24,745	24,745	19,796	41,694	168%
Kitchen Faucet Aerator - Kit	369	44,208	44,208	35,367	56,884	129%
Bathroom Faucet Aerator - Kit	738	13,485	13,485	10,788	21,691	161%
Window Film	53	3,022	3,022	2,417	2,131	71%
Total		656,377	656,377	525,101	889,450	136%

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Energy savings associated with virtual assessment efficiency kits are presented by kit type in Table 4-6.

Table 4-6 Kit-Level Annual Gross kWh Savings

<i>Kit Type</i>	<i>Number of Kits</i>	<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Electric Water Heater Kit	369	298,521	298,521	238,817	349,492	117%
Gas Water Heater Kit	137	35,620	35,620	28,496	52,483	147%
Total	506	334,141	334,141	267,313	401,975	120%

Table 4-7 summarizes the gross peak demand reduction of the Income Qualified Weatherproofing Program. The gross peak demand reduction for the program was 97.12 kW, with a realization rate of 147%.

Table 4-7 Measure-Level Annual Gross kW Savings

<i>Measure</i>	<i>Quantity of Measures Incited</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
LED Night Light	523	0.00	0.00	0.00	1.41	69123%
Direct Install LED	1,102	0.01	0.01	0.01	4.89	33722%
Kitchen Faucet Aerator	45	0.28	0.28	0.23	0.90	319%
Bathroom Faucet Aerator	53	0.13	0.13	0.11	0.12	86%
Showerhead	57	0.59	0.59	0.47	1.24	211%
Heat Pump Water Heater	34	7.11	7.11	5.68	8.20	115%
Advanced Power Strip	240	1.37	1.37	1.09	2.16	158%
Hot Water Pipe Insulation	297	1.71	1.71	1.37	1.40	82%
Ceiling Insulation	1	0.01	0.01	0.01	0.06	494%
Air Sealing	49	-	-	-	0.57	
Ductless Heat Pump	5	0.39	0.39	0.31	4.08	1047%
Packaged Terminal Heat Pump	65	25.90	25.90	20.72	27.96	108%
9W LED - Kit	4,048	8.98	8.98	7.18	10.05	112%
LED Nightlight - Kit	1,012	-	-	-	1.98	
Showerhead - Kit	738	5.94	5.94	4.76	18.73	315%
Advanced Power Strip - Kit	506	10.83	10.83	8.66	4.55	42%
Kitchen Faucet Aerator - Kit	369	1.66	1.66	1.33	6.21	375%
Bathroom Faucet Aerator - Kit	738	1.03	1.03	0.82	2.37	230%

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Window Film	53	-	-	-	0.23	
Total		65.95	65.95	52.76	97.12	147%

Table 4-8 summarizes the kW savings for the kits provided to virtual audit participants.

Table 4-8 Kit-Level Annual Gross kW Savings

<i>Kit Type</i>	<i>Number of Kits</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Electric Water Heater Kit	369	25.78	25.78	20.62	38.16	148%
Gas Water Heater Kit	137	2.66	2.66	2.13	5.73	215%
Total	506	28.44	28.44	22.75	43.89	154%

4.3.3. Estimation of Ex Post Net Savings

4.3.3.1. Methodology for Estimating Ex Post Net Energy Savings

ADM applied an NTG ratio of 1.0 for the Income Qualified Weatherproofing Program in line with common practice for the estimation of low-income program net savings.² An NTG ratio of 1.0 was also applied to the donated measures.

4.3.3.2. Results of Ex Post Net Savings Estimation

Table 4-9 summarizes the ex post annual net kWh and kW savings of the Residential Income Qualified Weatherproofing Program. The annual net savings totaled 2,176,101 kWh and 237.62 kW.

² The Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Chapter 21, p.45 <https://www.nrel.gov/docs/fy17osti/68578.pdf>

Table 4-9 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	656,377	65.95
Gross Audited Savings	656,377	65.95
Gross Verified Savings	525,101	52.76
Ex Post Gross Savings	889,450	97.12
Gross Realization Rate	136%	147%
Ex Post Free Ridership	0	-
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	889,450	97.12
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	7,936,138	NA

4.4. Process Evaluation

ADM did not complete a process evaluation of the Residential Income Qualified Weatherproofing Program.

4.5. Findings and Recommendations

First-year gross ex post savings decreased from 2,176,101 kWh in 2024 to 889,450 kWh in 2025, a reduction of about 59%. In contrast, lifetime savings increased from 7,514,409 kWh to 7,936,138 kWh, an increase of about 6%. The increase in lifetime kWh despite the decline in first-year kWh indicates that the 2025 portfolio delivered fewer immediate savings but from measures with longer expected service lives.

Overall, the change in the ratio of lifetime-to-first-year savings indicates that the program shifted toward longer-EUL measures in 2025, driven by higher contributions from equipment such as heat pump water heaters and packaged terminal heat pumps and reduced installation of short-life weatherization kit items that were common in 2024.

5. Home Energy Products ENERGY STAR Appliances

This chapter presents the results of both the impact and process evaluations of the 2025 Home Energy Products ENERGY STAR® Appliances Program that Indiana Michigan Power (I&M) offered to its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

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

5.1. Program Description

The ENERGY STAR® Appliances Program provides midstream incentives through the ENERGY STAR® Retail Products Platform. The ENERGY STAR® Retail Products Platform is a midstream initiative that partners with several utilities and other organizations to provide incentives for efficient products with major nationwide retailers. The goal of the ENERGY STAR Retail Products Platform (ESRPP) is to increase the market penetration of ENERGY STAR® certified products by enabling participating program sponsors to provide incentives to national retailers and buying groups that influence purchasing, stocking, and promotional decisions. Through these coordinated midstream interventions, ESRPP seeks to steadily shift the efficiency of selected product categories over time, resulting in a reduction in the overall energy-consumption profile of those categories at the market level.

I&M provides incentives for air purifiers, clothes washers dryers, freezers, and refrigerators.

5.2. Data Collection

Data used to support the impact evaluation of the program will include:

- Program tracking data from the primary tracking database (the retail product platform historical and program sales data); and
- Program summary data from the I&M DSM EE Program Scorecard.

Analysis was performed on a census of program records.

5.3. Estimation of Ex Post Gross Savings

5.3.1. Methodology for Estimating Ex Post Gross Energy Savings

5.3.1.1. Review of Documentation

ADM reviewed the program tracking data and sales data from the ENERGY STAR® Retail Products Platform to ensure that the data provides sufficient information to calculate energy and demand impacts. The data from the system was reviewed for duplicate entries.

5.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

Table 5-1 presents information on savings calculation formulas, savings calculation inputs, incremental cost, and effective useful life values and data sources applicable to the ENERGY STAR Retail Products Platform measures.

Table 5-1 ENERGY STAR Retail Products Platform Program Calculation Input Information

Variable Type	Variable Name	Variable Value	Variable Value Source
Measure Name: Electric Dryer			
Savings	ΔkWh		$(Load / CEF_{base} - Load / CEF_{eff}) * N_{cycles} * \%Electric$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	Load	Varies	ENERGY STAR database for applicable product ID.
Input	CEFBASE	Varies	Illinois TRM V10.0 Vol. 3, p. 48.
Input	CEFEff	Varies	ENERGY STAR database for applicable product ID.
Input	Ncycles	283	Illinois TRM V10.0 Vol. 3, p. 48.
Input	%Electric	1	Illinois TRM V10.0 Vol. 3, p. 48.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		16	Illinois TRM V10.0 Vol. 3, p. 47.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 47.
Measure Name: Freezer			
Savings	ΔkWh		$kWh_{base} - kW_{hee}$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	kWhbase	Varies	Illinois TRM V10.0 Vol. 3, p. 26-27.
Input	kWhee	Varies	Illinois TRM V10.0 Vol. 3, p. 26-27.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		22	Illinois TRM V10.0 Vol. 3, p. 26.
Inc Cost		35	Illinois TRM V10.0 Vol. 3, p. 26.
Measure Name: Refrigerator			
Savings	ΔkWh		$UEC_{base} - UEC_{ee}$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	UECbase	Varies	Illinois TRM V10.0 Vol. 3, p. 31.
Input	UECee	Varies	Illinois TRM V10.0 Vol. 3, p. 31.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		17	Illinois TRM V10.0 Vol. 3, p. 30.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 30.
Measure Name: Clothes Washer			
Savings	ΔkWh		$(Capacity * 1 / IMEF_{base} * N_{cycles} * (\%Cw_{base} + (\%DHW_{base} * \%Electric_{DHW}) + (\%Dryer_{base} * \%Electric_{Dryer}))) - (Capacity * 1 / IMEF_{eff} * N_{cycles} * (\%Cw_{eff} + (\%DHW_{eff} * \%Electric_{DHW}) + (\%Dryer_{eff} * \%Electric_{Dryer})))$

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Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	Capacity	Varies	ENERGY STAR database for applicable product ID.
Input	IMEFbase	1.75	Illinois TRM V10.0 Vol. 3, p. 11.
Input	IMEFeff	Varies	ENERGY STAR database for applicable product ID.
Input	Ncycles	295	Illinois TRM V10.0 Vol. 3, p. 11.
Input	%Cwbase	Varies	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%CWeff	Varies	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%DHWbase	Varies	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%DHWeff	Varies	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%Dryerbase	Varies	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%Dryereff	Varies	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%Electric_DHW	0.16	Illinois TRM V10.0 Vol. 3, p. 12.
Input	%Electric_Dryer	0.38	Illinois TRM V10.0 Vol. 3, p. 12.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		14	Illinois TRM V10.0 Vol. 3, p. 10.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 10.
Measure Name: Air Purifier			
Savings	ΔkWh		$Hours * (SmokeCADR\_base / (SmokeCADR\_per\_watt\_base * 1000)) + ((8760 - Hours) * PartialOnModePower\_base / 1000) + Hours * (SmokeCADR\_eff / (SmokeCADR\_per\_watt\_eff * 1000)) + ((8760 - Hours) * PartialOnModePower\_eff / 1000)$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	SmokeCADR_base	Varies	Illinois TRM V10.0 Vol. 3, p. 8.
Input	SmokeCADR_per_watt_base	Varies	Illinois TRM V10.0 Vol. 3, p. 8.
Input	PartialOnModePower_base	Varies	Illinois TRM V10.0 Vol. 3, p. 8.
Input	SmokeCADR_eff	Varies	Characteristics of applicable equipment.
Input	SmokeCADR_per_watt_eff	Varies	Characteristics of applicable equipment.
Input	PartialOnModePower_eff	Varies	Characteristics of applicable equipment.
Input	Hours	5840	Illinois TRM V10.0 Vol. 3, p. 7.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		9	Illinois TRM V10.0 Vol. 3, p. 6.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 7.

5.3.2. Results of Ex Post Gross Savings Estimation

Table 5-2 summarizes the gross kWh savings of the Home Energy Products ENERGY STAR® Appliances Program by measure. The ex post annual energy savings for the program were 2,183,224 kWh with a realization rate of 96%.

Table 5-2 Measure-Level Annual Gross kWh Savings

<i>Measure</i>	<i>Quantity of Measures Incented</i>	<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Electric Dryer	4,194	632,012	632,012	632,012	599,097	95%
Freezer	1,476	74,710	74,710	74,710	77,421	104%
Refrigerator	12,904	695,632	695,632	695,632	680,418	98%
Clothes Washer	4,349	408,230	408,230	408,230	376,227	92%
Air Purifier	537	456,450	456,450	456,450	450,062	99%
Total	23,460	2,267,034	2,267,034	2,267,034	2,183,224	96%

Table 5-3 summarizes the gross peak demand reduction of the ENERGY STAR® Appliances Program. The gross peak demand reduction for the program was 238.40 kW, with a realization rate of 90%.

Table 5-3 Measure-Level Annual Gross kW Savings

<i>Measure</i>	<i>Quantity of Measures Incented</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Electric Dryer	4,194	83.93	83.93	83.93	65.42	78%
Freezer	1,476	7.66	7.66	7.66	8.45	110%
Refrigerator	12,904	72.81	72.81	72.81	74.30	102%
Clothes Washer	4,349	49.47	49.47	49.47	41.08	83%
Air Purifier	537	50.14	50.14	50.14	49.14	98%
Total	23,460	264.00	264.00	264.00	238.40	90%

5.4. Estimation of Ex Post Net Savings

The ENERGY STAR Retail Products Platform (ESRPP) is a market transformation program designed to promote the long-term adoption of energy-efficient products by aligning utility incentives and promotions with national ENERGY STAR standards. The program partners with retailers to encourage a strategic focus on energy-efficient products by providing incentives from utilities and other program sponsors. These incentives aim to influence inventory decisions, increasing the availability and sales of ENERGY STAR certified products. The program's goal is to achieve sustained adoption of energy-efficient products over time.

5.4.1. NEEA Guidance Document

The *ENERGY STAR® Retail Products Platform Evaluation Quick Start Document* provided by NEEA in 2025 emphasizes that ESRPP is designed as a national market transformation initiative. The guidance outlines an evaluation approach that uses a broad evidence base—retailer interviews,

MPIs, logic models, manufacturer influence, and stock/assortment trends—to understand how the program affects the market over time. This information is valuable for assessing market progress, documenting behavioral changes among retailers and manufacturers, and understanding how the program supports long-term shifts in product efficiency.

However, the guidance also acknowledges that Sponsors may evaluate the program through different lenses, including annual resource acquisition. In that context, evaluators are required to estimate the incremental change in efficient product sales above naturally occurring market adoption, attributable to the program within a specific program year. This requires a method that produces a quantitative estimate of program-attributable sales change.

The guidance provides a strong framework for integrating qualitative and directional evidence. Interviews and retailer share-outs are described as central sources of insight into how incentives shape assortment, stocking, promotion, and buying-cycle decisions. These qualitative findings help establish whether observed efficiency gains are consistent with expected market effects.

In our evaluation, we incorporated these qualitative insights by summarizing themes from retailer interviews and reviewing the Market Progress Indicators (MPIs) available for the products in the portfolio. This qualitative evidence will be included to demonstrate consistency between observed sales trends and retailer behavior, and to show whether the program is influencing stocking decisions as intended.

5.4.1.1.1. Need for a Quantitative Baseline for Annual Resource Acquisition

While the guidance provides a broad framework for understanding market transformation, the methods presented do not yield a discrete numerical estimate of annual, incremental program impacts.

The guidance explicitly supports the use of a forecasted naturally occurring baseline for quantifying program impacts. It notes that evaluators should use pre-program sales data to forecast market adoption without the program and compare actual market share to the baseline. This is consistent with the regression-based baseline approach we used to assess the net (program attributable) impacts of the program.

We use this approach to quantify the program impacts for these reasons:

- The forecasting method produces a defensible, reproducible estimate of the expected market share in the absence of the program.
- The method is consistent with the data structure available (full-category retail sales and multi-year history).
- It is the only approach that directly yields the quantity required for resource acquisition accounting: an estimate of incremental sales attributable to the program in the current year.

- While MPIs and qualitative indicators describe market movement, they do not produce a numerical estimate of annual program-induced sales above baseline.

Thus, for annual savings estimation, a baseline-forecasting approach remains necessary and aligned with the guidance.

5.4.1.1.2. How This Evaluation Integrates Both Aspects of the Guidance

The evaluation combined multiple sources of evidence to reflect the intent of the 2025 ENERGY STAR® Retail Products Platform Evaluation Quick Start Document while meeting the requirements of an annual resource acquisition assessment. The guidance emphasizes that ESRPP operates through several pathways—retailer assortment decisions, buying and promotional practices, manufacturer influence, and broader market signals—which cannot be understood through sales data alone. For this reason, the evaluation incorporated qualitative and market-contextual evidence to assess whether observed changes in product efficiency are consistent with the types of market effects ESRPP is designed to produce.

The qualitative components of the evaluation included referencing the 2025 retailer interviews commissioned by NEEA, and the available Market Progress Indicators (MPIs) report #2. These sources provide information on how retailers interpret and respond to program incentives, what factors influence assortment and stocking decisions, and how internal product strategy evolves over time. The evaluation synthesized this information to assess whether the program activities and retailer behaviors observed during the year were directionally aligned with the program theory and logic model described in the guidance.

At the same time, the evaluation required a distinct quantitative method to estimate annual program-attributable sales in a manner consistent with resource acquisition reporting. Because qualitative evidence and MPIs are informative but not structured to produce a numerical estimate of program impacts for a single year, the evaluation relied on a forecasted naturally occurring baseline to quantify the change in efficient model market share above what would have occurred without the program. The regression-based baseline establishes the counterfactual market trajectory using pre-program sales data, and the comparison to actual market share yields the incremental sales attributed to the program.

This integrated approach ensures that the evaluation reflects the broader goals of ESRPP by documenting program influence and market progress while also producing the quantitative estimate required for annual savings reporting. The qualitative evidence serves to interpret the sales data and assess consistency with expected behavioral pathways, and the quantitative baseline method provides the defensible estimate of annual program-attributable impacts.

5.4.2. Baselining to Quantify Program Impacts

While the program emphasizes long-term market transformation, a key component of the evaluation was to quantify the share of efficient product sales directly attributable to the program

versus those resulting from natural market adoption during the current program year. To achieve this, ADM conducted regression analyses using historical pre-program sales data to forecast sales of qualified products in the absence of the program.

The approach is consistent with the baselining approach outlined in the *ENERGY STAR® Retail Products Platform (RPP): Conditions and Considerations in Evaluating Market Transformation Programs and Evaluation Guidance for RPP* guidance document.

We describe the three different models used to analyze the data below.

- **Model 1:** A linear regression model with qualified product sales regressed on a time variable equal to the number of months since the beginning of the historical period and non-qualified product sales for the month. Non-qualified product sales were included in the model to capture sales activity overall. That is, non-qualified sales were included to account for exogenous factors that affect sales of the product category (e.g., supply constraints or economic conditions), and in doing so, we assume that exogenous factors would affect both qualified and non-qualified product sales.
- **Model 2:** A Poisson regression in the same form as regression model 1. A Poisson link was used because count data were regressed on the set of predictors.
- **Model 3:** A probit regression that models market penetration of qualified products. In this model, the ratio of qualified product sales to non-qualified product sales is regressed on the sales quarter.

ADM applied these models to the sales data for each product category. For two products, refrigerators and washers, sales data were run separately for advanced and basic tier units. Advanced and basic tier units were also sold for freezers, but few advanced tier freezers were sold and for that reason, the advanced and basic tiers were combined in the analysis. For all other products, only basic tier units were sold.

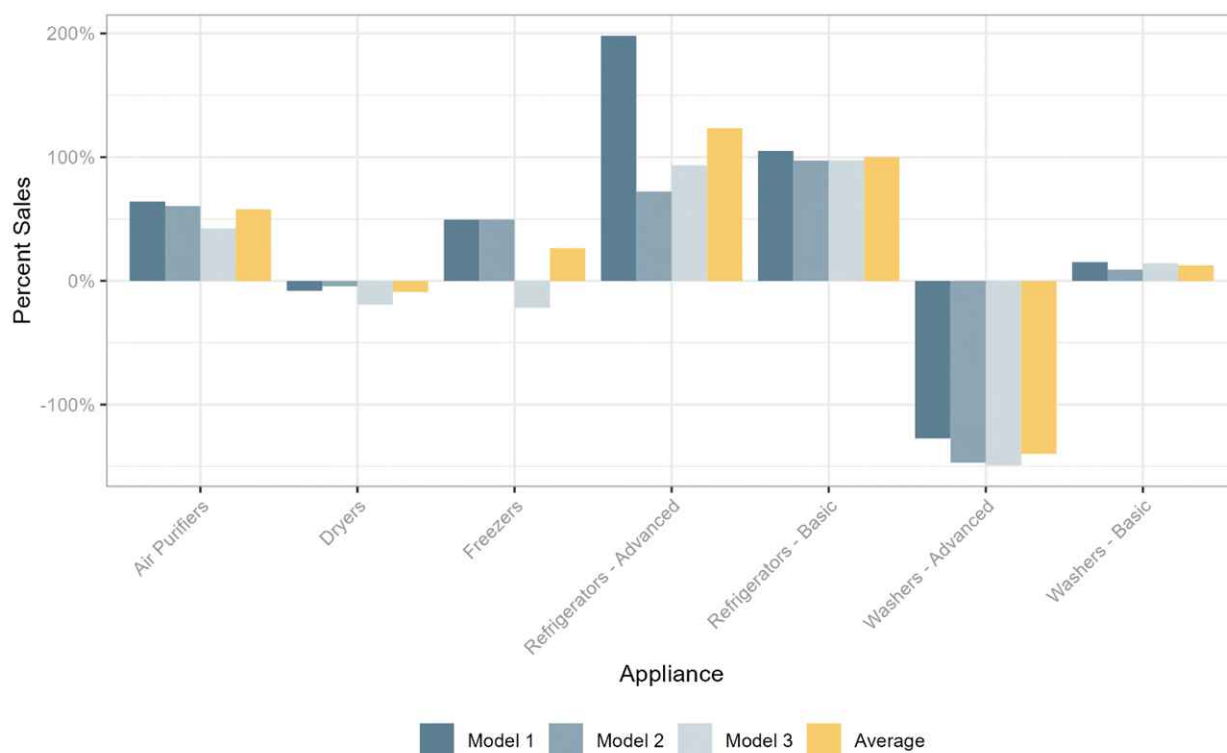
The estimated model coefficients were used to forecast sales of the qualified products in the absence of program support. The model estimated sales were compared to the actual sales to estimate the percentage increase in sales, which is the share of products that were sold due to the program. The increased sales percentage was calculated as:

$$\frac{\text{Observed Sales} - \text{Model Estimated Sales}}{\text{Observed Sales}}$$

The increased sales percentage is a positive value when the observed sales are greater than the forecasted sales and a negative value when the observed sales are less than the forecasted sales.

Figure 5-1 presents the percentage of increased sales estimated using each of the models.

Figure 5-1 Increased Sales Percentage



As shown in Figure 5-1, for most products, the three models produced similar estimates of the percentage of increased sales, but the coefficients were more divergent for advanced refrigerators, and model three showed a decline in sales for freezers compared to an increase shown for the other two modes.

To estimate an overall sales increase, ADM averaged the three model estimates of sales. The average value was weighted by the sum of the squared prediction errors for each of the model estimates. Prediction errors were operationalized as the sum of the squared difference between the predicted and observed values. Put differently, the more closely the model predicted sales aligned with the observed values, the greater the weight applied to that model estimates in calculating the overall average.

To determine if the observed predicted sales increase was statistically significant, ADM calculated the 90% confidence interval for the predicted increase. To calculate the confidence level, ADM calculated the standard error of the summed monthly predictions for each model as the square root of the sum of the standard errors for the monthly predicted values for each model. For example, for model 1, the standard error of the increase was calculated as:

$$SE_{Model\ 1} = \sqrt{\sum_i^n SE_{Model\ 1\ predicted\ value}}$$

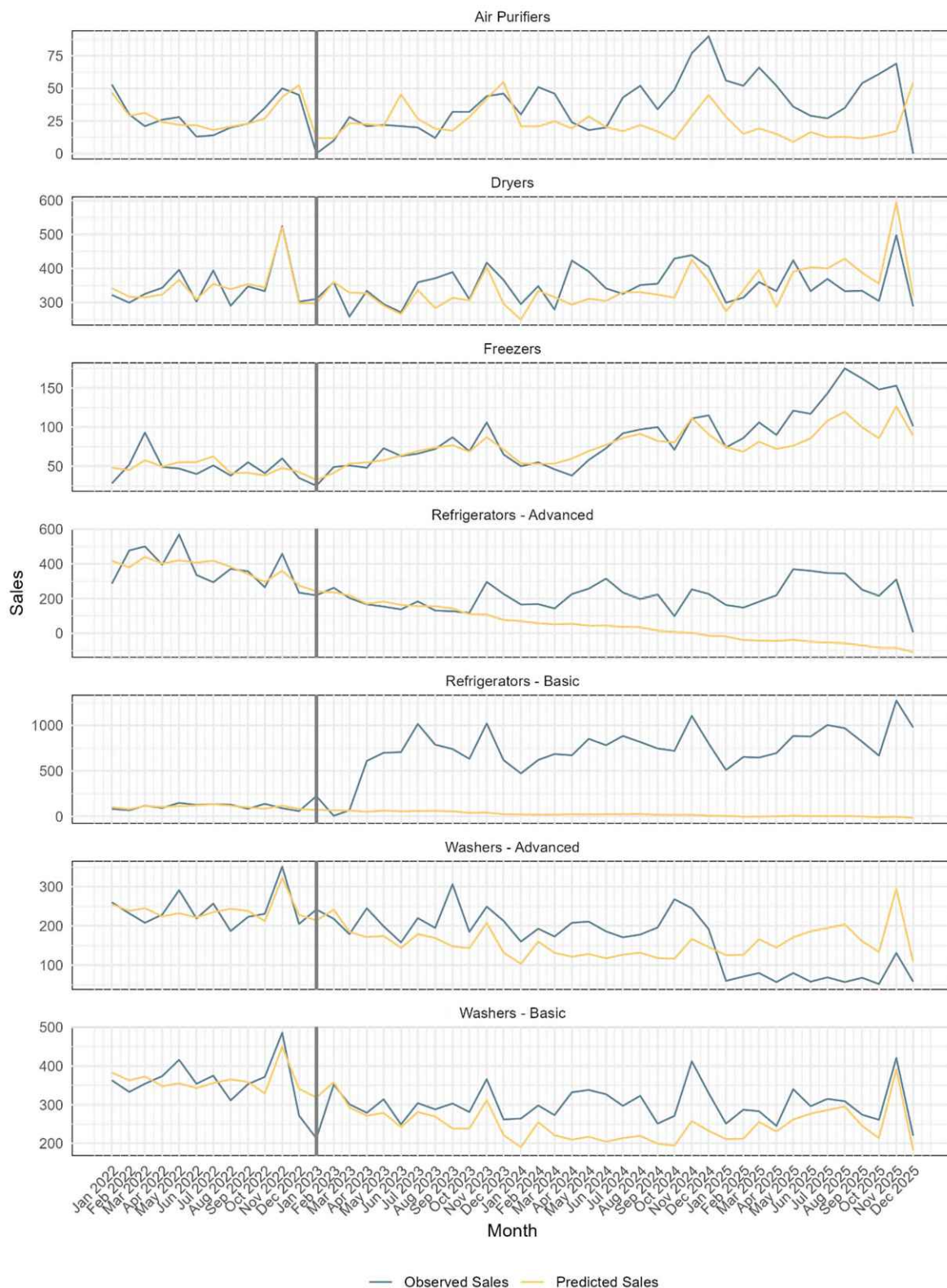
To estimate the standard error of the weighted average increase calculated across the three model results, ADM used the following formula:

$$SE_{AverageIncrease} = \sqrt{\frac{\frac{SE_{Model\ 1}}{SSPE_{Model1}} + \frac{SE_{Model\ 2}}{SSPE_{Model2}} + \frac{SE_{Model\ 3}}{SSPE_{Model3}}}{\frac{1}{SSPE_{Model1}} + \frac{1}{SSPE_{Model2}} + \frac{1}{SSPE_{Model3}}}}$$

Figure 5-2 displays plots of the observed and forecasted sales during the pre- and post-program periods.

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Figure 5-2 Observed and Forecasted Qualified Product Sales (Vertical Bar Divides the Pre and Post Program Periods)



5.4.3. Findings from Retailer Interviews and the Market Progress Evaluation Report

5.4.3.1. 2025 Retailer Interview Findings

The following summarizes the retailer interview findings provided by NEEA on the influence of the ESRPP program.

Retailers report that the ESRPP portal and associated incentives influence merchant engagement and sales of ENERGY STAR qualified products. Program contacts state that incentive earnings are presented to merchant teams in clear dollar amounts, often quarterly, which makes the value more visible. Larger incentives and cumulative totals draw merchant attention and are viewed as contributing to margin performance.

Program contacts indicate that incentive funds are meaningful to merchants because they support sales and margin goals. Retailers note that the incentives help offset cost pressures, including tariff-related increases, and allow merchants to maintain ENERGY STAR stock levels. Some retailers view ESRPP as a stable program with established processes relative to newer incentive programs.

Retailers describe improvements in ENERGY STAR product performance and sales, citing ongoing attention to qualified models. Several retailers report growth in ENERGY STAR market share, including increased sales of efficient laundry products such as heat pump dryers and combined washer–dryer units.

Retailers also report promotional activities supported by ESRPP incentives. These include online placement of qualified models, updates to retail websites, in-store point-of-purchase materials, sales associate training, and periodic price promotions. Incentives also reduce reliance on vendor funding for promotional discounts for some products.

Retailers indicate that ESRPP influences assortment decisions. Some merchants have prioritized ENERGY STAR products they may not have previously included, and the program helps ensure that qualified models remain available in the assortment. One retailer noted regional assortment adjustments in areas with strong program participation or customer interest, which contrasts with typical national-level assortment strategies. One retailer noted that “In places such as California, we have a lot of ENERGY STAR-minded customers. We do kind of change up the assortment, and where we know we have participants in RPP.”

Engagement with private label product teams varies across retailers. Some retailers do not offer private label appliances, while others coordinate with private label teams to highlight qualified models through in-store messaging.

Overall, retailers report that ESRPP influences merchant decision-making by making incentive earnings visible, supporting promotional activity, contributing to margin performance, encouraging ENERGY STAR assortment, and helping manage cost pressures.

5.4.3.2. 2023 Market Progress Report Findings

Below, the market progress Retail Product Portfolio Market Progress Evaluation Report #2, the most currently available, are summarized.

The market progress evaluation used multiple data sources and analytic approaches to assess whether the Retail Product Portfolio (RPP) program is influencing retailer behavior, product availability, and sales of efficient products in the Northwest. The evaluation examined evidence across five primary methods.

- **Review of NEEA Internal Documents.** The evaluation team reviewed NEEA communications, internal memos, program documentation, and materials shared with the U.S. EPA and other partners. This review supported the assessment of whether program activities influenced retailer assortment and marketing decisions and whether the program contributed to changes in ENERGY STAR specifications and test procedures. Any document containing evidence related to RPP outcomes was incorporated into the analysis.
- **Analysis of Retail Sales Data. NEEA provided monthly retailer sales data from 2016 to 2021.** Participating retailers supplied full-category data for periods both before and during their program participation. The evaluation examined the share of products meeting ENERGY STAR or higher-tier criteria, as well as the share of products that qualified for RPP incentives. This analysis was used to identify market share trends and assess whether efficient product sales increased during the program period.
- **Assortment and Pricing Data from Participating and Nonparticipating Retailers.** The evaluation collected product availability and pricing data from retailer websites across eight cities in the Northwest. For each sampled store location, the team documented the models available for immediate purchase and identified ENERGY STAR-certified products. Data were collected from both participating and nonparticipating retailers to determine whether participating retailers' assortment decisions were reflected in the broader market. This method supported the assessment of retailer engagement (Outcome I) and provided information for evaluating whether competitive effects extended program influence beyond participating stores.
- **Review of Relevant Academic Literature.** The evaluation team reviewed economic literature on retail competition and product markets to assess whether participating retailers' assortment decisions could influence nonparticipating retailers' offerings. The literature review informed the evaluation's assessment of NEEA's assumption that changes made by major participating retailers can generate broader market effects.
- **Review of ENERGY STAR Product and Testing Specifications.** The evaluation examined ENERGY STAR specifications and testing procedures to assess whether the program and its partners influenced updates to qualification criteria (Outcome III) or improvements in test methods (Outcome IV). Third-party evaluations conducted for NEEA were incorporated to determine the strength of this influence.

The Market Progress Indicator (MPI) assessment shows that the Retail Product Portfolio (RPP) program is influencing the market for efficient products in several ways, though the extent of influence varies across product categories. The program's primary influence pathway -- supporting retailers to incorporate incentives into assortment, pricing, training, and promotional decisions -- shows measurable progress in most categories. Indicators of increased ENERGY STAR market share are strongest in categories where efficient product availability is high and manufacturer offerings have expanded.

Below, we present the findings for the outcomes identified in the program logic model.

5.4.3.2.1. Program-Wide Influence on Retailer Behavior (Outcome I)

Across participating retailers, the program has strengthened internal processes that support the promotion and sale of ENERGY STAR products. Retailers reported expanded internal training programs for sales staff, offering online search and filtering capabilities for ENERGY STAR-qualified models, and regular featuring of ENERGY STAR products in category updates and promotional materials. These changes indicate that retailers are incorporating efficiency into their assortment and marketing decisions, consistent with the intended short-term program outcome.

This program-wide engagement sets the foundation for increased visibility and availability of efficient products across participating stores, even in categories where sales trends have been flat. Evidence from the MPI assessment shows that retailers consistently feature ENERGY STAR products in holiday and seasonal promotions and have incorporated ENERGY STAR messaging into both digital and in-store channels.

5.4.3.2.2. Influence on Sales and Market Share (Outcome II)

Program influence on actual sales varies by category:

- Refrigerators showed the strongest evidence of increased sales of efficient options. ENERGY STAR and higher-tier models demonstrated year-over-year growth, and market share of incentivized models increased substantially. Retailers offered a broad assortment of ENERGY STAR models, and advertisements consistently promoted qualifying units.
- Clothes Dryers showed mixed progress. Retailers highlight ENERGY STAR dryers in promotions, but the market share of efficient models has remained relatively constant, and most efficient units are not incentivized. Despite improved retailer engagement, consumer purchasing patterns have not shifted.
- Clothes Washers showed limited progress toward increased sales of efficient units. While ENERGY STAR washers are widely available and featured in retailer promotions, market share of incentivized top-load units has stagnated. Consumer preferences for front-load versus top-load washers have remained stable, limiting opportunities for growth in the incentivized segment.

- Freezers show limited progress. Product availability was low across both participating and nonparticipating stores, and retailer advertising did not feature freezers. Although market share of efficient freezers increased from 2020 to 2021, it has not fully recovered to earlier levels. Retailer engagement in this category remains minimal.

Overall, the program is seeing its clearest sales-related influence where efficient products are more broadly available, and where manufacturers have continued to introduce qualifying models. In categories with constrained availability or low consumer demand for efficient versions, retailer engagement alone has not been sufficient to shift sales patterns.

5.4.3.2.3. Manufacturer and Specification Influence (Outcomes III & IV)

The program also influences the efficient product market by supporting updates to ENERGY STAR specifications and federal test procedures. In categories such as refrigerators, freezers, room air conditioners, and televisions, analyses show that NEEA and program partners played meaningful roles in shaping ENERGY STAR criteria and test methods. These specification improvements help differentiate efficient products, which over time supports greater product availability and potential shifts in market share.

5.4.4. Integration of Evidence of Program Effect on Sales

Below we summarize the evidence that the program affected sales. We emphasize that these findings provide insight into whether the program is increasing sales, but does not address the question of by how much.

<i>Research Activity</i>	<i>Evidence of Program Impact on Sales</i>	<i>Details</i>
2025 Retailer Interviews	+	Retailers reported that the ESRPP portal and incentives influence their sales of ENERGY STAR products by giving merchant teams clear visibility into incentive earnings and reinforcing decisions to prioritize efficient models in assortment and promotions. They noted that these supports help maintain competitive pricing, align with corporate sustainability goals, and encourage ongoing investment in activities that elevate ENERGY STAR products in the market. However, some comments also point to customer preferences driving sales and stocking decisions, for example a reference to ENERGY STAR preference in California. Additionally, some comments from retailers characterize incentives as having modest incremental impacts (“every little bit counts”).
2023 Market Progress Indicator Report		

Refrigerators	++	Retailers offered a broad assortment of ENERGY STAR models, and advertisements consistently promoted qualifying units.
Dryers	-	Retailers highlight ENERGY STAR dryers in promotions, but the market share of efficient models has remained relatively constant, and most efficient units are not incentivized.
Washers	-	While ENERGY STAR washers are widely available and featured in retailer promotions, market share of incentivized top-load units has stagnated.
Freezers	+	Although market share of efficient freezers increased from 2020 to 2021, it has not fully recovered to earlier levels. Retailer engagement in this category remains minimal.
2025 Baseline		
Air Purifiers	+	Sales were up by 58% compared to forecasted baseline.
Dryers	-	Sales were down by 9% compared to forecasted baseline.
Freezers	+	Sales were up by 26% compared to forecasted baseline.
Refrigerators - Advanced	+	Sales were up by 123% compared to forecasted baseline.
Refrigerators - Basic	+	Sales were up by 100% compared to forecasted baseline.
Washers - Advanced	-	Sales were down by 140% compared to forecasted baseline.
Washers - Basic	+	Sales were up by 13% compared to forecasted baseline.
Scoring: ++ Strong evidence of impact, + Limited evidence of impact, - Absence of evidence of impact		

5.4.5. Results of Ex Post Net Savings Estimation

ADM assumed that the net impact of the program was 0 if the net sales value 1) was negative, indicating that sales were less than predicted based on pre-program sales or 2) the 90% confidence interval for the increase in sales contained 0, suggesting that the sales increase was within the range of normal sample variation. As such, ADM assumed the net program effect for these products was 0. Table 5-4 summarizes the sales effects used to estimate the program savings.

Table 5-4 Final Net Sale Values

<i>Product</i>	<i>Average Increase</i>	<i>90% Confidence Interval (Lower/Upper)</i>	<i>Percent Increase in Sales</i>
Air Purifiers	311	297 / 325	58%
Dryers	-381	-408 / -354	-9%
Freezers	389	369 / 409	26%
Refrigerators - Advanced	3,596	3552 / 3640	123%

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Refrigerators - Basic	9,995	9971 / 10020	100%
Washers - Advanced	-1,177	-1205 / -1148	-140%
Washers - Basic	441	409 / 473	13%

Table 5-5 compares the net sales impact found for the I&M program and compares it to values found in three other evaluations of the ENERGY STAR® Retail Products Platform. As shown, the estimates are variable but there is some consistency for dryers, and advanced refrigerators. Each of the benchmark evaluations was performed for the first year the program was offered.

Table 5-5 Percent Increase Benchmark Comparison

<i>Product</i>	<i>I&M (PY2023)</i>	<i>I&M (PY2024)</i>	<i>I&M (PY2025)</i>	<i>Con Edison</i>	<i>PG&E</i>	<i>ComEd*</i>
Air Purifiers	-13%	48%	58%		-5%	
Dryers	4%	11%	-9%	10%	8%	
Freezers	3%	0%	26%	11%	63%	
Refrigerators - Advanced	12%	84%	123%	15%	15%	0%
Refrigerators - Basic	91%	97%	100%		2%	
Washers - Advanced	18%	34%	-140%	-43%	-104%	2%
Washers - Basic	4%	30%	13%		85%	
Sources:						
Con Edison Retail Products Platform (RPP) Evaluation 2017. EMI Consulting. June 2018.						
Pacific Gas & Electric ENERGY STAR Retail Products Platform (ESRPP). Program Pilot Early Evaluation. Final Report. January 2019.						
ComEd ENERGY STAR Retail Products Platform Pilot Impact Evaluation Report. Program Year 2020 (CY2020). Guidehouse. April 2021.						
*ComEd’s program included basic and advanced tiers, but incentives were only provided for basic-tier clothes washers and advanced-tier refrigerators.						

Table 5-6 summarizes the ex post annual net kWh and kW savings of the ENERGY STAR® Appliances Program. The annual net savings totaled 999,761 kWh and 129.23 kW.

Table 5-6 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	2,267,034	264.00
Gross Audited Savings	2,267,034	264.00
Gross Verified Savings	2,267,034	264.00
Ex Post Gross Savings	2,183,224	238.40

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<i>Category</i>	<i>kWh</i>	<i>kW</i>
Gross Realization Rate	96%	90%
Ex Post Free Ridership	1,183,463	129.23
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	999,761	109.17
Net-to-Gross Ratio	46%	46%
Ex Post Net Lifetime Savings	14,897,457	NA

5.5. Findings and Recommendations

The evaluation found that ESRPP generated measurable above-baseline product sales in several categories. Using the regression-based counterfactual model, statistically significant net increases were identified for basic and advanced refrigerators (100% and 123% above baseline, respectively), air purifiers (58%), freezers (26%), and basic washers (13%). Dryers and advanced washers showed statistically significant declines relative to the modeled baseline, resulting in net program impacts of zero for those categories. These findings indicate that the program is influencing sales in categories where incentives, product availability, and market conditions support customer uptake.

Interview and MPI assessment data provide additional context on retailer practices. Retailers reported that incentives and the ESRPP portal influence routine merchandising activities, including maintaining ENERGY STAR stock levels, updating online product displays, using ENERGY STAR filters in online search tools, and featuring qualified products in promotions. Retailers also described internal training and the use of incentive information as part of ongoing merchant processes. These reported practices are consistent with the activities documented in the 2023 MPI report, which noted increased staff training, clearer online ENERGY STAR visibility, and regular presentation of ENERGY STAR products in marketing materials. These findings describe retailer engagement with the program but do not imply long-term structural changes absent additional evidence.

The MPI assessment also documents that NEEA and program partners participated in national specification and test-procedure development processes for several product categories. While the report describes program partner involvement, it does not establish the extent to which these contributions influenced the final specifications.

- **Recommendation 1:** Reassess investments by product category based on observed net impacts. Given the variation in net effects across categories, program administrators may wish to maintain or expand support for categories with consistent, statistically significant above-baseline sales (e.g., refrigerators, air purifiers, and freezers). For categories with zero or negative net effects (e.g., dryers and advanced washers), administrators could consider

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adjusting incentives or eligibility criteria, refining targeting strategies, or temporarily reducing emphasis on these categories until market conditions or product availability improve. Aligning program activities with empirically demonstrated impacts will help ensure efficient use of program resources.

6. Home HVAC Midstream

This chapter presents the results of both the impact and process evaluations of the 2025 Home HVAC Midstream Program that Indiana Michigan Power (I&M) offered to its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year.
- Complete a process evaluation of the program.
- Provide recommendations for program improvement as appropriate.

6.1. Program Description

The rebates provided in the Home HVAC Midstream Program offset a portion of the cost barriers inhibiting the local stocking practices for more efficient HVAC measures. The prescriptive rebates in this program are pre-determined cash reimbursements for typical energy efficiency measures undertaken by residential end use customers. Measure rebates in this program are designed with the intent to provide a partial offset of the incremental measure cost but serve to offset the cost for distributors to stock the more efficient measures eligible for rebates in this program.

The program may also provide encouragement for distributors through other incentives if they demonstrate through and provide sales data that stocking levels have improved through the use of the distributor's sales team, as applicable and as determined by I&M and its implementation partner for this program.

6.2. Data Collection

Data used to support the impact evaluation of the program included:

- Program tracking data from the primary tracking database;
- Program summary data from the I&M DSM EE Program Scorecard; and
- Participant survey data and/or distributor interview data.

Because of the design and size of the program ADM combined participants from Michigan and Indiana in developing the survey and interview findings.

Because of the program's design and scale, ADM combined participants from Michigan and Indiana when developing the survey and interview findings. Data were collected from customers who received rebated equipment and from participating distributors. These data were used to confirm measure installation, establish the appropriate baseline, and support the process evaluation and estimation of net savings.

Table 6-1 summarizes the data collection activities. ADM sought to survey all end users who installed rebate-eligible equipment by the end of October 2025. During development of the survey sample, ADM excluded cases where measures were installed in larger multifamily properties. To engage participants, ADM mailed a letter containing a QR code and survey link and offered a \$15 gift card incentive. This initial outreach was supplemented with telephone follow-up, with up to three call attempts per customer.

Distributors were contacted by email to participate in interviews. Three distributors completed interviews, representing 65% of the units discounted through the program at the time the sample frame was developed.

Table 6-1 Home HVAC Midstream Survey and Interview Data Collection

<i>Survey</i>	<i>Mode</i>	<i>Time Frame</i>	<i>Number of Contacts</i>	<i>Number of Completions</i>	<i>Completion Rate</i>
Midstream HVAC End-User	Letter mailed web survey link and phone follow up	October to December 2025	94	21	22.3%
Midstream HVAC – Distributors	Teams Meeting	December 2025	7	3	42.3%

6.3. Estimation of Ex Post Gross Savings

6.3.1. Methodology for Estimating Ex Post Gross Energy Savings

6.3.1.1. Review of Documentation

ADM reviewed the program tracking data to ensure that the data provides sufficient information to identify unique customers for surveying and to calculate energy and demand impacts. The data from the system was reviewed for duplicate entries.

6.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

Table 6-2 presents information on savings calculation formulas, savings calculation inputs, incremental cost, and effective useful life values and data sources applicable to the Home HVAC Midstream Program.

Table 6-2 Home HVAC Midstream Program Calculation Input Information

<i>Variable Type</i>	<i>Variable Name</i>	<i>Variable Value</i>	<i>Variable Value Source</i>
<i>Measure Name: Ductless Heat Pump</i>			

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Savings - 1	ΔkWh Baseline 1		$\begin{aligned} &(((Capacity\_heat\_ee / HSPF2\_base) - (Capacity\_heat\_ee / HSPF2\_ee)) / 1000 * EFLH\_heat) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / SEER2\_ee)) / 1000 * EFLH\_cool) + ((Heating\_kwh\_exist - ((Capacity\_heat\_ee / HSPF2\_base) / 1000 * EFLH\_heat)) * ER\_factor) + \\ &(((Capacity\_cool\_exist / SEER2\_exist) - (Capacity\_cool\_ee / SEER2\_base)) / 1000 * ER\_factor * EFLH\_cool) \end{aligned}$
Savings - 2	ΔkW Baseline 1		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Savings - 2	ΔkWh (Baseline 2)		$\begin{aligned} &(((Capacity\_heat\_ee / HSPF2\_base) - (Capacity\_heat\_ee / HSPF2\_ee)) / 1000 * EFLH\_heat) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / SEER2\_ee)) / 1000 * EFLH\_cool) \end{aligned}$
Savings - 2	ΔkW (Baseline 2)		$per\_unit\_gross\_ex\_post\_kwh\_savings\_second\_baseline * cdf$
Input	Capacity_cool_exist	Varies	Assumed equivalent to new equipment.
Input	Capacity_cool_ee	Varies	Tracking data.
Input	EFLH_cool	Varies	Illinois TRM V10.0 Vol. 3, p. 157. Indiana TRM Workbook V1.
Input	SEER2_exist	Varies	Illinois TRM V10.0 Vol. 3, p. 158. ASHP.
Input	SEER2_base	13.4	2023 Indiana TRM Workbook, '5.3.12 Ductless Heat Pumps' worksheet.
Input	SEER2_ee	Varies	AHRI. Characteristics of applicable equipment.
Input	Capacity_heat_ee	Varies	Tracking data.
Input	EFLH_heat	Varies	Illinois TRM V10.0 Vol. 3, p. 158. Indiana TRM Workbook V1.
Input	HSPF2_base	Varies	2023 Indiana TRM Workbook, '5.3.12 Ductless Heat Pumps' worksheet.
Input	HSPF2_ee	Varies	AHRI. Characteristics of applicable equipment.
Input	Heating_kwh_exist	Varies	Pre-project annual electric energy usage. Based on econometric analysis of interval meter data and capped at estimate of electric resistance baseline usage.
Input	ER_factor	Varies	Based on analysis of survey responses.
Input	cdf	Varies	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL - 1		Varies	Illinois TRM V10.0 Vol. 3, p. 154.
EUL - 2		Varies	Illinois TRM V10.0 Vol. 3, p. 154.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 155.
Measure Name: Air Source Heat Pump			
Savings - 1	ΔkWh Baseline 1		$\begin{aligned} &(((Capacity\_heat\_ee / HSPF2\_base) - (Capacity\_heat\_ee / HSPF2\_ee)) / 1000 * EFLH\_heat) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / SEER2\_ee)) / 1000 * EFLH\_cool) + ((Heating\_kwh\_exist - ((Capacity\_heat\_ee / HSPF2\_base) / 1000 * EFLH\_heat)) * ER\_factor) + \\ &(((Capacity\_cool\_exist / SEER2\_exist) - (Capacity\_cool\_ee / SEER2\_base)) / 1000 * ER\_factor * EFLH\_cool) \end{aligned}$
Savings - 2	ΔkW Baseline 1		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Savings - 2	ΔkWh (Baseline 2)		$\begin{aligned} &(((Capacity\_heat\_ee / HSPF2\_base) - (Capacity\_heat\_ee / HSPF2\_ee)) / 1000 * EFLH\_heat) + (((Capacity\_cool\_ee / SEER2\_base) - (Capacity\_cool\_ee / SEER2\_ee)) / 1000 * EFLH\_cool) \end{aligned}$

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Savings - 2	ΔkW (Baseline 2)		$per\_unit\_gross\_ex\_post\_kwh\_savings\_second\_baseline * cdf$
Input	$Capacity\_cool\_exist$	Varies	Tracking data.
Input	$Capacity\_cool\_ee$	Varies	Tracking data.
Input	$EFLH\_cool$	Varies	Illinois TRM V10.0 Vol. 3, p. 75. Indiana TRM Workbook V1.
Input	$SEER2\_exist$	Varies	Illinois TRM V10.0 Vol. 3, p. 76. ASHP.
Input	$SEER2\_base$	14.3	2023 Indiana TRM Workbook, '5.3.1 ASHP' worksheet.
Input	$SEER2\_ee$	Varies	AHRI. Characteristics of applicable equipment.
Input	$Capacity\_heat\_ee$	Varies	Tracking data.
Input	$EFLH\_heat$	Varies	Illinois TRM V10.0 Vol. 3, p. 77. Indiana TRM Workbook V1.
Input	$HSPF2\_base$	Varies	2023 Indiana TRM Workbook, '5.3.1 ASHP' worksheet.
Input	$HSPF2\_ee$	Varies	AHRI. Characteristics of applicable equipment.
Input	$Heating\_kwh\_exist$	Varies	Pre-project annual electric energy usage. Based on econometric analysis of interval meter data and capped at estimate of electric resistance baseline usage.
Input	ER_factor	Varies	Based on analysis of survey responses.
Input	cdf	Varies	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL - 1		Varies	Illinois TRM V10.0 Vol. 3, p. 72.
EUL - 2		Varies	Illinois TRM V10.0 Vol. 3, p. 72.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 73.
Measure Name: Central Air Conditioner			
Savings - 1	ΔkWh Baseline 1		$((Capacity\_cool / SEER2\_base) - (Capacity\_cool / SEER2\_ee)) / 1000 * EFLH\_cool) + ((Capacity\_cool / SEER2\_exist) - (Capacity\_cool / SEER2\_base)) / 1000 * ER\_factor * EFLH\_cool$
Savings - 2	ΔkW Baseline 1		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Savings - 2	ΔkWh (Baseline 2)		$((Capacity\_cool / SEER2\_base) - (Capacity\_cool / SEER2\_ee)) / 1000 * EFLH\_cool$
Savings - 2	ΔkW (Baseline 2)		$per\_unit\_gross\_ex\_post\_kwh\_savings\_second\_baseline * cdf$
Input	$Capacity\_cool$	Varies	Tracking data.
Input	$Capacity\_cool$	Varies	Tracking data.
Input	$EFLH\_cool$	Varies	Illinois TRM V10.0 Vol. 3 Vol. 3, p. 94.
Input	$SEER2\_exist$	Varies	Illinois TRM V10.0 Vol. 3 Vol. 3, p. 94.
Input	$SEER2\_base$	13.4	2023 Indiana TRM Workbook, '5.3.3 Central Air Conditioning' worksheet.
Input	$SEER2\_ee$	Varies	AHRI. Characteristics of applicable equipment.
Input	ER_factor	Varies	Based on analysis of survey responses.
Input	cdf	Varies	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL - 1		6	Illinois TRM V10.0 Vol. 3 Vol. 3, p. 92.
EUL - 2		12	Illinois TRM V10.0 Vol. 3 Vol. 3, p. 92.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3 Vol. 3, p. 92.
Measure Name: Smart Thermostat			
Savings	ΔkWh		$Cooling\_kWh * Heating\_Reduction + Heating\_kWh * Cooling\_Reduction$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$

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Input	<i>Heating_Reduction</i>	0.085	Illinois TRM V10.0 Vol. 3, p. 180. Unknown baseline thermostat type.
Input	<i>Cooling_kWh</i>	Varies	If newly-installed HVAC equipment present, equals $((btuh\_cool\_new\_unit / SEER2\_ee) / 1000 * EFLH\_cool)$; otherwise, based on econometric analysis of interval meter data.
Input	<i>Cooling_Reduction</i>	0.084	Illinois TRM V10.0 Vol. 3, p. 182.
Input	<i>Heating_kWh</i>	Varies	If newly-installed HVAC equipment providing heating present, equals $((btuh\_heat\_new\_unit / HSPF2\_ee) / 1000 * EFLH\_heat)$; otherwise, based on econometric analysis of interval meter data.
Input	<i>cdf</i>	Varies	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		11	Illinois TRM V10.0 Vol. 3, p. 178.
Inc Cost		125	Illinois TRM V10.0 Vol. 3, p. 178.

6.3.1.2.1. Early Replacement Analysis

6.3.1.2.1.1 Determining Early Replacement Likelihood Score (*ER_factor*)

Responses to the following two participant survey questions were used to develop estimates of *ER_factor* referenced in Table 6-2, which is the likelihood that an early replacement baseline is applicable to the estimation of equipment savings:

- Question 1 (LIKELIHOOD): Using a scale where 0 is “not at all likely” and 10 is “very likely”, how likely is it that you would have installed the same [EQUIPMENT_TYPE] at about the same time if you had not received the discount?
- Question 2 (TIMING): When might you have installed the same [EFF_MEASURE1/2] if the discount was not available?

Survey respondent *ER_Factor* is calculated as follows:

$$ER\_factor = IF(TIMING \geq \text{two years}, (10 - LIKELIHOOD) / 10, 0)$$

If a customer is a survey respondent, then, in the savings analysis, *ER_factor* is equal to value calculated per the formula above based on the customer’s survey responses. If a customer is a survey non-respondent, then *ER_factor* is set equal to the average *ER_factor* of survey respondents for the applicable measure.

6.3.1.2.1.2 Determining Incremental Early Replacement Savings

Stipulated values and new equipment capacity values were employed to calculate the kWh estimates for normal replacement heating and cooling, as well as incremental early replacement cooling.

However, for estimating incremental early replacement heating savings, a different methodology was utilized due to the lack of data on pre-existing equipment characteristics. This methodology used customer interval energy usage data to establish the existing equipment baseline energy use

for early replacements. The three-step process used to estimate the existing equipment energy use is described below.

Step 1. Develop initial estimate of existing heating energy usage.

For participants with complete interval energy usage data, econometric analysis of interval usage data was conducted using the following model:

$$kWh_i = B_0 + B_{1CDH_i} + B_{2HDH_i} + e_i$$

Where:

kWh = Dependent variable; hourly power (kWh).

CDH = $MAX(\text{Outdoor Temperature} - 65^\circ F, 0)$

HDH = $MAX(65^\circ F - \text{Outdoor Temperature}, 0)$

Interval usage data-based estimates of annual heating energy usage ($kWh\_exist\_heat\_ami$) are calculated as follows:

- If the t-statistic of the meter-specific value of B2 resulting from estimation of the model described above was less than 10.0, we set $kWh\_exist\_heat\_ami$ equal to 0.
- If the t-statistic of the meter-specific value of B2 resulting from estimation of the model described above was equal to or greater than 10.0, we calculated $kWh\_exist\_heat\_ami$ by multiplying the sum of the applicable annual heating degree hours (HDH) by the meter-specific value of B2 resulting from estimation of the model described above.

Step 2. Cap initial estimate of existing heating energy usage at estimated resistance heating unit energy usage.

$Heating\_kwh\_inter$ was calculated as:

$$Heating\_kwh\_exist\_inter = MIN(kWh\_exist\_heat\_ami, Electric\_resistance\_heating\_kWh)$$

Where:

$$Electric\_resistance\_heating\_kWh = ((Capacity\_heat * EFLH\_heat * (1 / 3.41)) / 1000)$$

Step 3. Develop final estimate of existing heating energy usage, ensuring that no incremental early replacement heating energy savings are calculated unless substantiated by results of the analysis of interval data.

Then, $Heating\_kwh\_exist$ was calculated as:

$$Heating\_kwh\_exist = MAX(Heating\_kwh\_exist\_inter, Baseline\_unit\_heating\_kwh)$$

Where:

$$Baseline\_unit\_heating\_kwh = ((Capacity\_heat * EFLH\_heat * (1 / HSPF\_base)) / 1000)$$

Application of the third step ensures that incremental heating early replacement savings equal 0 kWh when there was insufficient pre-project kWh usage to substantiate a finding of incremental early replacement savings.

Again, incremental heating early replacement savings are calculated as:

$$(Heating\_kwh\_exist - (Capacity\_heat / HSPF\_base / 1000 * EFLH\_heat)) * ER\_factor$$

ER_factor is the estimated likelihood that an early replacement baseline is applicable. If a customer was a survey respondent, then ER_factor was equal a value between 0 and 1 based on responses related to when equipment replacement would have occurred in the absence of the program. If a customer is a survey non-respondent, then ER_factor was set equal to the average ER_factor of survey respondents for the applicable measure.

6.3.1.3. Verification and In-Service Rates

Table 7-4 shows the verification rates for program measures provided through the Home Energy Home HVAC Midstream Program. The results are based on a combination of customers that received discounted equipment through either the Indiana or Michigan programs that I&M and its implementation contractor run.

Table 6-3 Summary of Measure Verification Rates

<i>Measure</i>	<i>Number of Measure Responses</i>	<i>Verification/ In Service Rate</i>	<i>Stratum/Source</i>	<i>Stratum Sample Size</i>
Air Source Heat Pump	5	100%	Average Midstream HVAC Value	21
Central Air Conditioner	4	100%	Average Midstream HVAC Value	21
Ductless Heat Pump	12	100%	Average Midstream HVAC Value	21
Heat Pump Water Heater	0	100%	Average Midstream HVAC Value	21

6.3.2. Results of Ex Post Gross Savings Estimation

Table 6-4 summarizes the gross kWh savings of the Home HVAC Midstream Program by measure. The ex post annual energy savings for the program were 232,322 kWh with a realization rate of 116%.

Table 6-4 Measure-Level Annual Gross kWh Savings

<i>Measure</i>	<i>Quantity of Measures Incented</i>	<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Air Source Heat Pump	69	114,410	114,410	114,410	89,707	78%
Ductless Heat Pump	64	76,710	76,710	76,710	130,241	170%
Central Air Conditioner	13	5,947	5,947	5,947	3,382	57%
Smart Thermostat	16	2,983	2,983	2,983	8,992	301%
Total	162	200,051	200,051	200,051	232,322	116%

Some unit equipment types were misidentified in the tracking data. In some cases, heat pumps were recorded as central air conditioners, and in others central air conditioners were recorded as heat pumps. Some heat pump units were also labeled as cold-climate heat pumps even though they did not meet the criteria for that designation. In addition, several projects with ductless heat pumps showed ex post savings estimates that were several times higher than the ex ante values.

Table 6-5 summarizes the gross peak demand reduction of the HVAC Midstream Program. The gross peak demand reduction for the program was 108.06 kW, with a realization rate of 228%.

Table 6-5 Measure-Level Annual Gross kW Savings

<i>Measure</i>	<i>Quantity of Measures Incented</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Air Source Heat Pump	69	15.92	15.92	15.92	50.68	318%
Ductless Heat Pump	64	22.79	22.79	22.79	49.77	218%
Central Air Conditioner	13	7.10	7.10	7.10	6.62	93%
Smart Thermostat	16	1.52	1.52	1.52	0.98	64%
Total	162	47.34	47.34	47.34	108.06	228%

6.4. Estimation of Ex Post Net Savings

For the HVAC Midstream Program, ADM assessed free ridership using data collected from a customer survey for those who received discounted HVAC equipment and interviews with participating distributors. These methods aimed to identify both direct and indirect impacts of the program on the adoption of high-efficiency HVAC units. The program's direct effect on end-users was through offering discounts that reduced costs for end-users. Indirectly, it influenced the market by increasing the availability of efficient units and motivating distributors to promote these to buyers.

The integration of data from end-users and distributors was as follows:

- When End-Users Were Aware of the Discount, free ridership was estimated using the lower score between the end-user's and the average distributor's free ridership scores.
- When End-Users Were Unaware of the Discount, the average distributor score alone was utilized for free ridership estimation.

The approach to estimating free ridership for end-users and distributors is described below.

6.4.1.1. Estimation End-User Free Ridership

The methodology for calculating end-user free ridership relies on participant responses in three key areas:

Prior Intent to Install Efficient Equipment: Determined by two questions:

- “Were you planning to install an energy-efficient [Equipment] before learning about the I&M discount?”
- “If yes, did you intend to specifically install an energy-efficient [Equipment] as opposed to a standard efficiency model?”

End-users who were not planning on installing an efficient system prior to learning about the discount are classified as non-free riders.

Action in the Absence of Discount: Evaluated through the question:

- “Without the I&M discount, what would have been your likely course of action?”

Table 6-6 summarizes how the responses to that question were scored.

Table 6-6 Free Ridership Score of Action Taken without Discount

<i>Reported Action Taken without Discount</i>	<i>Free Ridership Score</i>
You would have bought the exact same system or one that was more energy efficient	1
You would have bought a less efficient or lower cost system	.5
You would not have bought a new	0

Likelihood of Installing the Same Equipment Without Discount: This aspect is quantified by converting the likelihood rating to the question “Using a scale where 0 is “not at all likely” and 10 is “very likely”, how likely is it that you would have installed the same [Equipment] at about the same time if you had not received the discount?” into a score:

- Likelihood Score = Likelihood Rating / 10

6.4.1.2. Estimation Distributor Free Ridership

Interviews with distributors were used to assess the program influence on distributor sales tactics, stocking practices, and on sales of qualified equipment. The responses and scoring approach are

discussed below. Scoring was performed so that larger values indicated a greater likelihood of free ridership.

Because a limited number of distributor interviews were completed, the net savings analysis of distributor responses used responses from distributors operating in Indiana and in Michigan where I&M also offers the midstream program.

Program Influence on Sales Tactics: A sales tactics score was developed based on distributor reported tactics taken to sell more program-qualified equipment. Specifically, the sales tactics score was calculated by subtracting 0.2 from 1.0, so that lower scores indicated lower potential free ridership, for each of the following tactics that a distributor reported taking:

- Upsell contractors to purchase program-qualified units.
- Conduct training workshops for contractors.
- Marketing of program-qualified units.
- Discuss the benefits of program-qualified units with design professionals (e.g., engineers or architects).
- Develop marketing or informational materials for service providers to use.

Program Influence on Stocking: Distributors who reported that they had increased their stocking of program qualified equipment because of the program were assigned a stocking score of 0 and all others were assigned a stocking score of 1.

Program Influence Score: The program influence score was developed using the distributors 0 to 10 rating on how influential the program has been on their sales of program qualified equipment. Specifically, the score was equal to 1 minus the rating divided by 10.

The overall free ridership score was equal to the average of the sales tactics, influence on sales, and stocking scores.

6.4.1.3. *Estimation of Participant Spillover*

There is limited opportunity for spillover in the midstream program because all qualified measure sales by participating distributors are included in the program sales. For this reason, ADM did not assess participant spillover.

6.4.1.4. *Estimation of Non-Participant Spillover*

ADM estimated non-participant spillover through a survey of non-participating customers in PY2021. No spillover was identified, and ADM did not apply non-participant savings to the PY2023 net savings estimate.

6.4.2. Results of Ex Post Net Savings Estimation

Table 6-7 summarizes the free ridership rates developed from the survey of end-users and interviews with distributors.

Table 6-7 Summary of Free Ridership Rates

<i>Measure</i>	<i>Number of Measure Responses</i>	<i>Average Free Ridership</i>	<i>Stratum / Source</i>	<i>Stratum Sample Size</i>
Air Source Heat Pump	5	43%	Average Midstream HVAC Value	21
Central Air Conditioner	4	43%	Average Midstream HVAC Value	21
Ductless Heat Pump	12	43%	Average Midstream HVAC Value	21
Heat Pump Water Heater	0	43%	Average Midstream HVAC Value	21
Smart Thermostat	0	43%	Average Midstream HVAC Value	21

6.4.2.1. Comparison with other Evaluations

ADM compared its net-to-gross findings to results from other evaluations of midstream programs. We focused on studies that documented their methodologies and derived net-to-gross ratios from primary research. The table below summarizes these results. On average, free ridership was estimated at 49%, though the studies show wide variation. This average result is similar to the result found in this evaluation.

Table 6-8 Midstream Net Savings Benchmarking

<i>Methodology</i>	<i>Program Administrator</i>	<i>State</i>	<i>Sector</i>	<i>Year of Study</i>	<i>Equipment Type</i>	<i>Free Ridership</i>
Distributor Interviews	ComED	IL	Residential	2023	Heat pumps (including midstream DMSHP, ASHP, and GSHP) and Ductless Mini-Splits	16%
					Central AC	31%
Distributor and Contractors	Ameren	IL	Residential	2020	Mixed	53%
Distributors and Contractors		CA	Both	2021	Mixed	96%
Average						49%

6.4.2.2. Ex Post Net kW Demand Reductions

Table 6-9 summarizes the ex post annual net kWh and kW savings of the Home HVAC Midstream Program. The annual net savings totaled 131,912 kWh and 61.34 kW.

Table 6-9 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	200,051	47.34
Gross Audited Savings	200,051	47.34
Gross Verified Savings	200,051	47.34
Ex Post Gross Savings	232,322	108.06
Gross Realization Rate	116%	228%
Ex Post Free Ridership	100,410	46.72
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	131,912	61.34
Net-to-Gross Ratio	57%	57%
Ex Post Net Lifetime Savings	2,013,212	na

6.5. Process Evaluation

ADM completed a process evaluation of the Home HVAC Midstream Program. The process evaluation was based on a review of program documentation and interviews with program staff to understand the program design and procedures. Feedback on the program was obtained from distributors and an end-user survey provided information on the benefits of the efficient equipment. The data collection procedures and number of responses obtained are summarized in Section 6.2.

The program changed to a new implementation contractor in PY2025. The information below summarizes the program design and processes.

6.5.1. Program Design

The table below summarizes the program incentive levels.

Table 6-10 Summary of Program Incentives

<i>Eligible Equipment</i>	<i>Minimum Incentive per Unit</i>	<i>SEER2</i>	<i>HSPF2</i>	<i>EER2</i>	<i>COP</i>
Air-Source Heat Pumps (Split & Packaged Ducted Systems)	\$195	15.2	7.8	9.8	N/A
	\$255	16	8	9.8	N/A
	\$315	17	8	9.8	N/A
	\$375	18	8.1	9.8	N/A
	\$480	21	8.1	9.8	N/A
Cold Climate Heat Pumps (Split, Packaged Ducted & Non-Ducted Systems)	\$540	15.2	8.4	9.8	2
	\$600	16	9.1	9.8	2.2
Central Air Conditioners (Split & Packaged Systems)	\$105	15.2	N/A	9.8	N/A
	\$135	16	N/A	9.8	N/A
	\$180	17	N/A	9.8	N/A
	\$300	18	N/A	9.8	N/A
Ductless Heat Pumps	\$315	17	8.1	9.8	N/A
	\$420	19	8.4	9.8	N/A
	\$480	21	8.4	9.8	N/A
	\$600	23	8.4	9.8	N/A

Incentives are paid to both the installing contractor and the distributor. The installing contractor gets at least 60% of the incentive amount that should be provided to the customer as a discount on the cost of the equipment, but distributor can provide them additional incentives if they chose. Distributors have general flexibility in how they chose to use the incentive dollars.

The midstream incentive data show that most incentive dollars were directed toward heat pump technologies (Table 6-11). Air source and ductless heat pumps together accounted for nearly all incentive spending, with each measure type receiving close to half of the funds. Central air conditioners and smart thermostats represented a small share of both incentive dollars and incented units.

Table 6-11 Midstream Incentives Paid

<i>Measure Type</i>	<i>Incentives Paid</i>	<i>Number of Units</i>
Air Source Heat Pump	\$60,500	69
Central Air Conditioner	\$3,950	13
Ductless Heat Pump	\$58,150	64
Smart Thermostat	\$1,025	16

Participation in the Midstream HVAC program declined in 2025 compared to 2024, likely related to the transition to a new implementation contractor and the time required to establish their program operations. The number of air source heat pumps dropped from 212 units in 2024 to 69 units in 2025, and ductless heat pumps decreased from 100 to 64 units. Installations of central air conditioners increased from 3 to 13 units, but this did not offset the broader decline. Smart thermostat participation also fell from 39 units to 16 units.

The distribution of units across efficiency tiers shows that participating contractors and distributors primarily moved equipment at the higher end of each measure's efficiency range (Table 6-12). For air source heat pumps, more than four-fifths of reported units were at the 16.0 SEER / 9.1 HSPF level. Central air conditioner volumes were also concentrated at the mid-tier 16.0 SEER level, with smaller but still meaningful shares at 17.0 and 18.0 SEER. Ductless heat pump sales skewed even more strongly toward top-tier equipment, with nearly two-thirds of units delivered at 23.0 SEER and only small shares at the lower tiers.

Table 6-12 Distribution of Units Across Efficiency Levels

<i>Measure Type</i>	<i>Minimum SEER</i>	<i>Minimum HSPF</i>	<i>Number of Units</i>	<i>Share of Measure Type</i>
Air Source Heat Pump	15.2	7.8	195	5.9%
	15.2	8.4	540	8.8%
	16.0	8.0	255	1.5%
	16.0	9.1	600	80.9%
	18.0	8.1	375	2.9%
Central Air Conditioner	15.2		105	7.7%
	16.0		135	53.8%
	17.0		180	15.4%
	18.0		300	23.1%
Ductless Heat Pump	17.0	8.1	315	4.7%
	19.0	8.4	420	10.9%
	21.0	8.4	480	20.3%
	23.0	8.4	600	64.1%

The program is designed to increase sales of high-efficiency HVAC equipment by influencing decisions at multiple points in the supply chain, from distributors to contractors to end-use customers.

At the distributor level, the program relies on incentive structures and performance management to encourage participation and focus on higher-efficiency products. Distributors retain up to 40% of the incentive to support marketing, sales bonuses, or other internal activities that promote high-efficiency sales, while at least 60 percent is passed through to contractors as an instant discount for customers. Incentive budgets are initially allocated to each distributor based on projected sales, and these allocations are adjusted over time based on actual performance. The intent is to create competition among distributors to increase sales of qualifying equipment.

Program staff hold regular meetings with distributors to review performance scorecards. These scorecards track incentive allocations, application volumes, savings achieved, and product mix, helping distributors monitor progress and identify opportunities to sell more high-efficiency models. The program also monitors payment timelines to ensure incentives flow quickly through the supply chain, reducing the financial burden on distributors and contractors and sustaining their

willingness to participate. The intent is that over time, as distributors see increased sales of higher-efficiency equipment, they begin to shift their stocking practices to carry more qualifying units, improving product availability. Program staff emphasized that this is a gradual process, and the distributors need to become convinced that they can sell the higher efficiency units and not end up baring the cost of surplus inventory.

At the contractor level, the program provides tools and incentives that help contractors sell higher-efficiency equipment more effectively. Program staff work with distributors to communicate the business case for promoting efficient equipment, showing contractors how selling higher-margin systems can increase their profitability. Additionally, the program provides guidance on stacking incentives from manufacturers, distributors, and the utility to increase the attractiveness of the high-efficiency units. Contractors also receive marketing materials, such as flyers, to use with customers when presenting high-efficiency options.

For customers, the program's primary influence comes through the instant rebate offered at the point of sale. Contractors apply the incentive immediately, reducing the purchase price and lowering the customer's upfront cost. This visible price signal makes high-efficiency equipment more competitive with baseline options at the moment the purchase decision is made. Contractors are required to communicate that the rebate is funded by I&M to reinforce program visibility and awareness among end users. In the survey of end-users, about half (52.4%) of customers were aware that the unit they bought included a discount from I&M, suggesting the need for additional training and communication on this point.

6.5.2. Partner Eligibility and Participant Requirements

To recruit distributors, the implementation contractor began by re-engaging those that participated under the previous program cycle. Additional distributors were identified through internal networks and industry relationships. The implementation contractor's national offerings team leveraged its connections with manufacturers to encourage distributor participation and to facilitate introductions with new market partners.

Contractor recruitment occurs primarily through participating distributors. Program staff noted what they see as the two main advantages to this approach. First, distributors already confirm that their contractors are properly licensed, reducing administrative burden for the program. Second, distributors are familiar with which contractors are likely to be receptive to promoting high-efficiency equipment.

When distributors enroll, they provide estimates of the sales volume they expect to process through the program during the year. The implementation contractor uses these projections to allocate each distributor a portion of the overall incentive budget. Although the program requests historical sales data to support these estimates, staff reported that such data are not always provided and may be of variable quality. When distributors project unusually high sales volumes, the implementation contractor reviews available historical information to assess whether the projections appear reasonable.

Distributor performance often diverges from initial expectations, especially in the early stages of participation. One contributing factor is that distributors may have limited visibility into how much of their total sales volume will qualify for program incentives. To maintain alignment between funding and performance, the implementation contractor tracks sales progress throughout the year and adjusts budget allocations as needed, shifting funds from underperforming distributors to those demonstrating higher activity and greater potential for energy savings.

In the first year of the program under the current implementer, the distributor sales volumes varied substantially. Sales were concentrated among a small number of distributors. The top two distributors accounted for 123 of 162 units (76%), and the top three accounted for 150 units (93%). Six distributors recorded any sales during the period, while eight reported zero units. The median across all distributors was 0 units; among the six with activity, the median was 17 units. This distribution suggest a skew toward a few high-volume distributors, with others either not yet engaged, not stocking qualifying equipment, or not reporting activity during the period.

Table 6-13 Summary of Distributor HVAC System Sales

<i>Distributor (Anonymous)</i>	<i>Units</i>
Distributor 8	68
Distributor 6	55
Distributor 2	27
Distributor 13	7
Distributor 12	4
Distributor 5	1
Distributor 1	0
Distributor 3	0
Distributor 4	0
Distributor 7	0
Distributor 9	0
Distributor 10	0
Distributor 11	0

6.5.3. Program Sales Process

Sales within the midstream HVAC program begin when a participating contractor sells and installs a qualifying high-efficiency unit. At the time of sale, the contractor provides the homeowner or business customer with an instant rebate that reduces the purchase price. This incentive is offered immediately rather than through a post-installation claim.

After the sale, the contractor records the transaction in the program's online portal. The portal collects information needed for program verification, including the customer's name and address, model and serial numbers of the installed equipment, the sales invoice showing the rebate as a line

item, and the name of the distributor that supplied the equipment. Contractors can complete this process directly through the web portal or by using a fillable PDF if working offline. Once submitted, the portal automatically checks customer eligibility by matching the address to utility customer information system (CIS) data. If an address does not appear as eligible, the contractor contacts the program team to confirm eligibility before proceeding.

Following the contractor's submission, the application enters a two-step review and approval process. First, the distributor receives the application and confirms that the sale aligns with its records. The distributor verifies that the purchase order number, model, and serial number match equipment sold from its inventory. Once confirmed, the distributor approves the application and forwards it to the program implementer. The program implementer then performs a secondary review to ensure the customer and equipment meet program eligibility requirements, documentation is complete, and the rebate amount is correct. The database tool uses an API to match models to the AHRI database to verify the recorded equipment specifications.

Most submissions originate from applications entered by contractors through the portal, but distributors can also submit directly, especially for commercial projects where they sell equipment directly to end users. The portal accommodates single or bulk uploads, enabling distributors to group multiple sales into a single submission.

In some cases, particularly among large national distributors or manufacturers, rebate processing is managed by third-party service providers. In this arrangement, contractors submit their sales through the manufacturer's portal, where the third-party processor reviews and validates each application before bulk-importing approved records into the program's main portal. The distributor continues to oversee its overall program performance, track sales activity, and issue credits to contractors, while the rebate processor manages the documentation and data submission process.

Sales are submitted to the implementation contractor for incentive payment at a cadence of the distributors choosing. The distributor is responsible for paying the incentives owed to contractors.

Overall, distributors described the administrative aspects of the I&M midstream program as workable, though the level of effort required varied by role and by the specific administrative task. Respondents generally indicated that the core rebate submission and payment process functions adequately and does not represent a major barrier to participation. Some noted that once internal staff became familiar with the program requirements and systems, the process became routine and manageable.

That said, two respondents identified some areas where administrative processes create friction. One distributor noted challenges reconciling incentive payments internally due to the use of multiple identifiers (e.g., project ID and reference numbers), which require manual tracking to align payments with specific applications. This respondent indicated that including an application ID on credit or payment documentation would simplify internal reconciliation and reduce staff time spent investigating discrepancies.

Another respondent emphasized the level of detail required in rebate submissions, noting that I&M requires more extensive equipment and installation information than other utility programs they support. As the respondent explained, *“They’re asking for what was taken out, what was removed, what was installed, the serial numbers, the SEERs—while other utilities only ask for AHRI, serial numbers, and model numbers.”* While the respondent indicated they had adapted to these requirements over time, they described the learning curve as initially frustrating, particularly for staff whose primary role is sales support rather than technical HVAC expertise.

In contrast, a third respondent viewed the documentation requirements as reasonable and did not identify administrative burden as a significant concern, noting that the program compensates distributors for claim processing and that internal staff handle submissions efficiently.

Across interviews, early-program timing and payment delays were mentioned as a temporary issue during the start of a program year, but respondents indicated this had been resolved and that incentive payments are now received within an acceptable timeframe.

6.5.4. Barriers to Efficiency

Distributors consistently identified cost as the primary barrier to the adoption of higher-efficiency HVAC equipment. Distributors noted that higher-efficiency systems carry higher upfront prices, and many contractors and homeowners remain highly price-sensitive, often defaulting to the lowest-cost option when making purchase decisions. Even when rebates are available, respondents indicated that price remains the dominant factor shaping customer choices.

A related barrier is the challenge of effectively communicating the value of higher-efficiency equipment. Respondents explained that efficiency metrics (e.g., SEER ratings) do not resonate with many customers unless they are translated into expected dollar savings. One respondent stated that sales outcomes depend heavily on the salesperson’s ability to explain benefits in practical, financial terms and another emphasized the importance of the “kitchen table” discussions around the upfront costs and long-term cost savings. It was noted that when sales staff or contractors lack confidence in explaining these benefits, or do not personally value higher-efficiency options, they are less likely to promote them. One respondent suggested developing a tool that salespeople could use to show the longer-term cost savings from installing a higher efficiency unit.

Respondents also described a tendency among some contractors to focus on lowest-price bids as a default sales strategy. This approach can limit the consideration of higher-efficiency options, even when customers might be willing to pay more if benefits were clearly explained. One respondent characterized this as an ongoing challenge in shifting contractor behavior from selling “lowest cost” to selling “best solution.”

While awareness of efficient technologies was not described as entirely absent, respondents suggested that awareness alone is insufficient to drive adoption. Contractors and customers may know that higher-efficiency options exist, but without clear financial framing or sufficient incentives, those options are often not prioritized.

The review of marketing materials showed that program messaging partially addressed the cost barriers identified by distributors but did not fully align with the specific challenges respondents described.

Both the distributor counter mat and the residential contractor flyer emphasized that program incentives reduce the upfront cost of high-efficiency equipment. The distributor counter mat highlighted the opportunity to “pass the savings on to your customers,” indicating that incentives can lower purchase prices at the point of sale. The residential contractor flyer similarly promoted “instant discounts” applied automatically at purchase, with no rebate forms required. This messaging is consistent with distributor feedback that high upfront costs are a significant barrier and that many customers and contractors default to lower-priced equipment options.

However, the materials placed less emphasis on long-term operating cost savings, which respondents noted are critical to shifting customer decisions. While the residential flyer included brief ENERGY STAR statistics illustrating potential bill savings for certain technologies, the materials did not provide tools or structured information to help distributors or contractors translate efficiency metrics into clear financial outcomes.

The materials also did not directly address respondents’ observations that some contractors default to presenting the lowest-cost option, even when customers might be open to higher-efficiency alternatives if benefits were clearly explained. The counter mat and flyer focused on available discounts but did not include messaging aimed at influencing contractor sales practices or encouraging presentation of multiple equipment tiers.

While awareness of efficient technologies was not identified as a primary barrier, respondents noted that awareness alone is insufficient without strong financial framing. The flyer and counter mat communicated basic technology types and incentive availability but did not extend to messaging that helps contractors or distributors articulate comparative long-term value.

6.5.5. Perceived Benefits of Efficient Equipment

Distributor interviews and end-user survey results show alignment around the primary benefits associated with high-efficiency HVAC equipment, particularly when those benefits can be expressed in practical or financial terms.

From the distributor perspective, the benefits of high-efficiency equipment were framed largely around improved value at the point of sale. Distributors emphasized that higher-efficiency systems are easier to sell when customers can see a clear payoff, such as lower operating costs, improved comfort, or the ability to offset higher upfront prices through rebates.

End-user survey results are consistent with this understanding. The most commonly cited benefit among respondents was lower energy bills, selected by 68.4% of respondents, indicating that operating cost savings are the dominant motivation for choosing high-efficiency equipment. Nearly half of respondents (47.4%) also selected better performance or comfort, suggesting that

comfort-related benefits resonate strongly with customers. Additional benefits included rebates or incentives (26.3%), increased home value (26.3%), and quieter operation (21.1%).

Notably, recommendations from contractors or installers were identified as a benefit by 21.1% of respondents, underscoring the role contractors play in shaping customer perceptions and reinforcing distributor observations that sales conversations are important to equipment selection. In contrast, fewer respondents selected technical or long-term considerations such as longer equipment life, fewer maintenance issues, or environmental benefits (each selected by 5.3%), suggesting these factors are less influential in customer decision-making.

6.5.6. Program Influence on Equipment Choices

Across distributor interviews, respondents indicated that the I&M midstream program has a moderate but meaningful influence on sales outcomes, particularly in shaping the mix of equipment sold rather than driving overall sales volume. Two respondents rated the program's influence at approximately 7 on a 10-point scale, suggesting that incentives play a noticeable role in purchase decisions.

Respondents consistently described the program as supporting the sale of higher-efficiency, higher-cost equipment, rather than generating incremental demand. Incentives were characterized as a tool that helps contractors "close the deal" by reducing the effective price difference between standard and high-efficiency options. In this way, the program was viewed as enabling customers to move up to more efficient equipment that they might otherwise forgo.

Two respondents indicated that, absent the program, they would expect some shift away from efficient equipment offerings. While estimates of the magnitude varied and were described as difficult to quantify, respondents generally agreed that the program contributes to higher efficiency selections, even when manufacturer promotions and other utility or municipal rebates are also available. These layered incentives were described as collectively reinforcing.

One respondent stated that the program does not significantly alter the distributor's core business practices or sales approach. Participation was described as primarily reactive, rather than actively promoted, with the distributor weighing program participation against other priorities and margin considerations. The respondent explained that incentive levels are generally not high enough to justify additional effort or staff training beyond basic participation and noted that this pattern is typical across most midstream programs in which their company participates.

Because 60% of the incentive is required to be passed through to customers via their contractor, this represents an additional mechanism through which the program can influence purchases of higher-efficiency equipment.

6.5.7. Partner On-Boarding and Training

Implementation staff first train distributor sales teams to act as extensions of program outreach, leveraging their existing relationships to recruit contractors efficiently. Once contractors are identified, the program provides an onboarding session covering the program overview, eligibility

rules, and how to use the online intake portal (and a fillable PDF option) to submit applications. Training includes how to verify customer eligibility using address-based lookup tools tied to utility CIS data, and where to find territory resources (e.g., ZIP code lists and an interactive service-area map). The team also offers pre-qualification support—reviewing proposed equipment and efficiency levels before a sale—to reduce errors and rework.

Over time, the implementation contractor reported that they deliver ongoing training and support in several formats. With distributors, the team adds technical trainings and webinars with subject-matter experts. It has begun offering sales-oriented training to help contractors understand the business case for upselling higher-efficiency equipment, using cost data and simple financial models that show how product mix affects margins. As contractors begin participating, staff provide support as needed including answering questions, pre-checking equipment, and troubleshooting address-eligibility issues flagged by the portal.

Distributors generally reported that the training and guidance provided through the I&M midstream program are effective and sufficient for supporting participation. Distributors described receiving training through a mix of in-person meetings and virtual formats (e.g., Teams), and indicated that the training helped them understand program requirements, eligible equipment, and submission processes.

Respondents highlighted the responsiveness and accessibility of program staff as a strength of the training and support model. Follow-up assistance and timely responses to questions were viewed as particularly helpful, especially during periods when staff were learning program requirements or addressing dealer questions.

Respondents did not identify major gaps in training content. Those with more direct responsibility for rebate submissions indicated that, after an initial learning period, the training and guidance were adequate to manage the program requirements. Respondents in more senior or oversight roles reported fewer direct interactions with training materials but indicated that they were not aware of any internal difficulties related to understanding or implementing the program.

6.5.8. Quality Assurance and Control

Quality control is built into the intake and review process. At submission, the portal confirms territory eligibility through an address match to CIS data; customer account numbers are matched to the address on the back end. The system enforces business rules, including duplicate checks on model and serial numbers to prevent resubmission of the same equipment. For equipment validation, reviewers have access to an AHRI API connection to confirm that model numbers and system combinations meet qualifying criteria. Submissions that fail any checks are placed into a “flawed” status with admin notes that specify the issue and the corrective action needed.

Issues identified are routed to the appropriate party for resolution. Depending on the issue, the program notifies the distributor to coordinate fixes or returns the application directly to the contractor when contractor-entered data must be corrected. Distributors can see application

statuses and error flags in the portal, which helps them manage follow-up with their contractor network.

Quality management also extends to performance monitoring and payment timeliness. The program conducts regular check-ins with distributors. These occur monthly as a standard, and more frequently for high-volume partners. The program has a score card that summarizes various metrics such as incentive allocations, paid and in-pipeline applications, savings to date, measure mix, and top participating contractors. These scorecards are intended to help identify bottlenecks and issues for resolution. The team tracks end-to-end payment timelines, submission to program payment, and program payment to distributor.

6.6. Findings and Recommendations

Participation in the Midstream HVAC program declined in 2025 compared to 2024. The number of air source heat pumps dropped from 212 units in 2024 to 69 units in 2025, and ductless heat pumps decreased from 100 to 64 units. Installations of central air conditioners increased from 3 to 13 units, but this did not offset the broader decline. Smart thermostat participation also fell from 39 units to 16 units.

Participation was lowest during the first three months of 2025 when the program transitioned to a new implementation contractor, averaging 3 units per month, and increased to an average of 17 units per month for the remainder of the year.

Distributors described the program’s influence as occurring primarily at the point of sale through the instant discount mechanism. They consistently identified upfront cost as the main barrier to adoption of higher-efficiency HVAC equipment and explained that incentives reduce the effective price difference between standard- and high-efficiency options. Several respondents noted that the instant discount helps contractors “close the deal” by making higher-efficiency equipment more financially competitive at the time the purchase decision is made. This description is consistent with the program requirement that at least 60% of the incentive be passed through as an immediate price reduction and with end-user survey results indicating that 52.4% of respondents were aware that a discount was provided by I&M.

Distributors have discretion over incentive dollars, which allows multiple promotional approaches but creates variation in how incentives are used. Distributors are permitted to retain up to 40% of incentive dollars and have flexibility in how these funds are applied, including marketing activities, sales bonuses, or other internal efforts to promote high-efficiency equipment. Distributors may also choose to provide additional incentives beyond the required contractor pass-through, resulting in variation across distributors in how incentive dollars are deployed.

Documentation and workflow controls support data quality, with some friction from detailed requirements and internal reconciliation. The program relies on a multi-step review process in which distributors verify sales details and the program implementer confirms customer and equipment eligibility. Quality control measures include address-based eligibility checks using CIS data, duplicate checks on model and serial numbers, and verification of equipment specifications

through an AHRI API. While distributors generally described the process as workable once staff became familiar with it, some noted challenges related to reconciling payments internally and the level of detail required in submissions relative to other utility programs.

- **Recommendation 1: Streamline documentation and payment reconciliation while preserving data quality.** To reduce administrative friction while maintaining strong quality assurance, the program could pursue targeted system enhancements focused on automation and traceability.

First, the program could expand use of the existing AHRI API to auto-populate equipment and measure details in the application portal once a model or AHRI reference number is entered. Distributors noted that I&M requires more detailed equipment information than many other programs, and automating population of fields such as efficiency ratings and system attributes would reduce manual entry, lower the risk of data entry errors, and ease the learning curve for sales and administrative staff.

Second, the program could include the application ID on all incentive payment documentation, including checks and credit memos issued to distributors. Distributors identified internal reconciliation as a challenge due to the use of multiple identifiers across systems. Adding the application ID would improve traceability between payments and approved applications, reduce time spent investigating discrepancies, and support more efficient internal accounting without altering the underlying review or approval process.

Initial delays in payments were described as temporary and resolved. Distributors noted early-year payment timing issues during program startup but indicated these issues were temporary and have since been resolved, with current payment timelines viewed as acceptable.

Cost is the primary barrier to higher-efficiency HVAC adoption identified by distributors. Across distributor interviews, higher upfront cost was consistently identified as the main barrier to adoption of high-efficiency equipment. Respondents explained that customers often default to the lowest-cost option unless contractors are able to clearly frame efficiency in terms of expected bill savings or comfort improvements. Respondents emphasized the importance of “kitchen table” discussions and noted that contractors who lack confidence in communicating these benefits are less likely to promote higher-efficiency options.

- **Recommendation 2: Strengthen contractor-facing sales training and tools to increase confidence in promoting high-efficiency options.** To address cost-driven customer hesitation and improve the ability of contractors to communicate the value of high-efficiency HVAC equipment, the program could enhance its contractor support resources. The program could develop targeted sales-training modules, contractor job aids, and simple customer-facing materials (e.g., ROI calculators, bill-savings estimates, comfort comparison one-pagers) to help contractors frame efficiency benefits clearly and consistently. Providing these tools would strengthen contractor confidence, improve the quality of customer conversations, and increase the likelihood that high-efficiency options are presented and accepted.

Distributors and end users align on the benefits that resonate most -- lower energy bills and improved comfort. Distributors described high-efficiency equipment as easier to sell when benefits are framed around operating cost savings and comfort rather than technical efficiency metrics. End-user survey results align with this perspective: lower energy bills were the most frequently cited benefit (68.4%), followed by better performance or comfort (47.4%).

Training and support are generally viewed as sufficient, with program staff responsiveness cited as a strength. Distributors and contractors reported that onboarding, training, and ongoing support adequately prepared them to participate in the program. Training covered eligibility requirements, submission processes, and use of the online portal, with additional technical and sales-oriented support provided over time. Respondents highlighted the accessibility and responsiveness of program staff as particularly valuable, especially during early participation and periods of program change.

7. Home Energy Products Retail

This chapter presents the results of both the impact and process evaluations of the 2025 Home Energy Products Retail that Indiana Michigan Power (I&M) offered to its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

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

7.1. Program Description

The Home Energy Products Retail provides instant discounts and “Fast Track” Rebates to customers purchasing qualified energy efficient products from the program website. The marketplace also provides information on the efficiency of the products listed.

The objectives of the program include lowering electric consumption in the residential market sector through the purchase and installation of eligible energy efficiency measures and attributing electric energy savings to those purchases that receive a rebate.

Table 7-1 Summary of Incentives

<i>Product</i>	<i>Incentive</i>	<i>Quantity Limit</i>	<i>Rebate Type</i>	<i>Qualifications</i>
Smart Thermostats	\$50.00	2/account/lifetime	Instant & Fast-Track	Electric Heat ONLY
ES Dehumidifier - Energy Star	\$25.00	2/account/lifetime	Instant & Fast-Track	
ES TV 8.0 > , screen 60" & larger	\$40.00	4/account/lifetime	Instant & Fast-Track	
ES TV 8.0 > , screen 30" - 59"	\$20.00	4/account/lifetime	Instant & Fast-Track	
Smart Sockets	\$5.00	No limit	Instant & Fast-Track	
Air Purifiers - Energy Star	\$75.00	3/account/lifetime	Instant & Fast-Track	
Water Heater - UEF ≥ 0.95	\$25.00	2/account/lifetime	Fast-Track Only	
Advanced Power Strips	\$12.00	2/account/lifetime	Fast-Track Only	
Energy-efficient Showerhead (1.5 gpm)	\$20.00	Limit of 3 each	Fast-Track Only	Must have an electric water heater
ES Window AC's ($\geq 8,000$ Btu's)	\$20.00	4/account/lifetime	Instant Only	

Additionally, the program offered retail discounts for these measures:

- Advanced Power Strip

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- Door Seals and Sweeps
- Spray Foam
- Weather Stripping
- Window and Door Caulk
- LED Nightlight
- Dehumidifier
- Smart Thermostat

Lastly weatherization kits were provided that included the following measures:

- Outlet Gasket
- Door Sweep
- Spray Foam
- Weather Stripping

The kits were distributed at events or provided to customers in their home.

7.2. Data Collection

7.2.1. Participant Survey

ADM completed a survey of online marketplace participants to collect data for estimating net savings and assessing the customer experience.

To determine the minimum sample size needed to meet this precision requirement, ADM assumed a CV of .5, as is typically used in residential program evaluations. The sample size requirement was estimated using the following formula:

$$n = \left(\frac{1.645 * CV}{TP} \right)^2$$

Where,

1.645 = Z Score for 90% confidence interval in a normal distribution

CV = Coefficient of Variation

TP = Targeted Precision, 10% in this evaluation

With 10% targeted precision (TP), this called for a minimum sample of 68 participants. The survey resulted in 6 survey responses, falling well short of the target. Survey results for in-service rates and free ridership were consistent with PY2023 findings. The 2025 in-service rate was 100%, compared to 98%-100% in PY2023. Free ridership across all measures was 36% in 2025,

compared to 23%-31% in PY2023. Based on these results, ADM used the 2025 survey data to estimate the program's gross and net savings despite the small number of responses.

ADM administered the survey to a census of unique contacts for the Home Energy Products Retail. For the email survey, ADM contacted each participant up to three times to ask them to complete the survey. Table 7-2 summarizes the results of the survey data collection effort.

Table 7-2 Home Energy Products Retail Survey Data Collection

<i>Survey</i>	<i>Mode</i>	<i>Time Frame</i>	<i>Number of Contacts</i>	<i>Number of Completions</i>	<i>Completion Rate</i>
Online Marketplace Participant	Email	December 2025	17	4	23.5%
Online Marketplace Participant	Email	October 2025	123	13	10.6%

7.2.2. Program Staff Interviews

ADM interviewed the I&M program coordinator to learn about the program website, portal for monitoring website activity, program marketing efforts and design.

7.3. Estimation of Ex Post Gross Savings

7.3.1. Methodology for Estimating Ex Post Gross Energy Savings

7.3.1.1. Review of Documentation

I&M maintains program tracking information that includes a list of all participants, the measures that they purchased and received a discount for, and the kWh and kW savings associated with each measure. The first aspect of conducting measurements of program activity was to verify that the tracking data report of participants and measures was accurate. To this end, ADM reviewed the program data to verify that the fields required for performing the evaluation are tracked and populated (i.e., the data is not missing) and that the values are reasonable. ADM took several steps in verifying the number of measures installed, which consist of the following:

- Validating program tracking data by checking for duplicate or erroneous entries; and
- Conducting verification surveys with a sample of program participants to verify that customers listed in the program tracking database did indeed participate and that the number of measures claimed to be installed is accurate.

7.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

Table 7-3 presents information on savings calculation formulas, savings calculation inputs, incremental cost, and effective useful life values and data sources applicable to the Home Energy Products Retail Program.

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Table 7-3 Home Energy Products Retail Program Calculation Input Information

Variable Type	Variable Name	Variable Value	Variable Value Source
Measure Name: Marketplace Smart Thermostat			
Savings	ΔkWh		$Cooling\_kWh * Heating\_Reduction + Heating\_kWh * Cooling\_Reduction$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	Heating_Reduction	0.085	Illinois TRM V10.0 Vol. 3, p. 180. Unknown baseline thermostat type.
Input	Cooling_kWh	Varies	Based on econometric analysis of interval meter data.
Input	Cooling_Reduction	0.084	Illinois TRM V10.0 Vol. 3, p. 182.
Input	Heating_kWh	Varies	Based on econometric analysis of interval meter data.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		11	Illinois TRM V10.0 Vol. 3, p. 178.
Inc Cost		125	Illinois TRM V10.0 Vol. 3, p. 178.
Measure Name: Marketplace Dehumidifier			
Savings	ΔkWh		$Pints\_per\_Day * 0.473 / 24 * Hours * ((1 / L\_kWh\_base) - (1 / L\_kWh\_EE))$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	Hours	2200	Illinois TRM V10.0 Vol. 3, p. 17.
Input	L_kWh_base	Varies	Illinois TRM V10.0 Vol. 3, p. 17.
Input	L_kWh_EE	Varies	Characteristics of applicable equipment.
Input	Pints_per_Day	Varies	Characteristics of applicable equipment.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		12	Illinois TRM V10.0 Vol. 3, p. 16.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 17.
Measure Name: Marketplace Air Purifier			
Savings	ΔkWh		$Hours * (SmokeCADR\_base / (SmokeCADR\_per\_watt\_base * 1000)) + ((8760 - Hours) * PartialOnModePower\_base / 1000) + Hours * (SmokeCADR\_eff / (SmokeCADR\_per\_watt\_eff * 1000)) + ((8760 - Hours) * PartialOnModePower\_eff / 1000)$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	SmokeCADR_base	Varies	Illinois TRM V10.0 Vol. 3, p. 8.
Input	SmokeCADR_per_watt_base	Varies	Illinois TRM V10.0 Vol. 3, p. 8.
Input	PartialOnModePower_base	Varies	Illinois TRM V10.0 Vol. 3, p. 8.
Input	SmokeCADR_eff	Varies	Characteristics of applicable equipment.
Input	SmokeCADR_per_watt_eff	Varies	Characteristics of applicable equipment.
Input	PartialOnModePower_eff	Varies	Characteristics of applicable equipment.
Input	Hours	5840	Illinois TRM V10.0 Vol. 3, p. 7.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.

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EUL		9	Illinois TRM V10.0 Vol. 3, p. 6.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 7.
Measure Name: Marketplace Water Heater			
Savings	ΔkWh		$(1 / UEF_{base} - 1 / UEF_{new}) * 17.6 \text{ GPD} * \text{Household} * 365.25 * 8.33 \text{ lbs / gallon} * (T_{out} - T_{in}) / 3412 + kWh_{cooling} - kWh_{heating} + \text{Dehumidification}$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	UEF_{base}	Varies	Federal appliance standard.
Input	UEF_{new}	Varies	Tracking data. Characteristics of applicable equipment.
Input	17.6 GPD	17.6	Illinois TRM V10.0 Vol. 3, p. 217.
Input	Household	Varies	Illinois TRM V10.0 Vol. 3, p. 217.
Input	T_{out}	125	Illinois TRM V10.0 Vol. 3, p. 217.
Input	T_{in}	50.7	Illinois TRM V10.0 Vol. 3, p. 217.
Input	$kWh_{cooling}$	Varies	$IF(\text{heat\_pump\_water\_heater}=1, (((17.6 \text{ GPD} * \text{Household} * 365.25 * 8.33 \text{ lbs / gallon} * (T_{out} - T_{in}) * 1) / 3412 - ((1 / UEF_{new} * 17.6 \text{ GPD} * \text{Household} * 365.25 * 8.33 \text{ lbs / gallon} * (T_{out} - T_{in}) * 1) / 3412))) * LF * \text{CoolLoadFactor}) / (\text{COP}_{cool}) * LM), 0)$
Input	$kWh_{heating}$	Varies	$IF(\text{heat\_pump\_water\_heater}=1, (((17.6 \text{ GPD} * \text{Household} * 365.25 * 8.33 \text{ lbs / gallon} * (T_{out} - T_{in}) * 1) / 3412 - ((1 / UEF_{new} * 17.6 \text{ GPD} * \text{Household} * 365.25 * 8.33 \text{ lbs / gallon} * (T_{out} - T_{in}) * 1) / 3412))) * LF * \text{HeatLoadFactor}) / (\text{COP}_{heat}), 0)$
Input	Dehumidification	Varies	If heat_pump_water_heater = 1, Illinois TRM V10.0 Vol. 3, p. 219. Dehumidifier usage unknown; otherwise 0.
Input	cdf	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		15	Illinois TRM V10.0 Vol. 3, p. 215.
Inc Cost		Varies	Illinois TRM V10.0 Vol. 3, p. 216. If electric resistance, equals \$0.
Measure Name: Marketplace Television			
Savings	ΔkWh		kWh
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	kWh	Varies	Illinois TRM V11.0 Vol. 3, p. 86-87. Depends on screen size. New measure in TRM V11.0; not found in TRM V10.0.
Input	cdf	0.000637	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		5	Illinois TRM V11.0, Vol. 3, p. 86.
Inc Cost		60	Illinois TRM V11.0 Vol. 3, p. 86.
Measure Name: Marketplace Smart Socket			
Savings	ΔkWh		$((((WBase * OnAdj) - WEff) * (\text{hrswkday} - \text{hrswkday\_open})) + (((WBase * OnAdj) - WEff) * (\text{hrswkend} - \text{hrswkend\_open}))) / 1000 * \text{weeks\_year}$
Savings	ΔkW		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	$WBase$	Varies	Illinois TRM V10.0 Vol. 2, p. 799.
Input	$OnAdj$	1	Illinois TRM V10.0 Vol. 2, p. 800.
Input	$WEff$	0.7	Illinois TRM V10.0 Vol. 2, p. 800.
Input	hrswkday	106	Illinois TRM V10.0 Vol. 2, p. 800.

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Input	<i>hrswkday_open</i>	30	Illinois TRM V10.0 Vol. 2, p. 909, provides estimate of 48 for offices; ADM estimate for residences is 30.
Input	<i>hrswkend</i>	62	Illinois TRM V10.0 Vol. 2, p. 800.
Input	<i>hrswkend_open</i>	16	Illinois TRM V10.0 Vol. 2, p. 909, provides estimate of V10 for offices; ADM estimate for residences is 16.
Input	<i>weeks_year</i>	52.2	Illinois TRM V10.0 Vol. 2, p. 800.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		7	Illinois TRM 10.0 Vol. 2, p. 798.
Inc Cost		9	Illinois TRM 10.0 Vol. 2, p. 907.
Measure Name: Marketplace Advanced Power Strip			
Savings	ΔkWh		<i>kWh</i>
Savings	ΔkW		<i>per_unit_gross_ex_post_kwh_savings * cdf</i>
Input	<i>kWh</i>	Varies	Illinois TRM V10 Vol. 3, p. 64.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		7	Illinois TRM V10 Vol. 3, p. 63.
Inc Cost		10	Illinois TRM V10 Vol. 3, p. 63.
Measure Name: LED Nightlight			
Savings	ΔkWh		$(WattsBase - WattsEE) * Hours / 1000 * (WHFe + IF)$
Savings	ΔkW		$(WattsBase - WattsEE) * Hours / 1000 * WHFd * cdf$
Input	<i>WattsBase</i>	7	Illinois TRM V10 Vol. 3, p. 310
Input	<i>WattsEE</i>	0.33	Program tracking data.
Input	<i>Hours</i>	4380	Illinois TRM V10 Vol. 3, p. 311
Input	<i>WHFe</i>	Varies	Illinois TRM V10 Vol. 3, p. 311
Input	<i>IF</i>	Varies	Illinois TRM V10 Vol. 3, p. 312
Input	<i>WHFd</i>	Varies	Illinois TRM V10 Vol. 3, p. 313
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		Varies	Illinois TRM 10.0 Vol. 3, p. 310
Inc Cost		0	Cost of measure accounted for by program costs.
Measure Name: Outlet Gasket (Kit)			
Savings	ΔkWh		$((kWhper\_gasket\_elec\_resistance * \%elec\_resistance + kWhper\_gasket\_heat\_pump * \%heat\_pump) + ((\Delta CFM50 / N\_cool * 60 * 24 * CDD * DUA * 0.018) / (1000 * \eta Cool)) * LM * ADJAirSealingCool * \%Cool)) * quantity\_gaskets\_per\_pack$
Savings	ΔkW		<i>per_unit_gross_ex_post_kwh_savings * cdf</i>
Input	<i>kWhper_gasket_elec_resistance</i>	10.2	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>kWhper_gasket_heat_pump</i>	5.1	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>%elec_resistance</i>	0.241196	2020 RECS Midwest Census Region data.
Input	<i>%heat_pump</i>	0.0822972	2020 RECS Midwest Census Region data.
Input	$\Delta CFM50$	6.491	Illinois TRM V10 Vol. 3, p. 329.
Input	<i>N_cool</i>	39.5	Illinois TRM V10 Vol. 3, p. 321.
Input	<i>CDD</i>	820	Illinois TRM V10 Vol. 3, p. 322.

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Input	<i>DUA</i>	0.75	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>ηCool</i>	10.5	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>LM</i>	3.3	Illinois TRM V10 Vol. 3, p. 323.
Input	<i>ADJAirSealingCool</i>	1	Illinois TRM V10 Vol. 3, p. 323.
Input	<i>%Cool</i>	0.52	Indiana TRM 2023 Workbook, 5.6.1.
Input	<i>quantity_gaskets_per_pack</i>	12	Product characteristics.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		20	Illinois TRM 10.0 Vol. 3, p. 320.
Inc Cost		0	Cost of measure accounted for by program costs.
Measure Name: Door Sweep (Kit)			
Savings	<i>ΔkWh</i>		$((kWhper\_sf\_elec\_resistance * \%elec\_resistance + kWhper\_sf\_heat\_pump * \%heat\_pump) * ADJRxAirSealing) + ((ACFM50 / N\_cool * 60 * 24 * CDD * DUA * 0.018) / (1000 * ηCool) * LM * \%Cool)$
Savings	<i>ΔkW</i>		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	<i>kWhper_sf_elec_resistance</i>	195.3	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>kWhper_sf_heat_pump</i>	97.6	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>%elec_resistance</i>	0.241196	2020 RECS Midwest Census Region data.
Input	<i>%heat_pump</i>	0.0822972	2020 RECS Midwest Census Region data.
Input	<i>ΔCFM50</i>	25.5	Illinois TRM V10 Vol. 3, p. 329.
Input	<i>N_cool</i>	39.5	Illinois TRM V10 Vol. 3, p. 321.
Input	<i>CDD</i>	Varies	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>DUA</i>	0.75	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>ηCool</i>	10.5	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>LM</i>	3.3	Illinois TRM V10 Vol. 3, p. 323.
Input	<i>ADJRxAirSealing</i>	0.8	Illinois TRM V10 Vol. 3, p. 328.
Input	<i>%Cool</i>	0.52	Indiana TRM 2023 Workbook, 5.6.1.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		1	Illinois TRM 10.0 Vol. 3, p. 320.
Inc Cost		0	Cost of measure accounted for by program costs.
Measure Name: Spray Foam (Kit)			
Savings	<i>ΔkWh</i>		$((kWhper\_sf\_elec\_resistance * \%elec\_resistance + kWhper\_sf\_heat\_pump * \%heat\_pump) * ADJRxAirSealing) + ((ACFM50 / N\_cool * 60 * 24 * CDD * DUA * 0.018) / (1000 * ηCool) * LM * \%Cool)) * LinearFeet$
Savings	<i>ΔkW</i>		$per\_unit\_gross\_ex\_post\_kwh\_savings * cdf$
Input	<i>kWhper_sf_elec_resistance</i>	13	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>kWhper_sf_heat_pump</i>	6.5	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>%elec_resistance</i>	0.241196	2020 RECS Midwest Census Region data.
Input	<i>%heat_pump</i>	0.0822972	2020 RECS Midwest Census Region data.
Input	<i>ΔCFM50</i>	0.639	Illinois TRM V10 Vol. 3, p. 329.

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Input	<i>N_cool</i>	39.5	Illinois TRM V10 Vol. 3, p. 321.
Input	<i>CDD</i>	Varies	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>DUA</i>	0.75	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>ηCool</i>	10.5	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>LM</i>	3.3	Illinois TRM V10 Vol. 3, p. 323.
Input	<i>ADJRxAirSealing</i>	0.8	Illinois TRM V10 Vol. 3, p. 328.
Input	<i>%Cool</i>	0.52	Indiana TRM 2023 Workbook, 5.6.1.
Input	<i>LinearFeet</i>	17	Product characteristics.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		1	Illinois TRM 10.0 Vol. 3, p. 320.
Inc Cost		0	Cost of measure accounted for by program costs.
Measure Name: Weather Stripping (Kit)			
Savings	<i>ΔkWh</i>		$((kWhper\_sf\_elec\_resistance * \%elec\_resistance + kWhper\_sf\_heat\_pump * \%heat\_pump) * ADJRxAirSealing) + ((ACFM50 / N\_cool * 60 * 24 * CDD * DUA * 0.018) / (1000 * \eta Cool) * LM * \%Cool)) * LinearFeet$
Savings	<i>ΔkW</i>		<i>per_unit_gross_ex_post_kwh_savings</i> * <i>cdf</i>
Input	<i>kWhper_sf_elec_resistance</i>	13	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>kWhper_sf_heat_pump</i>	6.5	Illinois TRM V10 Vol. 3, p. 327.
Input	<i>%elec_resistance</i>	0.241196	2020 RECS Midwest Census Region data.
Input	<i>%heat_pump</i>	0.0822972	2020 RECS Midwest Census Region data.
Input	<i>ΔCFM50</i>	0.639	Illinois TRM V10 Vol. 3, p. 329.
Input	<i>N_cool</i>	39.5	Illinois TRM V10 Vol. 3, p. 321.
Input	<i>CDD</i>	Varies	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>DUA</i>	0.75	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>ηCool</i>	10.5	Illinois TRM V10 Vol. 3, p. 322.
Input	<i>LM</i>	3.3	Illinois TRM V10 Vol. 3, p. 323.
Input	<i>ADJRxAirSealing</i>	0.8	Illinois TRM V10 Vol. 3, p. 328.
Input	<i>%Cool</i>	0.52	Indiana TRM 2023 Workbook, 5.6.1.
Input	<i>LinearFeet</i>	17	Product characteristics.
Input	<i>cdf</i>	0.0001092	I&M IRP 2023-2025 average coincident peak kW-to-kWh factor.
EUL		1	Illinois TRM 10.0 Vol. 3, p. 320.
Inc Cost		0	Cost of measure accounted for by program costs.

7.3.1.3. Verification and In-Service Rates

Table 7-4 shows the verification rates for measures provided through the Home Energy Products Retail Program. The in-service rates for the retail markdown items and kits were taken from the Illinois TRM v.10, which is referenced by the Indiana TRM.

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Table 7-4 Summary of Measure Verification Rates

Measure	Number of Measure Responses	Verification/ In Service Rate	Stratum/Source	Stratum Sample Size
Marketplace Air Purifier	5	94%	Average Online Marketplace Measure Value	16
Marketplace Dehumidifier	4	94%	Average Online Marketplace Measure Value	16
Marketplace Smart Thermostat	5	94%	Average Online Marketplace Measure Value	16
Marketplace Socket	2	94%	Average Online Marketplace Measure Value	16
Marketplace TV	2	94%	Average Online Marketplace Measure Value	16
Marketplace Television	0	94%	Average Online Marketplace Measure Value	16
Marketplace Smart Socket	0	94%	Average Online Marketplace Measure Value	16
Marketplace Advanced Power Strip	0	94%	Average Online Marketplace Measure Value	16
Marketplace Showerhead	0	94%	Average Online Marketplace Measure Value	16
Electric Dryer	NA	100%	Assumed Value	NA
Freezer	NA	100%	Assumed Value	NA
Refrigerator	NA	100%	Assumed Value	NA
Clothes Washer	NA	100%	Assumed Value	NA
Air Purifier	NA	100%	Assumed Value	NA
Outlet Gasket (Kit)	NA	60%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
Door Sweep (Kit)	NA	56%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
Spray Foam (Kit)	NA	56%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
Weather Stripping (Kit)	NA	62%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
Spray Foam	NA	100%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
Weather Stripping	NA	100%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
Advanced Power Strip	NA	71%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.2.1 Air Sealing, p. 402	NA
Door Seals and Sweeps	NA	100%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA

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Measure	Number of Measure Responses	Verification/ In Service Rate	Stratum/Source	Stratum Sample Size
Smart Thermostat	NA	100%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.3.16 Advanced Thermostat, p. 180	NA
Dehumidifier	NA	100%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.1.3 ENERGY STAR Dehumidifier, p. 15 (Savings not factored by ISR)	NA
Window and Door Caulk	NA	100%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.6.1 Air Sealing, p. 328	NA
LED Nightlight	NA	60%	Illinois Statewide Technical Reference Manual (v10.0), Vol 3, 5.5.11 LED Nightlights, p. 311	NA

7.3.2. Results of Ex Post Gross Savings Estimation

Table 7-5 summarizes the gross kWh savings of the Home Energy Products Retail Program by measure. The ex post annual energy savings for the program were 1,136,919 kWh with a realization rate of 68%.

Table 7-5 Measure-Level Annual Gross kWh Savings

Measure	Quantity of Measures Incited	Ex Ante Gross kWh Savings	Gross Audited kWh Savings	Gross Verified kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
Marketplace Smart Thermostat	83	27,390	27,390	25,868	27,146	99%
Marketplace Dehumidifier	32	4,553	4,553	4,300	4,928	108%
Marketplace Air Purifier	85	63,750	63,750	60,208	60,496	95%
Marketplace Water Heater	8	816	816	0	0	0%
Marketplace Television	8	640	640	604	669	104%
Marketplace Smart Socket	6	330	330	312	314	95%
Marketplace Advanced Power Strip	3	300	300	283	292	97%
Advanced Power Strip	2,107	84,491	84,491	59,988	154,085	182%
Door Seals and Sweeps	1,574	58,238	58,238	58,238	72,148	124%
Spray Foam	17,371	1,858,697	1,858,697	1,858,697	879,914	47%
Weather Stripping	9,292	388,406	388,406	388,406	470,679	121%
Window and Door Caulk	33,382	2,126,433	2,126,433	2,126,433	1,690,939	80%
LED Nightlight	2,363	32,137	32,137	19,282	27,801	87%
Dehumidifier	21	2,922	2,922	2,922	3,107	106%
Smart Thermostat	62	32,308	32,308	32,308	10,927	34%
Outlet Gasket (Kit)	7,500	802,500	802,500	481,500	178,633	22%
Door Sweep (Kit)	7,500	277,500	277,500	155,400	192,516	69%

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<i>Measure</i>	<i>Quantity of Measures Incited</i>	<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Spray Foam (Kit)	7,500	144,750	144,750	81,060	212,748	147%
Weather Stripping (Kit)	7,500	313,500	313,500	194,370	235,542	75%
Total	96,397	6,219,661	6,219,661	5,550,181	4,222,883	68%

The following discusses factors affecting realization rates that differed substantially from 100%.

- Marketplace Water Heater (0%). All of the water heaters had a Uniform Energy Factor (UEF) value equal to that of a standard efficiency water heater (.92).
- Spray Foam (47%). ADM applied an in-service rate of 56%, which may account for the difference in savings. In contrast the kit spray foam ex ante savings assumed a lower per unit savings.
- Smart Thermostat (34%). All ex ante savings assumed a value of 521 kWh per unit. The Evaluated savings leveraged analysis of interval meter data to estimate the cooling and heating kWh which resulted in variable savings.
- Outlet Gasket (Kit) (22%). Ex ante savings assumed 107 kWh per unit. Ex post savings applied an in-service rate of 56% and based savings on the IN TRM and calculated savings of 24 kWh per unit.
- Advanced Power Strips (182%). Ex ante savings assumed 40.1 kWh per unit and ex post savings were 107 kWh per unit. In contrast, ex ante savings for marketplace power strips assumed 100 kWh per unit.

Table 7-6 summarizes the gross peak demand reduction of the Home Energy Products Retail Program. The gross peak demand reduction for the program was 463.41 kW, with a realization rate of 2252%, a value that reflects that fact that ex ante kW savings were 0 for several measures.

Table 7-6 Measure-Level Annual Gross kW Savings

<i>Measure</i>	<i>Quantity of Measures Incited</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Marketplace Smart Thermostat	83	1.49	1.49	1.41	2.96	198%
Marketplace Dehumidifier	32	1.04	1.04	0.98	0.54	52%
Marketplace Air Purifier	85	3.06	3.06	2.89	6.61	216%
Marketplace Water Heater	8	0.24	0.24	-	-	0%
Marketplace Television	8	0.09	0.09	0.08	0.43	484%
Marketplace Smart Socket	6	-	-	-	0.03	
Marketplace Advanced Power Strip	3	0.02	0.02	0.01	0.03	212%

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<i>Measure</i>	<i>Quantity of Measures Incited</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Advanced Power Strip	2,107	10.54	10.54	7.48	16.83	160%
Door Seals and Sweeps	1,574	-	-	-	7.88	
Spray Foam	17,371	-	-	-	96.08	
Weather Stripping	9,292	-	-	-	51.40	
Window and Door Caulk	33,382	-	-	-	184.64	
LED Nightlight	2,363	2.36	2.36	1.42	4.97	210%
Dehumidifier	21	0.63	0.63	0.63	0.34	54%
Smart Thermostat	62	1.12	1.12	1.12	1.19	107%
Outlet Gasket (Kit)	7,500	-	-	-	19.51	
Door Sweep (Kit)	7,500	-	-	-	21.02	
Spray Foam (Kit)	7,500	-	-	-	23.23	
Weather Stripping (Kit)	7,500	-	-	-	25.72	
Total	96,397	20.58	20.58	16.02	463.41	2252%

7.3.3. Estimation of Ex Post Net Savings

ADM estimated free ridership and participant spillover through a survey of program participants.

7.3.3.1. Estimation of Free Ridership – Online Marketplace

7.3.3.1.1. Prior Plans

A score to reflect the presence of prior plans will be based on the responses to the following two questions:

- Did you decide to purchase the measure before you learned about I&M’s Online Marketplace or after you learned about I&M’s Online Marketplace?
- Were you planning to buy the measure before you learned that you could get a rebate or discount through I&M’s Online Marketplace?

Respondents who indicate that they decided to purchase the measure after viewing it on I&M’s online marketplace and who said that they were not planning to purchase the item before learning of the marketplace were considered not to have prior plans and assigned a score of 0. All other respondents were assigned a plans score of 1.

7.3.3.1.2. Likelihood of Purchasing

A likelihood of purchasing score was developed by dividing the numeric response to the following question by 10.

- How likely is it that you would have bought the same measure at about the same time if you could not have received the rebate or discount through the I&M Online Marketplace?

[Rated on a 0 – 10 Scale]

7.3.3.1.3. Timing and Quantity Adjustments

A timing adjustment score was developed based on respondents reporting of when they would have purchased the equipment if they had not purchased the item through the marketplace. Table 7-7 shows how the score will be developed.

Table 7-7 Timing Adjustment Score

<i>Likely Timing of Project in Absence of the Program</i>	<i>Timing Score</i>
Within 6 months	1
Between 6 months and 1 year	.67
In more than 1 year to 2 years	.33
In two years or more	0

A quantity adjustment score was developed based on the response as shown in the table below.

Table 7-8 Timing Adjustment Score

<i>At the time you bought them, would you have bought the same number of Measure] if a rebate or discount was not available through I&M's Online Marketplace?</i>	<i>Quantity Score</i>
Yes	1
No would not have purchased any	0
No, would have purchased fewer	0.5

12.3.5.1.4. Free Ridership Scoring

ADM calculated an overall project free ridership by combining the scores described above.

*Free Ridership = Prior Plans Score * Program Influence * Timing Score * Quantity Adjustment*

12.3.5.2. Methodology for Estimating Spillovers

Program participants may 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 were asked whether they implemented any additional energy saving measures like those offered on the marketplace, for which they did not receive a program discount.

Participants who reported implementing on one or more efficiency measures were asked two questions for use in developing a spillover score:

- SO1: Using the scale below, how important was the experience with the program in your decision to buy the [Measure]?
- SO2: Using the scale below, how likely would you have been to install the [Measure] if you had not participated in the program?

The response to these questions were used to develop a spillover score as follows:

$$\text{Spillover} = \text{Average}(\text{SO1}, 10 - \text{SO2})$$

All the associated measure savings were considered attributable to the program if the resulting score was greater than 7.

None of the respondents reported installing measures that qualified as spillover.

12.3.5.3. Methodology for Estimating Non-Participant Spillover

ADM estimated non-participant spillover through a survey of non-participating customers in PY2021. No spillover was identified, and ADM did not apply non-participant savings to the PY2025 net savings estimate.

7.3.3.2. Estimation of Net Savings for Retail Items and Kits

ADM completed a literature review to develop estimates of net-to-gross factors to assess the net savings of the program. The results are summarized in the table below.

Table 7-9 Retail Discount Free Ridership Literature Review Findings

<i>Program</i>	<i>Measure</i>	<i>Free Ridership</i>	<i>Reference</i>
Retail Discount	Advanced Power Strip	36%	Public Service Company of Oklahoma 2024 Energy Efficiency & Demand Response Programs: Annual Report
Downstream / online marketplace	Dehumidifier	34%	Opinion Dynamics Evaluation Team. (2024, August 30). Memorandum: AIC 2024 Retail Products Initiative Net-to-Gross Findings.
Downstream / online marketplace	Dehumidifier	42%	NMR Group, Inc., & DNV, Inc. (2021, June 8). Residential Products Net-to-Gross Study (MA20X04-E-PRODNTG): Final Report.
Downstream / online marketplace	Dehumidifier	41%	Buege, A., & Bullard, E. (2023, September 1). ComEd Retail Online Program, Appliance Rebate Component Net-to-Gross Research Results – Final.
Downstream / online marketplace	Advanced Power Strip	4%	ADM Associates, Inc. (2022, March). 2021 Indiana Residential Portfolio EM&V Report (Volume I of II). Prepared for: Indiana Michigan Power.

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<i>Program</i>	<i>Measure</i>	<i>Free Ridership</i>	<i>Reference</i>
Downstream / online marketplace	Advanced Power Strip	18%	Guidehouse. (2023, September 1). ComEd Retail Online Program, Appliance Rebate Component Net-to-Gross Research Results – Final.
Downstream / online marketplace	Smart Thermostat	14%	Guidehouse. (2023, September 1). ComEd Retail Online Program, Appliance Rebate Component Net-to-Gross Research Results – Final.
Downstream / online marketplace	Smart Thermostat	14%	Cadmus. (2023, May 22). Focus on Energy: Calendar Year 2022 Evaluation Report, Volume II – Program Evaluations.
Downstream / online marketplace	Smart Thermostat	27%	Public Service Company of Oklahoma 2024 Energy Efficiency & Demand Response Programs: Annual Report
Downstream / online marketplace	Smart Thermostat	29%	Opinion Dynamics. (2022, June 10). Ameren Missouri Program Year 2021: Volume 2 – Residential Portfolio Appendices.
Retail Discount	LED Nightlights	24%	2025 Virginia Residential Portfolio EM&V Report
Retail Discount	Door Seals and Sweeps	28%	Public Service Company of Oklahoma 2024 Energy Efficiency & Demand Response Programs: Annual Report
Retail Discount	Spray Foam	28%	Public Service Company of Oklahoma 2024 Energy Efficiency & Demand Response Programs: Annual Report
Retail Discount	Spray Foam	48%	2025 Virginia Residential Portfolio EM&V Report
Retail Discount	Other Air Sealing (Gaskets, Caulk)	41%	2025 Virginia Residential Portfolio EM&V Report
Values Applied			
Average Advanced Powerstrip Value Applied		19%	
Average Dehumidifier Value Applied		39%	
Average Smart Thermostat Value Applied		21%	
Average Weatherization Measures Value Applied		36%	

The net-to-gross ratio for the kits was based on the average net-to gross results for kits reported in these evaluation reports:

- ILLUME Advising, LLC. (2022, June 15). 2021 DSM Portfolio NIPSCO Evaluation Report.
- Opinion Dynamics. (2022). Ameren Illinois Company 2020 Residential Program Impact Evaluation Report.
- Cadmus. (2021, May 21). Focus on Energy: Calendar Year 2020 Evaluation Report, Volume II – Program Evaluations.
- Guidehouse. (2020). Energy Saving Kits Impact Evaluation Report: Energy Efficiency Plan, Plan Year 2019 (1/1/2019–12/31/2019).

Based on this review a free ridership ratio of .05 was applied to the gross kit savings.

7.3.4. Results of Ex Post Net Savings Estimation

ADM combined the free ridership results across all measures because of the small sample size. Table 7-10 summarizes the free ridership results.

Table 7-10 Summary of Free Ridership Rates

<i>Measure</i>	<i>Number of Measure Responses</i>	<i>Average Free Ridership</i>	<i>Stratum / Source</i>	<i>Stratum Sample Size</i>
Marketplace Air Purifier	4	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Dehumidifier	1	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Smart Thermostat	5	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Socket	2	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace TV	1	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Water Heater	0	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Television	0	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Smart Socket	0	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Advanced Power Strip	0	16%	Average Online Marketplace Measure Free Ridership	13
Marketplace Showerhead	0	16%	Average Online Marketplace Measure Free Ridership	13
Electric Dryer	NA	100%	Historical Sales Forecast	NA
Freezer	NA	74%	Historical Sales Forecast	NA
Refrigerator	NA	0%	Historical Sales Forecast	NA
Clothes Washer	NA	90%	Historical Sales Forecast	NA
Air Purifier	NA	42%	Historical Sales Forecast	NA
Outlet Gasket (Kit)	NA	5%	Literature review value based on non-low income give away efficiency kits	NA
Door Sweep (Kit)	NA	5%	Literature review value based on non-low income give away efficiency kits	NA
Spray Foam (Kit)	NA	5%	Literature review value based on non-low income give away efficiency kits	NA
Weather Stripping (Kit)	NA	5%	Literature review value based on non-low income give away efficiency kits	NA
Spray Foam	0	36%	Literature review value.	NA
Weather Stripping	0	36%	Literature review value.	0
Advanced Power Strip	0	19%	Literature review value.	0
Door Seals and Sweeps	0	36%	Literature review value.	0

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<i>Measure</i>	<i>Number of Measure Responses</i>	<i>Average Free Ridership</i>	<i>Stratum / Source</i>	<i>Stratum Sample Size</i>
Smart Thermostat	0	29%	Literature review value.	0
Dehumidifier	0	39%	Literature review value.	0
Window and Door Caulk	0	36%	Literature review value.	0
LED Nightlight	0	24%	Literature review value.	0

Table 7-11 summarizes the ex post annual net kWh and kW savings of the Home Energy Products Retail Program. The annual net savings totaled 999,761 kWh and 129.23 kW.

Table 7-11 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	2,267,034	264.00
Gross Audited Savings	2,267,034	264.00
Gross Verified Savings	2,267,034	264.00
Ex Post Gross Savings	2,183,224	238.40
Gross Realization Rate	96%	90%
Ex Post Free Ridership	1,183,463	129.23
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	999,761	109.17
Net-to-Gross Ratio	46%	46%
Ex Post Net Lifetime Savings	14,897,457	NA

7.4. Process Evaluation

ADM did not complete a process evaluation of the Home Energy Products Retail Program.

7.5. Findings and Recommendations

Ex post gross savings increased from 1,136,919 kWh in 2024 to 4,222,883 kWh in 2025, driven by a shift toward retail discounts for weatherization materials and the continued distribution of weatherization kits. In 2025, retail discounts contributed 3,309,600 kWh (78.4%), kits contributed 819,439 kWh (19.4%), and marketplace measures contributed 93,845 kWh (2.2%). Although savings from marketplace measures also increased significantly, from 31,353 kWh to 93,845 kWh, this component remained less than 3% of ex post gross savings.

The program rebated water heaters that met the federal minimum efficiency standard, but the last rebates were issued in May. The water heaters rebated through the program had a Uniform Energy Factor (UEF) value equal to that of a standard efficiency water heater (.92). The program increased the efficiency requirement in May.

8. 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 8-1.

Table 8-1 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.				✓		✓		✓

8.1. PY2025 Cost Effectiveness Evaluation

The following tables summarize key financial benefit and cost inputs for the various tests as well as the test results for each residential program during PY2025.

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Table 8-2 Home Online Energy Checkup

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ -			\$ -		\$ -		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 2,343,587							
Lost Revenue (NPV)						\$ 2,844,637		
Avoided Energy Costs (NPV)			\$ 1,118,443		\$ 1,118,443		\$ 1,118,443	
Avoided Capacity Costs (NPV)			\$ 259,860		\$ 259,860		\$ 259,860	
Avoided T&D Costs (NPV)			\$ 69,529		\$ 69,529		\$ 69,529	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 793,554		\$ 793,554		\$ 793,554
Total Benefits	\$ 2,343,587		\$ 1,447,831		\$ 1,447,831		\$ 1,447,831	
Total Costs	\$ -		\$ 793,554		\$ 3,638,192		\$ 793,554	
Test Score	N/A		1.82		0.40		1.82	

Table 8-3 Home Energy Report

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ -			\$ -		\$ -		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 678,051							
Lost Revenue (NPV)						\$ 678,051		
Avoided Energy Costs (NPV)			\$ 203,764		\$ 203,764		\$ 203,764	
Avoided Capacity Costs (NPV)			\$ 54,605		\$ 54,605		\$ 54,605	
Avoided T&D Costs (NPV)			\$ 20,047		\$ 20,047		\$ 20,047	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 239,395		\$ 239,395		\$ 239,395
Total Benefits	\$ 678,051		\$ 278,416		\$ 278,416		\$ 278,416	
Total Costs	\$ -		\$ 239,395		\$ 917,445		\$ 239,395	
Test Score	N/A		1.16		0.30		1.16	

Table 8-4 Residential Income Qualified Weatherproofing

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 0			\$ 0		\$ 0		
Program Installation Costs				\$ 311,133		\$ 311,133		\$ 311,133
Bill Savings (NPV)	\$ 471,821							
Lost Revenue (NPV)						\$ 614,672		
Avoided Energy Costs (NPV)			\$ 225,963		\$ 225,963		\$ 225,963	
Avoided Capacity Costs (NPV)			\$ 52,688		\$ 52,688		\$ 52,688	
Avoided T&D Costs (NPV)			\$ 14,098		\$ 14,098		\$ 14,098	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 470,044		\$ 470,044		\$ 470,044
Total Benefits	\$ 471,821		\$ 292,749		\$ 292,749		\$ 292,749	
Total Costs	\$ -		\$ 781,177		\$ 1,395,849		\$ 781,177	
Test Score	N/A		0.37		0.21		0.37	

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Table 8-5 Home Energy Products ENERGY STAR® Appliances

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 190,575			\$ 190,575		\$ 190,575		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 696,032							
Lost Revenue (NPV)						\$ 897,427		
Avoided Energy Costs (NPV)			\$ 382,972		\$ 382,972		\$ 382,972	
Avoided Capacity Costs (NPV)			\$ 89,951		\$ 89,951		\$ 89,951	
Avoided T&D Costs (NPV)			\$ 22,546		\$ 22,546		\$ 22,546	
Incremental Costs		\$ 638,230						\$ 638,230
Program Overhead Costs				\$ 117,826		\$ 117,826		\$ 117,826
Total Benefits	\$ 886,607		\$ 495,468		\$ 495,468		\$ 495,468	
Total Costs	\$ 638,230		\$ 308,401		\$ 1,205,828		\$ 756,056	
Test Score	1.39		1.61		0.41		0.66	

Table 8-6 Home HVAC Midstream

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 123,725			\$ 123,725		\$ 123,725		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 94,556							
Lost Revenue (NPV)						\$ 79,596		
Avoided Energy Costs (NPV)			\$ 52,723		\$ 52,723		\$ 52,723	
Avoided Capacity Costs (NPV)			\$ 53,123		\$ 53,123		\$ 53,123	
Avoided T&D Costs (NPV)			\$ 13,245		\$ 13,245		\$ 13,245	
Incremental Costs		\$ 21,895						\$ 21,895
Program Overhead Costs				\$ 466,928		\$ 466,928		\$ 466,928
Total Benefits	\$ 218,281		\$ 119,091		\$ 119,091		\$ 119,091	
Total Costs	\$ 21,895		\$ 590,653		\$ 670,250		\$ 488,823	
Test Score	9.97		0.20		0.18		0.24	

Table 8-7 Home Energy Products Retail

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 403,385			\$ 403,385		\$ 403,385		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 612,461							
Lost Revenue (NPV)						\$ 685,277		
Avoided Energy Costs (NPV)			\$ 244,410		\$ 244,410		\$ 244,410	
Avoided Capacity Costs (NPV)			\$ 57,272		\$ 57,272		\$ 57,272	
Avoided T&D Costs (NPV)			\$ 17,328		\$ 17,328		\$ 17,328	
Incremental Costs		\$ 30,021						\$ 30,021
Program Overhead Costs				\$ 1,530,239		\$ 1,530,239		\$ 1,530,239
Total Benefits	\$ 1,015,846		\$ 319,010		\$ 319,010		\$ 319,010	
Total Costs	\$ 30,021		\$ 1,933,625		\$ 2,618,902		\$ 1,560,260	
Test Score	33.84		0.16		0.12		0.20	

8.2. PY2023 – PY2025 Cost Effectiveness Evaluation

Cost effectiveness of programs across PY2023 – PY2025 was also evaluated. Table 8-8 through Table 8-13 summarize key financial benefit and cost inputs for the various tests along as well as the test results for each residential program during PY2023 – PY2025.

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Table 8-8 Home Online Energy Checkup (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ -			\$ -		\$ -		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 4,643,428							
Lost Revenue (NPV)						\$ 5,686,888		
Avoided Energy Costs (NPV)			\$ 2,161,428		\$ 2,161,428		\$ 2,161,428	
Avoided Capacity Costs (NPV)			\$ 458,958		\$ 458,958		\$ 458,958	
Avoided T&D Costs (NPV)			\$ 128,505		\$ 128,505		\$ 128,505	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 1,630,768		\$ 1,630,768		\$ 1,630,768
Total Benefits	\$ 4,643,428		\$ 2,748,892		\$ 2,748,892		\$ 2,748,892	
Total Costs	\$ -		\$ 1,630,768		\$ 7,317,656		\$ 1,630,768	
Test Score	N/A		1.69		0.38		1.69	

Table 8-9 Home Energy Report (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ -			\$ -		\$ -		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 855,157							
Lost Revenue (NPV)						\$ 855,157		
Avoided Energy Costs (NPV)			\$ 253,563		\$ 253,563		\$ 253,563	
Avoided Capacity Costs (NPV)			\$ 76,524		\$ 76,524		\$ 76,524	
Avoided T&D Costs (NPV)			\$ 30,816		\$ 30,816		\$ 30,816	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 295,503		\$ 295,503		\$ 295,503
Total Benefits	\$ 855,157		\$ 360,903		\$ 360,903		\$ 360,903	
Total Costs	\$ -		\$ 295,503		\$ 1,150,660		\$ 295,503	
Test Score	N/A		1.22		0.31		1.22	

Table 8-10 Residential Income Qualified Weatherproofing (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 0			\$ 0		\$ 0		
Program Installation Costs				\$ 1,011,285		\$ 1,011,285		\$ 1,011,285
Bill Savings (NPV)	\$ 1,254,423							
Lost Revenue (NPV)						\$ 1,588,460		
Avoided Energy Costs (NPV)			\$ 556,936		\$ 556,936		\$ 556,936	
Avoided Capacity Costs (NPV)			\$ 134,057		\$ 134,057		\$ 134,057	
Avoided T&D Costs (NPV)			\$ 38,983		\$ 38,983		\$ 38,983	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 1,409,054		\$ 1,409,054		\$ 1,409,054
Total Benefits	\$ 1,254,423		\$ 729,976		\$ 729,976		\$ 729,976	
Total Costs	\$ -		\$ 2,420,339		\$ 4,008,799		\$ 2,420,339	
Test Score	N/A		0.30		0.18		0.30	

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Table 8-11 Home Energy Products ENERGY STAR® Appliances (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 628,294			\$ 628,294		\$ 628,294		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 1,790,537							
Lost Revenue (NPV)						\$ 2,219,287		
Avoided Energy Costs (NPV)			\$ 969,604		\$ 969,604		\$ 969,604	
Avoided Capacity Costs (NPV)			\$ 230,120		\$ 230,120		\$ 230,120	
Avoided T&D Costs (NPV)			\$ 60,200		\$ 60,200		\$ 60,200	
Incremental Costs		\$ 1,734,658						\$ 1,734,658
Program Overhead Costs				\$ 448,814		\$ 448,814		\$ 448,814
Total Benefits	\$ 2,418,831		\$ 1,259,925		\$ 1,259,925		\$ 1,259,925	
Total Costs	\$ 1,734,658		\$ 1,077,108		\$ 3,296,395		\$ 2,183,472	
Test Score	1.39		1.17		0.38		0.58	

Table 8-12 Home HVAC Midstream (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 463,102			\$ 463,102		\$ 463,102		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 453,399							
Lost Revenue (NPV)						\$ 560,212		
Avoided Energy Costs (NPV)			\$ 249,197		\$ 249,197		\$ 249,197	
Avoided Capacity Costs (NPV)			\$ 177,686		\$ 177,686		\$ 177,686	
Avoided T&D Costs (NPV)			\$ 46,567		\$ 46,567		\$ 46,567	
Incremental Costs		\$ 255,855						\$ 255,855
Program Overhead Costs				\$ 861,623		\$ 861,623		\$ 861,623
Total Benefits	\$ 916,500		\$ 473,449		\$ 473,449		\$ 473,449	
Total Costs	\$ 255,855		\$ 1,324,725		\$ 1,884,937		\$ 1,117,479	
Test Score	3.58		0.36		0.25		0.42	

Table 8-13 Home Energy Products Retail (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 452,671			\$ 452,671		\$ 452,671		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 1,063,116							
Lost Revenue (NPV)						\$ 1,232,140		
Avoided Energy Costs (NPV)			\$ 441,746		\$ 441,746		\$ 441,746	
Avoided Capacity Costs (NPV)			\$ 102,359		\$ 102,359		\$ 102,359	
Avoided T&D Costs (NPV)			\$ 31,147		\$ 31,147		\$ 31,147	
Incremental Costs		\$ 131,948						\$ 131,948
Program Overhead Costs				\$ 1,932,154		\$ 1,932,154		\$ 1,932,154
Total Benefits	\$ 1,515,787		\$ 575,253		\$ 575,253		\$ 575,253	
Total Costs	\$ 131,948		\$ 2,384,825		\$ 3,616,965		\$ 2,064,102	
Test Score	11.49		0.24		0.16		0.28	

2025 Indiana Residential Portfolio EM&V Report Volume II of II

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Indiana Michigan Power

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1 Introduction

Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., a Qualus Company, (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 2025.

This report is divided into two volumes providing information on the impact, process, and cost-effectiveness evaluation of the I&M portfolio of residential programs implemented in Indiana during the 2025 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: Home Energy Report Survey Instrument
- Chapter 3: Residential Income Qualified Weatherproofing Survey Instruments
- Chapter 4: Midstream HVAC End-User Survey Instrument
- Chapter 5: Midstream HVAC Distributor Interview Guide
- Chapter 6: Home Energy Products Retail Participant Survey Instrument
- Chapter 7: Home Energy Report Survey Results
- Chapter 8: Residential Income Qualified Weatherproofing Survey Results
- Chapter 9: Midstream HVAC End-User Survey Results
- Chapter 10: Home Energy Products Retail Participant Survey Results

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

2 Home Energy Report Survey Instrument

Introduction

1. Welcome! Thank you for taking this survey to tell us about your experience with I&M's Home Energy Reports. Your feedback is very important to us and will help I&M improve its programs for customers like you.
Your responses are confidential and will be used for research purposes only. ADM Associates does not share survey data with third parties for marketing purposes. Our full privacy statement is linked here: admenergy.com/privacy
Once you have entered a response for each question, use the arrow at the bottom right of the screen to get to the next question.

Screening

2. We would like your feedback about I&M's Home Energy Reports. These reports provide you with information regarding your home's energy usage and share tips on how you can save energy.

Do you recall receiving these reports?
 1. Yes
 2. No **[Terminate Survey]**
 98. I don't know **[Terminate Survey]**

Home Energy Report Engagement

3. Which of the following statements best describes what you did with the last Home Energy Report you received?
 1. I read the entire report
 2. I skimmed the main sections of the report
 3. I glanced at it briefly but didn't read the details
 4. I did not read the report at all
 98. I don't remember
4. About how many of the Home Energy Reports you received have you read? It's okay to give your best guess.
 1. All the reports I received
 2. Most of the reports I received (more than half)
 3. About half of the reports I received
 4. Some of the reports I received (less than half)
 5. None of the reports I received
 98. I don't remember

[Display Q5 IF Q4 = 4 or 5]

5. What is the main reason that you read less than half of the reports?

[RANDOMIZE 1-8]

1. Do not have the time
2. Limited interest in the report content
3. The suggested tips were not applicable to my home
4. Information provided was not valuable or useful
5. Information in the home energy report appeared inaccurate
6. I didn't notice receiving the home energy report
7. Reports were difficult to understand or interpret
8. Already aware of my energy usage
9. Other (Please specify)

[Terminate Survey if Q3 =4 and Q4 = 5]

6. Has anyone else in your household read the home energy reports?

1. Yes
2. No
3. Not applicable
98. I don't know

[Display if channel = Mail]

7. Were you aware that you could provide an email address to receive your home energy report by email instead of a paper report in the mail?

1. Yes
2. No

[Display if channel = Mail]

8. Would you prefer to receive an email report instead of a paper report?

1. Yes
2. No
98. Not sure

Home Energy Report Quality

9. The next few questions are about your opinions of the Home Energy Reports. How easy or difficult is it to understand the information on your home energy usage? Would you say...

1. Very easy
2. Somewhat easy
3. Neither easy nor difficult
4. Somewhat difficult
5. Very difficult

10. Thinking about the monthly home energy report, how accurate do you think the information on how much electricity your home uses is? Would you say...

1. Very accurate
2. Somewhat accurate
3. Neither accurate nor inaccurate
4. Somewhat inaccurate
5. Very inaccurate

[Open-Ended]

11. The home energy report provides information on how much electricity your home uses compared to similar homes. Do you remember seeing that comparison?

1. Yes
2. No

[Display if Q11 = 1]

12. How accurate do you think the home comparison is? Would you say...

1. Very accurate
2. Somewhat accurate
3. Neither accurate nor inaccurate
4. Somewhat inaccurate
5. Very inaccurate

[Display If Q12 > 3]

13. What did you find inaccurate in your Home Energy Report home comparison?

[Open-Ended]

[Display If Q12 > 3]

14. Did you know that you could provide additional information about your home to improve the accuracy of the home comparisons?

1. Yes
2. No

15. How much do you trust the information in the Home Energy Report?

1. A great deal
2. Somewhat
3. A little
4. Not at all
98. Don't know

[Display Q16 If Q15 > 1]

16. Why do you not trust the information in the Home Energy Report?

17. How much have you learned about energy-saving actions from the Home Energy Report?

[Scale: 1 = Nothing at all, 5 = A great deal]

1. Nothing at all
2. A little
3. A moderate amount
4. Quite a bit
5. A great deal

18. Has the Home Energy Report helped you better understand your household energy usage?

[Scale: 1 = Not at all, 5 = Very much]

1. Not at all
2. A little
3. Somewhat
4. Quite a bit
5. Very much

19. How confident do you feel in your ability to control your home's electricity use?

[Scale: 1 = Not at all confident, 5 = Very confident]

1. Not at all confident
2. Slightly confident
3. Moderately confident
4. Confident
5. Very confident

20. Which types of information in the report do you find most helpful?

[MULTISELECT]

1. Tips for changing usage habits
2. Rebates and incentives
3. Seasonal energy usage patterns
4. Comparison with similar homes
5. Personalized energy insights
6. None of the above were helpful

21. Using a scale where 1 means very dissatisfied and 5 means very satisfied, please rate your satisfaction with the following:

[Scale: 1 (Very dissatisfied) to 5 (Very satisfied)]

- a) The accuracy of the information provided about your home's energy use
- b) The relevance of the energy saving tips provided in the report
- c) Visual presentation and layout of the report
- d) The overall value of the Home Energy Report

22. Do you have any suggestions for how to improve the Home Energy Report?

[Open-Ended]

Home Characteristics and Demographics

23. Finally, please answer a few questions about your household. As a reminder, your responses will remain confidential.
24. Are you the person who manages or pays the utility bills in your household?
1. Yes
 2. No
 99. Prefer not to answer
25. Do you rent or own your home?
1. Rent
 2. Own
 99. Prefer not to answer
26. Is the residence located at [address]...
1. Your primary residence
 2. A residence that you rent to someone else
 3. A vacation property that is not occupied year-round
 4. Something else
 99. Prefer not to answer
27. Which of the following best describes your home?
1. Manufactured home
 2. Single-family house detached from any other house
 3. Single family house attached to one or more other houses, for example, duplex, row house, or townhome
 4. Apartment in a building with 2 to 3 units
 5. Apartment in a building with 4 or more units
 6. Other (Please describe)
 98. Don't know
 99. Prefer not to answer
28. What fuel does your main heating system use?
1. Electricity
 2. Natural Gas
 3. Propane
 4. Something else (Please specify)
 98. Don't know
 99. Prefer not to answer
29. What fuel does your main water heater use?
1. Electricity
 2. Natural Gas

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- 3. Propane
- 4. Something else (Please specify)
- 98. Don't know
- 99. Prefer not to answer

30. Approximately when was your home built?

- 1. Before 1960
- 2. 1960 to 1979
- 3. 1980 to 1999
- 4. 2000 to 2009
- 5. 2010 or later
- 98. I don't know
- 99. Prefer not to answer

31. About how many square feet is your home? If you are unsure, an estimate is okay.

- 1. Less than 1,000 square feet
- 2. 1,000-1,999 square feet
- 3. 2,000-2,999 square feet
- 4. 3,000-3,999 square feet
- 5. Greater than 4,000 square feet
- 98. I don't know
- 99. Prefer not to answer

3 Residential Income Qualified Weatherproofing Survey Instruments

3.1 Virtual Kit Participant Survey Instrument

1. Thank you for taking this survey about your experience with I&M's Income Qualified Home Energy Checkup Program. Your feedback is very important and will help I&M improve the programs and services it offers customers like you.

ADM Associates is conducting this survey on I&M's behalf. Your responses are confidential and will be used for research purposes only. ADM Associates does not share survey data with third parties for marketing purposes. ADM's full privacy statement can be viewed at: admenergy.com/privacy

2. Our records indicate that your household received a kit of energy saving items from I&M. Is that correct?
 1. Yes
 2. No (TERMINATE SURVEY)
 98. Don't know (TERMINATE SURVEY)

[Display if Q2 = 1]

3. Did you or anyone in your household take part in a telephone home energy checkup through the program?
 1. Yes
 2. No
 98. Don't know

[Display if Q3 = 1]

4. How did you first learn about I&M's Income Qualified Home Energy Checkup program?

[RANDOMIZE 1 – 8]

1. Email from I&M
2. Mailer from I&M or message on your utility bill
3. I&M Website (www.electricideas.com or indianamichiganpower.com)
4. Friend or relative (word-of-mouth)
5. Program representative
6. Community or public event with program representatives
7. Social media (Facebook, Instagram or Twitter)
8. Other (Please Specify)
98. Don't know

[Display if Q3 = 1]

5. How did you sign up for the program?
1. Using the online form on the I&M website
 2. By telephone
 3. Some other way (please describe)

[Display if Q3 = 1]

6. How easy or difficult was it to sign up for the program?
1. Very easy
 2. Somewhat easy
 3. Somewhat difficult
 4. Very difficult

[Display Q7 if Q6 = 3 or 4]

7. What was difficult about the sign-up process?

Kit Installation

[Display Q8 , Q9, and Q10 on the same page]

[Display if KIT = GAS]

8. **[Display if STATE = IN]** Our records say that you received a kit of energy saving items from I&M. This kit included advanced power strips, and night lights.
[Display if STATE = MI] Our records say that you received a kit of energy saving items from I&M. This kit included LED light bulbs, a 3-way LED bulb, an advanced power strip, and night lights.

[Display if KIT = ELEC]

9. **[Display if STATE = IN]** Our records say that you received a kit of energy saving items from I&M. This kit included an advanced power strip, a high efficiency showerhead, a kitchen faucet aerator, a bathroom faucet aerator, and night lights.
[Display if STATE = MI] Our records say that you received a kit of energy saving items from I&M. This kit included LED light bulbs, advanced power strips, a high efficiency showerhead, a kitchen faucet aerator, a bathroom faucet aerator, 3-way LED bulb, and night lights.

[Display Q8 , Q9, and Q10 on the same page]

10. Did you receive that kit from I&M?

1. Yes
2. No **[Skip to next section]**
98. Not sure **[Skip to next section]**

11. We would like to know if you have had a chance to install any of the kit items and how many of the items are currently installed.

LED Lightbulbs

[Display if STATE = MI]

12. How many of the 8 LED lightbulbs are currently installed?

- 0. 0
- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8
- 98. Don't know

[Display Q13 if Q12 = 1 - 8]

13. What types of bulbs did you replace with the new LED light bulbs? (Please select all that apply)

[Multiselect]

- 1. CFLs
- 2. Incandescent/halogen
- 3. LEDs
- 98. Don't know

[Display Q14 if Q13 = 1]

14. How many CFLs did the new LED light bulbs replace?

[Display Q14 if Q13 = 2]

15. How many incandescent/halogen light bulbs did the new LED light bulbs replace?

[Display Q15 if Q13 = 3]

16. How many LED light bulbs did the new LED light bulbs replace?

[Display Q17 if Q12 = 0 - 7]

17. You indicated that you have not installed [8- Q12 RESPONSE] LED bulb(s). How many of those do you think you will install in the next 6 months?

- 0. 0 [Display if Q12 = 0, 1, 2, 3, 4, 5, 6, 7]
- 1. 1 [Display if Q12 = 0, 1, 2, 3, 4, 5, 6, 7]
- 2. 2 [Display if Q12 = 0, 1, 2, 3, 4, 5, 6]
- 3. 3 [Display if Q12 = 0, 1, 2, 3, 4, 5]

- 4. 4 [Display if Q12 = 0, 1, 2, 3,4]
- 5. 5 [Display if Q12 = 0, 1, 2,3]
- 6. 6 [Display if Q12 = 0,1,2]
- 7. 7 [Display if Q12 = 0,1]
- 8. 8 [Display if Q12 = 0]
- 98. Don't know

[Display Q18 if Q12 = 0, 1, 2, 3, 4, 5, 6, OR 7]

18. Why have you not installed all of the LED bulbs yet? (Select all that apply)

- 1. I did not receive 8 bulbs
- 2. I have not had the time to install them
- 3. I am not interested in installing them
- 4. I am waiting for light bulbs to burn out before replacing them
- 5. I don't like them
- 6. Some of the bulbs were broken/did not work
- 6. Other (Please specify)
- 98. Don't know

19. Before you received the energy efficiency kit, what share of the light bulbs in your home were LED? Your best guess is fine.

- 1. None
- 2. Some but less than 25%
- 3. Between 25% and 75%
- 4. More than 75%
- 98. Don't know

Advanced Power Strip

20. Have you started using the advanced power strip that you received in the kit?

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

[Display Q21 if Q20 = 2]

21. Why are you not using the Advanced Power Strip? (Select all that apply)

- 1. The power turned off while I was using equipment that was plugged into it
- 2. I'm not sure how to use it
- 3. I'm not interested in using it
- 4. I didn't have a need for it
- 5. Other (Please specify)
- 98. Don't know

[Display Q22 if Q20 =2]

22. Do you plan to start using the advanced power strip in the next six months?

1. Yes
2. No

[if Q20 = 1 , SET APS USE TO

“is plugged into”,

if Q22 =1, SET APS USE TO,

“will you plug into”]

[Display if Q20 = 1 OR Q22 =1]

23. What kind of equipment [APS_USE] the advanced power strip?

[Multiselect]

1. Audio/visual/entertainment equipment
2. Computer/office equipment
3. Other types of equipment

[Display if Q23 = 3]

24. What other types of equipment are plugged into the advanced power strip?

[Display Q25 thru Q27 if STATE = MI]

25. Is the 3-way LED bulb currently installed?

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

[Display Q26 if Q25 = 1]

26. Do you plan to install the 3-way LED bulb in the next 6 months?

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

[Display Q27 if Q25 = 1]

27. Why have you not installed the 3-way bulb? (Select all that apply)

[Multiselect]

1. I did not receive the 3-way bulb
2. I have not had the time to install it
3. I am not interested in installing it

- 4. I am waiting for light bulbs to burn out before replacing them
- 5. I don't like them
- 8. Other (Please specify)
- 98. Don't know

Showerhead

[Display Q28 if KIT = ELEC]

28. Is the showerhead currently installed?

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

[Display Q29 if Q28 = 1]

29. Do you plan to install the showerhead in the next 6 months?

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

[Display Q30 if Q28 = 1]

30. Why have you not installed the showerhead? (Select all that apply)

[Multiselect]

- 1. I did not receive the showerhead
- 2. I have not had the time to install it
- 3. I am not interested in installing it
- 4. I do not have enough showers to use it
- 5. I did not know how to install the showerhead
- 6. I need physical assistance or tools to install it
- 7. I don't like it
- 8. Other (Please specify)
- 98. Don't know

Kitchen Faucet Aerator

[Display Q31 if KIT = ELEC]

31. Is the kitchen faucet aerator currently installed?

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

[Display Q32 if Q31 =2]

32. Do you plan to install the kitchen faucet aerator in the next 6 months?

1. Yes
2. No

[Display Q33 if Q31 = 2]

33. Why have you not installed the kitchen faucet aerator? (Select all that apply)

[Multiselect]

1. I did not receive it
2. I have not had the time to install it
3. I am not interested in installing it
4. I did not know how to install it
5. I need physical assistance or tools to install it
6. I don't like it
7. Other (Please specify)
98. Don't know

Bathroom Faucet Aerator

[Display Q34 if KIT = ELEC]

34. Is the bathroom faucet aerator currently installed?

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

[Display Q35 if Q34 = 1]

35. Do you plan to install the bathroom faucet aerator in the next 6 months?

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

[Display Q36 if Q34 = 1]

36. Why have you not installed the bathroom faucet aerator? (Select all that apply)

[Multiselect]

1. I did not receive it
2. I have not had the time to install it
3. I am not interested in installing it
4. I don't like it
5. I did not know how to install it
6. I need physical assistance or tools to install it
7. Other (Please specify)
98. Don't know

LED Night Lights

37. How many of the two LED night lights are currently installed?

- 0. 0
- 1. 1
- 2. 2
- 98. Don't know

[Display Q38 if Q37= 0, 1]

38. You indicated that you have not installed [2 - Q37 RESPONSE] LED night light(s). How many of those do you think you will install in the next 6 months?

- 0. [Display if Q28 = 0 OR 1] 0
- 1. [Display if Q28 = 0 OR 1] 1
- 2. [Display if Q28 = 0] 2
- 98. Don't know

[Display Q39 if Q37 = 0,1]

39. Why have you not installed both of the LED night lights? (Select all that apply)

[Multiselect]

- 1. I did not receive them
- 2. I have not had the time to install them
- 3. I am not interested in installing them
- 4. I don't like them
- 5. I didn't need them
- 6. Other (Please specify)
- 98. Don't know

[Display Q40 if Q37 = 1 or 2]

40. When you installed the LED night light(s), did you replace a night light(s) that you already had, or did you plug it into an empty outlet?

- 1. Replaced a night light
- 2. Installed the night light in an empty socket
- 3. [Display if Q37 = 2] Replaced one night light and installed the other in an empty socket
- 98. Don't know

[Display Q41 if Q37 = 2]

41. Did either of the night lights that you installed replace a night light that you already had or did they plug into unused outlets?

- 1. Neither replaced a night light they already had
- 2. One replaced a night light they already had
- 3. Both replaced a night light they already had

98. Don't know

[Display Q42 if Q38 = 1 or 2]

42. When you install the night light(s) you haven't already installed, will you...

1. Replace another night light
2. Install in an empty socket
3. **[Display if Q38 = 2]** Replace one night light and install the other in an empty socket
98. Don't know

Window Film

43. The kit you received had enough window film to install on 3 windows. How many windows have you installed the window film on?

0. 0
1. 1
2. 2
3. 3 or more
98. Don't know

[Display Q44 if Q43 = 0, 1, 2]

44. You indicated that you have installed the window film on [QError! Reference source not found. RESPONSE]. How many more windows do you think you will install the window film on in the next 6 months?

0. **[Display if Q43 = 0 ,1, 2]** 0
1. **[Display if Q43 = 0 ,1, 2]** 1
2. **[Display if Q43 = 0, 1]** 2
3. **[Display if Q43 = 0]** 3 or more
98. Don't know

[Display Q45 if Q43 = 0,1,2]

45. Why have you not installed all of the window film? (Select all that apply)

[Multiselect]

1. I did not receive them
2. I haven't had time to install them
3. I am not interested in installing them
4. I didn't like the appearance or design
5. I didn't need window film for all of my windows
6. I didn't have windows that matched the size of the film
7. I don't know how to install them
8. I had difficulty installing them
9. Other (please specify)

98. Don't know

Experience with energy checkup

[Display section of Q3 = 1]

46. The next few questions are about the telephone discussion of your home energy use with the program representative. Were you the person in your household who participated in the virtual audit?

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

[Display Q47 if Q46 = 1]

47. About how long did the discussion take?

- 1. 15 minutes or less
- 2. 15 to 30 minutes
- 3. 30 to 45 minutes
- 4. 45 to 60 minutes
- 5. More than 60 minutes
- 98. Don't know

[Display q48 if q46 = 1]

48. Did the person you spoke with provide any energy saving tips?

- 1. Yes
- 2. No

[Display Q49 if Q48 = 1]

49. What energy saving tips do you recall?

[Display Q50 if Q46 = 1]

50. Overall, how useful was the discussion for helping you understand ways you can save energy?

- 1. 1 (Not at all useful)
- 2. 2
- 3. 3
- 4. 4
- 5. 5 (Very useful)

[Display Q51 if Q50= 1, 2, or 3]

51. Why do you think the discussion was not very useful for helping you understand ways you can save energy?

Participant satisfaction

[Display section of Q3 = 1]

52. 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)]

- a. The energy checkup service, overall
- b. The information provided through the discussion
- c. [Display if Q10 = 1] The kit items that you received

[Display Q53 if ANY IN Q52 < 3]

53. Why are you dissatisfied with those aspects of the program you mentioned?

[TEXT BOX]

54. Using the scale below, how dissatisfied or satisfied are you with I&M as your electricity service provider?

[SCALE: 1 = 1 (Very dissatisfied) 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very satisfied)]

55. Given your experience with the energy checkup service, how likely are you to recommend it to your friends or family?

[SCALE: 0 = 0 (Not at all likely) 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5 6 = 6, 7 = 7, 8 = 8, 9 = 9, 10 = 10 (Extremely likely)]

56. Why do you give it that rating?

Demographics/Home characteristics

57. The next few questions are about your household. Like all of your responses, this information will be kept confidential but you do not need to answer any question you do not want to answer.

58. Do you rent this residence, or own it and rent it to someone else?

- 1. Own
- 2. Rent
- 3. Own and rent to someone else
- 99. Prefer not to answer

59. Which of the following best describes your home? Is it a...

1. Manufactured home
2. Single-family house detached from any other house
3. Single family house attached to one or more other houses, for example, duplex, row house, or townhome
4. Apartment in a building with 2 to 3 units
5. Apartment in a building with 4 or more units
6. Other (Please Specify)
99. Prefer not to answer

60. When was your home built?

1. Before 1950
2. 1950 to 1959
3. 1960 to 1969
4. 1970 to 1979
5. 1980 to 1989
7. 1990 to 1999
8. 2000 to 2009
9. 2010 or later
99. Prefer not to answer

61. What is the main fuel used for heating your home?

1. Electricity
2. Natural Gas
3. Propane
4. Something else
5. Don't heat home
99. Prefer not to answer

62. What fuel does your main water heater use?

1. Electricity
2. Natural Gas
3. Propane
4. Something else
5. Don't heat home

99. Prefer not to answer

63. Including yourself, how many people currently live in your home year-round?

1. 1
2. 2
3. 3
4. 4

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- 5. 5
- 6. 6
- 7. 7
- 8. 8 or more
- 99. Prefer not to answer

64. How many bathroom faucets do you have in your home?

- 0. 0
- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8 or more
- 99. Prefer not to answer

65. How many showers do you have in your home?

- 0. 0
- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8 or more
- 98. Prefer not to answer

66. Which of the following best describes your annual household income?

1. Less than \$10,000
2. \$10,000 to less than \$20,000
3. \$20,000 to less than \$30,000
4. \$30,000 to less than \$40,000
5. \$40,000 to less than \$50,000
6. \$50,000 to less than \$75,000
7. \$75,000 to less than \$100,000
8. \$100,000 to less than \$150,000
9. \$150,000 to less than \$200,000
10. \$200,000 or more
99. Prefer not to answer

3.2 In-Home Participant Survey Instrument

1. Our records indicate that your household participated in I&M's Home Energy Checkup Program by receiving an in-home energy assessment and some energy saving home improvements. Is that correct?

1. Yes
2. No (TERMINATE SURVEY)
98. Don't know (TERMINATE SURVEY)

Program Awareness

2. How did you first learn about I&M's Home Energy Checkup Program?

1. Email from I&M
2. I&M postal mailing
3. I&M Website (www.electricideas.com or indianamichiganpower.com)
4. Friend or Relative (word-of-mouth)
5. I&M Representative
6. Community event
7. Social media (Facebook, Instagram or Twitter)
8. Other (Specify)
98. Don't know

Energy Audit

3. Did a program representative come to your home to complete a home energy checkup?

1. Yes
2. No
98. Not sure

[Display if Q3= 1]

4. Did you schedule the home energy checkup you received through the program?

1. Yes
2. No, another person in my household scheduled it
3. I am not aware that a home energy assessment was performed

[Display if Q3= 1]

5. What were the main reasons you wanted to have the checkup done in your home? Select all that apply.

1. Required to in order to receive the home improvements
2. Recommended by contractor
3. Recommended by friend or family
4. Wanted to better understand the condition of my home
5. Concerned about a specific issue(s) in my home
6. Save energy to save money
7. Save energy to protect the environment
8. Wanted to make my home more comfortable

[Display if Q3= 1]

6. Did the energy expert that did the home checkup ask you about any concerns you had about your home?

1. Yes
2. No
98. Not Sure

[Display if Q3= 1]

7. Did the energy expert discuss the findings from the checkup with you?

1. Yes
2. No
98. Not Sure

[Display if Q3= 1]

8. At the end of your checkup, did you receive a report or list of recommendations for making your home more energy efficient?

1. Yes
2. No
98. Not Sure

[Display if Q3= 1]

9. On a scale of 1 to 5, where 1 means "Very dissatisfied" and 5 means "Very satisfied", how satisfied were you with each of the following?

1. The amount of time between scheduling and when the checkup took place
2. The time it took to complete the checkup
3. The professionalism of the energy expert

4. The quality of the work performed during the checkup
5. The energy checkup overall

[If any Q9 statement < 3]

10. Why were you dissatisfied with [PIPED RESPONSES < 3]?

11. Not including the energy efficiency improvements that were made to your home, did you learn about any tips for reducing energy use in your home during the checkup?

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

[Display Q12 if Q11= 1]

12. What tips for reducing your energy use did you learn from the home energy checkup?

[Display Q13 if Q12 = 1]

13. Have you implemented any of the energy saving tips that you learned about from the home energy checkup?

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

[Display Q14 if Q13 = 1]

14. Which energy saving tips have you implemented?

[Display if Q3= 1 OR 2]

15. Overall, how useful was the information provided in the home energy checkup? Would you say it was...

1. Not at all useful
2. Not very useful
3. Somewhat useful
4. Very useful

Major Measure Verification [Display if MAJMEAS_COUNT > 0]

16. According to our records you made the following home improvements through I&M's Home Energy Checkup Program. Is this information correct?

[Scale: 1 = Correct, 2 = Incorrect, 98 = Don't know]

[Display if DUCTLESS HP = 1] Ductless heat pump

[Display if REFRIGERATOR = 1] Refrigerator

[Display if AIR SEALING = 1] Air sealing to reduce air leakage and drafts

[Display if INSULATION= 1] Insulation

[Display if any in Q16= 1]

17. The next question is about the [VERIFIED MEASURES] installed through the program. How long did it take for a contractor to contact you to have those improvements made after the checkup was completed?

1. Less than 2 weeks
2. 2 – 4 weeks
3. 5- 6 weeks
4. 7- 8 weeks
5. More than 8 weeks
98. Don't know

[Display if Q17= 1-5]

18. You said it took [PIPED Q17 RESPONSE] for a contractor to contact you about making the improvements. About how long did it take to have the work done from when you first had the energy checkup completed?

1. Less than 2 weeks
2. 2 – 4 weeks
3. 5- 6 weeks
4. 7- 8 weeks
5. More than 8 weeks
98. Don't know

Direct Install Verification [Display if di_meas = 1]

19. According to our records you received the following energy saving items through I&M's Home Energy Checkup Program. Is this information correct?

[Scale: 1 = Correct, 2 = Incorrect, 98 = Don't know]

a) [Display if LED_QUANT > 0] [LED_QUANT] LED light bulbs

[Display if BATH_AERATOR_QUANT > 0] [BATH_AERATOR_QUANT] energy and water efficient bathroom faucet aerators(s)

[Display if KITCHEN_AERATOR_QUANT > 0] [KITCHEN_AERATOR_QUANT] energy and water efficient kitchen faucet aerator(s)

[Display if SHOWER_QUANT > 0] [SHOWER_QUANT] energy and water efficient showerheads

[Display if PIPEWRAP = 1] Pipe wrap

[Display if APS_QUANT > 0] [APS_QUANT] advanced power strip(s)

[Display if NIGHTLIGHT_QUANT > 0] [NIGHTLIGHT_QUANT] Night light(s)

[Display Q20 if Q19A = 2]

20. How many LED light bulbs did you receive?

[Display Q21 if Q19B = 2]

21. How many energy and water efficient bathroom faucet aerators did you receive?

[Display Q22 if Q19C = 2]

22. How many energy and water efficient kitchen faucet aerators did you receive?

[Display Q23 if Q19D = 2]

23. How many energy and water efficient showerheads did you receive?

[Display Q23 if Q19D = 2]

24. How many advanced power strips did you receive?

[Display Q23 if Q19D = 2]

25. How many nightlights did you receive?

[Set variables: If verified (Q19 = 1), set to tracked quantity, else set to value provided in response.]

LED_INSTALLED

BATH_INSTALLED

KITCHEN_INSTALLED

SHOWER_INSTALLED

APS_INSTALLED

NIGHTLIGHT_INSTALLED]

[Display if any of the following > 0:

LED_INSTALLED

BATH_INSTALLED

KITCHEN_INSTALLED

SHOWER_INSTALLED

APS_INSTALLED

NIGHTLIGHT_INSTALLED]

26. Did a program representative install the energy savings items that you received or leave them with you to install yourself?

[Scale: 1 = Installed, 2 = Left them for me to install]

- a) [LED_INSTALLED >0] LED Lightbulbs
- b) [BATH_INSTALLED >0] Bathroom faucet aerators
- c) [KITCHEN_INSTALLED >0] Kitchen faucet aerators
- d) [SHOWER_INSTALLED >0] Showerheads
- e) [APS_INSTALLED >0] Advanced power strips
- f) [NIGHTLIGHT_INSTALLED >0] Nightlights

Nightlights and APS Verification

[Display if NIGHTLIGHT_INSTALLED > 0]

27. Are you currently using all the [NIGHTLIGHT_INSTALLED] nightlights that you received?

- 1. Yes
- 2. No (How many are you using?)

[Display if Q27 = 1 or Q27 = 2 and currently installed count >0]

28. How many of the nightlights that you are currently using replaced an existing nightlight?

[Display if APS_INSTALLED > 0]

29. Are you currently using the advanced power strip? How many of the [APS_INSTALLED] advanced power strips that you received are you currently using?

- 0. 0 (Not using any power strips)
- 1. 1
- 2. [Display if APS_INSTALLED > 1] 2
- 3. [Display if APS_INSTALLED > 2] 3
- 4. [Display if APS_INSTALLED > 3] 4
- 5. [Display if APS_INSTALLED > 4] 5
- 98. Not sure

[Display if Q29 > 0]

30. For each of the advanced power strips that you are currently using, please tell us what type of equipment is plugged into the power strip.

[Scale: 1 = Audio/visual/entertainment equipment, 2 = Computer/office equipment, 3 = Other types of equipment]

- a) [Display if Q29 > 0] Advanced power strip 1
- [Display if Q29 > 1] Advanced power strip 2
- [Display if Q29 > 2] Advanced power strip 3
- [Display if Q29 > 3] Advanced power strip 4
- [Display if Q29 > 4] Advanced power strip 5

[Display if any in Q30 = 3]

31. What other types of equipment are plugged into the advanced power strip?

LED

[Display section if LED_INSTALLED > 0]

32. Are all the [LED_INSTALLED] LED bulbs that you received currently installed in a lamp?

1. Yes
2. No

[Display Q33 if Q32= 1]

33. How many of the [LED_INSTALLED] LED bulbs are currently installed?

34. What types of bulbs did the new LED light bulbs replace? (Please select all that apply)

[Multiselect]

1. CFLs
2. Incandescent/halogen
3. LEDs
98. Don't know

[Display Q35 if Q32 = 1]

35. How many CFLs did the new LED light bulbs replace?

[Display Q35 if Q32 = 2]

36. How many incandescent/halogen light bulbs did the new LED light bulbs replace?

[Display Q36 if Q32 = 3]

37. How many LED light bulbs did the new LED light bulbs replace?

Low-Flow Devices

[Display if BATH_INSTALLED> 0]

38. Are all the [BATH_INSTALLED] bathroom faucet aerators that you received currently installed in your home?

1. Yes
2. No

[Display if Q38 =2]

39. How many of the [BATH_INSTALLED] bathroom faucet aerators are currently installed in your home?

[Display if KITCHEN_INSTALLED> 0]

40. Are all the [KITCHEN_INSTALLED] kitchen aerators that you received currently installed in your home?

1. Yes
2. No (How many are currently installed?)

[Display if Q40 =2]

41. How many of the [KITCHEN_INSTALLED] kitchen faucet aerators are currently installed in your home?

[Display if SHOWER_INSTALLED > 0]

42. Are all the [SHOWER_INSTALLED] low-flow showerheads that you received currently installed in your home?

1. Yes
2. No (How many are currently installed?)

[Display if Q42 = 2]

43. How many of the [SHOWER_INSTALLED] are currently installed in your home?

Program Satisfaction

44. Using a scale where 1 means “very dissatisfied” and 5 means “very satisfied,” please rate how satisfied you are with each of the following:

[Scale: 1 = 1 (Very dissatisfied), 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very satisfied)]

- a. Performance of the items or improvements installed
- b. The effort required to sign up to participate in the program
- c. The quality of the installation work
- d. The program overall

[Display Q45 if ANY IN Q44 < 3]

45. Why are you dissatisfied with the following aspects of the program?

46. Using the same scale where 1 means “very dissatisfied” and 5 means “very satisfied,” how satisfied are you with I&M as your electricity service provider?

[Scale: 1 = 1 (Very dissatisfied) 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very satisfied)]

47. How likely are you to recommend Home Energy Checkup Program to a friend or colleague?

[Scale: 0 (Not at all likely) – 10 (Extremely likely)]

48. Why do you give it that rating?

Demographics/Home Characteristics

49. The next few final questions are about your household. This information will be kept confidential, but you do not need to answer any question you do not want to answer.

50. Do you own the home that participated in the Home Energy Checkup Program, rent it, or own it and rent it to someone else?

1. Own

Indiana Residential Portfolio

- 2. Rent
- 3. Own and rent to someone else
- 99. Prefer not to answer

51. Which of the following best describes your home? Is it a...

- 1. Manufactured home
- 2. Single-family house detached from any other house
- 3. Single family house attached to one or more other houses, for example, duplex, row house, or townhome
- 4. Apartment in a building with 2 to 3 units
- 5. Apartment in a building with 4 or more units
- 6. Other (Specify)
- 99. Prefer not to answer

52. How many bathroom faucets do you have in your home?

- 0. 0
- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8 or more
- 99. Prefer not to answer

53. How many showers do you have in your home?

- 0. 0
- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8 or more
- 98. Prefer not to answer

54. When was your home built?

- 1. Before 1950
- 2. 1950 to 1959
- 3. 1960 to 1969
- 4. 1970 to 1979
- 5. 1980 to 1989

- 7. 1990 to 1999
- 8. 2000 to 2009
- 9. 2010 or later
- 99. Prefer not to answer

55. Including yourself, how many people currently live in your home year-round?

- 1. 1
- 2. 2
- 3. 3
- 4. 4
- 5. 5
- 6. 6
- 7. 7
- 8. 8 or more
- 99. Prefer not to answer

56. Which of the following best describes your annual household income?

- 1. Less than \$10,000
- 2. \$10,000 to less than \$20,000
- 3. \$20,000 to less than \$30,000
- 4. \$30,000 to less than \$40,000
- 5. \$40,000 to less than \$50,000
- 6. \$50,000 to less than \$75,000
- 7. \$75,000 to less than \$100,000
- 8. \$100,000 to less than \$150,000
- 9. \$150,000 to less than \$200,000
- 10. \$200,000 or more
- 99. Prefer not to answer

57. Did your home receive any assistance in paying your electricity bill in the past year?

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

Follow up Discussion

58. We may wish to discuss some of your survey responses in more detail by telephone. If selected, are you open to participating in a telephone conversation with us?

- 1. Yes
- 2. No

[Display if Q58 = 1]

59. Would you prefer to arrange a time to speak by email or by telephone? Please select your preferred method of contact to schedule the interview.

- 1. Email

2. Telephone

[Display if Q58 = 1]

60. Please provide your preferred contact information (email address or telephone number) for scheduling the conversation.

4 Home HVAC Midstream End-User Survey

1. Hello. My name is ____ with ADM Associates and I'm calling on behalf of Indiana Michigan Power's, or I&M's, home energy efficiency heat pump and air conditioner program that provides rebates to I&M customers for installing energy efficient heating and cooling equipment.

I am contacting you because our records indicate that your household installed a new [EQUIPMENT_TYPE]. I would like to ask a few questions about your new [EQUIPMENT_TYPE].

This is not a sales call, and I am not going to ask you to buy anything. If you are interested, you can view our privacy policy statement at admenergy.com/privacy.

Do you have a few minutes?

(If refusal: ask: Is there someone else I can talk to or another time when you could speak?)

(If the call is transferred to a new individual, repeat the introduction)

(If refusal: thank and terminate)

FAQ

(Why are you conducting this study: I&M has hired our firm to evaluate the program. As part of the evaluation, we're talking with customers that received a discount on the equipment to understand their experiences with the equipment. Studies like this help I&M better understand customers' need for energy efficiency programs and services.)

(Timing: This survey should take less than 10 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALL BACK APPOINTMENT)

(Sales concern: I am not selling anything; we would simply like to learn about your experience with the program. Your responses will be kept confidential and not revealed to anyone unless you grant permission.

Email Intro and Screening

[Display Section if Email =1]

2. Thank you for taking this survey to tell us about your experience with the [EQUIPMENT_TYPE] you installed. Your feedback is very important to us and will help us improve our programs for customers like you. This survey should take less than 10 minutes.

Your responses are confidential and will be used for research purposes only. ADM Associates does not share survey data with third parties for marketing purposes. Our full privacy statement is linked here: admenenergy.com/privacy

Once you have entered a response for each question, use the arrow at the bottom right of the screen to get to the next question. If you need to leave the survey, reopen it by clicking on the link in your survey invitation using the same device you first used to click the link (phone, tablet, computer, etc.). When you reopen the survey this way, your previous answers will be saved, and you can continue with the next unanswered question.

Introduction

4. Just to confirm, did you install a new [EQUIPMENT_TYPE] in 2025?

1. Yes
2. No

[Display if Q3 = 2]

5. What is incorrect about the information we have?

1. You installed new energy saving equipment but it was not a [EQUIPMENT_TYPE]
2. You installed [EQUIPMENT_TYPE] but not at that location
3. You did not install any energy saving new equipment in 2025

If Q4 = 3, Terminate Survey]

[Display if Q4 = 1]

6. What type of equipment did you install?

[Display if Q4 = 2]

7. Is the location where the equipment is installed a home or a business?

1. Home
2. Business
3. Other (Please explain)

[Display if Q4 = 2]

8. Does the location receive electricity service from Indiana-Michigan Power (I&M)?

1. Yes
2. No
98. Not sure

Program Influence

9. What were the main benefits you were hoping to get when you chose to install a high efficiency [EQUIPMENT_TYPE], compared to a standard efficiency unit? Please select all that apply.

[Multiselect]

1. Lower energy bills
2. Better performance or comfort (e.g., more consistent temperatures)
3. Longer equipment life
4. Fewer repairs or maintenance issues
5. Quieter operation
6. Environmental benefits (e.g., lower carbon footprint)
7. Rebates or incentives
8. Increased home value
9. Recommendation from contractor or installer

10. Other (please specify)

98. Not sure

10. Did you know that the [EQUIPMENT_TYPE] included a discount provided by I&M?

1. Yes

2. No

[Display if Q8 = 1]

11. Were you planning to install an energy efficient [EQUIPMENT_TYPE] before you learned about the discount provided by I&M?

1. Yes

2. No

98. Not sure

[Display if Q10 = 1]

12. Just to be clear, did you have plans to specifically install an energy efficient [EQUIPMENT_TYPE] instead of installing a standard efficiency [EQUIPMENT_TYPE]?

1. Yes

2. No

98. Not sure

[Display if Q8 = 1]

13. Would you have been able to afford the high efficiency [EQUIPMENT_TYPE] if the discount was not available?

1. Yes

2. No

98. Not sure

[Display if Q8 = 1]

14. If the discount was not provided by I&M, which of the following best describes what you would have done?

1. You would have bought the exact same [EQUIPMENT_TYPE] or one that was more energy efficient

2. You would have bought a less efficient or lower cost [EQUIPMENT_TYPE]

3. You would not have bought a new [EQUIPMENT_TYPE]

[Display if Q8 = 1]

15. Using a scale where 0 is “not at all likely” and 10 is “very likely”, how likely is it that you would have installed the same [EQUIPMENT_TYPE] at about the same time if you had not received the discount?

[Use scale as stated in question]

[Display if Q8 = 1]

16. When might you have installed the same [EFF_MEASURE1/2] if the discount was not available?

1. At the same time as when you installed it
2. Within 6 months of when you installed it
3. Between 6 months and 1 year
4. In more than 1 year to 2 years
5. In two years or more
6. Never, would not have installed an energy efficient [EQUIPMENT_TYPE]
98. Don't know

17. Did the contractor you worked with recommend that you install the energy efficient [EQUIPMENT_TYPE]?

1. Yes
2. No

Heat pump baseline

[Display section if EQUIPMENT_TYPE = heat pump, ductless heat pump, or geothermal heat pump]

18. Did the [EQUIPMENT_TYPE] replace some old heating and cooling equipment?

1. Yes, it replaced both cooling and heating equipment
2. Yes, it replaced cooling equipment
3. Yes, it replaced heating equipment
4. No, it was a new installation that did not replace any equipment

[Display if Q16 = 1]

19. Did the [EQUIPMENT_TYPE] replace a heat pump?

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

Heat pump replacement

[Display section if Q17 = 1]

20. Was the old heat pump working at the time it was replaced?

1. Yes
2. No

21. Thinking about the old heat pump you replaced, which of the following best describes when and how it was originally installed.

1. You bought the house new and the unit was original equipment when you bought it.
2. It was original equipment in a newly constructed home when the previous owner bought it.
3. It was there when you bought the house from a previous owner.
4. You or your family installed the old unit.
5. Other (Please specify)

22. Do you know the approximate age of the old heat pump that was replaced?

1. Yes (How old was it?)
2. No

[Display section if Q20 = 2]

23. Which of the following do you think is the most likely age of the old heat pump:

1. More than 20 years old
2. 15 – 20 years old
3. 10 – 15 years old
4. Less than 10 years old

Other heating equipment replacement

[Display section if Q16 = 3 OR Q17 =2]

24. Was the old heating equipment working at the time it was replaced?

1. Yes
2. No

25. What type of heating system did you have before you installed the [EQUIPMENT_TYPE]?

1. Electric resistance heating
2. An air source heat pump
3. Some other kind of heating system
4. No heating equipment
98. Don't know

[Display if Q23 = 1]

26. Was your electric resistance heating system an electric furnace or baseboard heating?

1. Electric furnace
2. Electric baseboard heating

98. Don't know

27. Thinking about the old heating equipment you replaced, which of the following best describes when and how it was originally installed.

1. You bought the house new and the unit was original equipment when you bought it.
2. It was original equipment in a newly constructed home when the previous owner bought it.
3. It was there when you bought the house from a previous owner.
4. You or your family installed the old unit.
5. Other (Please specify)

28. Do you know the approximate age of the old heating equipment that was replaced?

1. Yes (How old was it?)
2. No

[Display if Q26 = 2]

29. Which of the following do you think is the most likely age of the old heating equipment:

1. More than 20 years old
2. 15 – 20 years old
3. 10 – 15 years old
4. Less than 10 years old

Cooling equipment replacement

[Display section if (Q16 =1 AND Q17 = 2) OR (Q16 =1 AND Q17 = 98) OR Q16 = 2]

30. Was the cooling equipment that you replaced a central air conditioner?

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

[Display if Q28 = 1]

31. Thinking about the [Q28 Response] you replaced, which of the following best describes when and how it was originally installed in.

1. You bought the house new and the unit was original equipment when you bought it.
2. It was original equipment in a newly constructed home when the previous owner bought it.
3. It was there when you bought the house from a previous owner.
4. You or your family installed the old unit.
5. Other (Please specify)

[Display if Q28 = 1]

32. Was the old central air conditioner working at the time it was replaced?

1. Yes

2. No

[Display if Q28 = 1]

33. Do you know the approximate age of the old central air conditioner that was replaced?

1. Yes (How old was it?)
2. No

[Display if Q31 = 2]

34. Which of the following do you think is the most likely age of the old central air conditioner:

1. More than 20 years old
2. 15 – 20 years old
3. 10 – 15 years old
4. Less than 10 years old

Central air conditioner

[Display section if EQUIPMENT_TYPE = air conditioner]

35. Did the central air conditioner that you installed replace a different central air conditioner?

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

[Display if Q33 = 1]

36. Thinking about the central air conditioner that you replaced, which of the following best describes when and how it was originally installed in.

1. You bought the house new and the unit was original equipment when you bought it.
2. It was original equipment in a newly constructed home when the previous owner bought it.
3. It was there when you bought the house from a previous owner.
4. You or your family installed the old unit.
5. Other (Please specify)

[Display if Q33 = 1]

37. Was the old air conditioner working at the time it was replaced?

1. Yes
2. No

[Display if Q33 = 1]

38. Do you know the approximate age of the old air conditioner that was replaced?

1. Yes (How old was it?)
2. No

[Display if Q36 = 2]

39. Which of the following do you think is the most likely age of the old air conditioner:

1. More than 20 years old
2. 15 – 20 years old
3. 10 – 15 years old
4. Less than 10 years old

Home characteristics

40. Which of the following best describes your home? Is it a...

1. Manufactured home
2. Single-family house detached from any other house
3. Single family house attached to one or more other houses, for example, duplex, row house, or townhome
4. Apartment in a building with 2 to 3 units
5. Apartment in a building with 4 or more units
6. Other (Please describe)
98. Don't know

41. When was your home built?

1. Before 1950
2. 1950 to 1959
3. 1960 to 1969
4. 1970 to 1979
5. 1980 to 1989
7. 1990 to 1999
8. 2000 to 2009
9. 2010 or later
98. Don't know

42. What is the approximate square footage of your home? Your best estimate is fine.

5 Midstream HVAC Distributor Interview Guide

Business Background

Objective: Warm up and get additional background information on the business.

1. To begin with, can you tell me about your role in your business?
2. Could you tell me a little about your business and the types of equipment and services you provide?
3. Do you supply larger HVAC systems of greater than 5 tons? *[If yes, probe for the number of systems where they are greater than or less than 5 tons in the past 3 months.]*
4. How many locations does [Company] operate within I&M's service territory?
5. How did you first hear about I&M's Heating and Cooling Program? Why were you interested in participating?
6. To your knowledge, how long has [Company] been a participating distributor in the program?

Training

Objective: Understand the adequacy of the program training and understand if there are opportunities for improvement.

7. Has I&M or ICF provided any training or guidance on the program in the past year?
8. How was that provided?
 1. In-person
 2. Live online webinar
 3. Pre-recorded webinar
 4. Some other way (please specify)
9. How helpful was it for understanding the program and what you needed to do to participate?
10. How could I&M or ICF improve the training and guidance they provide to distributors like you?

Program Influence

11. I have a few questions about how the program might have affected your business practices. Can you tell me which of the following strategies the program team supported you on, if any, to sell more program-qualified units?

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

- b) Encourage dealers to purchase program-qualified units
- c) Conduct training workshops for dealers
- d) Marketing of program-qualified units
- e) Discuss the benefits of program-qualified units with new home builders or purchasing agents
- f) Develop marketing or informational materials for dealers to use

12. Thinking about your sales over the past year, on a scale of 0 to 10, where 0 means "Not at all influential" and 10 means "Extremely influential", how influential was the program on your sales of program-incentivized equipment?

[Insert 0-10 scale as defined in the question]

13. We understand that many factors can affect your decisions about what equipment you choose to stock, but we are interested in understanding how the I&M program may have affected your stocking practices of energy efficient, program-qualified equipment.

If the I&M Program was not offered next year, would you order less of the following types of equipment?

[Scale: 1 = Yes, 2 = No, 98 = Not sure]

- g) **[If CAC = 1]** High efficiency central air conditioners that qualify for the program
- h) **[If Heatpump = 1]** High efficiency air source heat pumps that qualify for the program
- i) **[If Minisplit = 1]** High efficiency ductless heat pumps that qualify for the program
- j) **[If HPWH = 1]** Heat pump water heaters

[Display if any in Q13 = 1]

14. If the I&M Program was not offered next year, how much would you decrease your orders or each of the following types of equipment?

[% Response]

- k) **[If Q13a = 1]** High efficiency central air conditioners that qualify for the program
- l) **[If Q13b = 1]** High efficiency air source heat pumps that qualify for the program
- m) **[If Q13c = 1]** High efficiency ductless heat pumps that qualify for the program
- n) **[If Q13d = 1]** Heat pump water heaters (Only ask about not efficient for rebates and eligible for distributor rebates)

15. Considering your responses to the previous questions and your overall experience, please describe in detail how you believe the program has influenced your sales of high-efficiency air conditioners and heat pumps. Feel free to discuss both positive and negative impacts.

Market Conditions

16. What are the most significant challenges or barriers to sales of efficient HVAC equipment as opposed to less efficient options that are available?
17. Can you identify any specific information gaps or misunderstandings about energy-efficient HVAC technologies among contractors or end-users?
18. Can you suggest any specific improvements or additions to the program that could increase customer acceptance and implementation of energy-efficient HVAC solutions?

Satisfaction

19. Overall, what do you think is working well with the I&M's Heating and Cooling Program?
20. I&M revised the program in 2025 including working with a new company, ICF, to deliver the program. Do you think that this change has improved your experience with the program, not made a difference, or made it worse? Why do you say that?
21. What is your perspective on the program requirements as a participant? (If needed, for example the paperwork, documentation, etc. that is needed to receive the incentive payments)
22. What do you think could be improved about the program?
23. What could the program do to help you increase the percent of units you sell that qualify for program rebates?
24. Is there anything else you would like to discuss about your experience as a distributor in I&M's Heating and Cooling Program?

6 Home Energy Products Retail Participant Survey Instrument

1. Thank you for taking this survey about your experience with I&M's Online Marketplace service. Your feedback is very important and will help I&M improve the programs and services it offers customers like you.

ADM Associates is conducting this survey on I&M's BEHALF. Your responses are confidential and will be used for research purposes only. ADM Associates does not share survey data with third parties for marketing purposes. ADM's full privacy statement can be viewed at: admenenergy.com/privacy

When you take the survey, once you have entered a response for each question, use the arrow at the bottom right of the screen to get to the next question. Click the box below and then click on the arrow at the bottom right to continue with the survey.

2. Our records indicate that your household received a rebate or discount on [ALL_MEASURES] through I&M's Online Marketplace in 2025.
Are you familiar with this?
 1. Yes
 2. No [TERMINATE SURVEY]
3. To begin with, we would like to verify the items that you received an I&M Online Marketplace discount or rebate on. Is this information correct?

[Scale: 1 = Yes, 2 = No, 98 = Don't know]

- a. [If DEHUMIDIFIER_QUANT > 0] [DEHUMIDIFIER_QUANT] Dehumidifier(s)
- b. [If LED_QUANT > 0] [LED_QUANT] LED light bulb(s)
- c. [If APS_QUANT > 0] [APS_QUANT] Advanced power strip(s)
- d. [If SHOWER_QUANT > 0] [SHOWER_QUANT] High efficiency showerhead(s)
- e. [If BATH_QUANT > 0] [BATH_QUANT] High efficiency bathroom faucet aerator(s)
- f. [If KITCHEN_QUANT > 0] [KITCHEN_QUANT] High efficiency kitchen faucet aerator(s)
- g. [If TSTAT_QUANT > 0] [TSTAT_QUANT] Wi-Fi / smart thermostat(s)
- h. [If AIR_QUANT > 0] [AIR_QUANT] Air purifier(s)
- i. [If LED_BATTERY_QUANT > 0] [LED_BATTERY_QUANT] LED light bulbs with batter back up
- j. [If SOCKET_QUANT > 0] [SOCKET_QUANT] Wi-Fi plus Bluetooth smart socket(s)
- k. [If TV_QUANT > 0] [TV_QUANT] Television(s)
- l. [If CENTRAL_AC_QUANT > 0] [CENTRAL_AC_QUANT] Central air conditioner(s)
- m. [If CENTRAL_HP_QUANT > 0] [CENTRAL_HP_QUANT] Central heat pump(s)
- n. [If WINDOW_AC_QUANT > 0] [WINDOW_AC_QUANT] Window air conditioner(s)
- o. [If WATER_HEATER_QUANT > 0] [WATER_HEATER_QUANT] Water heater(s)

[Display Q4 if any in Q3 = 2]

4. What is incorrect about our information?

[Multiselect, make 3 exclusive]

1. The number of products you got a rebate or discount for
2. The type of products you got a rebate or discount for
3. You did not get an I&M Online Marketplace discount or rebate for the product

[Display Q5 if Q4=1]

5. How many of the products did you get a rebate or discount for?

[Table of text boxes]

1. **[If Q3a = 2]** Dehumidifier(s)
2. **[If Q3b = 2]** LED light bulb(s)
3. **[If Q3c = 2]** Advanced power strip(s)
4. **[If Q3d = 2]** High efficiency showerhead(s)
5. **[If Q3e = 2]** High efficiency bathroom faucet aerator(s)
6. **[If Q3f = 2]** High efficiency kitchen faucet aerator(s)
7. **[If Q3g = 2]** Wi-Fi / smart thermostat(s)
8. **[If Q3h = 2]** Air purifier(s)
9. **[If Q3i = 2]** LED light bulbs with batter back up
10. **[If Q3j = 2]** WiFi plus Bluetooth smart socket(s)
11. **[If Q3k = 2]** Television(s)
12. **[If Q3l = 2]** Central air conditioner(s)
13. **[If Q3m = 2]** Central heat pump(s)
14. **[If Q3n = 2]** Window air conditioner(s)
15. **[If Q3o = 2]** Water heater(s)

[Display Q6 if Q4=2]

6. What products did you buy from the I&M Online Marketplace?

[TERMINATE SURVEY if NONE IN Q3 = 1]

Awareness and Motivation

7. How did you first learn about I&M's Online Marketplace?

[Randomize 1-4]

1. From an email
2. From a friend, family member, or colleague
3. Through an internet search
4. When logging on the I&M website
5. In some other way (Please describe)

[Display if Q7 = 1]

8. What kind of email did you learn about the marketplace from?
1. An email promoting the Online Marketplace product you purchased
 2. An email promoting a different Online Marketplace product than the one you purchased
 3. An I&M newsletter
 4. An email with information on my home energy use and information on the Online Marketplace
 5. Some other kind of email (Please describe)
9. Which of the following are reasons why you chose to shop on the Online Marketplace?

[Select all that apply. Randomize 1-4]

1. To save money on the product because an I&M discount was available
 2. The website provided information on products that save energy
 3. It was convenient
 4. The product selection was good
 5. For some other reason (Please describe)
10. How easy was it to find the product(s) you were looking for on the Online Marketplace?
1. Very easy
 2. Easy
 3. Difficult
 4. Very difficult

[Display if Q10= 3 or 4]

11. What was difficult or what would have made it easier to find the product(s)?

12. How easy was it to identify products that are eligible for an I&M rebate or discount?

1. Very easy
2. Easy
3. Difficult
4. Very difficult

[Display if Q12= 3 or 4]

13. What was difficult or what would have made it easier to find the rebated or discounted products?

LED Verification

[Display Section if Q3B= 1]

14. Are/is the [LED_QUANT] LED light bulbs that you purchased from the Online Marketplace currently installed?

1. Yes
2. [Display if LED_QUANT > 1] Some are
3. No, none are

[Display if Q14= 2]

15. How many of the [LED_QUANT] LED light bulbs that you purchased are currently installed?

[Display if Q14= 2 or 3]

16. How many more of the [UNINSTALLED COUNT] LED light bulbs that you have not installed do you think you will install in the next six months?

[Display if Q14= 2 or 3]

17. Why have you not installed all of the LED bulbs yet? (Select all that apply)

1. I have not had the time to install them
2. I am not interested in installing them
3. I am waiting for light bulbs to burn out before replacing them
4. I don't like them
5. Some or all of the bulbs were broken
6. Other (Please specify)
98. Don't know

LED with Battery Backup Verification

[Display Section if Q3B= 1]

18. Are/is the [LED_BATTERY_QUANT] LED light bulbs with a battery backup that you purchased from the Online Marketplace currently installed?

1. Yes
2. [Display if LED_QUANT > 1] Some are
3. No, none are

[Display if Q18= 2]

19. How many of the [LED_BATTERY_QUANT] LED light bulbs with a battery backup that you purchased are currently installed?

[Display if Q18= 2 or 3]

20. How many more of the [LED_BATTERY_QUANT] LED light bulbs with a battery backup do you think you will install in the next six months?

[Display if Q18= 1 or 2]

21. Are you using the light bulbs with the battery backup in the same way you would use any other light bulb, or are you using them for a special use such as where you don't have an outlet?

1. Using it the same as any other light bulb
2. Using them for a special application

[Display if Q21= 1 or 2]

22. Could you briefly describe how you are using the light bulbs with battery backup?

[Display if Q18= 1 or 2]

23. About how many hours are you using the light bulbs with a battery back up in a typical week?

If you are using more than one, please provide an average.

Your best guess is fine.

APS Verification

[Display Section if Q3B = 1]

24. Did you order the energy-saving Advanced Power Strip(s) for use in a home or a business location?

1. For use in a home
2. For use in a business
3. [Display if APS_QUANT >1] Both, or use in a home and a business

25. How many of the [APS_QUANT] energy saving Advanced Power Strip(s) that you purchased from the I&M online marketplace are you currently using?

0. 0 (Not using any power strips purchased)
1. 1
2. 2

[Display Q26 if APS_QUANT - Q25 >0]

26. Why are you not using the Advanced Power Strip? (Select all that apply)

1. The power turned off while I was using equipment that was plugged into it
2. I'm not sure how to use it
3. I'm not interested in using it
4. I didn't have a need for it
5. Other (Please specify)

98. Don't know

[Display Q27 if APS_QUANT - Q25 > 0]

27. How many of the **[APS_QUANT - Q25]** Advanced Power Strip(s) you have not started using do you think you will start using in the next six months?

[Calculate APS_TOTAL as Q27 + Q25]

[Display QError! Reference source not found. if APS_TOTAL > 0]

28. For each of the advanced power strips that you are currently using or will use in the next six months, please tell us what type of equipment is or will be plugged into the power strip.

[Scale: 1. Audio/visual/entertainment equipment, 2. Computer/office equipment, 3. Other types of equipment]

1. **[Display if APS_TOTAL > 0]** Advanced power strip 1
2. **[Display if APS_TOTAL > 1]** Advanced power strip 2

[Display Q29 if any in Q17 = 3]

29. What other kind of equipment are you using with the power strip(s)?

Shower Verification

[Display Section if Q3C = 1]

17. Are/is the **[SHOWER_QUANT]** high efficiency showerhead(s) that you purchased from the Online Marketplace currently installed?

1. Yes
2. **[Display if SHOWER_QUANT > 1]** Some are
3. No, none are

[Display if Q17= 2]

30. How many of the **[SHOWER_QUANT]** high efficiency showerhead(s) that you purchased are currently installed?

[Display if Q17= 2 or 3]

31. How many more of the high efficiency showerhead(s) do you think you will install in the next six months?

[Display if Q17= 2 or 3]

32. Why have you not installed all of the high efficiency showerhead(s)? (Select all that apply)

1. I have not had the time to install them
2. I am not interested in installing them

3. I need help installing them
4. I don't like them
5. Doesn't fit my shower
6. Other (Please specify)
98. Don't know

Bath Verification

[Display Section if Q3D = 1]

33. Are/is the [BATH_QUANT] high efficiency bathroom faucet aerator(s) that you purchased from the Online Marketplace currently installed?

1. Yes
2. [Display if BATH_QUANT > 1] Some are
3. No, none are

[Display if Q33= 2]

34. How many of the [BATH_QUANT] high efficiency bathroom faucet aerator(s) that you purchased are currently installed?

[Display if Q33= 2 or 3]

35. How many more of the high efficiency bathroom faucet aerator(s) do you think you will install in the next six months?

[Display if Q33= 2 or 3]

36. Why have you not installed all of the high efficiency bathroom faucet aerator(s)? (Select all that apply)

1. I have not had the time to install them
2. I am not interested in installing them
3. I need help installing them
4. I don't like them
5. Doesn't fit my faucet
6. Other (Please specify)
98. Don't know

Kitchen Verification

[Display Section if Q3E = 1]

37. Are/is the [KITCHEN_QUANT] high efficiency kitchen faucet aerator(s) that you purchased from the Online Marketplace currently installed?

1. Yes

2. [Display if KITCHEN_QUANT > 1] Some are
3. No, none are

[Display if Q37= 2]

38. How many of the [KITCHEN_QUANT] high efficiency kitchen faucet aerator(s) that you purchased are currently installed?

[Display if Q37= 2 or 3]

39. How many more of the high efficiency kitchen faucet aerator(s) do you think you will install in the next six months?

[Display if Q37= 2 or 3]

40. Why have you not installed all of the high efficiency kitchen faucet aerator(s)? (Select all that apply)
1. I have not had the time to install them
 2. I am not interested in installing them
 3. I need help installing them
 4. I don't like them
 5. Doesn't fit my faucet
 6. Other (Please specify)
 98. Don't know

Smart Plug Verification

[Display Section if Q3E = 1]

41. Are/is the [SOCKET_QUANT] WiFi plus Bluetooth smart sockets(s) that you purchased from the Online Marketplace currently installed?
1. Yes
 2. [Display if SOCKET_QUANT > 1] Some are
 3. No, none are

[Display if Q41= 2]

42. How many of the [SOCKET_QUANT] WiFi plus Bluetooth smart sockets(s) that you purchased are currently installed?

[Display if Q41= 2 or 3]

43. How many more of the WiFi plus Bluetooth smart socket(s) do you think you will install in the next six months?

[Display if Q41= 1 or 2]

44. We would like to know how you are using the WiFi plus Bluetooth smart sockets(s) that you got.

If you are using more than one WiFi plus Bluetooth smart socket, please think of one of them when answering the next few questions.

What do you have plugged into the device?

1. Air purifier
2. Coffee pot / electric tea kettle
3. Computer / computer monitor
4. DVD player
5. DVR
6. Game console
7. Lamp
8. Microwave
9. Mobile device (such as a phone or tablet)
10. Room air conditioner
11. Space heater
12. Stereo/smart speaker or other music player
13. Television set
14. Toaster / toaster oven
15. Something else

45. What other device do you have plugged into the WiFi plus Bluetooth smart socket?

46. Do you use the WiFi plus Bluetooth smart socket to schedule when the [Q44 RESPONSE] is turned on and off?

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

47. Do you use the WiFi plus Bluetooth smart socket connectivity to manually turn the device on and off?

1. Yes
2. No

48. About how much less time is the [Q44 RESPONSE] turned on now that you are controlling it with the WiFi plus Bluetooth smart socket??

1. None - it is on for the same amount of time
2. About 20% less
3. About 40% less
4. About 60% less
5. At least 80% less
98. Not sure

Thermostat Verification

[Display Section if Q3F = 1]

49. Are/is the Wi-Fi thermostat(s) that you received a rebate for currently installed and working?

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

[Display if Q49 = 2]

50. What is wrong with the Wi-Fi thermostat or why is it not installed?

51. What type of thermostat did the Wi-Fi thermostat replace?

- 1 A programmable thermostat that allows you to schedule the temperature settings for different times of the day
- 2 A standard thermostat that lets you set on/off temperatures
- 3 A different Wi-Fi smart thermostat
- 98 Don't know

[Display if Q51 =1]

52. Was the programmable thermostat that was replaced programmed with scheduled times to adjust the temperature at the time you replaced it with the Wifi thermostat?

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

53. Does the Wi-Fi thermostat control a central cooling system, a central heating system, or both?

- 1. Central cooling system
- 2. Central heating system
- 3. Both cooling and heating systems
- 98. Don't know

[Display if Q53 = 2 OR 3]

54. What type of central heating system do you have?

- 1. Central furnace
- 2. Heat pump
- 3. Other (Please specify)
- 98. Don't know

[Display if Q53 = 2 OR 3]

55. What is the main fuel used by the central heating system?

- 1. Electricity
- 2. Natural Gas
- 3. Propane
- 4. Something else (Please specify)

98. Don't know

Free Ridership

56. The next few questions are about the [EFF_MEASURE1] that you got a rebate or discount for from the I&M Online Marketplace. You may have received a rebate or discount on other products but these questions are about the [EFF_MEASURE1].

57. Did you purchase the [EFF_MEASURE1] on the I&M Online Marketplace or did you buy it somewhere else and apply for a rebate using the Online Marketplace?

1. Made the purchase using the I&M Online Marketplace
2. Bought it somewhere else

58. Did you decide to buy the [EFF_MEASURE1]...

1. Before you learned about I&M's Online Marketplace
2. After you learned about I&M's Online Marketplace
98. Don't know

[Display if Q57 = 1 (Purchased product through I&M Online Marketplace)]

59. Did you shop for [EFF_MEASURE1] at any other retailers before buying it on I&M's Online Marketplace?

1. Yes
2. No

[Display if Q59 = 1]

60. What is the most important reason for why you decided to buy the [EFF_MEASURE1] on I&M's Online Marketplace instead of from another retailer?

[RANDOMIZE 1 – 4]

1. It was convenient
2. Shipping was free
3. The instant rebate / price of the product
4. You felt confident in the quality
5. The information about the product efficiency provided on the website
6. For some other reason (Please explain)

61. The I&M's Online Marketplace website shows you an Enervee Score that tells you how energy efficient a product is compared to other products.

[Insert Image]

Do you recall seeing the Enervee Score for the [EFF_MEASURE1] you bought?

1. Yes
2. No

[Ask if Q61 = 1]

62. How important was the Enervee Score in your decision to buy the [EFF_MEASURE1]?

[Scale: 0 (Not at all important) – 10 (Very important)]

63. Were you planning to buy an [EFF_MEASURE1] before you learned that you could get a rebate or discount through I&M's Online Marketplace?

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

64. Would you have been able to buy the [EFF_MEASURE1] if the rebate or discount was not available through I&M's Online Marketplace?

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

[Display Q65 if Q64 = 1]

65. Just to confirm, if the rebate or discount was not available through the program, would you still have paid the additional cost to buy an [EFF_MEASURE1]?

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

[Display Q66 if EFF_MEASURE1 = "smart thermostat"]

66. What kind of thermostat would you most likely have bought if the rebate or discount from I&M was not available?

- 1. The same smart or learning thermostat
- 2. A different smart or learning thermostat
- 3. A programable or manual thermostat
- 4. Would not have purchased a new thermostat
- 98. Don't know

[Display Q67 if EFF_MEASURE1 = "ENERGY STAR air purifier" OR "ENERGY STAR dehumidifier" OR "high efficiency central air conditioner", "high efficiency central heat pump", "high efficiency room air conditioner", "ENERGY STAR television"]

67. What efficiency level of product would you most likely have bought if the rebate or discount from I&M was not available?

- 1. The same or higher efficiency

- 2. A less efficient product
- 3. The lowest efficiency or lowest cost option
- 4. Would not have purchased the product
- 98. Don't know

68. How likely is it that you would have bought the same [EFF_MEASURE1] at about the same time if you could not have received the rebate or discount through the I&M Online Marketplace?

[Scale: 0 (Not at all likely) = 0, 1=1, 2=2, 3=3, 4=4, 5=5, 6=6, 7=7, 8=8, 9=9, 10 (Very likely)=10]

69. Did you buy the [EFF_MEASURE1] sooner than you would have if the information and rebate from the program had not been available?

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

[Display Q70 if Q69 = 1]

70. When might you have bought the same [EFF_MEASURE1] if you had not participated in the program?

- 1. Within 6 months of when you purchased it
- 2. Between 6 months and 1 year
- 3. In more than 1 year to 2 years
- 4. In two years or more
- 98. Don't know

71. At the time you bought them, would you have bought the same number of [EFF_MEASURE1] if a rebate or discount was not available through I&M's Online Marketplace?

- 1. Yes
- 2. No would not have purchased any
- 3. No, would have purchased fewer [EFF_MEASURE1]
- 98. Don't know

[Display Q72 if Q71 = 3]

72. About how many percent fewer [EFF_MEASURE1] do you think you would have bought?

- 1. 1–10% fewer
- 2. 11 – 20% fewer
- 3. 21 – 30% fewer
- 4. 31 – 40% fewer
- 5. 41 – 50% fewer
- 6. 51 – 60% fewer
- 7. 61 – 70% fewer
- 8. 71 – 80% fewer

- 9. 81 – 90% fewer
- 10. 91 – 100% fewer

Participant Spillover

73. We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive or rebate for.

Since participating in the [program_name] program, have you installed any ADDITIONAL energy efficient items in a household in I&M's service territory without receiving an incentive or rebate?

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

[Display if Q73 = 1]

74. We would like to know what you purchased and installed because of your experience with the program that you did not get a rebate or discount for.

Since participating in the program in [YEAR] have you done any of the following?

[Multiselect]

- 1. Purchased and installed an ENERGY STAR® appliance such as refrigerator, dishwasher, clothes washer, or clothes dryer
- 2. Purchased and installed water heater pipe insulation
- 3. Purchased and installed water heater jacket, blanket, or insulation
- 4. Purchased and installed low flow faucet aerators
- 5. Purchased and installed low flow showerheads
- 6. Purchased and installed an ENERGY STAR® room air conditioner
- 7. Purchased and installed an energy efficient water heater, tankless water heater, or heat pump water heater
- 8. Purchased and installed a smart thermostat
- 9. Purchased and installed a high efficiency heating or cooling equipment
- 10. Insulated your attic or walls
- 11. Air sealing (e.g., attic sealing, door seals, foam insulation, or door sweeps)
- 12. Purchased and installed energy saving advanced power strips
- 13. Purchased and installed an ENERGY STAR® pool pump
- 14. Purchased and installed an ENERGY STAR® air purifier
- 15. Purchased and installed an ENERGY STAR® dehumidifier
- 16. Something else
- 17. None of the above **[Exclusive, Skip to end of block]**

[Display Q75 if Q73 = 1]

75. Why did you not get an I&M incentive rebate or discount for that energy saving equipment?

- 1. Did not know an incentive, rebate or discount was available

2. Did not want to complete an application
3. The application paperwork was too long or complicated
4. I planned to but forgot
5. Some other reason (please describe)
6. I did get an incentive [Skip to end of the block]
7. Don't know

[Display if Q74 = 1]

76. What kind of appliance did you purchase?

[Multiselect]

1. Refrigerator
2. Freezer
3. Dishwasher
4. Clothes washer
5. Clothes dryer – Electric
6. Clothes dryer – Gas
7. Other (Please describe)
98. Don't know

[Display if Q74 = 1]

77. Does the appliance have an ENERGY STAR label?

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

[Display if Q74 = 4]

78. How many low flow faucet aerators did you install in bathroom sinks?

[Display if Q74 = 4]

79. How many low flow faucet aerators did you install in kitchen sinks?

[Display if Q74 = 5]

80. How many low flow shower heads did you install?

[Display if Q74 = 6]

81. How many ENERGY STAR® room air conditioners did you install?

[Display if Q74 = 7]

82. How do you know that the water heater you installed is an energy efficient water heater?

[Display if Q74 = 7]

83. What type of water heater did you install? Was it a...

1. Natural gas storage tank water heater
2. Electric storage tank water heater
3. Heat pump water heater
4. A natural gas tank less water heater
5. Some other type of water heater (Specify)
98. Don't know

[Display Q74 = 8]

84. What type of thermostat did the Wi-Fi thermostat replace?

1. A programmable thermostat that allows you to schedule the temperature settings for different times of the day
2. A standard thermostat that lets you set on/off temperatures
3. A different Wi-Fi smart thermostat
98. Don't know

[Display if Q74 = 8]

85. Does the thermostat control your heating system, cooling system, or both?

1. Heating system
2. Cooling system
3. Both

[Display if Q85 = 1 OR 3]

86. Do you have an electric heating system?

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

[Display if Q86 = 1]

87. Is your heating system a heat pump?

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

[Display if Q74 = 9]

88. What type of heating or cooling equipment did you install?

1. Energy-efficient central air conditioner
2. Energy-efficient air source heat pump
3. Energy-efficient ground source heat pump
4. Energy-efficient ductless mini-split heat pump
5. Something else (please describe)

[Display if Q88 = 1]

89. What is the efficiency rating of the HVAC unit you purchased?

1. SEER: **[NUMERIC; OPEN-ENDED]**
2. EER: **[NUMERIC; OPEN-ENDED]**
98. Not sure

[Display if Q74 = 10]

90. What is the R-value of the insulation you installed?

[Display if Q74 = 10]

91. Where did you install the new insulation?

[Multiselect]

1. Attic
2. Walls
98. Don't know

[Display if Q91 = 1]

92. Approximately what size (in square feet) is the attic where the insulation is installed?

1. Square feet: **[NUMERIC; OPEN-ENDED]**
98. Not sure

[Display if Q74 = 11]

93. What type of weatherization products did you purchase and install?

1. Door seals
2. Spray foam insulation
3. Door sweeps

4. Something else (please describe)

[Display if Q93 = 1 – 4, and loop and merge]

94. How many [Q93 RESPONSE] did you purchase and install?

[Display if Q74 = 12]

95. How many energy saving advanced power strips did you purchase and install?

1. 1
2. 2
3. 3 or more

[Display if Q74 = 14]

96. How many ENERGY STAR® air purifiers did you install?

[Display if Q74 = 15]

97. How many ENERGY STAR® dehumidifiers did you install?

[Display if Q74 = 17]

98. What other energy efficient items did you install?

[Loop and merge section for Q74 = 1 – 15, skip if did not install anything]

99. In approximately what month and year did you install the [Q74 response] that you did not receive an incentive for?

100. Using the scale below, how important was the experience with the I&M Online Marketplace in your decision to install the [Q74 response]?

[SCALE: 0 = 0 (Not at all important), 1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5, 6 = 6, 7 = 7, 8 = 8, 9 = 9, 10 = 10 (Extremely important), 98 = Don't know]

101. Using the scale below, how likely would you have been to install the [Q74 response] if you had not used the I&M Online Marketplace?

[SCALE: 0 = 0 (Not at all likely), 1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5, 6 = 6, 7 = 7, 8 = 8, 9 = 9, 10 = 10 (Extremely likely), 98 = Don't know]

Program Satisfaction

102. Overall, how satisfied are you with the following products that you received a rebate or discount for?

[Scale: 1 = 1 (Very dissatisfied), 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very satisfied)]

- a. **[If Q3a = 1]** Dehumidifier(s)
- b. **[If Q3b = 1]** LED light bulb(s)
- c. **[If Q3c = 1]** Advanced power strip(s)
- d. **[If Q3d = 1]** High efficiency showerhead(s)
- e. **[If Q3e = 1]** High efficiency bathroom faucet aerator(s)
- f. **[If Q3f = 1]** High efficiency kitchen faucet aerator(s)
- g. **[If Q3g = 1]** Wi-Fi / smart thermostat(s)
- h. **[If Q3h = 1]** Air purifier(s)
- i. **[If Q3i = 1]** LED light bulbs with battery backup
- j. **[If Q3j = 1]** WiFi plus Bluetooth smart socket(s)
- k. **[If Q3k = 1]** Television(s)
- l. **[If Q3l = 1]** Central air conditioner(s)
- m. **[If Q3m = 1]** Central heat pump(s)

[Display if Q57 = 1 (Purchased product through I&M Online Marketplace)]

103. How clear was the information on the receipt for your Online Marketplace program purchase?

- 1. Very clear
- 2. Somewhat clear
- 3. Somewhat unclear
- 4. Not at all unclear

[Display if Q103 = 3 or 4]

104. What information was unclear? Please select all that apply.

- 1. My final purchase price
- 2. The amount of the rebate from I&M that I received
- 3. The amount of sales tax/or how the tax was calculated
- 4. Something else (Please describe)

[Display if Fast-Track application (applied for rebate)]

105. How easy was it to submit for the rebate, including the account verification process?

- 1. Very easy
- 2. Easy
- 3. Difficult
- 4. Very difficult

[Display if Q105 = 3 or 4]

106. What could make the rebate submission process easier?

107. Overall, how satisfied are you with your I&M Online Marketplace experience?

[Scale: 1 = 1 (Very dissatisfied) , 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very satisfied)]

[Display if Q107 < 3]

108. What would have made your purchase experience better?

109. Given your experience using the online marketplace, how likely are you to recommend the I&M Marketplace to friends or colleague?

[Scale: 0 = 0 (Not at all likely), 1 = 1, 2 = 2, 3 = 3, 4 = 4, 5 = 5, 6 = 6, 7 = 7, 8 = 8, 9 = 9, 10 = 10 (Extremely likely)]

110. Why do you give it that rating?

Demographics/Home Characteristics

111. The next few questions are about your household. This information will be kept confidential and you do not need to answer any question you do not want to answer.

112. Do you own the home where the rebated equipment was installed, rent it, or own it and rent it to someone else?

- 1. Own
- 2. Rent
- 3. Own and rent to someone else
- 98. Don't know
- 99. Prefer not to state

113. Which of the following best describes your home? Is it a...

- 1. Manufactured home
- 2. Single-family house detached from any other house
- 3. Single family house attached to one or more other houses, for example, duplex, row house, or townhome
- 4. Apartment in a building with 2 to 3 units
- 5. Apartment in a building with 4 or more units
- 6. Other (Specify)
- 98. Don't know
- 99. Prefer not to state

114. What fuel does your main water heater use?

1. Electricity
2. Natural Gas
3. Propane
4. Something else (Specify)
5. Don't heat home
98. Don't know
99. Prefer not to state

115. Including yourself, how many people currently live in your home year-round?

1. 1
2. 2
3. 3
4. 4
5. 5
6. 6
7. 7
8. 8 or more
98. Don't know
99. Prefer not to state

116. Which of the following best describes your annual household income?

1. Less than \$10,000
2. \$10,000 to less than \$20,000
3. \$20,000 to less than \$30,000
4. \$30,000 to less than \$40,000
5. \$40,000 to less than \$50,000
6. \$50,000 to less than \$75,000
7. \$75,000 to less than \$100,000
8. \$100,000 to less than \$150,000
9. \$150,000 to less than \$200,000
10. \$200,000 or more
98. Don't know
99. Prefer not to state

7 Home Energy Report Survey Results

Q2 - We would like your feedback about I&M's Home Energy Reports. These reports provide you with information regarding your home's energy usage and share tips on how you can save energy. Do you recall receiving these reports?

#	Answer	%	Count
1	Yes	90.8%	108
2	No	7.6%	9
3	I don't know	1.7%	2
	Total	100%	119

Q3 - Which of the following statements best describes what you did with the last Home Energy Report you received?

#	Answer	%	Count
1	I read the entire report	41.3%	50
2	I skimmed the main sections of the report	46.3%	56
3	I glanced at it briefly but didn't read the details	4.1%	5
4	I did not read the report at all	1.7%	2
5	I don't remember	6.6%	8
	Total	100%	121

**Q4 - About how many of the Home Energy Reports you received have you read?
It's okay to give your best guess.**

#	Answer	%	Count
1	All the reports I received	43.2%	51
2	Most of the reports I received (more than half)	33.1%	39
3	About half of the reports I received	10.2%	12
4	Some of the reports I received (less than half)	5.9%	7
5	None of the reports I received	0.0%	0
6	I don't remember	7.6%	9
	Total	100%	118

Q5 - What is the main reason that you read less than half of the reports?

#	Answer	%	Count
1	Do not have the time	14.3%	1
2	Limited interest in the report content	14.3%	1
3	The suggested tips were not applicable to my home	14.3%	1
4	Information provided was not valuable or useful	0.0%	0
5	Information in the home energy report appeared inaccurate	14.3%	1
6	I didn't notice receiving the home energy report	0.0%	0
7	Reports were difficult to understand or interpret	14.3%	1
8	Already aware of my energy usage	28.6%	2
9	Other (Please specify)	0.0%	0
	Total	100%	7

Q6 - Has anyone else in your household read the home energy reports?

#	Answer	%	Count
1	Yes	12.4%	15
2	No	67.8%	82
3	Not applicable	14.0%	17
4	I don't know	5.8%	7
	Total	100%	121

Q7 - Were you aware that you could provide an email address to receive your home energy report by email instead of a paper report in the mail?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	100.0%	1
	Total	100%	1

Q8 - Would you prefer to receive an email report instead of a paper report?

#	Answer	%	Count
1	Yes	100.0%	1
2	No	0.0%	0
3	Not sure	0.0%	0
	Total	100%	1

Q9 - How easy or difficult is it to understand the information on your home energy usage? Would you say...

#	Answer	%	Count
1	Very easy	54.6%	65
2	Somewhat easy	31.1%	37
3	Neither easy nor difficult	10.9%	13
4	Somewhat difficult	0.8%	1
5	Very difficult	2.5%	3
	Total	100%	119

Q10 - Thinking about the monthly home energy report, how accurate do you think the information on how much electricity your home uses is? Would you say...

#	Answer	%	Count
1	Very accurate	32.8%	39
2	Somewhat accurate	47.9%	57
3	Neither accurate nor inaccurate	10.1%	12
4	Somewhat inaccurate	4.2%	5
5	Very inaccurate	5.0%	6
	Total	100%	119

Q11 - The home energy report provides information on how much electricity your home uses compared to similar homes. Do you remember seeing that comparison?

#	Answer	%	Count
1	Yes	86.0%	104
2	No	14.0%	17
	Total	100%	121

Q12 - How accurate do you think the home comparison is? Would you say...

#	Answer	%	Count
1	Very accurate	28.2%	29
2	Somewhat accurate	43.7%	45
3	Neither accurate nor inaccurate	11.7%	12
4	Somewhat inaccurate	14.6%	15
5	Very inaccurate	1.9%	2
	Total	100%	103

Q14 - Did you know that you could provide additional information about your home to improve the accuracy of the home comparisons?

#	Answer	%	Count
1	Yes	43.8%	7
2	No	56.3%	9
	Total	100%	16

Q15 - How much do you trust the information in the Home Energy Report?

#	Answer	%	Count
1	A great deal	43.7%	52
2	Somewhat	38.7%	46
3	A little	8.4%	10
4	Not at all	8.4%	10
5	Don't know	0.8%	1
	Total	100%	119

Q17 - How much have you learned about energy-saving actions from the Home Energy Report?

#	Answer	%	Count
1	Nothing at all	10.8%	13
2	A little	34.2%	41
3	A moderate amount	24.2%	29
4	Quite a bit	28.3%	34
5	A great deal	2.5%	3
	Total	100%	120

Q18 - Has the Home Energy Report helped you better understand your household energy usage?

#	Answer	%	Count
1	Not at all	9.7%	11
2	A little	18.6%	21
3	Somewhat	29.2%	33
4	Quite a bit	31.0%	35
5	Very much	11.5%	13
	Total	100%	113

Q19 - How confident do you feel in your ability to control your home's electricity use?

#	Answer	%	Count
1	Not at all confident	4.2%	5
2	Slightly confident	16.1%	19
3	Moderately confident	29.7%	35
4	Confident	29.7%	35
5	Very confident	20.3%	24
	Total	100%	118

Q20 - Which types of information in the report do you find most helpful?

#	Answer	%	Count
1	Tips for changing usage habits	37.5%	45
2	Rebates and incentives	20.8%	25
3	Seasonal energy usage patterns	51.7%	62
4	Comparison with similar homes	42.5%	51
5	Personalized energy insights	29.2%	35
6	None of the above were helpful	12.5%	15
	Total	100%	120

Q21 - Using a scale where 1 means very dissatisfied and 5 means very satisfied, please rate your satisfaction with the following:

#	Question	1 - Very dissatisfied		2		3		4		5 - Very satisfied		Total
1	The accuracy of the information provided about your home's energy use	5.1%	6	5.9%	7	26.3%	31	27.1%	32	35.6%	42	118
2	The relevance of the energy saving tips provided in the report	2.5%	3	8.5%	10	26.3%	31	29.7%	35	33.1%	39	118
3	Visual presentation and layout of the report	4.2%	5	3.4%	4	16.1%	19	28.8%	34	47.5%	56	118
4	The overall value of the Home Energy Report	3.4%	4	7.7%	9	22.2%	26	26.5%	31	40.2%	47	117

Q23 - Are you the person who manages or pays the utility bills in your household?

#	Answer	%	Count
1	Yes	92.6%	112
2	No	5.8%	7
3	Prefer not to answer	1.7%	2
	Total	100%	121

Q24 - Do you rent or own your home?

#	Answer	%	Count
1	Rent	7.5%	9
2	Own	90.8%	109
3	Prefer not to answer	1.7%	2
	Total	100%	120

Q25 - Is the residence located at [Field-Address]...

#	Answer	%	Count
1	Your primary residence	95.9%	116
2	A residence that you rent to someone else	0.0%	0
3	A vacation property that is not occupied year-round	0.8%	1
4	Something else	0.8%	1
5	Prefer not to answer	2.5%	3
	Total	100%	121

Q26 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	3.3%	4
2	Single-family house detached from any other house	85.1%	103
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	3.3%	4
4	Apartment in a building with 2 to 3 units	0.8%	1
5	Apartment in a building with 4 or more units	3.3%	4
6	Other (Please describe)	2.5%	3
7	Don't know	0.0%	0
8	Prefer not to answer	1.7%	2
	Total	100%	121

Q27 - What fuel does your main heating system use?

#	Answer	%	Count
1	Electricity	28.3%	34
2	Natural Gas	65.0%	78
3	Propane	0.8%	1
4	Something else (Please specify)	3.3%	4
5	Don't know	0.0%	0
6	Prefer not to answer	2.5%	3
	Total	100%	120

Q28 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	40.0%	48
2	Natural Gas	55.8%	67
3	Propane	0.8%	1
4	Something else (Please specify)	0.0%	0
5	Don't know	1.7%	2
6	Prefer not to answer	1.7%	2
	Total	100%	120

Q29 - Approximately when was your home built?

#	Answer	%	Count
1	Before 1960	31.4%	38
2	1960 to 1979	33.1%	40
3	1980 to 1999	14.0%	17
4	2000 to 2009	11.6%	14
5	2010 or later	6.6%	8
6	I don't know	1.7%	2
7	Prefer not to answer	1.7%	2
	Total	100%	121

Q30 - About how many square feet is your home? If you are unsure, an estimate is okay.

#	Answer	%	Count
1	Less than 1,000 square feet	10.8%	13
2	1,000-1,999 square feet	58.3%	70
3	2,000-2,999 square feet	14.2%	17
4	3,000-3,999 square feet	1.7%	2
5	Greater than 4,000 square feet	6.7%	8
6	I don't know	5.0%	6
7	Prefer not to answer	3.3%	4
	Total	100%	120

8 Residential Income Qualified Weatherproofing Survey Results

8.1 Kit Recipient Survey Results

Q2 - Our records indicate that your household received a kit of energy saving items from I&M. Is that correct?

#	Answer	%	Count
1	Yes	83.3%	5
2	No	16.7%	1
98	Don't know	0.0%	0
	Total	100%	6

Q4 - How did you first learn about I&M's Income Qualified Home Energy Checkup program?

#	Answer	%	Count
1	Email from I&M	33.3%	1
2	Mailer from I&M or message on your utility bill	33.3%	1
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	0.0%	0
4	Friend or relative (word-of-mouth)	0.0%	0
5	Program representative	0.0%	0
6	Community or public event with program representatives	0.0%	0
7	Social media (Facebook, Instagram or Twitter)	0.0%	0
8	Other (Please Specify)	0.0%	0
98	Don't know	33.3%	1
	Total	100%	3

Q5 - How did you sign up for the program?

#	Answer	%	Count
1	Using the online form on the I&M website	66.7%	2
2	By telephone	33.3%	1
3	Some other way (please describe)	0.0%	0
	Total	100%	3

Q6 - How easy or difficult was it to sign up for the program?

#	Answer	%	Count
1	Very easy	33.3%	1
2	Somewhat easy	33.3%	1
3	Somewhat difficult	33.3%	1
4	Very difficult	0.0%	0
	Total	100%	3

Q13 - We would like to know if you have had a chance to install any of the kit items and how many of the items are currently installed. How many of the 8 LED lightbulbs are currently installed?

#	Answer	%	Count
0	0	0.0%	0
1	1	0.0%	0
2	2	0.0%	0
3	3	0.0%	0
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q14 - What types of bulbs did you replace with the new LED light bulbs? (Please select all that apply)

#	Answer	%	Count
1	CFLs	0.0%	0
2	Incandescent/halogen	0.0%	0
3	LEDs	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q18 - You indicated that you have not installed {8 - [QID4-ChoiceGroup-SelectedChoices]} LED bulb(s). How many of those do you think you will install in the next 6 months?

#	Answer	%	Count
0	0	0.0%	0
1	1	0.0%	0
2	2	0.0%	0
3	3	0.0%	0
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q19 - Why have you not installed all of the LED bulbs yet? (Select all that apply)

#	Answer	%	Count
1	I did not receive 8 bulbs	0.0%	0
2	I have not had the time to install them	0.0%	0
3	I am not interested in installing them	0.0%	0
4	I am waiting for light bulbs to burn out before replacing them	0.0%	0
5	I don't like them	0.0%	0
6	Some of the bulbs were broken/did not work	0.0%	0
7	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q20 - Before you received the energy efficiency kit, what share of the light bulbs in your home were LED? Your best guess is fine.

#	Answer	%	Count
1	None	0.0%	0
2	Some but less than 25%	0.0%	0
3	Between 25% and 75%	0.0%	0
4	More than 75%	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q21 - Have you started using the advanced power strip that you received in the kit?

#	Answer	%	Count
1	Yes	80.0%	4
2	No	20.0%	1
98	Don't know	0.0%	0
	Total	100%	5

Q22 - Why are you not using the Advanced Power Strip? (Select all that apply)

#	Answer	%	Count
1	The power turned off while I was using equipment that was plugged into it	0.0%	0
2	I'm not sure how to use it	0.0%	0
3	I'm not interested in using it	0.0%	0
4	I didn't have a need for it	0.0%	0
5	Other (Please specify)	100.0%	1
98	Don't know	0.0%	0
	Total	100%	1

Q23 - Do you plan to start using the advanced power strip in the next six onths?

#	Answer	%	Count
1	Yes	100.0%	1
2	No	0.0%	0
	Total	100%	1

Q24 - What kind of equipment [Field-APS%20USE] the advanced power strip?

#	Answer	%	Count
1	Audio/visual/entertainment equipment	75.0%	3
2	Computer/office equipment	25.0%	1
3	Other types of equipment	0.0%	0
	Total	100%	4

Q29 - Is the showerhead currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q30 - Do you plan to install the showerhead in the next 6 months?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q31 - Why have you not installed the showerhead? (Select all that apply)

#	Answer	%	Count
1	I did not receive the showerhead	0.0%	0
2	I have not had the time to install it	0.0%	0
3	I am not interested in installing it	0.0%	0
4	I do not have enough showers to use it	0.0%	0
5	I did not know how to install the showerhead	0.0%	0
6	I need physical assistance or tools to install it	0.0%	0
7	I don't like it	0.0%	0
8	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q32 - Is the kitchen faucet aerator currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q33 - Do you plan to install the kitchen faucet aerator in the next 6 months?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
	Total		0

Q34 - Why have you not installed the kitchen faucet aerator? (Select all that apply)

#	Answer	%	Count
1	I did not receive it	0.0%	0
2	I have not had the time to install it	0.0%	0
3	I am not interested in installing it	0.0%	0
4	I did not know how to install it	0.0%	0
5	I need physical assistance or tools to install it	0.0%	0
6	I don't like it	0.0%	0
7	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q35 - Is the bathroom faucet aerator currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q36 - Do you plan to install the bathroom faucet aerator in the next 6 months?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q37 - Why have you not installed the bathroom faucet aerator? (Select all that apply)

#	Answer	%	Count
1	I did not receive it	0.0%	0
2	I have not had the time to install it	0.0%	0
3	I am not interested in installing it	0.0%	0
4	I don't like it	0.0%	0
5	I did not know how to install it	0.0%	0
6	I need physical assistance or tools to install it	0.0%	0
7	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q38 - How many of the two LED night lights are currently installed?

#	Answer	%	Count
0	0	0.0%	0
1	1	60.0%	3
2	2	40.0%	2
98	Don't know	0.0%	0
	Total	100%	5

Q39 - You indicated that you have not installed \$e{2 - [QID24-ChoiceGroup-SelectedChoices]} LED night light(s). How many of those do you think you will install in the next 6 months?

#	Answer	%	Count
0	0	0.0%	0
1	1	100.0%	3
2	2	0.0%	0
	Total	100%	3

Q40 - Why have you not installed both of the LED night lights? (Select all that apply)

#	Answer	%	Count
1	I did not receive them	0.0%	0
2	I have not had the time to install them	0.0%	0
3	I am not interested in installing them	0.0%	0
4	I don't like them	0.0%	0
5	I didn't need them	33.3%	1
6	Other (Please specify)	33.3%	1
98	Don't know	33.3%	1
	Total	100%	3

Q41 - When you installed the LED night light(s), did you replace a night light(s) that you already had, or did you plug it into an empty outlet?

#	Answer	%	Count
1	Replaced a night light	60.0%	3
2	Installed the night light in an empty socket	40.0%	2
3	Replaced one night light and installed the other in an empty socket	0.0%	0
98	Don't know	0.0%	0
	Total	100%	5

Q42 - When you install the night light(s) you haven't already installed, will you...

#	Answer	%	Count
1	Replace another nightlight	33.3%	1
2	Install in an empty socket	33.3%	1
3	Replace one night light and install the other in an empty socket	0.0%	0
98	Don't know	33.3%	1
	Total	100%	3

Q46 - The next few questions are about the telephone discussion of your home energy use with the program representative. Were you the person in your household who participated in this discussion?

#	Answer	%	Count
1	Yes	100.0%	3
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

Q47 - About how long did the discussion take?

#	Answer	%	Count
1	15 minutes or less	66.7%	2
2	15 to 30 minutes	0.0%	0
3	30 to 45 minutes	33.3%	1
4	45 to 60 minutes	0.0%	0
5	More than 60 minutes	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

Q48 - Did the person you spoke with provide any energy saving tips?

#	Answer	%	Count
1	Yes	100.0%	3
2	No	0.0%	0
	Total	100%	3

Q50 - Overall, how useful was the discussion for helping you understand ways you can save energy?

#	Answer	%	Count
1	1 (Not at all useful)	0.0%	0
2	2	0.0%	0
3	3	33.3%	1
4	4	66.7%	2
5	5 (Very useful)	0.0%	0
	Total	100%	3

Q52 - Using the scale below, please rate how dissatisfied or satisfied you are with each of the following:

#	Question	1 (Very dissatisfied)		2		3		4		5 (Very satisfied)		Total
1	The energy checkup service, overall	0.0%	0	0.0%	0	33.3%	1	33.3%	1	33.3%	1	3
2	The information provided through the energy use discussion	0.0%	0	0.0%	0	33.3%	1	33.3%	1	33.3%	1	3
3	The kit items that you received	0.0%	0	0.0%	0	0.0%	0	0.0%	0	100.0%	3	3

Q54 - Using the scale below, how dissatisfied or satisfied are you with I&M as your electricity service provider?

#	Answer	%	Count
1	1 (Very dissatisfied)	0.0%	0
2	2	0.0%	0
3	3	33.3%	1
4	4	33.3%	1
5	5 (Very satisfied)	33.3%	1
	Total	100%	3

Indiana Residential Portfolio

Q57 - Do you rent this residence, or own it and rent it to someone else?

#	Answer	%	Count
1	Own	100.0%	5
2	Rent	0.0%	0
3	Own and rent to someone else	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	5

Q58 - Which of the following best describes your home? Is it a...

#	Answer	%	Count
1	Manufactured home	0.0%	0
2	Single-family house detached from any other house	100.0%	5
3	Single family house attached to one or more other houses, for example, duplex,	0.0%	0
4	row house, or townhome	0.0%	0
5	Apartment in a building with 2 to 3 units	0.0%	0
6	Apartment in a building with 4 or more units	0.0%	0
7	Other (Please Specify)	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	5

Indiana Residential Portfolio

Q59 - When was your home built?

#	Answer	%	Count
1	Before 1950	20.0%	1
2	1950 to 1959	0.0%	0
3	1960 to 1969	20.0%	1
4	1970 to 1979	20.0%	1
5	1980 to 1989	0.0%	0
6	1990 to 1999	0.0%	0
7	2000 to 2009	20.0%	1
8	2010 or later	0.0%	0
99	Prefer not to answer	20.0%	1
	Total	100%	5

Q60 - What is the main fuel used for heating your home?

#	Answer	%	Count
1	Electricity	0.0%	0
2	Natural Gas	80.0%	4
3	Propane	0.0%	0
4	Something else	0.0%	0
5	Don't heat home	0.0%	0
99	Prefer not to answer	20.0%	1
	Total	100%	5

Q61 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	20.0%	1
2	Natural Gas	80.0%	4
3	Propane	0.0%	0
4	Something else	0.0%	0
5	Don't heat home	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	5

Q62 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	40.0%	2
2	2	0.0%	0
3	3	60.0%	3
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
9	Prefer not to answer	0.0%	0
	Total	100%	5

Q63 - How many bathroom faucets do you have in your home?

#	Answer	%	Count
1	0	0.0%	0
2	1	40.0%	2
3	2	40.0%	2
4	3	20.0%	1
5	4	0.0%	0
6	5	0.0%	0
7	6	0.0%	0
8	7	0.0%	0
9	8 or more	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	5

Q64 - How many showers do you have in your home?

#	Answer	%	Count
1	0	0.0%	0
2	1	75.0%	3
3	2	25.0%	1
4	3	0.0%	0
5	4	0.0%	0
6	5	0.0%	0
7	6	0.0%	0
8	7	0.0%	0
9	8 or more	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	4

Q65 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than \$10,000	0.0%	0
2	\$10,000 to less than \$20,000	20.0%	1
3	\$20,000 to less than \$30,000	20.0%	1
4	\$30,000 to less than \$40,000	0.0%	0
5	\$40,000 to less than \$50,000	0.0%	0
6	\$50,000 to less than \$75,000	20.0%	1
7	\$75,000 to less than \$100,000	20.0%	1
8	\$100,000 to less than \$150,000	20.0%	1
9	\$150,000 to less than \$200,000	0.0%	0
10	\$200,000 or more	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	5

8.2 In-Home Participant Survey Results

Q2 - We are conducting a study to evaluate the I&M Home Energy Checkup Program. I&M will use the results of this evaluation to determine the effectiveness of the program and to make improvements. This is not a sales call, and I am not going to ask you to buy anything. If you are interested, you can view our privacy policy statement at admenergy.com/privacy. May I ask you a few questions?

#	Answer	%	Count
1	Yes	100.0%	4
2	No (Thank respondent and terminate the interview)	0.0%	0
	Total	100%	4

Q5 - Our records indicate that your household participated in I&M's Energy Checkup Program by receiving an in-home energy assessment and some energy saving home improvements. Is that correct?

#	Answer	%	Count
1	Yes	100.0%	11
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	11

Q6 - How did you first learn about I&M's Home Energy Checkup Program?

#	Answer	%	Count
1	Email from I&M	18.2%	2
2	I&M postal mailing	45.5%	5
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	0.0%	0
4	Friend or Relative (word-of-mouth)	18.2%	2
5	I&M Representative	0.0%	0
6	Community event	9.1%	1
7	Social media (Facebook, Instagram or Twitter)	0.0%	0
8	Other (Specify)	9.1%	1
98	Don't know	0.0%	0
	Total	100%	11

Q8 - Did you schedule the home energy checkup you received through the program?

#	Answer	%	Count
1	Yes	85.7%	6
2	No, another person in my household scheduled it	14.3%	1
3	I am not aware that a home energy assessment was performed	0.0%	0
	Total	100%	7

Q9 - What were the main reasons you wanted to have the checkup done in your home? Select all that apply.

#	Answer	%	Count
1	Required to in order to receive the home improvements	0.0%	0
2	Recommended by contractor	0.0%	0
3	Recommended by friend or family	0.0%	0
4	Wanted to better understand the condition of my home	83.3%	5
5	Concerned about a specific issue(s) in my home	50.0%	3
6	Save energy to save money	66.7%	4
7	Save energy to protect the environment	16.7%	1
8	Wanted to make my home more comfortable	33.3%	2
	Total	100%	6

Q10 - Did the energy expert that did the home checkup ask you about any concerns you had about your home?

#	Answer	%	Count
1	Yes	33.3%	2
2	No	0.0%	0
98	Not sure	66.7%	4
	Total	100%	6

Q11 - At the end of your checkup, did you receive a report or list of recommendations for making your home more energy efficient?

#	Answer	%	Count
1	Yes	50.0%	3
2	No	0.0%	0
98	Not sure	50.0%	3
	Total	100%	6

Q12 - On a scale of 1 to 5, where 1 means “Very dissatisfied” and 5 means “Very satisfied”, how satisfied were you with each of the following?

#	Question	1 (Very dissatisfied)	2	3	4	5 (Very satisfied)	Total
1	The amount of time between scheduling and when the checkup took place	0.0% 0	0.0% 0	0.0% 0	33.3% 2	66.7% 4	6
2	The time it took to complete the checkup	0.0% 0	0.0% 0	0.0% 0	16.7% 1	83.3% 5	6
3	The professionalism of the energy expert	0.0% 0	0.0% 0	16.7% 1	0.0% 0	83.3% 5	6
4	The quality of the work performed during the checkup	0.0% 0	16.7% 1	0.0% 0	0.0% 0	83.3% 5	6
5	The energy checkup overall	0.0% 0	16.7% 1	0.0% 0	0.0% 0	83.3% 5	6

Q14 - Not including the energy efficiency improvements that were made to your home, did you learn about any tips for reducing energy use in your home during the checkup?

#	Answer	%	Count
1	Yes	50.0%	3
2	No	50.0%	3
98	Don't know	0.0%	0
	Total	100%	6

Q16 - Have you implemented any of the energy saving tips that you learned about from the home energy checkup?

#	Answer	%	Count
1	Yes	100.0%	3
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

Q18 - Overall, how useful was the information provided in the home energy checkup? Would you say it was...

#	Answer	%	Count
1	Not at all useful	14.3%	1
2	Not very useful	0.0%	0
3	Somewhat useful	28.6%	2
4	Very useful	57.1%	4
	Total	100%	7

Q19 - According to our records you made the following home improvements through I&M's Home Energy Checkup Program. Is this information correct?

#	Question	Correct		Incorrect		Don't know		Total
1	Ductless heat pump	0.0%	0	0.0%	0	0.0%	0	undefined
2	Refrigerator	0.0%	0	0.0%	0	0.0%	0	undefined
3	Air sealing to reduce air leakage and drafts	0.0%	0	66.7%	2	33.3%	1	3
4	Insulation	0.0%	0	0.0%	0	0.0%	0	undefined
5	Heat pump water heater	0.0%	0	0.0%	0	0.0%	0	undefined
6	Heat pump	0.0%	0	0.0%	0	100.0%	1	1

Q20 - The next question is about the [QID19-ChoiceGroup-SelectedChoicesForAnswer-1] installed through the program. How long did it take for a contractor to contact you to have those improvements made after the checkup was completed?

#	Answer	%	Count
1	Less than 2 weeks	0.0%	0
2	2 – 4 weeks	0.0%	0
3	5- 6 weeks	0.0%	0
4	7- 8 weeks	0.0%	0
5	More than 8 weeks	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q21 - You said it took [QID20-ChoiceGroup-SelectedChoices] for a contractor to contact you about making the improvements. About how long did it take to have the work done from when you first had the energy checkup completed?

#	Answer	%	Count
1	Less than 2 weeks	0.0%	0
2	2 – 4 weeks	0.0%	0
3	5- 6 weeks	0.0%	0
4	7- 8 weeks	0.0%	0
5	More than 8 weeks	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q22 - According to our records you received the following energy saving items through I&M's Home Energy Checkup Program. Is this information correct?

#	Question	Correct		Incorrect		Don't know		Total
1	[Field-LED%20QUANT] LED light bulbs	100.0%	5	0.0%	0	0.0%	0	5
2	[Field-BATH%20AERATOR%20QUANT] energy and water efficient bathroom faucet aerators(s)	100.0%	2	0.0%	0	0.0%	0	2
3	[Field-KITCHEN%20AERATOR%20QUANT] energy and water efficient kitchen faucet aerator(s)	100.0%	5	0.0%	0	0.0%	0	5
4	[Field-SHOWER%20QUANT] energy and water efficient showerheads	100.0%	4	0.0%	0	0.0%	0	4
5	Pipe wrap	80.0%	4	0.0%	0	20.0%	1	5
6	[Field-APS%20QUANT] advanced power strip(s)	83.3%	5	0.0%	0	16.7%	1	6
7	[Field-NIGHTLIGHT%20QUANT] night light(s)	100.0%	7	0.0%	0	0.0%	0	7

Q47 - Using a scale where 1 means "very dissatisfied" and 5 means "very satisfied," please rate how satisfied you are with each of the following:

#	Question	Very dissatisfied1		2		3		4		Very satisfied5		Total
1	Performance of the items or improvements installed	0.0%	0	0.0%	0	18.2%	2	18.2%	2	63.6%	7	11
2	The effort required to sign up to participate in the program	0.0%	0	0.0%	0	0.0%	0	18.2%	2	81.8%	9	11
3	The quality of the installation work	0.0%	0	0.0%	0	10.0%	1	20.0%	2	70.0%	7	10
4	The program overall	9.1%	1	0.0%	0	9.1%	1	18.2%	2	63.6%	7	11

Q49 - Using the same scale where 1 means “very dissatisfied” and 5 means “very satisfied,” how satisfied are you with I&M as your electricity service provider?

#	Answer	%	Count
1	Very dissatisfied 1	0.0%	0
2	2	0.0%	0
3	3	9.1%	1
4	4	27.3%	3
5	Very satisfied 5	63.6%	7
	Total	100%	11

Q50 - How likely are you to recommend the Home Energy Checkup Program to a friend or colleague?

#	Group	%	Count
1	Detractor	27.3%	3
2	Passive	9.1%	1
3	Promoter	63.6%	7
	Total	100%	11

Q53 - Do you own the home that participated in the Home Energy Checkup Program, rent it, or own it and rent it to someone else?

#	Answer	%	Count
1	Own	27.3%	3
2	Rent	72.7%	8
3	Own and rent to someone else	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	11

Q54 - Which of the following best describes your home? Is it a...

#	Answer	%	Count
1	Manufactured home	18.2%	2
2	Single-family house detached from any other house	36.4%	4
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	0.0%	0
4	Apartment in a building with 2 to 3 units	9.1%	1
5	Apartment in a building with 4 or more units	27.3%	3
6	Other (Please describe)	9.1%	1
99	Prefer not to answer	0.0%	0
	Total	100%	11

Q55 - How many bathroom faucets do you have in your home?

#	Answer	%	Count
0	0	9.1%	1
1	1	72.7%	8
2	2	18.2%	2
3	3	0.0%	0
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	11

Q56 - How many showers do you have in your home?

#	Answer	%	Count
0	0	9.1%	1
1	1	90.9%	10
2	2	0.0%	0
3	3	0.0%	0
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
99	Prefer not to answer	0.0%	0
	Total	100%	11

Q57 - When was your home built?

#	Answer	%	Count
1	Before 1950	9.1%	1
2	1950 to 1959	0.0%	0
3	1960 to 1969	45.5%	5
4	1970 to 1979	0.0%	0
5	1980 to 1989	0.0%	0
6	1990 to 1999	9.1%	1
7	2000 to 2009	0.0%	0
8	2010 or later	0.0%	0
99	Prefer not to answer	36.4%	4
	Total	100%	11

Q58 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	72.7%	8
2	2	27.3%	3
3	3	0.0%	0
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
9	Prefer not to answer	0.0%	0
	Total	100%	11

Q59 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than \$10,000	9.1%	1
2	\$10,000 to less than \$20,000	9.1%	1
3	\$20,000 to less than \$30,000	9.1%	1
4	\$30,000 to less than \$40,000	9.1%	1
5	\$40,000 to less than \$50,000	0.0%	0
6	\$50,000 to less than \$75,000	0.0%	0
7	\$75,000 to less than \$100,000	0.0%	0
8	\$100,000 to less than \$150,000	0.0%	0
9	\$150,000 to less than \$200,000	0.0%	0
10	\$200,000 or more	0.0%	0
99	Prefer not to answer	63.6%	7
	Total	100%	11

Q60 - Did your home receive any assistance in paying your electricity bill in the past year?

#	Answer	%	Count
1	Yes	45.5%	5
2	No	54.5%	6
99	Don't know/Prefer not to answer	0.0%	0
	Total	100%	11

9 Midstream HVAC End-User Survey Results

Q3 - Just to confirm, did you install a new [Field-EQUIPMENT_TYPE]?

#	Answer	%	Count
1	Yes	100.0%	21
2	No	0.0%	0
	Total	100%	21

Q4 - What is incorrect about the information we have?

#	Answer	%	Count
1	You installed new energy saving equipment but it was not a \${e://Field/EQUIPMENT_TYPE}	0.0%	0
2	You installed \${e://Field/EQUIPMENT_TYPE} but not at that location	0.0%	0
3	You did not install any new energy saving equipment in 2025	0.0%	0
	Total		0

Q6 - Is the location where the equipment is installed a home or a business?

#	Answer	%	Count
1	Home	0.0%	0
2	Business	0.0%	0
3	Other (Please explain)	0.0%	0
	Total		0

Q7 - Does the location receive electricity service from Indiana-Michigan Power (I&M)?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	0.0%	0
98	Not sure	0.0%	0
	Total		0

Q8 - What were the main benefits you were hoping to get when you chose to install a high efficiency [Field-EQUIPMENT_TYPE], compared to a standard efficiency unit? Please select all that apply.

#	Answer	%	Count
1	Lower energy bills	65.0%	13
4	Better performance or comfort (e.g., more consistent temperatures)	45.0%	9
5	Longer equipment life	5.0%	1
6	Fewer repairs or maintenance issues	5.0%	1
7	Quieter operation	20.0%	4
8	Environmental benefits (e.g., lower carbon footprint)	5.0%	1
9	Rebates or incentives	25.0%	5
10	Increased home value	25.0%	5
11	Recommendation from contractor or installer	20.0%	4
12	Other (please specify)	15.0%	3
13	Not sure	5.0%	1
	Total	100%	20

Q9 - Did you know that the [Field-EQUIPMENT_TYPE] included a discount provided by I&M?

#	Answer	%	Count
1	Yes	52.4%	11
2	No	47.6%	10
	Total	100%	21

Q10 - Were you planning to install an energy efficient [Field-EQUIPMENT_TYPE] before you learned about the discount provided by I&M?

#	Answer	%	Count
1	Yes	72.7%	8
2	No	27.3%	3
98	Not sure	0.0%	0
	Total	100%	11

Q11 - Just to be clear, did you have plans to specifically install an energy efficient [Field-EQUIPMENT_TYPE] instead of installing a standard efficiency [Field-STANDARD_EQUIPMENT_TYPE]?

#	Answer	%	Count
1	Yes	100.0%	8
2	No	0.0%	0
98	Not sure	0.0%	0
	Total	100%	8

Q12 - Would you have been able to afford the high efficiency [Field-EQUIPMENT_TYPE] if the discount was not available?

#	Answer	%	Count
1	Yes	81.8%	9
2	No	9.1%	1
98	Not sure	9.1%	1
	Total	100%	11

Q13 - If the discount was not provided by I&M, which of the following best describes what you would have done?

#	Answer	%	Count
1	You would have bought the exact same \${e://Field/STANDARD_EQUIPMENT_TYPE} or one that was more energy efficient	72.7%	8
2	You would have bought a less efficient or lower cost \${e://Field/STANDARD_EQUIPMENT_TYPE}	27.3%	3
3	You would not have bought a new \${e://Field/STANDARD_EQUIPMENT_TYPE}	0.0%	0
	Total	100%	11

Q14 - Using a scale where 0 is “not at all likely” and 10 is “very likely”, how likely is it that you would have installed the same [Field-EQUIPMENT_TYPE] at about the same time if you had not received the discount?

#	Answer	%	Count
0	0 (Not at all likely)	0.0%	0
1	1	0.0%	0
2	2	0.0%	0
3	3	0.0%	0
4	4	0.0%	0
5	5	18.2%	2
6	6	0.0%	0
7	7	0.0%	0
8	8	9.1%	1
9	9	0.0%	0
10	10 (Very likely)	72.7%	8
	Total	100%	11

Q15 - When might you have installed the same [Field-EQUIPMENT_TYPE] if the discount was not available?

#	Answer	%	Count
1	At the same time as when you installed it	81.8%	9
2	Within 6 months of when you installed it	0.0%	0
3	Between 6 months and 1 year	9.1%	1
4	In more than 1 year to 2 years	0.0%	0
5	In two years or more	0.0%	0
6	Never, would not have installed an energy efficient \${e://Field/EQUIPMENT_TYPE}	0.0%	0
98	Don't know	9.1%	1
	Total	100%	11

Q16 - Did the contractor you worked with recommend that you install the energy efficient [Field-EQUIPMENT_TYPE]?

#	Answer	%	Count
1	Yes	68.4%	13
2	No	31.6%	6
	Total	100%	19

Q17 - Did the [Field-EQUIPMENT_TYPE] replace some old heating and cooling equipment?

#	Answer	%	Count
1	Yes, it replaced both cooling and heating equipment	40.0%	6
2	Yes, it replaced cooling equipment	20.0%	3
3	Yes, it replaced heating equipment	6.7%	1
4	No, it was a new installation that did not replace any equipment	33.3%	5
	Total	100%	15

Q18 - Did the [Field-EQUIPMENT_TYPE] replace a heat pump?

#	Answer	%	Count
1	Yes	66.7%	4
2	No	33.3%	2
98	Don't know	0.0%	0
	Total	100%	6

Q19 - Was the old heat pump working at the time it was replaced?

#	Answer	%	Count
1	Yes	75.0%	3
2	No	25.0%	1
	Total	100%	4

Q20 - Thinking about the old heat pump you replaced, which of the following best describes when and how it was originally installed.

#	Answer	%	Count
1	You bought the house new and the unit was original equipment when you bought it.	0.0%	0
2	It was original equipment in a newly constructed home when the previous owner bought it.	0.0%	0
3	It was there when you bought the house from a previous owner.	25.0%	1
4	You or your family installed the old unit.	75.0%	3
5	Other (Please specify)	0.0%	0
	Total	100%	4

Indiana Residential Portfolio

Q21 - Do you know the approximate age of the old heat pump that was replaced?

#	Answer	%	Count
1	Yes (How old was it?)	100.0%	4
2	No	0.0%	0
	Total	100%	4

Q22 - Which of the following do you think is the most likely age of the old heat pump:

#	Answer	%	Count
1	More than 20 years old	0.0%	0
2	15 – 20 years old	0.0%	0
3	10 – 15 years old	0.0%	0
4	Less than 10 years old	0.0%	0
	Total		0

Q23 - Was the old heating equipment working at the time it was replaced?

#	Answer	%	Count
1	Yes	100.0%	3
2	No	0.0%	0
	Total	100%	3

Q24 - What type of heating system did you have before you installed the [Field-EQUIPMENT_TYPE]?

#	Answer	%	Count
1	Electric resistance heating	0.0%	0
2	An air source heat pump	0.0%	0
3	Some other kind of heating system	100.0%	3
4	No heating equipment	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

Q25 - Was your electric resistance heating system an electric furnace or baseboard heating?

#	Answer	%	Count
1	Electric furnace	0.0%	0
2	Electric baseboard heating	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q26 - Thinking about the old heating equipment you replaced, which of the following best describes when and how it was originally installed.

#	Answer	%	Count
1	You bought the house new and the unit was original equipment when you bought it.	33.3%	1
2	It was original equipment in a newly constructed home when the previous owner bought it.	0.0%	0
3	It was there when you bought the house from a previous owner.	66.7%	2
4	You or your family installed the old unit.	0.0%	0
5	Other (Please specify)	0.0%	0
	Total	100%	3

Q27 - Do you know the approximate age of the old heating equipment that was replaced?

#	Answer	%	Count
1	Yes (How old was it?)	66.7%	2
2	No	33.3%	1
	Total	100%	3

Q28 - Which of the following do you think is the most likely age of the old heating equipment:

#	Answer	%	Count
1	More than 20 years old	0.0%	0
2	15 – 20 years old	100.0%	1
3	10 – 15 years old	0.0%	0
4	Less than 10 years old	0.0%	0
	Total	100%	1

Q29 - Was the cooling equipment that you replaced a central air conditioner?

#	Answer	%	Count
1	Yes	40.0%	2
2	No	60.0%	3
98	Don't know	0.0%	0
	Total	100%	5

Q30 - Thinking about the central air conditioner you replaced, which of the following best describes when and how it was originally installed in.

#	Answer	%	Count
1	You bought the house new and the unit was original equipment when you bought it.	0.0%	0
2	It was original equipment in a newly constructed home when the previous owner bought it.	0.0%	0
3	It was there when you bought the house from a previous owner.	100.0%	2
4	You or your family installed the old unit.	0.0%	0
5	Other (Please specify)	0.0%	0
	Total	100%	2

Q31 - Was the old central air conditioner working at the time it was replaced?

#	Answer	%	Count
1	Yes	50.0%	1
2	No	50.0%	1
	Total	100%	2

Q32 - Do you know the approximate age of the old central air conditioner that was replaced?

#	Answer	%	Count
1	Yes (How old was it?)	50.0%	1
2	No	50.0%	1
	Total	100%	2

Q33 - Which of the following do you think is the most likely age of the old central air conditioner:

#	Answer	%	Count
1	More than 20 years old	100.0%	1
2	15 – 20 years old	0.0%	0
3	10 – 15 years old	0.0%	0
4	Less than 10 years old	0.0%	0
	Total	100%	1

Q34 - Did the central air conditioner that you installed replace a different central air conditioner?

#	Answer	%	Count
1	Yes	100.0%	4
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	4

Q35 - Thinking about the central air conditioner that you replaced, which of the following best describes when and how it was originally installed in.

#	Answer	%	Count
1	You bought the house new and the unit was original equipment when you bought it.	0.0%	0
2	It was original equipment in a newly constructed home when the previous owner bought it.	25.0%	1
3	It was there when you bought the house from a previous owner.	25.0%	1
4	You or your family installed the old unit.	50.0%	2
5	Other (Please specify)	0.0%	0
	Total	100%	4

Q36 - Was the old air conditioner working at the time it was replaced?

#	Answer	%	Count
1	Yes	25.0%	1
2	No	75.0%	3
	Total	100%	4

Q37 - Do you know the approximate age of the old air conditioner that was replaced?

#	Answer	%	Count
1	Yes (How old was it?)	100.0%	4
2	No	0.0%	0
	Total	100%	4

Q38 - Which of the following do you think is the most likely age of the old air conditioner:

#	Answer	%	Count
1	More than 20 years old	0.0%	0
2	15 – 20 years old	0.0%	0
3	10 – 15 years old	0.0%	0
4	Less than 10 years old	0.0%	0
	Total		0

Q39 - Which of the following best describes your home? Is it a...

#	Answer	%	Count
1	Manufactured home	0.0%	0
2	Single-family house detached from any other house	89.5%	17
3	Single-family house attached to one or more other houses, for example, duplex, row house, or townhome	0.0%	0
4	Apartment in a building with 2 to 3 units	0.0%	0
5	Apartment in a building with 4 or more units	0.0%	0
6	Other (Please describe)	5.3%	1
98	Don't know	5.3%	1
	Total	100%	19

Q40 - When was your home built?

#	Answer	%	Count
1	Before 1950	10.5%	2
2	1950 to 1959	10.5%	2
3	1960 to 1969	10.5%	2
4	1970 to 1979	31.6%	6
5	1980 to 1989	10.5%	2
6	1990 to 1999	5.3%	1
7	2000 to 2009	10.5%	2
8	2010 or later	10.5%	2
98	Don't know	0.0%	0
	Total	100%	19

Q42 - Please provide the email address that you would like the gift card sent to.

#	Answer	%	Count
1	Do not send me a gift card.	0.0%	0
4	Please send my gift card to this email address.	100.0%	19
	Total	100%	19

10 Home Energy Products Retail Participant Survey Results

Q2 - Our records indicate that your household received a rebate or discount on [Field-ALL_MEASURES] through I&M's Online Marketplace. Are you familiar with this purchase?

#	Answer	%	Count
1	Yes	100.0%	17
2	No	0.0%	0
	Total	100%	17

Q3 - To begin with, we would like to verify the items that you received an I&M Online Marketplace discount or rebate on. Is this information correct?

#	Question	Yes		No		Don't know		Total
1	[Field-LED_QUANT] LED light bulb(s)	0.0%	0	0.0%	0	0.0%	0	undefined
2	[Field-DEHUMIDIFIER_QUANT] Dehumidifiers	100.0%	4	0.0%	0	0.0%	0	4
3	[Field-APS_QUANT] Advanced power strip(s)	0.0%	0	0.0%	0	0.0%	0	undefined
4	[Field-SHOWER_QUANT] High efficiency showerhead(s)	0.0%	0	0.0%	0	0.0%	0	undefined
5	[Field-BATH_QUANT] High efficiency bathroom faucet aerator(s)	0.0%	0	0.0%	0	0.0%	0	undefined
6	[Field-KITCHEN_QUANT] High efficiency kitchen faucet aerator(s)	0.0%	0	0.0%	0	0.0%	0	undefined
7	[Field-TSTAT_QUANT] Wi-Fi / smart thermostat(s)	100.0%	5	0.0%	0	0.0%	0	5
8	[Field-AIR_QUANT] air purifier(s)	100.0%	5	0.0%	0	0.0%	0	5
9	[Field-LED_BATTERY_QUANT] LED light bulbs with a battery backup	0.0%	0	0.0%	0	0.0%	0	undefined
10	[Field-SOCKET_QUANT] WiFi plus Bluetooth smart socket(s)	66.7%	2	33.3%	1	0.0%	0	3
11	[Field-TV_QUANT] Television(s)	100.0%	2	0.0%	0	0.0%	0	2
12	[Field-CENTRAL_AC_QUANT] Central air conditioner(s)	0.0%	0	0.0%	0	0.0%	0	undefined
13	[Field-CENTRAL_HP_QUANT] Central heat pump(s)	0.0%	0	0.0%	0	0.0%	0	undefined
14	[Field-WINDOW_AC_QUANT] Window air conditioner(s)	0.0%	0	0.0%	0	0.0%	0	undefined
15	[Field-WATER_HEATER_QUANT] Water heater(s)	0.0%	0	0.0%	0	0.0%	0	undefined

Q4 - What is incorrect about our information?

#	Answer	%	Count
1	The number of products you got a rebate or discount for	0.0%	0
2	The type of products you got a rebate or discount for	0.0%	0
3	You did not get an I&M Online Marketplace discount or rebate for the product	100.0%	1
	Total	100%	1

Q8 - How did you first learn about I&M's Online Marketplace?

#	Answer	%	Count
1	From an email	76.5%	13
4	From a friend, family member, or colleague	5.9%	1
5	Through an internet search	0.0%	0
6	When logging on the I&M website	17.6%	3
7	In some other way (Please describe)	0.0%	0
	Total	100%	17

Q9 - What kind of I&M email did you learn about the marketplace from?

#	Answer	%	Count
6	Some other kind of email (Please describe)	0.0%	0
5	An email with information on my home energy use and information on the Online Marketplace	23.1%	3
7	An email promoting the Online Marketplace product you purchased	15.4%	2
1	An email promoting the Online Marketplace product you purchased	15.4%	2
4	An I&M newsletter	46.2%	6
	Total	100%	13

Q9 - Which of the following are reasons why you chose to shop on the Online Marketplace? (Please select all that apply)

#	Answer	%	Count
1	To save money on the product because an I&M discount was available	82.4%	14
2	The website provided information on products that save energy	17.6%	3
3	It was convenient	23.5%	4
4	The product selection was good	17.6%	3
5	The information about the product efficiency provided on the website	29.4%	5
6	For some other reason (Please describe)	11.8%	2
	Total	100%	17

Q10 - How easy was it to find the product(s) you were looking for on the Online Marketplace?

#	Answer	%	Count
1	Very easy	41.2%	7
2	Easy	58.8%	10
3	Difficult	0.0%	0
4	Very difficult	0.0%	0
	Total	100%	17

Q12 - How easy was it to identify products that are eligible for an I&M rebate or discount?

#	Answer	%	Count
1	Very easy	37.5%	6
4	Easy	62.5%	10
5	Difficult	0.0%	0
6	Very difficult	0.0%	0
	Total	100%	16

Q14 - Are/is the [Field-LED_QUANT] LED light bulbs that you purchased from the Online Marketplace currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	Some are	0.0%	0
3	No, none are	0.0%	0
	Total		0

Q17 - Why have you not installed all of the LED bulbs yet? (Select all that apply)

#	Answer	%	Count
1	I have not had the time to install them	0.0%	0
2	I am not interested in installing them	0.0%	0
3	I am waiting for light bulbs to burn out before replacing them	0.0%	0
4	I don't like them	0.0%	0
5	Some or all of the bulbs were broken	0.0%	0
6	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q18 - Are/is the [Field-LED_BATTERY_QUANT] LED light bulbs with a battery backup that you purchased from the Online Marketplace currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	Some are	0.0%	0
3	No, none are	0.0%	0
	Total		0

Q21 - Are you using the light bulbs with the battery backup in the same way you would use any other light bulb, or are you using them for a special use such as where you don't have an outlet?

#	Answer	%	Count
1	Using it the same as any other light bulb	0.0%	0
2	Using them for a special application	0.0%	0
	Total		0

Q24 - Did you order the energy-saving Advanced Power Strip(s) for use in a home or a business location?

#	Answer	%	Count
1	For use in a home	0.0%	0
2	For use in a business	0.0%	0
3	Both, for use in a home and a business	0.0%	0
	Total		0

Q25 - How many of the [Field-APS_QUANT] energy-saving Advanced Power Strip(s) that you ordered from the I&M online marketplace are you currently using?

#	Answer	%	Count
0	0 (Not using any power strips purchased)	0.0%	0
1	1	0.0%	0
2	2	0.0%	0
	Total		0

Q26 - Why are you not using the / all of the Advanced Power Strips you ordered? (Select all that apply)

#	Answer	%	Count
1	The power turned off while I was using equipment that was plugged into it	0.0%	0
2	I'm not sure how to use it	0.0%	0
3	I'm not interested in using it	0.0%	0
4	I didn't have a need for it	0.0%	0
5	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q28 - For each of the advanced power strips that you are currently using, please tell us what type of equi

#	Question	Audio/visual/entertainment equipment		Computer/office equipment		Other types of equipment		Total
1	Advanced power strip 1	0.0%	0	0.0%	0	0.0%	0	0
2	Advanced power strip 2	0.0%	0	0.0%	0	0.0%	0	0

Q30 - Are/is the [Field-SHOWER_QUANT] high efficiency showerhead(s) that you purchased from the Online Marketplace currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	Some are	0.0%	0
3	No, none are	0.0%	0
	Total		0

**Q33 - Why have you not installed all of the high efficiency showerhead(s) ?
(Select all that apply)**

#	Answer	%	Count
1	I have not had the time to install them	0.0%	0
2	I am not interested in installing them	0.0%	0
3	I need help installing them	0.0%	0
4	I don't like them	0.0%	0
5	Doesn't fit my shower	0.0%	0
6	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q34 - Are/is the [Field-BATH_QUANT] high efficiency bathroom faucet aerator(s) that you purchased from the Online Marketplace currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	Some are	0.0%	0
3	No, none are	0.0%	0
	Total		0

Q37 - Why have you not installed all of the high efficiency bathroom faucet aerator(s)? (Select all that apply)

#	Answer	%	Count
1	I have not had the time to install them	0.0%	0
2	I am not interested in installing them	0.0%	0
3	I need help installing them	0.0%	0
4	I don't like them	0.0%	0
5	Doesn't fit my faucet	0.0%	0
6	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q38 - Are/is the [Field-KITCHEN_QUANT] high efficiency kitchen faucet aerator(s) that you purchased from the Online Marketplace currently installed?

#	Answer	%	Count
1	Yes	0.0%	0
2	Some are	0.0%	0
3	No, none are	0.0%	0
	Total		0

Q41 - Why have you not installed all of the high efficiency kitchen faucet aerator(s)? (Select all that apply)

#	Answer	%	Count
1	I have not had the time to install them	0.0%	0
2	I am not interested in installing them	0.0%	0
3	I need help installing them	0.0%	0
4	I don't like them	0.0%	0
5	Doesn't fit my faucet	0.0%	0
6	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q42 - Are/is the [Field-SOCKET_QUANT] WiFi plus Bluetooth smart socket(s) that you purchased from the Online Marketplace currently in use? By in use we mean they have something plugged into them.

#	Answer	%	Count
1	Yes	50.0%	1
2	Some are	0.0%	0
3	No, none are	50.0%	1
	Total	100%	2

Q45 - We would like to know how you are using the WiFi plus Bluetooth smart sockets(s) that you got. If you are using more than one WiFi plus Bluetooth smart socket, please think of one of them when answering the next few questions. What do you have plugged into the device?

#	Answer	%	Count
1	Air purifier	0.0%	0
2	Coffee pot / electric tea kettle	0.0%	0
3	Computer / computer monitor	0.0%	0
4	DVD player	0.0%	0
5	DVR	0.0%	0
6	Game console	0.0%	0
7	Lamp	100.0%	1
8	Microwave	0.0%	0
9	Mobile device (such as a phone or tablet)	0.0%	0
10	Room air conditioner	0.0%	0
11	Space heater	0.0%	0
12	Stereo/smart speaker or other music player	0.0%	0
13	Television set	0.0%	0
14	Toaster / toaster oven	0.0%	0
15	Something else	0.0%	0
	Total	100%	1

Q47 - Do you use the WiFi plus Bluetooth smart socket connectivity to manually turn the device on and off?

#	Answer	%	Count
1	Yes	100.0%	1
2	No	0.0%	0
	Total	100%	1

Q48 - About how much less time is the [QID76-ChoiceGroup-SelectedChoices] turned on now that you are controlling it with the WiFi plus Bluetooth smart socket?

#	Answer	%	Count
1	None - it is on for the same amount of time	100.0%	2
2	About 20% less	0.0%	0
3	About 40% less	0.0%	0
4	About 60% less	0.0%	0
5	At least 80% less	0.0%	0
98	Not sure	0.0%	0
	Total	100%	2

Q49 - Are/is the Wi-Fi thermostat(s) that you ordered through the I&M Online Marketplace currently installed and working?

#	Answer	%	Count
1	Yes	60.0%	3
2	No	40.0%	2
98	Don't know	0.0%	0
	Total	100%	5

Q51 - What type of thermostat did the Wi-Fi thermostat replace?

#	Answer	%	Count
1	A programmable thermostat that allows you to schedule the temperature settings for different times of the day	33.3%	1
2	A standard thermostat that lets you set on/off temperatures	33.3%	1
3	A different Wi-Fi smart thermostat	33.3%	1
98	Don't know	0.0%	0
	Total	100%	3

Q52 - Was the programmable thermostat that was replaced programmed with scheduled times to adjust the temperature at the time you replaced it with the Wifi thermostat?

#	Answer	%	Count
1	Yes	100.0%	1
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	1

Q53 - Does the Wi-Fi thermostat control a central cooling system, a central heating system, or both?

#	Answer	%	Count
1	Central cooling system	0.0%	0
2	Central heating system	0.0%	0
3	Both cooling and heating systems	100.0%	3
98	Don't know	0.0%	0
	Total	100%	3

Q54 - What type of central heating system do you have?

#	Answer	%	Count
1	Central furnace	100.0%	3
2	Heat pump	0.0%	0
3	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

QID31_3_TEXT - Other (Please specify)
Other (Please specify) - Text

Q55 - What is the main fuel used by the central heating system?

#	Answer	%	Count
1	Electricity	0.0%	0
2	Natural Gas	66.7%	2
3	Propane	33.3%	1
4	Something else (Please specify)	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

QID32_4_TEXT - Something else (Please specify)
Something else (Please specify) - Text

Q57 - Did you purchase the [Field-EFF_MEASURE1] on the I&M Online Marketplace or did you buy it somewhere else and apply for a rebate using the Online Marketplace?

#	Answer	%	Count
1	Made the purchase using the I&M Online Marketplace	47.1%	8
4	Bought it somewhere else	52.9%	9
	Total	100%	17

Q58 - Did you decide to buy the [Field-EFF_MEASURE1]....

#	Answer	%	Count
1	Before you learned about I&M's Online Marketplace	17.6%	3
2	After you learned about I&M's Online Marketplace	82.4%	14
98	Don't know	0.0%	0
	Total	100%	17

Q59 - Did you shop for [Field-EFF_MEASURE1] at any other retailers before buying it on I&M's Online Marketplace?

#	Answer	%	Count
1	Yes	50.0%	4
2	No	50.0%	4
	Total	100%	8

Q60 - What is the most important reason for why you decided to buy the [Field-EFF_MEASURE1] on I&M's Online Marketplace?

#	Answer	%	Count
1	It was convenient	0.0%	0
2	Shipping was free	0.0%	0
3	The instant rebate / price of the product	100.0%	4
4	You felt confident in the quality	0.0%	0
5	For some other reason (Please explain)	0.0%	0
	Total	100%	4

Q61 - The I&M's Online Marketplace website shows you an Enervee Score that tells you how energy efficient a product is compared to other products. Do you recall seeing the Enervee Score for the [Field-EFF_MEASURE1] you bought?

#	Answer	%	Count
1	Yes	58.8%	10
2	No	41.2%	7
	Total	100%	17

Q62 - How important was the Enervee Score in your decision to buy the [Field-EFF_MEASURE1]?

#	Answer	%	Count
1	0 (Not at all important)	10.0%	1
2	1	0.0%	0
3	2	0.0%	0
4	3	0.0%	0
5	4	0.0%	0
6	5	10.0%	1
7	6	0.0%	0
8	7	10.0%	1
9	8	50.0%	5
10	9	10.0%	1
11	10 (Very important)	10.0%	1
	Total	100%	10

Q63 - Were you planning to buy an [Field-EFF_MEASURE1] before you learned that you could get a rebate or discount through I&M's Online Marketplace?

#	Answer	%	Count
1	Yes	52.9%	9
2	No	41.2%	7
98	Don't know	5.9%	1
	Total	100%	17

Q64 - Would you have been able to buy the [Field-EFF_MEASURE1] if the rebate or discount was not available through I&M's Online Marketplace?

#	Answer	%	Count
1	Yes	47.1%	8
2	No	29.4%	5
98	Don't know	23.5%	4
	Total	100%	17

Q65 - Just to confirm, if the rebate or discount was not available through the program, would you still have paid the additional cost to buy an [Field-EFF_MEASURE1]?

#	Answer	%	Count
1	Yes	38.5%	5
2	No	53.8%	7
98	Don't know	7.7%	1
	Total	100%	13

Q66 - What kind of thermostat would you most likely have bought if the rebate or discount from I&M was not available?

#	Answer	%	Count
1	The same smart or learning thermostat	0.0%	0
4	A different smart or learning thermostat	0.0%	0
5	A programable or manual thermostat	0.0%	0
6	Would not have purchased a new thermostat	0.0%	0
7	Don't know	0.0%	0
	Total		0

Q67 - What efficiency level of product would you most likely have bought if the rebate or discount from I&M was not available?

#	Answer	%	Count
1	The same or higher efficiency	0.0%	0
4	A less efficient product	0.0%	0
5	The lowest efficiency or lowest cost option	0.0%	0
6	Would not have purchased the product	0.0%	0
7	Don't know	0.0%	0
	Total		0

Q68 - How likely is it that you would have bought the same [Field-EFF_MEASURE1] at about the same time if you could not have received the rebate or discount through the I&M Online Marketplace?

#	Answer	%	Count
0	0 Not at all likely	25.0%	4
1	1	12.5%	2
2	2	18.8%	3
3	3	6.3%	1
4	4	0.0%	0
5	5	12.5%	2
6	6	6.3%	1
7	7	0.0%	0
8	8	0.0%	0
9	9	0.0%	0
10	10 Very likely	18.8%	3
	Total	100%	16

Q69 - Did you buy the [Field-EFF_MEASURE1] sooner than you would have if the information and financial assistance from the program had not been available?

#	Answer	%	Count
1	Yes	62.5%	10
2	No	18.8%	3
98	Don't know	18.8%	3
	Total	100%	16

Q70 - When might you have bought the same [Field-EFF_MEASURE1] if you had not participated in the program?

#	Answer	%	Count
1	Within 6 months of when you purchased it	10.0%	1
2	Between 6 months and 1 year	30.0%	3
3	In more than 1 year to 2 years	10.0%	1
4	In two years or more	20.0%	2
98	Don't know	30.0%	3
	Total	100%	10

Q71 - At the time you bought them, would you have bought the same number of [Field-EFF_MEASURE1] if a rebate or discount was not available through I&M's Online Marketplace?

#	Answer	%	Count
1	Yes	37.5%	6
2	No would not have purchased any	50.0%	8
3	No, would have purchased fewer \${e://Field/EFF_MEASURE1}	0.0%	0
4	Don't know	12.5%	2
	Total	100%	16

Q72 - About how many percent fewer [Field-EFF_MEASURE1] do you think you would have bought?

#	Answer	%	Count
1	1 - 10 % fewer	0.0%	0
2	11 - 20% fewer	0.0%	0
3	21 - 30% fewer	0.0%	0
4	31 - 40% fewer	0.0%	0
5	41 - 50% fewer	0.0%	0
6	51 -60% fewer	0.0%	0
7	61 - 70% fewer	0.0%	0
8	71 - 80% fewer	0.0%	0
9	81 - 90% fewer	0.0%	0
10	91 - 100% fewer	0.0%	0
	Total		0

Q73 - We would like to know if you have installed any additional energy efficient equipment because of your experience with the program that you DID NOT receive an incentive or rebate for. Since participating in the [Field-program_name] program, have you installed any ADDITIONAL energy efficient items in a household in I&M's service territory without receiving an incentive or rebate?

#	Answer	%	Count
1	Yes	13.3%	2
2	No	73.3%	11
98	Don't know	13.3%	2
	Total	100%	15

Q74 - We would like to know what you purchased and installed because of your experience with the program that you did not get a rebate or discount for. Since participating in the program in [Field-YEAR] have you done any of the following?

#	Answer	%	Count
1	Purchased and installed an ENERGY STAR® appliance such as refrigerator, dish clothes washer, or clothes dryer	0.0%	0
2	Purchased and installed water heater pipe insulation	0.0%	0
3	Purchased and installed water heater jacket, blanket, or insulation	0.0%	0
4	Purchased and installed low flow faucet aerators	0.0%	0
5	Purchased and installed low flow showerheads	50.0%	1
6	Purchased and installed an ENERGY STAR® room air conditioner	0.0%	0
7	Purchased and installed an energy efficient water heater, tankless water heater pump water heater	0.0%	0
8	Purchased and installed a smart thermostat	50.0%	1
9	Purchased and installed a high efficiency heating or cooling equipment	50.0%	1
10	Insulated your attic or walls	0.0%	0
11	Air sealing (e.g., attic sealing, door seals, foam insulation, or door sweeps)	50.0%	1
12	Purchased and installed energy saving advanced power strips	0.0%	0
13	Purchased and installed an ENERGY STAR® pool pump	0.0%	0
14	Purchased and installed an ENERGY STAR® air purifier	50.0%	1
15	Purchased and installed an ENERGY STAR® dehumidifier	100.0%	2
16	Something else	0.0%	0
98	None of the above	0.0%	0
	Total	100%	2

Q84 - What type of thermostat did the smart thermostat replace?

#	Answer	%	Count
1	A programmable thermostat that allows you to schedule the temperature settings for different times of the day	0.0%	0
2	A standard thermostat that lets you set on/off temperatures	0.0%	0
4	A different Wi-Fi smart thermostat	100.0%	1
98	Don't know	0.0%	0
	Total	100%	1

Q85 - Does the smart thermostat control a central cooling system, a central heating system, or both?

#	Answer	%	Count
1	Central cooling system	0.0%	0
4	Central heating system	0.0%	0
5	Both	100.0%	1
	Total	100%	1

Q86 - Do you have an electric heating system?

#	Answer	%	Count
1	Yes	0.0%	0
2	No	100.0%	1
98	Don't know	0.0%	0
	Total	100%	1

Q102 - Overall, how satisfied are you with the following products that you received a rebate or discount for?

#	Question	1Very dissatisfied		2		3		4		5Very satisfied		Total
1	LED light bulb(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
2	Dehumidifier(s)	0.0%	0	0.0%	0	25.0%	1	25.0%	1	50.0%	2	4
3	Advanced power strip(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
4	High efficiency showerhead(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
5	High efficiency bathroom faucet aerator(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
6	High efficiency kitchen faucet aerator(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
7	Wi-Fi / smart thermostat(s)	0.0%	0	0.0%	0	0.0%	0	50.0%	2	50.0%	2	4
8	Air purifier(s)	0.0%	0	0.0%	0	0.0%	0	60.0%	3	40.0%	2	5
9	LED light bulbs with battery backup	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
10	WiFi plus Bluetooth smart socket	0.0%	0	0.0%	0	0.0%	0	0.0%	0	100.0%	1	1
11	Television(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	100.0%	1	1
12	Central air conditioner(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined
13	Central heat pump(s)	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	undefined

Q103 - How clear was the information on the receipt for your Online Marketplace program purchase?

#	Answer	%	Count
1	Very clear	50.0%	3
4	Somewhat clear	50.0%	3
5	Somewhat unclear	0.0%	0
6	Not at all unclear	0.0%	0
	Total	100%	6

Q104 - What information was unclear? Please select all that apply.

#	Answer	%	Count
1	My final purchase price	0.0%	0
4	The amount of the rebate from I&M that I received	0.0%	0
5	The amount of sales tax/or how the tax was calculated	0.0%	0
6	Something else (Please describe)	0.0%	0
	Total		0

Q105 - Overall, how satisfied are you with your I&M Online Marketplace experience?

#	Answer	%	Count
1	1 Very dissatisfied	0.0%	0
2	2	0.0%	0
3	3	28.6%	4
4	4	28.6%	4
5	5 Very satisfied	42.9%	6
	Total	100%	14

Q110 - Do you own the home where the rebated equipment was installed, rent it, or own it and rent it to someone else?

#	Answer	%	Count
1	Own	92.9%	13
2	Rent	7.1%	1
3	Own and rent to someone else	0.0%	0
98	Don't know	0.0%	0
99	Prefer not to state	0.0%	0
	Total	100%	14

Q111 - Which of the following best describes your home? Is it a...

#	Answer	%	Count
1	Manufactured home	0.0%	0
2	Single-family house detached from any other house	92.9%	13
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	0.0%	0
4	Apartment in a building with 2 to 3 units	0.0%	0
5	Apartment in a building with 4 or more units	7.1%	1
6	Other (Please specify)	0.0%	0
98	Don't know	0.0%	0
99	Prefer not to state	0.0%	0
	Total	100%	14

Q112 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	35.7%	5
2	Natural Gas	57.1%	8
3	Propane	7.1%	1
4	Something else (Please specify)	0.0%	0
5	Don't heat home	0.0%	0
98	Don't know	0.0%	0
99	Prefer not to state	0.0%	0
	Total	100%	14

Q113 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	28.6%	4
2	2	50.0%	7
3	3	14.3%	2
4	4	0.0%	0
5	5	0.0%	0
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
98	Don't know	0.0%	0
99	Prefer not to state	7.1%	1
	Total	100%	14

Q114 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than \$10,000	7.1%	1
2	\$10,000 to less than \$20,000	7.1%	1
3	\$20,000 to less than \$30,000	7.1%	1
4	\$30,000 to less than \$40,000	0.0%	0
5	\$40,000 to less than \$50,000	0.0%	0
6	\$50,000 to less than \$75,000	21.4%	3
7	\$75,000 to less than \$100,000	0.0%	0
8	\$100,000 to less than \$150,000	28.6%	4
9	\$150,000 to less than \$200,000	7.1%	1
10	\$200,000 or more	7.1%	1
98	Don't know	0.0%	0
99	Prefer not to state	14.3%	2
	Total	100%	14

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2025 Indiana Commercial & Industrial Portfolio EM&V Report Volume I of II

Prepared for:
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April 30, 2026

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1. Introduction

Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., a Qualus Company, (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 2025 through December 2025 (PY2025).

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

<i>Program</i>	<i>Number of Sampled Projects</i>
Work Prescriptive	29
Work Custom	25
Work Direct Install	11
Work Strategic Energy Management	4

Surveys were conducted to collect data on the program's impact on participants' decisions to install efficient equipment, as well as their feedback on the program. Table 1-2 summarizes the survey data collection completed for PY2025.

Table 1-2 Summary of Survey Data Collection

<i>Survey</i>	<i>Mode</i>	<i>Time Frame</i>	<i>Number of Contacts</i>	<i>Number of Completions</i>	<i>Completion Rate</i>
Work Prescriptive and Custom Participant Survey	Email and phone follow up	October 2025, January 2026	283	27	9.5%
Work Small Business Direct Install Participant Survey	Email and phone follow up	October 2025, January 2026	8	2	25.0%
Total			291	29	10.0%

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

<i>Variable</i>	<i>Definition</i>
kWh Savings Goal	<i>kWh Savings Goal</i> is the energy savings goal cited in the applicable portfolio plan.
Ex Ante Gross kWh Savings	<i>Ex Ante Gross kWh Savings</i> 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	<i>Gross Audited kWh Savings</i> are determined by reviewing tracking data presenting for any errors and adjusting <i>Ex Ante Gross kWh Savings</i> accordingly.
Gross Verified kWh Savings	<i>Gross Verified kWh Savings</i> are determined by applying an installation rate to the <i>Gross Audited kWh Savings</i> . 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	<i>Ex Post Gross kWh Savings</i> 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	<i>Ex Post Net kWh Savings</i> are equal to <i>Ex Post Gross kWh Savings</i> , adjusted to account for free ridership and spillover. ²
Ex Post Net Lifetime kWh Savings	<i>Ex Post Net Lifetime kWh Savings</i> is the <i>Ex Post Net kWh Savings</i> occurring over the course of the applicable measure effective useful life (EUL).
Gross Realization Rate	<i>Gross Realization Rate</i> is equal to <i>Ex Post Gross kWh Savings</i> divided by <i>Ex Ante Gross kWh Savings</i> .
Net-to-Gross Ratio	<i>Net-to-Gross Ratio</i> is equal to <i>Ex Post Net kWh Savings</i> divided by <i>Ex Post Gross kWh Savings</i> .
Free Rider ³	A <i>free rider</i> 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 Work Direct Install Programs as the in-service rate for these programs is 1.0.

² ADM conducted a non-participant spillover study in 2021 to estimate non-participant spillover and concluded that there was not any qualifying non-participant spillover. Spillover savings presented in this report reflect participant spillover.

³ Northeast Energy Efficiency Partnerships (NEEP) EMV Glossary version 2.1. <https://neep.org/media/4330>

Variable	Definition
Spillover (Participant and Non-Participant) ⁴	<i>Spillover</i> 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. <i>Participant spillover</i> 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. <i>Non-participant</i> 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 PY2025. Total C&I portfolio ex post gross energy savings are 84,302,774 kWh, while ex post net energy savings are 76,643,395 kWh, as shown in Table 1-5.

Table 1-5 Summary of Energy Savings – PY2025

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	30,838,640	30,838,640	30,838,640	26,116,487	85%	23,581,523	90%	352,244,876
Work Custom	42,892,788	60,072,019	60,072,019	55,569,536	130%	50,451,779	91%	300,715,022
Work Strategic Energy Management	3,471,505	3,471,505	3,471,505	2,156,866	62%	2,156,866	100%	2,464,318
Work Direct Install	550,370	550,370	550,370	391,299	71%	391,299	100%	5,586,733
Work Midstream	63,549	63,549	63,549	68,586	108%	61,928	90%	948,499
C&I Portfolio Totals	77,816,852	94,996,083	94,996,083	84,302,774	108%	76,643,395	91%	661,959,448

⁴ Ibid.

Total C&I portfolio ex post gross peak demand savings are 13,107.82 kW, while ex post net peak demand savings are 12,754.74, as shown in Table 1-6.

Table 1-6 Summary of Peak Demand Impacts – PY2025

<i>Program Name</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Net kW Savings</i>	<i>Net-to- Gross Ratio</i>
Work Prescriptive	4,044.73	4,044.73	4,044.73	3,961.12	98%	3,611.87	91%
Work Custom	7,115.29	9,076.39	9,076.39	8,791.71	124%	8,791.71	100%
Work Strategic Energy Management	659.65	659.65	659.65	272.34	41%	272.34	100%
Work Direct Install	82.36	82.36	82.36	39.12	47%	39.12	100%
Work Midstream	15.26	15.26	15.26	43.53	285%	39.69	91%
C&I Portfolio Totals	11,917.28	13,878.38	13,878.38	13,107.82	110%	12,754.74	97%

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 PY2025 Benefit-Cost Ratios

<i>Program</i>	<i>Program Administrator Cost Test</i>	<i>Total Resource Cost Test</i>	<i>Ratepayer Impact Measure</i>	<i>Participant Cost Test</i>
Work Prescriptive	3.88	2.56	0.52	5.13
Work Midstream	0.44	0.48	0.32	8.58
Work Custom	2.92	1.60	0.52	3.26
Work Strategic Energy Management	0.25	0.31	0.17	141.71
Work Direct Install	1.00	0.89	0.33	5.09
C&I Portfolio Total	3.09	1.91	0.51	4.01

1.4. Evaluation Findings and Recommendations

1.4.1. Work Custom and Prescriptive

Satisfaction with the program is high across components, with installation quality, equipment eligibility, and overall program experience receiving exceptionally high ratings. Nearly all participants selected the highest rating for installation quality, and equipment eligibility similarly received overwhelmingly positive feedback, indicating that available technologies align well with participant needs. Overall program satisfaction followed this pattern, with a large majority giving the top rating and no respondents expressing low satisfaction.

Customer experience with the I&M application process is mixed, with roughly half of respondents rating most elements as acceptable while others expressed dissatisfaction, particularly with the online portal and clarity of instructions. Between 20% and 40% of participants provided low ratings (1–2) for key aspects such as ease of using the portal (38.5% negative) and clarity of information (28.5% negative), and more than one-third gave a neutral rating for the overall process. Open-ended comments also note these issues in which participants described unclear documentation requirements, difficulty locating the application, and significant portal usability issues including repeated system errors, upload failures, and slow performance. Several respondents also noted challenges tracking multiple active projects, especially when submissions occurred through different channels.

- **Recommendation 1:** Improve the clarity, consistency, and visibility of application instructions, with particular attention to custom lighting projects and documentation requirements. Clearer, more structured guidance, such as step-by-step checklists and clearer explanations of key terms, would reduce customer confusion and lower the need for staff assistance. Enhancing clarity is likely to improve satisfaction scores related to ease of finding information and clarity of instructions.

The realization rate varied across sampled projects that reduced compressed air usage. For Sample ID 103, ex ante hours of use for the (96) pneumatic blow off tools at 4,800 for each tool indicate a baseline air consumption usage that is unattainable. The theoretical baseline consumption exceeds the air plant capacity, and the number of machine operators to discharge air simultaneously exceeds their workforce. Sample ID 104 contained an error in usage of the application workbook referencing the value for horsepower (25) whereas the prescriptive measure is based on a complete compressor as the unit of measure for the energy savings, but appropriate for the incentive. Sample ID 205 and Sample ID 207 projects replaced pneumatic tools with corded electric tools and battery tools. The sum of the theoretical air consumption for the baseline case exceeded the air plant capacity.

- **Recommendation 2:** Increase rigor for project data collection for projects that significantly reduce air consumption. For low flow air nozzles, measure actual usage of hand-held blow off air tools for a representative sample to be replaced. Similarly, for equipment blow off nozzles, measure time nozzle is discharging air as a proportion to the process hours. Photograph the existing tools and process to validate the TRM assumptions for baseline CFM consumption. These steps should improve the accuracy of the ex ante savings estimates and the ex post realization rates.
- **Recommendation 3:** Leverage the evaluation team to review prescriptive savings along with assumptions for the variables of the savings algorithm. Implement document control and/or a centralized database for managing the project milestones. Aligning ex ante and ex post approaches will improve the ex ante savings estimates and improve program monitoring during the course of the year.

1.4.2. Work Direct Install

The realization rate varied across sampled projects due to differences in fixture types, wattages, and operating hours compared to prescriptive assumptions. For sample ID 304, ID 305, ID 306, ID 307, the LED linear tubes replaced existing higher wattage LED tubes. The ex ante savings approach applied prescriptive savings that aligned with a LED replacing linear fluorescent differential wattage. For sample ID 303, the installed controls were on lower wattage fixtures than the prescriptive assumptions. For ID 308, the hours of use were lower than the prescriptive assumptions.

- **Recommendation 1:** Recommend a measure offering specific to higher efficiency LED lighting replacing older LED lamps. This will allow for incentive payments that are better aligned with the energy savings impact of the measure.

1.4.3. Work Midstream

Process evaluation findings and recommendations presented in the residential program chapter are applicable to the Work Midstream Program.

Savings realization for the midstream C&I HVAC program varied primarily due to inconsistencies between ex ante and ex post assumptions related to building type classification and associated effective full-load hours (EFLH). In two of the three reviewed cases where realization rates differed significantly from 100% (Sample IDs 151 and 153), ex post savings exceeded ex ante estimates because the ex post analyses applied higher EFLH values aligned with the evaluated building types. Sample ID 155 produced a realization rate below 100% (72%), the reason for which could not be determined because key ex ante baseline assumptions were not documented, limiting the evaluator's ability to reconcile differences in savings estimates.

- **Recommendation 1:** Improve the accuracy of ex ante savings estimates by strengthening guidance and controls around building type identification in program tracking systems. Ensuring that building type selections reflect actual facility use would align EFLH assumptions more closely with ex post operating conditions, reducing systematic over- or under-estimation of savings.

1.4.4. Work Strategic Energy Management

Participation in SEM increased in PY2025. The program had an increase in SEM program participation with 12 participants completing projects in 2025, compared to 10 in 2024.

The evaluation identified discrepancies in the methods used to estimate first-year energy savings. For Sample ID 400, ex ante savings were reported for two distinct periods and subsequently annualized. In contrast, the program's CUSUM savings method already accounts for all implemented measures, as CUSUM represents cumulative savings over the baseline period. For ID401, the usage of change-flags do not completely represent the same operation conditions when they are removed as the period from which they were regressed. The change flag for ID401 represented a significant capital project, but was reset to the null value when there were issues with the old piece of equipment.

- **Recommendation 1:** Provide additional guidelines for the CUSUM tool. The baseline reporting period may need to move forward in the timeline when there are significant capital projects, instead of adding change-point binary flags in the linear regression for the predicted energy usage.

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 2025 program year. Volume I is organized as follows:

- Chapter 2: Work Prescriptive
- Chapter 3: Work Midstream
- Chapter 4: Work Custom
- Chapter 5: Work Direct Install
- Chapter 6: Work Strategic Energy Management
- Chapter 7: 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 2025 through December 2025.

The objectives of the evaluation were to:

- Complete project pre-approval reviews;
- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year; 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) will be included.

Customers can either apply for rebates in this program by email or postal mail, or can participate through a trade ally that may apply for the rebate.

Categories of eligible measures for this program include:

- Lighting fixtures and replacement lamps
- Lighting controls
- HVAC systems
- Variable frequency drives
- ENERGY STAR Commercial refrigeration equipment
- ENERGY STAR Commercial kitchen equipment

Work Prescriptive also include a midstream HVAC component.

2.2. Data Collection

2.2.1. Verification of Measures

2.2.1.1. *Sampling Plan*

ADM selected a sample of all 2025 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

<i>Variable</i>	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Stratum 4</i>	<i>Stratum 5</i>	<i>Totals</i>
Strata boundaries (kWh)	> 400000	170000 - 400000	80000 - 170000	20000 - 80000	< 20000	
Number of projects	10	33	61	169	419	692
Total Ex Ante Annual kWh	5,975,098	8,221,604	7,313,329	6,820,266	2,508,343	30,838,640
Average kWh Savings	597,510	249,140	119,891	40,357	5,986	1,012,883
Std. dev. of kWh savings	192,899	64,435	23,766	16,287	5,689	303,076
Coefficient of variation	0.32	0.26	0.2	0.4	0.95	
Final design sample	6	7	4	7	5	29

2.2.1.2. Verification Data Collection Procedures

ADM used remote verifications to collect project-specific data. The following bulleted list summarizes the remote data collection procedures ADM followed. For remote data collection, ADM continued to use its practice of a detailed review of project invoicing and supporting documentation. ADM discussed any discrepancies between invoicing and documentation and incentivized measures identified in program tracking data with the customer contact. Additionally, ADM referenced CLEAResult's pre- and post-inspection forms, when available.

- For cases where the information needed was limited to the verification of the installation of the equipment, an ADM analyst contacted the site contact by email, with telephone follow-up as needed, to confirm the installation of the measure. For cases where more detailed information such as operations schedules or heating and cooling type was needed, ADM completed interviews guided by the information needs defined in the site-specific M&V plan. For these cases, a member of the ADM call center contacted the site contact to schedule a time for an interview with the analyst or an engineer, as appropriate. In some cases, ADM also requested site contacts to install monitoring equipment that ADM mailed to them if they had the technical resources available to support that activity and other M&V approaches were not feasible. ADM only took this approach for equipment that involved no safety risks to the customer. Additionally, customers were asked to send pictures of installed equipment such as motor nameplates. The site-specific M&V plan referred to the data collection plan for the site.
- For cases where Option B (retrofit isolation) would be applied, ADM requested energy use data collected through EMS systems or other onsite monitoring efforts implemented by site

staff or their contractors, if available. As needed, and if acceptable to the customer, ADM scheduled video conferencing with its experienced engineers and field staff to assist customers with getting this data. As mentioned above, ADM may have mailed and asked customers to install and mail back monitoring equipment where the site staff had the technical resources to support the data collection effort and other M&V approaches were not viable. ADM only took this approach for equipment that involved no safety risks to the customer.

- Application of International Performance Measurement and Verification Protocol (IPMVP) Option C was used for custom measures where feasible, supplemented by information collected by telephone or email on schedule and equipment changes that may have occurred during the pre-and post-installation period.

2.2.2. Participant Survey

ADM administered a survey to Work-Prescriptive and Work-Custom participants to collect data for use in estimating net savings and obtaining feedback about participants' experience with the program. Table 2-2 summarizes the survey data collection efforts. To increase the response rate, ADM contacted participants through both email and telephone communications.

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

Survey	Mode	Time Frame	Number of Contacts	Number of Completions	Completion Rate
Work Prescriptive and Custom Participant Survey	Email and phone follow up	January 2026	95	18	18.9%
Work Prescriptive and Custom Participant Survey	Email and phone follow up	October 2025	188	9	4.8%
Total			283	27	9.5%

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. Collected prior year projects associated with similar equipment. 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 regarding 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

<i>Measure Category</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Lighting – Troffer	380,520	376,565	99%
Lighting – Downlight	46,451	45,363	98%
Lighting – High/Low Bay	2,414,313	1,591,892	66%
Compressed Air – Engineered Nozzles	736,128	87,538	12%
Lighting – Tubes & Relamps	952,244	882,974	93%
Lighting – Exterior	533,202	466,951	88%
Lighting – Troffer Retrofit Kit	15,053	14,626	97%
Compressed Air – VSD Compressor	733,075	213,228	29%
Lighting – Exit Signs	2,763	1,094	40%
Lighting – Controls	281,931	160,496	57%
Process – Insulation / Other	29,343	26,377	90%
Total	6,125,023	3,867,102	63%

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

<i>Stratum</i>	<i>Project Number</i>	<i>Measure</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Project Gross Realization Rate</i>
1	102	LED Interior Lighting	778,225	771,179	99%
1	103	Engineered Low Flow Air Nozzles	736,128	87,538	12%
1	104	VSD Air Compressor Replacement	583,128	11,057	2%
1	105	LED High Bay Lighting	450,542	172,231	38%
1	106	LED Interior & LED Exterior Lighting	426,531	412,558	97%
1	107	LED High Bay & LED Exterior Lighting	415,113	269,141	65%
2	108	LED Interior, Exterior Lighting and Controls	314,909	308,259	98%
2	110	LED High Bay Lighting	294,472	112,569	38%
2	111	LED Interior Lighting	289,761	265,174	92%
2	112	LED High Bay Lighting	285,638	71,293	25%
2	113	LED Interior Lighting & Controls	237,455	120,317	51%
2	114	LED High Bay & Interior Lighting	201,934	233,809	116%
3	115	VSD Air Compressor Replacement	149,947	202,171	135%
3	116	LED Highbay Lighting	147,236	134,518	91%
3	117	LED High Bay Lighting & Controls	133,387	193,772	145%
4	118	LED High Bay Lighting & Controls	70,279	81,271	116%
4	119	LED High Bay & LED Exterior Lighting	67,398	59,283	88%
4	121	LED Interior Lighting	34,570	34,034	98%
4	122	Injection Mold Machine Insulation	29,343	26,377	90%
4	123	LED Exterior Lighting	22,629	22,713	100%
5	124	LED Interior Lighting	19,091	23,079	121%
5	126	LED Interior Lighting	2,899	2,948	102%
5	127	LED Interior Lighting	2,453	2,327	95%
5	128	Lighting Controls	217	1,172	540%
4	130	LED Interior & Exterior Lighting & Controls	29,971	28,083	94%
2	131	LED High Bay Lighting	241,467	92,307	38%
3	132	LED Interior & Exterior Lighting & Controls	90,224	92,474	102%
5	133	LED Interior Lighting	7,805	9,955	128%
4	226	LED Lamp Replacing LED Lamp	62,273	25,491	41%
All Non-Sample Projects			24,713,617	22,249,386	90%

<i>Stratum</i>	<i>Project Number</i>	<i>Measure</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Project Gross Realization Rate</i>
Total			30,838,640	26,116,487	85%

Seven of the 29 sampled prescriptive projects had a realization rate that was below 90%.

- Sample ID 103 (Compressed Air – Low Flow Nozzles). Ex post savings were lower than ex ante due to a substantially overstated usage factor in the application. The ex ante estimate assumed 58% daily tool operation—implying air demand exceeding total compressor capacity and more operators than production staff. The ex post analysis applied verified usage patterns from a comparable facility of the same company, resulting in a 7% use factor consistent with typical operations and TRM defaults. The revised assumption yielded a 12% realization rate.
- Sample ID 104 (Compressed Air – VSD Compressor). Ex post savings were significantly lower because the application misinterpreted the quantity field, calculating savings as if 25 compressors were installed rather than one 25-hp unit. Recalculation using the TRM algorithm and verified operating hours produced 11,057 kWh in savings compared to 583,128 kWh ex ante, resulting in a 2% realization rate.
- Sample ID 105, 110, 131 (Lighting – LED High Bay Retrofits). Ex post savings were lower due to reduced verified baseline wattages and fewer operating hours than assumed in the prescriptive estimate. Fixture wattages and hours were confirmed through billing data modeling and site interviews. The resulting realization rate was 38%.
- Sample ID 113, 117, 118, 128 (Lighting – High Bay Fixtures and Occupancy Controls). The ex post savings were close to ex ante (90%) because verified operating hours from interval billing data (6,789 hours) were higher than the TRM prototypical assumption. But, the realization varied by measure type; occupancy-control savings were lower than ex ante because the installed fixture wattage (100W) was lower than the wattage implicitly assumed in the deemed savings value, reducing achievable control savings.
- Sample ID 112 (Lighting – HID to LED High Bay). The ex post savings were lower than ex ante due to significantly lower verified hours of use (2,564 hours) than assumed in the prescriptive estimate. The ex post analysis also verified lower fixture lumens than those associated with the selected deemed measure. The resulting realization rate was 25%.
- Sample ID 107, 119 (Lighting – Interior and Exterior LED Retrofits). Ex ante savings implicitly assumed a 1.0 usage factor. Ex post analysis applied a verified 0.67 usage factor based on interval billing data, reducing effective operating hours across measures and resulting in a 68% realization rate.
- Sample ID 226 (Lighting – LED Tube to LED Tube). Ex post savings were lower because the ex ante estimate assumed a 29.5W fluorescent baseline, while the verified baseline

consisted of lower-wattage LED lamps (16W and 18W). The smaller wattage differential reduced savings to 41% of ex ante values.

Ten of the sampled prescriptive projects had realization rates higher than 110%.

- Sample ID 115 (Compressed Air – Two VSD Compressors in New Construction). Ex post savings exceeded ex ante estimates because prescriptive savings relied on prototypical manufacturing hours, while the evaluation applied actual operating hours and the facility’s measured load profile. Most runtime occurred at part load, where VSD compressors deliver comparatively higher savings. The realization rate was 134%.
- Sample ID 124, 310 (Lighting – Linear Tubes and Downlights). Verified operating hours (4,512) exceeded TRM retail assumptions (4,099). Billing data showed usage before and after posted store hours, confirmed by site management. The resulting realization rate was 123%.
- Sample ID 133 (Lighting – LED Panel Fixtures). Ex post savings exceeded ex ante because deemed savings did not reflect site-specific fixture wattages and operating hours. Incorporating verified conditions increased savings to a 128% realization rate.

Table 2-5 presents the ex post annual gross kWh savings for the Work Prescriptive Program from January 2025 through December 2025.

Table 2-5 Ex Post Annual Gross kWh

<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
30,838,640	30,838,640	30,838,640	26,116,487	85%

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 2025 through December 2025.

Table 2-6 Ex Post Peak kW Reduction

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
4,044.73	4,044.73	4,044.73	3,961.12	98%

2.4. Estimation of 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 were the gross savings less free ridership, plus spillover.

2.4.1. Methodology for Estimating Free Ridership

A survey of program participants that asked them about the role of the program in their decision to implement the energy efficiency measures informed the net-to-gross analysis. ADM considered three factors to determine what percentage of savings could be attributable to free ridership. The three factors were:

- Plans and intentions of the firm to install a measure even without support from the program
- Influence that the program had on the decision to install a measure
- 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 showed free ridership. These rules made use of answers to questions on the decision-maker survey questionnaire.

The first factor required 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 were used with a set of rules to determine whether a participant's behavior indicated likely free ridership. Two binary variables accounted 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 were as follows:

- The respondent answered "yes" to the following two questions: "Did you have plans to install the measure before participating in the program?" and "Would you have completed the [MEASURE] project even if you had not participated in the program?"
- The respondent answered "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 answered "did not affect the 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 answered "no, the program did not affect the 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 that indicate customer plans and intentions that likely signify free ridership are as follows:

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

- The respondent answered either "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?"
- The respondent answered "did not affect the 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 indicated 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 answered "no, the program did not affect the 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 answered "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 answered "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 answered "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 answered "yes, purchased energy-efficient equipment but did not apply for a 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 12 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

<i>Indicator Variables</i>				<i>Free Ridership Score</i>
<i>Had Plans and Intentions to Install Measure without the Program? (Definition 1)</i>	<i>Had Plans and Intentions to Install Measure without the Program? (Definition 2)</i>	<i>The Program had influence on Decision to Install Measure?</i>	<i>Had Previous Experience with Measure?</i>	
Y	Y	Y	Y	100%
Y	Y	N	Y	100%
Y	Y	N	N	100%
Y	Y	Y	N	67%
N	Y	N	Y	67%
N	Y	Y	Y	33%
N	Y	N	N	33%
N	N	N	Y	33%
N	Y	Y	N	0%
N	N	Y	Y	0%
N	N	Y	N	0%
N	N	N	N	0%

The free ridership assessment also included questions on the participants' financial ability to pay for the measures. These questions were 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. There were no cases where respondents reported this and that they could not have afforded the measure without program support.

2.4.1.1. Methodology for Estimating Spillover

Program participants could implement additional energy saving measures without receiving a program incentive because they participated 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

$$\text{Spillover} = \text{Average}(\text{SO1}, 10 - \text{SO2})$$

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.

2.4.2. 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

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	30,838,640	4,044.73
Gross Audited Savings	30,838,640	4,044.73
Gross Verified Savings	30,838,640	4,044.73
Ex Post Gross Savings	26,116,487	3,961.12
Gross Realization Rate	85%	98%
Ex Post Free Ridership	2,534,965	349.25
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	23,581,523	3,611.87
Net-to-Gross Ratio	90%	91%
Ex Post Net Lifetime Savings	352,244,876	N/A

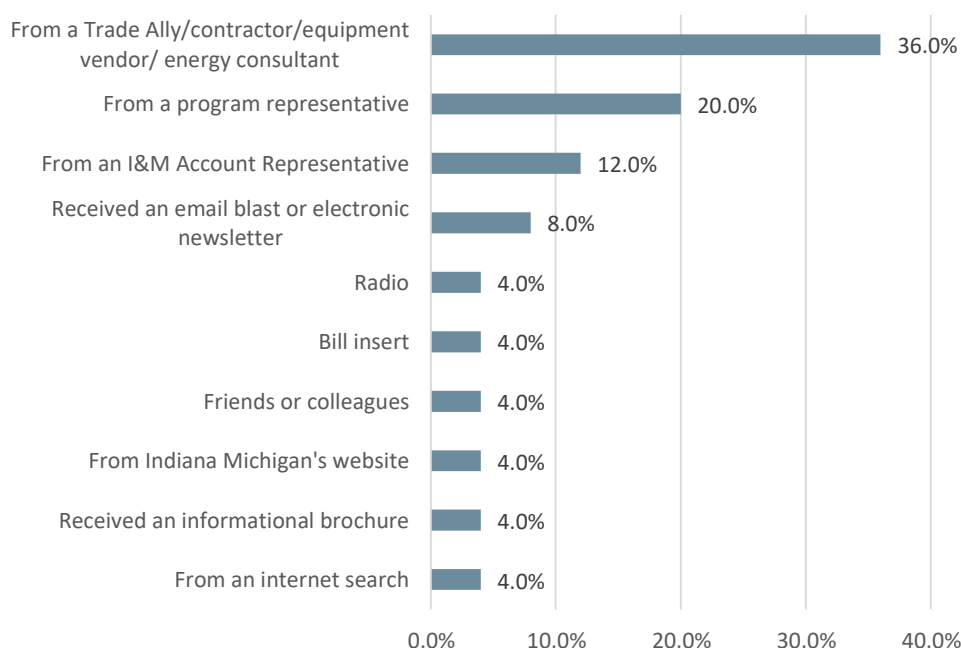
2.5. Process Evaluation

A process evaluation of the Work Prescriptive Program was not completed. Feedback from the participant survey used to estimate net savings is summarized below.

2.5.1. Participant Survey Findings

Awareness of Indiana Michigan Power’s incentives is driven primarily by program-affiliated channels. The largest share of participants (36%) first learned about the incentives through a Trade Ally, contractor, equipment vendor, or energy consultant. Program representatives accounted for another 20%, and I&M Account Representatives contributed 12%. Digital or broadcast outreach played a smaller role, with email newsletters at 8% and radio, bill inserts, internet searches, brochures, and the utility website each at 4% (see Figure 2-1).

Figure 2-1 Sources of Program Awareness (n = 25)



Customer feedback indicates that the I&M application process is generally acceptable but some participants gave neutral ratings or expressed dissatisfaction, particularly with the online portal and clarity of instructions. Across application elements, about half or more of respondents rated their experience as acceptable (ratings of 4 or 5): 54% for ease of finding the application, 54% for ease of using the portal, 57% for the time to approve the application, 50% for clarity of information, 64% for effort required, and 43% for the overall application process. However, between roughly one-fifth and two-fifths of respondents gave low ratings (1 or 2), especially for ease of using the application portal (38.5% negative) and clarity of information (28.5% negative), and more than one-third (35.7%) gave a neutral rating (3) for the overall process. (see Figure 2-2).

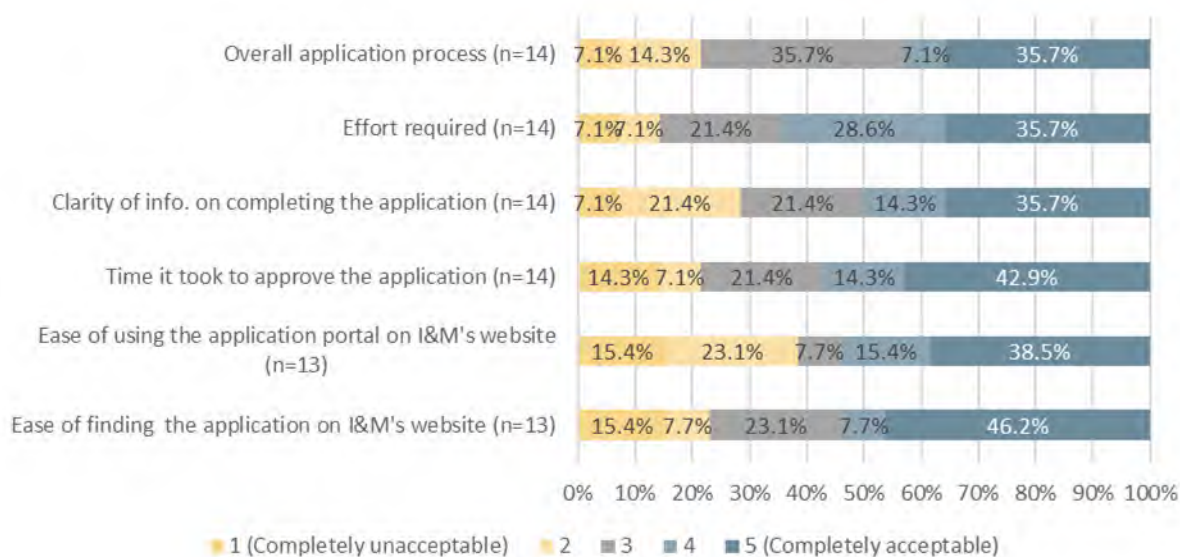
Respondents who reported challenges with the application process discussed some of the issues in open-ended comments. Some reported uncertainty about what materials were required for each submission, noting a need for “a clearer understanding of just what documentation is needed per project.” Others described difficulty keeping track of multiple active applications, particularly when some were submitted through the portal and others through a representative, stating that “the harder part is being able to track the projects together.”

Website functionality and portal performance emerged as concerns as well. Respondents described repeated system errors, slowdowns, and upload failures. One participant reported being unable to complete applications in both 2024 and 2025 because of the same persistent website error, explaining, “I could not complete the application due to an error in the website... the same problem occurred again in 2025,” and noted that the 2025 application still had not been resolved. Others echoed these issues, describing the portal as “really hard to use,” with one noting that “the website had delays and glitches... sometimes it wouldn’t take an upload.”

Several comments also pointed to difficulty locating the application on the website and inadequately clear instructions. Participants reported that “it wasn’t very easy to find the application” and that the directions were unclear enough that they needed staff support to complete a submission.

Respondents provided feedback on how to improve the application process, including the need for clearer instructions, particularly for custom lighting projects. Some noted that certain terms were unclear and that there was no accessible support for clarification. However, one respondent indicated that their contractor provided all necessary information.

Figure 2-2 Acceptability of the Application Process



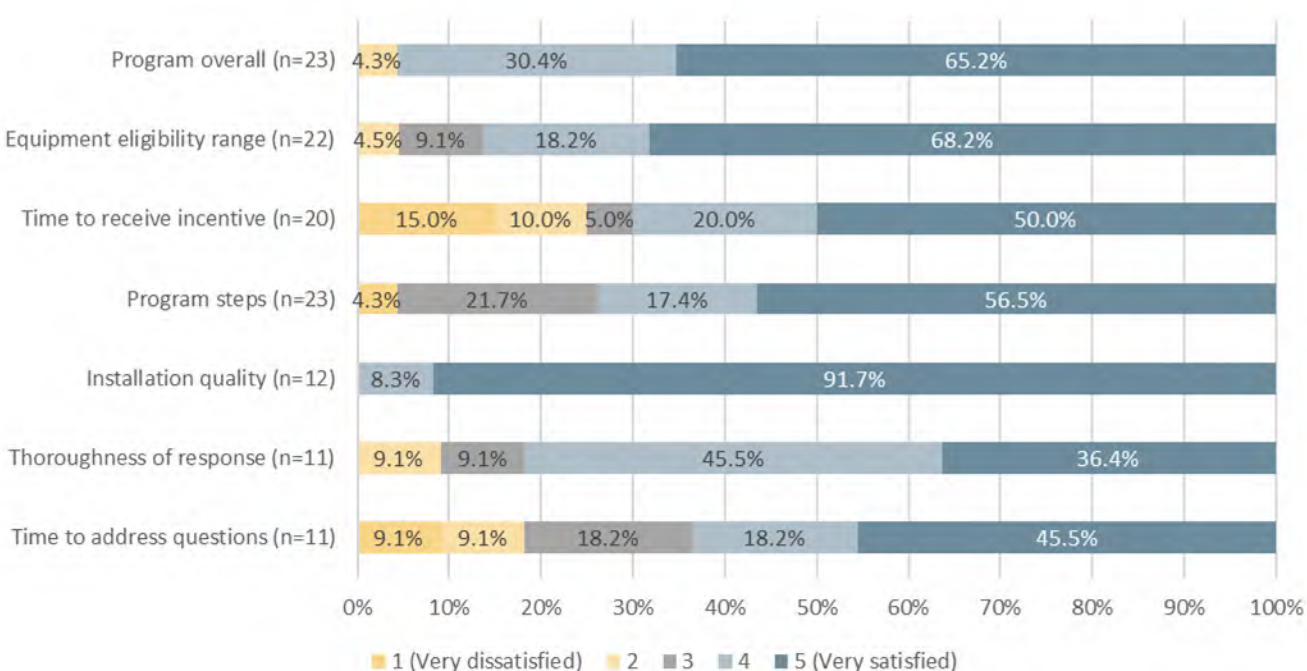
Satisfaction with the program was high across most components, with particularly for installation quality, equipment eligibility, and overall program experience. Installation quality received the most favorable ratings, with nearly all participants indicating the highest level of satisfaction. Equipment eligibility was also viewed very positively, suggesting that the range of qualifying technologies generally met participant needs. Overall program satisfaction followed the same pattern, with a large majority selecting the top rating and no participants expressing low satisfaction (see Figure 2-3).

Program steps were viewed favorably overall, though responses included a notable share of neutral ratings and a small portion of low satisfaction. These results point to opportunities to simplify program requirements or improve clarity in communicating the steps participants must complete.

Timeliness emerged as the most variable aspect of participant experience. Both the time to address questions and the time to receive incentives received mixed ratings, with roughly one-fifth to one-quarter of respondents indicating low satisfaction. These findings suggest inconsistency in response times or processing timelines and indicate areas where operational improvements may be warranted.

Thoroughness of staff responses was rated positively by most respondents, though some participants selected lower ratings, indicating room to strengthen clarity or completeness in communication.

Figure 2-3 Program Satisfaction



2.6. Findings and Recommendations

Satisfaction with the program is high across components, with installation quality, equipment eligibility, and overall program experience receiving exceptionally high ratings. Nearly all participants selected the highest rating for installation quality, and equipment eligibility similarly received overwhelmingly positive feedback, indicating that available technologies align well with participant needs. Overall program satisfaction followed this pattern, with a large majority giving the top rating and no respondents expressing low satisfaction.

Customer experience with the I&M application process is mixed, with roughly half of respondents rating most elements as acceptable while others expressed dissatisfaction, particularly with the online portal and clarity of instructions. Between 20% and 40% of participants provided low ratings (1–2) for key aspects such as ease of using the portal (38.5% negative) and clarity of information (28.5% negative), and more than one-third gave a neutral rating for the overall process. Open-ended comments also note these issues in which participants described unclear documentation requirements, difficulty locating the application, and significant portal usability issues including repeated system errors, upload failures, and slow performance. Several respondents also noted challenges tracking multiple active projects, especially when submissions occurred through different channels.

- **Recommendation 1:** Improve the clarity, consistency, and visibility of application instructions, with particular attention to custom lighting projects and documentation requirements. Clearer, more structured guidance, such as step-by-step checklists and clearer explanations of key terms, would reduce customer confusion and lower the need for staff assistance. Enhancing clarity is likely to improve satisfaction scores related to ease of finding information and clarity of instructions.

The realization rate varied across sampled projects that reduced compressed air usage. For Sample ID 103, ex ante hours of use for the (96) pneumatic blow off tools at 4,800 for each tool indicate a baseline air consumption usage that is unattainable. The theoretical baseline consumption exceeds the air plant capacity, and the number of machine operators to discharge air simultaneously exceeds their workforce. Sample ID 104 contained an error in usage of the application workbook referencing the value for horsepower (25) whereas the prescriptive measure is based on a complete compressor as the unit of measure for the energy savings, but appropriate for the incentive. Sample ID 205 and Sample ID 207 projects replaced pneumatic tools with corded electric tools and battery tools. The sum of the theoretical air consumption for the baseline case exceeded the air plant capacity.

- **Recommendation 2:** Increase rigor for project data collection for projects that significantly reduce air consumption. For low flow air nozzles, measure actual usage of hand-held blow off air tools for a representative sample to be replaced. Similarly, for equipment blow off nozzles, measure time nozzle is discharging air as a proportion to the process hours. Photograph the existing tools and process to validate the TRM assumptions for baseline CFM consumption. These steps should improve the accuracy of the ex ante savings estimates and the ex post realization rates.
- **Recommendation 3:** Leverage the evaluation team to review prescriptive savings along with assumptions for the variables of the savings algorithm. Implement document control and/or a centralized database for managing the project milestones. Aligning ex ante and ex post approaches will improve the ex ante savings estimates and improve program monitoring during the course of the year.

3. Work Midstream

This chapter presents the results of the evaluation of the Work Midstream Program. Indiana Michigan Power (I&M) offered the Work Midstream Program to its non-residential customers during the period January 2025 through December 2025.

The objectives of the evaluation were to:

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

3.1. Program Description

The Work Midstream Program seeks to improve through market transformation the stocking levels for energy efficient HVAC equipment in the I&M Michigan service territory.

Measure rebates in this program are designed with the intent to provide a partial offset of the incremental measure cost but serve to offset the cost for distributors to stock the more efficient measures eligible for rebates in this program. Variations in rebate amount across measure categories exist and be based on current costs of efficient equipment and the corresponding baseline equipment.

Measure rebates offered to distributors through this program are not available for rebates in any other I&M commercial and industrial program.

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 2025. The approach is described in Section 2.2.1.1 of this document on page 8.

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 Midstream Sample Design

<i>Variable</i>	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Totals</i>
Strata boundaries (kWh)	> 7000	3000 - 7000	< 7000	
Number of projects	2	3	7	12
Total Ex Ante Annual kWh	37,965	14,736	10,849	63,549
Average kWh Savings	18,983	4,912	1,550	25,444
Std. dev. of kWh savings	8,975	1,044	741	10,761
Coefficient of variation	0.47	0.21	0.48	
Final design sample	2	1	3	6

3.2.1.2. Verification Data Collection Procedure

The data collection procedure for the Work Midstream Program was the same as the approach described in Section 2.2 of this document on page 9.

3.2.2. Participant Survey

The survey data collection for the Work Midstream Program is described in Section 2.5.1 of this document on page 20.

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 Midstream Program was the same as the approach described in Section 2.3.1.1 of this document on page 10.

3.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

A breakdown of sampled measures for the Work Midstream Program is below in Table 4-2.

Table 3-2 Breakdown of Sampled Midstream Measures

<i>Measure Category</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Ante Gross kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
Air Conditioner	33,154	34,412	104%	9.94	29.34	295%
Cold Climate Air Source Heat Pump	2,538	1,820	72%	0.31	0.25	82%
Heat Pump	12,636	17,895	142%	1.72	2.50	145%
Total	33,154	34,412	104%	9.94	29.34	295%

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 4-3 displays the ex ante and ex post gross kWh savings of the Work Midstream Program including gross realization rates for sampled projects.

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

Stratum	Project Number	Measure	Ex Ante kWh Savings	Gross Ex Post kWh Savings	Project Gross Realization Rate
1	150	Air Conditioner ($\geq 65,000$ BTUH)	25,329	26,416	104%
1	151	Heat Pump ($< 65,000$ BTUH)	12,636	17,895	142%
2	152	Air Conditioner ($\geq 65,000$ BTUH)	5,835	5,835	100%
3	153	Air Conditioner	1,452	1,607	111%
3	154	Air Conditioner	537	554	103%
3	155	Cold Climate Air Source Heat Pump	2,538	1,820	72%
All Non-Sample Projects			15,221	14,458	95%
Total			48,328	54,127	112%

Below, results from three projects with realization rate below 90% or above 110% are discussed.

- Sample ID 151 (Mini-Split Heat Pumps). Ex post savings exceeded ex ante estimates due to differences in assumed building type and associated effective full-load hours (EFLH). The ex post analysis classified the facility as an automobile dealership and applied TRM EFLH values based on that building type and Springfield, IL weather data, resulting in higher heating and cooling hours. The ex ante tracking data listed the building as a manufacturing facility, which is typically associated with lower EFLH assumptions. The higher ex post EFLH values increased calculated savings and resulted in a 142% realization rate.
- Sample ID 153 (Packaged Air Conditioning Unit). Ex post savings were higher than ex ante due to differences in cooling EFLH assumptions tied to building type. While both analyses used the same TRM algorithm, cooling capacity, and efficiency inputs, the ex post analysis applied EFLH values for a healthcare clinic building using Chicago weather data. The ex ante assumptions reflected an office, low-rise building type, which generally has lower cooling hours. The higher ex post EFLH increased calculated savings, resulting in a 111% realization rate.
- Sample ID 155 (Cold Climate Heat Pump). Ex post savings were lower than ex ante estimates, resulting in a realization rate below 100%. Both analyses applied the TRM heat pump algorithm; however, the ex ante baseline assumptions used in the savings calculation were not documented in the tracking data. Without information on the ex ante baseline efficiencies or EFLH assumptions, differences in operating hours, baseline performance, or system sizing could not be quantified, contributing to the observed 72% realization rate..

Table 3-4 Ex Post Annual Gross kWh

<i>Ex Ante Annual kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>
63,549	63,549	63,549	68,586	108%

3.3.2.2. *Ex Post Gross kW Reductions*

Table 4-5 presents the ex post peak kW reduction for the Work Midstream Program during the period January 2025 through December 2025.

Table 3-5 Ex Post Peak kW

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
15.26	15.26	15.26	43.53	285%

3.4. Estimation of Ex Post Net Savings

3.4.1. Methodology for Estimating Ex Post Net Savings

ADM applied the Work Prescriptive net savings results to the Work Midstream Program to estimate net savings.

3.4.2. Results of Ex Post Net Savings Estimation

Table 4-6 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Work Midstream Program.

Table 3-6 Ex Post Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	63,549	15.26
Gross Audited Savings	63,549	15.26
Gross Verified Savings	63,549	15.26
Ex Post Gross Savings	68,586	43.53
Gross Realization Rate	108%	285%
Ex Post Free Ridership	6,657	3.84
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	61,928	39.69
Net-to-Gross Ratio	90%	91%
Ex Post Net Lifetime Savings	948,499	N/A

3.5. Process Evaluation

The discussion of process findings appears in the Residential Midstream chapter. The Work Midstream Program operates within a cross-sector midstream structure in which distributors support both residential and C&I markets, so the process evaluation—based on distributor interviews and program process review—did not analyze C&I-specific issues separately.

3.6. Findings and Recommendations

Process evaluation findings and recommendations presented in the residential program chapter are applicable to the Work Midstream Program.

Savings realization for the midstream C&I HVAC program varied primarily due to inconsistencies between ex ante and ex post assumptions related to building type classification and associated effective full-load hours (EFLH). In two of the three reviewed cases where realization rates differed significantly from 100% (Sample IDs 151 and 153), ex post savings exceeded ex ante estimates because the ex post analyses applied higher EFLH values aligned with the evaluated building types. Sample ID 155 produced a realization rate below 100% (72%), the reason for which could not be determined because key ex ante baseline assumptions were not documented, limiting the evaluator’s ability to reconcile differences in savings estimates.

- **Recommendation 1:** Improve the accuracy of ex ante savings estimates by strengthening guidance and controls around building type identification in program tracking systems. Ensuring that building type selections reflect actual facility use would align EFLH assumptions more closely with ex post operating conditions, reducing systematic over- or under-estimation of savings.

4. 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 from January 2025 through December 2025.

The objectives of the evaluation are to:

- Complete project pre-approval reviews;
- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year; and
- Provide recommendations for program improvement as appropriate.

4.1. Program Description

This program is available to commercial, industrial, and institutional accounts. The program is a custom program, designed to develop productive energy savings opportunities in cooperation with the customer. Each project will be specially designed. It is expected that projects will need to be carried out in narrow time windows as dictated by conditions specific to the customer's operations and that evaluation will consist primarily of short-term instrumentation and spot metering. The hurdle rate for projects under this program will be set to help ensure cost-effective projects are selected.

Customer incentive levels are set at \$0.06 per kWh saved for non-lighting measures and \$0.05 per kWh saved for lighting measures.

Eligible program measures may include lighting, lighting controls and systems, process improvements, new construction projects, compressed air systems, HVAC systems, and building retro commissioning, for example.

4.2. Data Collection

4.2.1. Verification of Measures

4.2.1.1. *Sampling Plan*

The sampling approach was combined for all C&I programs in 2025. The approach is described in Section 2.2.1.1 of this document on page 8.

The C&I AMI Portal was evaluated separately from the Custom Program sample. The sampled projects only included incentivized customer projects, while the portal is a behavioral intervention. The portal was treated as a distinct measure and was not included in the sampled project population.

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

Table 4-1 Population Statistics Used for Work Custom Sample Design

<i>Variable</i>	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Stratum 4</i>	<i>Stratum 5</i>	<i>Totals</i>
Strata boundaries (kWh)	> 1000000	250000 - 1000000	130000 - 250000	40000 - 130000	< 40000	
Number of projects	6	26	38	85	167	322
Total Ex Ante Annual kWh	14,021,703	13,132,882	6,959,257	5,984,591	2,794,355	42,892,788
Average kWh Savings	2,336,951	505,111	183,138	70,407	16,733	3,112,339
Std. dev. of kWh savings	2,816,374	214,481	37,709	24,525	11,555	3,104,643
Coefficient of variation	1.21	0.42	0.21	0.35	0.69	
Final design sample	6	8	3	3	5	25

4.2.1.2. Verification Data Collection Procedure

The data collection procedure for the Work Custom Program was the same as the approach described in Section 2.2 of this document on page 9.

4.2.2. Participant Survey

The survey data collection for the Work Custom Program is described in Section 2.5.1 of this document on page 20.

4.3. Estimation of Ex Post Gross Savings

4.3.1. Methodology for Estimating Ex Post Gross Savings

4.3.1.1. Review of Documentation

The process for reviewing program documentation for the Work Custom Program was the same as the approach described in Section 2.3.1.1 of this document on page 10.

4.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

A breakdown of sampled measures for the Work Custom Program is below in Table 4-2.

Table 4-2 Breakdown of Sampled Custom Measures

<i>Measure Category</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>
HVAC – General	2,135,552	1,391,517	65%
Compressed Air – General	8,849,183	7,507,500	85%
Lighting – General LED	8,876,940	8,871,310	100%
Total	19,861,675	17,770,327	89%

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.

4.3.1.3. *C&I AMI Portal*

The Commercial AMI Portal provides commercial customers with AMI meters access to detailed information on their energy usage. Customers can log in to their account to view historical usage and cost data, weather-related usage trends, and a heat map showing energy use intensity by time of day. In addition to the portal, I&M communicates with customers through three channels: high-bill alerts when a bill is 30% higher than the same month in the prior year, a monthly cumulative energy report, and an optional weekly energy report. This measure was evaluated as a Work Custom Program measure.

The evaluation used participant-only analyses to estimate energy savings for the C&I AMI presentment portal. The analysis relied on AMI interval data aggregated to daily consumption. AMI meters appeared to be fully deployed for most customers by end of 2024. In addition to the consumption data, we referenced data on interactions with the web-portal that was provided for the individual accounts. This data provided information on the components of the website users were engaging with.

The evaluation relied on individual participant models, which estimate usage changes separately for each customer. This approach avoids commingling participant observations and provides a clearer representation of customer-level changes in consumption.

Comparison group models using propensity score matching (LFER and PPR approaches) were produced but not used. Customer characteristics and operating conditions for nonparticipants could not be validated as comparable to participants, and these methods did not yield consistent results in prior years. In addition, given the increased AMI coverage in the service territory, there are two main concerns with using propensity score matching for C&I: (1) there may be fewer customers who do not participate in the program given the increased access, and (2) the customers who remain eligible for a comparison group may no longer be representative of participants due to self-selection bias or other qualitative traits.

This approach yielded an estimated mean savings of 3,988 kWh per participant that was associated with interacting with the bill comparison widget. The standard error was large relative to the estimate, resulting in a relative precision of 28% at the 90% confidence level. Given this level of uncertainty, ADM applied a conservative extrapolation approach. The 90% lower confidence interval value (2,864 kWh) for per-participant savings was multiplied by the population of customers that received the treatment (i.e., interacted with the bill comparison widget. Using this method, the extrapolated program savings were 17,179,231 kWh.

We did not apply a net savings adjustment to the estimated savings. This approach reflects the assumption that participants would not have had access to comparable information or decision-support tools in the absence of the program. Because the customer-facing insights are available only through the I&M platform, we treat the associated change in consumption as

attributable to the program rather than to actions that participants would have taken on their own. Under this assumption, the estimated effect represents a net impact without the need for a separate free-ridership adjustment.

Although prior evaluations did not consistently identify portal savings, the PY2025 results likely reflect improved data availability and changes in the evaluation approach. In earlier evaluations, AMI data coverage was more limited and required extensive trimming, with more than half of participants removed in some years. This limited both the platform's ability to generate accurate information for customers and the evaluation's ability to measure changes in usage. In contrast, AMI coverage in PY2025 was higher, and trimming was reduced to approximately 25 percent. AMI coverage in Indiana had approached full representation by early 2025.

The improved AMI coverage allowed the evaluation to use customer-level models rather than a single model estimated across all customers. This method aligns more closely with commercial program evaluation practice and provides customer-specific pre/post estimates instead of relying on an aggregate average. The customer-level approach was feasible this year because the AMI data provided many more observations per site, and participation in PY2025 was higher than in past years. These factors increased the precision of the estimates and enabled the results to meet the 90 percent confidence threshold.

4.3.2. 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.

4.3.2.1. *Ex Post Gross kWh Savings*

Table 4-3 displays the ex ante and ex post gross kWh savings of the Work Custom Program including gross realization rates for sampled projects.

Table 4-3 Work Custom Project-Level Ex Ante and Ex Post kWh Savings

<i>Stratum</i>	<i>Project Number</i>	<i>Measure</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Project Gross Realization Rate</i>
1	200	New Construction Lighting	8,076,858	8,076,858	100%
1	201	Air Leak Detection and Repair	1,474,614	1,474,668	100%
1	202	Electric Injection Mold Machine Replacing Hydraulic	1,190,500	1,190,500	100%
1	203	Electric Injection Mold Machine Replacing Hydraulic	1,190,500	1,190,500	100%
1	204	Air Leak Detection and Repair	1,063,153	839,671	79%
1	205	Electric Tools Replacing Pneumatic Tools	1,026,078	627,721	61%
2	206	Injection Mold Machine Insulation	948,439	355,733	38%
2	207	Electric Tools Replacing Pneumatic Tools	828,589	470,802	57%
2	208	LED High Bay Lighting & Controls	763,531	763,531	100%
2	209	Air Leak Detection and Repair	559,236	216,933	39%
2	210	Air Leak Detection and Repair	532,589	532,572	100%
2	211	Air Leak Detection and Repair	457,201	343,752	75%
2	212	Electric Injection Mold Machine Replacing Hydraulic	454,397	383,166	84%
2	213	Air Leak Detection and Repair	426,926	430,666	101%
3	214	Electric Injection Mold Machine Replacing Hydraulic	209,000	217,466	104%
3	215	Air Leak Detection and Repair	192,578	192,607	100%
3	216	Air Leak Detection and Repair	131,878	129,598	98%
4	217	Air Leak Detection and Repair	120,430	120,383	100%
4	218	Efficient Process Equipment	71,885	75,528	105%
4	219	Air Leak Detection and Repair	44,629	44,586	100%
5	220	Refrigeration Case Air Guide Vanes	36,551	30,921	85%
5	222	Air Leak Detection and Repair	28,095	28,134	100%
5	223	Air Leak Detection and Repair	15,281	15,307	100%
5	224	Air Leak Detection and Repair	4,194	4,181	100%
5	225	Air Leak Detection and Repair	14,543	14,543	100%
All Non-Sample Projects			23,031,113	20,619,977	90%
Total			42,892,788	38,390,305	90%

Seven of the sampled projects had realization rates below 90% primarily due to differences between ex ante and ex post assumptions for operating conditions, including pressures, airflow, usage hours, insulated area, leakage rates, and interactive effects. The key factors contributing to lower realization rates for each project are summarized below:

- Sample ID 204 (Compressed Air – Leak Repair). Ex post savings were lower than ex ante due to differences in air-generation efficiency assumptions and leak pressure conditions. The ex ante method applied kW/CFM values based on the compressor’s 190-psig discharge pressure from the CAGI datasheet, whereas the ex post method used efficiency values appropriate for the actual leak pressure of approximately 100 psig. The lower kW/CFM factor and verified repair volume resulted in a 79% realization rate.
- Sample ID 205 (Assembly Tools – Pneumatic to Electric). Ex post savings were lower primarily because the ex ante analysis overstated baseline pneumatic airflow. The application relied on generalized airflow values and an incorrect conversion from free air to SCFM, inflating estimated pneumatic consumption. The ex post analysis applied manufacturer specifications for comparable pneumatic tools and corrected power assumptions for battery charging and rundown torque. The revised approach produced a 61% realization rate.
- Sample ID 206 (Injection Molding – Barrel Insulation). Ex post savings were lower because the verified insulated surface area (296 ft²) was substantially smaller than the 543 ft² assumed ex ante. The ex post method also applied diameter-specific savings factors from the MEMD workpaper rather than the aggregated deemed value used in the prescriptive estimate. These adjustments resulted in a 38% realization rate.
- Sample ID 207 (Assembly Tools – Pneumatic to Electric). Ex ante savings overstated pneumatic airflow requirements and assumed continuous leakage from all tools. Inflated converted CFM values and a uniform per-tool leak rate exceeded conditions collected from an associated air leak project. The ex post analysis incorporated manufacturer airflow ratings and a leakage factor based on previous leak frequency, resulting in a 57% realization rate.
- Sample ID 209 (Compressed Air – Leak Repair). Ex post savings were substantially lower due to misapplication of compressor control factors in the ex ante estimate. Throttle-range percentages from the Uniform Methods Project were treated as compressor control factors, overstating achievable savings for centrifugal compressors. The ex post method applied the appropriate control factor (0.31) and kW/CFM efficiency values from the IL TRM, yielding a 39% realization rate.
- Sample ID 211 (Compressed Air – Leak Repair). Ex ante savings were overstated because kW/CFM values were based on 190-psig compressor operation, while actual leak pressures were near 100 psig. Using the higher-pressure efficiency value overstated savings. Applying kW/CFM values consistent with verified operating conditions produced a 75% realization rate.

- Sample ID 220 (Refrigeration – Air Vanes on Display Cases). The ex post savings were lower than ex ante because the ex post analysis included HVAC interactive effects associated with reduced heat rejection from the refrigerated cases. While both methods sourced compressor savings from the CalNext study, the ex post method used study-measure kWh/linear-foot values and accounted for the additional space-cooling load, resulting in a realization rate of 85%.

Table 4-4 Ex Post Annual Gross kWh

<i>Program Name</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Work Custom Including AMI Portal	42,892,788	60,072,019	60,072,019	55,569,536	130%
Work Custom w/o AMI Portal	42,892,788	42,892,788	42,892,788	38,390,305	90%

4.3.2.2. *Ex Post Gross kW Reductions*

Table 4-5 presents the ex post peak kW reduction for the Work Custom Program during the period January 2025 through December 2025.

Table 4-5 Ex Post Peak kW

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
7,115.29	9,076.39	9,076.39	8,791.71	124%

4.4. Estimation of Ex Post Net Savings

4.4.1. Methodology for Estimating Ex Post Net Savings

The procedure for the estimation of net program-level kWh energy savings and program-level kW demand reductions was the same as the approach described in Section 2.4 of this document on page 15.

4.4.2. Results of Ex Post Net Savings Estimation

Table 4-6 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Work Custom Program.

Table 4-6 Ex Post Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	42,892,788	7,115.29
Gross Audited Savings	60,072,019	9,076.39
Gross Verified Savings	60,072,019	9,076.39
Ex Post Gross Savings	55,569,536	8,791.71
Gross Realization Rate	130%	124%
Ex Post Free Ridership	5,117,757	-
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	50,451,779	8,791.71
Net-to-Gross Ratio	91%	100%
Ex Post Net Lifetime Savings	300,715,022	N/A

4.5. Process Evaluation

A process evaluation of the Work Custom Program was not completed. Section 2.5.1 summarizes feedback from the participant survey.

4.6. Findings and Recommendations

Applicable conclusions and recommendations are presented in Section 2.6.

5. Work Direct Install

This chapter presents the results of both the impact and process evaluations of the Work Direct Install Program that Indiana Michigan Power (I&M) offered to its non-residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Assess gross and net energy (kWh) savings and peak demand (kW) reductions resulting from participation in the program during the program year;
- Document and assess quality assurance and control procedures; and
- Provide recommendations for program improvement as appropriate.

5.1. Program Description

The Work Direct Install Program targets energy efficiency improvements in small commercial/retail establishments, food service facilities and grocery store/supermarkets with demand of less than 150 kW by providing onsite energy assessments and incentives for energy efficient lighting and refrigeration equipment. The program measures are installed by a program qualified trade ally.

Work Direct Install incentives are provided on a per unit of equipment basis and focus on lighting and refrigeration measures.

Incentives are capped at \$3,000 per site and \$21,000 per company, across all programs.

5.2. Data Collection

5.2.1. Verification of Measures

5.2.1.1. *Sampling Plan*

ADM selected a sample of all 2025 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 5-1 Population Statistics Used for Work Direct Install Sample Design

<i>Variable</i>	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Stratum 4</i>	<i>Totals</i>
Strata boundaries (kWh)	> 30000	10000 - 30000	< 10000	<2000	
Number of projects	6	7	9	16	38
Total Ex Ante Annual kWh	353,956	148,625	37,889	9,900	550,370
Average kWh Savings	58,993	21,232	4,210	619	85,053
Std. dev. of kWh savings	48,737	5,389	2,023	313	56,461
Coefficient of variation	0.83	0.25	0.48		
Final design sample	6	2	1	2	11

5.2.1.2. *Verification Data Collection Procedures*

The data collection procedure for the Work Direct Install Program was the same as the approach described in Section 2.2 of this document on page 9.

5.2.2. Participant Survey

ADM administered a survey to Work Direct Install participants to collect data for use in estimating net savings and obtaining feedback about participants' experience with the program. Table 5-2 summarizes the survey data collection efforts. To increase the response rate, ADM engaged participants through both email and telephone communications.

Table 5-2 Summary of Work Direct Install Data Collection

<i>Survey</i>	<i>Mode</i>	<i>Time Frame</i>	<i>Number of Contacts</i>	<i>Number of Completions</i>	<i>Completion Rate</i>
Work Small Business Direct Install Participant Survey	Email and phone follow up	January 2026	1	0	0.0%
Work Small Business Direct Install Participant Survey	Email and phone follow up	October 2025	7	2	28.6%
Total			8	2	25.0%

5.3. Estimation of Ex Post Gross Savings

5.3.1. Methodology for Estimating Ex Post Gross Savings

5.3.1.1. *Review of Documentation*

The process for reviewing program documentation for the Work Direct Install Program was the same as the approach described in Section 2.3.1.1 of this document on page 10.

5.3.1.2. *Procedures for Estimating Measure-Level Gross Energy Savings*

A breakdown of sampled measures for the Work Direct Install Program is below in Table 5-3.

Table 5-3 Breakdown of Sampled Work Direct Install Measures

<i>Measure Category</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>
Lighting – Tubes & Relamps	118,119	48,832	41%
Lighting – High/Low Bay	261,587	244,301	93%
Lighting – Controls	18,737	4,416	24%
Lighting – Downlight	1,557	1,603	103%
Lighting – Exterior	3,010	4,877	162%
Lighting – Troffer	2,676	2,661	99%
Lighting – Exit Signs	1,608	858	53%
Total	407,293	307,548	76%

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.

5.3.2. 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.

5.3.2.1. Ex Post Gross kWh Savings

Table 5-4 displays the ex ante and ex post gross kWh savings of the Work Direct Install Program including gross realization rates for sampled projects.

Table 5-4 Work Direct Install Project-Level Ex Ante and Ex Post kWh Savings

<i>Stratum</i>	<i>Project Number</i>	<i>Measure</i>	<i>Ex Ante kWh Savings</i>	<i>Gross Ex Post kWh Savings</i>	<i>Project Gross Realization Rate</i>
1	300	LED High Bay Lighting	157,594	151,780	96%
1	301	LED Interior & Exterior Lighting & Controls	49,461	33,795	68%
1	302	LED High Bay Lighting	43,254	43,254	100%
1	303	LED High Bay Lighting & Controls	37,309	28,284	76%
1	304	LED Lamp Replacing LED Lamp	35,588	14,065	40%
1	305	LED Lamp Replacing LED Lamp	30,750	10,043	33%
2	306	LED Lamp Replacing LED Lamp	26,814	9,180	34%
2	307	LED Lamp Replacing LED Lamp	21,648	12,257	57%
3	308	LED Lamp Replacing Fluorescent	2,987	2,512	84%
4	309	LED High Bay & Interior Lighting	1,274	1,294	102%
4	310	LED Interior Lighting	614	1,084	176%
All Non-Sample Projects			143,078	83,750	59%
Total			550,370	391,299	71%

One sampled prescriptive project had a realization rate over 110%:

- Sample ID 310 (SBDI Lighting – LED Tubes and Downlights). The ex post savings exceeded ex ante because the verified operating hours (4,512) were higher than the TRM prototypical value for retail buildings. The interval billing data showed lighting in use before and after posted store hours, matching staff stocking and cleanup activity described by the manager. These higher verified hours increased the calculated savings, producing a realization rate of 176% for the SBDI portion.

Seven sampled prescriptive projects had a realization rate that was lower than 90%:

- Sample ID 301 (SBDI Lighting – Warehouse Fixtures). The ex post savings were lower than ex ante because the verified operating hours from interval billing data (2,289 hours) were substantially lower than the TRM prototype assumption used for the ex ante deemed savings. In addition, the occupancy-sensor measure achieved much lower savings than the deemed value, likely due to lower fixture wattage and smaller achievable reductions under actual operating conditions. These adjustments produced a realization rate of 68%.
- Sample ID 303 (SBDI Lighting – LED High Bay and Sensors). The ex post savings were lower than ex ante primarily due to lower verified lighting operating hours (2,821 hours) compared to the TRM prototypical hours for manufacturing. The occupancy-sensor

savings were also overstated in the ex ante estimate relative to the efficient wattage of the installed product, resulting in lower verified savings for that measure. Together, these factors yielded a realization rate of 76%.

- Sample ID 304 (SBDI Lighting – LED Tube to LED Tube). The ex post savings were significantly lower than ex ante because the ex ante baseline assumed fluorescent lamp wattages (29.5W and 15W), whereas the verified baseline for all fixtures was 18W LED. This reduced the wattage delta between baseline and efficient fixtures, resulting in a realization rate of 40%.
- Sample ID 305 (SBDI Lighting – LED Tube to LED Tube). The ex post savings were lower than ex ante because the ex ante method applied the fluorescent baseline wattage (29.5W), while the verified baseline consisted of 18W LED lamps. With the actual baseline wattage much lower than the deemed assumption, the savings per fixture were reduced, resulting in a realization rate of 33%.
- Sample ID 306 (SBDI Lighting – LED Tube to LED Tube). The realization rate was lower because the ex ante savings used the TRM fluorescent baseline wattage (29.5W), but the verification found 18W LED lamps as the actual baseline condition. This smaller wattage difference reduced savings relative to the ex ante estimate, resulting in a realization rate of 34%.
- Sample ID 307 (SBDI Lighting – LED Tube to LED Tube). The ex post savings were lower than ex ante because the ex ante estimate assumed fluorescent lamps as the baseline (29.5W), while the verified baseline was 18W LED lamps. The reduced wattage differential led to lower calculated savings, contributing to a realization rate of 57%.
- Sample ID 308 (SBDI Lighting – 8' LED Tubes). The ex post savings were slightly lower than ex ante due to lower verified hours of use (2,860 hours) compared to the deemed hours (3,401) applied in the ex ante estimate. The lower operating hours reduced the realized annual savings, resulting in a realization rate of 84%.

Table 5-5 presents the ex post annual gross kWh savings for the Work Direct Install Program from January 2025 through December 2025.

Table 5-5 Ex Post Annual Gross kWh

<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
550,370	550,370	550,370	391,299	71%

5.3.2.2. *Ex Post Gross kW Reductions*

Table 5-6 presents the ex post peak kW reduction for the Work Direct Install Program from January 2025 through December 2025.

Table 5-6 Ex Post Peak kW Reduction

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
82.36	82.36	82.36	39.12	47%

5.4. Estimation of Ex Post Net Savings

5.4.1. Methodology for Estimating Ex Post Net Savings

The procedure for the estimation of net program-level kWh energy savings and program-level kW demand reductions was the same as the approach described in Section 2.4 of this document on page 15.

5.4.2. Results of Ex Post Net Savings Estimation

Table 4-6 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Work Direct Install Program.

Table 5-7 Ex Post Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	550,370	82.36
Gross Audited Savings	550,370	82.36
Gross Verified Savings	550,370	82.36
Ex Post Gross Savings	391,299	39.12
Gross Realization Rate	71%	47%
Ex Post Free Ridership	0	-
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	391,299	39.12
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	5,586,733	N/A

5.5. Process Evaluation

A process evaluation of the Work Direct Install Program was not completed.

5.6. Findings and Recommendations

The realization rate varied across sampled projects due to differences in fixture types, wattages, and operating hours compared to prescriptive assumptions. For sample ID 304, ID 305, ID 306, ID 307, the LED linear tubes replaced existing higher wattage LED tubes. The ex

ante savings approach applied prescriptive savings that aligned with a LED replacing linear fluorescent differential wattage. For sample ID 303, the installed controls were on lower wattage fixtures than the prescriptive assumptions. For ID 308, the hours of use were lower than the prescriptive assumptions.

- **Recommendation 1:** Recommend a measure offering specific to higher efficiency LED lighting replacing older LED lamps. This will allow for incentive payments that are better aligned with the energy savings impact of the measure.

6. Work Strategic Energy Management

This chapter presents the results of both the impact and process evaluations of the Work Strategic Energy Management that Indiana Michigan Power (I&M) offered to its non-residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation are to:

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

6.1. Program Description

The Work SEM Program provides a systematic approach to energy management within a commercial or industrial facility and is similar in concept to continual change practices and standards for business quality improvement, safety improvement, etc. SEM viability depends upon participating customer adoption and use of three elements:

1. Demonstrated commitment through policies, goals, and allocation of resources;
2. Demonstrated energy management planning and implementation; and
3. Implementing and using a system for measuring and reporting performance.

Accordingly, the Work SEM Program provides rebates, training, and energy savings identification and verification. Training rebates will provide for Building Operator Certification (BOC) training on a per-participant basis. Behavioral energy savings will be evaluated according to building type for those participating in the training.

SEM will also pay rebates based on a whole building assessment for energy savings, dependent upon the building type.

6.2. Data Collection

6.2.1. Verification of Measures

6.2.1.1. *Sampling Plan*

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.

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

Table 6-1 Population Statistics Used for Work Strategic Energy Management Sample Design

<i>Variable</i>	<i>Stratum 1</i>	<i>Stratum 2</i>	<i>Stratum 3</i>	<i>Totals</i>
Strata boundaries (kWh)	> 500000	150000 - 500000	< 500000	
Number of projects	4	4	4	12
Total Ex Ante Annual kWh	2,420,874	786,775	263,856	3,471,505
Average kWh Savings	605,219	196,694	65,964	867,876
Std. dev. of kWh savings	66,231	10,456	33,774	110,461
Coefficient of variation	0.11	0.05	0.51	
Final design sample	2	1	1	4

6.2.1.2. Verification Data Collection Procedures

In general, the data collection procedure for the Work SEM was the same as the approach described in Section 2.2 of this document on page 9. ADM used data collected by program implementers on the measures implemented through the program and other site-specific information on product schedules and trends in energy consumption. ADM will request the implementers statistical models used to estimate energy savings.

ADM supplemented data collected by the program with the collection of additional site-specific data on measures implemented, production changes and operating schedules, building automation system trend logs through telephone conversations and email exchanges with the site contact.

6.3. Estimation of Ex Post Gross Savings

6.3.1. Methodology for Estimating Ex Post Gross Savings

6.3.1.1. 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.

6.3.1.2. Procedures for Estimating Measure-Level Gross Energy Savings

All sampled measures for the Work Strategic Energy Management Program were characterized as SEM upgrades. The savings were evaluated using an IPMVP Option C: Whole Facility Model approach.

ADM calculated a kWh energy savings gross realization rate and a peak kW reduction gross realization rate for the M&V sample. The site-level gross impact analysis results for the M&V sample site are presented in Volume II of the report.

6.3.2. 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.

6.3.2.1. Ex Post Gross kWh Savings

Table 6-5 displays the ex ante and ex post gross kWh savings of the Work Strategic Energy Management Program including gross realization rates for sampled projects.

Table 6-2 Work Direct Install Project-Level Ex Ante and Ex Post kWh Savings

Stratum	Project Number	Measure	Ex Ante kWh Savings	Gross Ex Post kWh Savings	Project Gross Realization Rate
1	400	Strategic Energy Management	621,632	377,952	61%
1	401	Strategic Energy Management	567,316	156,482	28%
2	402	Strategic Energy Management	202,140	202,140	100%
3	403	Strategic Energy Management	71,942	76,863	107%
All Non-Sample Projects			2,008,475	1,343,429	67%
Total			3,471,505	2,156,866	62%

Factors contributing to the realization rate discrepancies included the following:

- Sample ID 400 (SEM – Operational and Maintenance Improvements). The ex post savings were lower than ex ante because the ex post analysis verified only first-year energy savings and excluded savings from previously incented measures with remaining effective useful life, particularly a compressed air leak repair project. Both the ex ante and ex post estimates

used the facility's SEM regression model, which incorporated production indicators, weather variables, and operational change logs, but the ex ante estimate included savings from ECMs that were already incentivized and outside the SEM reporting boundary. The ex post evaluation removed these overlapping savings and only credited savings attributable to new no-/low-cost SEM actions within the current reporting period, resulting in a realization rate of 61%.

- Sample ID 401 (SEM – Process and Operational Changes). The ex post savings were significantly lower than ex ante due to differences in the application of the changepoint flag associated with installation and operation of a new process oven. The ex ante model treated the oven as offline (binary value zero) for the last several billing periods, even though the evaluation confirmed that the old oven remained in warm-standby mode and was not equivalent to being fully offline. Because the changepoint coefficient ($\beta_2 = -4,229$) is large and materially influences the predicted baseline, misapplication of this flag overstated ex ante savings. The ex post evaluation applied a flag value that reflected the actual operating condition of the ovens, resulting in lower predicted consumption and a realization rate of 28%.

Table 6-3 displays the ex ante and ex post gross kWh savings of the Work SEM Program including gross realization rate.

Table 6-3 Ex Post Annual Gross kWh

<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
3,471,505	3,471,505	3,471,505	2,156,866	62%

6.3.2.2. *Ex Post Gross kW Reductions*

Table 6-4 presents the ex post peak kW reduction for the Work SEM Program from January 2025 through December 2025.

Table 6-4 Ex Post Peak kW Reduction

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
659.65	659.65	659.65	272.34	41%

6.4. Estimation of Ex Post Net Savings

6.4.1. 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.

ADM completed interviews with participants in PY2023 and determined that the net-to-gross ratio for the program was 100%. We applied this net-to-gross ratio to the PY2025 projects.

6.4.2. Results of Ex Post Net Savings Estimation

Table 6-5 summarizes the net ex post kWh savings and the net ex post kW demand reduction of the Work SEM Program.

Table 6-5 Ex Post Net kWh and kW Savings

Category	kWh	kW
Ex Ante Gross Savings	3,471,505	659.65
Gross Audited Savings	3,471,505	659.65
Gross Verified Savings	3,471,505	659.65
Ex Post Gross Savings	2,156,866	272.34
Gross Realization Rate	62%	41%
Ex Post Free Ridership	0	-
Ex Post Non-Participant Spillover	0	-
Ex Post Participant Spillover	0	-
Ex Post Net Savings	2,156,866	272.34
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	2,464,318	N/A

6.5. Process Evaluation

ADM did not complete a process evaluation of the Work SEM Program.

6.6. Findings and Recommendations

Participation in SEM increased in PY2025. The program had an increase in SEM program participation with 12 participants completing projects in 2025, compared to 10 in 2024.

The evaluation identified discrepancies in the methods used to estimate first-year energy savings. For Sample ID 400, ex ante savings were reported for two distinct periods and subsequently annualized. In contrast, the program's CUSUM savings method already accounts for all implemented measures, as CUSUM represents cumulative savings over the baseline period. For ID401, the usage of change-flags do not completely represent the same operation conditions when they are removed as the period from which they were regressed. The change flag for ID401 represented a significant capital project, but was reset to the null value when there were issues with the old piece of equipment.

- **Recommendation 1:** Provide additional guidelines for the CUSUM tool. The baseline reporting period may need to move forward in the timeline when there are significant capital projects, instead of adding change-point binary flags in the linear regression for the predicted energy usage.

7. 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 7-1.

Table 7-1 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.				✓		✓		✓

7.1. PY2025 Cost Effectiveness Evaluation

Table 7-2 through Table 7-6 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 PY2025.

Table 7-2 Work Prescriptive Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 1,718,198			\$ 1,718,198		\$ 1,718,198		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 15,598,085							
Lost Revenue (NPV)						\$ 20,793,513		
Avoided Energy Costs (NPV)			\$ 8,921,015		\$ 8,921,015		\$ 8,921,015	
Avoided Capacity Costs (NPV)			\$ 2,902,597		\$ 2,902,597		\$ 2,902,597	
Avoided T&D Costs (NPV)			\$ 728,110		\$ 728,110		\$ 728,110	
Incremental Costs		\$ 3,376,112						\$ 3,376,112
Program Overhead Costs				\$ 1,519,756		\$ 1,519,756		\$ 1,519,756
Total Benefits	\$ 17,316,283		\$ 12,551,722		\$ 12,551,722		\$ 12,551,722	
Total Costs	\$ 3,376,112		\$ 3,237,954		\$ 24,031,466		\$ 4,895,868	
Test Score	5.13		3.88		0.52		2.56	

Table 7-3 Work Midstream Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 21,372			\$ 21,372		\$ 21,372		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 41,580							
Lost Revenue (NPV)						\$ 55,695		
Avoided Energy Costs (NPV)			\$ 23,932		\$ 23,932		\$ 23,932	
Avoided Capacity Costs (NPV)			\$ 32,299		\$ 32,299		\$ 32,299	
Avoided T&D Costs (NPV)			\$ 8,093		\$ 8,093		\$ 8,093	
Incremental Costs		\$ 7,339						\$ 7,339
Program Overhead Costs				\$ 126,376		\$ 126,376		\$ 126,376
Total Benefits	\$ 62,952		\$ 64,324		\$ 64,324		\$ 64,324	
Total Costs	\$ 7,339		\$ 147,748		\$ 203,443		\$ 133,715	
Test Score	8.58		0.44		0.32		0.48	

Table 7-4 Work Custom Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 2,264,597			\$ 2,264,597		\$ 2,264,597		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 15,955,711							
Lost Revenue (NPV)						\$ 18,535,436		
Avoided Energy Costs (NPV)			\$ 7,827,834		\$ 7,827,834		\$ 7,827,834	
Avoided Capacity Costs (NPV)			\$ 3,046,166		\$ 3,046,166		\$ 3,046,166	
Avoided T&D Costs (NPV)			\$ 830,689		\$ 830,689		\$ 830,689	
Incremental Costs		\$ 5,588,154						\$ 5,588,154
Program Overhead Costs				\$ 1,738,281		\$ 1,738,281		\$ 1,738,281
Total Benefits	\$ 18,220,308		\$ 11,704,689		\$ 11,704,689		\$ 11,704,689	
Total Costs	\$ 5,588,154		\$ 4,002,878		\$ 22,538,313		\$ 7,326,435	
Test Score	3.26		2.92		0.52		1.60	

Table 7-5 Work Direct Install Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 35,160			\$ 35,160		\$ 35,160		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 253,477							
Lost Revenue (NPV)						\$ 369,076		
Avoided Energy Costs (NPV)			\$ 142,925		\$ 142,925		\$ 142,925	
Avoided Capacity Costs (NPV)			\$ 29,915		\$ 29,915		\$ 29,915	
Avoided T&D Costs (NPV)			\$ 7,561		\$ 7,561		\$ 7,561	
Incremental Costs		\$ 56,712						\$ 56,712
Program Overhead Costs				\$ 145,835		\$ 145,835		\$ 145,835
Total Benefits	\$ 288,637		\$ 180,401		\$ 180,401		\$ 180,401	
Total Costs	\$ 56,712		\$ 180,996		\$ 550,072		\$ 202,548	
Test Score	5.09		1.00		0.33		0.89	

Table 7-6 Work Strategic Energy Management Program Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 69,430			\$ 69,430		\$ 69,430		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 212,384							
Lost Revenue (NPV)						\$ 216,172		
Avoided Energy Costs (NPV)			\$ 69,763		\$ 69,763		\$ 69,763	
Avoided Capacity Costs (NPV)			\$ 24,577		\$ 24,577		\$ 24,577	
Avoided T&D Costs (NPV)			\$ 8,221		\$ 8,221		\$ 8,221	
Incremental Costs		\$ 1,989						\$ 1,989
Program Overhead Costs				\$ 332,914		\$ 332,914		\$ 332,914
Total Benefits	\$ 281,814		\$ 102,561		\$ 102,561		\$ 102,561	
Total Costs	\$ 1,989		\$ 402,344		\$ 618,516		\$ 334,902	
Test Score	141.71		0.25		0.17		0.31	

7.2. PY2023 – PY2025 Cost Effectiveness Evaluation

Cost effectiveness of programs across PY2023 – PY2025 was also evaluated. Table 7-7 through Table 7-11 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 PY2023 – PY2025.

Table 7-7 Work Prescriptive Program Cost Test Inputs and Results (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 4,728,037			\$ 4,728,037		\$ 4,728,037		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 43,412,693							
Lost Revenue (NPV)						\$ 60,513,984		
Avoided Energy Costs (NPV)			\$24,178,914		\$24,178,914		\$24,178,914	
Avoided Capacity Costs (NPV)			\$ 8,195,394		\$ 8,195,394		\$ 8,195,394	
Avoided T&D Costs (NPV)			\$ 2,186,256		\$ 2,186,256		\$ 2,186,256	
Incremental Costs		\$10,035,044						\$10,035,044
Program Overhead Costs				\$ 5,014,901		\$ 5,014,901		\$ 5,014,901
Total Benefits	\$ 48,140,730		\$ 34,560,564		\$ 34,560,564		\$ 34,560,564	
Total Costs	\$ 10,035,044		\$ 9,742,939		\$ 70,256,923		\$ 15,049,945	
Test Score	4.80		3.55		0.49		2.30	

Table 7-8 Work Midstream Program Cost Test Inputs and Results (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 21,372			\$ 21,372		\$ 21,372		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 41,580							
Lost Revenue (NPV)						\$ 55,695		
Avoided Energy Costs (NPV)			\$ 23,932		\$ 23,932		\$ 23,932	
Avoided Capacity Costs (NPV)			\$ 32,299		\$ 32,299		\$ 32,299	
Avoided T&D Costs (NPV)			\$ 8,093		\$ 8,093		\$ 8,093	
Incremental Costs		\$ 7,339						\$ 7,339
Program Overhead Costs				\$ 126,376		\$ 126,376		\$ 126,376
Total Benefits	\$ 62,952		\$ 64,324		\$ 64,324		\$ 64,324	
Total Costs	\$ 7,339		\$ 147,748		\$ 203,443		\$ 133,715	
Test Score	8.58		0.44		0.32		0.48	

Table 7-9 Work Custom Program Cost Test Inputs and Results (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 6,946,059			\$ 6,946,059		\$ 6,946,059		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 46,731,276							
Lost Revenue (NPV)						\$ 59,593,059		
Avoided Energy Costs (NPV)			\$22,452,555		\$22,452,555		\$22,452,555	
Avoided Capacity Costs (NPV)			\$ 7,434,985		\$ 7,434,985		\$ 7,434,985	
Avoided T&D Costs (NPV)			\$ 2,175,781		\$ 2,175,781		\$ 2,175,781	
Incremental Costs		\$13,087,500						\$13,087,500
Program Overhead Costs				\$ 6,766,965		\$ 6,766,965		\$ 6,766,965
Total Benefits	\$ 53,677,335		\$ 32,063,321		\$ 32,063,321		\$ 32,063,321	
Total Costs	\$ 13,087,500		\$ 13,713,024		\$ 73,306,083		\$ 19,854,465	
Test Score	4.10		2.34		0.44		1.61	

Table 7-10 Work Direct Install Program Cost Test Inputs and Results (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 181,793			\$ 181,793		\$ 181,793		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 567,349							
Lost Revenue (NPV)						\$ 817,349		
Avoided Energy Costs (NPV)			\$ 315,550		\$ 315,550		\$ 315,550	
Avoided Capacity Costs (NPV)			\$ 90,185		\$ 90,185		\$ 90,185	
Avoided T&D Costs (NPV)			\$ 23,874		\$ 23,874		\$ 23,874	
Incremental Costs		\$ 135,919						\$ 135,919
Program Overhead Costs				\$ 505,859		\$ 505,859		\$ 505,859
Total Benefits	\$ 749,142		\$ 429,609		\$ 429,609		\$ 429,609	
Total Costs	\$ 135,919		\$ 687,652		\$ 1,505,001		\$ 641,778	
Test Score	5.51		0.62		0.29		0.67	

Table 7-11 Work Strategic Energy Management Program Cost Test Inputs and Results (PY2023 – PY2025)

<i>Variable</i>	<i>PCT</i>		<i>UCT</i>		<i>RIM</i>		<i>TRC</i>	
	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>
Incentives	\$ 79,943			\$ 79,943		\$ 79,943		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 1,238,874							
Lost Revenue (NPV)						\$ 1,669,945		
Avoided Energy Costs (NPV)			\$ 607,857		\$ 607,857		\$ 607,857	
Avoided Capacity Costs (NPV)			\$ 147,232		\$ 147,232		\$ 147,232	
Avoided T&D Costs (NPV)			\$ 42,523		\$ 42,523		\$ 42,523	
Incremental Costs		\$ 315,573						\$ 315,573
Program Overhead Costs				\$ 937,800		\$ 937,800		\$ 937,800
Total Benefits	\$ 1,318,817		\$ 797,612		\$ 797,612		\$ 797,612	
Total Costs	\$ 315,573		\$ 1,017,743		\$ 2,687,688		\$ 1,253,373	
Test Score	4.18		0.78		0.30		0.64	

2025 Indiana Commercial & Industrial Portfolio

EM&V Report

Volume II of II

Prepared for:
Indiana Michigan Power

April 30, 2026

Prepared by:



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1. Introduction

Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., a Qualus Company, (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 2025.

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 2025 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: C&I 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

Facility Occupied Annual Hours

Interval billing data, weather data, time of day and day of week data are variables for the following linear regression equation.

$$\begin{aligned} \text{kWh}_{\text{hour}} = & \beta_0 + \beta_{\text{CDH}} \times \text{CDH} + \beta_{\text{HDH}} \times \text{HDH} \\ & + \beta_{\text{Weekday} \times \text{Hour1\_flag}} \times \text{WeekdayFlag} \times \text{Hour1\_Flag} \\ & + \dots \\ & + \beta_{\text{Weekday} \times \text{Hour24\_flag}} \times \text{WeekdayFlag} \times \text{Hour24\_Flag} \\ & + \beta_{\text{Weekend} \times \text{Hour1\_flag}} \times \text{WeekendFlag} \times \text{Hour1\_Flag} \\ & + \dots \\ & + \beta_{\text{Weekend} \times \text{Hour24\_flag}} \times \text{WeekendFlag} \times \text{Hour24\_Flag} \end{aligned}$$

Where:

β_0	=Y-Intercept
β_{CDH}	=Coefficient for the variable CDH, cooling degree hour
CDH	=Cooling degree hour
β_{HDH}	=Coefficient for the variable HDH, heating degree hour
HDH	=Heating degree hour
$\beta_{\text{Weekday} \times \text{Hour1\_Flag}}$	=Coefficient for the interactive variable Weekday x Hour1_Flag
WeekdayFlag x Hour1_Flag	=Interactive binary variable: WeekdayFlag x Hour1_Flag
....	=iteration of variables for hours 2 through 24 for weekdays
$\beta_{\text{Weekend} \times \text{Hour1\_Flag}}$	=Coefficient for the interactive variable Weekend x Hour1_Flag
WeekendFlag x Hour1_Flag	=Interactive binary variable: WeekendFlag x Hour1_Flag
....	=iteration of variables for hours 2 through 24 for weekends

The significance of the CDH, HDH coefficients are optimized by iterating through balance point temperatures, the approximated outdoor air temperature were building heating and cooling switchover. The coefficient and variable for CDH and HDH are set to null to build an hourly model for a 1 week period, to reflect base load energy usage, without the energy required for heating and cooling. Breakpoint points are visually identified in the model, for the transition to unoccupied and occupied periods. Hourly energy usage in transition from occupied to unoccupied may also be proportioned to load, along with time.

Sample ID 102

Executive Summary

For the projects represented by sample ID102, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 771,179 kWh, with an ex post peak demand reduction of 121.009 kW. The gross energy realization rate is 99%.

Project Description

The participant replaced existing lighting in the interior of a hospital with (15,388) LED 4' lamps, (886) LED 2' lamps, and (578) LED downlights.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 1L T8 to LED linear tube	9151	9151	24	17	5,548	1.13	403,945	403,945	100%
4' 1L THO to LED linear tube	1787	1787	28	12	5,548	1.13	179,231	179,231	100%
4' 1L T8 to LED linear tube	1365	1365	28	12	2,628	1.13	64,877	64,877	100%
Downlight to LED downlight	547	547	22	11	5,548	1.13	36,359	36,332	100%
4' 1L T8 to LED linear tube	1531	1531	24	17	2,628	1.13	32,006	32,013	100%
4' 1L T8 to LED linear tube	1339	1339	24	17	2,920	1.13	31,099	31,109	100%
2' 1L T8 to LED linear tube	548	548	15	13	5,548	1.13	14,845	7,962	54%
4' 1L THO to LED linear tube	215	215	28	12	2,920	1.13	11,342	11,351	100%
2' 1L T8 to LED linear tube	156	156	14	12	5,548	1.13	1,955	1,956	100%
2' 1L T8 to LED linear tube	156	156	14	12	2,628	1.13	926	927	100%
Downlight to LED downlight	25	25	22	11	2,628	1.13	780	787	101%
Downlight to LED downlight	4	4	54	21	2,920	1.13	457	442	97%
2' 1L T8 to LED linear tube	25	25	15	13	2,628	1.13	316	172	54%
Downlight to LED downlight	2	2	22	11	2,920	1.13	72	70	97%
2' 1L T8 to LED linear tube	1	1	15	13	2,920	1.13	15	8	51%
Total							778,225	771,179	99%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	778,225	771,179	99%	121.009
Total	778,225	771,179	99%	121.009

The ex post annual energy savings are 771,179 kWh, with an ex post peak demand reduction of 12.009 kW. The gross energy realization rate is 99%.

Sample ID 103

Executive Summary

Under a project represented by sample ID 103; a program participant received prescriptive incentives from I&M for replacing standard flow blow off air nozzles with low flow air nozzles in the production areas and maintenance shop at a manufacturing building.

The ex post annual energy savings were 87,538 kWh, with an ex post peak demand reduction of 17.6 kW. The gross realization rate for the project energy savings was 12 %.

Project Description

The participant replaced (96) handheld air blow off guns in the production areas and maintenance shop. The air from the guns removes debris from the product before loading in the production cell, and cleaning of the path the material will travel through. The air blow off guns are also used by the maintenance staff for preventative maintenance work, and repair work in the shop. The baseline blow off guns were of similar shape, but with a straight pipe, lacking the low flow orifice.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the installation verification and pictures of the installed nozzle. The baseline air blow off gun was observed from an associated air leak reduction production. The participant at this site did not respond to follow up questions, but the maintenance supervisor at the other location, which also completed a blow off gun replacement program, provided the usage patterns of the blow off tools. The following algorithm is from the measure *4.7.4 Efficient Compressed Air Nozzles in the Illinois TRM V13*.

$$kWh_{savings} = QTY \times (CFM_{baseflow} - CFM_{lowflow}) \times kW/CFM \times Hours \times \% Use$$

$$kW_{savings} = kWh_{savings} \times CDF$$

Where:

$kWh_{savings}$	= Annual energy savings
QTY	= Quantity nozzles placed in service
$CFM_{baseflow}$	= Base case, air flow, CFM
$CFM_{lowflow}$	= Efficient nozzle air flow, CFM,
$Hours$	= Annual hours of use
$\% Use$	= Portion of workday blow off used
kW/CFM	= kW/CFM plant air compressor
CDF	= Coincidence Factor for Peak Demand hours, 0.000201053

Review of variables: $Qty \times CFM_{baseflow} \times \% Use$

The product of the variables for the quantity of blow guns (Qty), the baseline blow off gun air flow ($CFM_{baseflow}$) $\times \% Use$ is associated with the volume of pressurized air discharged from the

compressed air plant. The participant indicated that all the air compressor are required to operate to support the air load demand, which for this plant is maximum capacity of 1,198 CFM.

In the following table, the product of the three variables, Qty,CFM, %USE is compared to the total air plant capacity:

Ex Ante Base Case Airflow compared to air compressor capacity

Variable	Value	
Qty	96 blow off tools	
CFM _{baseflow}	21 CFM to 28 CFM	
% Use	4,800 hours/tool	58%
	8,320 working hours	
CFM _{total baseflow}	2,114 CFM	
CFM _{total compressor capacity}	1,198 CFM	

As the ex ante total air flow with a diversity factor (usage factor) of 58% exceeds the total capacity of the air compressor plant (176%), the evaluation team contacted the participant of the same company as the participant, but at a different building performing the same manufacturing operations.

Task	Values	Value	Units
Product change swaps per day	Variable. Applied average	4	per 12hr shift
Products per swap	Variable. Typical applied	3	Per swap
Air blow off tool	High end of process time	2	Minutes per product
Cleaning of multi guide equipment	Same frequency as the product swaps	0.40	Hours
PM per day	Preventative maintenance + Shop work	4	PMs complete per shift
Air blow off tool usage	Estimated usage	15	Minutes per PM
Quantity blow off tools	All were installed	96	
Average hours per air tool per day	Sum of blow hrs/qty	1.62	Hours/day/blow-off tool

From the table above, one air blow off tool operating 1.62 hours per day, with a work schedule of 352 days, approximates an annual usage of 561 hours. The Usage Factor used in the savings algorithm, is 571 hours/8448 hours, or 7%. This usage factor of 7% is larger than the TRM default value of 5%, but less than the ex ante value of 58% (4380 hours/8448 hours).

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Air Nozzles	736,128	87,538	12%	17.60
Total	736,128	87,538	12%	17.60

The ex post annual energy savings were 87,538 kWh, and the corresponding ex post peak demand reduction was 17.60 kW. The gross realization rate is 12%.

- The ex ante and ex post savings estimates both reference the algorithm in the Illinois TRM for low-flow air nozzle savings and apply the same baseline airflow assumptions for the 0.125-inch and 0.250-inch nozzle diameters. The efficient airflow values were also identical for both diameters, based on manufacturer specifications.
- The ex ante savings were calculated assuming that each of the 96 air blow-off tools operates 4,800 hours per year, representing approximately 58% of the annual work hours associated with a theoretical population of 192 machine operators (96 tools × 2 shifts). Although the number of machine operators was not disclosed, the company's published total workforce across this facility and a second facility is fewer than 90 employees.
- The site contact at the associated facility provided tool usage patterns, which were used to develop a model estimating ex post annual operating hours of 571 per tool. This represents approximately 7% of the workday, which exceeds the TRM default assumption of 5% for hand-held blow-off tools.

Sample ID 104

Executive Summary

Under a project represented by Sample ID 104, prescriptive incentives were provided by I&M for for replacing an existing air compressor with a rotary screw - variable speed drive (VSD) air compressor in a manufacturing building.

The ex post annual energy savings were 11,057 kWh, and the corresponding ex post peak demand reduction was 2.22 kW. The gross realization rate for the project's energy savings was 2%.

Project Description

The participant replaced a (25) hp rotary screw constant speed air compressor with a (25) hp VSD air compressor to support the manufacturing operations. The compressor operates from 4AM to 5PM each weekday with a variable load.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, obtained the CAGI data sheet and project invoice. One air compressor completes the load requirement to operate manufacturing site. The site operates 13 hours per day Monday to Friday. The TRM algorithm for Variable Speed Air Compressor for sourced for the following algorithm.

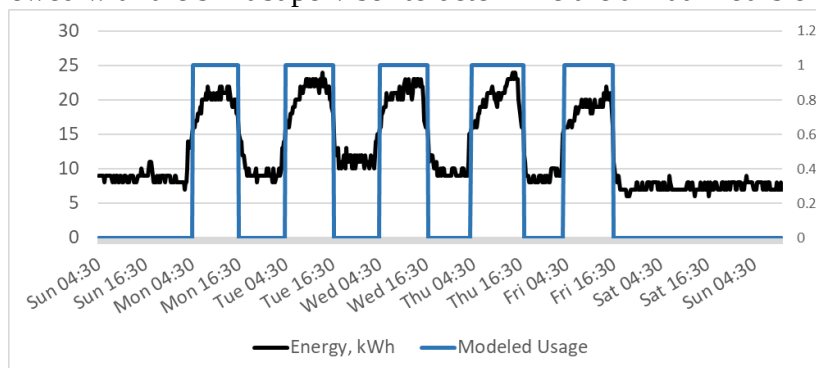
$$\Delta kWh = 0.9 \times Hp \times (CF_{base} - CF_{eff}) \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
Hp	= Horsepower of compressor motor
CF_{base}	= Control factor, constant speed
CF_{eff}	= Control factor, variable speed
$Hours$	= Annual hours of operation
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data was modeled with an indicator for suggested start/stop periods of production and reviewed with the shift supervisor to determine the annual hours of use.



Differences in Variables: *Quantity*

Although the ex ante prescriptive savings were applied per unit and the ex post savings were estimated with the TRM algorithm, the primary difference in savings is the usage of the quantity value. The application misinterpreted the units and applied the quantity of horsepower instead of the quantity of air compressors.

Savings Algorithm Inputs

Variable	Ex Post Value	Source	Ex Ante Value
Quantity	1	Invoice	25
Horsepower	25	Model plate	25
Base Compressor	Rotary: Load/unload Control: 3gal/CFM receiver	Industry practice	
CF _{base}	0.831	IL TRM	
Efficient compressor	VSD	Invoice	VSD
CF _{efficient}	0.705	IL TRM	
Hours	3900	Site supported by interval billing data	
Deemed savings per unit	N/A	N/A	23,3325
kWh _{save}	11,057		583,128

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
VSD Air Compressor	583,128	11,057	2%	2.22
Total	583,128	11,057	2%	2.22

The ex post annual energy savings were 11,057 kWh, and the corresponding ex post peak demand reduction was 2.22 kW. The gross realization rate is 2%.

- The ex ante savings method incorrectly applied the quantity of units to the prescribed savings for a (21-50 hp) VSD air compressor.
- Additionally, upon review of prior program year documentation, the invoices for both program years appear identical. The customer was not informed of this during the interview and may have been referring only to the prior year's compressor installation.

Low Flow Air Nozzle Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Ex Post Source</i>
CFM _{standard flow 1/8"}	21	21	IL TRM measure
CFM _{low flow 1/8"}	13	13	Product Specification
Installed quantity	82	82	Invoice, verified
CFM _{standard flow 1/4"}	28	28	IL TRM measure
CFM _{low flow 1/4"}	14	14	Product Specification
Installed quantity	14	14	Invoice, verified
Hours worked	8,448	8,448	Site contact
Use%	7%	58%	Calculated, hours/all hours
kW/CFM	0.18	0.18	CAGI Sheets for compressor
kWh _{savings}	87,538	736,128	Calculated
kW _{savings}	17.6	11.0	Calculated
CDF factor	0.000201053	0.000201053	Indiana TRM

Results

Realized Gross Savings

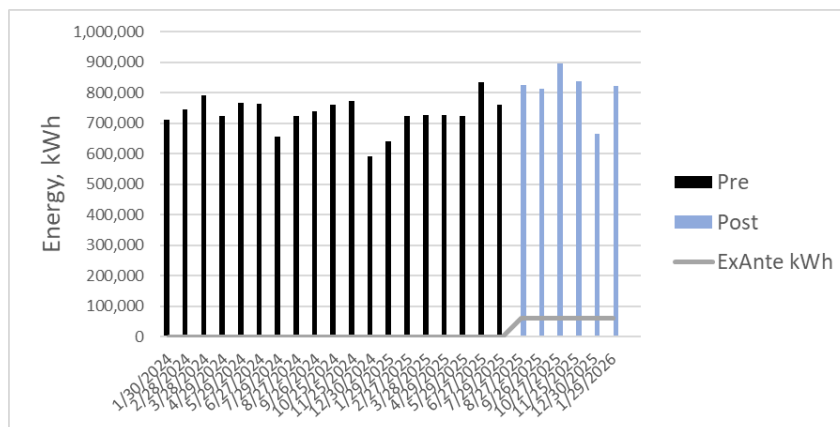
<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed Air	736,128	87,538	12%	17.60
Total	736,128	87,538	12%	17.60

The ex post energy savings are 87,538 kWh, peak demand savings are 17.7 kW, with an energy savings realization rate of 12 %.

- Both the ex ante and ex post estimates sourced the TRM based savings algorithm with the same values for pre and post blow off gun air flow, air compressor efficiency, and hours worked.
- The ex ante savings based on each (92) of the air blow off tools operating 57% of the work day implies a machine operator headcount of 104 (52x 2 shifts) people. The total number of employees including office support employees is approximately 49. The machine operators tend to multi machines per day.
- The ex ante savings sum total air demand for the baseline air blow off gun totals 2,114 CFM (1219 CFM with usage factor), whereas the air plant capacity is less, at 1198, with all four air compressors fully loaded.

- The ex post usage factor, derived from typical day usage model with the participant has an air demand of 142 CFM, which is 12% of the air plant capacity.
- The ex post usage factor of 7% is nearer to the TRM default value of 5%, than the ex ante value of 58%.
- An ancillary econometric method with billing data, in the following figure, results in zero savings from the pre-period to the post-period. Weather data was removed, as there was not a correlation to energy usage, production data could not be provided for the analysis.

Billing Data Pre and Post Period with Ex Ante Savings



Sample ID 105 110 131

Executive Summary

For the projects represented by samples ID105, 110, and 131 the program participant received prescriptive Lighting Pathway incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 377,107 kWh, with an ex post peak demand reduction of 59.50 kW. The gross energy realization rate is 38%.

Project Description

The participant replaced existing fluorescent lighting fixtures in the interior of their manufacturing facility with (335) LED high bay fixtures. Existing linear fluorescent T5HO fixture ranged from 4-lamp to 8-lamp.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The annual hours were provide by the participant. The variables for the energy savings algorithm are summarized in the following table. There was not a definitive boundary in the

three projects for the scope of work, as some replaced 8' fluorescent fixtures and other 4' fixtures, the base wattages is weighted based on the quantities replaced by the set of three projects.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 4L T5HO to LED high bay	43	43	234	198	5798	1.02	986,481	9,368	38%
4' 6L T5HO to LED high bay	208	208	360	198	5798	1.02		200,235	
4' 8L T5HO to LED high bay	48	48	468	198	5798	1.02		78,242	
4' 8L T5HO to LED high bay	36	36	468	198	8769	1.02		89,263	
Total							986,481	377,107	38%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting – Project 105	450,542	172,231	38%	27.18
Lighting – Project 110	294,472	112,569	38%	17.76
Lighting – Project 131	241,467	92,307	38%	14.56
Total	986,481	377,107	38%	59.50

The ex post annual energy savings are 377,107 kWh, with an ex post peak demand reduction of 59.50 kW. The gross energy realization rate is 38%. The installation of the measures occurred throughout the year. The base products and hours of use were confirmed with the client and reflect a lower base wattage and hours of use than what was presumed in the ex ante savings estimate.

Sample ID 106

Executive Summary

For the projects represented by sample ID106, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 412,558 kWh, with an ex post peak demand reduction of 47.185 kW. The gross energy realization rate is 97%.

Project Description

The participant replaced existing lighting in the interior and exterior of an automobile dealership with (81) LED High Bay fixtures, (58) LED Pole fixtures, (30) LED 2x4 troffers, and (68) LED 1x4 troffers.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

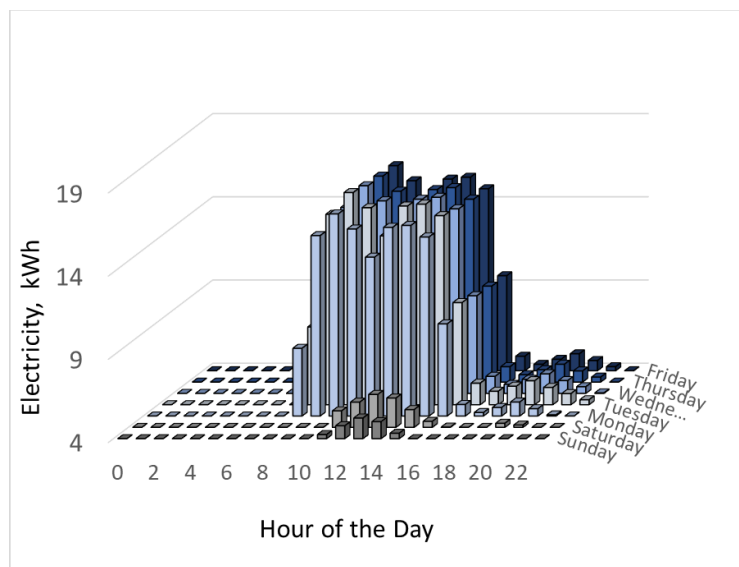
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
HID 400W to LED high bay	81	81	850	210	3,231	1.16	238,522	194,294	81%
HID 1000W to LED Pole	28	28	1080	131	4,303	1.00	91,616	114,339	125%
HID 750W to LED Pole	30	30	1080	130	4,303	1.00	76,951	92,945	121%
2x4 T8 to LED 2x4 troffer	68	68	85	49	3,231	1.06	17,209	8,268	48%
1x4 T8 to LED 1x4 troffer	16	16	60	35	3,231	1.06	2,234	2,712	121%
Total							426,531	412,558	97%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	426,531	412,558	97%	47.185
Total	426,531	412,558	97%	47.185

The ex post annual energy savings are 412,558 kWh, with an ex post peak demand reduction of 47.185 kW. The gross energy realization rate is 97%.

Sample ID 107 119

Executive Summary

For the projects represented by sample ID107 and 119, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 328,424, with an ex post peak demand reduction of 58.192 kW. The gross energy realization rate is 68%.

Project Description

The participant replaced existing lighting in the interior and exterior of an industrial building with (71) High Bay LED fixtures replacing HID fixtures, (238) exterior LED fixtures replacing HID fixtures, (362) LED linear tubes replacing fluorescent lamps, (27) LED corn cob lamps replacing HID lamps, and (17) LED wall sconces replacing fluorescent fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
HID 750W to LED high bay	30	30	850	320	5,840	1.00	24,624	17,976	73%
HID 250W to LED mogul lamp	27	27	284	85	2,869	1.00	15,301	15,421	101%
HID 750W to LED high bay	18	18	850	240	5,840	1.00	14,774	17,177	116%
HID 175W to LED exterior fixt	16	16	114	48	2,869	1.00	9,109	5,829	64%
HID 175W to LED wall pack	4	4	199	100	2,869	1.00	2,267	1,135	50%
4' 1L THO to LED linear tube	12	12	42	17	5,840	1.00	1,323	1,745	132%
HID 250W to LED exterior fixt	200	200	284	85	2,869	1.00	170,657	114,230	67%
HID 750W to LED high bay	21	21	850	240	5,840	1.00	122,392	74,810	61%
4' 1L THO to LED linear tube	350	350	42	17	5,840	1.00	76,343	50,896	67%
HID 175W to LED fixture	17	17	213	50	5,840	1.00	24,274	16,183	67%
HID 750W to LED high bay	2	2	850	240	5,840	1.00	10,554	7,125	68%
HID 400W to LED exterior fixture	11	11	284	120	2,869	1.00	9,684	5,178	53%
HID 150W to LED exterior fixture	3	3	114	30	4,303	1.00	1,208	719	60%
Total							482,511	328,424	68%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting – Project 119	67,398	59,282	88%	9.279
Lighting – Project 107	415,113	269,141	65%	48.914
Total	482,511	328,424	68%	58.192

The ex post annual energy savings are 328,424, with an ex post peak demand reduction of 58.19 kW. The gross energy realization rate is 68%. Although there was variance in all the realized savings, one common factor for the hours of use was applied to the ex post savings (0.67), compared to the ex ante savings implied value of (1), as it was not considered in the savings estimate. Additional detail in the development of the factor, based on power transmitted by I&M is found in the non-redacted supporting workpapers on worksheet, “Interval 2022 to 2026”.

Sample ID 108

Executive Summary

For the projects represented by sample ID108, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 308,259 kWh, with an ex post peak demand reduction of 41.046 kW. The gross energy realization rate is 98%.

Project Description

The participant replaced existing lighting in the interior and exterior of a warehouse facility with (216) LED High Bay fixtures, (65) LED Flood lights, (242) LED 4' lamps, (192) Occupancy Sensors, (78) LED A-line lamps, ((9) LED Exit Signs, (2) LED Area Lights, (2) LED U-bend lamps, and (1) LED 2' lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
HID to LED high bay	154	154	455	155	3,135	1.02	126,403	147,734	117%
HID to LED linear tube	65	65	455	140	3,135	1.02	82,007	65,369	80%
HID to LED high bay	38	38	392	150	3,135	1.02	31,190	29,406	94%
HID to LED high bay	24	24	392	150	3,135	1.02	30,279	18,572	61%
4' 1L T8 to LED 4' lamp	242	242	30	11	3,135	1.02	18,189	14,703	81%
No control to occupancy control	192	192	154	154	3,135	1.02	13,873	22,693	164%
Incandescent to LED A-line	78	78	40	9	3,135	1.02	8,783	7,732	88%
Inc exit sign to LED exit sign	9	9	40	2	3,135	1.02	2,763	1,094	40%
HID to LED area light	2	2	175	40	3,135	1.02	1,139	863	76%
4' 1L U-T8 to LED U-tube lamp	2	2	30	18	3,135	1.02	253	74	29%
2' 1L T8 to LED 2' lamp	1	1	15	9	3,135	1.02	30	19	64%
Total							314,909	308,259	98%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	314,909	308,259	98%	41.046
Total	314,909	308,259	98%	41.046

The ex post annual energy savings are 308,259 kWh, with an ex post peak demand reduction of 41.046 kW. The gross energy realization rate is 98%.

Sample ID 111

Executive Summary

For the projects represented by sample ID111, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 265,174 kWh, with an ex post peak demand reduction of 20.080 kW. The gross energy realization rate is 92%.

Project Description

The participant replaced existing lighting in the interior of an educational facility with (1,145) LED 2x4 troffer fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
2x4 Recessed to LED 2x4 Recessed	154	154	455	155	3,135	1.02	126,403	147,734	117%
Total							289,761	265,174	92%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	289,761	265,174	92%	20.080
Total	289,761	265,174	92%	20.080

The ex post annual energy savings are 265,174 kWh, with an ex post peak demand reduction of 20.080 kW. The gross energy realization rate is 92%. The deemed savings is based on a higher realization than the actual base and efficient product.

Sample ID 112

Executive Summary

For the projects represented by sample ID112, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 71,293 kWh, with an ex post peak demand reduction of 11.249 kW. The gross energy realization rate is 25%.

Project Description

The participant replaced existing lighting in the interior of a warehouse facility with (97) LED high bay fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

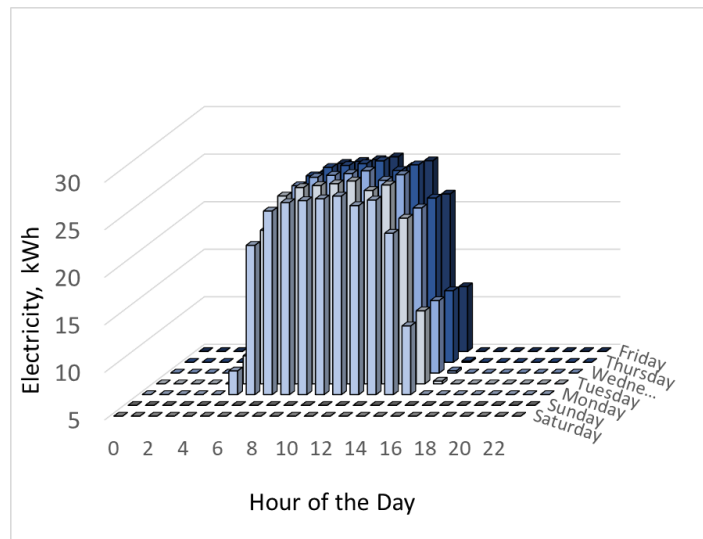
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The analysis utilized the hours of use of 2,564.

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
HID 400W to LED high bay	97	97	455	174	2,564	1.02	285,638	71,293	25%
Total							285,638	71,293	25%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	285,638	71,293	25%	11,249
Total	285,638	71,293	25%	11,249

The ex post annual energy savings are 71,293 kWh, with an ex post peak demand reduction of 11.249 kW. The gross energy realization rate is 25%. The lumens for the installed product are fewer than the corresponding measure selected.

Sample ID 113 117 118 128

Executive Summary

For the projects represented by sample IDs' 113, 117, 118 and 128, the program participant received prescriptive from I&M to support lighting replacements.

The ex post annual energy savings totaled 396,532 kWh, with an ex post peak demand reduction of 56.99 kW. The gross energy realization rate is 90%.

Project Description

The participant replaced existing lighting in warehouse building operating seven days per week with a reduced workload on the weekend. A trade ally assisted in replacing (744) linear fluorescent high bay fixtures with LED linear high bay fixtures, (198) linear fluorescent high bay and HID fixtures with LED high bay fixtures. Also, (579) of the new fixtures were installed with fixture mounted occupancy sensors.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

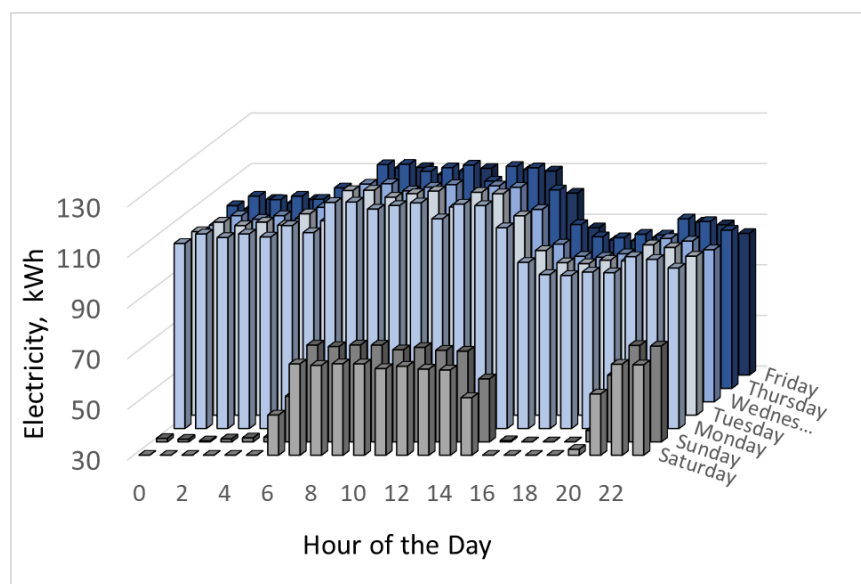
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 4LT8 to LED linear high bay	3	3	196	100	6,789	1.02	1,442	1,994	138%
4' 4LT8 to LED linear high bay	61	61	196	100	6,789	1.02	22,137	40,549	183%
No controls to Occ controls	468	468	0	100	6,789	1.02	213,876	77,774	36%
4' 6L T8 to LED high bay	55	55	392	235	6,789	1.02	45,144	59,792	132%
No controls to Occ controls	55	55	0	235	6,789	1.02	25,135	21,479	85%
No controls to Occ controls	3	3	0	235	6,789	1.02	217	1,172	540%
No controls to Occ controls	53	53	0	183	6,789	1.02	11,055	16,087	146%
4' 8L T8HO to LED high bay	53	53	392	235	6,789	1.02	43,502	57,617	132%
4' 8L T8HO to LED high bay	82	82	392	210	6,789	1.02	67,306	103,339	154%
4' 8L T8HO to LED low bay	8	8	392	210	6,789	1.02	6,566	10,082	154%
4' 4L T8HO to LED fixture	10	10	196	100	6,789	1.02	4,957	6,647	134%

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
Total							441,337	396,532	90%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting – Project 113	237,455	120,317	51%	14.102
Lighting – Project 117	133,387	193,772	145%	30.287
Lighting - Project 118	70,279	81,271	116%	12.439
Lighting – Project 128	217	1,172	540%	0.164
Total	441,337	396,532	90%	56.992

The ex post annual energy savings are 396,532 kWh, with an ex post peak demand reduction of 56.99 kW. The gross energy realization rate is 90%. The parameters for the deemed energy savings per unit are not available. The hours of use (6,789) determined by the interval billing data are larger than the prototypical TRM modeled warehouse building (3,135). The interval billing data model aligned with the reported usage of all lighting during the work week, with a reduced work staff on the weekend. The hours (6,789) were weighted for the weekend and weekday portion of full usage.

The occupancy controls measure that included the installation of 468 fixture mounted sensors on the linear high bay fixtures, had the lowest realization rate (36%). The eight foot linear fluorescent high bay fixtures have a variable setting for the lumen output and power input. During the site contact interview, the highest power/light output setting was provided at 100 watts. The product of the controlled wattage, quantity of sensors along with the Illinois TRM energy savings factor for fixture mounted sensors of 0.24 resulted in savings of 77,774 kWh compared to the ex ante value of 213,876 kWh. To reach the deemed savings value of 457 kWh/sensor, a theoretical fixture operating 8760 hours with a 24% savings for the controls would have an input wattage of approximately 200W, greater than the project installed fixture wattage of 100W.

Sample ID 114

Executive Summary

For the projects represented by sample ID114, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 233,809 kWh, with an ex post peak demand reduction of 33.69 kW. The gross energy realization rate is 116%.

Project Description

The participant replaced existing lighting in a manufacturing building operating seven days per week. A trade ally provided lighting that was self-installed by the participant throughout two program years: (178) high bay fixtures replaced with LED high bay fixtures, (86) linear fluorescent fixtures replaced with LED 2x4 panels, (30) HID low bay fixtures replaced with LED fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

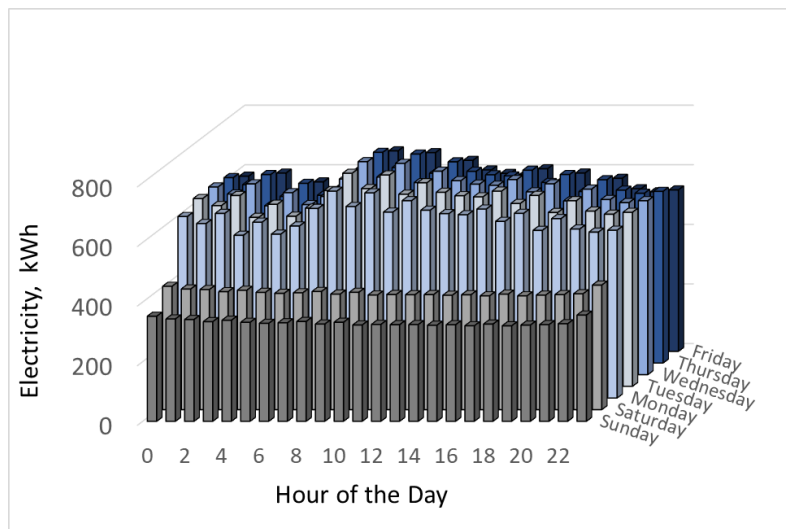
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
HID 400W to LED high bay	178	178	294	174	8,224	1.02	146,102	179,178	123%
4' 3L T8 to LED troffer	86	86	85	30	8,224	1.02	31,208	39,028	125%
HID 250W to LED low bay	30	30	196	134	8,224	1.02	24,624	15,603	63%
Total							201,934	233,809	116%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	201,934	233,809	116%	33.689
Total	201,934	233,809	116%	33.689

The ex post annual energy savings are 233,809 kWh, with an ex post peak demand reduction of 33.69 kW. The gross energy realization rate is 116%. The parameters for the deemed energy savings per unit are not available. The hours of use (8,224) provided by the participant and verified with interval billing is greater than TRM modeled manufacturing building (4,618).

The measure for the (30) had a low realization rate (63%), as the baseline fixture lumen equivalent was adjusted since the fixtures were not installed as 1:1 replacement.

Sample ID 115

Executive Summary

Under a project represented by Sample ID 115, prescriptive incentives were provided by I&M for specifying and installing two variable speed drive (VSD) air compressors during the construction of a new manufacturing building.

The ex post annual energy savings were 202,171 kWh, and the corresponding ex post peak demand reduction was 17.39 kW. The gross realization rate for the project's energy savings was 134%.

Project Description

The participant discontinued manufacturing performed at one building and constructed a larger building to perform the same type of operations. Two (100 hp) VSD air compressors with refrigerated dryers were specified and installed to support the new operations. A trade ally had previously completed an air study for an associated air leak project at the old building to profile the compressed air load through each hour of the week.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air study from an associated project, obtain the CAGI compressor data sheets and applied the metered load profile from a one compressor plant to a two compressor plant. The site maintenance manager was contacted to obtain the current run hours for the two new compressors and establish the air compressor sequencing. One air compressor completes the load requirement to operate manufacturing site. The site operates 20 hours per day Monday to Friday and 24 hours on the weekend, for 7904 annual hours.

$$\Delta kWh = \sum_{Flow\ bins} \%Time \times CFM \times \left[\frac{kW_{base}}{CFM} - \frac{kW_{Eff}}{CFM} \right] \times Annual\ Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
kW_{base}	= Power to Flow CAGI sheet, baseline, centrifugal load/unload, 3gal
kW_{eff}	= Power to Flow CAGI sheet, 100 hp VSD
CFM	= Air flow at each flow bin, 0 to 400 CFM
$Hours$	= Annual hours of operation, 7904
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The flow bin and power table with load profile from the old building applied to the new building.

Flow CFM		Power, kW		Hours per Year	Annual Energy, kWh		
		Base	New		Base	Efficient	Savings
0 to 1	10	25	0	866	21,659	-	21,659

1 to 40	35	31	11	3,071	96,698	34,129	62,569
40 to 80	7	50	22	592	29,611	13,161	16,451
80 to 120	7	59	31	642	38,054	19,622	18,432
120 to 160	8	68	38	720	48,675	27,338	21,337
160 to 200	11	73	49	945	69,145	46,389	22,757
200 to 240	13	79	56	1,109	87,291	61,617	25,674
240 to 280	7	83	66	614	51,177	40,373	10,804
280 to 320	2	87	74	178	15,479	13,173	2,305
320 to 360	.25	91	82	22	1,987	1,805	183
360 to 400	0	93	93	-	-	-	-
Total	100			8760	459,777	257,606	202,171

Results

Realized Gross Savings

Measure Category	Gross kWh Savings			Realized Peak kW Reduction
	Ex Ante	Ex Post	Realization Rate	
Compressed air leak repair	149,947	202,171	134%	17.39
Total	149,947	202,171	134%	17.39

The ex post annual energy savings were 202,171 kWh, and the corresponding ex post peak demand reduction was 17.39 kW. The gross realization rate for the project's energy savings was 134%. The ex ante prescriptive savings were based on a prototypical building with TRM based manufacturing hours. The ex post custom savings were based on the actual hours of operation, and the load study from the previous site applied to the new construction building. Nearly 80% of the operating hours were less than ½ full capacity, where the variable speed drive compressor has significant savings over a baseline air compressor (centrifugal, load/unload control, 3 gallons per CFM of receiver storage).

Sample ID 116

Executive Summary

For the projects represented by sample ID116, the program participant received prescriptive incentives from I&M to support lighting replacements in a warehouse building.

The ex post annual energy savings totaled 134,518 kWh, with an ex post peak demand reduction of 21.225 kW. The gross energy realization rate is 91%.

Project Description

The participant replaced existing (70) HID interior lighting with (50) LED high bay fixtures throughout the warehouse building.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

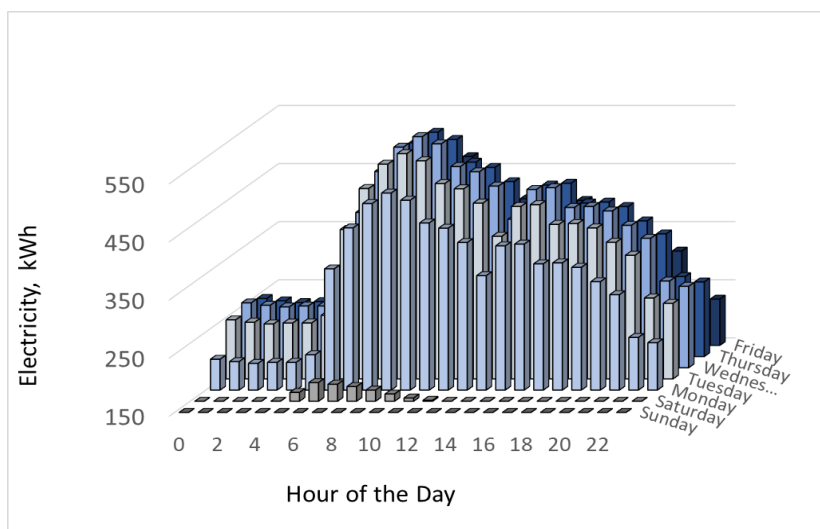
Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type



The modeled hours of 5712 are greater than the applicant provided lighting hours of 4160.

The 365 day trended data indicated an average of one Saturday worked per month. The ex post lighting hours are weighted with the periodic weekend work, and partial load after midnight on the weekdays. The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 6L T8 to LED high bay	70	50	226	166	5699	1.00	147,236	134,518	91%
Total							147,236	134,518	91%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	147,236	134,518	91%	21.225
Total	147,236	134,518	91%	21.225

The ex post annual energy savings are 134,518 kWh, with an ex post peak demand reduction of 21.225 kW. The gross energy realization rate is 91%. The savings measure selected (LED High Bay replacing > 400W HID) presumes a greater base wattage than one closer to the 400W. The project consisted of (70) 4' 6L T8 fixtures being upgraded to (50) LED high bays.

Sample ID 121 309

Executive Summary

For the projects represented by sample 121 and 309 the program participant received prescriptive and SBDI from I&M to support lighting replacements.

The ex post annual energy savings totaled 35,328 kWh, with an ex post peak demand reduction of 5.47 kW. The gross energy realization rate is 99%.

Project Description

The participant replaced existing lighting in retail building operating seven days per week. A trade ally assisted in replacing (411) T8 linear fluorescent lamps with LED linear tubes, (18) high output T5 linear fluorescent lamps LED linear tubes, (9) downlights in the office areas with LED downlights, and (1) HID high bay fixture was relamped with a mogul based LED bulb.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

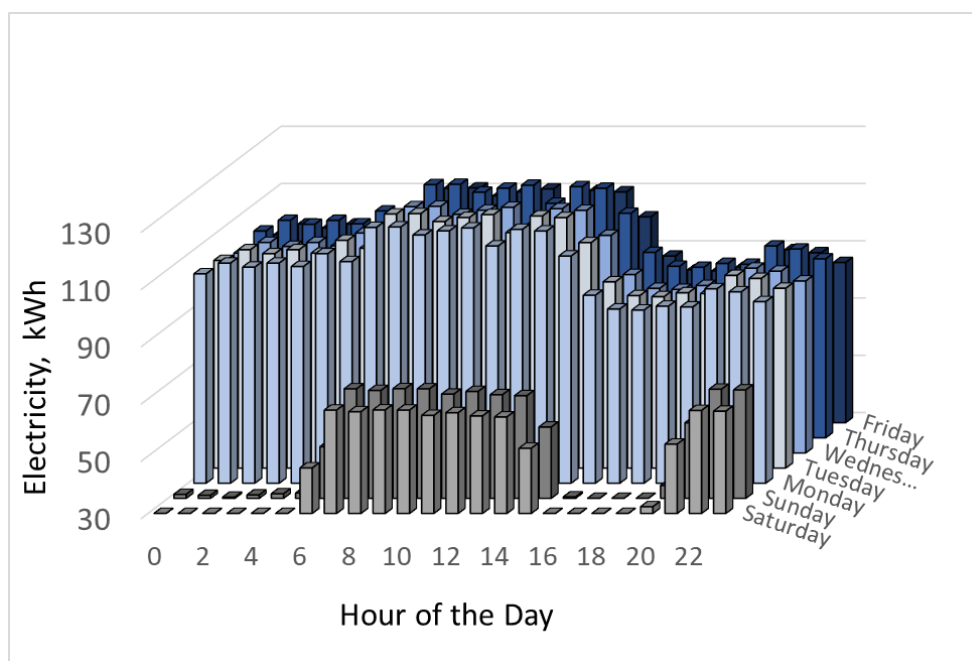
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
Downlight to LED downlight	9	9	54	22	4,200	1.06	1,274	1,294	102%
4' 1L THO to LED linear tube	18	18	42	25	4,200	1.06	2,720	1,346	50%
4' 1L T8 to LED linear tube	411	411	30	13	4,200	1.06	30,891	31,109	101%
HID 400W to LED mogul lamp	1	1	455	100	4,200	1.06	959	1,578	165%
Total							35,844	35,328	99%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Prescriptive lighting – Project 121	34,570	34,034	98%	5.241
SBDI lighting – Project 309	1,274	1,294	102%	0.225
Total	35,844	35,328	99%	5.241

The ex post annual energy savings are 35,328 kWh, with an ex post peak demand reduction of 5.47 kW. The gross energy realization rate is 99%. The parameters for the deemed energy savings per unit are not available. The hours of use (4,200) determined by the interval billing data are similar to the prototypical TRM modeled retail building (4,099).

The measure for replacing the high output T5 lamps had a low realization rate of 50%. The base wattage was determined by the Illinois TRM table for the lumen equivalent of the installed 3400 lumen T5 lamps, based on the table value of a 42 watt baseline for all lamps emitting greater than 2,400 lumens.

The measure for replacing the 400W HID lamp with an LED mogul lamp had a high realization rate of 165%. The base wattage was determined by the manufacturer’s specification sheet for the replacement of a 400W HID lamp. The incentivized program measure is based on the bin of “HID lamp greater than 250W, which is less than the baseline wattage of 400W.

Sample ID 122

Executive Summary

Under a project represented by Sample ID 122, prescriptive incentives were provided by I&M for retrofitting the heating barrel of injection molding machines with insulation in a manufacturing building.

The ex post annual energy savings were 26,377 kWh, and the corresponding ex post peak demand reduction was 5.01 kW with 90% realized energy savings.

Project Description

Insulated jackets were purchased and installed to the exterior surface of hydraulic injection molding machines to reduce the heat loss while operating. During the plastic melting process, electric resistance heat is applied to the barrel, and inlet at a temperature of 400F. The insulation reduces the heat transfer, and the load of the resistance heating.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, tabulated the insulation area from the invoices, and obtained the operating hours from the participant. The following algorithm from the *Indiana TRM 2.2* workbook for measure *Hydraulic Press Barrel Heater Insulation Retrofit* was referenced for the savings method below:

$$\Delta kWh = \Delta Energy_{save} \times \sum (Qty \times L_{barrel} \times Dia) \times \pi \times \frac{Hours}{1,000}$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$\Delta Energy_{save}$	= Energy loss(no insulation) – Energy loss(insulated), Watt/squarefeet
Qty	=Quantity of insulation wraps by size
L	= Length of barrel insulation, feet
Dia	= Diameter of barrel, feet
π	= pi, 3.14
$Hours$	= Annual hours barrel heater energized

Differences in variables: $L \times Dia \times \pi$

The ex post savings estimated determined the insulated area of the barrel heater by the equation: *length x diameter x pi*, the formula the outer area of a hollow cylinder. The ex ante savings method calculated the complete outer surface of the area, by included the equation $2 \times \pi \times r^2$. The result for the ex ante area was 24.25 square feet compared to the ex post value of 15.17 square feet.

Difference ins variables: $Energy_{save} \times Hours$

The ex post savings sourced the data for insulation savings from the *Indiana TRM v2.2 measure Injecting Molding Barrel Wrap*. The heat loss per unit for no insulation and 1” insulated for a barrel temperature of

500F used to determine the value for Energy_{save}. Based on the operating schedule, the result was 1679 watts per square foot per year. The ex ante referenced the deemed per unit savings from the MEMD measure at 1210 watts per square foot per year.

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Barrel Insulation	29,343	26,377	90%	5.01
Total	29,343	26,377	90%	5.01

The ex post annual energy savings were 26,377 kWh, and the corresponding ex post peak demand reduction was 5.01kW. The realized savings was 90%. The differences in the savings estimates are:

- The insulated barrel area was the outer surface and not the ends. The ex ante savings method included the ends in the area for the insulated square feet, resulted in a higher estimate.
- The ex post method sourced the energy savings per insulated area (1,679) from the Indiana TRM 2.2, whereas the ex ante sourced the deemed savings per unit value (1210) from the MEMD, resulted in a lower estimate of savings.

Sample ID 123

Executive Summary

For the projects represented by sample ID123, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 22,713 kWh, with an ex post peak demand reduction of 1.72 kW. The gross energy realization rate is 100%.

Project Description

The participant replaced existing exterior lighting with (4) LED flood fixtures, (6) LED pole fixtures, and (3) LED wall packs.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
HID to LED exterior flood	4	4	1080	336	4,303	1.00	13,088	12,806	98%
HID to LED exterior area light	6	6	455	244	4,303	1.00	5,756	5,435	94%
HID to LED wall pack	3	3	455	108	4,303	1.00	3,785	4,473	118%
Total							22,629	22,713	100%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	22,629	22,713	100%	1.720
Total	22,629	22,713	100%	1.720

The ex post annual energy savings are 22,713 kWh, with an ex post peak demand reduction of 1.72 kW. The gross energy realization rate is 100%.

Sample ID 124 310

Executive Summary

For the projects represented by sample 124 and 310, the program participant received prescriptive and SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 24,163 kWh, with an ex post peak demand reduction of 3.80 kW. The gross energy realization rate was 123%.

Project Description

The participant replaced existing lighting in a retail sales building operating seven days per week. A trade ally assisted in replacing (254) linear fluorescent tubes with LED linear tubes, (6) 8-ft fluorescent linear tubes with LED linear tubes and (2) incandescent downlights with LED equivalents

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
F96T8 8' to LED 8' linear lamp	6	6	70	43	4,512	1.06	331	775	234%
Downlight to LED downlight	2	2	54	22	4,512	1.06	283	309	109%
4' 1L T8 to LED linear tube	254	254	30	11	4,512	1.06	19,091	23,079	121%
Total							19,705	24,163	123%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Prescriptive Lighting – Project 124	19,091	23,079	121%	3.642
SBDI Lighting – Project 310	614	1,084	176%	0.162
Total	19,705	24,163	123%	3.642

The ex post annual energy savings are 24,163 kWh, with an ex post peak demand reduction of 3.80 kW. The gross energy realization rate is 123%.

The parameters for the deemed energy savings per unit are not available. The hours of use (4,512) determined by the interval billing data are somewhat larger than the prototypical TRM modeled retail sales building (4,099). The interval billing data model indicated lighting usage prior to the store opening and closing. The manager verified the extra time is utilized for stocking and cleanup beyond the posted operating hours.

Sample ID 126

Executive Summary

For the projects represented by sample ID126, the program participant received prescriptive incentives from I&M to support lighting replacements in a manufacturing building.

The ex post annual energy savings totaled 2,948 kWh, with an ex post peak demand reduction of 0.155 kW. The gross energy realization rate is 102%.

Project Description

The participant replaced existing interior lighting with (13) LED surface mount fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 4L T8 to LED fixture	13	13	85	35	4,500	1.02	2,899	2,948	102%
Total							2,899	2,948	102%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	2,899	2,948	102%	0.155
Total	2,899	2,948	102%	0.155

The ex post annual energy savings are 2,948 kWh, with an ex post peak demand reduction of 0.155 kW. The gross energy realization rate is 102%.

Sample ID 127

Executive Summary

For the projects represented by sample ID127, the program participant received prescriptive incentives from I&M to support lighting replacements in a manufacturing building.

The ex post annual energy savings totaled 2,326 kWh, with an ex post peak demand reduction of 0.176 kW. The gross energy realization rate is 95%.

Project Description

The participant replaced existing interior lighting with (9) LED vapor tight fixtures and (4) LED troffer fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 2L T8 to LED vapor tight	9	9	120	55	3,120	1.02	2,007	1,862	93%
4' 1L T8 to LED troffer	4	4	85	48	3,120	1.02	446	465	104%
Total							2,453	2,326	95%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	2,453	2,326	95%	0.176
Total	2,453	2,326	95%	0.176

The ex post annual energy savings are 2,326 kWh, with an ex post peak demand reduction of 0.176 kW. The gross energy realization rate is 95%. The ex ante hours of use were deemed which were greater than the actual facility usage hours for this area.

Sample ID 130

Executive Summary

For the projects represented by sample ID130, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 28,083 kWh, with an ex post peak demand reduction of 3.83 kW. The gross energy realization rate is 94%.

Project Description

The participant replaced existing interior and exterior lighting with (23) LED high bay fixtures, (5) LED wall packs, (28) LED 2x4 recessed fixtures, and (23) occupancy sensors for the high bays.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 8L T8HO to LED high bay	23	23	392	135	3,135	1.02	18,878	18,902	100%
HID to LED wall pack	5	5	284	76	3,135	1.00	6,308	3,262	52%
4' 3L T8/ to LED troffer	28	28	85	45	3,135	1.02	3,122	3,537	113%
No control to occupancy control	23	23	135	135	3,135	1.02	1,662	2,383	143%
Total							29,971	28,083	94%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	29,971	28,083	94%	3.831
Total	29,971	28,083	94%	3.831

The ex post annual energy savings are 28,083 kWh, with an ex post peak demand reduction of 3.831 kW. The gross energy realization rate is 94%. The application base watts for the second measure (400W) are greater than the applicable lumen equivalent for the installed product.

Sample ID 132

Executive Summary

For the projects represented by sample ID132, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 92,474 kWh, with an ex post peak demand reduction of 12.659 kW. The gross energy realization rate is 102%.

Project Description

The participant replaced existing interior and exterior lighting with (55) LED high bay fixtures, (223) Occupancy Sensors, (135) LED troffers, (4) LED area light fixtures, and (11) LED 4' Linear lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
HID to LED high bay	55	55	294	89	4,618	1.02	45,144	53,109	118%
No control to occupancy control	223	223	75	75	4,618	1.02	16,113	18,907	117%
4' 2L T8 to LED troffer	135	135	57	34	4,618	1.02	15,053	14,626	97%
HID to LED exterior fixt	4	4	455	200	4,618	1.02	13,088	4,795	37%
4' 1L T8 to LED linear tube	11	11	30	10	4,618	1.02	827	1,036	125%
Total							90,224	92,474	102%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	90,224	92,474	102%	12.659
Total	90,224	92,474	102%	12.659

The ex post annual energy savings are 92,474 kWh, with an ex post peak demand reduction of 12.659 kW. The gross energy realization rate is 102%.

Sample ID 133

Executive Summary

For the projects represented by sample ID133, the program participant received prescriptive incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 9,955 kWh, with an ex post peak demand reduction of 0.754 kW. The gross energy realization rate is 128%.

Project Description

The participant replaced existing interior and lighting with (70) LED panel fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 2L T8 to LED troffer	70	70	57	36	7,616	1.17	7,805	9,955	128%
Total							7,805	9,955	128%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	7,805	9,955	128%	0.754
Total	7,805	9,955	128%	0.754

The ex post annual energy savings are 9,955 kWh, with an ex post peak demand reduction of 0.754 kW. The gross energy realization rate is 128%. The ex ante savings was a deemed savings where the actual conditions were not considered.

Sample ID 150

Executive Summary

For the project represented by sample ID150, the program participant received midstream incentives from I&M for HVAC equipment replacements in a retail building.

The ex post annual energy savings totaled 26,416 kWh, with an ex post peak demand reduction of 23.52 kW. The gross energy realization rate is 104%.

Project Description

The participant replaced (20) rooftop HVAC units (RTU) for space cooling, with efficient units exceeding the minimum federal efficiency regulations. The cooling capacity and quantity replaced were : three at (13) ton, twelve at (9.5) ton, two at (7.3) ton, one at (4) ton, and two at (3) ton.

Measurement and Verification Effort

The midstream program tracking data were aggregated for each participant. The building type was verified or revised to align with the closest matching Indiana TRM 2023 building type classification. The effective full-load cooling hours (EFLH) were determined based on the building type and climate zone. The AHRI reference number for each model configuration was used to query Air-Conditioning, Heating, and Refrigeration Institute directory (AHRIdirectory.com) to obtain the rated cooling capacity (BTU/h) and cooling efficiency (SEER or IEER).

The applicable federal energy efficiency standards for unitary equipment were used to establish the minimum efficiency baseline, based on equipment type and cooling capacity range. The savings estimation followed the algorithm specified in *Illinois TRM measure 4.4.15 Single Package and Split System Unitary Air Conditioners* to calculate cooling energy savings. The resulting energy savings were multiplied by the coincident demand factor (CDF) of 0.0008905 to estimate coincident peak demand savings.

$$kWh = CAP_{cooling} \times \left(\frac{1}{IEER_{base}} - \frac{1}{IEER_{eff}} \right) \times EFLH_{cooling}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$CAP_{cooling}$	=Cooling capacity, kBTUh
$IEER_{base}$	= Federal efficiency regulations, IEER or SEER
$IEER_{eff}$	= Installed energy efficient equipment, IEER or SEER
$EFLH_{cooling}$	= Effective full load cooling hours by building type and climate zone

The variables for the energy savings algorithm with the results are summarized in the following table.

HVAC Algorithm Inputs & Energy Savings

Measure	Quantity	Capacity kBTU/h	Cooling Efficiency		EFLH	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
			Base	Efficient				
Packaged AC, 3 phase	2	35	13.4	21.2	640	1,228	1,230	100%
Packaged AC, 3 phase	1	48	13.4	19.9	640	748	749	100%
Packaged AC	2	88	14.8	21.0	640	2,243	2,247	100%
Packaged AC	12	114	14.8	20.7	640	16,835	16,861	100%
Packaged AC	3	156	14.2	19.0	640	4,275	5,329	125%
Total	20					25,329	26,416	104%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Air Conditioning Units	25,329	26,416	104%	23.52
Total	25,329	26,416	104%	23.52

The ex post annual energy savings are 26,416 kWh, with an ex post peak demand reduction of 23.52 kW. The gross energy realization rate is 104%. Both the ex ante and ex post savings were calculated using the TRM algorithm, with consistent inputs for cooling capacity and energy efficiency applied to the first 17 units.

The remaining three units exhibited higher realized savings, with a realization rate of 125%. This variance may be attributed to differences in baseline efficiency assumptions (14.2 IEER vs. 14.8 IEER). These units fall within the federal regulatory capacity bin of 135 kBTU/h to 240 kBTU/h, for which the minimum compliant efficiency is 14.2 IEER for air conditioning units without heating components.

Sample ID 151

Executive Summary

For the project represented by sample ID 151, the program participant received midstream incentives from I&M for HVAC equipment replacements in a automobile dealership building.

The ex post annual energy savings totaled 17,895 kWh, with an ex post peak demand reduction of 2.5 kW. The gross energy realization rate is 142%.

Project Description

The participant installed (8) mini-split heat pumps with a cooling capacity of (2.75) tons.

Measurement and Verification Effort

The midstream program tracking data were aggregated for each participant. The building type was verified or revised to align with the closest matching *Indiana TRM 2023* building type classification. The effective full-load heating and cooling hours (EFLH) were determined based on the building type and climate zone. The AHRI reference number for each model configuration was used to query Air-Conditioning, Heating, and Refrigeration Institute directory (AHRIdirectory.com) to obtain the rated cooling and heating capacity (BTU/h) and cooling and heating efficiency (SEER2, HSPF2).

The applicable federal energy efficiency standards for unitary equipment were used to establish the minimum efficiency baseline, based on equipment type and cooling capacity range. The savings estimation followed the algorithm specified in *Illinois TRM measure 4.4.9 Air and Water Source Heat Pump Systems* to calculate cooling energy savings. The resulting energy savings were multiplied by the coincident demand factor (CDF) of 0.000139 to estimate coincident peak demand savings.

$$kWh = CAP_{cooling} \times \left(\frac{1}{SEER1_{base}} - \frac{1}{SEER2_{eff}} \right) \times EFLH_{cooling} \\ + CAP_{heating} \times \left(\frac{1}{HSPF2_{base}} - \frac{1}{HSPF2_{eff}} \right) \times EFLH_{heating}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
CAP	= Cooling capacity, Heating capacity, kBTUh
$SEER2_{base}$	= Federal efficiency regulations, SEER2
$SEER2_{eff}$	= Installed energy efficient equipment, SEER2
$HSPF2_{base}$	= Federal efficiency regulations, HSPF2
$HSPF2_{eff}$	= Installed energy efficient equipment HSPF2

$EFLH_{cooling}$ = Effective full load cooling hours by building type and climate zone
 $EFLH_{heating}$ = Effective full load heating hours by building type and climate zone

The variables for the energy savings algorithm with the results are summarized in the following table.

HVAC Algorithm Inputs & Energy Savings

Measure	Quantity	Capacity Cooling/Heating g kBTUh	Efficiency Cooling/Heating SEER2/HSPF2		EFLH Cooling/ Heating	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
			Base	Efficient				
Heat Pump	8	33/35	14.3/7.5	20/8.5	1343/2694	12,636	17,895	142%
Total	8					12,636	17,895	142%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Heat Pumps	12,636	17,895	142%	2.50
Total	12,636	17,895	142%	2.50

The ex post annual energy savings are 17,895 kWh, with an ex post peak demand reduction of 2.50 kW. The gross energy realization rate is 142%. Both the ex ante and ex post savings were calculated using the TRM algorithm for air-source heat pumps. The ex post values for effective full-load hours (EFLH), for both heating and cooling, were based on the TRM building type classification of an automobile dealership using Springfield, IL weather data.

The ex ante assumptions were not documented in the tracking data; however, the recorded building type of “manufacturing facility” is typically associated with lower EFLH values for both heating and cooling. This difference in assumed building type likely contributed to the higher ex post savings and the resulting realization rate above 100%.

Sample ID 152

Executive Summary

For the project represented by sample ID152, the program participant received midstream incentives from I&M for HVAC equipment replacements in a restaurant building.

The ex post annual energy savings totaled 5,835 kWh, with an ex post peak demand reduction of 5.20 kW. The gross energy realization rate is 100%.

Project Description

The participant replaced (3) rooftop HVAC units (RTU) for space cooling, with efficient units exceeding the minimum federal efficiency regulations. The cooling capacity and quantity replaced were : one at (9) tons, two at (7) tons.

Measurement and Verification Effort

The midstream program tracking data were aggregated for each participant. The building type was verified or revised to align with the closest matching Indiana TRM 2023 building type classification. The effective full-load cooling hours (EFLH) were determined based on the building type and climate zone. The AHRI reference number for each model configuration was used to query Air-Conditioning, Heating, and Refrigeration Institute directory (AHRIdirectory.com) to obtain the rated cooling capacity (BTU/h) and cooling efficiency (SEER or IEER).

The applicable federal energy efficiency standards for unitary equipment were used to establish the minimum efficiency baseline, based on equipment type and cooling capacity range. The savings estimation followed the algorithm specified in *Illinois TRM measure 4.4.15 Single Package and Split System Unitary Air Conditioners* to calculate cooling energy savings. The resulting energy savings were multiplied by the coincident demand factor (CDF) of 0.0008905 to estimate coincident peak demand savings.

$$kWh = CAP_{cooling} \times \left(\frac{1}{IEER_{base}} - \frac{1}{IEER_{eff}} \right) \times EFLH_{cooling}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$CAP_{cooling}$	=Cooling capacity, kBTUh
$IEER_{base}$	= Federal efficiency regulations, IEER or SEER
$IEER_{eff}$	= Installed energy efficient equipment, IEER or SEER
$EFLH_{cooling}$	= Effective full load cooling hours by building type and climate zone

The variables for the energy savings algorithm with the results are summarized in the following table.

HVAC Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>	<i>Capacity kBTUh</i>	<i>Cooling Efficiency</i>		<i>EFLH</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
			<i>Base</i>	<i>Efficient</i>				
Packaged AC	1	110	14.8	20.3	1,021	2,056	2,056	100%
Packaged AC	2	87	14.8	21.6	1,021	3,778	3,778	100%
Total	3					5,834	5,835	100%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Air Conditioning Units	5,834	5,835	100%	5.20
Total	5,834	5,835	100%	5.20

The ex post annual energy savings are 5,835 kWh, with an ex post peak demand reduction of 5.20 kW. The gross energy realization rate is 100%. The ex ante and ex post savings were both based on the TRM algorithm with the same inputs for cooling capacity, energy efficiency and EFLH for a restaurant building.

Sample ID 153

Executive Summary

For the project represented by sample ID153, the program participant received midstream incentives from I&M for HVAC equipment replacements in a healthcare building.

The ex post annual energy savings totaled 1,607 kWh, with an ex post peak demand reduction of 0.12 kW. The gross energy realization rate is 111%.

Project Description

The participant replaced (1) rooftop HVAC units (RTU) for space cooling, with an efficient unit exceeding the minimum federal efficiency regulations. The cooling capacity and quantity replaced were : one at (4.7) .

Measurement and Verification Effort

The midstream program tracking data were aggregated for each participant. The building type was verified or revised to align with the closest matching Indiana TRM 2023 building type classification. The effective full-load cooling hours (EFLH) were determined based on the building type and climate zone. The AHRI reference number for each model configuration was used to query Air-Conditioning, Heating, and Refrigeration Institute directory (AHRIdirectory.com) to obtain the rated cooling capacity (BTU/h) and cooling efficiency (SEER or IEER).

The applicable federal energy efficiency standards for unitary equipment were used to establish the minimum efficiency baseline, based on equipment type and cooling capacity range. The savings estimation followed the algorithm specified in *Illinois TRM measure 4.4.15 Single Package and Split System Unitary Air Conditioners* to calculate cooling energy savings. The resulting energy savings were multiplied by the coincident demand factor (CDF) of 0.0008905 to estimate coincident peak demand savings.

$$kWh = CAP_{cooling} \times \left(\frac{1}{IEER_{base}} - \frac{1}{IEER_{eff}} \right) \times EFLH_{cooling}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$CAP_{cooling}$	=Cooling capacity, kBTUh
$IEER_{base}$	= Federal efficiency regulations, IEER or SEER
$IEER_{eff}$	= Installed energy efficient equipment, IEER or SEER
$EFLH_{cooling}$	= Effective full load cooling hours by building type and climate zone

The variables for the energy savings algorithm with the results are summarized in the following table.

HVAC Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>	<i>Capacity kBTUh</i>	<i>Cooling Efficiency</i>		<i>EFLH</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
			<i>Base</i>	<i>Efficient</i>				
Packaged AC	1	56	13.4	18.0	1,505	1,452	1,607	111%
Total	3					1,452	1,607	111%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Air Conditioning Units	1,452	1,607	111%	0.12
Total	1,452	1,607	111%	0.12

The ex post annual energy savings are 1,607 kWh, with an ex post peak demand reduction of 0.12 kW. The gross energy realization rate is 111%. The ex ante and ex post savings were both based on the TRM algorithm with the same inputs for cooling capacity, energy efficiency. The ex post value for EFLH cooling (1,505), based on a healthcare clinic building with Chicago weather, may be larger than the ex ante value for EFLH cooling, which listed an “Office – low rise building” type.

Sample ID 154

Executive Summary

For the project represented by sample ID154, the program participant received midstream incentives from I&M for HVAC equipment replacements in a retail building.

The ex post annual energy savings totaled 554 kWh, with an ex post peak demand reduction of 0.49 kW. The gross energy realization rate is 103%.

Project Description

The participant replaced (2) rooftop HVAC units (RTU) for space cooling, with an efficient unit exceeding the minimum federal efficiency regulations. The cooling capacity and quantity replaced were : two at (7.5) tons.

Measurement and Verification Effort

The midstream program tracking data were aggregated for each participant. The building type was verified or revised to align with the closest matching Indiana TRM 2023 building type classification. The effective full-load cooling hours (EFLH) were determined based on the building type and climate zone. The AHRI reference number for each model configuration was used to query Air-Conditioning, Heating, and Refrigeration Institute directory (AHRIdirectory.com) to obtain the rated cooling capacity (BTU/h) and cooling efficiency (SEER or IEER).

The applicable federal energy efficiency standards for unitary equipment were used to establish the minimum efficiency baseline, based on equipment type and cooling capacity range. The savings estimation followed the algorithm specified in *Illinois TRM measure 4.4.15 Single Package and Split System Unitary Air Conditioners* to calculate cooling energy savings. The resulting energy savings were multiplied by the coincident demand factor (CDF) of 0.0008905 to estimate coincident peak demand savings.

$$kWh = CAP_{cooling} \times \left(\frac{1}{IEER_{base}} - \frac{1}{IEER_{eff}} \right) \times EFLH_{cooling}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$CAP_{cooling}$	=Cooling capacity, kBTUh
$IEER_{base}$	= Federal efficiency regulations, IEER or SEER
$IEER_{eff}$	= Installed energy efficient equipment, IEER or SEER
$EFLH_{cooling}$	= Effective full load cooling hours by building type and climate zone

The variables for the energy savings algorithm with the results are summarized in the following table.

HVAC Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>	<i>Capacity kBTUh</i>	<i>Cooling Efficiency</i>		<i>EFLH</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
			<i>Base</i>	<i>Efficient</i>				
Packaged AC	2	90	14.8	15.8	720	537	554	103%
Total	2					537	554	103%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Air Conditioning Units	537	554	103%	0.49
Total	537	554	103%	0.49

The ex post annual energy savings are 554 kWh, with an ex post peak demand reduction of 0.49 kW. The gross energy realization rate is 103%. The ex ante and ex post savings were both based on the TRM algorithm with the same inputs for cooling capacity, energy efficiency. The ex post value for EFLH cooling (720), based on a retail-strip mall building with Chicago weather, may be larger than the ex ante value for EFLH cooling, which listed an “Retail-department store building” type.

Sample ID 155

Executive Summary

For the project represented by sample ID 155, the program participant received midstream incentives from I&M for HVAC equipment replacements in a high school building.

The ex post annual energy savings totaled 1,820 kWh, with an ex post peak demand reduction of 0.25 kW. The gross energy realization rate is 72%.

Project Description

The participant replaced (1) split-system heat pump with a cold climate heat pump. The cooling capacity and quantity replaced were : one at (1.83) tons.

Measurement and Verification Effort

The midstream program tracking data were aggregated for each participant. The building type was verified or revised to align with the closest matching *Indiana TRM 2023* building type classification. The effective full-load heating and cooling hours (EFLH) were determined based on the building type and climate zone. The AHRI reference number for each model configuration was used to query Air-Conditioning, Heating, and Refrigeration Institute directory (AHRIdirectory.com) to obtain the rated cooling and heating capacity (BTU/h) and cooling and heating efficiency (SEER2, HSPF2).

The applicable federal energy efficiency standards for unitary equipment were used to establish the minimum efficiency baseline, based on equipment type and cooling capacity range. The savings estimation followed the algorithm specified in *Illinois TRM measure 4.4.9 Air and Water Source Heat Pump Systems* to calculate cooling energy savings. The resulting energy savings were multiplied by the coincident demand factor (CDF) of 0.000139 to estimate coincident peak demand savings.

$$kWh = CAP_{cooling} \times \left(\frac{1}{SEER1_{base}} - \frac{1}{SEER2_{eff}} \right) \times EFLH_{cooling} \\ + CAP_{heating} \times \left(\frac{1}{HSPF2_{base}} - \frac{1}{HSPF2_{eff}} \right) \times EFLH_{heating}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
CAP	=Cooling capacity, Heating capacity, kBTUh
$SEER2_{base}$	= Federal efficiency regulations, SEER2
$SEER2_{eff}$	= Installed energy efficient equipment, SEER2
$HSPF2_{base}$	= Federal efficiency regulations, HSPF2
$HSPF2_{eff}$	= Installed energy efficient equipment HSPF2

$EFLH_{cooling}$ = Effective full load cooling hours by building type and climate zone
 $EFLH_{heating}$ = Effective full load heating hours by building type and climate zone

The variables for the energy savings algorithm with the results are summarized in the following table.

HVAC Algorithm Inputs & Energy Savings

Measure	Quantity	Capacity Cooling/Heating kBTUh	Efficiency Cooling/Heating SEER2/HSPF2		EFLH Cooling/ Heating	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
			Base	Efficient				
Heat Pump	1	22/24	14.3/7.5	23/10.5	883/1855	2,538	1,820	72%
Total	1					2,538	1,820	72%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Air Conditioning Units	2,538	1,820	72%	0.25
Total	2,538	1,820	72%	0.25

The ex post annual energy savings are 1,820 kWh, with an ex post peak demand reduction of 0.25 kW. The gross energy realization rate is 72%. The ex ante and ex post savings were both based on the TRM algorithm. The ex ante baseline values were not provided to compare the variables that differed in the energy savings calculation.

Sample ID 200

Executive Summary

Under a project represented by sample ID200, a program participant received custom incentives from I&M for the design and installation of a lighting system that resulted in a total installed wattage less than the building code–allowed wattage.

The ex post annual energy savings over a minimum code compliant building were 8,076,858 kWh, with an ex post peak demand reduction of 1,218.59 kW. The gross realization rate for the project energy savings was 100 %.

Project Description

The participant installed efficient LED lighting in a new construction warehouse building. Lighting was installed throughout six floors of the warehouse building with production operations, office areas, and exterior areas. The installed lighting power density (LPD) was less than both the Indiana statewide building code and the *Indiana TRM* adoption of the *Illinois TRM measure: 4.5.7 Lighting Power Density*. Lighting controls included networked lighting controls, for scheduling and dimming of individual light fixtures on the network.

Measurement and Verification

The evaluation team provided a preliminary review of the submission of the as-built documentation which included applicable lighting power allowances, compliance with code requirements, verification of areas for the LPD calculation. Feedback was provided before the application approval regarding exclusion of emergency space lighting which operated 24 hours per day. Due to the size of the project, the project detail was extensively captured in the program implementer’s workbook for interior and exterior lighting, and controls. The table provided in this report is an abbreviated summary and review of the final application submission.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.7, *Lighting Power Density*, in the 2023 Indiana Technical Reference Manual (TRM). The allowed power density (LPD) values, in watts per square foot by building type, were sourced from the 2018 *International Energy Conservation Code* (IECC 2018). The area size was sourced from construction drawings.

$$kWh_{savings} = Hours \times \left(LPD \times Area - \sum (Qty \times Watts)_{installed} \right) \times Whf_{kWh} / 1000 \frac{W}{kW}$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$ = Annual energy savings, kWh
 $kW_{savings}$ = Annual coincident peak demand savings, kW

<i>Hours</i>	= Lighting annual operating hours, hour
<i>LPD</i>	= Lighting power density, watt/SF
<i>Area</i>	= Area of building area with installed lighting, square feet
<i>Watts_{installed}</i>	= Sum of installed watts by fixture type and quantity
<i>Wh_{f,kWh}</i>	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
<i>CDF</i>	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The baseline wattage is determined by the allowances provided in the Illinois TRM, as they exceed (more stringent) the allowances of the Indiana statewide building code. The allowed wattage for the interior lighting is determined by the square feet of space (3,499,604) and the product of the warehouse building area method allowance of (0.48 watt/square foot). The exterior allowance for parking areas (0.04 watt/ square foot), entrances (48 watt/linear foot) and walkways (0.1 W/ square foot) factored by their respective values (3.2 M SF, 48 LF, 35K SF) respectively. In the following table, the allowed wattage for each area type is apportioned to the contribution of the efficient wattage to the total installed wattage for comparison purposes. The controls savings factor varied dependent on the code requirements, and for networked lighting controls which increased the controls savings factor. Networked controls were programmed to dim fixtures before going to unoccupied mode and provided operator station controls for setting preferred working lighting levels. Lighting on emergency circuits, which continuously operate, were excluded from control savings.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>	<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Controls Pre to Post</i>
		<i>Base</i>	<i>Efficient</i>			
LED 2x2 Recessed Light Fixture, 2000-3500 Lumens	24	57	20	3135	1.02	Non EMS .00 to .00 0.24 to 0.25 0.24 to 0.35
LED 2x4 Recessed Light Fixture, 4501-6000 Lumens	399	133	47	3135 - 8400	1.0 - 1.02	
LED High-Bay Fixture, 15001-20000 Lumens	1505	281	93 to 105	8400	1	
LED High-Bay Fixture, 20001-30000 Lumens	43	405	144	3135	1.02	
LED Pendant	48	76	27	3135	1.02	
LED Recessed	102	98	35	3135	1.02	
LED Surface & Suspended Linear Fixture, >7500 Lumens	3023	191	68	3135 - 8400	1.0 - 1.02	
LED Surface & Suspended Linear Fixture, 3001-4500 Lumens	103	127	40 to 48	3135	1.02	
LED Surface & Suspended Linear Fixture, 4501-6000 Lumens	5964	96	34	3135	1.02	
LED Exterior Fixtures, 15001-30000 Lumens	40	760	398	4303	1	Dusk to Dawn
LED Exterior Fixtures, 40001-50000 Lumens	127	760	398	4303	1	
LED Recessed	6	112	58	4303	1	
LED Exterior Fixtures, 5001-10000 Lumens	47	75	50 - 66	4303	1	
Interior Lighting Savings						7,723,007
Exterior Lighting Savings						269,753
Total Lighting Savings						7,992,760

Variable refrigerant flow HVAC systems

The installed heat pumps were variable refrigerant flow, exceeding the Federal Regulations for the minimum efficiency at the corresponding capacity bin. Savings were calculated with the Illinois TRM measure 4.4.60 VRF Refrigerant Flow HVAC System. The equation below is for cooling, heating savings was calculated similarly.

$$kWh = CAP_{cool} \times Cool_{adj} \times EFLH_{cool} \times \frac{1}{3412} + (CAP_{cool} \times EFLH_{cool} \times (\frac{1}{EER_{base}} - \frac{1}{EER_{eff}}))/1000$$

The EFLH for cooling of 1149 hours and EFLH for heat of 892 for the Chicago weather zone was applied to the values in the following table.

VRF HVAC Algorithm Inputs & Energy Savings

Heat Pump Capacity	CAP Cool/Heat kBTU/h	IEER Base	IEER Eff	COP Base	COP Eff	kWh Savings
14 ton	168/169	13.7	20.7	3.2	3.57	12,570
16 ton	192/216	13.7	21.4	3.2	3.75	16,820
6 ton	72/81	14.4	22.7	3.2	3.83	5,578
16 ton	192/216	13.7	21.4	3.2	3.57	16,061
18 ton	216/243	13.7	20.8	3.2	3.53	16,249
16 ton	192/216	13.7	21.4	3.2	3.75	16,820
Total						84,098

Results

The project expected savings and realized savings are summarized in the following table.

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
NC Lighting Power Density	7,992,760	7,992,760	100%	1218.59
NC HVAC	84,098	84,098	100%	0.0
Total	8,076,858	8,076,858	100%	1218.59

The ex post energy savings are 8,076,858 kWh over a minimum code compliant building with a gross energy savings realization rate of 100%. Corresponding demand savings are 1218.59 kW.

Sample ID 201

Executive Summary

Under a project represented by Sample ID 201, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 1,474,668 kWh, and the corresponding ex post peak demand reduction was 296.49 kW. The gross realization rate for the project energy savings was 100 %.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks and subsequently resulted in the repair of 948 CFM leaks. Of the (253) leaks that were repaired, most were made on pipe/tool threads for pneumatic tools supporting the production facility, The gross realization rate for the project's energy savings was 100%. Although the compressed air load is less during the evening and weekends, two compressors are still required to operate. As the trim compressor is also variable speed, the same compressed air generation efficiency (0.178 kW/CFM) were referenced for all hours of the year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

The ex ante and ex post savings method both selected an efficiency value for air generation outside the values provided in the Indiana TRM 2023.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	1219	948
Leaks repaired, CFM	948	948
Compressor equipment type	Rotary Screw	Rotary Screw
Compressor control type	VFD	VFD
Operating hours	8736	8736
kW/CFM	0.178	0.178
CF factor	0.000201	0.000201
kWh savings	1,474,668	1,474,614
kW savings	296.49	296.48

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	1,474,614	1,474,668	100%	296.49
Total	1,474,614	1,474,668	100%	296.49

The ex post annual energy savings were 1,474,668 kWh, and the corresponding ex post peak demand reduction was 296.49 kW. The gross realization rate for the project's energy savings was 100%. The evening/weekend periods still require two air compressors operating, with the same efficiency based on a variable speed rotary screw air compressor.

Sample ID 202 203 212

Executive Summary

For the projects represented by sample ID202, 203 and 212, the program participant received custom incentives from I&M for the purchase and installation of higher-efficiency all-electric injection molding machines, replacing hydraulic machines in the manufacturing facility.

The ex post annual energy savings totaled 2,835,397 kWh, with an ex post peak demand reduction of 396.83 kW. The gross energy realization rate is 97%.

Project Description

The participant replaced three hydraulic injection molding machines (3305, 3305, and 562 tons) with all-electric injection molding machines in the manufacturing facility. The all-electric machines use servo drive motors that consume power only when motion is required, whereas hydraulic machines require continuous energy input to maintain system and hold pressure.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site, collected associated projects from prior program years and verified the installation and production volume with the site.

Injection molding machine energy and demand savings were calculated using the algorithm from the *MEMD workpaper: "FES-140- Electric and Hybrid Injection Molding Machines*.

$$kWh_{savings} = \sum_{Area} \left[(AEC_{hydraulic} - AEC_{electric}) \times \frac{lbs}{year} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$AEC_{hydraulic}$	= Average Energy Consumption for hydraulic machine; kWh/lb
$AEC_{electric}$	= Average Energy Consumption for electric machine; kWh/lb
$Lbs/year$	= Pounds of material formed per year
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Injection Molding Machine Inputs & Energy Savings

<i>Electric Injection Molding Machine Capacity</i>	<i>Pounds per Year</i>	<i>AEC Hydraulic kWh/lb</i>	<i>AEC Electric kWh/lb</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
3305 ton	4.7M	0.43	0.18	1,190,500	1,190,500	100%
3305 ton	4.7M	0.43	0.18	1,190,500	1,190,500	100%
562 ton	2.0M	0.43	0.18	454,397	516,360	84%
Prior year savings					(133,194)	
Total				2,835,397	2,764,166	97%

The (562 ton) electric injection molding machine was also incentivized in the program year 2024. The program determined their initial method underestimated the energy savings and captured the incremental savings in 2025. The ex post savings method also calculated with the new savings method and provided the incremental increase in savings. Zero demand savings for the 562 ton unit, as the demand was included in 2024 reporting.

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Electric Injection Molder	2,835,397	2,764,166	97%	396.83
Total	2,835,397	2,764,166	97%	396.83

The ex post annual energy savings were 2,764,166, and the corresponding ex post peak demand reduction was 396.83kW. The gross realization rate for the project's energy savings was 97%. Both the ex ante and ex post savings method referenced the applicable MEMD method, and chose the higher certainty method which factors the actual pounds of material processed instead of the machine rated clamping force capacity. There was a difference in capturing the incremental savings for the 562 ton machine that was not identified.

Sample ID 204

Executive Summary

Under a project represented by Sample ID 204, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 839,671 kWh, and the corresponding ex post peak demand reduction was 168.82 kW. The energy savings realization rate was 79%.

Project Description

TAn ultrasonic leak detection audit performed by a trade ally identified compressed air leaks totaling 635 CFM, which subsequently resulted in the repair of 592 CFM. Of the 184 leaks repaired, the majority involved quick-connect fittings, pipe clamps and fittings, and air gun fittings. The facility maintains the compressed air system in a pressurized state 8,760 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	635	635
Leaks repaired, CFM	592	425
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Variable speed	Variable speed
Operating hours	8760	8760
Pressure at leak, psig	100	190
kW/CFM	0.162	0.205
CF factor	0.000201	0.000201
kWh savings	1,063,153	839,671
kW savings	213.75	168.82

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	1,063,153	839,671	79%	168.82
Total	1,063,153	839,671	79%	168.82

The ex post annual energy savings were 839,671 kWh, and the corresponding ex post peak demand reduction was 168.82 kW. The energy savings realization rate was 79%. The primary difference in the realized savings:

- Both the ex ante and ex post savings were based on the reduced air flow from the variable speed trim air compressor. The trade ally indicated the pressure at all of the air leaks as 100 psig, which is near the maximum allowed for the regulated air tool pressure. The trim compressor has a capacity of 820 cfm at 190 psig and 1050 cfm at 125 psig per the manufacturer data. The ex post savings were based on the air reduction at 100 psig, whereas the ex ante was based on the CAGI data sheet for 190 psig discharge pressure.

Sample ID 205

Executive Summary

For the project represented by sample ID205 the program participant received custom incentives from I&M to their pneumatic assembly tool conversion to electric and battery assembly tools in a manufacturing building.

The ex post annual energy savings totaled 627,721 kWh, with an ex post peak demand reduction of 78.47 kW. The gross energy realization rate is 61%.

Project Description

The participant replaced (816) pneumatic assembly tools with (816) battery powered electric tools and (14) air tools with corded electric tools, at the assembly lines in the manufacturing plant.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating the equivalent power of the pneumatic baseline assembly tool. The evaluation team selected an equivalent commercially available pneumatic tool operating in the same torque range and rotation speed. For battery tools, the inefficiency of charging then depleting the battery was captured with the ER factor of 2.5. The measure savings algorithm is similar to the *MEMD measure, Pneumatic Tools Replaced with Cordless Tools*.

$$kWh_{savings} = \sum_{Tools} \left[Hours_{rundown} \times \left(Qty_{base} \times CFM_{base} \times \frac{kW}{CFM_{comp}} - Qty_{installed} \times kW_{efficient} \times (1 + ER_{battery}) \right) \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$Hours_{rundown}$	= Average hours per year for assembly tool operating; site specific
CFM_{base}	= Equivalent air flow of pneumatic tool to electric; matching air tool
kW/CFM_{comp}	= Air compressor generation efficiency; CAGI sheet
$kW_{efficient}$	= Working power of electric assembly tool; Torque index x FreeTorque factor
$ER_{battery}$	= Inefficiency of battery energy conversion; 2.5
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Differences in Variable: $kW_{efficient} \times Hours$

The ex ante and ex post savings method both sourced the average tool operating time of 700 hours from the participant. The evaluation team noted that the torque applied by the electric tool to the fastener is variable

during the rundown. Conversely, the air flow for a pneumatic tool is constant up to the point the tool clutches or shuts off, going to zero flow. To approximate the variable torque for the electric tool, the evaluation team determined a weighted factor for rundown torque, prevailing torque and final torque by % time of each during the fastening sequence. This method reduced power, kW, for the efficient electric tool.

Differences in Variable: $kW_{Efficient} \times (1 + ER) \times Hours$

The ex post data collection noted that (816) tools are battery tools and (14) are corded electric tools. In the ex ante analysis, the $kWh_{efficient}$ is the sum of kWh_{medium} + $kWh_{battery\ charging}$. For the (14) corded tools, the value $kWh_{battery\ charging}$ equals zero kWh. There is an error in the formula that does not correctly reference either the battery charging energy to usage energy for (111) of the electric tools and (14) of the battery powered tools.

Differences in Variable: CFM_{Base}

The ex post sourced the pneumatic tool airflow from similar models of commercially available industrial assembly tools based on torque range and tool type. The ex ante values

Equivalent Air Nutrunner to Electric Torque Tool

Assembly Tool	Torque	Equivalent Air Tool Flow, CFM	
	High End, n-m	Ex Ante	Ex Post
Pistol Torque Screwdriver	2	28	13
	4	28	13
	8	28	13
	12	28	17
	15	35	17
	30	35	19
	50	35	19
Ratchet Wrench	48	28	20
Right Angle Nutrunner	8	28	15
	12	28	15
	20	28	15
	30	28	15
	40	28	15
	65	28	34
	70	35	34
	100	35	34
	140	35	34

The differences in the airflow for the equivalent pneumatic tool between the ex ante and ex post is due to the source of the equivalent tool and the usage and interpretation of ACFM, SCFM, CFM and FAD. This conversion was not needed by the ex ante savings as the rating value of air compressors, SCFM, is the same units for specifying pneumatic air tools.

The ex ante sourced generalized values from a table in the Engineer's Toolbox ([Air Tools - Air Consumption](#)), and made an assumption that free air, FAD should be converted to SCFM with a factor of 7.8. The error of this was somewhat minimized as the table also included a duty factor of 25%, which is not needed as the duty factor for the year is known (700 hrs/8760). The factor of 7.8 and the omission of the 25% factor, reduced the overestimation

of air flow for a pneumatic tool to 200%. The ex post method sourced the CFM value directly from equivalent air tool manufacturer's specifications.

Air Tool Algorithm Inputs & Energy Savings

Tools	<i>kWh=battery only</i>		<i>SCFM x Qty</i>		<i>kWh_{air tools}</i>		<i>kWh_{electric tools}</i>		<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Ex Ante</i>	<i>Ex Post</i>		
816 battery tools 14 corded tools	111/816	0/816	23,245	15,304	2,744,139	1,928,304	1,718,061	1,300,583	1,026,078	627,721
Contribution to Difference	86%		60%		70%		76%		61%	

Results

Gross Energy Impacts Summary

Measure Category	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed Air	1,026,078	627,721	61%	78.47
Total	1,026,078	627,721	61%	78.47

The ex post annual energy savings are 627,721 kWh, with an ex post peak demand reduction of 78.47 kW. The gross energy realization rate is 61%.

The ex ante and ex post savings methodology were both based on the difference of electric assembly tool energy from the reduced compressed air energy for replacing the pneumatic tools. The largest difference in the estimation of the equivalent compressed air needed to create the same torque profile of the electric tool. Another comparison can be made from the sum of the compressed air in the baseline case; even after applying a diversity factor based on 700 hours of use, the peak air demand reduced is 1,857 CFM, whereas the plant capacity is 4,325 CFM (3 air compressors running from the air leak project).

Sample ID 206

Executive Summary

For the projects represented by sample ID206 the program participant received custom incentives from I&M to retrofit the drums, accumulators and inlets of hydraulic injection molding machines with insulation to reduce the heat loss.

The ex post annual energy savings totaled 355,733 kWh, with an ex post peak demand reduction of 85.52 kW. The gross energy realization rate is 38%.

Project Description

Insulated jackets were purchased and installed to the exterior surface of hydraulic injection molding machines to reduce the heat loss while operating. During the plastic melting process, electric resistance heat is applied to the barrel, and inlet at a temperature of 400F. The insulation reduces the heat transfer, and the load of the resistance heating.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the invoice and obtained a specifying sheet from the manufacturer listing the products and dimensions. The savings algorithm was sourced from the custom workpaper for the MEMD measure, *Injection Molding Machine and Plastic Extruded Barrel Wrap Savings*.

$$\Delta kWh = \Delta Energy_{saved} \times \sum (Qty \times L_{barrel} \times Circ) \times \frac{Hours}{1,000}$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$\Delta Energy_{saved}$	= Energy save(no insulation) – Energy (insulated), Watt/squarefeet
Qty	= Quantity of insulation wraps by size
L	= Length of barrel insulation, feet
Circ	= Circumference of barrel, feet
Π	= pi, 3.14
Hours	= Annual hours barrel heater energized

Differences in Savings from Variable Qty x L x Dia

Order Type	Quantity	Subparts	Total width Inch	Circum Inch	Length Inch	Area Feet	kWh/ft/year
Custom	2	2	102	41	102	29	1173

Indiana C&I Portfolio 2025 EM&V

Custom	1	1	34	9.5	34	2	1277
Custom	1	1	7	9.5	7	0.5	1277
Standard	4	4	48	16	44	5	1248
Standard	8	2	80	16	76	8	1248
Standard	2	2	20	16	40	4	1248
Standard	2	2	12	16	12	1	1248
Standard	6	2	72	16	72	8	1248
Standard	4	2	40	16	40	4	1248
Standard	2	2	12	16	12	1	1248
Standard	3	3	18	16	18	2	1248
Standard	3	1	36	16	36	4	1248
Standard	2	1	24	16	24	3	1248
Standard	1	1	10	16	10	1	1248
Standard	1	1	12	9.5	12	1	1277
Standard	4	1	48	9.5	48	3	1277
Standard	3	3	15	16	15	2	1248
Standard	8	2	80	16	76	8	1248
Custom	4	4	244	47	244	80	1173
Custom	4	4	204	47	204	67	1173
Custom	1	1	40	47	40	13	1173
Custom	4	4	204	16	204	23	1248
Custom	2	2	56	16	56	6	1248
Custom	2	2	80	16	80	9	1248
Custom	2	2	56	16	56	6	1248
Custom	1	1	40	16	40	4	1248
Total	26					296	

The ex ante savings were based on 543 square feet of insulation, whereas the ex post totaled 296 square feet. The difference is the usage of the “quantity” from the invoice field, and “subpart” embedded in the description. As the insulated jackets are sold by standard sizes, one or more are used to cover the specified length and circumference of the machine barrel. The value for length in the description is the total of all the standard pieces, so the quantity field is not the appropriate multiplier for the “custom” jackets.

Differences for the variable Energy_{saved}

The MEMD workpaper FES-I2, Barrel Wraps for Injection Molders & Extruders provides both a deemed savings per square foot of insulation and also tables binned by the diameter of the barrel. The ex post sourced the distinct savings per barrel diameter, listed in the previous table, whereas the ex ante savings sourced the deemed savings value. The values in the MEMD workpaper were developed from the 3ePlus insulation calculator by barrel temperature and diameter.

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Injection Molding Machine	948,439	355,733	38%	85.52
Total	948,439	355,733	38%	85.52

The ex post annual energy savings totaled 355,733 kWh, with an ex post peak demand reduction of 85.52 kW. The gross energy realization rate is 38%. While both the ex ante and ex post savings method referenced the MEMD measure for Barrel Wraps, there were differences for two variables.

- The ex post insulated area (296 SF) was less than the ex ante area (542 SF), lowering the realized savings. The invoice quantity and descriptive length are not effective multipliers to determine the length, as there are sub-quantities to determine the total area.
- The ex post weighted average for the savings per foot per year of insulated hydraulic tube at 400F, was 1201 (kWh/ft/year), where as the aggregated deemed value used by the ex ante was more at 1210 (kWh/ft/year).

Sample ID 207

Executive Summary

For the project represented by sample ID207 the program participant received custom incentives from I&M to their pneumatic assembly tool conversion to electric and battery assembly tools in a manufacturing building.

The ex post annual energy savings totaled 470,802 kWh, with an ex post peak demand reduction of 58.85 kW. The gross energy realization rate is 57%.

Project Description

The participant replaced (59) pneumatic right-angle nutrunner tools with (59) electric tools at the assembly lines in the manufacturing plant.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating the equivalent power of the pneumatic baseline assembly tool. The evaluation team selected an equivalent commercially available pneumatic tool operating in the same torque range and rotation speed.

$$\sum_{Tools} \left[Hours_{rundown} \times \left(Qty_{base} \times CFM_{base} \times \frac{kW}{CFM_{comp}} - Qty_{installed} \times kW_{efficient} \right) + CFM_{leaks} \times \frac{kW}{CFM_{comp}} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

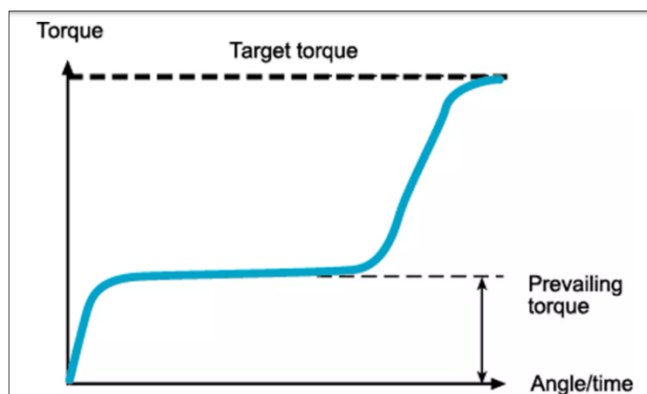
Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$Hours_{rundown}$	= Average hours per year for assembly tool operating
CFM_{base}	= Equivalent air flow of pneumatic tool to electric
kW/CFM_{comp}	= Air compressor generation efficiency
$kW_{efficient}$	= Working power of electric assembly tool
CFM_{leaks}	= Typical leakage for a pneumatic tool
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Differences in Variable: $Hours_{rundown}$

The ex ante and ex post savings method both sourced the average tool operating time of 700 hours from the participant. The evaluation team noted that the torque applied by the electric tool to the fastener is variable during the rundown. Conversely, the air flow for a pneumatic tool is constant up to the point the tool clutches or shuts off, going to zero flow. To approximate the variable torque for the electric tool, the evaluation team sourced a typical fastener tightening sequence torque curve.

Pneumatic Air Tool Faster Rundown to Final Torque



[Prevailing torque compensation strategies - Atlas Copco USA](#)

<i>Phase of Fastening</i>	<i>Electric Assembly Tool</i>		<i>Pneumatic Tool</i>
	<i>Time</i>	<i>% Torque</i>	<i>Air Flow, % CFM</i>
Rundown	10%	20% (average)	100%
Prevailing Torque	65%	40%	100%
Final Torque	25%	80% (average)	100%

Equivalent Air Nutrunner to Electric

Final Torque, n-m	Equivalent Air Tool Flow, CFM	
	Ex Ante	Ex Post
40-200	51	34
90-370	51	42
150-600	56	42
250-1000	56	60
1131-4000	67	105

The differences in the airflow for the equivalent pneumatic tool between the ex ante and ex post is due to the source of the equivalent tool and the usage and interpretation of ACFM, SCFM, CFM and FAD. This conversion was not needed by the ex ante savings as the rating value of air compressors, SCFM, is the same units for specifying pneumatic air tools.

The ex ante sourced generalized values from a table in the Engineer's Toolbox ([Air Tools - Air Consumption](#)), and made an assumption that free air, FAD should be converted to SCFM with a factor of 7.8. The error of this was some what minimized as the table also included a duty factor of 25%, which is not needed as the duty factor for the year is known (700 hrs/8760). The factor of 7.8 and the omission of the 25% factor, reduced the overestimation

of air flow for a pneumatic tool to 200%. The ex post method sourced the CFM value directly from equivalent air tool manufacturer's specifications.

Differences in variable, CFM_{leaks} .

A recent ultrasonic air leak detection project primarily located air leaks on pneumatic tool quick disconnects, nipple fittings, hose whips and the FRL (filter, regulator, lubricator). From the average of these measured leaks, (3.5 cfm), the ex ante base case applied this value to all (59) air tools. As this implied all tools were leak, whereas the air study did not find leaks in all tools, and the assumption that a leak is never repaired, the evaluation team decided this would overestimate savings, so a factor was applied for typical time to repair and an assumed percentage of tools leaking at the same time.

The variables for the energy savings algorithm are summarized in the following table.

Air Tool Algorithm Inputs & Energy Savings

Tools	CFM_{leaks}		$SCFM \times Qty$		$kWh_{air\ tools}$		$kWh_{electric\ tools}$		Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings
	Ex Ante	Ex Post	Ex Ante	Ex Post	Ex Ante	Ex Post	Ex Ante	Ex Post		
Qty 59	207	72	4,361	2,621	549,442	372,612	44,100	29,736	828,589	470,802
Difference, %	35%		60%		68%		67%		57%	

Results

Gross Energy Impacts Summary

Measure Category	$kWh\ Savings$			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Compressed Air	828,589	470,802	57%	58.85
Total	828,589	470,802	57%	58.85

The ex post annual energy savings are 470,802 kWh, with an ex post peak demand reduction of 58.85 kW. The gross energy realization rate is 57%.

The ex ante and ex post savings methodology were both based on the difference of electric assembly tool energy from the reduced compressed air energy for replacing the pneumatic tools. The largest difference in the estimation of the equivalent compressed air needed to create the same torque profile of the electric tool. Another comparison can be made from the sum of the compressed air in the baseline case, totaling 4,361 cfm in the ex ante estimate. Although there is a diversity factor for the number of tools running at any one time, the peak demand of 4,361 CFM (59 tools x CFM per tool) exceed the air plant typical capacity of 4,325 CFM (3 air compressors running from the air leak project).

Sample ID 208

Executive Summary

For the projects represented by sample ID208, the program participant received custom incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 763,531 kWh, with an ex post peak demand reduction of 132.732 kW. The gross energy realization rate is 100%.

Project Description

The participant replaced existing lighting in the interior with (247) LED high bay fixtures with dimming networking.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
High Bay to LED high bay with Dimming	244	247	284	40 - 230	8,760	1.02	763,531	763,531	100%
Total							763,531	763,531	100%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	763,531	763,531	100%	132.732
Total	763,531	763,531	100%	132.732

The ex post annual energy savings totaled 763,531 kWh, with an ex post peak demand reduction of 132.73 kW. The gross energy realization rate is 100%.

Sample ID 209

Executive Summary

Under a project represented by Sample ID 209, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 216,933 kWh, and the corresponding ex post peak demand reduction was 43.62 kW. The energy savings realization rate was 39%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks and subsequently resulted in the repair of 444 CFM leaks. Of the (76) leaks that were repaired, most were made on FRL's (filter/regulator/lubricators), pipe threads and some equipment within the production fenced area for process equipment. The facility maintains the equipment pressurized 24/7.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Centrifugal air compressor efficiency factors are not included in the *IN TRM 2023 TRM for measure 4.7.13 Compressed Air Leak Repair*. The ex post savings method referenced the efficiency (kW/CFM) and control factor from the *IL TRM V13 measure 4.7.13 Compressed Air Leak Repair* for a centrifugal air compressor with inlet valve modulation.

The ex ante savings method referenced the narrative attached to the table 5 in the *Uniform Methods Project for Compressed Air*. The footnote narrative speaks to a good part load performance within the throttle range of 0.86 for IGV and 0.67 for IBV. It appears that the ex ante method referenced these throttle range values as a CCAF factor for the control method.

The table in the UMP for the relationship of air compressor capacity to percentage of power indicates why the values of 0.86 and 0.67 overestimate the energy savings.

UMP – Power vs Capacity for Centrifugal Air Compressors and Control Method

Percentage of Capacity	Percentage of Power	
	Centrifugal IBV	Centrifugal IGV
0%	80%	74%
20%	80%	74%
40%	80%	74%
60%	80%	74%
80%	87%	83%
100%	100%	100%

In the previous table, as the air load is reduced from the air leakage repair, the maximum power that can be reduced is approximately 20% (100% -80%) for the IBV and 26% (100%-74%) for the IGV control methods. This aligns near to the ex post referenced value from the IL TRM V13 for inlet valve control with a value of 0.31

Air Leak Savings Algorithm Inputs

Variable	Ex Ante	Ex Post
Leaks found, CFM	444	445
Leaks repaired, CFM	444	445
Compressor equipment type	Centrifugal	Centrifugal
Compressor control type	IGV	IGV
Operating hours	8760	8760
kW/CFM	0.18	0.17
CCAF	0.31	0.86
kW/CFM	0.056	0.167
CF factor	0.000201	0.000201
kWh savings	216,933	559,236
kW savings	43.62	63.84

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	559,236	216,933	39%	43.62
Total	559,236	216,933	39%	43.62

The ex post annual energy savings were 216,933 kWh, and the corresponding ex post peak demand reduction was 43.62 kW. The energy savings realization rate was 39%. The primary difference in the savings:

- Air compressor efficiency: Ex post value of 0.18 kW/CFM referenced from IL TRM and ex ante value of 0.17 based on actual CAGI full load efficiency, slightly increases the realized savings.
- CCAF control factor: Ex post value of 0.31 referenced from the IL TRM and ex ante value of 0.84 incorrectly applied from the Uniform Methods Project footnote.

Sample ID 210

Executive Summary

Under a project represented by Sample ID 210, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 532,572 kWh, and the corresponding ex post peak demand reduction was 107.08 kW. The energy savings realization rate was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (509 CFM) and subsequently resulted in the repair of 425 CFM leaks. Of the (126) leaks that were repaired, the majority were repairs made to quick connect fittings. The facility maintains the equipment pressurized 8760 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	509	509
Leaks repaired, CFM	425	425
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Variable speed	Variable speed
Operating hours	8760	8760
kW/CFM	0.143	0.143
CF factor	0.000201	0.000201
kWh savings	532,589	532,572
kW savings	107.08	107.08

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	532,589	532,572	100%	107.08
Total	532,589	532,572	100%	107.08

The ex post annual energy savings were 532,572 kWh, and the corresponding ex post peak demand reduction was 107.08 kW. The energy savings realization rate was 100%.

Sample ID 211

Executive Summary

Under a project represented by Sample ID 211, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 343,752kWh, and the corresponding ex post peak demand reduction was 69.11 kW. The energy savings realization rate was 75%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (329 CFM) and subsequently resulted in the repair of 255 CFM leaks. Of the (83) leaks that were repaired, the majority were repairs made to quick connect fittings. The facility maintains the equipment pressurized 8760 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	330	330
Leaks repaired, CFM	256	256
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Variable speed	Variable speed
Operating hours	8760	8760
Pressure at leak, psig	100	190
kW/CFM	0.153	0.204
CF factor	0.000201	0.000201
kWh savings	457,201	343,752
kW savings	91.92	69.11

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	457,201	343,752	75%	69.11
Total	457,201	343,752	75%	69.11

The ex post annual energy savings were 343,752 kWh, and the corresponding ex post peak demand reduction was 69.11 kW. The energy savings realization rate was 75%. The primary difference in the realized savings:

- Both the ex ante and ex post savings were based on the reduced air flow from the variable speed trim air compressor. The trade ally indicate the pressure at all of the air leaks as 100 psig, which is near the maximum allowed for the regulated air tool pressure. The trim compressor has a capacity of 451 cfm at 190 psig and 623 cfm at 100 psig per the manufacturer data. The ex post savings were based on the air reduction at 100 psig, whereas the ex ante was based on the CAGI data sheet for 190 psig discharge pressure.

Sample ID 213

Executive Summary

Under a project represented by Sample ID 213, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 430,666 kWh, and the corresponding ex post peak demand reduction was 86.59 kW. The energy savings realization rate was 101%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks and subsequently resulted in the repair of 277 CFM leaks. Of the (64) leaks that were repaired, most were made on hoses to pneumatic tools and quick connect fittings, with the remaining repairs on air guns. The facility maintains the equipment pressurized 24/7.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Centrifugal air compressor efficiency factors are not included in the *IN TRM 2023 TRM for measure 4.7.13 Compressed Air Leak Repair*. The ex post savings method referenced the efficiency (kW/CFM) and control factor from the *IL TRM V13 measure 4.7.13 Compressed Air Leak Repair* for a centrifugal air compressor with inlet valve modulation.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	300	300
Leaks repaired, CFM	277	277
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Variable speed	Variable speed
Operating hours	8736	8736
kW/CFM	0.178	0.176
CF factor	0.000201	0.000201
kWh savings	430,666	426,926
kW savings	86.59	48.87

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	426,926	430,666	101%	86.59
Total	426,926	430,666	101%	86.59

The ex post annual energy savings were 430,666 kWh, and the corresponding ex post peak demand reduction was 86.50 kW. The energy savings realization rate was 101%. The primary difference in the savings:

- The ex post savings method referenced the deemed efficiency values in the IN TRM that reflects the product of the efficiency and control factor. The ex ante method referenced a custom method with the efficiency determined by the total package power divided by the full air flow and factored by the fraction of full load power. Either method is acceptable for estimating the savings, but to remain consistent with other air reduction projects evaluated, a TRM based method was selected.

Sample ID 214

Executive Summary

For the projects represented by sample ID214, the program participant received custom incentives from I&M for the purchase and installation of higher-efficiency hybrid servo-electric injection molding machines, replacing hydraulic machines in the manufacturing facility.

The ex post annual energy savings totaled 217,466, with an ex post peak demand reduction of 38.76 kW. The gross energy realization rate is 104%.

Project Description

The participant replaced four hydraulic injection molding machines (398, 237, 123 and 123 tons) with servo-hydraulic injection molding machines in the manufacturing facility. The new machines still hydraulic power, but have servo motors to reduce the hydraulic pump run time.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site, collected associated projects from prior program years and verified the installation and production volume with the site.

Injection molding machine energy and demand savings were calculated using the algorithm from the *MEMD workpaper: "FES-140- Electric and Hybrid Injection Molding Machines*.

$$kWh_{savings} = \sum_{Area} \left[(AEC_{hydraulic} - AEC_{electric}) \times \frac{lbs}{year} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
$AEC_{hydraulic}$	= Average Energy Consumption for hydraulic machine; kWh/lb
$AEC_{electric}$	= Average Energy Consumption for electric machine; kWh/lb
$Lbs/year$	= Pounds of material formed per year
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Injection Molding Machine Inputs & Energy Savings

<i>Hybrid Injection Molding Machine Capacity</i>	<i>Pounds per Year</i>	<i>AEC Hydraulic kWh/lb</i>	<i>AEC Electric kWh/lb</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
237 ton	265K	0.43	0.21	209,000	58,501	97%
398 ton	445K	0.43	0.21		98,242	
123 ton	138K	0.43	0.21		30,361	
123 ton	128K	0.43	0.21		30,361	
Total				209,000	217,466	97%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Hybrid Injection Molder	209,000	217,466	104%	38.76
Total	209,000	217,466	104%	38.76

The ex post annual energy savings were 217,466 and the corresponding ex post peak demand reduction was 37.76 kW. The gross realization rate for the project's energy savings was 104%. Both the ex ante and ex post savings method referenced the applicable MEMD method, but utilized the production data from the participant differently. The ex post applied the typical production for each machine, whereas the ex ante applied an averaged production data value to each unit.

Sample ID 215

Executive Summary

Under a project represented by Sample ID 215, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 192,607 kWh, and the corresponding ex post peak demand reduction was 38.72 kW. The energy savings realization rate was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (177 CFM) and subsequently resulted in the repair of 166 CFM leaks. Of the (39) leaks that were repaired, most were made to quick connect pneumatic fittings and hose fittings. The facility maintains the equipment pressurized 8736 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	177	177
Leaks repaired, CFM	166	166
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Load unload	Load unload
Operating hours	8736	8736
kW/CFM	0.133	0.133
CF factor	0.000201	0.000201
kWh savings	192,578	192,607
kW savings	38.72	38.72

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	192,578	192,607	100%	38.72
Total	192,578	192,607	100%	38.72

The ex post annual energy savings were 192,607 kWh, and the corresponding ex post peak demand reduction was 38.72 kW. The energy savings realization rate was 100%.

Sample ID 216

Executive Summary

Under a project represented by Sample ID 216, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 129,598 kWh, and the corresponding ex post peak demand reduction was 26.06 kW. The energy savings realization rate was 98%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (265 CFM) and subsequently resulted in the repair of 234 CFM leaks. Of the (65) leaks that were repaired, most were made to quick connect fittings for pneumatic air tools. The facility maintains the equipment pressurized 3640 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	265	265
Leaks repaired, CFM	234	234
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Load Unload	Load Unload
Operating hours	3640	3640
kW/CFM	0.152	0.199 & 0.152
CF factor	0.000201	0.000201
kWh savings	131,878	129,598
kW savings	26.51	26.06

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	131,878	129,598	98%	26.06
Total	131,878	129,598	98%	26.06

The ex post annual energy savings were 129,598 kWh, and the corresponding ex post peak demand reduction was 26.06 kW. The energy savings realization rate was 98%. The primary difference in the savings:

- The ex post savings was based on the reduced load of the trim air compressor. The ex ante savings method assigned savings/loss to the 50 hp and 75 hp air compressors, both rotary screw controlled by load/unload.

Sample ID 217

Executive Summary

Under a project represented by Sample ID 217, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 120,383 kWh, and the corresponding ex post peak demand reduction was 24.20 kW. The energy savings realization rate was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (132 CFM) and subsequently resulted in the repair of 93 CFM leaks. Of the (37) leaks that were repaired, most were made to air gun fittings and quick connect fittings. The facility maintains the equipment pressurized 8760 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	132	132
Leaks repaired, CFM	93	93
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Load Unload	Load Unload
Operating hours	8760	8760
kW/CFM	0.147	0.147
CF factor	0.000201	0.000201
kWh savings	120,430	120,383
kW savings	24.21	24.20

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	120,430	120,383	100%	24.20
Total	120,430	120,383	100%	24.20

The ex post annual energy savings were 120,383 kWh, and the corresponding ex post peak demand reduction was 24.20 kW. The energy savings realization rate was 100%.

Sample ID 218

Executive Summary

Under a project represented by Sample ID 218, custom incentives were provided by I&M for the replacement of conventional transformers and UV curing system with efficient transformers and improved lighting reflectance in a manufacturing building.

The ex post annual energy savings were 75,528 kWh, and the corresponding ex post peak demand reduction was 3.78 kW. The energy savings realization rate was 105%.

Project Description

The participant replaced three plastic curing systems having minimum efficient transformers and low efficient UV lighting with three new systems have high efficiency transformers, UV lighting system with high reflectance in their manufacturing process for curing materials.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, emailed the participant for additional specifications and replicated the ex ante savings method. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below ☺

$$\Delta kWh = [V \times 1.73 \times pf \times (Amps_{baseline} - Amps_{efficient})] \times AnnualHours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$Amps_{baseline}$	= Typical amps; metered by participant
$Amps_{efficient}$	= Typical amps; metered by participant
$V \times 1.73 \times pf$	= Volts(465) x 1.73 (3 ϕ) x pf (Power factor, 0.9)
$AnnualHours$	= Annual hours equipment operates, 2,000 hr by participant
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Source</i>
Hours	2,000	2,000	Participant
$V \times 1.73 \times pf$	480×1.0	$465 \times 1.73 \times 0.9$	Apparent power formula, 3 ϕ pf from nameplate Volts – typical operating

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Process equipment & transformers	71,885	75,528	105%	3.78
Total	71,885	75,528	105%	3.78

The ex post annual energy savings were 75,528 kWh, and the corresponding ex post peak demand reduction was 3.78 kW. The energy savings realization rate was 105%. The ex ante and ex post savings were based on the same method, same operating hours and metered pre and post equipment current. The ex post method converted the metered current in amps, with the apparent power formula for three phase current.

Sample ID 219

Executive Summary

Under a project represented by Sample ID 219, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 44,586 kWh, and the corresponding ex post peak demand reduction was 8.96 kW. The gross realization rate for the project's energy savings was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks and subsequently resulted in the repair of 28.7 CFM leaks. The reduced compressed air load for the VSD air compressor resulted in daily energy savings. The air compressor operates nearly 24/7 to support the industrial facility.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	28.7	28.7
Leaks repaired, CFM	28.7	28.7
Compressor equipment type	Rotary Screw	Rotary Screw
Compressor control type	VFD	VFD
Operating hours	8,736	8,736
kW/CFM	0.178	0.178
CF factor	0.000201	0.000201
kWh savings	44,586	44,629
kW savings	8.96	8.97

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	44,629	44,586	100%	8.96
Total	44,629	44,586	100%	8.96

The ex post annual energy savings were 44,586 kWh, and the corresponding ex post peak demand reduction was 8.96 kW. The gross realization rate for the project's energy savings was 100%.

Sample ID 220

Executive Summary

Under a project represented by Sample ID 220, custom incentives were provided by I&M for the retrofit of reach in refrigerated display cases with shelf mounted air vanes to reduce conditioned air losses in a grocery store building.

The ex post annual energy savings were 30,921 kWh, and the corresponding ex post peak demand reduction was 3.53kW. The energy savings realization rate was 85%.

Project Description

The trade ally retrofitted (26) medium temperature refrigerated cases with air vanes on the display shelves. The air vanes direct the conditioned air leaving the evaporator coil towards the interior of the display case, reduced conditioned air to the building space.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation.

The compressor rack savings per linear foot of retrofitted refrigerated display case was sourced from *CalNext, Field Assessment of Refrigerated Display Cases Air Curtain Guiding Vanes, October 16, 2024*. The study determined the savings by metering pre and post compressor rack energy consumption when display shelves were retrofitted with air curtain guiding vanes. The evaluation team set the evaluation boundary at the whole building, inclusive of both the refrigeration compressor rack and the HVAC space conditioning equipment.

$$\Delta kWh = \text{Compressor Savings} - \text{HVAC Interactive Effects}$$

$$\Delta kWh_{\text{compressor}} = \text{Linear Feet} \times \frac{kWh}{\text{Linear Foot}}$$

$$\Delta kWh_{\text{HVAC}} = \Delta kWh_{\text{compressor}} \times COP_{\text{rack}} \times 3.412 \frac{kBTU}{kWh} \times \frac{1}{IEER_{\text{HVAC}}} \times$$

$$\Delta kW = \Delta kWh / 8760$$

Where:

ΔkWh	= Energy savings at compressor rack less energy gained by HVAC
$\Delta kWh_{\text{compressor}}$	= Energy savings at compressor rack
ΔkWh_{hvac}	= Energy required for space cooling after reducing refrigeration loss
Linear feet	= Length of display cases retrofitted
kWh/LF	= Cal Next Study average savings
COP_{rack}	= Typical refrigeration COP
$IEER_{\text{HVAC}}$	= 2018 Minimum federal efficiency for large unitary HVAC equipment

Air Leak Savings Algorithm Inputs and Results

<i>Variable</i>	<i>Value</i>	<i>Source</i>
Linear feet	316	Invoice; sum of all case linear feet length
kW/LF	129.46	CalNext study; display case air curtain guiding vane
COP _{rack}	2.2	IL TRM V14 4.6.11 ECM motor for Reach In Refrigerated Case
IEER _{HVAC}	11.4	Federal efficiency standard (2018) Large unitary cooling
	<i>Ex Ante</i>	<i>Ex Post</i>
Δ kWh _{compressor}	36,551 kWh	40,909 kWh
Δ kWh _{HVAC}	-	(9,988)
kWh savings	36,551	30,921
kW savings	-	3.53

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Refrigeration	36,551	30,921	85%	3.53
Total	36,551	30,921	85%	3.53

The ex post annual energy savings were 30,921 kWh, and the corresponding ex post peak demand reduction was 3.53 kW. The energy savings realization rate was 85%.

Both the ex ante and ex post savings method referenced refrigeration rack compressor energy savings factor from the *CalNext, Field Assessment of Refrigerated Display Cases Air Curtain Guiding Vanes, October 16, 2024*. The ex post savings method set the evaluation boundary at the whole building level, and included the gain in space conditioning energy to offset the lessened conditioned air from the refrigeration open display cases.

- The ex post compressor savings was referenced at 129.46 kWh/linear feet, whereas the ex ante referenced the factor of 10% savings from the CalNext study.
- The ex post method included the interactive effects with the increased space cooling load, with the reduction in losses from the refrigerated open display case.

Sample ID 222

Executive Summary

Under a project represented by Sample ID 222, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 28,134 kWh, and the corresponding ex post peak demand reduction was 5.66 kW. The energy savings realization rate was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (26 CFM) and subsequently resulted in the repair of 21 CFM leaks. Of the (14) leaks that were repaired, most were made to fittings and plugs. The facility maintains the equipment pressurized 8760 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
Hours	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	26	26
Leaks repaired, CFM	21	21
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Load unload	Load unload
Operating hours	8760	8760
kW/CFM	0.152	0.152
CF factor	0.000201	0.000201
kWh savings	28,095	28,134
kW savings	5.65	5.66

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	28,095	28,134	100%	5.66
Total	28,095	28,134	100%	5.66

The ex post annual energy savings were 28,134 kWh, and the corresponding ex post peak demand reduction was 5.66 kW. The energy savings realization rate was 100%.

Sample ID 223

Executive Summary

Under a project represented by Sample ID 223, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 15,307 kWh, and the corresponding ex post peak demand reduction was 3.8 kW. The energy savings realization rate was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks (14 CFM) and subsequently resulted in the repair of 12 CFM leaks. Of the (4) leaks that were repaired, most were made to quick connect pneumatic fittings. The facility maintains the equipment pressurized 8760 hours per year.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
Hours	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	14	14
Leaks repaired, CFM	12	12
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Load unload	Load unload
Operating hours	8760	8760
kW/CFM	0.143	0.143
CF factor	0.000201	0.000201
kWh savings	15,281	15,307
kW savings	3.07	3.08

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	15,281	15,307	100%	3.08
Total	15,281	15,307	100%	3.08

The ex post annual energy savings were 15,307 kWh, and the corresponding ex post peak demand reduction was 3.08 kW. The energy savings realization rate was 100%.

Sample ID 224

Executive Summary

Under a project represented by Sample ID 224, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 4,181 kWh, and the corresponding ex post peak demand reduction was 0.84 kW. The gross realization rate for the project's energy savings was 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks and subsequently resulted in the repair of 27.7 CFM leaks. The reduced compressed air load for the rotary screw with lubrication air compressor resulted in daily energy savings. The air compressor operates one shift for five days per week.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

The ex ante and ex post savings method both selected an efficiency value for air generation outside the values provided in the *Indiana TRM 2023*. The actual efficiency from the CAGI data sheet was determined by the full flow rating and total package power. A control factor for the load/unload control type of 0.74 was factored to the compressor efficiency. The most applicable TRM table value of 0.152 may overestimate the savings.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	13.9	13.9
Leaks repaired, CFM	13.9	13.9
Compressor equipment type	Rotary Screw	Rotary Screw
Compressor control type	Load unload	Load unload
Operating hours	2080	2080
kW/CFM	0.145	0.145
CF factor	0.000201	0.000201
kWh savings	4,181	4,194
kW savings	0.84	0.84

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	4,194	4,181	100%	0.84
Total	4,194	4,181	100%	0.84

The ex post annual energy savings were 4,181 kWh, and the corresponding ex post peak demand reduction was 0.84 kW. The gross realization rate for the project's energy savings was 100%.

Sample ID 225

Executive Summary

Under a project represented by Sample ID 225, custom incentives were provided by I&M for the detection and repair of compressed air leaks at an industrial facility.

The ex post annual energy savings were 14,543 kWh, and the corresponding ex post peak demand reduction was 2.92 kW. The realized energy savings are 100%.

Project Description

The ultrasonic leak detection audit performed by a trade ally, identified air leaks and subsequently resulted in the repair of 37 CFM leaks. Of the (12) leaks that were repaired, most were made on air fittings and air regulators for pneumatic tools supporting the production facility, The gross realization rate for the project's energy savings was 100%. A single 20 hp air compressor operates 10 hours per day for 5 days per week.

Measurement and Verification Effort

To verify the project savings, ADM staff reviewed available project documentation, collected the air leak log, repaired air leak log, and air compressor equipment data. Operating hours were verified with a review of the interval electric billing data. The following algorithm from the *Indiana TRM 2023* workbook for measure 4.7.13 *Compressed Air Leak Repair* was referenced for the savings method below:

$$\Delta kWh = CFM_{repaired} \times \frac{kW}{CFM} \times Hours$$

$$\Delta kW = \Delta kWh \times CDF$$

Where:

ΔkWh	= Energy savings, kWh
$CFM_{repaired}$	= Sum of CFM of repaired air leaks
kW/CFM	= Indiana TRM air generation efficiency by control type & compressor type
$Hours$	= Annual hours air system is pressurized
ΔkW	= Annual coincident peak demand savings
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The table below presents ex ante and ex post energy savings, verified hours of operation, CFM of the repaired leak, and air compressor data, along with the energy and peak demand savings.

The ex ante and ex post savings method both selected an efficiency value for air generation outside the values provided in the *Indiana TRM 2023*.

Air Leak Savings Algorithm Inputs

<i>Variable</i>	<i>Ex Ante</i>	<i>Ex Post</i>
Leaks found, CFM	56	56
Leaks repaired, CFM	37	37
Compressor equipment type	Lubricated Rotary Screw	Lubricated Rotary Screw
Compressor control type	Load/Unload	Load/Unload
Operating hours	2600	2600
kW/CFM	0.152	0.152
CF factor	0.000201	0.000201
kWh savings	14,543	14,543
kW savings	2.92	2.92

Results

Realized Gross Savings

<i>Measure Category</i>	<i>Gross kWh Savings</i>			<i>Realized Peak kW Reduction</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Compressed air leak repair	14,543	14,543	100%	2.92
Total	14,543	14,543	100%	2.92

The ex post annual energy savings were 14,543 kWh, and the corresponding ex post peak demand reduction was 2.92 kW. The gross realization rate for the project's energy savings was 100%.

Sample ID 226

Executive Summary

For the projects represented by sample ID 226, the program participant received Prescriptive incentives to replace LED linear tubes with more efficient LED linear tubes in a retail sales building.

The ex post annual energy savings totaled 25,491 kWh, with an ex post peak demand reduction of 4.022 kW. The gross energy realization rate is 41%.

Project Description

The participant replaced existing lighting in retail building operating seven days per week. A trade ally replaced linear LED lamps with (950) 4' LED lamps and (6) 3' LED lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

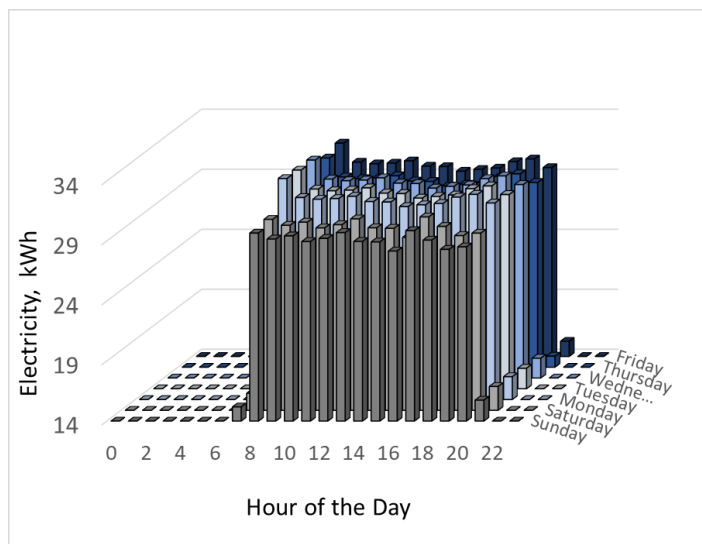
Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 1L LED to LED linear tube	880	880	18	13	4,732	1.06	57,323	22,070	39%
4' 1L LED to LED linear tube	70	70	18	9	4,732	1.06	4,560	3,195	70%
3' 1L LED to LED linear tube	6	6	16	9	4,732	1.06	391	226	58%
Total							62,273	25,491	41%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	62,273	25,491	41%	4.022
Total	62,273	25,491	41%	4.022

The ex post annual energy savings are 25,491 kWh, with an ex post peak demand reduction of 4.022 kW. The ex ante savings estimate utilized the deemed base wattages of 29.5W which is the wattage for a 4' fluorescent lamp. The verified base lamp wattages were 4' - 18W LED and 3' - 16W.

Sample ID 300

Executive Summary

For the projects represented by sample ID 300, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 151,780 kWh, with an ex post peak demand reduction of 11.49 kW. The gross energy realization rate is 96%.

Project Description

The participant replaced existing lighting in warehouse building operating five days per week. A trade ally replaced (192) linear HID high bay fixtures with LED high bay fixtures in a warehouse building with some manufacturing areas.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

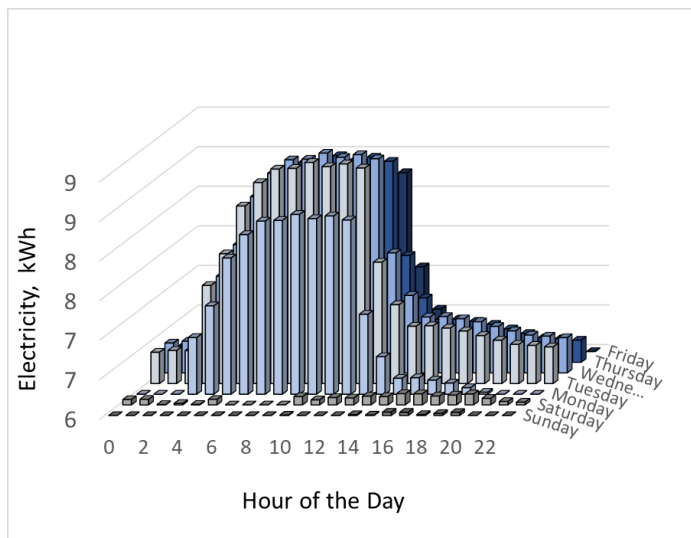
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
HID 400W to LED high bay	55	55	392	160	3,407	1.00	157,594	43,479	96%
HID 400W to LED high bay	91	91	392	160	3,407	1.00		71,938	
HID 400W to LED high bay	46	46	392	160	3,407	1.00		36,364	
Total							157,594	151,780	96%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	157,594	151,780	96%	11.49
Total	157,594	151,780	96%	11.49

The ex post annual energy savings are 151,780 kWh, with an ex post peak demand reduction of 11.49 kW. The parameters for the deemed energy savings per unit are not available. The existing fixtures included 4' 4L T5HO fixtures and HID 400W fixtures. The linear fluorescent fixture wattage was less than the HID 400W lamp fixtures (458W for the fixture).

Sample ID 301

Executive Summary

For the projects represented by sample ID 301, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 33,795 kWh, with an ex post peak demand reduction of 3.20 kW. The gross energy realization rate is 68%.

Project Description

The participant replaced existing lighting in warehouse building operating five days per week. A trade ally replaced (33) linear HID high bay fixtures with LED high bay fixtures, (24) linear fluorescent fixtures with LED panels, (8) HID wall packs with LED exterior wall packs, (8) incandescent exit signs with LED signs. Also, (33) of the new fixtures were installed with fixture mounted occupancy sensors.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

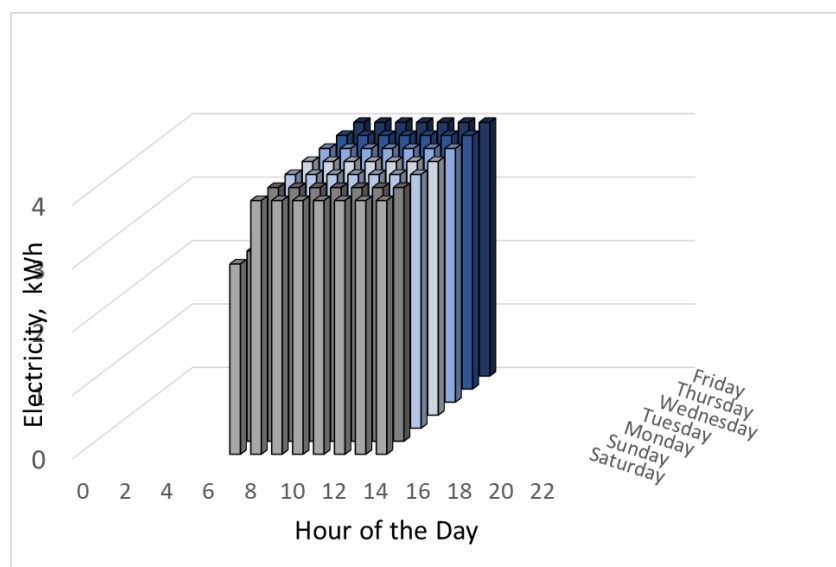
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
HID 400W to LED high bay	33	33	455	174	2,289	1.02	27,086	21,646	80%
2' 2L T8/T12 to LED troffer	24	24	85	37	2,289	1.02	2,676	2,661	99%
HID 175W to LED exterior fix	8	8	199	60	4,303	1.02	3,010	4,877	162%
Inc exit sign to LED exit sign	8	8	14	2	8,760	1.02	1,608	858	53%
No controls to occupancy controls	33	33	0	174	2,289	1.02	15,081	3,753	25%
Total							49,461	33,795	68%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	49,461	33,795	68%	3.200
Total	49,461	33,795	68%	3.200

The ex post annual energy savings are 33,795 kWh, with an ex post peak demand reduction of 3.20 kW. The parameters for the deemed energy savings per unit are not available. The hours of use (2,289) for the interior lighting determined by the interval billing data are less than the prototypical TRM modeled warehouse building (3,135) for the ex ante deemed savings per unit.

Sample ID 302

Executive Summary

For the projects represented by sample ID 302, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 43,254 kWh, with an ex post peak demand reduction of 3.275 kW. The gross energy realization rate is 100%.

Project Description

The participant replaced existing lighting in warehouse building. A trade ally replaced (70) high bay fixtures with (70) LED high bay fixtures.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 8L T8HO to LED high bay	70	70	392	159	2,600	1.02	43,254	43,254	100%
Total							43,254	43,254	100%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	43,254	43,254	100%	3.275
Total	43,254	43,254	100%	3.275

The ex post annual energy savings are 43,254 kWh, with an ex post peak demand reduction of 3.275 kW.

Sample ID 303

Executive Summary

For the projects represented by sample ID 303, the program participant received SBDI incentives from I&M to support lighting replacements in a manufacturing building.

The ex post annual energy savings totaled 28,284 kWh, with an ex post peak demand reduction of 2.225 kW. The gross energy realization rate is 76%.

Project Description

The participant replaced existing lighting in their manufacturing facility operating five days per week. A trade ally replaced (41) linear T5 HO high bay fixtures with LED high bay fixtures and (8) of the new fixtures were installed with fixture mounted occupancy sensors.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

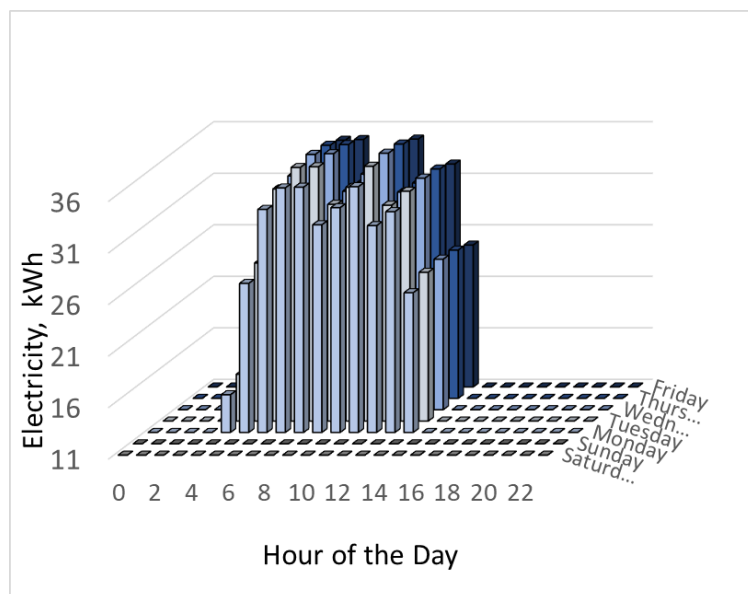
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The site annual hours of use (2,821) were utilized for the lighting hours in the analysis.

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 6L T5HO to LED high bay	41	41	375	141	2,821	1.02	33,653	27,621	82%
No controls to occupancy control	8	8	120	120	2,821	1.02	3,656	663	18%
Total							37,309	28,284	76%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	37,309	28,284	76%	2.225
Total	37,309	28,284	76%	2.225

The ex post annual energy savings are 28,284 kWh, with an ex post peak demand reduction of 2.225 kW. The hours of use (2,821) for the interior lighting determined by the interval billing data are less than the prototypical TRM modeled manufacturing building (4,618). The occupancy sensor ex-ante savings was overestimated for the actual product installed. The deemed wattage for the occupancy sensor measure is unknown.

The efficient wattage for the first measure is a weighted average of the two high bay fixtures installed at the facility. The second measure above was installed in one location with an efficient wattage of 120W.

Sample ID 304

Executive Summary

For the projects represented by sample ID 304, the program participant received SBDI incentives from I&M to replace LED linear tubes with more efficient LED linear tubes in a retail sales building.

The ex post annual energy savings totaled 14,065 kWh, with an ex post peak demand reduction of 1.968 kW. The gross energy realization rate is 40%.

Project Description

A total of 434 existing 18-W LED lamps were replaced with 434 LED lamps rated between 9W and 13W in a retail facility operating seven days per week.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

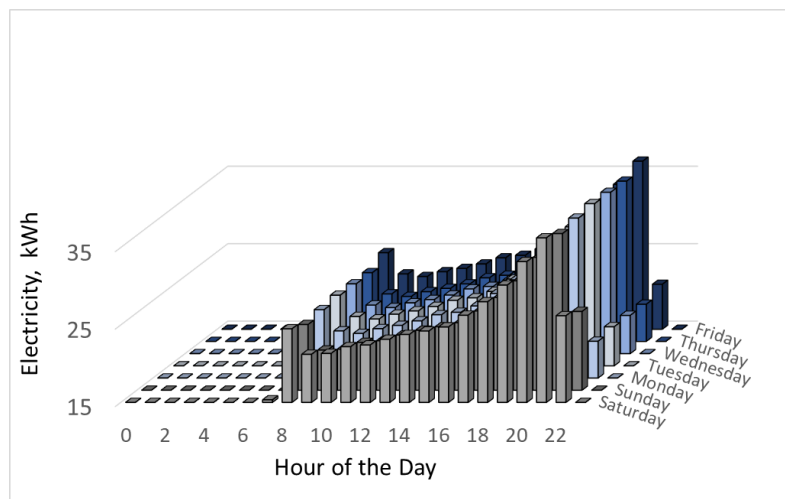
Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type



The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 1L LED to LED linear tube	380	380	18	13	5,549	1.06	31,160	11,175	36%
4' 1L LED to LED linear tube	54	54	18	9	5,549	1.06	4,428	2,890	65%
Total							35,588	14,065	40%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	35,588	14,065	40%	1.968
Total	35,588	14,065	40%	1.968

The ex post annual energy savings are 14,065 kWh, with an ex post peak demand reduction of 1.968 kW. The ex ante savings estimate utilized the deemed base wattages of 29.5W and 15W which are the wattages for a 4' and 2' fluorescent lamp. The verified base lamps were 4' - 18W LED.

Sample ID 305

Executive Summary

For the projects represented by sample ID 305, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 10,043 kWh, with an ex post peak demand reduction of 1.405 kW. The gross energy realization rate is 33%.

Project Description

The participant replaced existing lighting in retail building operating seven days per week. A trade ally replaced (375) linear LED lamps with new LED lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 1L LED to LED linear tube	367	367	18	13	4,966	1.06	30,094	9,659	32%
4' 1L LED to LED linear tube	8	8	18	9	4,966	1.06	656	383	58%
Total							30,750	10,043	33%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	30,750	10,043	33%	1.405
Total	30,750	10,043	33%	1.405

The ex post annual energy savings are 10,043 kWh, with an ex post peak demand reduction of 1.405 kW. The ex ante savings estimate utilized the deemed base wattage of 29.5W which is the wattage for a 4' fluorescent lamp. The verified base lamps were 4' - 18W LED.

Sample ID 306

Executive Summary

For the projects represented by sample ID 306, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 9,180 kWh, with an ex post peak demand reduction of 1.284 kW. The gross energy realization rate is 34%.

Project Description

The participant replaced existing lighting in retail building operating seven days per week. A trade ally replaced (327) linear LED lamps with new LED lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

<i>Measure</i>	<i>Quantity</i>		<i>Wattage</i>		<i>Annual Hours</i>	<i>Waste Heat Factor</i>	<i>Ex Ante Annual kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
	<i>Base</i>	<i>Efficient</i>	<i>Base</i>	<i>Efficient</i>					
4' 1L LED to LED linear tube	289	289	18	13	4,836	1.06	23,698	7,407	31%
4' 1L LED to LED linear tube	38	38	18	9	4,836	1.06	3,116	1,773	57%
Total							26,814	9,180	34%

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
Lighting	26,814	9,180	34%	1.284
Total	26,814	9,180	34%	1.284

The ex post annual energy savings are 9,180 kWh, with an ex post peak demand reduction of 1.284 kW. The ex ante savings estimate utilized the deemed base wattage of 29.5W fluorescent lamp. The verified base lamps were 4' - 18W LED.

Sample ID 307

Executive Summary

For the projects represented by sample ID 307, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 12,257 kWh, with an ex post peak demand reduction of 1.715 kW. The gross energy realization rate is 57%.

Project Description

The participant replaced existing lighting in retail building operating seven days per week. A trade ally replaced (264) linear LED lamps with new LED lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

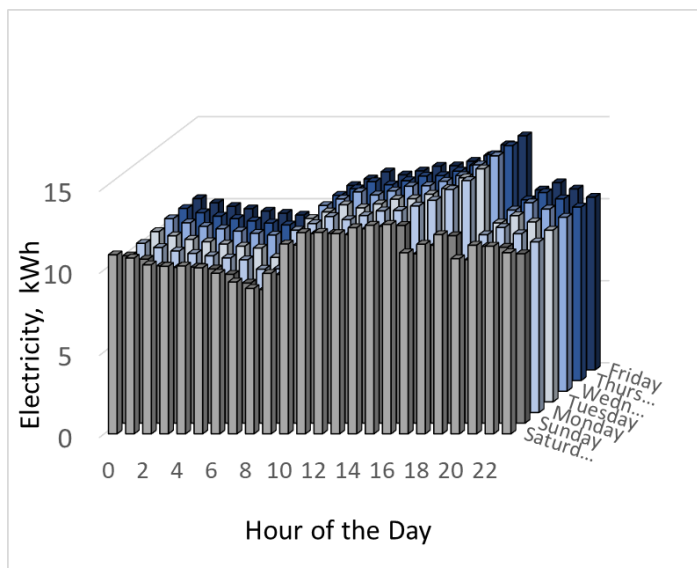
$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

Interval billing data spanning one year were modeled in conjunction with weather data to isolate the non-weather-dependent building load. The following figure illustrates the resulting hourly and daily energy usage, categorized by day of the week.



The modeled site hours align with the published operating hours for the retail store.

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
4' 1L LED to LED linear tube	264	264	18	13	8,760	1.06	21,648	12,257	57%
Total							21,648	12,257	57%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	21,648	12,257	57%	1.715
Total	21,648	12,257	57%	1.715

The ex post annual energy savings are 12,257 kWh, with an ex post peak demand reduction of 1.715 kW. The ex ante savings estimate utilized the deemed base wattage of 29.5W which is the wattage for a fluorescent lamp. The verified base lamp was an 18W LED lamp.

Sample ID 308

Executive Summary

For the projects represented by sample ID 308, the program participant received SBDI incentives from I&M to support lighting replacements.

The ex post annual energy savings totaled 2,512 kWh, with an ex post peak demand reduction of 0.351 kW. The gross energy realization rate is 84%.

Project Description

The participant replaced existing lighting in garage facility operating six days per week. A trade ally replaced (36) linear lamps with new LED lamps.

Measurement and Verification Effort

Qualus staff consolidated relevant project documents within the program implementer's SharePoint site and supplemented key parameters for estimating lighting savings with additional data sources. These included light fixture and lamp specifications such as wattage, lifetime, and lumens, obtained from manufacturer datasheets and the DLC Qualified Products List. Lighting hours of use were estimated using AMI interval billing data, modeled by hour and day of the week, and were further informed by follow-up emails with the site contact regarding lighting area-specific lighting usage. Verification of installed quantities was conducted through an interview with the site contact and a review of detailed project invoices. The HVAC equipment type for each usage area was identified to select the appropriate waste heat factors for the building type.

Lighting energy and demand savings were calculated using the algorithm from the Measure 4.5.4 *LED Bulbs and Fixtures*, in the 2023 Indiana Technical Reference Manual (TRM).

$$kWh_{savings} = \sum_{Area} \left[Hours \times (Qty_{base} \times W_{base} - Qty_{installed} \times W_{installed}) \times Whf_{kWh} / 1000 \frac{W}{kW} \right]$$

$$kW_{savings} = kWh_{savings} \times CDF_{measure\ type}$$

Where:

$kWh_{savings}$	= Annual energy savings
$kW_{savings}$	= Annual coincident peak demand savings
Qty	= Quantity of fixtures or lamps
W	= Wattage of each fixture or lamp
$Hours$	= Lighting annual operating hours
Whf	= Waste heat factor, Indiana TRM 2023 by building & HVAC type
CDF	= Demand factor, Indiana 2024-2025 CDF for EM&V by measure type

The variables for the energy savings algorithm are summarized in the following table.

Lighting Algorithm Inputs & Energy Savings

Measure	Quantity		Wattage		Annual Hours	Waste Heat Factor	Ex Ante Annual kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
	Base	Efficient	Base	Efficient					
8' 1L T8 to LED 8' linear lamp	36	36	56	32	2,860	1.00	2,987	2,512	84%
Total							2,987	2,512	84%

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
Lighting	2,987	2,512	84%	0.351
Total	2,987	2,512	84%	0.351

The ex post annual energy savings are 2,512 kWh, with an ex post peak demand reduction of 0.351 kW. The ex ante savings estimate utilized deemed hours of use (3,401) which is greater than the site hours (2,860).

Sample ID 400

Executive Summary

Under a project represented by sample ID 400, a program participant received SEM incentives from I&M for process improvements to their manufacturing process to reduce energy consumption.

The ex post annual energy savings were 377,952 kWh, with an ex post peak demand reduction of 43.15 kW. The gross realization rate for the project energy savings was 61%.

Project Description

The facility participates in the strategic Energy Management (SEM) program to track energy performance and forecast consumption with a statistical energy model. The program goal is to identify and implement no-cost and low cost operational, maintenance and behavioral changes to reduce electric energy consumption. The participant tracks operational changes, capital improvements and operating conditions in a workbook, including the CUSUM (cumulative sum) trend chart. Operational impacts were noted, adjustments completed and new measures were implemented. The ECMs implemented included shutdown procedure revisions, optimized compressed air dryers and maintenance work.

Measurement and Verification Effort

The SEM project documentation was collected along with interval billing data history. Prior year program project impacts were aggregated with the energy improvement implementation dates. The SEM team modeled the interval billing usage, weather data and production indicators. The savings were based on the difference of the predicted energy to the actual energy consumption.

$$kWh_{savings} = kWh_{predicted} - kWh_{actual}$$

$$kWh_{predicted} = \beta_0 + \beta_1 x Prod1 + \beta_2 x Prod2 + \beta_3 x HDD + \beta_4 x CDD$$

Where:

$kWh_{savings}$	= Energy model predicted energy – energy actual used
$kWh_{predicted}$	= Energy model linear regression
β_0	= Intercept; Value 7,800
$\beta_1 x Prod1$	= Production characteristic; β_1 is 0.3
$\beta_2 x Prod2$	= Production characteristic; β_2 is 0.3
$\beta_3 x HDD$	= Heating degree days; β_3 is 144
$\beta_4 x CDD$	= Cooling degree days; β_4 is 464

The ex ante and ex post savings's estimates were both based on the predicted linear regression equation from the billing periods of April 2022 to April 2024. The difference in savings are due to the evaluators task of verifying the first year energy savings. Also, contributing to the difference is the ex post savings excluded the incented project for compressed air leak reductions from 2024, having an effective useful life (EUL) of 3 years. All of the ECMs implemented in

2024 and 2024 (ID 1 to ID16) are included in the May25 to Nov25 post period range (the savings were extrapolated, as the period was not a full year).

Differences in Energy Model for Variable : Reporting Period & Air Leak Project

Post Period Range	Process/Project Numbers	Energy Savings (Predicted kWh – Actual kWh)	
		Ex Ante	Ex Post
May 2024 to April 2025	ID1 to ID9	196,341	N/A
May 2025 to November 2025	ID1 to ID9 ID10 to ID16	425,291	425,291
Air Leak Project	3 year EUL	0	-47,339
Total		621,632	377,952

Results

Gross Energy Impacts Summary

Measure Category	kWh Savings			Ex Post Gross kW Savings
	Ex Ante	Ex Post	Realization Rate	
SEM measures	621,632	377,952	61%	43.15
Total	621,632	377,952	61%	43.15

The ex post annual energy savings are 377,952 kWh, with an ex post peak demand reduction of 43.15 kW. The project energy savings gross realization rate is 61%. The ex ante and ex post savings estimate both were sourced from the energy modeling completed by the SEM team, based on local weather data, manufacturing production quantities and most of the associated projects incented by other I&M programs. The factors that resulted in the different estimates are:

- The evaluation task for first year energy savings precludes the double counting of savings from ECMs represented by ID1 to ID9.
- The incented air leak project savings reduced the predicted energy model as the project is out of the SEM program scope, already incentivized and has 3 year effective life.

Sample ID 401

Executive Summary

Under a project represented by sample ID 401, a program participant received SEM incentives from I&M for process improvements to their manufacturing process to reduce energy consumption.

The ex post annual energy savings were 156,482 kWh, with an ex post peak demand reduction of 17.86 kW. The gross realization rate for the project energy savings was 28%.

Project Description

The facility participates in the strategic Energy Management (SEM) program to track energy performance and forecast consumption with a statistical energy model. The program goal is to identify and implement no-cost and low cost operational, maintenance and behavioral changes to reduce electric energy consumption. The participant tracks operational changes, capital improvements and operating conditions in a workbook, including the CUSUM (cumulative sum) trend chart. Operational impacts were noted, adjustments completed and new measures were implemented. The ECMs implemented included installing engineered low flow air nozzles, controls programming for exhaust fans and SMART thermostats installed at two office locations.

Measurement and Verification Effort

The SEM project documentation was collected along with interval billing data history. Prior year program project impacts were aggregated with the energy improvement implementation dates. The SEM team modeled the interval billing usage, weather data and production indicators. The savings were based on the difference of the predicted energy to the actual energy consumption.

$$kWh_{savings} = kWh_{predicted} - kWh_{actual}$$

$$kWh_{predicted} = \beta_0 + \beta_1 x CP1 + \beta_2 x CP2 + \beta_3 x Prod3 + \beta_4 x CDD$$

Where:

$kWh_{savings}$	= Energy model predicted energy – energy actual used
$kWh_{predicted}$	=Energy model linear regression
β_0	= Intercept; Value 7,224
$\beta_1 x CP1_{flag}$	= Changepoint1 coefficient flag; β_1 is 2,360
$\beta_2 x CP2_{flag}$	= Changepoint2 coefficient flag; β_2 is -4,229
$\beta_3 x Prod3$	= Product characteristic3; β_3 is 0.46
$\beta_4 x CDD$	= Cooling degree days; β_4 is 336

After a new process oven was installed in 2024, the SEM team initiated a revision to the CUSUM trend chart to reduce the impact of the capital improvement to savings from the implementation of low-cost and no-cost measures. When an unplanned oven failure occurred, the old oven was put back in service, indicated in the table below for the utility billing period ending 8/31/2025, with a binary value of 1 for both the original CUSUM analysis (ex ante) and the ex post review.

Differences in Energy Model for Variable : $\beta_2 x CP2_{flag}$

<i>Date</i>	<i>New Oven Indicator Binary Flag Value</i>	
	<i>Ex Ante</i>	<i>Ex Post</i>
01/31/25	1	1
02/28/25	1	1
03/31/25	1	1
04/30/25	1	1
05/31/25	1	1
06/30/25	1	1
07/31/25	1	1
08/31/25	0	0
09/30/25	0	1
10/31/25	0	1
11/30/25	0	1

In the previous table, the ex ante and ex post values differed for the last 3 utility billing periods, when the new oven returned to service, but the older oven was inadvertently left in the warm-standby mode. The evaluation team did not agree with the continuation of the flag set to a value of zero, as the scenario of a the old oven with less productivity, constant speed exhaust fans did not approximate the conditions of the old oven offline, but left in warm-standby mode.

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
SEM measures	567,316	156,482	28%	17.86
Total	567,316	156,482	28%	17.86

The ex post annual energy savings are 156,482 kWh, with an ex post peak demand reduction of 17.86 kW. The project energy savings gross realization rate is 28%. The ex ante and ex post savings estimate both were sourced from the energy modeling completed by the SEM team, based on local weather data, manufacturing production quantities and associated projects incented by other I&M programs. The factors that resulted in the different estimates are:

- Usage of the changepoint flag for the new oven meets the conditions of a value of zero when the old oven is supporting production, but not when inadvertently left in warm standby model
- The changepoint flag β_2 with a value of -4,229 is impactful the predicted energy model. But has uncertainty in itself, as the regressed period included 18 periods with the old oven and 6 periods with the new oven. Recommendation for the SEM team is to identify periods without process changes to develop a model with less changepoints.

Sample ID 402

Executive Summary

Under a project represented by sample ID 403, a program participant received SEM incentives from I&M for process improvements to their manufacturing process to reduce energy consumption.

The ex post annual energy savings were 202,140 kWh, with an ex post peak demand reduction of 23.08 kW. The gross realization rate for the project energy savings was 100%.

Project Description

The facility participates in the strategic Energy Management (SEM) program to track energy performance and forecast consumption with a statistical energy model. The program goal is to identify and implement no-cost and low cost operational, maintenance and behavioral changes to reduce electric energy consumption. The participant tracks operational changes, capital improvements and operating conditions in a workbook, including the CUSUM (cumulative sum) trend chart. Operational impacts were noted, adjustments completed and new measures were implemented. The ECMs implemented included shutdown procedure revisions, optimized compressed air dryers and maintenance work.

Measurement and Verification Effort

The SEM project documentation was collected along with interval billing data history. Prior year program project impacts were aggregated with the energy improvement implementation dates. The review of tracking data, account numbers and the I&M meter list, identified that the tracking data is not correct. The interval data in the CUSUM workbook list two account numbers that are associated with the same company name, but a different address, different utility account. There were not any other incentivized projects completed at the revised site during the pre and post evaluation periods.

The SEM team modeled the interval billing usage, weather data and production indicators. The savings were based on the difference of the predicted energy to the actual energy consumption.

$$kWh_{savings} = kWh_{predicted} - kWh_{actual}$$

$$kWh_{predicted} = \beta_0 + \beta_1 x HDD$$

Where:

$kWh_{savings}$	= Energy model predicted energy – energy actual used
$kWh_{predicted}$	= Energy model linear regression
β_0	= Intercept; Value 3,29062

The ex ante and ex post savings's estimates were both based on the predicted linear regression equation from the billing periods of November 2022 to November 2023. There were no capital or

incentivized projects to exclude, when the evaluation boundary was shifted to the correct address and account number.

There were not any ECMs implemented the 2025, the savings are accumulated from the prior year, where the ECMs implemented include capturing radiant heat from nearby manufacturing stations to reduce the load on the radiant heat system.

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
SEM measures	202,140	202,140	100%	23.08
Total	202,140	202,140	100%	23.08

The ex post annual energy savings are 202,140 kWh, with an ex post peak demand reduction of 23.08 kW. The project energy savings gross realization rate is 100%. The ex ante and ex post savings estimate both were sourced from the energy modeling completed by the SEM team, based on local weather data, with savings accumulated from measures implemented in the prior program year.

Sample ID 403

Executive Summary

Under a project represented by sample ID 403, a program participant received SEM incentives from I&M for process improvements to their manufacturing process to reduce energy consumption.

The ex post annual energy savings were 76,863 kWh, with an ex post peak demand reduction of 34.88 kW. The gross realization rate for the project energy savings was 107%.

Project Description

The facility participates in the strategic Energy Management (SEM) program to track energy performance and forecast consumption with a statistical energy model. The program goal is to identify and implement no-cost and low cost operational, maintenance and behavioral changes to reduce electric energy consumption. The participant tracks operational changes, capital improvements and operating conditions in a workbook, including the CUSUM (cumulative sum) trend chart. Operational impacts were noted, adjustments completed and new measures were implemented. The primary ECM implemented was completing a chiller tuneup.

Measurement and Verification Effort

The SEM project documentation was collected along with interval billing data history. Prior year program project impacts were aggregated with the energy improvement implementation dates. The savings for both the ex ante method and ex post method were prescriptive, with the best fit MEMD database measure for chiller tuneup. As the chiller conditions the load from a manufacturing process, the HVAC systems for the MEMD Chiller Tuneup measure are not a complete match.

$$kWh_{savings} = \frac{kWh}{Ton} \times Tons_{chiller}$$

Where:

$kWh_{savings}$ = Energy savings

kWh/Ton =MEMD measure Chiller Tuneup – Heavy Industrial Building

$Tons_{chiller}$ = Chiller capacity, tons

Variable	Source	Ex Ante	Ex Post
Chiller Capacity, tons	Ex Ante: capacity of 2 chillers, 125 ton + 150 ton Ex Post: New chiller proposal load study for 12 production lines: 200 ton	265	200
Deemed Savings, kWh/ton	Both: Detroit Weather, Industrial Building Ex Post: largest value	271	384

In the previous table, the ex ante and ex post values differed for the chiller capacity. Although there is not an associated workpaper for the MEMD measure, Chiller Tune-up, TRM measures in general, do not have the specificity for a multi-chiller plant. The ex post savings was based on the trade ally study proposal for a new chiller, specifying the cooling load of 200 tons to support the twelve production lines in the facility. Also, the MEMD measures are binned to a space cooling HVAC type, based on a cooling load profile for outdoor air. The application for the process cooling has a load profile that exceeds space cooling. The largest deemed savings value, 384 kWh/ton, was the best fit, although it may underestimate the savings.

Results

Gross Energy Impacts Summary

<i>Measure Category</i>	<i>kWh Savings</i>			<i>Ex Post Gross kW Savings</i>
	<i>Ex Ante</i>	<i>Ex Post</i>	<i>Realization Rate</i>	
SEM - Chiller	71,942	76,863	107%	34.88
Total	71,942	76,863	107%	34.88

The ex post savings are 76,863 kWh and with a demand savings of 34.88 kW. The project energy savings gross realization rate is 107%. The ex ante and ex post savings estimate both were sourced from the MEMD measure, Chiller Tuneup for Detroit weather at an industrial building.

- The ex post savings considered the production line cooling capacity provided by the trade ally, instead of the full capacity of two chillers, which reduced the ex post estimate.
- The largest deemed savings value for the MEMD Chiller tuneup measure with same weather conditions and building type was selected to better approximate the process cooling load, as the measures were derived from space cooling loads. The higher savings per unit for this measure increased the ex post estimate.

3. C&I Participant Survey Instrument

Screening / background

1. Our records indicate that you are the main contact for the [FR_MEAS1] project completed at [LOCATION].
2. Were you involved in the decision to complete this project?
 1. Yes
 2. No
3. Could you provide the name and contact information of the person most knowledgeable about the decision to complete this project?

[Terminate if Q2 = 2]

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

5. 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 / CLEAResult
4. From an internet search
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

Onsite Energy Assessment

6. Did [PROGRAM TA/REPRESENTATIVE] complete an onsite energy evaluation or survey of your facility?

1. Yes
2. No

[Display IF Q6= 1]

7. Upon completion of your initial assessment, were there any energy efficiency measures recommended that you did not implement?
1. No, we implemented all of the recommended measures
 2. Yes, there were some recommended measures that we did not install
 98. Don't recall

[Display if Q7=2]

8. Which recommended measures did you **not** install? [Multiple response]
1. Lighting replacements
 2. Lighting controls
 3. HVAC measures
 4. Refrigeration measures
 5. Food service measures
 6. Compressed air measures
 7. Other measures not listed above (Please describe)
 98. Don't recall

[Display if Q7=2]

9. Why did you not install those recommended measures? [Multiple response]
1. High initial cost
 2. Identifying potential areas for improvement/lack of technical knowledge
 3. Other investments/improvements have higher funding priority
 4. Long payback period/return on investment
 5. Unaware of available incentives for energy efficient equipment
 6. Lack of corporate support for energy efficiency investments
 7. Lack of staff time to pursue energy efficiency upgrades
 8. Finding a contractor/vendor with which to work
 9. Confusion about who to contact for information or navigating the energy efficiency program offerings
 10. Completing the required paperwork to receive the incentive
 11. Don't own building
 12. Other, please specify [Anchor]

SBDI Trade Ally Experience

[Display Q10 IF SBDI = 1]

10. Using the scale below, please indicate how much you agree or disagree with the following statements regarding your experience with your SBDI Trade Ally:

[SCALE: 1 = 1 (Completely disagree), 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Completely agree), 98 = Not applicable]

[RANDOMIZE A – D]

- a) My SBDI Trade Ally's recommendations made sense for my business.
- b) My SBDI Trade Ally could answer my questions about the program.
- c) My SBDI Trade Ally could answer my questions about my project.
- d) I would recommend my SBDI Trade Ally as a contractor to consider.

[Display Q11 IF Q10a, Q10b, Q10c, or Q10d < 3]

11. What could your SBDI Trade Ally have done differently that would have improved your opinion of the service they provided?

Application Process and Project Completion

[Display Q12 IF SBDI = 0]

12. 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 Q13 IF Q12 = 1]

13. 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), 99 = Not applicable]

- a) the ease of finding the application on Indiana Michigan Power's website
- b) the ease of completing the application
- 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 Q14 IF Q13a-f) < 3]

14. How could the application process be improved?

[Display Q15 IF Q12 = 1]

15. 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 Q16 IF SBDI = 1]

16. 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 Q17 IF SBDI = 0]

17. 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

Energy Efficiency as a Service – Non-Participants

[Display section if EEaaS = 0 and STATE = IN]

18. I&M now offers a new program called Energy Efficiency-as-a-Service that provides efficiency improvements to commercial and industrial customers with zero upfront costs and immediate savings. I&M's partner, Allumia funds, installs, and maintains a complete upgrade and meters the actual savings achieved on a monthly basis. During the fixed contract term, the customer shares a percentage of the metered savings achieved to cover the cost of the program.

Before taking this survey, did you know that I&M offers this program?

- 1. Yes
- 2. No
- 98. Not sure

[Display if Q18 = 1]

19. Did you consider this service when you were planning your project?
- 1. Yes
 - 2. No

98. Not sure

[Display if Q19 = 1 or 2]

20. Why did you choose not to participate in Energy Efficiency-as-a-Service?

[Multiselect]

1. Concerns about sharing a percentage of savings with the program provider.
2. I prefer to handle energy efficiency improvements in-house.
3. Skepticism about the program's promised immediate savings.
4. Lack of trust in the program provider (Allumia funds).
5. Not interested in committing to a fixed-term contract.
6. I have financial constraints that prevent me from participating.
7. I find the zero upfront cost aspect too good to be true.
8. I had another financing option available
9. Other (please specify)

Energy Efficiency as a Service - Participants

[Display section if EEaaS = 1]

21. Our records say that you worked with I&M's Energy Efficiency as a Service Program. Through this program, Allumia provides design, financing, and implementation assistance.

Did your organization work with the Energy Efficiency as a Service Program?

1. Yes
2. No
98. Not sure

[Display if Q21 = 1]

22. Which aspect of the Energy Efficiency as a Service were the most important benefits to you when you were considering the service? Please select up to two options.

[Multiselect]

1. Project financing
2. Project management
3. The system maintenance provided
4. System design services
5. Installation services
6. Something else

[Display if Q23 = 6]

23. What was other benefit of the service that was important to you?

[Display if Q21 = 1]

24. How satisfied are you with the following aspects of the Energy Efficiency as a Service Program?

[SCALE: 1 = 1 (Very dissatisfied), 2 = 2, 3 = 3, 4 = 4, 5 = 5 (Very satisfied), 99 = Not applicable]

- a) The information you received on how the service works.
- b) The financing provided through the program.
- c) The process of installing the energy-saving equipment.
- d) The process of installing the metering system.
- e) The information you receive about the performance of the project.
- f) The impact on your electricity bill.

[Display if any in Q24 < 3]

25. What would have made you more satisfied with the Energy Efficiency as a Service Program?

Decision Making and Equipment Selection

26. 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 [LOCATION] 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 Q27 IF Q26 = 1 or 2]

27. 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 Q28 IF Q27= 2]

28. What payback period do you typically require to approve an efficiency project?

[Display Q29 IF Q27= 3]

29. What internal rate of return do you typically use to approve an efficiency project?
30. Before participating in the I&M program had you implemented any equipment or measure similar to the [FR_MEAS1] [INSTALLED_FR1] at the [LOCATION] location?
1. Yes
 2. No
 98. Don't know
31. When did you first learn about I&M's energy efficiency program? 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
32. Did you have plans to [INSTALL_FR1] the [FR_MEAS1] at the [LOCATION] location before participating in the program?
1. Yes
 2. No
 98. Don't know
- [Display Q33 IF Q32 = 1]
33. Prior to hearing about the program [FINANCING_INCENTIVE], was the purchase of the [FR_MEAS1] included in your organization's capital budget?
1. Yes
 2. No
 98. Don't know / Not applicable
- [Display Q34 IF Q32 = 1]
34. Had your organization ALREADY ordered or purchased the [FR_MEAS1] BEFORE you heard about the program?
1. Yes
 2. No
 98. Don't know
35. Did the program [FINANCING_INCENTIVE] help the [FR_MEAS1] project receive implementation approval from your organization?
1. Yes
 2. No

98. Don't know / Not applicable

36. 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

37. Did you have experience with I&M's energy efficiency programs before completing the [FR_MEAS1] project?

1. Yes

2. No

98. Don't know

[Display Q38 IF Q37 = 1]

38. How important was your previous experience with Indiana-Michigan-offered programs in making your decision to [INSTALL_FR1] the [FR_MEAS1] at the [LOCATION] location?

1. Very important

2. Somewhat important

3. Only slightly important

4. Not at all important

98. Don't know

[Display Q39 if Q6= 1]

39. Earlier you mentioned that [PROGRAM TA/REPRESENTATIVE] completed an onsite energy evaluation. Was the [FR_MEAS1] recommended through that onsite energy evaluation?

1. Yes

2. No

98. Don't know

[Display Q40 if Q39 = 1]

40. If the [FR_MEAS1] was not recommended as part of the onsite energy evaluation, 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

41. Would your organization have been financially able to [INSTALL_FR1] the [FR_MEAS1] at the [LOCATION] without the [FINANCING_INCENTIVE] from the program?

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

[Display Q42 if Q41 = 2]

42. To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program [FINANCING_INCENTIVE] was not available. Is that correct?

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

43. If the [FINANCING_INCENTIVE] from the program had not been available, how likely is it that you would have [INSTALLED_FR1] the [FR_MEAS1] at the [LOCATION] 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 if Q21 = 1]

44. How likely is it that you would have [INSTALLED_FR1] the [FR_MEAS1] if your organization had not received assistance with project design and implementation from Allumia through I&M's Energy Efficiency as a Service Program?

- 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 Q45 if Q41 = 2 and Q42 = 1 and Q32 = 1 and Q33 = 1]

45. 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 [FINANCING_INCENTIVE].

In your own words, can you explain the role that the financial incentive played in your decision to complete this project?

[Display Q46 IF MEASURE_QUANT > 1]

46. Did you install more [FR_MEAS1] because of the program?

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

[Display Q46 IF ENERGY_EQUIP = YES]

47. Did you install equipment that was more energy efficient because of the program?

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

[Display Q48 IF Q47 = 1]

48. What kind of equipment, if any, would you have installed if the program was not available?

- 1. [OPEN]
- 98. Don't know

49. Did you [INSTALL_FR1] the [FR_MEAS1] earlier than you otherwise would have because of program?

- 1. Yes
- 2. No, the program did not affect timing of project.
- 98. Don't know

[Display Q50 IF Q49= 1]

50. 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 Q51 IF MULTIPLE_MEASURE =1]

51. 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 MULTIPLE_MEASURE =1 Q51 = 2, REPEAT Q30 THROUGH Q50 WITH FR_MEAS2]

Spillover

[NOTE: THESE QUESTIONS SERVE TO COLLECT DATA TO QUANTIFY SPILLOVER EFFECTS FROM the INCENTIVE PROGRAMS AND DIRECT IMPACTS OF THE ENERGY ASSESSMENT TOOL]

52. 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 Q53 if Q52 = 1]

53. 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 Customer satisfaction]
98. Don't know

[Display Q54 if Q52= 1]

54. 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 SATISFACTION]]
8. Other (Please specify) [OPEN ENDED]
98. Don't know

[Display Q55 if Q52= 1]

55. 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

[Display Q56 IF Q52 = 1]

56. 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 Q57 IF Q56 = 19]

57. What other type of lighting equipment did you install?

[TEXT BOX] Lamps/Bulbs

[REPEAT Q58 - Q61 FOR EACH TYPE SELECTED IN Q56]

58. How many [Q56 RESPONSE] did you install?

[TEXT BOX] Watts

59. What was the average wattage of the [Q56 RESPONSE]?

60. Were the [Q56 RESPONSE] installed inside or outside?

- 1. Inside
- 2. Outside
- 3. Parking garage
- 98. Don't know

[Display Q61 IF Q60 = 1]

61. What type of building did you install the [Q56 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 Q62 IF Q60 = 1]

62. Is the inside space heated, cooled, or both?

- 1. Heated
- 2. Cooled
- 3. Both
- 98. Don't know

63. What type of lighting did the [Q56 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

64. What was the average wattage of the old lamps or bulbs?
65. How many of the old lamps or bulbs did you remove?

[Display Q66 if Q53 =1]

66. 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 Q67 if Q53 =1]

67. 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 Q68 if [Q66=0,1,2,3 AND Q67=0,1,2,3]

OR IF [Q66=8,9,10 AND Q67=8,9,10]

68. You scored the importance of your program experience to your decision to implement additional lighting measures with [Q66 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 [Q67 RESPONSE] out of 10 possible points.
69. Can you please explain the role the program made in your decision to implement this measure?

Lighting Controls

[Display Q70 IF Q53 = 2]

70. How many fixtures are being controlled by the lighting controls?

[Display Q71 IF Q53 = 2]

71. On average, how many lamps or bulbs does each fixture contain?

[Display Q72 IF Q53 = 2]

72. What is the average wattage of these lamps?

[Display Q73 IF Q53 = 2]

73. Are any of the lighting controls that you installed central time clock controls?

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

[Display Q74 IF Q73 = 1]

74. How many of the fixtures are controlled by the central time clock?

[Display Q75 IF Q53 = 2]

75. 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 Q76 IF Q53 = 2]

76. 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 Q77 if Q53 = 2]

77. 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 Q78 if [Q76=0,1,2,3 AND Q77=0,1,2,3]

OR [Q76=8,9,10 AND Q77=8,9,10]]

78. You scored the importance of your program experience to your decision to implement lighting controls with [Q76 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 [Q77 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

LED Exit Signs

[Display Q79 IF Q53 = 2]

79. Did you install single-sided or double-sided exit signs?

- 1. Single-sided
- 2. Double-sided
- 98. Don't know

[Display Q80 IF Q79 = 2]

80. How many double-sided LED exit signs did you install?

81. How many LED exit signs did you install?

82. 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

83. How important was your experience with the program in your decision to install LED exit signs?

[SCALE 0 "Not at all important" - 10 "Very important"]

- 98. Don't know

[Display Q84 if Q53 = 2]

84. If you had NOT participated in the program, how likely is it that your organization would still have installed LED exit signs?

[SCALE 0 "Definitely would not have installed" - 10 "Definitely would have installed"]

- 98. Don't know

[Display Q85 if {Q83=0,1,2,3 AND Q84=0,1,2,3}]

OR [Q83=8,9,10 AND Q84=8,9,10]]

85. You scored the importance of your program experience to your decision to implement lighting controls with [Q76 RESPONSE] out of 10 possible points. You ALSO scored the likelihood of implementing LED exit signs if your organization had not participated in the program with [Q77 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

HVAC Measures

[Display Q86 IF Q53 = 4]

86. 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 Q87 IF Q86 = 6]

87. What other type of HVAC equipment did you install?

[REPEAT Q88 – Q91 for each selected in Q86]

88. We would like to know more about the rated efficiency and number of units of the [Q86 RESPONSE](s) that you installed.
89. For each level of efficiency of the equipment you installed, please provide the rated efficiency and the number of units.
90. 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
91. What city is the building where you installed the heating/cooling equipment located in?
- [Display Q92 IF Q86 = 1-7]
92. 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 Q93 IF Q86 = 1-7]
93. 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 Q94 if [Q92=0,1,2,3 AND Q93=0,1,2,3] OR [Q92=8,9,10 AND Q93=8,9,10]]
94. You scored the importance of your program experience to your decision to implement energy efficient HVAC equipment with [Q92 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 [Q93 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?
- [Display Q95 IF Q53 = 4]
95. How many ENERGY STAR room air conditioners did you install?
- [Display Q96 IF Q53 = 4]
96. 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 Q97 IF Q53 = 4]

97. What city is the building where you installed the room air conditioners located in?

[Display Q98 IF Q53 = 4]

98. 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 Q99 IF Q53 = 4]

99. 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 Q100 if [Q98=0,1,2,3 AND Q99=0,1,2,3] OR [Q98=8,9,10 AND Q99=8,9,10]]

100. You scored the importance of your program experience to your decision to install the energy efficient air conditioners with [Q98 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 [Q99 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

Efficient Motors

[Display Q101 IF Q53 = 5]

101. How many efficient motors did you install?

[Display Q102 IF Q53 = 5]

102. 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]

[Display Q103 IF Q53 = 5]

103. 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 (%)

[Display Q104 IF Q53 = 5]

104. 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 Q105 IF Q53 = 5]

105. 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 Q106 IF Q53 = 5]

106. 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 Q107 if [Q105=0,1,2,3 AND Q106=0,1,2,3] OR [Q105=8,9,10 AND Q106=8,9,10]]

107. You scored the importance of your program experience to your decision to implement efficient motors with [Q105 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 [Q106 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

Commercial Refrigeration Equipment

[Display Q108 IF Q53 = 6]

108. 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 Q109 IF Q108 = 6]

109. What other type of energy efficient refrigeration equipment did you install?

[Display Q110 IF Q108 = 1]

110. How many ENERGY STAR commercial freezers did you install?

[Display Q111 IF Q110 = 1, REPEAT FOR EACH UP TO THREE TIMES]

111. What is the volume in cubic feet of the first freezer?

[Display Q112 IF Q110 = 1, REPEAT FOR EACH UP TO THREE TIMES]

112. Does this freezer have a solid door or a glass door?

- 1. Solid door
- 2. Glass door
- 98. Don't know

[Display Q113 IF Q110 = 1, REPEAT FOR EACH UP TO THREE TIMES]

113. Is this a vertical freezer or a chest type freezer?

- 1. Vertical
- 2. Chest
- 98. Don't know

[Display Q114 IF Q108 = 2]

114. How many ENERGY STAR commercial refrigerators did you install?

[TEXT BOX] refrigerators

[Display Q115 IF Q114 = 2, REPEAT FOR EACH UP TO THREE TIMES]

115. What is the volume in cubic feet of the first refrigerator?

[TEXT BOX] cubic feet

[Display Q116 IF Q114 = 2, REPEAT FOR EACH UP TO THREE TIMES]

116. Does this refrigerator have a solid door or a glass door?

- 1. Solid door
- 2. Glass door

98. Don't know

[Display Q117 IF Q114 = 2, REPEAT FOR EACH UP TO THREE TIMES]

117. Is this a vertical refrigerator or a chest type refrigerator?

- 1. Vertical
- 2. Chest
- 98. Don't know

[Display Q118 IF Q108 = 3]

118. 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 Q119 IF Q118= 1 OR 3]

119. How many humidity-based controls did you install?

[Display Q120 IF Q118= 1 OR 3]

120. What is the total number of freezer or refrigerator doors controlled by the humidity-based controls?

[Display Q121 IF Q118= 2 OR 3]

121. How many conductivity-based controls did you install?

[Display Q122 IF Q118= 2 OR 3]

122. What is the total number of freezer or refrigerator doors controlled by the conductivity-based controls?

[Display Q123 IF Q118 = 98]

123. How many anti-sweat heater controls did you install?

[Display Q124 IF Q118 = 98]

124. What is the total number of freezer or refrigerator doors controlled by the anti-sweat heater controls?

[Display Q125 IF Q108 = 4]

125. How many linear feet in total of LED case lighting did you install?

[Display Q126 IF Q108 = 5]

126. How many linear feet of refrigerated case covers did you install?

[Display Q127 if Q53=6]

127. 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 Q128 if Q53=6]

128. 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 Q129 if [Q127=0,1,2,3 AND Q128=0,1,2,3] AND [Q127=8,9,10 AND Q128=8,9,10]]

129. You scored the importance of your program experience to your decision to implement energy efficient refrigeration equipment with [Q127 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 [Q128 RESPONSE] out of 10 possible points. Can you please explain the role the program made in your decision to implement this measure?

Commercial Kitchen Equipment

[Display Q130 IF Q53 = 7]

130. 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 Q131 IF Q130 = 8]

131. What other type of kitchen equipment did you install?

[Display Q132 IF Q130 = 1]

132. 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 Q133 IF Q130 = 1]

133. How many pre-rinse spray valves with a flow rate equal to or less than 1.6 gallons per minute did you install?

[Display Q134 IF Q130 = 1]

134. Did you install the pre-rinse spray valves that the [LOCATION] location?

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

[Display Q135 IF Q134= 2]

135. In what city is the building where you installed the pre-rinse spray valves located in?

[Display Q136 IF Q130 = 2]

136. How many ENERGY STAR commercial fryers did you install?

[Display Q137 IF Q130 = 3]

137. 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 Q138 IF Q130 = 4]

138. How many ENERGY STAR hot food holding cabinets did you install?

[Display Q139 IF Q130 = 5]

139. How many ENERGY STAR commercial griddles did you install?

[Display Q140 IF Q130 = 6]

140. How many ENERGY STAR commercial convection ovens did you install?

[Display Q141 IF Q130 = 7]

141. How many ENERGY STAR commercial combination ovens did you install?

[Display Q142 if Q53= 1 and Q130=1-8]

142. 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 Q143 if Q53= 1 and Q130=1-8]

143. 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 Q144 if [Q142=0,1,2,3 AND Q143=0,1,2,3] OR [Q142=8,9,10 AND Q143=8,9,10]]

144. You scored the importance of your program experience to your decision to implement energy efficient kitchen equipment with [Q142 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 [Q143 RESPONSE] out of 10 possible points.

145. Can you please explain the role the program made in your decision to implement this measure?

Customer Satisfaction

146. 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)

147. 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)]

[A AND B FIRST, RANDOMIZE C - M, ASK N LAST]

- a) [Display IF Q146 = 1] How long it took program staff to address your questions or concerns
- b) [Display IF Q146 = 1] How thoroughly they addressed your questions or concerns
- c) [Display IF SBDI = 1] The amount of time between the onsite energy assessment and the installation of the equipment
- d) [Display IF SBDI = 1] The equipment that was installed
- e) [Display IF SBDI = 1 OR Q17 = 2,3,4] The quality of the installation
- f) [Display IF SBDI = 0] The steps you had to take to get through the program
- g) [Display IF SBDI = 0 and EEaaS = 0] The amount of time it took to get your rebate or incentive
- h) The range of equipment that qualifies for the program
- i) [Display IF SBDI = 1] How well your SBDI Trade Ally explained the program rules and processes
- j) The program overall

[Display Q148 IF ANY IN Q146 < 3]

- 148. Why were you dissatisfied with those parts of the program you mentioned?
- 149. If you could change one thing about the program, what would it be?
- 150. 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)]

Firmographic

- 151. 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
 - 99. Prefer not to state
- 152. Which best describes your facility located at [LOCATION]? Would you say this facility is...
 - 1. Your company's only location
 - 2. One of several locations owned by your company
 - 3. The headquarters location of a company with several locations
 - 98. Not sure
 - 99. Prefer not to state
- 153. About how many people work at this location?
 - 1. Less than 10
 - 2. 10 – 25
 - 3. 26 – 50
 - 4. 51 – 100
 - 5. 101- 250
 - 6. More than 250
 - 98. Not sure
 - 99. Prefer not to state
- 154. What is the total square footage of the interior space building located at [LOCATION]? If you are not sure of the total square footage, please provide your best guess.
- 155. 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. C&I Participant Survey Results

4.1. Work Prescriptive and Custom Survey Results

Q3 - Our records indicate that you are the main contact for the [Field-FR_MEAS_1] project completed at [Field-LOCATION]. Were you involved in the decision to complete this project?

#	Answer	%	Count
1	Yes	96.3%	26
2	No	3.7%	1
	Total	100%	27

Q5 - Has your organization completed a project that received incentives from Indiana Michigan Power before the project(s) you completed in [Field-YEAR]?

#	Answer	%	Count
1	Yes	65.4%	17
2	No	19.2%	5
3	Not sure	15.4%	4
	Total	100%	26

Q6 - 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	34.6%	9
2	From an Indiana Michigan Power Account Representative	11.5%	3
3	From a program representative	19.2%	5
4	From an internet search	3.8%	1
5	At an event/trade show	0.0%	0
6	Received an email blast or electronic newsletter	7.7%	2
7	Received an informational brochure	3.8%	1
8	From a program sponsored webinar	0.0%	0
9	From Indiana Michigan's website	3.8%	1
10	Friends or colleagues	3.8%	1
11	Some other way (please explain)	11.5%	3
98	Don't know	0.0%	0
	Total	100%	26

Q7 - Did [Field-PROGRAM%20TA_REPRESENTATIVE] complete an onsite energy evaluation or survey of your facility?

#	Answer	%	Count
1	Yes	53.8%	14
2	No	46.2%	12
	Total	100%	26

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Q8 - Upon completion of your initial assessment, were there any energy efficiency measures recommended that you did not implement?

#	Answer	%	Count
1	No, we implemented all of the recommended measures	71.4%	10
4	Yes, there were some recommended measures that we did not install	21.4%	3
5	Don't recall	7.1%	1
	Total	100%	14

Q9 - Which recommended measures did you not install?

#	Answer	%	Count
1	Lighting replacements	33.3%	1
4	Lighting controls	0.0%	0
5	HVAC measures	0.0%	0
6	Refrigeration measures	0.0%	0
7	Food service measures	33.3%	1
8	Compressed air measures	0.0%	0
9	Other measures not listed above (Please describe)	33.3%	1
10	Don't recall	33.3%	1
	Total	100%	3

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Q10 - Why did you not install those recommended measures?

#	Answer	%	Count
1	High initial cost	33.3%	1
4	Identifying potential areas for improvement/lack of technical knowledge	0.0%	0
5	Other investments/improvements have higher funding priority	0.0%	0
6	Long payback period/return on investment	0.0%	0
7	Unaware of available incentives for energy efficient equipment	0.0%	0
8	Lack of corporate support for energy efficiency investments	33.3%	1
9	Lack of staff time to pursue energy efficiency upgrades	33.3%	1
10	Finding a contractor/vendor with which to work	0.0%	0
11	Confusion about who to contact for information or navigating the energy efficiency program offerings	0.0%	0
13	Completing the required paperwork to receive the incentive	0.0%	0
14	Don't own building	0.0%	0
15	Other, please specify	0.0%	0
	Total	100%	3

Q13 - Which of the following people worked on completing your application for program incentives (including gathering required documentation)?

#	Answer	%	Count
1	Yourself	57.7%	15
2	Another member of your company	19.2%	5
3	A contractor	34.6%	9
4	An equipment vendor	3.8%	1
5	A designer or architect	0.0%	0
	Total	100%	26

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Q14 - Using a 5-point scale, where 1 means “completely unacceptable” and 5 means “completely acceptable,” how would you rate . . .

#	Question	Completely unacceptable	1	2	3	4	Completely acceptable	5	Not applicable	Total				
1	the ease of finding the application on Indiana Michigan Power's website	13.3%	2	6.7%	1	20.0%	3	6.7%	1	40.0%	6	13.3%	2	15
2	the ease of using the application portal on Indiana Michigan Power's website	13.3%	2	20.0%	3	6.7%	1	13.3%	2	33.3%	5	13.3%	2	15
3	the time it took to approve the application	13.3%	2	6.7%	1	20.0%	3	13.3%	2	40.0%	6	6.7%	1	15
4	the clarity of information on how to complete the application	6.7%	1	20.0%	3	20.0%	3	13.3%	2	33.3%	5	6.7%	1	15
5	the effort required to provide required invoices or other supporting documentation	6.7%	1	6.7%	1	20.0%	3	26.7%	4	33.3%	5	6.7%	1	15
6	the overall application process	6.7%	1	13.3%	2	33.3%	5	6.7%	1	33.3%	5	6.7%	1	15

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Q16 - Did you have a clear sense of whom you could go to for assistance with the application process?

#	Answer	%	Count
1	Yes	66.7%	10
2	No	26.7%	4
98	Don't know	6.7%	1
	Total	100%	15

Q18 - Who installed your program-qualified equipment or efficiency upgrades? Was it...

#	Answer	%	Count
1	Your own staff	32.0%	8
2	A contractor you've worked with before	48.0%	12
3	A contractor recommended by the Indiana Michigan program (registered trade ally)	8.0%	2
4	A new contractor that someone else recommended	4.0%	1
5	Someone else (Please specify)	4.0%	1
98	Don't know	4.0%	1
	Total	100%	25

Indiana C&I Portfolio 2025 EM&V

Q24 - 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.	15.4%	4
2	No. Our organization purchased significant energy efficient equipment and applied for an incentive.	26.9%	7
3	No significant energy efficient equipment was purchased by our organization.	34.6%	9
98	Don't know	23.1%	6
	Total	100%	26

Q25 - 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	36.4%	4
2	Simple payback	45.5%	5
3	Internal rate of return	36.4%	4
4	Life cycle cost	18.2%	2
5	We don't use any of these	18.2%	2
98	Don't know	18.2%	2
	Total	100%	11

Q28 - Before participating in the [Field-program_name] Program, had you implemented any equipment or measure similar to the [Field-FR_MEAS_1] [Field-IMPLEMENTED_1] at [Field-LOCATION]?

#	Answer	%	Count
1	Yes	38.5%	10
2	No	50.0%	13
98	Don't know	11.5%	3
	Total	100%	26

Q29 - 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_MEAS_1] project, including the efficiency level and the scope of the project?

#	Answer	%	Count
1	Before	73.1%	19
2	After	11.5%	3
98	Don't know	15.4%	4
	Total	100%	26

Q30 - Did you have plans to [Field-IMPLEMENT_1] the [Field-FR_MEAS_1] at [Field-LOCATION] before participating in the program?

#	Answer	%	Count
1	Yes	53.8%	14
2	No	42.3%	11
98	Don't know	3.8%	1
	Total	100%	26

Indiana C&I Portfolio 2025 EM&V

Q31 - Prior to hearing about the program [Field-FINANCING_INCENTIVE], was the purchase of the [Field-FR_MEAS_1] included in your organization's capital budget?

#	Answer	%	Count
1	Yes	35.7%	5
2	No	21.4%	3
98	Don't know / Not applicable	42.9%	6
	Total	100%	14

Q32 - Had your organization ALREADY ordered or purchased the [Field-FR_MEAS_1] BEFORE you heard about the program?

#	Answer	%	Count
1	Yes	28.6%	4
2	No	50.0%	7
98	Don't know	21.4%	3
	Total	100%	14

Q33 - Did the program [Field-FINANCING_INCENTIVE] help the [Field-FR_MEAS_1] project receive implementation approval from your organization?

#	Answer	%	Count
1	Yes	65.4%	17
2	No	11.5%	3
98	Don't know / Not applicable	23.1%	6
	Total	100%	26

Q34 - Would you have completed the [Field-FR_MEAS_1] project even if you had not participated in the program?

#	Answer	%	Count
1	Yes	38.5%	10
2	No	30.8%	8
98	Don't know	30.8%	8
	Total	100%	26

Q35 - Did you have experience with I&M's energy efficiency programs before completing the [Field-FR_MEAS_1] project?

#	Answer	%	Count
1	Yes	53.8%	14
2	No	38.5%	10
98	Don't know	7.7%	2
	Total	100%	26

Q36 - How important was your previous experience with Indiana-Michigan-offered programs in making your decision to [Field-IMPLEMENT_1] the [Field-FR_MEAS_1] at [Field-LOCATION]?

#	Answer	%	Count
1	Very important	57.1%	8
2	Somewhat important	14.3%	2
3	Only slightly important	7.1%	1
4	Not at all important	7.1%	1
98	Don't know	14.3%	2
	Total	100%	14

Indiana C&I Portfolio 2025 EM&V

Q37 - Earlier you mentioned that [Field-PROGRAM%20TA_REPRESENTATIVE] completed an onsite energy evaluation. Was the [Field-FR_MEAS_1] recommended through that onsite energy evaluation?

#	Answer	%	Count
1	Yes	78.6%	11
2	No	14.3%	2
98	Don't know	7.1%	1
	Total	100%	14

Q38 - If the [Field-FR_MEAS_1] was not recommended as part of the onsite energy evaluation, how likely is it that you would have [Field-IMPLEMENTED_1] it anyway?

#	Answer	%	Count
1	Definitely would have	18.2%	2
2	Probably would have	9.1%	1
3	Probably would not have	45.5%	5
4	Definitely would not have	18.2%	2
98	Don't know	9.1%	1
	Total	100%	11

Q39 - Would your organization have been financially able to [Field-IMPLEMENT_1] the [Field-FR_MEAS_1] at [Field-LOCATION] without the [Field-FINANCING_INCENTIVE] from the program?

#	Answer	%	Count
1	Yes	65.4%	17
2	No	11.5%	3
98	Don't know	23.1%	6
	Total	100%	26

Indiana C&I Portfolio 2025 EM&V

Q40 - To confirm, your organization would NOT have allocated the funds to complete a similar energy saving project if the program [Field-FINANCING_INCENTIVE] was not available. Is that correct?

#	Answer	%	Count
1	Yes	100.0%	3
2	No	0.0%	0
98	Don't know	0.0%	0
	Total	100%	3

Q41 - If the [Field-FINANCING_INCENTIVE] from the [Field-program_name] Program had not been available, how likely is it that you would have [Field-IMPLEMENTED_1] the [Field-FR_MEAS_1] at [Field-LOCATION] anyway?

#	Answer	%	Count
1	Definitely would have \${e://Field/IMPLEMENTED_1}	11.5%	3
2	Probably would have \${e://Field/IMPLEMENTED_1}	30.8%	8
3	Probably would not have \${e://Field/IMPLEMENTED_1}	38.5%	10
4	Definitely would not have \${e://Field/IMPLEMENTED_1}	11.5%	3
98	Don't know	7.7%	2
	Total	100%	26

Q42 - How likely is it that you would have [Field-IMPLEMENTED_1] the [Field-FR_MEAS_1] if your organization had not received assistance with project design and implementation from Allumia through I&M's Energy Efficiency as a Service Program?

#	Answer	%	Count
1	Definitely would have \${e://Field/IMPLEMENTED_1}	0.0%	0
2	Probably would have \${e://Field/IMPLEMENTED_1}	0.0%	0
3	Probably would not have \${e://Field/IMPLEMENTED_1}	0.0%	0
4	Definitely would not have \${e://Field/IMPLEMENTED_1}	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q44 - Did you install more [Field-FR_MEAS_1] because of the program?

#	Answer	%	Count
1	Yes	100.0%	1
2	No, program did not affect quantity purchased and installed.	0.0%	0
98	Don't know	0.0%	0
	Total	100%	1

Q45 - Did you install equipment that was more energy efficient because of the program?

#	Answer	%	Count
1	Yes	0.0%	0
2	No, program did not affect level of efficiency chosen for equipment.	50.0%	1
98	Don't know	50.0%	1
	Total	100%	2

Indiana C&I Portfolio 2025 EM&V

Q46 - What kind of equipment, if any, would you have installed if the program was not available?

#	Answer	%	Count
1	Please specify	0.0%	0
98	Don't know	0.0%	0
	Total		0

Q47 - Did you [Field-IMPLEMENT_1] the [Field-FR_MEAS_1] earlier than you otherwise would have without the program?

#	Answer	%	Count
1	Yes	34.6%	9
2	No, program did not affect timing of project.	46.2%	12
98	Don't know	19.2%	5
	Total	100%	26

Q48 - When would you otherwise have completed the project?

#	Answer	%	Count
1	Less than 6 months later	0.0%	0
2	6-12 months later	11.1%	1
3	1-2 years later	0.0%	0
4	3-5 years later	33.3%	3
5	More than 5 years later	11.1%	1
98	Don't know	44.4%	4
	Total	100%	9

Indiana C&I Portfolio 2025 EM&V

Q165 - 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	42.3%	11
2	No	57.7%	15
98	Don't know	0.0%	0
	Total	100%	26

Indiana C&I Portfolio 2025 EM&V

Q166 - Using the scale below, please rate how dissatisfied or satisfied you are with each of the following

#	Question	Very dissatisfied1		2		3		4		Very satisfied5		Don't know		Total
1	How long it took program staff to address your questions or concerns	9.1%	1	9.1%	1	18.2%	2	18.2%	2	45.5%	5	0.0%	0	11
2	How thoroughly they addressed your questions or concerns	0.0%	0	9.1%	1	9.1%	1	45.5%	5	36.4%	4	0.0%	0	11
5	The quality of the installation	0.0%	0	0.0%	0	0.0%	0	6.7%	1	73.3%	11	20.0%	3	15
6	The steps you had to take to get through the program	3.8%	1	0.0%	0	19.2%	5	15.4%	4	50.0%	13	11.5%	3	26
7	The amount of time it took to get your rebate or incent	11.5%	3	7.7%	2	3.8%	1	15.4%	4	38.5%	10	23.1%	6	26
8	The range of equipment that qualifies for incentives	0.0%	0	3.8%	1	7.7%	2	15.4%	4	57.7%	15	15.4%	4	26
10	The program overall	0.0%	0	3.8%	1	0.0%	0	26.9%	7	57.7%	15	11.5%	3	26

Q169 - Using the same scale, how dissatisfied or satisfied are you with I&M as your electricity service provider?

#	Answer	%	Count
1	Very dissatisfied1	0.0%	0
2	2	0.0%	0
3	3	7.7%	2
4	4	30.8%	8
5	Very satisfied5	53.8%	14
98	Don't know	7.7%	2
	Total	100%	26

Q170 - 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	73.1%	19
2	Own and rent to someone else	0.0%	0
3	Rent	15.4%	4
98	Don't know	11.5%	3
	Total	100%	26

Indiana C&I Portfolio 2025 EM&V

Q171 - Which best describes your facility located at [Field-LOCATION]? Would you say that this facility is...

#	Answer	%	Count
1	Your company's only location	36.0%	9
2	One of several locations owned by your company	52.0%	13
3	The headquarters location of a company with several locations	4.0%	1
4	Not sure	4.0%	1
5	Prefer not to state	4.0%	1
	Total	100%	25

Q172 - About how many people work at this location?

#	Answer	%	Count
1	Less than 10	24.0%	6
2	10 - 25	12.0%	3
3	26- 50	8.0%	2
4	51- 100	24.0%	6
5	101-250	12.0%	3
6	More than 250	4.0%	1
7	Not sure	12.0%	3
8	Prefer not to state	4.0%	1
	Total	100%	25

4.2. Small Business Direct Install Survey Results

Due to the limited number of survey responses (n =2), tabulated results are not presented to protect respondent confidentiality.

2025 Indiana Conservation Voltage Program EM&V Report

Prepared for:

Indiana Michigan Power

April 30, 2026

Prepared by:



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1. Introduction

This report addresses the measuring, verifying and evaluating of energy savings and demand reductions that resulted from the implementation by Indiana Michigan Power Company (I&M) in 2025 of its Conservation Voltage Program (CVR) Program. I&M implemented this program in conjunction with Utilidata, Inc.

1.1 Description of Program

Under ANSI Standard C84.1-2016 Electric Power Systems and Equipment, a utility system is to deliver electricity to end-users at a voltage within the range of 120 +/- 5% volts (i.e., 114 – 126). With the usual system design, customers close to a substation receive voltages closer to 126 volts and customers farther from the substation receive lower voltages. Voltage regulating equipment is applied as necessary to ensure the required minimum voltages are provided.

The CVR program is based on implementing Conservation Voltage Reduction (CVR), which is a process by which the utility systematically reduces voltages in its distribution network, resulting in a proportional reduction of load on the network. Because most devices operated by electricity (especially motors) are designed to operate most efficiently at 115 volts, any “excess” voltage is typically wasted, usually in the form of heat. Tighter voltage regulation allows end-use devices to operate more efficiently without any action on the part of consumers. Consumers receive a lower but still acceptable voltage and use less energy to accomplish the same tasks.

Voltage is controlled for the circuits at the substations using Utilidata’s AdaptiVolt Volt/VAR Optimization (VVO) platform. AdaptiVolt uses secure digital communications to implement a closed-loop control system. Using AdaptiVolt allows I&M to dispatch voltage-based demand control within seconds. The system measures end-of-line voltage and sends the voltage information back to the controller at the substation in real time.

Using the AdaptiVolt™ system, voltages are controlled for each of the three phases being distributed to the circuits served by the substation. Thus, the voltage for Phase A was the same for all three circuits, and similarly for Phases B and C.

1.2 Impact Evaluation Findings

Table 1-1 below presents the total aggregated annual gross and net energy (kWh) savings achieved by the CVR Program during PY2025.

Table 1-1. Summary of Ex Post PY2025 kWh Savings

<i>Ex Ante Annual kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Annual Gross kWh Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Annual Net kWh Savings</i>	<i>Net-to-Gross Ratio</i>
16,588,919	16,588,919	16,588,919	16,588,919	100%	16,588,919	100%

Table 1-2 presents the total gross and net peak demand (kW) impacts achieved by the CVR Program during PY2025.

Table 1-2. Summary of Ex Post PY2025 kW Peak Demand Impacts

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Net kW Savings</i>	<i>Net-to-Gross Ratio</i>
4,089.84	4,089.84	4,089.84	4,090	100%	4,089.84	100%

1.3 Organization of Report

This report is organized as follows:

- Chapter 2: Data Collection
- Chapter 3: Impact Evaluation Methods
- Chapter 4: Impact Evaluation Findings

2. Data Collection

The effects of voltage optimization for 2025 were analyzed using voltage and power data extracted from I&M’s SCADA system.

I&M and Utilidata used an “on/off” procedure for voltage reductions during various parts of 2025.¹ This procedure involves disengaging the CVR system during specified days to enable the provision of data sets with measurements of voltages and energy use that include both regular voltages (measured on “off” days, during which the CVR system is disengaged) and reduced voltages (measured on “on” days, during which the CVR system is engaged).

During 2025, data were collected for regulated source voltages by phase and power by circuit. Voltage and power were measured at 30 second intervals, giving 120 data-points per hour for each element. Voltages were measured at the substation level for three phases.

While CVR was initially engaged prior to 2025 for most circuits included in the analysis, the CVR system was initially engaged during 2025 for the circuits listed below in Table 2-1.

Table 2-1 Initial CVR System Engagement During 2025 by Circuit by Date

<i>Circuit ID</i>	<i>Date CVR System Initially Engaged</i>
Haymond-4098921	6/3/2025
Haymond-4098922	6/3/2025
Haymond-4098923	6/3/2025
Hillcrest-4929721	4/17/2025
Hillcrest-4929722	9/15/2025
Hillcrest-4929723	9/15/2025
Hillcrest-4929724	4/17/2025
Hillcrest-4929725	4/17/2025
LanternPark-4180221	6/10/2025
LanternPark-4180222	6/10/2025
LanternPark-4180223	6/10/2025
Mayfield-4930421	9/8/2025
Mayfield-4930422	9/8/2025
Mayfield-4930423	9/8/2025
Mississinewa-4517621	6/3/2025
Mississinewa-4517622	6/3/2025
RobisonPark-4050121	3/19/2025
RobisonPark-4050122	3/19/2025

¹ For discussion of “on / off” testing, see, for example, Pacific Northwest Regional Technical Forum, *Standard Protocol #1 for Automated CVR*, November 2011.

2025 Indiana CVR Program

<i>Circuit ID</i>	<i>Date CVR System Initially Engaged</i>
RobisonPark-4050123	3/19/2025
RobisonPark-4050124	3/19/2025
RobisonPark-4050125	3/19/2025
RobisonPark-4050126	3/19/2025
Summit-4937821	10/10/2025
Summit-4937822	10/10/2025
Summit-4937823	10/10/2025

Hourly temperature readings were available from the quality controlled local climatological data program of the National Climatic Data Center² for 2025 for the multiple weather stations selected based on proximity to the substations for which CVR is enabled. This temperature data was used for the analysis.

Table 2-2 shows the time during 2025 during which the CVR system was engaged, as well as associated average CVR factors and energy savings rate. Where CVR engagement rates were uniform across circuits, information is presented by station; otherwise, results are shown by group of circuits at a station with uniform CVR engagement rates.

Table 2-2 PY2025 CVR System Engagement, CVR Engaged State Energy Savings, and CVR Factors by Station

<i>Substation / Circuit Group</i>	<i>Average CVR Factor</i>	<i>Hours Engaged</i>	<i>Engaged State kWh Consumption</i>	<i>Engaged State kWh Savings</i>	<i>kWh Savings Rate</i>
Blaine	0.58	6,500	52,595,752	956,663	1.8%
Cleveland	0.52	2,849	23,786,588	198,336	0.8%
Daleville	0.75	2,203	20,011,782	220,192	1.1%
Decatur	0.92	14	184,031	6,695	3.6%
Dunlap	1.18	4,691	56,371,389	1,570,512	2.8%
EastSide (4093121, 4093122, 4093123)	0.50	1,671	12,974,166	261,170	2.0%
EastSide (4093124, 4093125, 4093126)	0.78	1,671	11,681,393	423,099	3.6%
Farmland	0.51	5,618	17,612,148	282,202	1.6%
Grabill	0.67	1,681	15,272,761	218,360	1.4%
Hacienda (4933521, 4933523, 4933524)	1.07	1,548	999,249	45,086	4.5%
Harper	0.59	1,827	14,600,505	236,838	1.6%
Haymond	0.40	2,462	20,717,623	315,041	1.5%
Hillcrest	0.60	1,440	17,274,054	501,119	2.9%
IllinoisRoad	0.60	5,214	39,001,661	876,463	2.2%

² For information on the QCLCD data, see <http://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/quality-controlled-local-climatological-data-qclcd>

2025 Indiana CVR Program

<i>Substation / Circuit Group</i>	<i>Average CVR Factor</i>	<i>Hours Engaged</i>	<i>Engaged State kWh Consumption</i>	<i>Engaged State kWh Savings</i>	<i>kWh Savings Rate</i>
Jay	0.63	8,224	42,367,238	145,606	0.3%
LanternPark	0.58	1,896	1,410,971	26,266	1.9%
Lincoln	0.65	2,023	30,822,248	305,579	1.0%
LusherAvenue (4094023, 4094024, 4094025, 4094026)	0.61	5,997	29,526,495	594,406	2.0%
Mackey (4535221, 4535225)	0.45	5,745	26,005,577	402,002	1.5%
Mackey (4535222, 4535223, 4535224)	0.39	6,806	57,637,773	660,094	1.1%
McKinley (4055921,4055922, 4055926)	0.55	1,609	19,700,453	215,479	1.1%
McKinley (4055923, 4055924, 4055925)	0.49	6,136	41,718,980	379,495	0.9%
Mississinewa	0.58	2,299	12,212,814	254,861	2.1%
Muessel	0.59	6,653	45,429,251	910,259	2.0%
Northland (4933421, 4933422, 4933423)	0.61	6,965	46,423,837	652,066	1.4%
Osolo (4058023, 4058025, 4058026)	0.95	2,234	18,311,466	165,644	0.9%
PettitAvenue	0.50	4,752	42,006,719	292,339	0.7%
RobisonPark	0.68	3,117	37,169,754	974,167	2.6%
SouthBend	0.76	7,470	73,792,890	1,630,915	2.2%
Southside (4094621, 4094622, 4094623, 4094624)	0.73	8,554	51,056,603	1,282,962	2.5%
Spyrun	0.64	3,634	14,524,192	494,244	3.4%
StateStreet	0.65	479	4,366,571	24,440	0.6%
Summit	0.58	433	6,784,866	131,843	1.9%
Trier	0.75	2,527	1,315,554	36,676	2.8%
Total			983,638,481	17,168,287	1.7%

3. Impact Evaluation Methods

This chapter discusses the method used for analysis of data to determine energy savings attributable to the CVR Program.

3.1 Determination of CVR Factors

CVR system data analysis was performed using Stata, a statistical software program used for data analysis, data management, and graphics. Stata code was used to analyze CVR data to assess the performance of the system based on the energy usage and voltage data across different time intervals and conditions.

The panel data is organized in a structured manner that represents multiple circuits of stations for which CVR is enabled. Circuit-level data is further broken down into its respective phases. This means for every single circuit in the dataset, there are three corresponding entries or groups – one for each phase of that circuit. Each circuit-phase combination (e.g., Circuit 1 - Phase A, Circuit 1 - Phase B, Circuit 1 - Phase C, and so forth) serves as an individual group within the panel, allowing for detailed analysis and comparison of CVR's performance across different circuits and their respective phases.

The raw data files contain circuit-phase-level 30-second time series data, including energy usage, voltage, and CVR operating status information. Three files are conveyed for each hour, with data for the various stations and circuits divided between the three files.

The data analysis is aimed at creation of two products facilitating calculation of energy savings:

- **Circuit-Phase Operational Report:** This comprehensive report provides circuit-phase-level insights, including voltage levels, power consumption, and the operating status of the CVR system for each circuit and its respective phase. It serves as a detailed snapshot of the system's operational history, with information presented for each month of system operation.
- **Regression Analysis Report:** This report presents the results of regression analyses performed on data samples. It provides detailed information on CVR factors and related data.

Regression analysis is used to relate circuit power data to month of year, day type (business day/non-business day), CVR operating state and weather. The regression model used is given in Equation 3-1 below.

Equation 3-1

$$kWh_i = \beta_0 + \beta_1 Engaged_j + \beta_2 CDH_i + \beta_3 HDH_i + \beta_4 Hour_i + \beta_5 Month_i + \beta_6 Day\_Type_i + e_i$$

Regression analysis model variables are described in Table 3-1.

Table 3-1. Regression Analysis Model Variables

<i>Variable Name</i>	<i>Variable Description</i>
kWh	Dependent variable; hourly power (kW).
Engaged	1 if CVR is engaged; otherwise 0.
CDH	MAX (Outdoor Temperature - 65°F, 0)
HDH	MAX (65°F - Outdoor Temperature, 0)
Hour * Day_Type	Group of dummy variables for hour of the day, by day type (business day, non-business day).
Month	Group of dummy variables for month.

For each circuit and phase, regression models using the specification in Equation 3-1 are estimated. Regression models are performed using a sample of data generated through pairing hourly observations occurring during CVR system engagement with hourly observations occurring during CVR system disengagement. Paired observations occurred during consecutive days of the same day type (business/non-business) and during the same hour of day. The approach to selection of paired observations is intended to minimize the impact of non-CVR-related variables impacting energy usage that are not otherwise controlled for by model independent variables.

The regression model reference a full year of data, when available. This full-year reference holds true not only for annual analyses, which have been presented in annual Energy Measurement & Verification (EM&V) reports, but also for any preliminary, mid-year investigations undertaken.

The value for β_1 estimated through the regression analysis captures the impact of CVR system engagement on circuit-level energy usage, controlling for month of year, weather, day type, and hour of day.

The results of the regression analyses and associated voltage reduction reflected in the regression data set are used to determine applicable conservation voltage reduction factor (*CVRf*) for each circuit and phase. A *CVRf* measures the relationship between changes in energy in response to changes in voltage effected under the operation of the CVR system. Mathematically, *CVRf* is calculated as the ratio between the percentage change in energy usage and the percentage change in voltage, as shown below in Equation 3-2.

Equation 3-2

$$CVRf = -(\beta_1 / (kWh_{engaged\_sample} + \beta_1)) / ((V_{idle\_sample} - V_{engaged\_sample}) / V_{idle\_sample})$$

Inputs to the calculation of *CVRf* are described in Table 3-2.

Table 3-2. CVRf Calculation Input Variables

<i>Variable Name</i>	<i>Variable Description</i>
β_1	Coefficient of <i>Engaged</i> variable of applicable circuit-phase regression analysis, which is the estimate of the change in energy usage associated with CVR system engagement.
kWh _{engaged_sample}	Average hourly kWh electric energy usage for the applicable circuit-phase when the CVR system is engaged, based on the selected sample of data used in the regression analysis.
V _{engaged_sample}	Average voltage for the applicable circuit-phase when the CVR system status is engaged, taken from the same data subset utilized for regression analysis.
V _{idle_sample}	Average voltage for the applicable circuit-phase when the CVR system status is idle, also derived from the data subset used for the regression analysis.

The Regression Analysis Report presents the results of the regression analyses performed for each circuit and phase. The CVR factors presented in the report are then referenced along with the system data presented in the Circuit-Phase Operational Report to estimate ex post energy savings. This is facilitated by estimating the applicable baseline energy usage ($kWh_{baseline\_pop}$) using Equation 3-3 shown below.

Equation 3-3

$$kWh_{baseline\_pop} = (kWh_{engaged\_pop} * V_{idle\_pop}) / (-CVRf * V_{idle\_pop} + CVRf * V_{engaged\_pop} + V_{idle\_pop})$$

Inputs to the calculation of CVRf are described in Table 3-2.

Table 3-3. Baseline Energy Usage Calculation Input Variables

<i>Variable Name</i>	<i>Variable Description</i>
<i>CVRf</i>	Applicable CVR factor calculated by using Equation 3-2.
kWh _{engaged_pop}	kWh electric energy usage for the applicable circuit-phase when the CVR system is engaged, based on the population of observations for the applicable circuit and phase.
V _{engaged_pop}	Average voltage for the applicable circuit-phase when the CVR system status is engaged, taken from the same population of observations.
V _{idle_pop}	Average voltage for the applicable circuit-phase when the CVR system status is idle, also derived from the population of observations.

The calculation of $kWh_{baseline\_pop}$ enables calculation of energy savings ($kWh_{savings}$) using Equation 3-4 shown below.

Equation 3-4

$$kWh_{savings} = kWh_{baseline\_pop} - kWh_{engaged\_pop}$$

3.2 Determination of Meta-Regression CVR Factors

The savings analyses described in section 3.1 are based on regression analyses performed over a data span of up to 365 days (“365-day regression analysis”). These regression models are designed to account for overall energy consumption by employing specific independent variables, including a dummy variable designed to discern the incremental impact of CVR system engagement on energy consumption. However, for certain circuits and phases, there may be marked energy consumption deviations caused by factors that are not accounted for by the model. Even with data sampling methodology outlined in section 3.1, unaccounted factors may still influence the results. Hence, there is a possibility that results derived from any specific 365-day data frame could be disproportionately influenced by distinct variables not considered in our model.

To mitigate the potential impact of unaccounted-for factors, we carried out a meta-analysis spanning multiple 365-day periods. This holistic approach aims to critically evaluate the integrity of our various models and subsequently establish refined CVR factors grounded in the comprehensive meta-review.

All 365-day regression analyses available over a 365 day period were included in the meta-regression analysis.

For each 365-day regression analysis, Equation 3-5 and Equation 3-6 were used to create data quality metric variable n_{norm} and f_{norm} , based on number of hourly observations and F-statistic, which measures model goodness of fit.

Equation 3-5

$$n_{norm} = (n_i - n_{min}) / (n_{max} - n_{min})$$

Equation 3-6

$$f_{norm} = (f_i - f_{min}) / (f_{max} - f_{min})$$

Table 3-4 describes the inputs to the calculation of n_{norm} and f_{norm} .

Table 3-4. Data Quality Score Input Variables

<i>Variable Name</i>	<i>Variable Description</i>
n_i	Number of hourly observations on which the applicable 365-day regression analysis is based.
n_{min}	Number of hourly observations for the 365-day regression analysis with the fewest observations, to be included in the meta-analysis for the applicable circuit and phase.
n_{max}	Number of hourly observations for the 365-day regression analysis with the most observations, to be included in the meta-analysis for the applicable circuit and phase.
f_i	F-statistic of the applicable 365-day regression analysis.
f_{min}	F-statistic for the 365-day regression analysis with the lowest F-statistic to be included in the meta-analysis for the applicable circuit and phase.
f_{max}	F-statistic for the 365-day regression analysis with the highest F-statistic to be included in the meta-analysis for the applicable circuit and phase.

The data quality metrics described by Equation 3-5 and Equation 3-6 were then referenced to create a score variable using Equation 3-7 shown below.

Equation 3-7

$$score = (n_{norm} + f_{norm}) / 2$$

Meta-regression analysis is then performed to generate preliminary meta-CVR factors for each circuit and phase based on the CVRf and score of the 365-day regression analyses included in the analysis, as shown in Equation 3-8.

Equation 3-8

$$CVRf_{meta\_preliminary} = \beta_0 + \beta_1 CVRf_i + \beta_2 Score_i + e_i$$

Using the coefficients from the regression model specified above, predicted $CVRf_{meta\_preliminary}$ values are generated for each observation included in the meta-analysis for the applicable circuit and phase. These preliminary meta-analysis CVR factors require further refinement.

Given the variability in the reliability and significance of different datasets, we calculate a weighted CVR factor. Each predicted $CVRf_{meta\_preliminary}$ is weighted by its associated *score*, ensuring that more reliable and significant datasets have a larger influence on the final updated CVR factor, and the final meta-regression CVR factor is calculated as the mean of the weighted predicted $CVRf_{meta\_preliminary}$ values as shown below in Equation 3-9.

Equation 3-9

$$CVRf_{meta} = \sum (CVRf_{meta\_preliminary,i} * Score_i) / \sum Score_i$$

The meta-analysis CVR factor is representative of the collective behavior across all datasets, with due consideration given to the characteristics of all the 365-day regression analyses.

Meta-analysis CVR factors were referenced to support calculation of PY2025 CVR Program energy savings.

3.3 Application of Meta-Regression CVR Factors for Circuits with Insufficient On/Off Observations

For several circuit groups with extended CVR engagement periods in 2025, the specified schedule for alternating system engagement and disengagement was not sufficiently applied. For this reason, for the applicable circuits, it was not possible to apply the analytical methods outlined in section 3.1 to determine CVR factors. Table 3-5 presents a list of circuits affected by this data limitation.

Table 3-5. Circuits with Insufficient Alternation Between System Engagement and Disengagement

<i>Circuit ID</i>	<i>Engaged State kWh Consumption</i>
Blaine-4098026	2,664,413
Blaine-4098027	12,296,268
Cleveland-4933322	8,972,573
Dunlap-4932721	11,047,066
Haymond-4098921	7,574,370
Haymond-4098923	8,280,912
Hillcrest-4929723	4,520,846
Hillcrest-4929725	1,287,712
Jay-4054321	15,989,196
Jay-4054322	26,378,042
LanternPark-4180221	418,661
LanternPark-4180222	430,016
LanternPark-4180223	562,295
Mckinley-4055921	8,857,870
Mississinewa-4517621	5,255,881
Mississinewa-4517622	6,956,933
Muessel-4103021	13,118,369
RobisonPark-4050123	723,168
Summit-4937821	1,515,671
Summit-4937822	1,240,126
Summit-4937823	4,029,069

To address this data limitation, the meta-regression CVR factors developed through the methods presented in section 3.2 were referenced to establish conservative CVR factors for these circuits.

The goal was to ensure that energy savings estimates remained methodologically sound while accounting for the lack of direct on/off observations.

The following steps were taken to derive the CVR factors for circuits with insufficient on/off engagement:

- Meta-regression CVR factors were compiled separately for each phase (A, B, and C).
- A weighted average CVR factor was computed, using each circuit's total kWh engaged as the weighting factor.
- To ensure the CVR factors applied to untested circuits were not overstated, a 95% confidence interval (CI) lower bound was calculated.
- The weighted standard deviation of meta-regression CVR factors was computed, and a t-distribution adjustment was applied to derive the lower bound of the 95% confidence interval.

The final assigned CVR factors applied to circuits in Table 3-5 were determined using the lower bound of the 95% confidence interval. The resulting CVR factors are presented in Table 3-6.

Table 3-6. CVR Factors for Circuits with Insufficient Alternation Between System Engagement and Disengagement

<i>Phase</i>	<i>CVR Factor</i>
A	0.52
B	0.63
C	0.59

3.4 Ex Post Savings Calculations

The meta-analysis CVR factors the system data presented in the Circuit-Phase Operational Report (described in section 3.1) were referenced to estimate ex post energy savings. This is facilitated by estimating the applicable average baseline energy usage ($kWh_{avg\_baseline}$) using Equation 3-10 shown below.

Equation 3-10

$$kWh_{avg\_baseline} = (kWh_{avg\_engaged} * V_{baseline}) / (-CVRf * V_{idle\_pop} + CVRf * V_{engaged} + V_{baseline})$$

Inputs to the calculation of CVRf are described in Table 3-7.

Table 3-7. Baseline Energy Usage Calculation Input Variables

<i>Variable Name</i>	<i>Variable Description</i>
CVRf	If available, use meta-analysis CVR factor calculated by using Equation 3-9; otherwise use CVR factor calculated by using Equation 3-2.

<i>Variable Name</i>	<i>Variable Description</i>
$kWh_{avg\_engaged}$	Average hourly kWh electric energy usage for the applicable circuit-phase when the CVR system status is engaged during the applicable year.
$V_{engaged}$	Average voltage for the applicable circuit-phase when the CVR system status is engaged during the applicable year.
$V_{baseline}$	Use average voltage when the CVR system status was idle, derived from the population of observations of the 365-day regression analyses associated with CVRf.

The calculation of $kWh_{avg\_baseline}$ enables calculation of the energy savings rate ($kWh_{savings\_rate}$) using Equation 3-11 shown below.

Equation 3-11

$$kWh_{savings\_rate} = (kWh_{avg\_baseline} - kWh_{avg\_engaged}) / kWh_{avg\_baseline}$$

To calculate ex post energy savings, the energy savings rate is factored by energy consumption during eligible operating periods. Eligible operating periods includes times when the CVR system is engaged and times when the CVR system is not engaged due to reasons beyond the utility's control.³ Eligible and ineligible operating periods are described in Table 3-8.

Table 3-8. Eligible and Ineligible Operating Periods

<i>Status</i>	<i>Description</i>	<i>Note</i>	<i>Category</i>
CVR Engaged	The CVR system is engaged.	N/A	Eligible
Test Schedule	Any time the system is disengaged due to employment of an on/off testing schedule.	If deemed CVR factors are not applicable, schedules are implemented that disengage the CVR system for approximately 18% of the year to support performance of impact evaluation.	Eligible
Feeder Outage	Any time the majority of a feeder is out due to any reason.	Feeder outages are typically not predictable or planned and are outside of I&M's control. They are an anomaly and are not certain to occur on the same feeder in subsequent years.	Eligible
Repair / Maintenance	Repair or maintenance work is performed on a CVR feeder causing CVR to be disabled.	Repair and maintenance of I&M's system is an operational necessity to provide customers with safe and reliable electric service. These events are not certain to occur on the same feeder in subsequent years.	Eligible

³ For an example of a similar CVR savings calculation provision, see 2023 Illinois Statewide Technical Reference Manual for Energy Efficiency, Version 11.0, Volume 4, p. 22-31 (Section 6.2.1 Voltage Optimization). Created in collaboration with the Illinois Energy Efficiency Stakeholder Advisory Group (SAG). Available at: <https://www.ilsag.info/wp-content/uploads/IL-TRM-Version-11.0-Volumes-1-4-Compiled-Final.pdf>.

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<i>Status</i>	<i>Description</i>	<i>Note</i>	<i>Category</i>
Switching	Dispatch disables CVR on the feeder for any necessary switching event.	I&M will perform switching for storms, outages, repair, maintenance, safety, and work to support new customer growth. These events are not certain to occur on the same feeder in subsequent years.	Eligible
Technology	A failure of the Information and/or Communication Technology which results in “all” CVR feeders being disabled simultaneously due to events outside of I&M’s control.	CVR is dependent upon third party infrastructure that I&M has no control over. Examples include the loss of the cellular communications network (AT&T and Verizon), the failure of the CVR software provided by the outside vendor, or a cyber event. Events of this nature are an anomaly and are not certain to occur year after year. This event is not predictable or planned and is outside of I&M’s control.	Eligible
Worldwide Pandemic / Orders by Civil Authorities	Repairs and maintenance may take longer due to limited crew availability or other restrictions/priorities.	Due to restrictions, repairs and maintenance may take longer. This reasonable delay is outside the control of I&M.	Eligible
Disaster Recovery (DR) Testing	I&M periodically performs Disaster Recovery testing on systems (AMI, ADMS, CVR, etc.) which could result in CVR disabling. Typically all CVR feeders would be affected during DR testing.	Disaster Recovery testing is necessary and critical to ensure that I&M can operate safely and effectively during an unforeseen event.	Ineligible
Server patching/issues	Anytime servers go down or patching takes place and the CVR system does not come back online due to servers not rebooting correctly.	Events of this nature are unavoidable, but should be addressed by I&M in a timely fashion. This should result in negligible impacts to energy savings.	Ineligible
Configuration Changes	Anytime CVR is disabled for making updates to the Orion, go-live testing, or to make changes on the system resulting in shutting down services.	Events of this nature are unavoidable, but should be addressed by I&M in a timely fashion. This should result in negligible impacts to energy savings.	Ineligible
CVR field hardware failures	The loss or failure of a voltage regulator control, LTC control, or switched capacitor control on a feeder.	Events of this nature are unavoidable, but should be addressed by I&M in a timely fashion. This should result in negligible impacts to energy savings.	Ineligible

<i>Status</i>	<i>Description</i>	<i>Note</i>	<i>Category</i>
Loss of communications	Anytime a device has a communications failure that would result in CVR disabling. This event does not include 3rd party cellular communications network (AT&T and Verizon) failures.	Events of this nature are unavoidable, but should be addressed by I&M in a timely fashion. This should result in negligible impacts to energy savings.	Ineligible

Ex post energy savings ($kWh_{savings}$) are calculated using Equation 3-12, where $kWh_{eligible}$ is the total electric energy consumption during the eligible operating periods.

Equation 3-12

$$kWh_{savings} = (kWh_{eligible} * (1 + kWh_{savings\_rate})) - kWh_{eligible}$$

Ex post peak demand savings ($kW_{savings}$) are calculated using Equation 3-13, where $kWh_{eligible\_peak}$ is the electric energy consumption during the eligible operating periods during the applicable peak period, and $hours_{peak}$ is the number of hours comprising the applicable peak period.

Equation 3-13

$$kW_{savings} = ((kWh_{eligible\_peak} * (1 + kWh_{savings\_rate})) - kWh_{eligible\_peak}) / hours_{peak}$$

4. Impact Evaluation Findings

This chapter presents the results from the analysis of data for the Indiana CVR program in 2025 to determine kWh savings and CVR factors associated with voltage reduction for the various circuits and phases.

4.1 Circuit/Phase-Level Energy Savings and CVR Factors T

For each circuit and phase, kWh savings and CVR factors were calculated. The percentage savings from reducing voltage was calculated and divided by the percentage reduction in voltage to determine the CVR factor. The resulting estimates of engaged state kWh savings and CVR factors for the various phases of the circuits and phases are reported by substation in Table 4-1 through Table 4-33.

Table 4-1 PY2025 Energy Savings and CVR Factors by Phase: Blaine Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Blaine-4098021	A	125.03	121.02	36,311	4,353,740	0.83%	0.26
	B	125.28	121.16	61,285	3,927,670	1.54%	0.47
	C	125.03	121.02	108,878	3,496,814	3.02%	0.94
	Total /Average	125.12	121.07	206,474	11,778,224	1.72%	0.53
Blaine-4098024	A	124.57	120.61	78,007	2,604,977	2.91%	0.92
	B	124.70	120.59	58,059	3,256,929	1.75%	0.53
	C	124.90	120.78	38,284	1,122,394	3.30%	1.00
	Total /Average	124.68	120.63	174,350	6,984,300	2.44%	0.75
Blaine-4098025	A	125.03	120.91	49,577	1,937,113	2.50%	0.76
	B	124.88	120.69	97,894	2,001,782	4.66%	1.39
	C	124.80	120.64	32,314	2,671,159	1.20%	0.36
	Total /Average	124.89	120.73	179,785	6,610,053	2.65%	0.80
Blaine-4098026	A	125.41	121.47	12,515	754,922	1.63%	0.52
	B	125.27	121.01	7,253	333,800	2.13%	0.63
	C	124.90	121.07	28,798	1,575,690	1.79%	0.59
	Total /Average	125.09	121.18	48,566	2,664,413	1.79%	0.57
Blaine-4098027	A	124.36	120.41	78,231	4,655,492	1.65%	0.52
	B	124.72	120.45	84,511	3,861,537	2.14%	0.63
	C	124.29	120.41	70,428	3,779,239	1.83%	0.59
	Total /Average	124.45	120.42	233,169	12,296,268	1.86%	0.57
Blaine-4098028	A	125.44	120.83	41,487	4,189,468	0.98%	0.27
	B	125.28	120.69	53,118	3,383,002	1.55%	0.42
	C	125.36	120.79	19,714	4,690,024	0.42%	0.11
	Total /Average	125.36	120.78	114,318	12,262,494	0.92%	0.25

Table 4-2 PY2025 Energy Savings and CVR Factors by Phase: Cleveland Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Cleveland-4933321	A	122.24	120.57	21,592	2,940,806	0.73%	0.53
	B	122.05	120.38	20,670	3,004,007	0.68%	0.50
	C	121.85	120.34	60,555	3,740,600	1.59%	1.29
	Total /Average	122.03	120.42	102,816	9,685,412	1.05%	0.80
Cleveland-4933322	A	122.10	120.57	19,525	2,962,997	0.65%	0.52
	B	121.81	120.41	21,181	2,927,623	0.72%	0.63
	C	121.92	120.50	21,295	3,081,953	0.69%	0.59
	Total /Average	121.95	120.49	62,001	8,972,573	0.69%	0.58
Cleveland-4933323	A	124.55	120.44	(1,993)	1,771,355	-0.11%	(0.03)
	B	124.94	120.55	23,394	1,998,751	1.16%	0.33
	C	125.72	121.20	12,117	1,358,497	0.88%	0.25
	Total /Average	125.01	120.68	33,518	5,128,603	0.65%	0.19

Table 4-3 PY2025 Energy Savings and CVR Factors by Phase: Daleville Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Daleville-4927921	A	125.24	123.72	22,093	3,263,031	0.67%	0.56
	B	126.09	124.47	25,664	2,265,242	1.12%	0.87
	C	126.07	124.16	65,528	3,720,287	1.73%	1.14
	Total /Average	125.78	124.08	113,285	9,248,559	1.21%	0.90
Daleville-4927922	A	125.24	123.74	5,833	855,086	0.68%	0.56
	B	126.06	124.47	8,688	1,266,196	0.68%	0.54
	C	126.09	124.17	6,880	987,269	0.69%	0.45
	Total /Average	125.84	124.17	21,401	3,108,551	0.68%	0.51
Daleville-4927923	A	125.28	123.76	18,920	2,018,620	0.93%	0.76
	B	126.10	124.50	35,238	2,834,051	1.23%	0.97
	C	126.09	124.20	31,350	2,802,001	1.11%	0.74
	Total /Average	125.88	124.19	85,507	7,654,672	1.10%	0.83

Table 4-4 PY2025 Energy Savings and CVR Factors by Phase: Decatur Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Decatur-4926421	A	123.81	118.97	560	28,147	1.95%	0.50
	B	123.81	118.95	906	33,516	2.63%	0.67
	C	123.99	119.07	988	27,870	3.42%	0.86
	Total /Average	123.87	118.99	2,455	89,533	2.67%	0.68
Decatur-4926422	A	125.10	120.28	546	13,616	3.86%	1.00
	B	124.51	119.63	521	15,203	3.31%	0.85
	C	124.20	119.19	798	19,866	3.86%	0.96
	Total /Average	124.55	119.63	1,866	48,685	3.69%	0.93
Decatur-4926423	A	124.36	119.25	649	15,175	4.10%	1.00
	B	124.28	118.85	751	13,596	5.24%	1.20
	C	124.30	118.88	974	17,043	5.41%	1.24
	Total /Average	124.31	118.99	2,374	45,813	4.93%	1.15

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Table 4-5 PY2025 Energy Savings and CVR Factors by Phase: Dunlap Circuits

Circuit ID	Phase	Baseline Voltage	Engaged State Voltage	Engaged State kWh Savings	Engaged State kWh Consumption	Percent Savings	CVR Factor
Dunlap-4932721	A	125.07	120.82	77,919	4,331,082	1.77%	0.52
	B	125.87	121.17	81,054	3,383,972	2.34%	0.63
	C	125.11	120.68	70,511	3,332,011	2.07%	0.59
	Total /Average	125.33	120.89	229,484	11,047,066	2.04%	0.57
Dunlap-4932722	A	125.38	121.29	54,785	2,341,446	2.29%	0.70
	B	124.87	120.76	103,031	3,147,800	3.17%	0.96
	C	124.78	120.73	166,697	4,167,445	3.85%	1.18
	Total /Average	124.96	120.88	324,512	9,656,692	3.25%	1.00
Dunlap-4932723	A	124.51	120.62	174,447	6,449,939	2.63%	0.84
	B	124.51	120.62	255,063	7,148,289	3.45%	1.10
	C	124.57	120.69	220,423	7,087,444	3.02%	0.97
	Total /Average	124.53	120.64	649,933	20,685,672	3.05%	0.98
Dunlap-4932724	A	125.14	120.73	30,186	1,119,552	2.63%	0.75
	B	125.08	121.30	27,551	1,126,906	2.39%	0.79
	C	125.12	120.77	46,284	958,004	4.61%	1.32
	Total /Average	125.11	120.94	104,021	3,204,463	3.14%	0.94
Dunlap-4932725	A	122.09	120.54	41,410	1,017,863	3.91%	3.09
	B	121.96	120.41	34,423	1,089,119	3.06%	2.41
	C	121.80	120.37	62,751	1,487,767	4.05%	3.45
	Total /Average	121.93	120.43	138,584	3,594,749	3.71%	3.02
Dunlap-4932726	A	124.36	120.95	9,820	2,520,204	0.39%	0.14
	B	123.29	120.47	30,061	2,911,573	1.02%	0.45
	C	124.26	120.85	84,097	2,750,971	2.97%	1.08
	Total /Average	123.95	120.75	123,979	8,182,747	1.49%	0.58

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Table 4-6 PY2025 Energy Savings and CVR Factors by Phase: EastSide Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
EastSide-4093121	A	125.05	120.76	11,776	808,028	1.44%	0.42
	B	125.14	120.05	16,712	779,175	2.10%	0.52
	C	125.34	120.15	16,674	770,378	2.12%	0.51
	Total /Average	125.17	120.32	45,162	2,357,581	1.88%	0.49
EastSide-4093122	A	125.06	120.76	24,617	1,909,023	1.27%	0.37
	B	125.15	120.05	36,736	1,547,006	2.32%	0.57
	C	125.35	120.14	30,066	1,611,000	1.83%	0.44
	Total /Average	125.18	120.35	91,419	5,067,029	1.77%	0.46
EastSide-4093123	A	125.03	120.74	25,948	1,810,250	1.41%	0.41
	B	125.12	120.02	53,896	1,780,656	2.94%	0.72
	C	125.33	120.13	44,744	1,958,649	2.23%	0.54
	Total /Average	125.16	120.29	124,589	5,549,556	2.20%	0.56
EastSide-4093124	A	125.24	120.01	61,006	1,433,815	4.08%	0.98
	B	125.30	119.95	67,212	1,481,412	4.34%	1.02
	C	125.34	119.91	64,283	1,438,681	4.28%	0.99
	Total /Average	125.29	119.95	192,502	4,353,909	4.23%	0.99
EastSide-4093125	A	125.26	120.03	53,946	1,408,704	3.69%	0.88
	B	125.33	119.97	55,911	1,520,093	3.55%	0.83
	C	125.37	119.93	61,593	1,600,849	3.70%	0.85
	Total /Average	125.32	119.98	171,451	4,529,646	3.65%	0.86
EastSide-4093126	A	125.31	120.09	11,639	827,641	1.39%	0.33
	B	125.33	119.99	23,359	972,123	2.35%	0.55
	C	125.41	119.99	24,149	998,074	2.36%	0.55
	Total /Average	125.35	120.02	59,147	2,797,838	2.07%	0.49

Table 4-7 PY2025 Energy Savings and CVR Factors by Phase: Farmland Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Farmland-4927321	A	125.06	120.62	53,446	2,816,512	1.86%	0.52
	B	125.09	121.22	24,255	2,311,603	1.04%	0.34
	C	125.16	121.35	42,115	2,328,785	1.78%	0.58
	Total /Average	125.10	121.04	119,816	7,456,900	1.58%	0.49
Farmland-4927322	A	125.10	120.68	9,164	506,461	1.78%	0.50
	B	125.10	121.22	7,138	410,456	1.71%	0.55
	C	125.18	121.38	14,574	715,282	2.00%	0.66
	Total /Average	125.14	121.12	30,876	1,632,198	1.86%	0.58
Farmland-4927323	A	125.07	120.65	57,438	2,233,087	2.51%	0.71
	B	125.11	121.25	45,485	3,226,211	1.39%	0.45
	C	125.19	121.39	28,588	3,063,752	0.92%	0.30
	Total /Average	125.13	121.15	131,510	8,523,050	1.52%	0.48

Table 4-8 PY2025 Energy Savings and CVR Factors by Phase: Grabill Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Grabill-4935221	A	124.34	122.00	11,383	1,328,832	0.85%	0.45
	B	124.60	121.79	15,906	1,037,140	1.51%	0.67
	C	125.36	122.91	19,618	1,545,522	1.25%	0.64
	Total /Average	124.81	122.30	46,907	3,911,494	1.18%	0.59
Grabill-4935222	A	124.36	122.00	43,114	2,644,165	1.60%	0.85
	B	124.59	121.76	52,597	3,102,508	1.67%	0.74
	C	125.35	122.89	33,809	2,542,780	1.31%	0.67
	Total /Average	124.75	122.19	129,520	8,289,453	1.54%	0.75
Grabill-4935223	A	124.44	122.11	10,358	811,726	1.26%	0.67
	B	124.68	121.87	9,622	1,080,034	0.88%	0.39
	C	125.44	123.00	21,953	1,180,055	1.83%	0.94
	Total /Average	124.91	122.37	41,933	3,071,814	1.35%	0.66

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Table 4-9 PY2025 Energy Savings and CVR Factors by Phase: Hacienda Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Hacienda-4933521	A	125.15	120.54	4,987	126,507	3.79%	1.03
	B	125.32	120.16	7,304	157,547	4.43%	1.08
	C	125.15	119.63	4,391	91,983	4.56%	1.03
	Total /Average	125.22	120.16	16,682	376,038	4.25%	1.05
Hacienda-4933523	A	125.12	120.51	4,563	127,338	3.46%	0.94
	B	125.30	120.13	4,697	103,982	4.32%	1.05
	C	125.13	119.59	4,809	95,370	4.80%	1.08
	Total /Average	125.18	120.12	14,069	326,690	4.13%	1.02
Hacienda-4933524	A	125.14	120.53	5,134	112,554	4.36%	1.18
	B	125.30	120.13	4,588	96,230	4.55%	1.10
	C	125.14	119.61	4,613	87,737	5.00%	1.13
	Total /Average	125.19	120.13	14,336	296,521	4.61%	1.14

Table 4-10 PY2025 Energy Savings and CVR Factors by Phase: Harper Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Harper-4928821	A	123.73	120.39	25,229	2,273,504	1.10%	0.41
	B	124.48	120.86	45,879	2,076,417	2.16%	0.74
	C	124.25	121.10	33,405	2,456,885	1.34%	0.53
	Total /Average	124.15	120.79	104,513	6,806,806	1.51%	0.56
Harper-4928822	A	123.72	120.37	36,547	1,971,578	1.82%	0.67
	B	124.46	120.84	56,172	3,068,231	1.80%	0.62
	C	124.27	121.10	39,605	2,753,889	1.42%	0.56
	Total /Average	124.21	120.81	132,325	7,793,699	1.67%	0.61

Table 4-11 PY2025 Energy Savings and CVR Factors by Phase: Haymond Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Haymond-4098921	A	124.88	120.72	40,186	2,282,802	1.73%	0.52
	B	124.30	120.39	55,502	2,756,182	1.97%	0.63
	C	125.06	120.91	50,292	2,535,386	1.95%	0.59
	Total /Average	124.73	120.66	145,980	7,574,370	1.89%	0.58
Haymond-4098922	A	125.21	120.96	4,955	2,028,706	0.24%	0.07
	B	125.29	121.23	6,717	1,372,164	0.49%	0.15
	C	125.43	121.01	(3,982)	1,461,471	-0.27%	(0.08)
	Total /Average	125.30	121.05	7,690	4,862,341	0.16%	0.05
Haymond-4098923	A	125.24	121.03	52,522	2,947,427	1.75%	0.52
	B	125.39	121.43	52,219	2,591,287	1.98%	0.63
	C	125.39	121.06	56,631	2,742,198	2.02%	0.59
	Total /Average	125.34	121.17	161,372	8,280,912	1.91%	0.57

Table 4-12 PY2025 Energy Savings and CVR Factors by Phase: Hillcrest Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Hillcrest-4929721	A	123.36	118.70	10,580	382,666	2.69%	0.71
	B	123.99	119.42	9,011	368,924	2.38%	0.65
	C	125.26	120.45	4,704	366,140	1.27%	0.33
	Total /Average	124.19	119.51	24,296	1,117,730	2.13%	0.57
Hillcrest-4929722	A	123.23	118.62	102,637	2,573,633	3.84%	1.02
	B	123.77	119.22	109,568	2,429,104	4.32%	1.17
	C	124.53	119.98	115,389	2,646,896	4.18%	1.14
	Total /Average	123.85	119.28	327,594	7,649,633	4.11%	1.11
Hillcrest-4929723	A	123.02	118.52	28,175	1,455,171	1.90%	0.52
	B	122.90	118.61	34,247	1,532,035	2.19%	0.63
	C	124.72	120.23	33,056	1,533,641	2.11%	0.59
	Total /Average	123.56	119.13	95,478	4,520,846	2.07%	0.58
Hillcrest-4929724	A	125.37	118.76	14,208	983,209	1.42%	0.27
	B	125.31	118.73	13,463	908,187	1.46%	0.28
	C	125.35	118.73	(1,099)	806,736	-0.14%	(0.03)
	Total /Average	125.34	118.74	26,572	2,698,133	0.98%	0.19
Hillcrest-4929725	A	123.30	118.91	8,528	451,515	1.85%	0.52
	B	123.91	119.59	9,793	439,344	2.18%	0.63
	C	125.30	120.63	8,859	396,852	2.18%	0.59
	Total /Average	124.12	119.67	27,179	1,287,712	2.07%	0.58

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Table 4-13 PY2025 Energy Savings and CVR Factors by Phase: Illinois Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
IllinoisRoad-4510721	A	124.94	120.41	93,288	4,145,776	2.20%	0.61
	B	125.13	120.43	108,815	4,101,929	2.58%	0.69
	C	124.69	120.37	94,105	4,108,777	2.24%	0.65
	Total /Average	124.92	120.40	296,207	12,356,482	2.34%	0.65
IllinoisRoad-4510722	A	125.74	121.39	88,061	4,619,549	1.87%	0.54
	B	125.37	120.77	131,213	5,549,536	2.31%	0.63
	C	126.28	121.60	140,863	4,959,372	2.76%	0.75
	Total /Average	125.78	121.23	360,137	15,128,458	2.33%	0.64
IllinoisRoad-4510723	A	124.84	120.33	69,751	3,150,791	2.17%	0.60
	B	125.14	120.59	71,162	4,421,419	1.58%	0.44
	C	125.21	120.54	79,205	3,944,512	1.97%	0.53
	Total /Average	125.08	120.50	220,118	11,516,721	1.88%	0.51

Table 4-14 PY2025 Energy Savings and CVR Factors by Phase: Jay Circuit

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Jay-4054321	A	123.87	124.55	(15,221)	5,326,584	-0.29%	0.52
	B	123.44	122.35	31,026	5,552,390	0.56%	0.63
	C	123.66	122.20	35,682	5,110,221	0.69%	0.59
	Total /Average	123.65	123.03	51,487	15,989,196	0.32%	0.64
Jay-4054322	A	123.86	124.54	(22,354)	7,854,225	-0.29%	0.52
	B	123.43	122.34	49,833	8,950,337	0.55%	0.63
	C	123.64	122.18	66,640	9,573,480	0.69%	0.59
	Total /Average	123.63	122.94	94,119	26,378,042	0.36%	0.63

Table 4-15 PY2025 Energy Savings and CVR Factors by Phase: Lincoln Circuit

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Lincoln-4051821	A	123.72	121.92	10,026	4,415,384	0.23%	0.16
	B	123.80	121.81	18,273	4,271,651	0.43%	0.27
	C	122.84	121.08	10,466	4,143,669	0.25%	0.18
	Total /Average	123.46	121.61	38,764	12,830,704	0.30%	0.20
Lincoln-4051822	A	122.14	120.41	56,422	3,635,118	1.53%	1.08
	B	122.14	120.41	48,181	3,488,488	1.36%	0.96
	C	124.34	121.84	90,201	3,588,358	2.45%	1.22
	Total /Average	122.88	120.89	194,804	10,711,965	1.79%	1.10
Lincoln-4051824	A	123.88	122.39	11,422	2,343,328	0.49%	0.40
	B	123.99	121.78	35,616	2,367,415	1.48%	0.83
	C	124.04	122.07	24,972	2,568,836	0.96%	0.60
	Total /Average	123.97	122.08	72,010	7,279,579	0.98%	0.64

Table 4-16 PY2025 Energy Savings and CVR Factors by Phase: Lantern Park Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
LanternPark-4180222	A	125.84	120.85	2,926	138,894	2.06%	0.52
	B	124.91	119.56	3,417	124,127	2.68%	0.63
	C	125.17	119.02	4,944	166,995	2.88%	0.59
	Total /Average	125.31	119.77	11,287	430,016	2.56%	0.58
LanternPark-4180223	A	124.00	118.39	4,691	194,900	2.35%	0.52
	B	124.91	118.56	6,235	189,921	3.18%	0.63
	C	123.37	118.67	4,052	177,474	2.23%	0.59
	Total /Average	124.11	118.54	14,978	562,295	2.59%	0.58

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Table 4-17 PY2025 Energy Savings and CVR Factors by Phase: Lincoln Circuits

Circuit ID	Phase	Baseline Voltage	Engaged State Voltage	Engaged State kWh Savings	Engaged State kWh Consumption	Percent Savings	CVR Factor
Lincoln-4051821	A	123.72	121.92	10,026	4,415,384	0.23%	0.16
	B	123.80	121.81	18,273	4,271,651	0.43%	0.27
	C	122.84	121.08	10,466	4,143,669	0.25%	0.18
	Total /Average	123.46	121.61	38,764	12,830,704	0.30%	0.20
Lincoln-4051822	A	122.14	120.41	56,422	3,635,118	1.53%	1.08
	B	122.14	120.41	48,181	3,488,488	1.36%	0.96
	C	124.34	121.84	90,201	3,588,358	2.45%	1.22
	Total /Average	122.88	120.89	194,804	10,711,965	1.79%	1.10
Lincoln-4051824	A	123.88	122.39	11,422	2,343,328	0.49%	0.40
	B	123.99	121.78	35,616	2,367,415	1.48%	0.83
	C	124.04	122.07	24,972	2,568,836	0.96%	0.60
	Total /Average	123.97	122.08	72,010	7,279,579	0.98%	0.64

Table 4-18 PY2025 Energy Savings and CVR Factors by Phase: Lusher Circuits

Circuit ID	Phase	Baseline Voltage	Engaged State Voltage	Engaged State kWh Savings	Engaged State kWh Consumption	Percent Savings	CVR Factor
LusherAvenue-4094023	A	124.98	121.20	26,661	1,882,004	1.40%	0.46
	B	124.81	120.70	40,088	2,667,321	1.48%	0.45
	C	125.08	120.87	48,732	2,255,068	2.12%	0.63
	Total /Average	124.95	120.89	115,481	6,804,393	1.67%	0.51
LusherAvenue-4094024	A	125.17	121.48	57,173	3,334,685	1.69%	0.57
	B	125.23	121.14	92,227	3,772,671	2.39%	0.73
	C	125.28	121.16	52,254	2,149,405	2.37%	0.72
	Total /Average	125.22	121.27	201,654	9,256,761	2.13%	0.68
LusherAvenue-4094025	A	124.12	120.41	88,860	4,335,175	2.01%	0.67
	B	124.45	120.45	94,123	4,917,946	1.88%	0.58
	C	124.58	120.42	94,287	4,212,220	2.19%	0.66
	Total /Average	124.38	120.43	277,271	13,465,341	2.02%	0.63

Table 4-19 PY2025 Energy Savings and CVR Factors by Phase: Mackey Circuits

Circuit ID	Phase	Baseline Voltage	Engaged State Voltage	Engaged State kWh Savings	Engaged State kWh Consumption	Percent Savings	CVR Factor
Mackey-4535221	A	124.67	121.16	94,663	6,044,392	1.54%	0.55
	B	125.68	121.78	176,924	5,787,746	2.97%	0.96
	C	124.75	121.19	70,606	6,162,664	1.13%	0.40
	Total /Average	125.02	121.37	342,193	17,994,802	1.87%	0.64
Mackey-4535222	A	124.94	121.09	60,161	6,501,305	0.92%	0.30
	B	125.12	121.21	109,066	5,966,694	1.80%	0.57
	C	125.12	121.17	106,602	6,669,791	1.57%	0.50
	Total /Average	125.06	121.16	275,829	19,137,791	1.42%	0.46
Mackey-4535223	A	124.53	120.59	(710)	8,944,205	-0.01%	(0.00)
	B	124.78	120.72	143,230	8,486,821	1.66%	0.51
	C	124.85	120.77	28,461	8,341,291	0.34%	0.10
	Total /Average	124.72	120.69	170,982	25,772,317	0.66%	0.20
Mackey-4535224	A	125.04	121.06	58,147	4,141,662	1.38%	0.43
	B	125.31	121.19	84,184	4,299,629	1.92%	0.58
	C	125.13	120.96	70,953	4,286,374	1.63%	0.49
	Total /Average	125.16	121.07	213,283	12,727,664	1.65%	0.50
Mackey-4535225	A	124.73	121.38	8,365	2,547,710	0.33%	0.12
	B	125.06	121.57	41,090	2,888,169	1.40%	0.50
	C	124.65	121.24	10,354	2,574,896	0.40%	0.15
	Total /Average	124.82	121.40	59,809	8,010,775	0.74%	0.27

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Table 4-20 PY2025 Energy Savings and CVR Factors by Phase: McKinley Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Mckinley-4055921	A	125.00	121.75	37,912	2,768,120	1.35%	0.52
	B	125.26	122.27	44,000	2,903,937	1.49%	0.63
	C	125.37	123.21	32,615	3,185,813	1.01%	0.59
	Total /Average	125.22	122.45	114,527	8,857,870	1.28%	0.58
Mckinley-4055922	A	125.01	121.76	29,657	1,335,465	2.17%	0.84
	B	125.28	122.29	28,321	1,214,059	2.28%	0.96
	C	125.45	123.28	18,578	1,046,873	1.74%	1.01
	Total /Average	125.23	122.38	76,556	3,596,397	2.08%	0.92
Mckinley-4055923	A	123.42	120.95	36,972	2,336,247	1.56%	0.78
	B	123.35	120.74	28,979	1,846,048	1.55%	0.73
	C	123.39	121.05	19,529	1,762,634	1.10%	0.58
	Total /Average	123.39	120.92	85,480	5,944,929	1.42%	0.71
Mckinley-4055924	A	123.38	120.92	64,975	7,111,962	0.91%	0.45
	B	123.30	120.68	101,198	6,749,169	1.48%	0.70
	C	123.27	120.94	57,593	7,609,628	0.75%	0.40
	Total /Average	123.32	120.85	223,766	21,470,759	1.03%	0.52
Mckinley-4055925	A	123.39	120.92	8,199	5,349,018	0.15%	0.08
	B	123.29	120.68	46,686	4,137,488	1.12%	0.53
	C	123.26	120.92	15,364	4,816,785	0.32%	0.17
	Total /Average	123.32	120.85	70,249	14,303,291	0.49%	0.24
Mckinley-4055926	A	124.90	121.76	6,718	2,468,480	0.27%	0.11
	B	125.15	122.29	13,971	2,430,720	0.57%	0.25
	C	125.24	123.20	3,707	2,346,986	0.16%	0.10
	Total /Average	125.09	122.40	24,396	7,246,186	0.34%	0.16

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Table 4-21 PY2025 Energy Savings and CVR Factors by Phase: Northland Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Mississinewa-4517621	A	125.17	120.54	33,171	1,689,489	1.93%	0.52
	B	125.00	120.47	41,885	1,802,821	2.27%	0.63
	C	124.65	120.37	36,188	1,763,570	2.01%	0.59
	Total /Average	124.94	120.46	111,244	5,255,881	2.07%	0.58
Mississinewa-4517622	A	125.55	121.01	41,819	2,183,815	1.88%	0.52
	B	125.62	121.11	51,031	2,218,416	2.25%	0.63
	C	125.53	121.35	50,767	2,554,702	1.95%	0.59
	Total /Average	125.56	121.17	143,617	6,956,933	2.02%	0.58

Table 4-22 PY2025 Energy Savings and CVR Factors by Phase: Muessel Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Muessel-4103021	A	124.14	120.59	65,842	4,367,627	1.49%	0.52
	B	124.41	120.75	81,964	4,363,215	1.84%	0.63
	C	123.87	120.62	68,431	4,387,526	1.54%	0.59
	Total /Average	124.14	120.65	216,237	13,118,369	1.62%	0.58
Muessel-4103022	A	125.32	120.78	73,845	2,613,075	2.75%	0.76
	B	125.25	120.73	50,060	2,352,332	2.08%	0.58
	C	125.20	120.69	45,691	2,270,811	1.97%	0.55
	Total /Average	125.26	120.74	169,596	7,236,218	2.29%	0.63
Muessel-4103023	A	124.83	120.70	45,348	4,182,368	1.07%	0.32
	B	124.81	120.55	54,976	3,869,037	1.40%	0.41
	C	125.06	120.72	61,584	4,012,114	1.51%	0.44
	Total /Average	124.90	120.66	161,908	12,063,520	1.32%	0.39
Muessel-4103024	A	124.92	120.48	78,775	3,888,047	1.99%	0.56
	B	125.39	120.73	185,924	4,998,209	3.59%	0.97
	C	125.29	120.65	97,819	4,124,889	2.32%	0.63
	Total /Average	125.22	120.63	362,518	13,011,144	2.71%	0.74

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Table 4-23 PY2025 Energy Savings and CVR Factors by Phase: Northland Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Northland-4933421	A	124.58	121.85	41,736	5,183,676	0.80%	0.37
	B	124.47	121.85	42,617	5,284,895	0.80%	0.38
	C	123.49	120.81	51,825	4,594,964	1.12%	0.51
	Total /Average	124.21	121.54	136,179	15,063,534	0.90%	0.42
Northland-4933422	A	124.29	121.44	42,142	3,964,882	1.05%	0.46
	B	125.05	122.22	70,276	3,631,509	1.90%	0.84
	C	124.99	122.13	68,710	3,549,475	1.90%	0.83
	Total /Average	124.76	121.91	181,127	11,145,866	1.60%	0.70
Northland-4933423	A	124.27	121.42	84,818	6,527,548	1.28%	0.56
	B	125.03	122.19	123,491	6,861,218	1.77%	0.78
	C	124.94	122.09	126,451	6,825,671	1.82%	0.79
	Total /Average	124.76	121.91	334,760	20,214,436	1.63%	0.71

Table 4-24 PY2025 Energy Savings and CVR Factors by Phase: Osolo Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Osolo-4058023	A	125.31	124.09	24,508	3,210,667	0.76%	0.78
	B	125.47	124.03	32,823	2,650,819	1.22%	1.07
	C	125.42	124.31	15,736	2,606,445	0.60%	0.68
	Total /Average	125.39	124.14	73,066	8,467,931	0.86%	0.86
Osolo-4058025	A	125.27	124.05	10,641	851,228	1.23%	1.26
	B	125.41	123.97	13,739	1,109,859	1.22%	1.07
	C	125.34	124.23	10,310	990,318	1.03%	1.16
	Total /Average	125.35	124.08	34,690	2,951,405	1.16%	1.15
Osolo-4058026	A	125.27	124.05	25,826	2,299,909	1.11%	1.14
	B	125.45	124.01	19,738	2,149,276	0.91%	0.79
	C	125.39	124.28	12,324	2,442,945	0.50%	0.57
	Total /Average	125.37	124.12	57,887	6,892,130	0.83%	0.84

Table 4-25 PY2025 Energy Savings and CVR Factors by Phase: Pettit Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
PettitAvenue-4917221	A	124.27	122.65	72,238	7,080,583	1.01%	0.78
	B	124.27	122.32	69,346	6,177,025	1.11%	0.71
	C	124.51	123.35	33,656	5,568,964	0.60%	0.64
	Total /Average	124.34	122.75	175,240	18,826,572	0.92%	0.72
PettitAvenue-4917222	A	124.20	122.56	31,870	5,008,757	0.63%	0.48
	B	124.24	122.27	30,412	5,251,462	0.58%	0.36
	C	124.41	123.22	22,921	6,002,171	0.38%	0.40
	Total /Average	124.29	122.71	85,203	16,262,390	0.52%	0.41
PettitAvenue-4917223	A	124.21	122.58	9,760	1,905,363	0.51%	0.39
	B	124.24	122.28	15,941	2,402,970	0.66%	0.42
	C	124.44	123.27	6,194	2,609,424	0.24%	0.25
	Total /Average	124.31	122.74	31,896	6,917,757	0.46%	0.36

Table 4-26 PY2025 Energy Savings and CVR Factors by Phase: RobisonPark Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
RobisonPark-4050121	A	125.19	120.62	90,694	2,553,213	3.43%	0.94
	B	124.70	120.41	60,055	2,659,015	2.21%	0.64
	C	124.54	120.40	54,104	2,945,130	1.80%	0.54
	Total /Average	124.79	120.47	204,853	8,157,358	2.45%	0.71
RobisonPark-4050122	A	124.51	120.68	84,167	3,390,740	2.42%	0.79
	B	124.93	120.76	49,523	3,698,178	1.32%	0.40
	C	125.47	121.39	47,122	3,239,830	1.43%	0.44
	Total /Average	124.96	120.93	180,813	10,328,748	1.72%	0.53
RobisonPark-4050123	A	125.44	120.79	4,393	223,612	1.93%	0.52
	B	125.14	120.57	5,538	236,559	2.29%	0.63
	C	125.19	120.58	5,793	262,998	2.16%	0.59
	Total /Average	125.25	120.64	15,724	723,168	2.13%	0.58
RobisonPark-4050124	A	125.79	121.33	12,280	913,446	1.33%	0.37
	B	125.55	121.34	6,770	889,865	0.76%	0.23
	C	125.56	121.57	3,379	903,920	0.37%	0.12
	Total /Average	125.64	121.41	22,429	2,707,231	0.82%	0.24
RobisonPark-4050125	A	125.29	120.70	114,746	2,800,794	3.94%	1.07
	B	125.73	121.13	110,154	2,859,326	3.71%	1.01
	C	125.42	120.81	127,951	2,761,869	4.43%	1.20
	Total /Average	125.48	120.88	352,851	8,421,988	4.02%	1.10
RobisonPark-4050126	A	125.33	121.24	68,650	2,306,432	2.89%	0.89
	B	125.66	121.76	63,328	1,828,317	3.35%	1.08
	C	125.17	121.54	65,520	2,696,513	2.37%	0.82
	Total /Average	125.36	121.50	197,497	6,831,261	2.81%	0.91

Table 4-27 PY2025 Energy Savings and CVR Factors by Phase: SouthBend Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
SouthBend-4050321	A	124.36	120.98	163,392	11,960,457	1.35%	0.50
	B	124.24	120.39	244,057	12,816,370	1.87%	0.60
	C	124.67	120.50	290,530	10,708,759	2.64%	0.79
	Total /Average	124.41	120.62	697,979	35,485,585	1.93%	0.63
SouthBend-4050322	A	124.45	121.46	146,834	7,957,733	1.81%	0.75
	B	124.97	121.14	245,256	8,756,356	2.72%	0.89
	C	124.98	120.83	161,807	5,171,577	3.03%	0.91
	Total /Average	124.78	121.19	553,897	21,885,666	2.47%	0.86
SouthBend-4050323	A	125.14	122.19	97,507	5,421,966	1.77%	0.75
	B	124.87	121.12	138,913	6,041,535	2.25%	0.75
	C	125.06	120.97	142,619	4,958,137	2.80%	0.85
	Total /Average	125.02	121.43	379,039	16,421,638	2.26%	0.79

Table 4-28 PY2025 Energy Savings and CVR Factors by Phase: Southside Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
SouthSide-4094621	A	124.92	120.85	7,197	431,454	1.64%	0.50
	B	125.67	121.78	23,714	1,021,315	2.27%	0.73
	C	125.29	121.05	20,104	582,890	3.33%	0.99
	Total /Average	125.40	121.37	51,015	2,035,659	2.44%	0.76
SouthSide-4094622	A	124.94	120.87	267,618	10,300,645	2.53%	0.78
	B	125.71	121.81	243,027	9,168,937	2.58%	0.83
	C	125.33	121.08	293,113	10,713,577	2.66%	0.79
	Total /Average	125.31	121.23	803,757	30,183,159	2.59%	0.80
SouthSide-4094623	A	124.92	120.85	99,745	4,975,958	1.97%	0.60
	B	125.73	121.81	137,901	5,405,243	2.49%	0.80
	C	125.38	121.13	113,116	4,898,234	2.26%	0.67
	Total /Average	125.35	121.28	350,761	15,279,435	2.24%	0.69
SouthSide-4094624	A	124.89	120.84	8,646	740,027	1.15%	0.36
	B	125.67	121.78	28,286	1,190,777	2.32%	0.75
	C	125.32	121.08	40,497	1,627,547	2.43%	0.72
	Total /Average	125.35	121.27	77,428	3,558,350	2.13%	0.65

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Table 4-29 PY2025 Energy Savings and CVR Factors by Phase: Spyrun Circuits

Circuit ID	Phase	Baseline Voltage	Engaged State Voltage	Engaged State kWh Savings	Engaged State kWh Consumption	Percent Savings	CVR Factor
Spyrun-4923321	A	125.17	119.18	64,471	1,978,164	3.16%	0.66
	B	125.12	119.13	89,859	2,501,818	3.47%	0.72
	C	125.71	119.66	65,706	1,872,136	3.39%	0.70
	Total /Average	125.31	119.30	220,036	6,352,119	3.35%	0.70
Spyrun-4923322	A	125.13	119.15	11,725	645,720	1.78%	0.37
	B	125.09	119.10	21,092	798,943	2.57%	0.54
	C	125.69	119.64	20,814	832,277	2.44%	0.51
	Total /Average	125.32	119.31	53,631	2,276,939	2.30%	0.48
Spyrun-4923329	A	125.12	119.14	51,468	2,068,102	2.43%	0.51
	B	125.09	119.10	82,020	1,766,777	4.44%	0.93
	C	125.67	119.62	87,089	2,060,256	4.06%	0.84
	Total /Average	125.30	119.30	220,577	5,895,134	3.61%	0.75

Table 4-30 PY2025 Energy Savings and CVR Factors by Phase: StateStreet Circuits

Circuit ID	Phase	Baseline Voltage	Engaged State Voltage	Engaged State kWh Savings	Engaged State kWh Consumption	Percent Savings	CVR Factor
StateStreet-4928721	A	123.79	122.58	3,717	801,443	0.46%	0.47
	B	123.63	121.75	9,747	717,291	1.34%	0.88
	C	123.79	122.58	5,670	718,238	0.78%	0.80
	Total /Average	123.74	122.31	19,135	2,236,971	0.85%	0.73
StateStreet-4928723	A	123.78	122.57	1,403	259,836	0.54%	0.55
	B	123.62	121.74	2,296	272,768	0.83%	0.55
	C	123.78	122.57	1,605	262,267	0.61%	0.62
	Total /Average	123.73	122.29	5,304	794,871	0.66%	0.57

Table 4-31 PY2025 Energy Savings and CVR Factors by Phase: Summit Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Summit-4937821	A	124.74	120.89	8,076	495,094	1.61%	0.52
	B	125.03	120.84	10,966	511,679	2.10%	0.63
	C	125.21	120.68	11,021	508,899	2.12%	0.59
	Total /Average	124.99	120.80	30,062	1,515,671	1.94%	0.58
Summit-4937822	A	124.11	121.13	5,746	455,166	1.25%	0.52
	B	124.92	121.21	7,635	403,054	1.86%	0.63
	C	125.07	120.93	7,556	381,906	1.94%	0.59
	Total /Average	124.67	121.10	20,937	1,240,126	1.66%	0.58
Summit-4937823	A	124.39	120.41	22,569	1,331,119	1.67%	0.52
	B	124.63	120.41	29,469	1,359,855	2.12%	0.63
	C	124.92	120.43	28,805	1,338,094	2.11%	0.59
	Total /Average	124.65	120.42	80,844	4,029,069	1.97%	0.58

Table 4-32 PY2025 Energy Savings and CVR Factors by Phase: Trier Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Trier-4936421	A	125.30	120.81	7,791	265,527	2.85%	0.80
	B	125.32	120.80	8,384	264,979	3.07%	0.85
	C	125.40		-	262,462	0.00%	
	Total /Average	125.34	80.82	16,175	792,969	2.00%	0.06
Trier-4936422	A	125.22	120.71	4,524	125,310	3.48%	0.97
	B	125.27	120.71	4,255	110,551	3.71%	1.02
	C	125.29	120.82	5,607	152,991	3.54%	0.99
	Total /Average	125.26	120.76	14,386	388,852	3.57%	0.99
Trier-4936423	A	125.08	120.58	1,809	41,687	4.16%	1.16
	B	125.11	120.58	2,177	48,446	4.30%	1.19
	C	125.27	120.78	2,129	43,600	4.66%	1.30
	Total /Average	125.15	120.65	6,115	133,734	4.37%	1.21

Table 4-33 PY2025 Energy Savings and CVR Factors by Phase: Wallen Circuits

<i>Circuit ID</i>	<i>Phase</i>	<i>Baseline Voltage</i>	<i>Engaged State Voltage</i>	<i>Engaged State kWh Savings</i>	<i>Engaged State kWh Consumption</i>	<i>Percent Savings</i>	<i>CVR Factor</i>
Wallen-4923421	A	125.45	120.86	5,769	182,845	3.06%	0.84
	B	125.48	120.92	5,752	132,809	4.15%	1.14
	C	125.56	120.85	5,950	141,861	4.03%	1.07
	Total /Average	125.49	120.87	17,471	457,516	3.68%	1.00
Wallen-4923422	A	124.92	120.51	5,835	212,742	2.67%	0.76
	B	125.02	120.60	5,534	222,796	2.42%	0.69
	C	124.84	120.48	3,241	196,029	1.63%	0.47
	Total /Average	124.93	120.53	14,610	631,568	2.26%	0.64
Wallen-4923423	A	125.31	120.78	2,624	77,521	3.27%	0.91
	B	125.38	120.84	1,169	41,397	2.75%	0.76
	C	125.31	120.79	2,807	83,205	3.26%	0.91
	Total /Average	125.32	120.80	6,601	202,122	3.16%	0.88
Wallen-4923424	A	125.41	120.78	1,118	53,231	2.06%	0.56
	B	125.04	120.88	2,191	104,557	2.05%	0.62
	C	125.33	120.74	2,208	78,149	2.75%	0.75
	Total /Average	125.22	120.81	5,517	235,937	2.28%	0.65
Wallen-4923425	A	124.99	123.84	1,487	248,648	0.59%	0.65
	B	124.83	121.51	5,120	257,232	1.95%	0.73
	C	125.18	123.75	2,789	268,123	1.03%	0.90
	Total /Average	125.00	123.04	9,396	774,003	1.20%	0.76
Wallen-4923426	A	124.87	120.39	4,870	284,190	1.68%	0.47
	B	125.18	120.53	6,527	311,626	2.05%	0.55
	C	125.37	120.75	6,383	249,715	2.49%	0.68
	Total /Average	125.13	120.55	17,779	845,531	2.06%	0.56

The percentage savings rates presented in Table 4-1 through Table 4-33 were applied to electric energy usage occurring during eligible periods outlined in Table 3-8. Table 4-37 shows the circuit-level and total eligible and ineligible period energy usage during PY2025.

Table 4-34 PY2025 Energy Usage during Eligible and Ineligible Operating Periods

<i>Circuit ID</i>	<i>Total Ineligible Period</i>	<i>CVR Engaged</i>	<i>Test Schedule</i>	<i>Feeder Outage</i>	<i>Repair / Maintenance</i>	<i>Switching</i>	<i>Total Eligible Period</i>
Berne-4923223	39,312,158	-	-	-	-	-	-
Berne-4923224	29,289,710	-	-	-	-	-	-
Blaine-4098021	68,822	11,778,224	16,984	-	-	-	11,795,208
Blaine-4098024	44,276	6,984,300	8,795	-	-	-	6,993,095
Blaine-4098025	55,091	6,610,053	10,974	-	-	-	6,621,027

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<i>Circuit ID</i>	<i>Total Ineligible Period</i>	<i>CVR Engaged</i>	<i>Test Schedule</i>	<i>Feeder Outage</i>	<i>Repair / Maintenance</i>	<i>Switching</i>	<i>Total Eligible Period</i>
Blaine-4098026	1,806,494	2,664,413	505,680	-	-	-	3,170,092
Blaine-4098027	7,419,775	12,296,268	2,132,040	-	-	-	14,428,308
Blaine-4098028	7,654,215	12,262,494	2,162,621	-	-	-	14,425,115
Cleveland-4933321	15,031,620	9,685,412	3,479,017	-	-	-	13,164,429
Cleveland-4933322	14,825,879	8,972,573	3,493,497	-	-	-	12,466,069
Cleveland-4933323	8,479,257	5,128,603	1,912,735	-	-	-	7,041,338
CountyRoad4-4051421	21,183,244	-	-	-	-	-	-
CountyRoad4-4051422	25,032,618	-	-	-	-	-	-
CountyRoad4-4051423	14,566,380	-	-	-	-	-	-
Daleville-4927921	8,750,120	9,248,559	-	-	-	-	9,248,559
Daleville-4927922	3,469,139	3,108,551	-	-	-	-	3,108,551
Daleville-4927923	7,147,974	7,654,672	-	-	-	-	7,654,672
Decatur-4926421	48,379,019	89,533	-	-	-	-	89,533
Decatur-4926422	22,597,956	48,685	-	-	-	-	48,685
Decatur-4926423	23,876,319	45,813	-	-	-	-	45,813
DieboldRoad-4530321	19,819,273	-	-	-	-	-	-
DieboldRoad-4530322	17,195,997	-	-	-	-	-	-
Dunlap-4932721	1,150,284	11,047,066	353,543	-	-	-	11,400,609
Dunlap-4932722	1,087,209	9,656,692	337,492	-	-	-	9,994,184
Dunlap-4932723	2,293,193	20,685,672	707,558	-	-	-	21,393,230
Dunlap-4932724	8,704,776	3,204,463	1,836,587	-	-	-	5,041,050
Dunlap-4932725	11,211,761	3,594,749	2,423,571	-	-	-	6,018,321
Dunlap-4932726	21,925,138	8,182,747	4,551,732	-	-	-	12,734,479
EastSide-4093121	2,026,980	2,357,581	-	-	-	2,486,976	4,844,557
EastSide-4093122	5,459,017	5,067,029	-	-	-	7,677,142	12,744,171
EastSide-4093123	6,143,731	5,549,556	-	-	-	3,578,037	9,127,593
EastSide-4093124	4,519,785	4,353,909	-	-	-	6,516,778	10,870,687
EastSide-4093125	4,849,292	4,529,646	-	-	-	7,090,306	11,619,953
EastSide-4093126	179,232	2,797,838	-	-	-	13,205,605	16,003,443
Elcona-4938121	7,481,776	-	-	-	-	-	-
Elcona-4938122	21,731,419	-	-	-	-	-	-
Elcona-4938123	26,853,771	-	-	-	-	-	-
Farmland-4927321	3,646,768	7,456,900	-	-	-	-	7,456,900
Farmland-4927322	803,013	1,632,198	-	-	-	-	1,632,198
Farmland-4927323	4,231,384	8,523,050	-	-	-	-	8,523,050
Grabill-4935221	7,320,217	3,911,494	-	-	-	-	3,911,494
Grabill-4935222	13,938,797	8,289,453	-	-	-	-	8,289,453
Grabill-4935223	4,833,369	3,071,814	-	-	-	-	3,071,814

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<i>Circuit ID</i>	<i>Total Ineligible Period</i>	<i>CVR Engaged</i>	<i>Test Schedule</i>	<i>Feeder Outage</i>	<i>Repair / Maintenance</i>	<i>Switching</i>	<i>Total Eligible Period</i>
Hacienda-4933521	438,446	376,038	-	-	-	1,495,996	1,872,033
Hacienda-4933523	196,002	326,690	-	-	-	1,490,592	1,817,282
Hacienda-4933524	340,867	296,521	-	-	-	1,247,680	1,544,202
Hacienda-4933525	12,633,689	-	-	-	-	-	-
Hacienda-4933526	5,825,871	-	-	-	-	-	-
Hacienda-4933527	7,614,944	-	-	-	-	-	-
Harper-4928821	26,127,763	6,806,806	-	-	-	-	6,806,806
Harper-4928822	26,662,815	7,793,699	-	-	-	-	7,793,699
Haymond-4098921	13,592,152	7,574,370	2,780,046	-	-	-	10,354,416
Haymond-4098922	8,025,017	4,862,341	1,657,268	-	-	-	6,519,610
Haymond-4098923	13,552,241	8,280,912	2,844,644	-	-	-	11,125,556
Hillcrest-4929721	11,846,731	1,117,730	-	-	-	-	1,117,730
Hillcrest-4929722	17,857,038	7,649,633	3,782,310	-	-	-	11,431,942
Hillcrest-4929723	11,453,687	4,520,846	2,325,064	-	-	-	6,845,910
Hillcrest-4929724	30,557,795	2,698,133	-	-	-	-	2,698,133
Hillcrest-4929725	17,250,996	1,287,712	-	-	-	-	1,287,712
IllinoisRoad-4510721	6,832,727	12,356,482	-	-	-	-	12,356,482
IllinoisRoad-4510722	8,886,018	15,128,458	-	-	-	-	15,128,458
IllinoisRoad-4510723	6,307,160	11,516,721	-	-	-	-	11,516,721
Jay-4054321	640,309	15,989,196	108,462	-	-	-	16,097,657
Jay-4054322	1,009,582	26,378,042	181,460	-	-	-	26,559,502
LanternPark-4180221	484,282	418,661	122,688	-	-	-	541,349
LanternPark-4180222	534,530	430,016	138,308	-	-	-	568,324
LanternPark-4180223	647,498	562,295	167,329	-	-	-	729,624
Lincoln-4051821	8,639,951	12,830,704	2,618,578	-	-	-	15,449,282
Lincoln-4051822	6,985,564	10,711,965	1,914,701	-	-	-	12,626,666
Lincoln-4051823	-	-	-	-	-	-	-
Lincoln-4051824	4,576,768	7,279,579	1,346,590	-	-	-	8,626,169
LusherAvenue-4094021	36,967,126	-	-	-	-	-	-
LusherAvenue-4094022	13,860,232	-	-	-	-	-	-
LusherAvenue-4094023	332,727	6,804,393	-	-	-	-	6,804,393
LusherAvenue-4094024	524,162	9,256,761	-	-	-	-	9,256,761
LusherAvenue-4094025	689,413	13,465,341	-	-	-	-	13,465,341
LusherAvenue-4094026	14,064,178	-	-	-	-	-	-
Mackey-4535221	4,567,959	17,994,802	3,994,890	-	-	-	21,989,692
Mackey-4535222	1,326,470	19,137,791	3,516,048	-	-	-	22,653,838
Mackey-4535223	1,943,296	25,772,317	4,769,388	-	-	-	30,541,705
Mackey-4535224	859,139	12,727,664	2,361,209	-	-	-	15,088,874

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<i>Circuit ID</i>	<i>Total Ineligible Period</i>	<i>CVR Engaged</i>	<i>Test Schedule</i>	<i>Feeder Outage</i>	<i>Repair / Maintenance</i>	<i>Switching</i>	<i>Total Eligible Period</i>
Mackey-4535225	2,211,731	8,010,775	1,776,242	-	-	-	9,787,017
Mayfield-4930421	17,053,510	5,330	-	-	-	-	5,330
Mayfield-4930422	20,638,933	7,169	-	-	-	-	7,169
Mayfield-4930423	12,822,064	4,575	-	-	-	-	4,575
Mckinley-4055921	3,599,764	8,857,870	6,851,671	-	23,817,426	-	39,526,967
Mckinley-4055922	1,815,567	3,596,397	2,503,864	-	9,671,401	-	15,771,662
Mckinley-4055923	411,639	5,944,929	1,196,668	-	-	-	7,141,597
Mckinley-4055924	709,776	21,470,759	4,059,923	-	-	-	25,530,682
Mckinley-4055925	1,453,640	14,303,291	2,607,895	-	-	-	16,911,186
Mckinley-4055926	2,923,512	7,246,186	6,063,201	-	22,868,659	-	36,178,045
Mississinewa-4517621	6,224,684	5,255,881	1,516,787	-	-	-	6,772,668
Mississinewa-4517622	8,478,263	6,956,933	2,112,811	-	-	-	9,069,744
Monroe-4925321	19,083,031	-	-	-	-	-	-
Muessel-4103021	4,537,188	13,118,369	1,271,991	-	-	-	14,390,360
Muessel-4103022	2,171,365	7,236,218	558,834	-	-	-	7,795,052
Muessel-4103023	393,701	12,063,520	47,023	-	-	-	12,110,543
Muessel-4103024	1,300,504	13,011,144	332,671	-	-	-	13,343,815
Northland-4933421	1,072,722	15,063,534	2,838,876	-	-	-	17,902,410
Northland-4933422	567,486	11,145,866	1,892,087	-	-	-	13,037,954
Northland-4933423	1,417,343	20,214,436	3,807,017	-	-	-	24,021,453
Northland-4933424	37,944,013	-	-	-	-	-	-
Northland-4933425	13,421,597	-	-	-	-	-	-
Northland-4933426	15,526,238	-	-	-	-	-	-
Osolo-4058021	25,665,001	-	-	-	-	-	-
Osolo-4058022	23,880,645	-	-	-	-	-	-
Osolo-4058023	3,731,189	8,467,931	-	-	19,178,799	-	27,646,730
Osolo-4058024	32,168,383	-	-	-	-	-	-
Osolo-4058025	1,339,388	2,951,405	-	-	7,843,033	-	10,794,437
Osolo-4058026	2,657,507	6,892,130	-	-	17,093,113	-	23,985,243
PettitAvenue-4917221	14,957,383	18,826,572	-	-	-	-	18,826,572
PettitAvenue-4917222	13,132,069	16,262,390	-	-	-	-	16,262,390
PettitAvenue-4917223	4,868,571	6,917,757	-	-	-	-	6,917,757
RobisonPark-4050121	11,180,543	8,157,358	2,062,092	-	-	-	10,219,450
RobisonPark-4050122	8,004,750	10,328,748	1,178,603	-	-	-	11,507,351
RobisonPark-4050123	1,044,512	723,168	211,493	-	-	-	934,661
RobisonPark-4050124	3,494,010	2,707,231	642,062	-	-	-	3,349,292
RobisonPark-4050125	5,965,071	8,421,988	789,337	-	-	-	9,211,326
RobisonPark-4050126	9,459,289	6,831,261	1,657,256	-	-	-	8,488,518

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<i>Circuit ID</i>	<i>Total Ineligible Period</i>	<i>CVR Engaged</i>	<i>Test Schedule</i>	<i>Feeder Outage</i>	<i>Repair / Maintenance</i>	<i>Switching</i>	<i>Total Eligible Period</i>
SouthBend-4050321	6,550,849	35,485,585	-	-	-	-	35,485,585
SouthBend-4050322	2,286,499	21,885,666	-	-	-	-	21,885,666
SouthBend-4050323	1,667,465	16,421,638	-	-	-	-	16,421,638
SouthSide-4094621	23,355	2,035,659	-	-	-	-	2,035,659
SouthSide-4094622	271,423	30,183,159	-	-	-	-	30,183,159
SouthSide-4094623	134,763	15,279,435	-	-	-	-	15,279,435
SouthSide-4094624	41,394	3,558,350	-	-	-	-	3,558,350
Southside-4099921	27,381,083	-	-	-	-	-	-
Southside-4099922	26,452,254	-	-	-	-	-	-
Southside-4099923	20,089,244	-	-	-	-	-	-
SouthSummitville-4529121	9,773,969	-	-	-	-	-	-
SouthSummitville-4529122	3,410,034	-	-	-	-	-	-
Spyrun-4923321	4,815,430	6,352,119	1,839,731	-	-	-	8,191,850
Spyrun-4923322	1,994,609	2,276,939	731,878	-	-	-	3,008,817
Spyrun-4923329	5,875,072	5,895,134	2,085,916	-	-	-	7,981,051
StateStreet-4928721	9,612,397	2,236,971	-	-	-	-	2,236,971
StateStreet-4928722	6,503,199	1,334,729	-	-	-	-	1,334,729
StateStreet-4928723	5,881,495	794,871	-	-	-	-	794,871
Summit-4937821	16,796,203	1,515,671	-	-	-	-	1,515,671
Summit-4937822	25,722,320	1,240,126	-	-	-	-	1,240,126
Summit-4937823	37,684,752	4,029,069	-	-	-	-	4,029,069
Summit-4937824	3,726,868	-	-	-	-	-	-
Summit-4937825	3,549,339	-	-	-	-	-	-
Trier-4936421	1,405,668	792,969	-	-	-	-	792,969
Trier-4936422	826,838	388,852	-	-	-	-	388,852
Trier-4936423	185,016	133,734	-	-	-	-	133,734
Wallen-4923421	2,362,115	-	-	-	-	-	-
Wallen-4923422	3,043,097	-	-	-	-	-	-
Wallen-4923423	1,400,948	-	-	-	-	-	-
Wallen-4923424	723,381	-	-	-	-	-	-
Wallen-4923425	2,146,097	-	-	-	-	-	-
Wallen-4923426	2,346,658	-	-	-	-	-	-
Total	1,393,061,806	905,684,424	109,197,741	-	100,472,431	44,789,112	1,160,143,708

Below, Table 4-35 shows circuit-level and total ex post kWh savings.

Table 4-35 PY2025 CVR Ex Post kWh Savings

Circuit ID	Total Eligible Period kWh Consumption	CVR Savings Rate	Ex Post kWh Savings
Blaine-4098021	11,795,208	1.7%	206,797
Blaine-4098024	6,993,095	2.4%	174,596
Blaine-4098025	6,621,027	2.6%	180,124
Blaine-4098026	3,170,092	1.5%	49,451
Blaine-4098027	14,428,308	1.6%	236,743
Blaine-4098028	14,425,115	0.8%	116,325
Total - Blaine	57,432,846	1.7%	964,036
Cleveland-4933321	13,164,429	0.8%	111,531
Cleveland-4933322	12,466,069	0.5%	68,039
Cleveland-4933323	7,041,338	0.5%	36,710
Total - Cleveland	32,671,836	0.7%	216,281
Daleville-4927921	9,248,559	1.2%	113,285
Daleville-4927922	3,108,551	0.7%	21,401
Daleville-4927923	7,654,672	1.1%	85,507
Total - Daleville	20,011,782	1.1%	220,192
Decatur-4926421	89,533	2.7%	2,455
Decatur-4926422	48,685	3.7%	1,866
Decatur-4926423	45,813	4.9%	2,374
Total - Decatur	184,031	3.5%	6,695
Dunlap-4932721	11,400,609	2.0%	231,601
Dunlap-4932722	9,994,184	3.2%	328,171
Dunlap-4932723	21,393,230	3.0%	656,726
Dunlap-4932724	5,041,050	2.2%	113,954
Dunlap-4932725	6,018,321	2.6%	158,617
Dunlap-4932726	12,734,479	1.0%	132,436
Total - Dunlap	66,581,872	2.4%	1,621,506
EastSide-4093121	4,844,557	1.0%	49,180
EastSide-4093122	12,744,171	0.8%	103,020
EastSide-4093123	9,127,593	1.4%	131,225
EastSide-4093124	10,870,687	2.0%	216,376
EastSide-4093125	11,619,953	1.6%	193,875
EastSide-4093126	16,003,443	0.7%	105,529
Total - EastSide	65,210,404	1.2%	799,205
Farmland-4927321	7,456,900	1.6%	119,816
Farmland-4927322	1,632,198	1.9%	30,876
Farmland-4927323	8,523,050	1.5%	131,510
Total - Farmland	17,612,148	1.6%	282,202

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<i>Circuit ID</i>	<i>Total Eligible Period kWh Consumption</i>	<i>CVR Savings Rate</i>	<i>Ex Post kWh Savings</i>
Grabill-4935221	3,911,494	1.2%	46,907
Grabill-4935222	8,289,453	1.5%	129,520
Grabill-4935223	3,071,814	1.3%	41,933
Total - Grabill	15,272,761	1.4%	218,360
Hacienda-4933521	1,872,033	1.1%	21,626
Hacienda-4933523	1,817,282	1.0%	18,295
Hacienda-4933524	1,544,202	1.2%	18,685
Total - Hacienda	5,233,517	1.1%	58,606
Harper-4928821	6,806,806	1.5%	104,513
Harper-4928822	7,793,699	1.7%	132,325
Total - Harper	14,600,505	1.6%	236,838
Haymond-4098921	10,354,416	1.5%	157,171
Haymond-4098922	6,519,610	0.1%	8,278
Haymond-4098923	11,125,556	1.5%	174,656
Total - Haymond	27,999,581	1.2%	340,105
Hillcrest-4929721	1,117,730	2.1%	24,296
Hillcrest-4929722	11,431,942	2.8%	333,383
Hillcrest-4929723	6,845,910	1.4%	97,503
Hillcrest-4929724	2,698,133	1.0%	26,572
Hillcrest-4929725	1,287,712	2.1%	27,179
Total - Hillcrest	23,381,428	2.1%	508,934
IllinoisRoad-4510721	12,356,482	2.3%	296,207
IllinoisRoad-4510722	15,128,458	2.3%	360,137
IllinoisRoad-4510723	11,516,721	1.9%	220,118
Total - IllinoisRoad	39,001,661	2.2%	876,463
Jay-4054321	16,097,657	0.3%	51,836
Jay-4054322	26,559,502	0.4%	94,766
Total - Jay	42,657,159	0.3%	146,601
LanternPark-4180221	541,349	0.0%	-
LanternPark-4180222	568,324	2.1%	12,070
LanternPark-4180223	729,624	2.3%	16,833
Total - LanternPark	1,839,297	1.5%	28,903
Lincoln-4051821	15,449,282	0.3%	45,226
Lincoln-4051822	12,626,666	1.7%	221,969
Lincoln-4051824	8,626,169	0.9%	82,447
Total - Lincoln	36,702,118	0.9%	349,642
LusherAvenue-4094023	6,804,393	1.7%	115,481
LusherAvenue-4094024	9,256,761	2.1%	201,654

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<i>Circuit ID</i>	<i>Total Eligible Period kWh Consumption</i>	<i>CVR Savings Rate</i>	<i>Ex Post kWh Savings</i>
LusherAvenue-4094025	13,465,341	2.0%	277,271
Total - LusherAvenue	29,526,495	2.0%	594,406
Mackey-4535221	21,989,692	1.8%	411,171
Mackey-4535222	22,653,838	1.4%	325,851
Mackey-4535223	30,541,705	0.7%	202,332
Mackey-4535224	15,088,874	1.6%	252,141
Mackey-4535225	9,787,017	0.7%	71,907
Total - Mackey	100,061,126	1.2%	1,263,402
Mayfield-4930421	5,330	0.0%	-
Mayfield-4930422	7,169	0.0%	-
Mayfield-4930423	4,575	0.0%	-
Total - Mayfield	17,073	0.0%	-
Mckinley-4055921	39,526,967	0.3%	122,384
Mckinley-4055922	15,771,662	0.5%	81,800
Mckinley-4055923	7,141,597	1.4%	102,539
Mckinley-4055924	25,530,682	1.0%	265,864
Mckinley-4055925	16,911,186	0.5%	83,119
Mckinley-4055926	36,178,045	0.1%	26,141
Total - Mckinley	141,060,141	0.5%	681,846
Mississinewa-4517621	6,772,668	1.8%	121,992
Mississinewa-4517622	9,069,744	1.7%	159,779
Total - Mississinewa	15,842,412	1.7%	281,772
Muessel-4103021	14,390,360	1.5%	224,522
Muessel-4103022	7,795,052	2.2%	175,603
Muessel-4103023	12,110,543	1.3%	162,511
Muessel-4103024	13,343,815	2.7%	371,903
Total - Muessel	47,639,771	1.9%	934,540
Northland-4933421	17,902,410	0.9%	161,797
Northland-4933422	13,037,954	1.6%	211,450
Northland-4933423	24,021,453	1.6%	397,688
Total - Northland	54,961,817	1.4%	770,936
Osolo-4058023	27,646,730	0.3%	89,003
Osolo-4058025	10,794,437	0.4%	42,813
Osolo-4058026	23,985,243	0.3%	72,812
Total - Osolo	62,426,411	0.3%	204,628
PettitAvenue-4917221	18,826,572	0.9%	175,240
PettitAvenue-4917222	16,262,390	0.5%	85,203
PettitAvenue-4917223	6,917,757	0.5%	31,896

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<i>Circuit ID</i>	<i>Total Eligible Period kWh Consumption</i>	<i>CVR Savings Rate</i>	<i>Ex Post kWh Savings</i>
Total - PettitAvenue	42,006,719	0.7%	292,339
RobisonPark-4050121	10,219,450	2.1%	221,331
RobisonPark-4050122	11,507,351	1.6%	186,697
RobisonPark-4050123	934,661	1.7%	16,510
RobisonPark-4050124	3,349,292	0.7%	24,236
RobisonPark-4050125	9,211,326	3.8%	363,429
RobisonPark-4050126	8,488,518	2.5%	213,741
Total - RobisonPark	43,710,597	2.3%	1,025,943
SouthBend-4050321	35,485,585	1.9%	697,979
SouthBend-4050322	21,885,666	2.5%	553,897
SouthBend-4050323	16,421,638	2.3%	379,039
Total - SouthBend	73,792,890	2.2%	1,630,915
SouthSide-4094621	2,035,659	2.4%	51,015
SouthSide-4094622	30,183,159	2.6%	803,757
SouthSide-4094623	15,279,435	2.2%	350,761
SouthSide-4094624	3,558,350	2.1%	77,428
Total - Southside	51,056,603	2.5%	1,282,962
Spyrun-4923321	8,191,850	2.9%	248,949
Spyrun-4923322	3,008,817	2.0%	59,952
Spyrun-4923329	7,981,051	3.0%	248,801
Total - Spyrun	19,181,717	2.8%	557,703
StateStreet-4928721	2,236,971	0.8%	19,135
StateStreet-4928722	1,334,729	0.0%	-
StateStreet-4928723	794,871	0.7%	5,304
Total - StateStreet	4,366,571	0.6%	24,440
Summit-4937821	1,515,671	1.9%	30,062
Summit-4937822	1,240,126	1.7%	20,937
Summit-4937823	4,029,069	2.0%	80,844
Total - Summit	6,784,866	1.9%	131,843
Trier-4936421	792,969	2.0%	16,175
Trier-4936422	388,852	3.6%	14,386
Trier-4936423	133,734	4.4%	6,115
Total - Trier	1,315,554	2.7%	36,676
Grand Total	1,160,143,708	1.4%	16,588,919

4.2 Peak Reduction

This chapter presents the results of the analysis of demand reduction occurring during 2025 PJM 5CP hours. Demand reductions, accounting for those circuits for which the CVR system was enabled during the 5CP hours, are presented in Table 4-36.

Table 4-36. kW Reduction during PY2025 PJM 5CP

Circuit ID	6/23/2025	6/24/2025	6/25/2025	7/28/2025	7/29/2025
	5:00 PM - 6:00 PM	5:00 PM - 6:00 PM	2:00 PM - 3:00 PM	5:00 PM - 6:00 PM	5:00 PM - 6:00 PM
Blaine-4098021	39.38	39.49	37.58	39.74	39.72
Blaine-4098024	37.13	37.50	33.40	34.76	36.80
Blaine-4098025	30.86	30.05	33.68	29.13	31.66
Blaine-4098026	18.23	18.39	14.01	-	-
Blaine-4098027	70.22	57.60	46.13	-	-
Blaine-4098028	47.17	45.97	35.48	-	-
Cleveland-4933321	95.34	71.78	80.35	-	-
Cleveland-4933322	37.91	30.32	37.95	-	-
Cleveland-4933323	27.21	21.37	25.32	-	-
Dunlap-4932721	61.54	47.87	55.51	56.48	59.05
Dunlap-4932722	96.30	71.94	94.88	90.12	93.66
Dunlap-4932723	162.95	124.68	158.38	151.85	155.11
EastSide-4093121	-	34.12	36.46	35.67	38.12
EastSide-4093122	-	104.79	113.96	117.20	122.42
EastSide-4093123	-	59.85	66.61	69.47	69.32
EastSide-4093124	-	219.74	235.80	238.51	249.95
EastSide-4093125	-	202.92	212.73	214.45	221.85
EastSide-4093126	-	135.63	145.99	136.13	138.15
Farmland-4927321	31.78	36.34	28.96	33.26	34.88
Farmland-4927322	7.14	8.23	6.73	7.50	7.47
Farmland-4927323	31.26	35.74	34.10	34.46	36.63
Hacienda-4933521	40.69	37.60	38.30	22.77	24.11
Hacienda-4933523	13.83	12.67	12.65	20.70	21.81
Hacienda-4933524	26.43	24.09	24.32	23.27	24.67
IllinoisRoad-4510721	137.23	120.02	123.37	126.82	133.54
IllinoisRoad-4510722	154.95	134.90	145.26	143.78	146.19
IllinoisRoad-4510723	102.04	85.65	93.81	95.58	98.23
Jay-4054321	11.37	11.37	10.17	10.67	9.24
Jay-4054322	18.90	18.85	19.18	17.60	15.58
LanternPark-4180222	9.68	9.35	8.01	8.70	9.07
LanternPark-4180223	13.57	13.36	11.41	12.14	13.20

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Circuit ID	6/23/2025	6/24/2025	6/25/2025	7/28/2025	7/29/2025
	5:00 PM - 6:00 PM	5:00 PM - 6:00 PM	2:00 PM - 3:00 PM	5:00 PM - 6:00 PM	5:00 PM - 6:00 PM
LusherAvenue-4094023	30.51	24.60	25.44	27.44	28.21
LusherAvenue-4094024	44.62	40.10	44.14	42.76	45.24
LusherAvenue-4094025	65.78	55.97	61.00	62.03	63.80
Mackey-4535221	74.03	65.24	76.49	65.45	70.77
Mackey-4535222	74.01	60.36	70.82	67.98	69.32
Mackey-4535223	41.52	37.09	42.20	42.29	41.49
Mackey-4535224	58.05	47.02	55.71	54.22	55.59
Mackey-4535225	10.16	9.67	14.60	10.10	10.59
Mckinley-4055921	79.48	26.73	72.08	72.61	78.61
Mckinley-4055922	109.08	105.11	110.89	101.82	106.68
Mckinley-4055923	21.13	19.89	21.17	19.51	20.45
Mckinley-4055924	37.01	35.60	36.35	57.01	59.30
Mckinley-4055925	16.17	15.98	15.42	15.03	16.11
Mckinley-4055926	18.38	8.28	22.88	18.56	19.90
Mississinewa-4517621	52.17	51.14	42.61	50.32	54.66
Mississinewa-4517622	85.56	93.29	112.24	94.53	101.38
Muessel-4103021	89.27	-	75.69	69.52	82.09
Muessel-4103022	64.79	-	60.31	53.00	60.92
Muessel-4103023	5.18	41.29	40.07	44.12	45.82
Muessel-4103024	9.74	76.92	79.67	78.79	82.05
Northland-4933421	22.62	19.89	29.40	21.77	23.08
Northland-4933422	64.75	48.58	57.47	57.56	60.04
Northland-4933423	59.85	49.25	65.97	59.05	58.65
Osolo-4058023	61.55	47.89	55.69	55.87	56.79
Osolo-4058025	39.52	31.86	36.73	36.60	37.39
Osolo-4058026	39.16	34.24	41.35	37.98	39.59
PettitAvenue-4917221	88.79	83.38	86.02	-	-
PettitAvenue-4917222	39.38	37.51	37.12	-	-
PettitAvenue-4917223	12.68	12.18	11.84	-	-
RobisonPark-4050122	-	-	-	104.38	108.00
RobisonPark-4050123	-	-	-	9.51	10.24
RobisonPark-4050125	-	-	-	223.57	234.15
SouthBend-4050321	166.90	142.01	155.31	153.75	158.60
SouthBend-4050322	151.94	125.80	143.23	141.68	146.75
SouthBend-4050323	96.30	81.05	92.34	92.40	97.26
SouthSide-4094621	8.73	8.19	9.96	9.02	8.66
SouthSide-4094622	211.72	184.83	184.11	187.29	192.02
SouthSide-4094623	71.38	68.70	75.79	71.74	73.27

2025 Indiana CVR Program

<i>Circuit ID</i>	<i>6/23/2025</i>	<i>6/24/2025</i>	<i>6/25/2025</i>	<i>7/28/2025</i>	<i>7/29/2025</i>
	<i>5:00 PM - 6:00 PM</i>	<i>5:00 PM - 6:00 PM</i>	<i>2:00 PM - 3:00 PM</i>	<i>5:00 PM - 6:00 PM</i>	<i>5:00 PM - 6:00 PM</i>
SouthSide-4094624	16.44	15.15	15.72	16.03	16.63
Spyrun-4923321	103.26	103.16	101.46	-	-
Spyrun-4923322	23.47	22.27	20.75	-	-
Spyrun-4923329	117.73	115.13	114.69	-	-
Total	3,705.91	3,947.50	4,435.20	4,096.07	4,264.53

The summarized results for each PJM 5CP hour are presented in Table 4-37 below.

Table 4-37. Summary of kW Reductions during PJM 5CP Hours

<i>Date</i>	<i>Hour Start</i>	<i>Hour End</i>	<i>Ex Post Net kW Savings</i>
6/23/2025	5:00 PM	6:00 PM	3,705.91
6/24/2025	5:00 PM	6:00 PM	3,947.50
6/25/2025	2:00 PM	3:00 PM	4,435.20
7/28/2025	5:00 PM	6:00 PM	4,096.07
7/29/2025	5:00 PM	6:00 PM	4,264.53
Maximum Peak kW Reduction			4,435.20
Average Peak kW Reduction			4,089.84

2025 Indiana Demand Response Portfolio EM&V Report

Prepared for:

Indiana Michigan Power

April 30, 2026

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1. Introduction

Under contract with Indiana Michigan Power (I&M), ADM Associates, Inc., a Qualus Company, (ADM) performed evaluation, measurement and verification (EM&V) activities to confirm the load shifting and demand reduction (kW) realized through the Demand Response (DR) portfolio programs that I&M implemented from January 2025 through December 2025 (PY2025) in Indiana.

This chapter provides a summary of evaluation findings for the DR Portfolio and presents information regarding the organization of the report.

In 2025, I&M's DR Portfolio consisted of the programs listed in the table below. For some programs, no qualifying participants were enrolled, or no events were called during the period. ADM did not perform EM&V for those programs.

Table 1-1 Summary of PY2025 Program Status

<i>Program</i>	<i>PY2025 Program Status</i>
Small Business DLC	No enrollments
Work Thermostat	Inactive program
Commercial Critical Peak Pricing	No enrollments
Commercial Time-of-Use	Active program
Voluntary Curtailment Service	No enrollments
Residential Critical Peak Pricing	No enrollments
Residential Time-of-Use	Active program
Home Energy Management	Active program
Residential HVAC DLC	Active program
Residential IQ Water Heater DLC	Inactive program
Residential Customer Engagement Demand Response	Active program

1.1. Impact Evaluation Findings

The savings variables presented in this evaluation report are defined in Table 1-2.

Table 1-2 Savings-Related Terminology

<i>Variable</i>	<i>Definition</i>
kW Savings Goal	kW Savings Goal is the demand reduction goal cited in the applicable portfolio plan.
Ex Ante Gross kW Savings	Ex Ante Gross kW Savings are the annual peak demand reduction reported by I&M and are typically obtained from I&M's DSM/EE Program Scorecard documents.
Gross Audited kW Savings	Gross Audited kW Savings are determined by reviewing tracking data presenting for any errors (e.g., arithmetic errors or inaccurate reporting of quantities of units incented, etc.), and adjusting Ex Ante Gross kW Savings accordingly.
Gross Verified kW Savings	Gross Verified kW Savings are determined by applying an installation rate to the Gross Audited kW Savings. The installation rate is defined as the ratio of units that were verified

Indiana Demand Response Portfolio

Variable	Definition
	to the number of units reported (claimed). This reflects all adjustments made by ADM, without accounting for the impact of free ridership or spillover.
Ex Post Gross kW Savings	Ex Post Gross kW Savings are the realized annual gross kW peak demand reductions reflecting all adjustments made by ADM, without accounting for free ridership or spillover.
Ex Post Net kW Savings	Ex Post Net kW Savings are equal to Ex Post Gross kW Savings, adjusted to account for the impact of free ridership and spillover.
Gross Realization Rate	Gross Realization Rate is equal to Ex Post Gross kW Savings divided by Ex Ante Gross kW Savings.
Net-to-Gross Ratio	Net-to-Gross Ratio is equal to Ex Post Net kW Savings divided by Ex Post Gross kW Savings.
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 the impact of 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).

ADM performed EM&V activities for the portfolio of active demand response programs during PY2025. Total DR Portfolio ex post gross and ex post net energy savings are 100,618 kWh.

Table 1-3 Summary of Energy Savings

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
Home Energy Management	70,442	70,442	70,442	78,702	112%	78,702	100%	1,574,040
Residential HVAC DLC	13,994	13,994	13,994	9,919	71%	9,919	100%	198,379
Residential Customer Engagement Demand Response	12,561	12,561	12,561	11,998	96%	11,998	100%	239,951
Residential Time-of-Use	-	-	-	-	N/A	-	N/A	-
Residential EV Time-of-Use	-	-	-	-	N/A	-	N/A	-
Commercial Time-of-Use	-	-	-	-	N/A	-	N/A	-
Portfolio Totals	96,997	96,997	96,997	100,618	104%	100,618	100%	2,012,370

Total demand response portfolio ex post gross and ex post net peak demand savings are 8,587.36 kW.

Indiana Demand Response Portfolio

Table 1-4 Summary of Peak Demand Impacts

<i>Program Name</i>	<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Net kW Savings</i>	<i>Net- to- Gross Ratio</i>
Home Energy Management	6,938.08	6,938.08	6,938.08	5,947.03	86%	5,947.03	100%
Residential HVAC DLC	642.11	642.11	642.11	957.93	149%	957.93	100%
Residential Customer Engagement Demand Response	519.57	519.57	519.57	763.09	147%	763.09	100%
Residential Time-of-Use	395.08	395.08	395.08	249.60	63%	249.60	100%
Residential EV Time-of-Use	251.10	251.10	251.10	341.41	136%	341.41	100%
Commercial Time-of-Use	1,350.11	1,350.11	1,350.11	328.31	24%	328.31	100%
Portfolio Totals	10,096.04	10,096.04	10,096.04	8,587.36	85%	8,587.36	100%

1.2. Demand Response Metrics

I&M offered a variety of demand response programs to its customers and Table 1-5 summarizes metrics for the demand response program offerings. Metrics cover participation, load reduction, and the participant experience.

- **The per-participant load impacts varied across programs.** Home Energy Management produced higher per participant reductions than Residential HVAC DLC. Residential Customer Engagement produced the lowest per participant savings, likely due to the need of customers to identify ways to decrease load during the events.
- **The negative impact shown for the HVAC DLC season low was due to device non-response.** Several events resulted in effectively no demand response because of a device control issue.

Table 1-5 Demand Response Program Metrics

<i>Program</i>	<i>Participation Metrics</i>		<i>Load Reduction Metrics</i>	
	<i>Number of Events During the Year</i>	<i>Largest Number of Participants Enrolled During an Event</i>	<i>Average Per Participant Hourly kW Reduction (Season Low)</i>	<i>Average Per Participant Hourly kW Reduction (Season High)</i>
Home Energy Management	9	7,035	0.83	1.19
Residential HVAC DLC	9	2,315	-0.08	0.87
Residential Customer Engagement Demand Response	9	8,850	0.01	0.10

1.3. Demand Response Residential Customer Segmentation Metrics

ADM developed metrics based on participation rates and incentive dollars received across various residential customer segments. These segments were created by integrating publicly available census tract-level data with customer account records, enabling classification based on specific demographic and environmental indicators.

The segmentation process involved geolocating customer premises, assigning each account to a corresponding census tract, and matching those tracts to publicly available data. This method provided indicators for characterizing customer segments and aligning them with program participation metrics.

The data sources and corresponding segmentation variables are summarized below:

- **Energy Burdened Census Tracts:** Sourced from the Climate and Economic Justice Screening Tool (CEJST), this variable indicates whether the average household energy cost in a census tract equals or exceeds 6% of the average household income. Tracts meeting this criterion are categorized as "Yes"; others are labeled "No."
- **50%+ of Households Below 200% FPL:** Also derived from CEJST, this variable identifies census tracts where at least 50% of households fall below 200% of the Federal Poverty Level (FPL). Tracts meeting this threshold are categorized as "Yes"; others are labeled "No."

The metrics and customer segments developed through this methodology provide insights into participation trends and the distribution of incentive dollars. The metrics are defined in Table 1-6.

Table 1-6 Definitions of Metrics

<i>Metric</i>	<i>Definition</i>
Number of Households	The number of households is equal to the number of unique utility account numbers regardless of whether they participated in the program.
Participant Count	The number of unique utility account numbers that were enrolled in the program during the program year.
Incentive Payments	The sum of the incentive payments made by the program to the customer accounts during the program year.
Average Credit Amount	The sum of the incentive payments divided by the number of unique utility account numbers (i.e., participant count).
Share of Households Participating	The participant count divided by the number of households and expressed as a percentage.

The key findings from the analysis are as follows.

The analysis shows that the demand response programs continue to reach households in energy-burdened and lower-income census tracts. Participation levels and incentive amounts vary across programs and customer segments.

- Across the three programs, households in energy-burdened census tracts and in areas with higher percentages of households below 200% of the federal poverty level participated at lower rates and received smaller incentives.
- Total participation and incentive payments were higher in non-energy-burdened census tracts because these areas contain more households and have higher participation rates.

Participation and incentive amounts differed across programs:

- **Home Energy Management (HEM).** Participation rates were higher in non-energy-burdened census tracts (1.52% vs. 0.60%) and in areas with fewer low-income households (1.72% vs. 0.66%). Total incentive payments and average credit amounts were also slightly higher in non-energy-burdened areas (\$76 vs. \$74). These differences may reflect lower smart thermostat ownership among lower-income households. Lower incentive amounts in energy-burdened areas may also reflect smaller demand reductions due to smaller cooling equipment.
- **HVAC Direct Load Control (DLC).** Participation rates in energy-burdened census tracts were lower (0.23% vs. 0.45% in non-energy-burdened tracts), as were average incentives (\$86 vs. \$95). Similar differences were observed for areas with higher percentages of households below 200% of the federal poverty level. Lower ownership of central air conditioning systems among lower-income households likely limits participation.
- **iControl.** Participation patterns were more uniform across census tract types. Participation rates were 1.11% in energy-burdened tracts and 1.82% in non-energy-burdened tracts, with average credits of \$3–\$4 across all segments. Because iControl does not require specific equipment and uses a range of demand reduction approaches, participation and incentive levels were more consistent across income groups.

Overall, HEM and HVAC DLC showed larger participation gaps between lower- and higher-income census tracts, while iControl participation was more uniform. Differences for HEM and HVAC DLC may be linked to differences in equipment ownership across income groups.

The following summarizes the key findings for the three residential demand response programs.¹

1.3.1. HEM (Home Energy Management)

HEM participation rates and average credit amounts are higher in non-energy burdened tracts and in areas with lower percentages of households below 200% of the federal poverty level. Participation rates may be influenced by lower adoption rates of smart thermostats among lower-income households. For example, in Indiana, 12% of households with incomes over \$60,000 per

¹ We note that 2.4% of demand response participant accounts did not match to accounts listed in the segmentation file, which resulted in an underestimate of total incentive payments.

year have a smart thermostat, compared to 5% of households with lower incomes.² Additionally, lower incentive amounts in energy burdened census tracts may result from smaller demand reductions, as these households are more likely to have air conditioning systems with smaller capacity.

Table 1-7 Home Energy Management Customer Segmentation Summary

<i>Metric</i>	<i>Energy Burdened Census Tracts</i>	<i>Number of Households</i>	<i>Participant Count</i>	<i>Incentive Payments</i>	<i>Average Credit Amount</i>	<i>Share of Households Participating</i>
Energy Burdened Census Tracts	Yes	7,679	46	\$3,393	\$74	0.60%
	No	490,075	7,442	\$565,520	\$76	1.52%
50% + of Households Below 200% FPL	Yes	101,268	669	\$50,639	\$76	0.66%
	No	396,486	6,819	\$518,273	\$76	1.72%

* Higher scores indicate greater environmental challenges and population vulnerability.

Key points are:

- **Energy Burdened Census Tracts:** 46 of 7,679 participated (0.60%); total incentive payments \$3,393; average credit \$74.
- **Non-Energy Burdened Census Tracts:** 7,442 of 490,075 participated (1.52%); total incentive payments \$565,520; average credit \$76.
- **50%+ of Households Below 200% FPL:** 669 of 101,268 participated (0.66%); total incentive payments \$50,639; average credit \$76.
- **Less than 50% of Households Below 200% FPL:** 6,819 of 396,486 participated (1.72%); total incentive payments \$518,273; average credit \$76.

1.3.2. HVAC DLC (Heating, Ventilation, and Air Conditioning Direct Load Control)

Participation rates and average credit amounts are lower in energy burdened tracts and in areas with higher percentages of households below 200% of the federal poverty level. Barriers to participation among lower-income households may include lower ownership rates of central air conditioning systems. For example, in Indiana, 93% of households with incomes over \$60,000 per year have central air conditioning, compared to 70% of households with lower incomes.³

² Analysis of 2020 Residential Energy Consumption Survey (RECS).

³ Analysis of 2020 Residential Energy Consumption Survey (RECS).

Table 1-8 HVAC DLC Customer Segmentation Summary

<i>Metric</i>	<i>Energy Burdened Census Tracts</i>	<i>Number of Households</i>	<i>Participant Count</i>	<i>Incentive Payments</i>	<i>Average Credit Amount</i>	<i>Share of Households Participating</i>
Energy Burdened Census Tracts	Yes	7,679	18	\$1,555	\$86	0.23%
	No	490,075	2,213	\$210,094	\$95	0.45%
50% + of Households Below 200% FPL	Yes	101,268	359	\$32,489	\$90	0.35%
	No	396,486	1,872	\$179,160	\$96	0.47%

Key points are:

- **Energy Burdened Census Tracts:** 18 of 7,679 participated (0.23%); total incentive payments \$1,555; average credit \$86.
- **Non-Energy Burdened Census Tracts:** 2,213 of 490,075 participated (0.45%); total incentive payments \$210,094; average credit \$95.
- **50%+ of Households Below 200% FPL:** 359 of 101,268 participated (0.35%); total incentive payments \$32,489; average credit \$90.
- **Less than 50% of Households Below 200% FPL:** 1,872 of 396,486 participated (0.47%); total incentive payments \$179,160; average credit \$96.

1.3.3. iControl

Participation rates and credit amounts are similar across energy burdened and non-energy burdened census tracts, as well as across areas with higher and lower percentages of low-income households. The absence of specific equipment requirements for iControl may have contributed to the consistent participation rates. Additionally, the program's use of heterogeneous demand reduction strategies may have minimized differences in reductions achieved across these census tract groups.

Table 1-9 iControl Customer Segmentation Summary

<i>Metric</i>	<i>Energy Burdened Census Tracts</i>	<i>Number of Households</i>	<i>Participant Count</i>	<i>Incentive Payments</i>	<i>Average Credit Amount</i>	<i>Share of Households Participating</i>
Energy Burdened Census Tracts	Yes	7,679	85	\$264	\$3	1.11%
	No	490,075	8,921	\$35,457	\$4	1.82%
50% + of Households Below 200% FPL	Yes	101,268	1,548	\$5,123	\$3	1.53%
	No	396,486	7,458	\$30,598	\$4	1.88%

* Higher scores indicate greater environmental challenges and population vulnerability.

Key points are:

- Energy Burdened Census Tracts: 85 of 7,679 participated (1.11%); total incentive payments \$264; average credit \$3.
- Non-Energy Burdened Census Tracts: 8,921 of 490,075 participated (1.82%); total incentive payments \$35,457; average credit \$4.
- 50%+ of Households Below 200% FPL: 1,548 of 101,268 participated (1.53%); total incentive payments \$5,123; average credit \$3.
- Less than 50% of Households Below 200% FPL: 7,458 of 396,486 participated (1.88%); total incentive payments \$30,598; average credit \$4.

1.4. Demand Response Emission Reductions

ADM estimated the emission reduction benefits of the demand response (DR) programs using tools provided by the U.S. Environmental Protection Agency (EPA). The methodology consisted of two primary steps: quantifying emission reductions and monetizing their value.

To estimate emission reductions, ADM utilized the EPA's AVERT (Avoided Emissions and Generation Tool).⁴ AVERT performs regional analyses by grouping areas according to grid balancing authorities. For this analysis, ADM referenced the Mid-Atlantic region to align with the geographic area served by the DR programs.

ADM calculated emission reductions by summing the total demand reductions achieved by the four demand response programs during the hour and day of each event. Since AVERT uses historical data from 2023, ADM mapped 2025 event dates to corresponding 2023 dates based on the day of the week.⁵ For example, Monday, June 23, 2025, was mapped to Monday, June 26, 2023, to ensure consistency in the day of the week of the impacts.

ADM monetized the health impacts of emission reductions using the EPA's COBRA (Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool).⁶ COBRA estimates the value of health benefits associated with reductions in these pollutants: SO₂, NO_x, CO₂, PM_{2.5}, VOCs, and NH₃. In applying COBRA, ADM used a 2% discount rate to calculate the present value of these health benefits.

The value of CO₂ reductions was monetized separately using the EPA's 2020 estimate of the social cost of carbon (SCC), which is \$190 per metric ton at a 2% discount rate.⁷ ADM acknowledges

⁴ <https://www.epa.gov/avert>

⁵ The most recently available data was from 2023.

⁶ <https://www.epa.gov/cobra>

⁷ U.S. Environmental Protection Agency. (2023). Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. Washington, DC: National Center for Environmental Economics, Office of Policy; Climate Change Division, Office of Air and Radiation.

that SCC values can vary significantly depending on assumptions, with estimates ranging from \$10 to \$800 per ton. This variability underscores the importance of considering different scenarios when interpreting results.

The emission impacts and monetized benefits were allocated to the individual programs based on each program's share of the hourly impacts. The emission reductions are summarized in Table 1-10 and the monetized value of the emission impacts are summarized in Table 1-11.

Table 1-10 Summary of Emission Reductions

<i>Emissions (lb)</i>	<i>Total Emission Impacts from DR Programs</i>	<i>HEM</i>	<i>HVAC DLC</i>	<i>Customer Engagement</i>	<i>Small Business DLC</i>
SO ₂	-90	-70.4	-10.7	-8.9	0.0
NO _X	-70	-54.8	-8.3	-6.9	0.0
Ozone season NO _x	-80	-62.6	-9.5	-7.9	0.0
CO ₂	-160,080	-125,211.7	-19,087.6	-15,780.7	0.0
PM _{2.5}	-10	-7.8	-1.2	-1.0	0.0
VOCs	>0	>0	>0	>0	>0
NH ₃	>0	>0	>0	>0	>0

Note: AVERT rounds impacts to the nearest 10 units. Values of >0 indicate non-zero results, but within +/- 10 units.

Table 1-11 Monetized Emission Impacts

<i>Benefit</i>	<i>Total Emission Impacts from DR Programs</i>	<i>HEM</i>	<i>HVAC DLC</i>	<i>Customer Engagement</i>
Total Health Effects from PM _{2.5}	\$5,850	\$4,576	\$698	\$577
Total Health Effects from O ₃	\$2,300	\$1,799	\$274	\$227
CO ₂ Reduction Valuation @ \$190 per metric ton	\$13,796	\$10,791	\$1,645	\$1,360
Total Value of Emission Reductions	\$21,946	\$17,166	\$2,617	\$2,163

1.5. Load Shifting Metrics

For each time-of-use program, Table 1-12 shows the estimated annual energy usage that occurred during off-peak periods, which would have otherwise been consumed during on-peak periods if the program account customers exhibited similar consumption patterns to the control groups referenced to perform impact analysis.

Table 1-12 Load Shifting Program Metrics

<i>Program</i>	<i>kWh</i>	<i>kWh per Enrolled Account</i>
Commercial EV Time-of-Use	1,160,982	2,497
Residential Time-of-Use	863,143	500
Residential EV Time-of-Use	1,462,605	3,236

1.6. Evaluation Findings and Recommendations

1.6.1. Commercial Time-of-Use

The account population increased from 456 in 2024 to 465 in 2025, however the kW savings increased from 232.96 to 328.31. Similarly, the annualized on-peak kWh savings increased from 829,312 to 1,022,577.

1.6.2. Residential Time-of-Use

Enrollment and savings in the residential TOU program have remained stable from 2024 to 2025. Enrollment increased from 1,492 to 1,727 accounts). The aggregated peak-demand savings remained increased from 211.53 kW in 2024 to 249.60 kW in 2025. The residential EV TOU impact was 341.41 kW.

1.6.3. Home Energy Management

Event-level mean hourly demand reductions are consistently in the 5.8–8.3 MW range, with maximum hourly reductions between about 7.0 and 9.8 MW. Across all nine events, the event-level mean hourly kW reduction ranges from 5,804.94 kW (7/30) to 8,341.44 kW (7/24), with multiple events clustered in the 6.7–7.7 MW range (e.g., 7,638.79 kW on 6/23 and 7,497.89 kW on 6/24). The per-participant results closely mirror this consistency, with average hourly reductions typically around 0.8–1.2 kW and maximum event-hour impacts between 1.0 and 1.41 kW.

The dispatch strategy appears well targeted to PJM’s 5 coincident peak hours. Four of the nine events were flagged as coincident with 5CP (6/23, 6/24, 7/28, 7/29), and for the days with identified PJM coincident peaks the peak occurs during the hour ending 6:00 PM. On those days, event windows consistently include the 5–6 PM hour and often capture some of the largest hourly reductions: 6/23 and 6/24 show 9,161 kW and 9,200 kW reductions in the 4–5 PM hour and 6,116 kW and 5,795 kW in 5–6 PM, while 7/28 and 7/29 show 7,169 kW and 6,582 kW in the 5–6 PM hour, respectively. This indicates that the DR program is not only aligned with peak hours but is also performing robustly during the most system-critical period.

Across events, the largest hourly reductions consistently occur in the early portion of the event window, particularly 4–5 PM. For example, 4–5 PM reductions reach 9,161–9,200 kW on 6/23–6/24 and 9,831 kW on 7/24, representing the maximum event hour for those days. Reductions in 5–6 PM remain substantial but are generally smaller than 4–5 PM (e.g., 6,116–6,851 kW on those same days). For events that extend into a third hour (such as 7/25, 7/28, 7/30 with 3–6 PM windows and 7/29 with a 4–7 PM window), reductions are generally lower in the last hour compared to the first event hour (refer to the event performance plots that show the decline in performance). At the participant level, this pattern is mirrored by maximum hourly reductions in the 1.0–1.41 kW range, with event-level averages around 0.83–1.19 kW, suggesting customers deliver their strongest response at event start with some attrition over time.

Event-level mean reductions are generally strong but show some variation across the season. Early-season events in late June cluster around 6.8–7.6 MW averages (6/23–6/26), and the 7/24 event reaches the highest mean at 8.34 MW. In contrast, 7/25 and 7/30 have lower event-level means of 5.84 MW and 5.80 MW, respectively, despite similar event windows to other days. While this variation could be explained by weather, baseline conditions, or participation patterns (information not provided here), the pattern indicates that performance is not flat across the season and may warrant ongoing tracking and diagnostics.

1.6.4. Residential HVAC DLC

HVAC DLC delivered consistent, meaningful per-participant reductions in June, but device control failures prevented the program from delivering expected load reductions in July events. Average participant reductions during the June 23–25 events ranged from 0.75 to 0.92 kW per participant during the core event hours (4–6 PM), with event-level mean hourly reductions of 0.81–0.87 kW. This performance is consistent with typical residential HVAC DLC outcomes and demonstrates that devices and control logic were initially operating effectively. After June 25, events essentially produced no measurable load impacts because devices were not executing control signals. This control failure fully explains the sharp decline in performance in the late-season events, including negative or near-zero impacts during two PJM coincident peak hours.

- **Recommendation 1.** Establish protocols that reduce the risk of future event non-performance. I&M should require the implementation partner to monitor device responsiveness leading up to each event and report when units fail to communicate or acknowledge control signals within a defined timeframe (such as 24 hours prior to dispatch). Internally, the program should review device-level performance indicators before each event to ensure that the portfolio is operational and ready for dispatch. These steps would reduce the likelihood of multiple non-performing events and strengthen the program's reliability during critical peak periods.

Event timing generally aligned well with PJM 5CP hours, but realized performance during some CP hours was weak or negative, reducing capacity value. I&M successfully dispatched

events coincident with four of the five PJM 5CP days, and three of those 5CP hours aligned directly with evaluated events (June 23, June 24, July 28, July 29). However, the quality of load reduction during 5CP hours was highly variable: June 23 and 24 produced large reductions (2,132 kW and 1,725 kW), July 29 delivered only a modest 16 kW reduction, and July 28 produced a net increase of 42 kW during the CP hour. As a result, while the program demonstrated strong dispatch timing, the effective capacity contribution across all 5CP hours is diluted by poor July performance, limiting the program’s reliability from a system planning perspective.

1.6.5. Residential Customer Engagement Demand Response

Four of the five PJM coincident peak (5CP) days aligned with program events, and these hours produced some of the strongest load impacts of the season. Reductions during 5CP hours ranged from 482 kW to 967 kW, with an average of 763 kW, indicating that customers reliably shifted or reduced usage during the highest-value hours. Aligning with 5CP days is crucial for capacity benefits, and the program demonstrated operational success in targeting these system peaks.

Several events, particularly 6/23, 6/24, 7/28, and 7/29, produced consistent reductions in the 4–6 PM window. Other events (e.g., 6/25 and 7/25) showed low or negative adjustments in certain hours. Hour-over-hour variation reflects differences in weather, baseline usage, participant engagement, and the inherently voluntary nature of behavioral response.

Per-participant load impacts were modest but scale effectively given the large population. Average participant reductions ranged from 0.04 to 0.10 kW in the core event hours. Although these impacts are small at the individual household level—as expected for a behavioral DR offering—they aggregate to substantial system benefits. Some hours show near-zero or slight positive usage increases, reflecting normal behavioral noise and the challenge of driving consistent customer action without automated controls.

Program performance was sustained across the summer without evidence of participant fatigue. Impacts in late-July events were as strong or stronger than early-season events. This indicates that customers remained attentive to event notifications and that messaging retained effectiveness throughout the summer. Behavioral programs can suffer declining engagement over time, but this pattern was not observed.

While event-level demand reductions varied in magnitude, the pattern of results does not indicate any decline in performance as the season progressed. Per-participant demand reductions fluctuated from one event to another, with average reductions in the 4 to 6 PM window generally ranging between 0.04 and 0.10 kW. Some hours showed lower or slightly negative values, which is typical for behavioral demand response due to normal variation in customer usage rather than controlled load curtailment. Importantly, several of the highest

per-participant reductions occurred in late-season events, such as the 0.09–0.11 kW reductions on 7/28 and strong performance again on 7/29, indicating that participant responsiveness did not diminish as the summer progressed. The absence of a downward trend suggests that customers remained consistently engaged throughout the program season.

1.7. Organization of Report

This report provides information on the evaluation of the Indiana Michigan Power portfolio of residential programs implemented in Indiana during the 2025 program year. It is organized as follows:

- Chapter 2: Small Business DLC
- Chapter 3: Work Thermostat
- Chapter 4: Commercial Critical Peak Pricing
- Chapter 5: Commercial Time-of-Use
- Chapter 6: Voluntary Curtailment Service
- Chapter 7: Residential Critical Peak Pricing
- Chapter 8: Residential Time-of-Use
- Chapter 9: Home Energy Management
- Chapter 10: Residential HVAC DLC
- Chapter 11: Residential IQ Water Heater DLC
- Chapter 12: Residential Customer Engagement Demand Response

2. Small Business DLC

This chapter presents the evaluation of the Small Business DLC Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2025 through December 2025.

2.1. Program Description

The Commercial Small Business DLC Program is offered to small commercial I&M customers with an AMI meter.

Through this program, I&M will install a Pelican Wireless Energy Management System at no cost to customers. This system will enable I&M to make small adjustments to customers' air conditioner during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers earn a \$1.95 bill credit for each event.

There were no customers enrolled in the Small Business DLC Program in PY2025.

3. Work Thermostat

This chapter presents the evaluation for the Work Thermostat Program that Indiana Michigan Power (I&M) is offering to its commercial customers during the period of January 2025 through December 2025.

3.1. Program Description

The Work Thermostat Program is offered to commercial I&M customers with an AMI meter.

Through this program, I&M will install a small device on participating customers' water heater that will stop electricity consumption during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers earn a \$1.95 bill credit for each event.

I&M did not operate the Work Thermostat Program in PY2025.

4. Commercial Critical Peak Pricing

This chapter presents the evaluation of the Commercial Critical Peak Pricing Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2025 through December 2025.

4.1. Program Description

The Commercial Critical Peak Pricing Program is designed to motivate, through price response, general service customers to either manage the timing of, or to conserve, usage during I&M and PJM peak and critical peak hour periods.

The program offers participants seasonally tiered on peak electricity pricing and Critical Peak period pricing for demand response events to encourage customers to:

- Reduce usage during these high-cost periods (e.g., manage thermostat settings to decrease air conditioner run time),
- Shift usage to lower priced periods or to off peak periods set forth in the pricing structure of the CPP tariff, or
- Conserve usage during high-cost periods (e.g., change appliance settings to ‘off’ to eliminate appliance energy use for the peak or high-cost periods).

Commercial Critical Peak Pricing is available to certain I&M Indiana commercial General Service tariff customers that have an advanced meter (i.e., AMI meter) installed.

Customers enrolled in the Commercial Critical Peak Pricing Program are subject to the pricing provisions set forth in the Commercial Critical Peak Pricing tariff. Customers must determine their own level of engagement in the CPP pricing tiers but can use tools provided by I&M through the AMI Data Portal to educate and inform themselves on their individual usage level and timing.

I&M may call Critical Peak events during a specified time period (e.g., 3 p.m. to 6 p.m. on a hot summer weekday) when it anticipates, or experiences high power system loads and/or emergency system conditions. During Critical Peak Events, Critical Peak Hours pricing applies, where the price for electricity during Critical Peak event hours is substantially higher than non-Critical Peak periods (i.e. all other pricing tiers set forth in Commercial Critical Peak Pricing).

No more than fifteen events will occur in a year. Events will be less than five hours per day.

Since Commercial Critical Peak Pricing electricity pricing is peak period focused and inherently encourages customers to take responsive action to reduce Critical Peak Hours usage, higher demand savings result during Critical Peak Events when compared to reductions during other Commercial Critical Peak Pricing cost tier periods.

Table 4-1 Summary of Commercial Peak Pricing Tariff (GS – CPP, Tariff Code 260)

<i>Winter (Off Peak Season) Months: October 1 through April 30</i>	<i>Billing Hours</i>	<i>Rates</i>
Monthly Service Charge (\$)		24.65
Energy Charge (¢ per kWh)	All Except Critical Peak	10.317
Critical Peak Hours (¢ per kWh)	When Notified	49.3
<i>Summer (On Peak Season) Months: May 1 through September 30</i>	<i>Billing Hours</i>	<i>Rates</i>
Monthly Service Charge		\$24.65
		Energy Charges (¢ per kWh)
Low-Cost Hours	Midnight – 7 AM and 9 PM - Midnight	5.906
Medium-Cost Hours	Cost Hours 7 AM – 1 PM and 7 PM – 9 PM	6.032
High-Cost Hours	1 PM – 7 PM	24.417
Critical Peak Hours	When Notified	49.3

There were no customers enrolled in the Commercial Critical Peak Pricing Program in PY2025.

5. Commercial Time-of-Use

This chapter presents the evaluation of the Commercial Time-of-Use Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2025 through December 2025.

5.1. Program Description

The Commercial Time-of-Use Program is available to General Service and Large General Service customers with an AMI meter who:

- Have 12-month average demands less than 10 kW (Tariff G.S. – TOD2).
- Have plug-in electric vehicles (PEV) (Tariff G.S – PES).
- Have 12-month average demand of less than 1,000 kW (Tariff L.G.S. – TOD).

The program is intended to shift customer energy usage from high-cost periods to low-cost periods.

The Commercial Time of Use Program includes three tariffs with variable time-of-day pricing, as summarized in Table 5-1.

Table 5-1 Summary of Commercial Time of Use Tariffs

<i>Tariff Code</i>	<i>Tariff Description</i>	<i>Price Information</i>
219	TARIFF G.S. – PEV (Stand-alone PEV Service)	All PEV Off – Peak kWh 7.36 ¢ per kWh All PEV On – Peak kWh 12.512 ¢ per kWh For the purpose of this tariff, the daily on-peak billing period is defined as 6 a.m. to 11 p.m. Off-peak billing period is defined as those hours not designated as on-peak hours
221	TARIFF G.S. – TOD2	Energy Charge: 10.440 ¢ per kWh for all low-cost hours 23.411 ¢ per kWh for all high-cost hours May through September, 2 PM to 6 PM on weekdays
220	TARIFF G.S. – PEV (Submetered PEV Time-of-Day)	-3.362 ¢ (Credit) per kWh Off-Peak \$ 1.58 second meter charge if monthly PEV use is < 250 kWh For the purpose of this tariff, the daily on-peak billing period is defined as 6 a.m. to 11 p.m. Off-peak billing period is defined as those hours not designated as on-peak hours.

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<i>Tariff Code</i>	<i>Tariff Description</i>	<i>Price Information</i>
255	Tariff L.G.S. – TOD (Primary)	On-Peak kWh 8.320 ¢ per kWh Off-Peak kWh 4.991 ¢ per kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.
253	Tariff L.G.S. – TOD (Secondary)	On-Peak kWh 9.540 ¢ per kWh Off-Peak kWh 5.371 ¢ per kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.

5.2. Data Collection

Data used to support the impact evaluation of the program included customer AMI interval electric energy usage data and associated tariff code.

5.3. Estimation of Ex Post Load Impact

5.3.1. Methodology for Estimating Ex Post Load Impact

This section outlines the methodological framework for assessing the effects of I&M's time-of-use (TOU) rate pricing on the distribution of energy usage between on-peak and off-peak periods. Given the challenges posed by insufficient pre-treatment data and the absence of an established treatment group, we used a quasi-experimental design with a matched control group. This control group served to establish a baseline for comparison, enabling the assessment of the impact of Time-of-Use (TOU) rates on energy consumption behaviors.

To establish a robust control group, we employed a distance matching approach. This method involves matching each account subject to TOU pricing (treatment group) with multiple non-TOU rate accounts (control group) based on their energy usage characteristics.

The variables for matching include:

- **kWh_total:** Mean daily kWh usage during the months the on-peak period applies, providing a baseline comparison of overall energy consumption.
- **kWh_total_month_j:** Mean daily kWh usage for each month j during the on-peak period, allowing for a comparison that accounts for monthly variations in energy usage.

The distance between each treatment account and potential control accounts is calculated using the following formula:

$$\text{Distance} = ((\text{kWh\_total\_treatment} - \text{kWh\_total\_i})^2 + \sum(\text{kWh\_total\_treatment\_monthj} - \text{kWh\_total\_monthj\_i})^2)^{.5}$$

This Euclidean distance serves as the basis for identifying the closest matches, ensuring comparability between treatment and control groups across observed aggregate energy usage characteristics.

For each treatment account, the five control accounts with the minimum distance are selected. This process aims to create a well-matched control group that mirrors the treatment group's characteristics as closely as possible, thus facilitating a more accurate estimation of the TOU pricing impact.

The analysis is predicated on two critical assumptions:

- **Shift in Energy Usage:** TOU rates are assumed to cause a shift in energy consumption from on-peak to off-peak periods without significantly altering the aggregate energy usage.
- **Absence of Self-Selection Bias:** It is assumed that individuals do not self-select into TOU rates based on their predisposition towards off-peak energy consumption.

5.3.1.1. *Effective Useful Life and Incremental Costs*

A lifetime of 20 years is applied to program energy impact, consistent with the applicable program type referenced in the most recent I&M demand response market potential study.

No incremental costs are incurred as a result of program participation.

5.3.2. Results of Ex Post Gross Load Impact

This section presents the ex post annual gross energy savings and ex post gross demand reductions associated with the 2025 Commercial Time-of-Use Program.

5.3.2.1. *Load Impact Results*

Table 5-2 presents the load impacts resulting from the Commercial Time-of-Use (TOU) Program, with results broken down according to each specific on-peak schedule. Over 98% of commercial TOU customer accounts fall under tariffs 253 and 255. On average, the hourly energy consumption during on-peak periods for the treatment group was 4.6% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 1,119,218 kWh.

This reduction of 1,119,218 kWh represents the estimated annual energy usage that occurred during off-peak periods, which would have otherwise been consumed during on-peak periods if the treatment group exhibited similar consumption patterns to the control group.

Table 5-2 Commercial Time-of-Use Program-level Load Impacts

Variable	Time of Day	Group	Tariff 253 & 255	Tariff 221	Tariff 219 & 220	Total
Average Hourly kWh Consumption	On-Peak	Treatment	14.88	2.83	1.28	n/a
		Control	15.60	2.65	1.17	n/a
	Off-Peak	Treatment	12.44	2.05	0.50	n/a
		Control	11.43	2.09	0.78	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.72	(0.19)	(0.11)	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			4.6%	-7.1%	-9.6%	4.4%
Annualized Population Difference in Average kWh On-Peak Consumption			1,162,362	(412)	(968)	1,160,982
Account Population			458.00	5.00	2.00	465
Ex Post kW Savings			329.47	(0.94)	(0.23)	328.31

5.3.2.2. *Ex Post Gross kW Savings*

Table 5-3 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 5-3 Program-level Gross kW Reduction

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>	<i>Ex Post Net kW Savings</i>	<i>Net-to-Gross Ratio</i>
1,350.11	1,350.11	1,350.11	328.31	24%	328.31	100%

5.4. Estimation of Ex Post Load Impact

5.4.1. Methodology for Estimating Net Ex Post Load Impact

The kW and kWh savings estimated using the procedures outlined in Section 5.3 are net savings estimates.

5.4.2. Results of Ex Post Net Load Impact

Table 5-4 summarizes the ex post annual net kWh and kW savings of the Commercial Time-of-Use Program. The annual net savings totaled 0 kWh and 328.31 kW.

Table 5-4 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	-	1,350.11
Gross Audited Savings	-	1,350.11
Gross Verified Savings	-	1,350.11
Ex Post Gross Savings	-	328.31
Gross Realization Rate	n/a	24%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	328.31
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	-	n/a

5.5. Findings and Recommendations

The account population increased from 456 in 2024 to 465 in 2025, however the kW savings increased from 232.96 to 328.31. Similarly, the annualized on-peak kWh savings increased from 829,312 to 1,022,577.

6. Voluntary Curtailment Service

This chapter presents the evaluation of the Voluntary Curtailment Service Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2025 through December 2025.

6.1. Program Description

The Voluntary Curtailment Service Program provides customers with the opportunity to reduce their cost of electric service by curtailing usage during Voluntary Curtailment Events requested by I&M. Upon each event, the customer has the option, but not the obligation, to curtail usage at their premises and be compensated for reducing their usage.

The Voluntary Curtailment Service Program is available to customers with a curtailable usage of at least 1,000 kW for a single account. Customers that participate in a third-party demand response program or who are receiving competitive energy services from a Curtailment Service Provider or aggregator are not eligible.

For each Voluntary Curtailment Event, Curtailed Demand is defined as the difference between the Customer's Average On-Peak Demand and the maximum sixty (60)-minute integrated demand in kW during the Voluntary Curtailment Event, and not less than zero. I&M reviews customer usage on Voluntary Curtailment Event day(s) and the non-event day immediately prior to Voluntary Curtailment Event day(s) and based on that review, issues curtailment credits any amount of customer usage reduced. The amount of the credit is the product of the curtailed demand and the number of voluntary curtailment event hours and the voluntary curtailment price, summed for each event in the calendar month.

I&M determines the Customer's Average On-Peak Demand in kW as specified in a contract addendum for service under this Rider. The Customer's Average On-Peak Demand will be reviewed at least annually. Annual, seasonal or monthly Average On-Peak Demands may be established based upon Customer's historic usage patterns. For the purpose of determining the Average On-Peak Demand, the on-peak period is defined as 7:00 a.m. to 11:00 p.m. ET for all weekdays, Monday through Friday.

There were no customers enrolled in the Voluntary Curtailment Service Program in PY2025.

7. Residential Critical Peak Pricing

This chapter presents the evaluation for the Residential Critical Peak Pricing (CPP) Program that Indiana Michigan Power (I&M) is offering to its commercial customers during the period of January 2025 through December 2025.

7.1. Program Description

The Residential CPP Program is designed to motivate, through price response, residential customers to either manage the timing of, or to conserve, usage during I&M and PJM peak and critical peak hour periods.

The program offers participants seasonally tiered on peak electricity pricing and Critical Peak period pricing for demand response events to encourage customers to:

- Reduce usage during these high-cost periods (e.g., manage thermostat settings to decrease air conditioner run time),
- Shift usage to lower priced periods or to off peak periods set forth in the pricing structure of the CPP tariff, or
- Conserve usage during high-cost periods (e.g., change appliance settings to ‘off’ to eliminate appliance energy use for the peak or high-cost periods).

Customers enrolled in the Residential CPP Program are subject to the pricing provisions set forth in the CPP tariff. Customers must determine their own level of engagement in the CPP pricing tiers but can use tools provided by I&M through the AMI Data Portal to educate and inform themselves on their individual usage level and timing.

I&M may call Critical Peak events during a specified time period (e.g., 3 p.m. to 6 p.m. on a hot summer weekday) when it anticipates, or experiences high power system loads and/or emergency system conditions. During Critical Peak Events, Critical Peak Hours pricing applies, where the price for electricity during Critical Peak event hours is substantially higher than non-Critical Peak periods (i.e. all other pricing tiers set forth in CPP).

No more than fifteen events will occur in a year. Events will be less than five hours per day.

Since CPP electricity pricing is peak period focused and inherently encourages customers to take responsive action to reduce Critical Peak Hours usage, higher demand savings result during Critical Peak Events when compared to reductions during other CPP cost tier periods.

Table 7-1 Summary of Residential Peak Pricing Tariff (R.S. – CPP, Tariff Code 060)

<i>Winter (Off Peak Season) Months: October 1 through April 30</i>	<i>Billing Hours</i>	<i>Rates</i>
Monthly Service Charge (\$)		\$14.79
Energy Charge (¢ per kWh)	All Except Critical Peak	10.318
Critical Peak Hours (¢ per kWh)	When Notified	49.3
<i>Summer (On Peak Season) Months: May 1 through September 30</i>	<i>Billing Hours</i>	<i>Rates</i>
Monthly Service Charge		\$14.79
		Energy Charges (¢ per kWh)
Low-Cost Hours	Midnight – 7 AM and 9 PM – Midnight	5.647
Medium-Cost Hours	Cost Hours 7 AM – 1 PM and 7 PM – 9 PM	6.010
High-Cost Hours	1 PM – 7 PM	23.775
Critical Peak Hours	When Notified	49.3

There were no customers enrolled in the Residential Critical Peak Pricing Program in PY2025.

8. Residential Time-of-Use

This chapter presents the results of the impact evaluation for the Residential Time-of-Use Program that Indiana Michigan Power (I&M) is offering to its residential customers during the period of January 2025 through December 2025.

8.1. Program Description

The Residential Time-of-Use Program is available to residential customers with an AMI meter. The program is intended to shift customer energy usage from high-cost periods to low-cost periods.

The Residential Time-of-Use Program includes three tariffs with variable time-of-day pricing, as summarized in Table 8-1.

Table 8-1 Summary of Residential Service Time-of-Day Tariffs

<i>Tariff Code</i>	<i>Tariff Description</i>	<i>Price Information</i>
29	RESIDENTIAL:PLUG-IN ELECTRIC VEH	-3.835 ¢ (credit) per kWh for all off-peak hours \$1.70 second meter charge if monthly PEV usage is < 250 kWh the daily on-peak billing period is defined as 6 a.m. to 11 p.m.
30	RESIDENTIAL - LOAD MANAGEMENT-ON-PK	18.465 ¢ per kWh for all on-peak kWh 6.330 ¢ per kWh for all off-peak kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.
34	RESIDENTIAL - EMP - TOD - ON-PEAK	RESIDENTIAL - EMP - TOD - ON-PEAK

8.2. Data Collection

Data used to support the impact evaluation of the program included:

- Program tracking data from the primary tracking database;
- Customer AMI billing data and associated tariff code;
- Location specific weather data; and
- Data from relevant secondary sources.

8.3. Estimation of Ex Post Load Impact

Section 5.3 presents the methodology used to estimate the load impact of the Residential Time-of-Use rates.

8.3.1.1. Effective Useful Life

A lifetime of 20 years is applied to program savings, consistent with the applicable program type referenced in the most recent I&M demand response market potential study.

No incremental costs are incurred as a result of program participation.

8.3.2. Results of Ex Post Gross Savings Estimation

This section presents the ex post annual gross energy savings and ex post gross demand reductions associated with the 2025 Residential Time-of-Use Program.

8.3.2.1. Load Impact Results

Table 8-2 presents the load impacts resulting from the Residential Time-of-Use non-EV rates, with results broken down according to each specific on-peak schedule. Eighty-eight percent of program TOU customer accounts fall under tariff 30. On average, the hourly energy consumption during on-peak periods for the treatment group was 7.4% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 863,143 kWh.

This reduction of 863,143 kWh represents the estimated annual energy usage that occurred during off-peak periods, which would have otherwise been consumed during on-peak periods if the treatment group exhibited similar consumption patterns to the control group.

Table 8-2 Residential Time-of-Use Program-level Load Impacts

Variable	Time of Day	Group	Tariff 62	Tariff 30	Tariff 34	Total
Average Hourly kWh Consumption	On-Peak	Treatment	1.28	1.80	2.43	n/a
		Control	1.31	1.95	2.69	n/a
	Off-Peak	Treatment	0.94	1.91	1.99	n/a
		Control	0.93	1.69	1.73	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.02	0.16	0.26	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			1.9%	8.0%	9.6%	7.4%
Annualized Population Difference in Average kWh On-Peak Consumption			2,000	840,795	20,348	863,143
Account Population			183	1,518	26	1,727
Ex Post kW Savings			4.55	238.32	6.73	249.60

Table 8-3 presents the load impacts resulting from the Residential EV Time-of-Use, with results broken down according to each specific on-peak schedule. On average, the hourly energy consumption during on-peak periods for the treatment group was 28.0% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 863,143 kWh.

This reduction of 1,462,605 kWh represents the estimated annual energy usage that occurred during off-peak periods, which would have otherwise been consumed during on-peak periods if the treatment group exhibited similar consumption patterns to the control group.

Table 8-3 Residential EV Time-of-Use Program-level Load Impacts

Variable	Time of Day	Group	Tariff 29	Total
Average Hourly kWh Consumption	On-Peak	Treatment	1.94	n/a
		Control	2.70	n/a
	Off-Peak	Treatment	3.82	n/a
		Control	1.99	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.76	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			28.0%	28.0%
Annualized Population Difference in Average kWh On-Peak Consumption			1,462,605	1,462,605
Account Population			452.00	452
Ex Post kW Savings			341.41	341.41

8.3.2.2. Ex Post Gross kW Savings

Table 8-4 below shows the estimated program-level ex post gross peak kW reduction resulting from the programs.

Table 8-4 Program-level Gross kW Reduction

Program	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
Residential Time-of-Use	395.08	395.08	395.08	249.60	63%	249.60	100%
Residential EV Time-of-Use	251.10	251.10	251.10	341.41	136%	341.41	100%

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Total	646.18	646.18	646.18	591.01	91%	591.01	100%

8.4. Estimation of Ex Post Net Load Impact

8.4.1. Methodology for Estimating Ex Post Net Impacts

The load impacts estimated using the procedures outlined in Section 5.3 are assumed to be net savings estimates.

8.4.2. Results of Ex Post Net Load Impact

Table 8-5 summarize the ex post annual net kWh and kW savings for Residential Time-of-Use and Residential EV Time-of-Use ex post results are shown in Table 8-6.

Table 8-5 Residential Time of Use Annual Net kWh and kW Savings

Category	kWh	kW
Ex Ante Gross Savings	-	395.08
Gross Audited Savings	-	395.08
Gross Verified Savings	-	395.08
Ex Post Gross Savings	-	249.60
Gross Realization Rate	n/a	63%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	249.60
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	-	n/a

Table 8-6 Residential EV Time of Use Annual Net kWh and kW Savings

Category	kWh	kW
Ex Ante Gross Savings	-	251.10
Gross Audited Savings	-	251.10
Gross Verified Savings	-	251.10
Ex Post Gross Savings	-	341.41
Gross Realization Rate	n/a	136%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-

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Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	341.41
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	-	n/a

8.5. Findings and Recommendations

Enrollment and savings in the residential TOU program have remained stable from 2024 to 2025. Enrollment increased from 1,492 to 1,727 accounts). The aggregated peak-demand savings remained increased from 211.53 kW in 2024 to 249.60 kW in 2025. The residential EV TOU impact was 341.41 kW.

9. Home Energy Management

This chapter presents the evaluation of the Home Energy Management Program that Indiana Michigan Power (I&M) offered its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2025.
- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.
- Provide recommendations for program improvement as appropriate.

9.1. Program Description

Home Energy Management is a demand response program that provides I&M residential customers the opportunity to enroll their smart thermostat to participate in demand response events. Enrolling customers receive a \$25 enrollment incentive (up to two incentive payments per account may be received for multiple thermostats) and may earn a \$2.40 bill credit for each event they participate in for at least 50% of the duration of the event.

Events may occur on weekdays during the months of May through September. Events typically last 2-3 hours but may last 6 hours. Up to 15 events may be called during the year. To qualify, would-be participants:

- Must be an I&M residential customer.
- Use an eligible internet-connected thermostat for cooling.
- Have continuous Wi-Fi/internet.
- Have central air conditioning.

Select Alarm.com, Amazon, ecobee, Emerson, Google Nest, Honeywell Home thermostats, and Lux thermostats qualify for the program.

9.2. Data Collection

Data used to support the impact evaluation of the program included:

- Program tracking data from the primary tracking database;
- Customer AMI billing data and associated tariff code.
- Location specific weather data.
- Data from relevant secondary sources.

9.3. Estimation of Ex Post Gross Savings

9.3.1. Methodology for Estimating Ex Post Gross Energy Savings

9.3.1.1. Analysis of Peak Event Reductions and Energy Savings

To estimate the program ex post energy and demand savings, ADM used AMI data from a census of participants to estimate the program ex post energy and demand savings.

To perform the season-level analysis of event peak demand reductions and energy savings, hourly baseline energy usage, ADM used a propensity score matching approach to develop a control group of non-participant customers for baseline development. Using Euclidean distance matching, we selected a set of match days to serve as proxies for each event day in each state. Match days, chosen from non-holiday, summer weekdays during the program year, were based on weather and energy usage of non-participant residential customers. For each event date, ADM selected the three days with the closest average usage and weather as match days. Through this process, a match day may have been chosen multiple times for different events, but an event day cannot serve as a match day for another event.

After determining the match days, for each event, we compared the energy usage of participants on non-event days with that of non-participants on non-event days to identify a control group match for each participant.

To facilitate control group creation, we constructed the following variables:

- kWh_12_14 = mean hourly kWh during 12:00 PM - 3:00 PM
- kWh_15_17 = mean hourly kWh during 3:00 PM - 6:00 PM
- kWh_18_20 = mean hourly kWh during 6:00 PM - 9:00 PM
- kWh = mean hourly kWh during all hours

We then calculated a distance variable for each potential control match account for each treatment account:

Equation 9-1 Euclidean Distance Calculation

$$\text{Distance} = ((\text{kWh}_{12\_14_{\text{treatment}}} - \text{kWh}_{12\_14_i})^2 + (\text{kWh}_{15\_17_{\text{treatment}}} - \text{kWh}_{15\_17_i})^2 + (\text{kWh}_{18\_20_{\text{treatment}}} - \text{kWh}_{18\_20_i})^2 + (\text{kWh}_{\text{treatment}} - \text{kWh}_i)^2)^{.5}$$

For each treatment account, the potential control account with the minimum distance was selected as the match account, applying a tie-breaking procedure if needed.

With the control group selected, we determined the average hourly event day usage. The control group's average usage served as a preliminary baseline. This baseline was adjusted by a normalization factor equal to $(\text{kWh}_{\text{treatment}} / \text{kWh}_{\text{control}})$, based on usage values two hours prior to

the first event hour. As the average non-event hour usage of treatment and control groups on event days was similar, the adjustment factor generally varied little from 1.0.

The table below shows the match days selected.

Table 9-1 Match Days

<i>Event Date</i>	<i>Match Days</i>
6/23/2025	7/15/2025
	7/23/2025
	7/11/2025
7/24/2025	7/16/2025
	6/27/2025
	5/16/2025
6/24/2025	6/27/2025
	7/3/2025
	7/8/2025
7/25/2025	6/16/2025
	7/22/2025
	6/30/2025
6/25/2025	7/23/2025
	7/11/2025
	7/3/2025
6/26/2025	5/15/2025
	7/11/2025
	6/3/2025
7/28/2025	6/11/2025
	7/2/2025
	7/10/2025
7/29/2025	7/23/2025
	7/15/2025
	6/17/2025
7/30/2025	5/12/2025
	7/7/2025
	6/19/2025

9.3.1.2. Analysis of Peak Event Reductions and Energy Savings

ADM referenced demand reduction during events, precooling periods, and snapback to calculate average annual energy savings. The equation for this shown below (Equation 9-2) is based on reference to hourly data. The summation will occur for all periods during the event and for two hours before and after the event (to cover precooling/load shifting and snapback periods).

Equation 9-2 Estimation of Energy Savings

$$kWh_{saved} = \sum_t kW_t^{reduction}$$

9.3.1.3. Effective Useful Life

To calculate lifetime kWh savings, ADM applied a lifetime of 20 years to program savings, consistent with the applicable program type referenced in the most recent I&M demand response market potential study.

No incremental costs are incurred as a result of program participation.

9.3.2. Results of Ex Post Gross Savings Estimation

This section presents the ex post annual gross energy savings and ex post gross demand reductions resulting from the 2025 Home Energy Management.

I&M initiated 9 load management events during the summer of 2025. As shown in Table 9-2 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 9-2 Demand Response Event Times

Date	Event Start Time	Event Stop Time	Event Coincident with 5CP	PJM Coincident Peak Occurred During Hour Ending
6/23/2025	4:00 PM	6:00 PM	Yes	6:00 PM
6/24/2025	4:00 PM	6:00 PM	Yes	6:00 PM
6/25/2025	4:00 PM	6:00 PM	No	
6/26/2025	2:00 PM	4:00 PM	No	
7/24/2025	4:00 PM	6:00 PM	No	
7/25/2025	3:00 PM	6:00 PM	No	
7/28/2025	3:00 PM	6:00 PM	Yes	6:00 PM
7/29/2025	4:00 PM	7:00 PM	Yes	6:00 PM
7/30/2025	3:00 PM	6:00 PM	No	

ADM calculated the demand reductions for each event hour. Table 9-3 provides aggregate hourly results for both the demand response events, as well as the one-hour precooling and one-hour snapback period following the event. In the table below, we represent non-event hours with gray fill, and PJM 5CP hours corresponding with events with red font.

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Table 9-3 kW Reductions for Event Days by Hour

Date	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	3:00 PM - 4:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	Event-Level Mean Hourly kW Reduction	Maximum Event Hour kW Reduction
6/23/2025			-4,090.61	9,161.11	6,116.47	-2,586.68	7,638.79	9,161.11
6/24/2025			-4,272.07	9,200.30	5,795.49	-2,849.01	7,497.89	9,200.30
6/25/2025			-4,703.44	8,267.96	5,661.28	-3,022.03	6,964.62	8,267.96
6/26/2025	-5,184.73	7,686.37	5,893.83	-2,515.78			6,790.10	7,686.37
7/24/2025			-4,448.11	9,831.90	6,850.98	-2,558.12	8,341.44	9,831.90
7/25/2025		-6,703.82	7,012.25	6,067.07	4,449.52	-3,797.27	5,842.95	7,012.25
7/28/2025		-6,271.63	7,880.16	7,169.58	5,293.28	-3,408.06	6,781.00	7,880.16
7/29/2025			-4,912.08	9,274.35	6,582.89	4,292.56	6,716.60	9,274.35
7/30/2025		-5,943.24	7,585.59	5,944.62	3,884.60	-3,933.51	5,804.94	7,585.59

Table 9-4 presents average participant demand reductions for each event hour.

Table 9-4 Average Participant kW Reductions for Event Days by Hour

Date	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	3:00 PM - 4:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	Event-Level Mean Hourly kW Reduction	Maximum Event Hour kW Reduction
6/23/2025			-0.61	1.36	0.91	-0.38	1.14	1.36
6/24/2025			-0.63	1.36	0.86	-0.42	1.11	1.36
6/25/2025			-0.70	1.23	0.84	-0.45	1.03	1.23
6/26/2025	-0.77	1.14	0.87	-0.37			1.01	1.14
7/24/2025			-0.64	1.41	0.98	-0.37	1.19	1.41
7/25/2025		-0.96	1.00	0.87	0.64	-0.54	0.84	1.00
7/28/2025		-0.89	1.12	1.02	0.75	-0.49	0.97	1.12
7/29/2025			-0.70	1.32	0.94	0.61	0.95	1.32
7/30/2025		-0.85	1.08	0.85	0.55	-0.56	0.83	1.08

Table 9-5 presents a summary of the aggregate demand reductions occurring during PJM 5CP hours.

Table 9-5 Summary of kW Reductions during PJM 5CP Events

Date	Hour Start	Hour End	Ex Post Net kW Savings
6/23/2025	5:00 PM	6:00 PM	6,116.47
6/24/2025	5:00 PM	6:00 PM	5,795.49
6/25/2025	2:00 PM	3:00 PM	n/a

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7/28/2025	5:00 PM	6:00 PM	5,293.28
7/29/2025	5:00 PM	6:00 PM	6,582.89
Maximum Event Hour Peak kW Reduction			6,582.89
Average Event Hour Peak kW Reduction			5,947.03

Figure 9-1 through Figure 9-9 graphically present average participant actual and predicted energy usage for each event day.

Figure 9-1 June 23, 2025 Event Average Participant Actual and Predicted Energy Usage

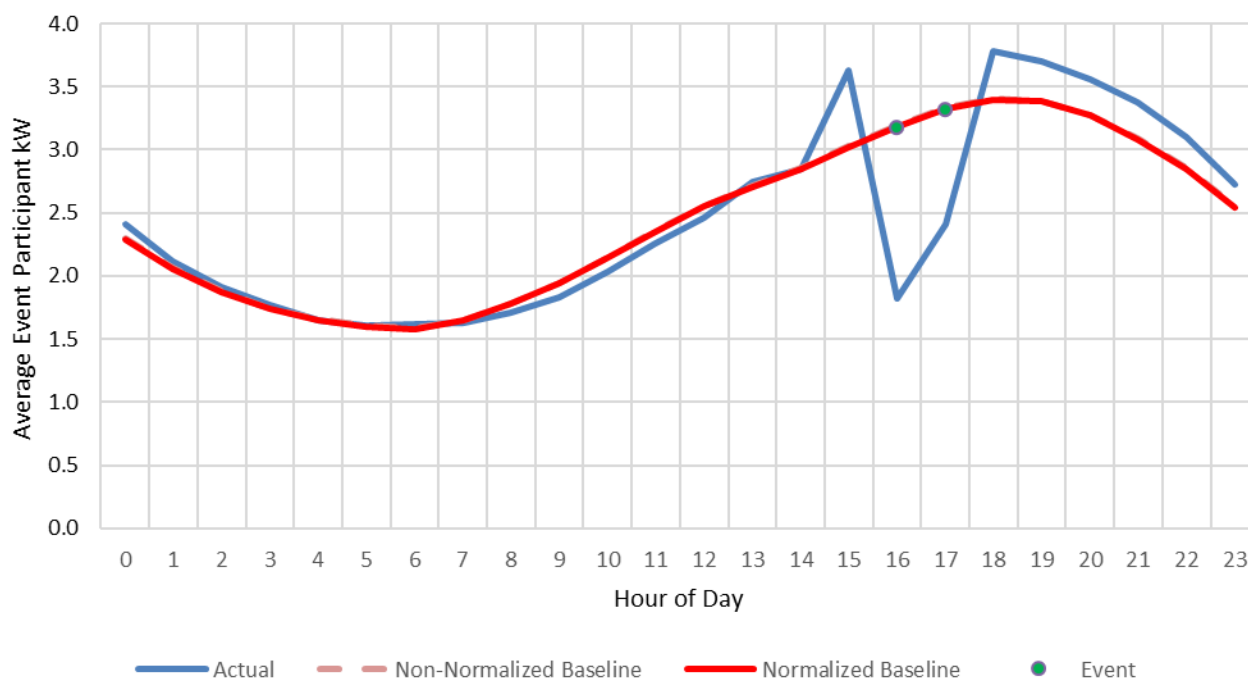


Figure 9-2 June 24, 2025 Event Average Participant Actual and Predicted Energy Usage

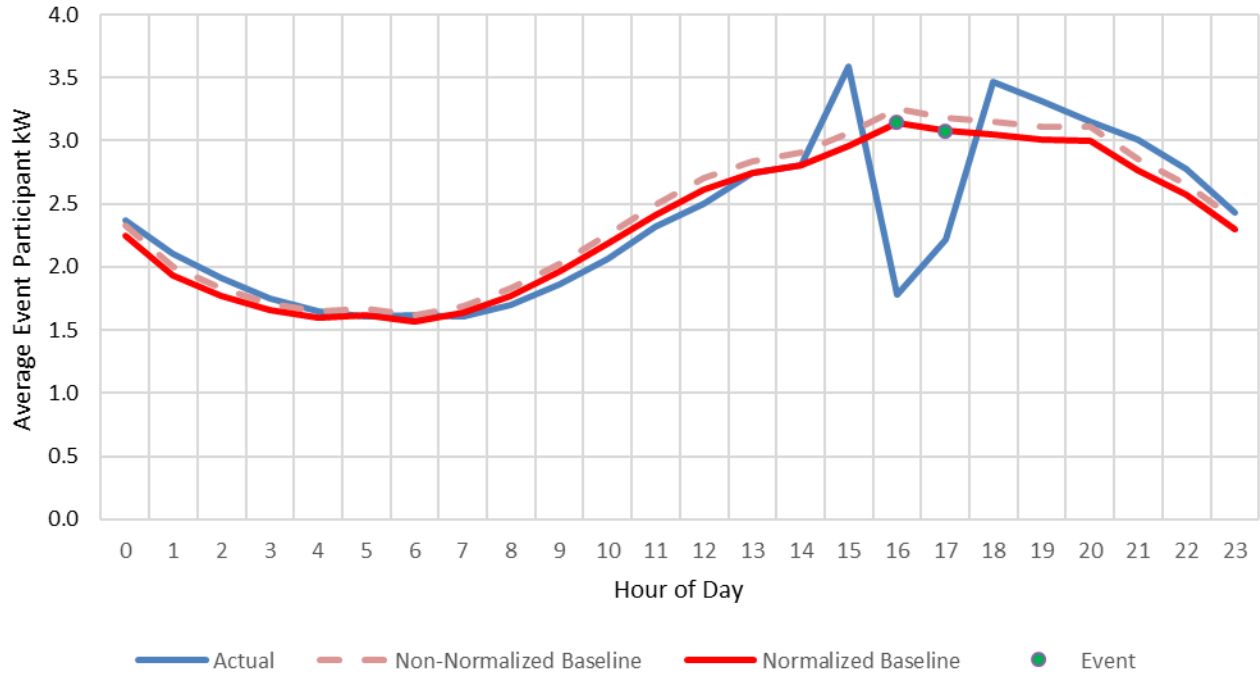


Figure 9-3 June 25, 2025 Event Average Participant Actual and Predicted Energy Usage

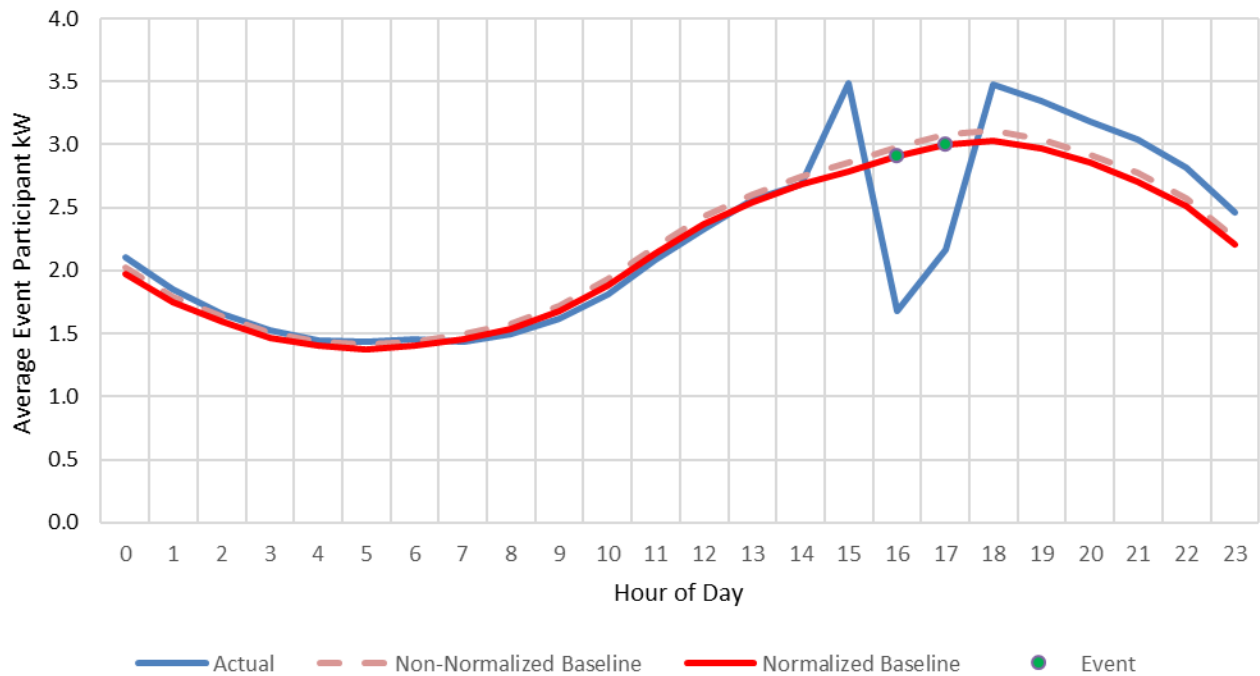


Figure 9-4 June 26, 2025 Event Average Participant Actual and Predicted Energy Usage

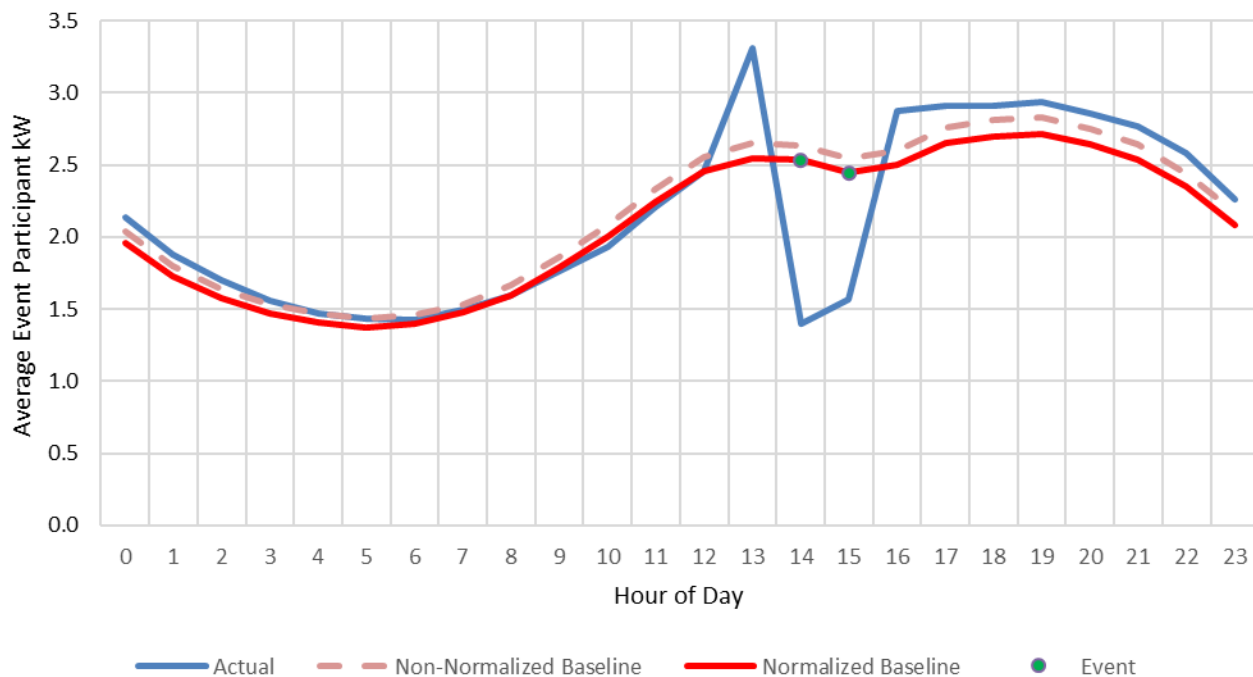


Figure 9-5 July 24, 2025 Event Average Participant Actual and Predicted Energy Usage

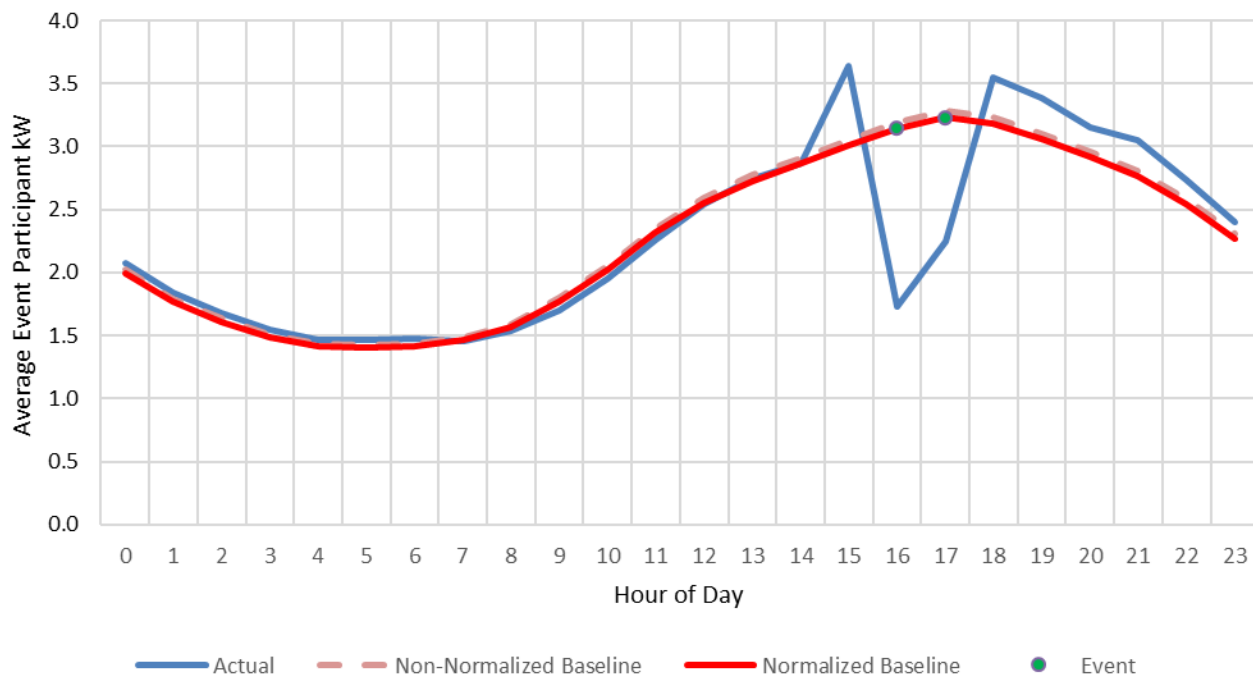


Figure 9-6 July 25, 2025 Event Average Participant Actual and Predicted Energy Usage

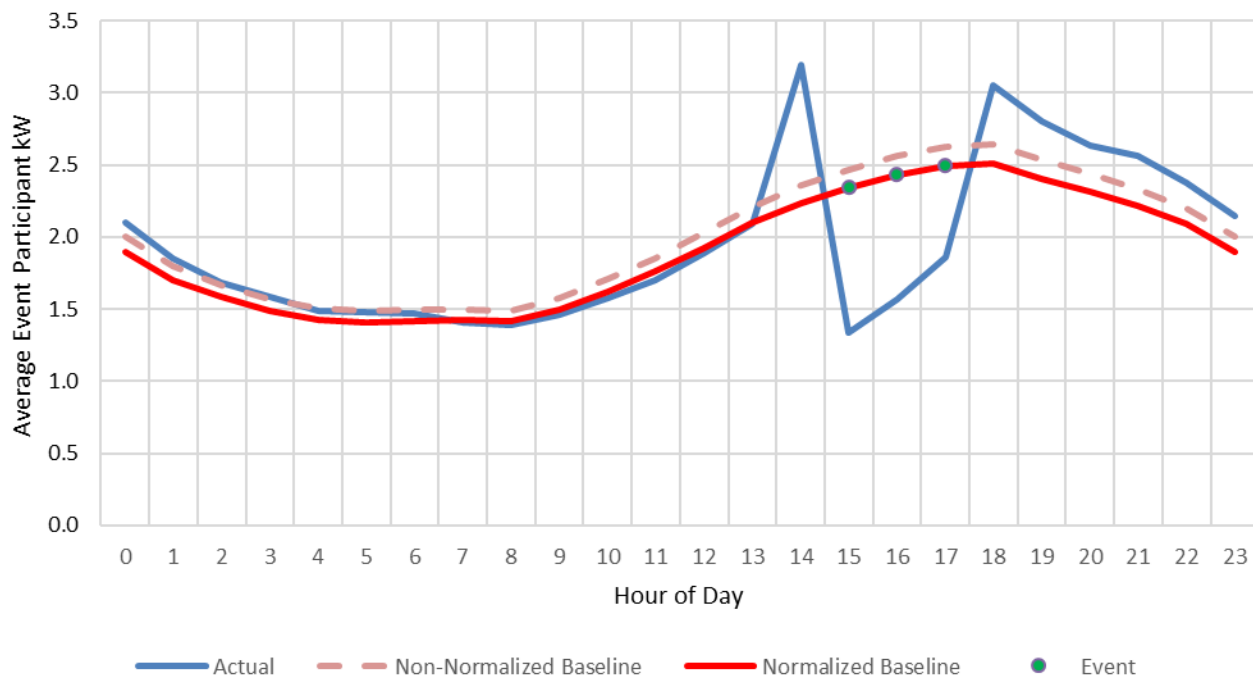


Figure 9-7 July 28, 2025 Event Average Participant Actual and Predicted Energy Usage

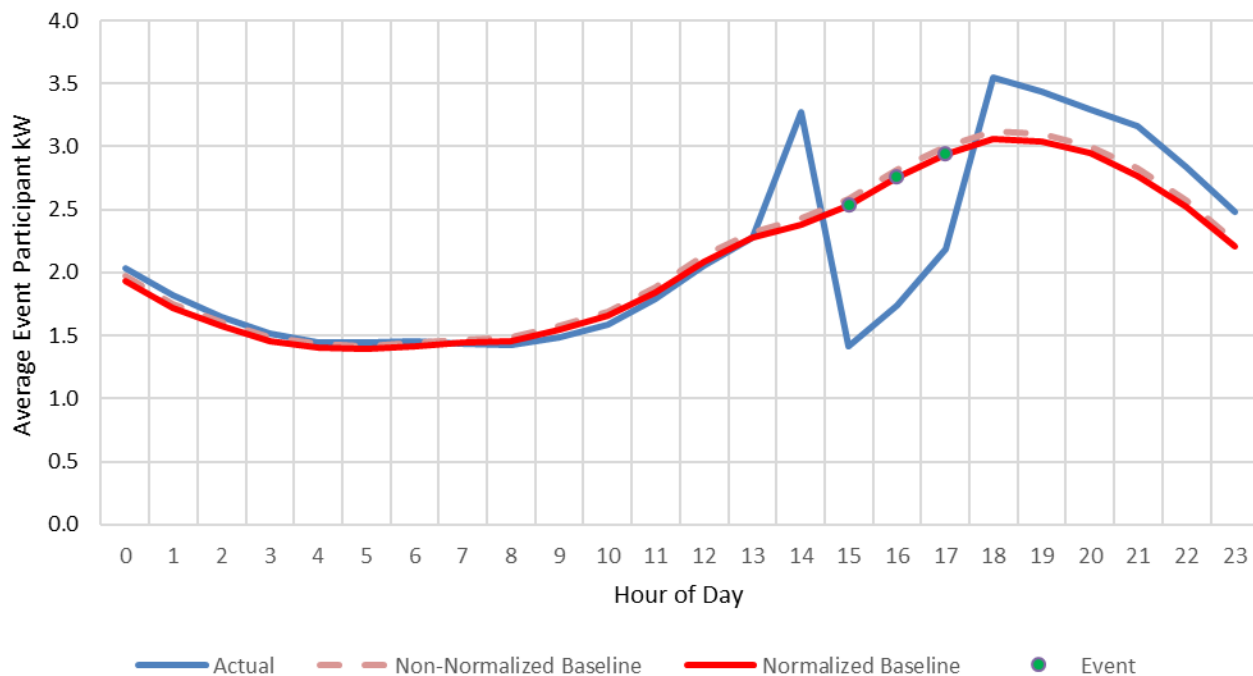


Figure 9-8 July 29, 2025 Event Average Participant Actual and Predicted Energy Usage

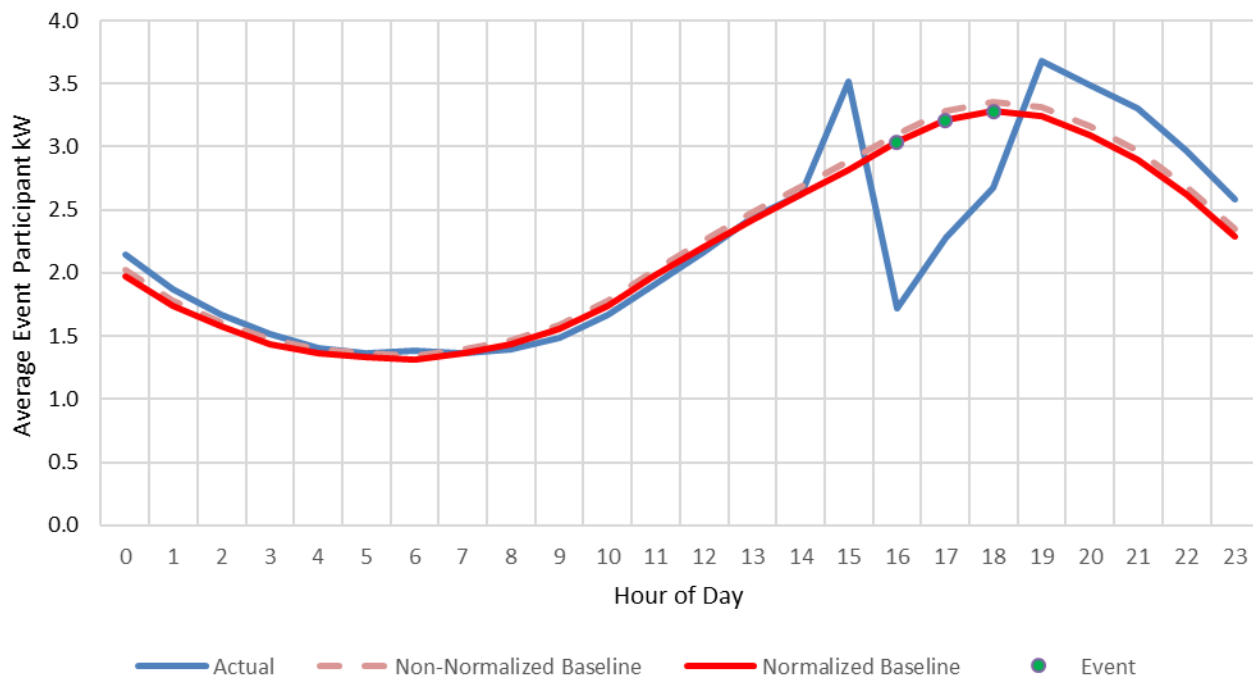
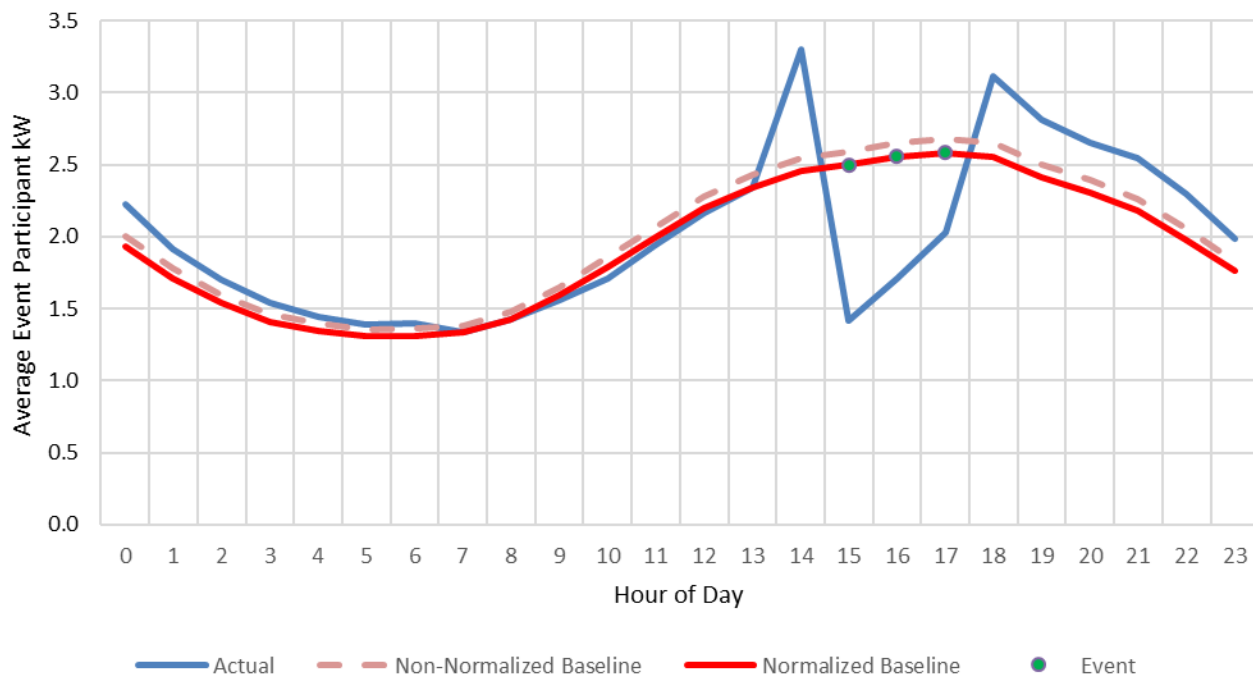


Figure 9-9 July 30, 2025 Event Average Participant Actual and Predicted Energy Usage



9.3.2.1. Ex Post Gross kWh Savings

Table 9-6 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 9-6 Program-Level Annual Gross kWh Savings

<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
70,442	70,442	70,442	78,702	112%

9.3.2.2. Ex Post Gross kW Savings

Table 9-7 below shows the estimated program-level ex post gross peak kW reduction resulting from the program. The overall gross kW realization rate for the program is 86%.

Table 9-7 Program-level Gross kW Reduction

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
6,938.08	6,938	6,938.08	5,947.03	86%

9.4. Estimation of Ex Post Net Savings

9.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 9.3 are net savings estimates.

9.4.2. Results of Ex Post Net Savings Estimation

Table 9-8 summarizes the ex post annual net kWh and kW savings of the Home Energy Management Program. The annual net savings totaled 78,702 kWh and 5,947.03 kW.

Table 9-8 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	70,442	6,938.08
Gross Audited Savings	70,442	6,938.08
Gross Verified Savings	70,442	6,938.08
Ex Post Gross Savings	78,702	5,947.03
Gross Realization Rate	112%	86%

Category	kWh	kW
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	78,702	5,947.03
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	1,574,040	N/A

9.5. Findings and Recommendations

Event-level mean hourly demand reductions are consistently in the 5.8–8.3 MW range, with maximum hourly reductions between about 7.0 and 9.8 MW. Across all nine events, the event-level mean hourly kW reduction ranges from 5,804.94 kW (7/30) to 8,341.44 kW (7/24), with multiple events clustered in the 6.7–7.7 MW range (e.g., 7,638.79 kW on 6/23 and 7,497.89 kW on 6/24). The per-participant results closely mirror this consistency, with average hourly reductions typically around 0.8–1.2 kW and maximum event-hour impacts between 1.0 and 1.41 kW.

The dispatch strategy appears well targeted to PJM’s 5 coincident peak hours. Four of the nine events were flagged as coincident with 5CP (6/23, 6/24, 7/28, 7/29), and for the days with identified PJM coincident peaks the peak occurs during the hour ending 6:00 PM. On those days, event windows consistently include the 5–6 PM hour and often capture some of the largest hourly reductions: 6/23 and 6/24 show 9,161 kW and 9,200 kW reductions in the 4–5 PM hour and 6,116 kW and 5,795 kW in 5–6 PM, while 7/28 and 7/29 show 7,169 kW and 6,582 kW in the 5–6 PM hour, respectively. This indicates that the DR program is not only aligned with peak hours but is also performing robustly during the most system-critical period.

Across events, the largest hourly reductions consistently occur in the early portion of the event window, particularly 4–5 PM. For example, 4–5 PM reductions reach 9,161–9,200 kW on 6/23–6/24 and 9,831 kW on 7/24, representing the maximum event hour for those days. Reductions in 5–6 PM remain substantial but are generally smaller than 4–5 PM (e.g., 6,116–6,851 kW on those same days). For events that extend into a third hour (such as 7/25, 7/28, 7/30 with 3–6 PM windows and 7/29 with a 4–7 PM window), reductions are generally lower in the last hour compared to the first event hour (refer to the event performance plots that show the decline in performance). At the participant level, this pattern is mirrored by maximum hourly reductions in the 1.0–1.41 kW range, with event-level averages around 0.83–1.19 kW, suggesting customers deliver their strongest response at event start with some attrition over time.

Event-level mean reductions are generally strong but show some variation across the season. Early-season events in late June cluster around 6.8–7.6 MW averages (6/23–6/26), and the 7/24 event reaches the highest mean at 8.34 MW. In contrast, 7/25 and 7/30 have lower event-level means of 5.84 MW and 5.80 MW, respectively, despite similar event windows to other days. While

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this variation could be explained by weather, baseline conditions, or participation patterns (information not provided here), the pattern indicates that performance is not flat across the season and may warrant ongoing tracking and diagnostics.

10. Residential HVAC DLC

This chapter presents the evaluation of the Residential HVAC DLC Program that Indiana Michigan Power (I&M) offered its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2025.
- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.
- Provide recommendations for program improvement as appropriate.

10.1. Program Description

The Residential HVAC DLC Program is offered to income qualified (income less than or equal to 200% of the federal poverty level) and/or senior citizen (age 65+) residential customers with AMI meters installed. Customers must own a working central air conditioning unit and have slow or unreliable internet service.

The Program is designed to test and demonstrate how AMI system connectivity can:

- Differently engage specific residential customer segments.
- Provide customers with a DLC demand response offering that requires little to no customer involvement.
- Require no customer ownership of DLC equipment.
- Augment I&M's demand response capabilities.

I&M will install a small device on participating customers' exterior air conditioning equipment that will cycle the compressor during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers earn a \$2.40 bill credit for each event.

10.2. Data Collection

Data used to support the impact evaluation of the program included:

- Program tracking data from the primary tracking database.
- Customer AMI billing data.
- Location specific weather data.
- Data from relevant secondary sources.

10.3. Estimation of Ex Post Gross Savings

10.3.1. Methodology for Estimating Ex Post Gross Energy Savings

10.3.1.1. Analysis of Peak Event Reductions and Energy Savings

The methodology discussed in Section 9.3.1.1 was used to estimate the savings resulting from the Peak Event Reductions.

10.3.1.2. Effective Useful Life

To calculate lifetime kWh savings, ADM applied a lifetime of 20 years to program savings, consistent with the applicable program type referenced in the most recent I&M demand response market potential study.

No incremental costs are incurred as a result of program participation.

10.3.2. Results of Ex Post Gross Savings Estimation

This section presents the ex post annual gross energy savings and ex post gross demand reductions resulting from the 2025 Residential HVAC DLC.

I&M initiated nine (9) load management events during the summer of 2025. As shown in Table 10-1 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days. However, event performance was poor during the July events because of device communication issue.

Table 10-1 Demand Response Event Times

<i>Date</i>	<i>Event Start Time</i>	<i>Event Stop Time</i>	<i>Event Coincident with 5CP</i>	<i>PJM Coincident Peak Occurred During Hour Ending</i>
6/23/2025	4:00 PM	6:00 PM	Yes	6:00 PM
6/24/2025	4:00 PM	6:00 PM	Yes	6:00 PM
6/25/2025	4:00 PM	6:00 PM	No	
6/26/2025	2:00 PM	4:00 PM	No	
7/24/2025	4:00 PM	6:00 PM	No	
7/25/2025	3:00 PM	6:00 PM	No	
7/28/2025	3:00 PM	6:00 PM	Yes	6:00 PM
7/29/2025	4:00 PM	7:00 PM	Yes	6:00 PM
7/30/2025	3:00 PM	6:00 PM	No	

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The demand reductions were calculated for each event hour. Aggregate hourly results are provided below in Table 10-2 for both the demand response events, as well as the one-hour precooling and one-hour snapback period following the event. In the table below, non-event hours are represented with gray fill, and PJM 5CP hours corresponding with events are represented with red font.

Table 10-2 kW Reductions for Event Days by Hour

<i>Date</i>	<i>1:00 PM - 2:00 PM</i>	<i>2:00 PM - 3:00 PM</i>	<i>3:00 PM - 4:00 PM</i>	<i>4:00 PM - 5:00 PM</i>	<i>5:00 PM - 6:00 PM</i>	<i>6:00 PM - 7:00 PM</i>	<i>Event-Level Mean Hourly kW Reduction</i>	<i>Maximum Event Hour kW Reduction</i>
6/23/2025			-45.30	1,905.49	2,132.30	-204.29	2,018.90	2,132.30
6/24/2025			79.36	1,998.12	1,724.89	-729.67	1,861.51	1,998.12
6/25/2025			72.16	1,739.17	1,978.30	-109.30	1,858.73	1,978.30
6/26/2025	-37.12	-72.44	-15.84	55.75			-44.14	55.75
7/24/2025			61.50	91.30	50.34	45.64	70.82	91.30
7/25/2025		4.89	118.66	31.97	40.02	55.70	63.55	118.66
7/28/2025		-185.69	-115.15	-37.75	-41.98	-134.26	-64.96	-37.75
7/29/2025			34.22	-19.36	16.48	105.48	34.20	105.48
7/30/2025		-68.05	-109.55	-318.41	-87.83	-90.81	-171.93	-68.05

Table 10-3 presents average participant demand reductions for each event hour.

Table 10-3 Average Participant kW Reductions for Event Days by Hour

<i>Date</i>	<i>1:00 PM - 2:00 PM</i>	<i>2:00 PM - 3:00 PM</i>	<i>3:00 PM - 4:00 PM</i>	<i>4:00 PM - 5:00 PM</i>	<i>5:00 PM - 6:00 PM</i>	<i>6:00 PM - 7:00 PM</i>	<i>Event-Level Mean Hourly kW Reduction</i>	<i>Maximum Event Hour kW Reduction</i>
6/23/2025			-0.02	0.82	0.92	-0.09	0.87	0.92
6/24/2025			0.03	0.87	0.75	-0.32	0.81	0.87
6/25/2025			0.03	0.76	0.86	-0.05	0.81	0.86
6/26/2025	-0.02	-0.03	-0.01	0.02			-0.02	0.02
7/24/2025			0.03	0.04	0.02	0.02	0.03	0.04
7/25/2025		0.00	0.05	0.01	0.02	0.02	0.03	0.05
7/28/2025		-0.08	-0.05	-0.02	-0.02	-0.06	-0.03	-0.02
7/29/2025			0.01	-0.01	0.01	0.05	0.01	0.05
7/30/2025		-0.03	-0.05	-0.14	-0.04	-0.04	-0.08	-0.03

A summary of the aggregate demand reductions occurring during PJM 5CP hours is presented below in Table 10-4.

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Table 10-4 Summary of kW Reductions during PJM 5CP Events

<i>Date</i>	<i>Hour Start</i>	<i>Hour End</i>	<i>Ex Post Net kW Savings</i>
6/23/2025	5:00 PM	6:00 PM	2,132.30
6/24/2025	5:00 PM	6:00 PM	1,724.89
6/25/2025	2:00 PM	3:00 PM	n/a
7/28/2025	5:00 PM	6:00 PM	-41.98
7/29/2025	5:00 PM	6:00 PM	16.48
Maximum Event Hour Peak kW Reduction			2,132.30
Average Event Hour Peak kW Reduction			957.93

Figure 9-1 through Figure 9-9 graphically present average participant actual and predicted energy usage for each event day.

Figure 10-1 June 23, 2025 Event Average Participant Actual and Predicted Energy Usage

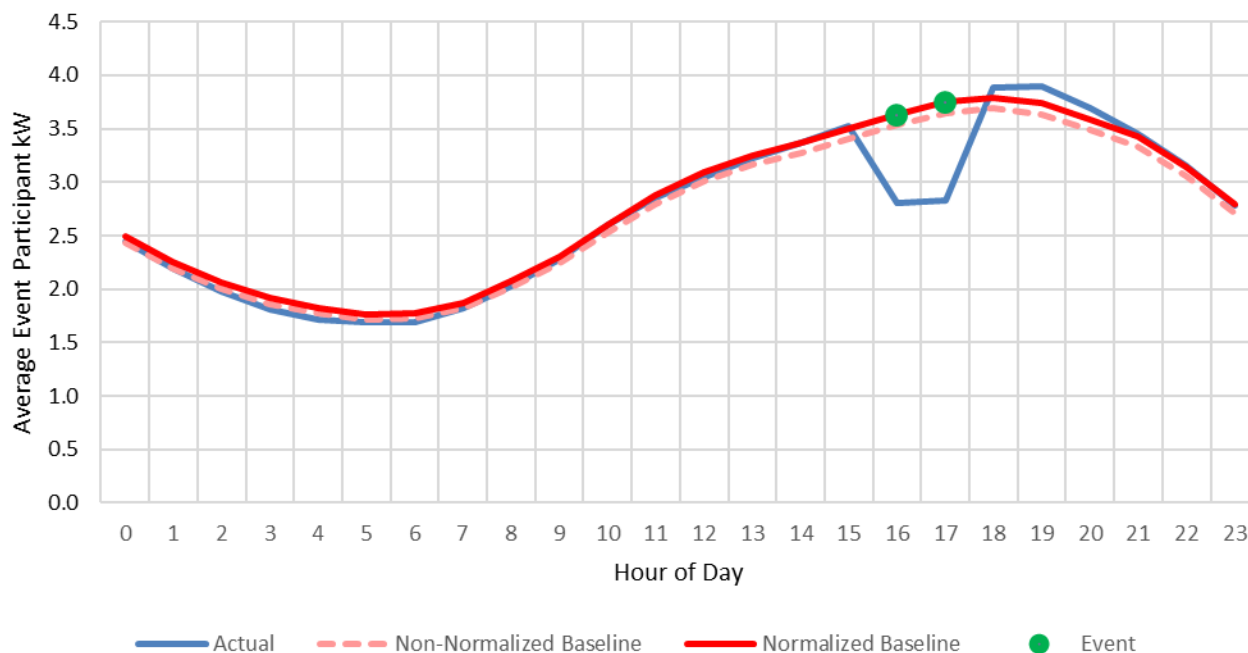


Figure 10-2 June 24, 2025 Event Average Participant Actual and Predicted Energy Usage

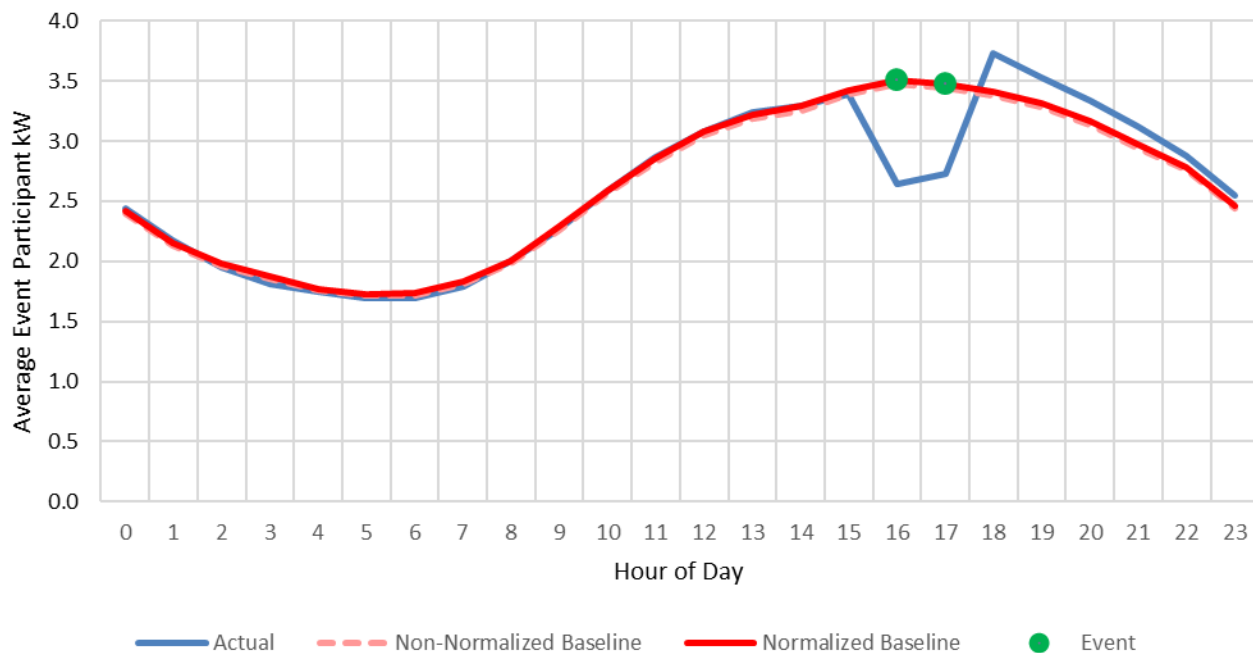


Figure 10-3 June 25, 2025 Event Average Participant Actual and Predicted Energy Usage

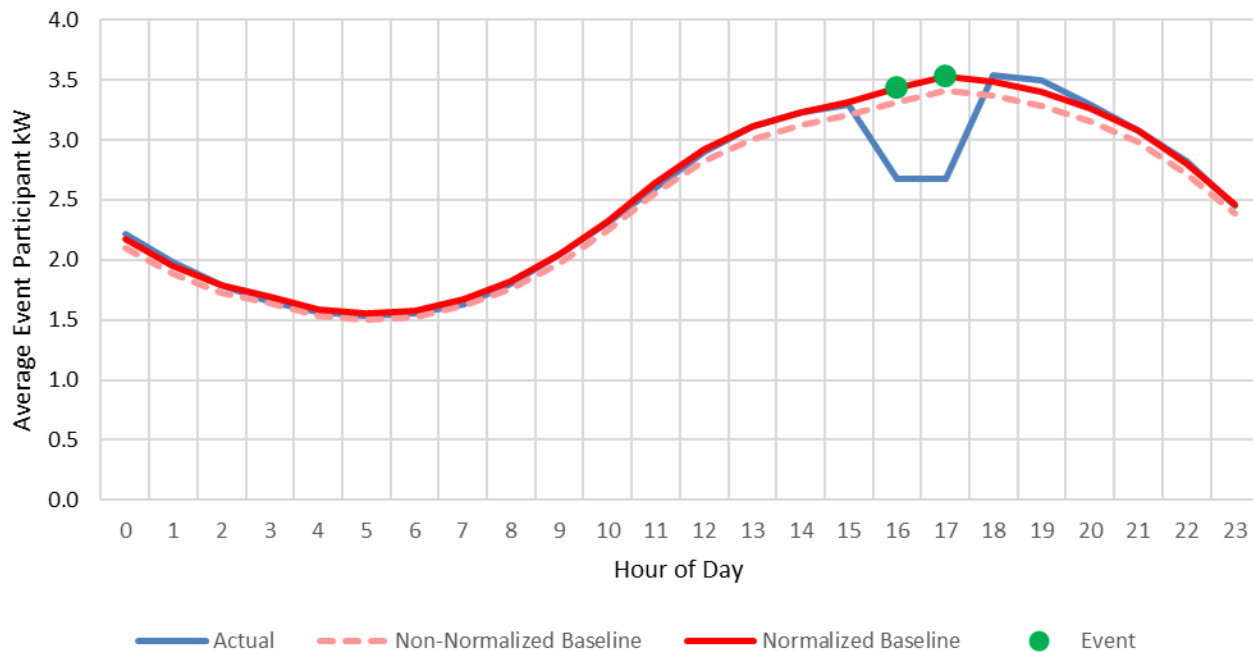


Figure 10-4 June 26, 2025 Event Average Participant Actual and Predicted Energy Usage

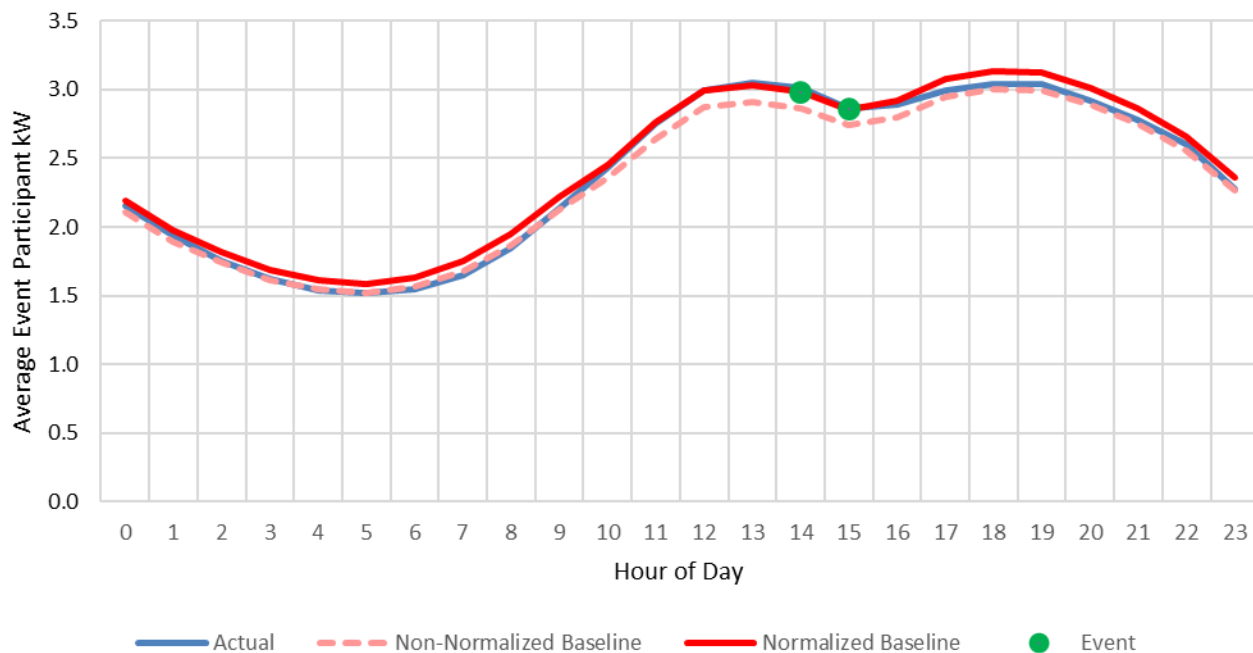


Figure 10-5 July 24, 2025 Event Average Participant Actual and Predicted Energy Usage

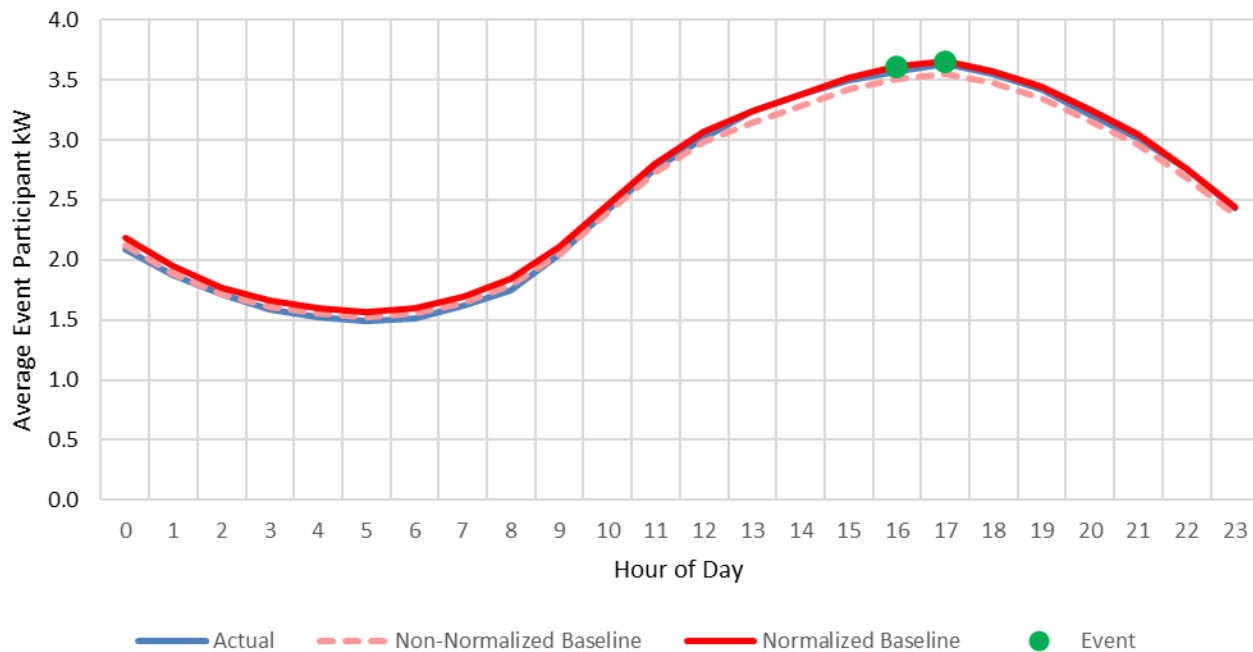


Figure 10-6 July 25, 2025 Event Average Participant Actual and Predicted Energy Usage

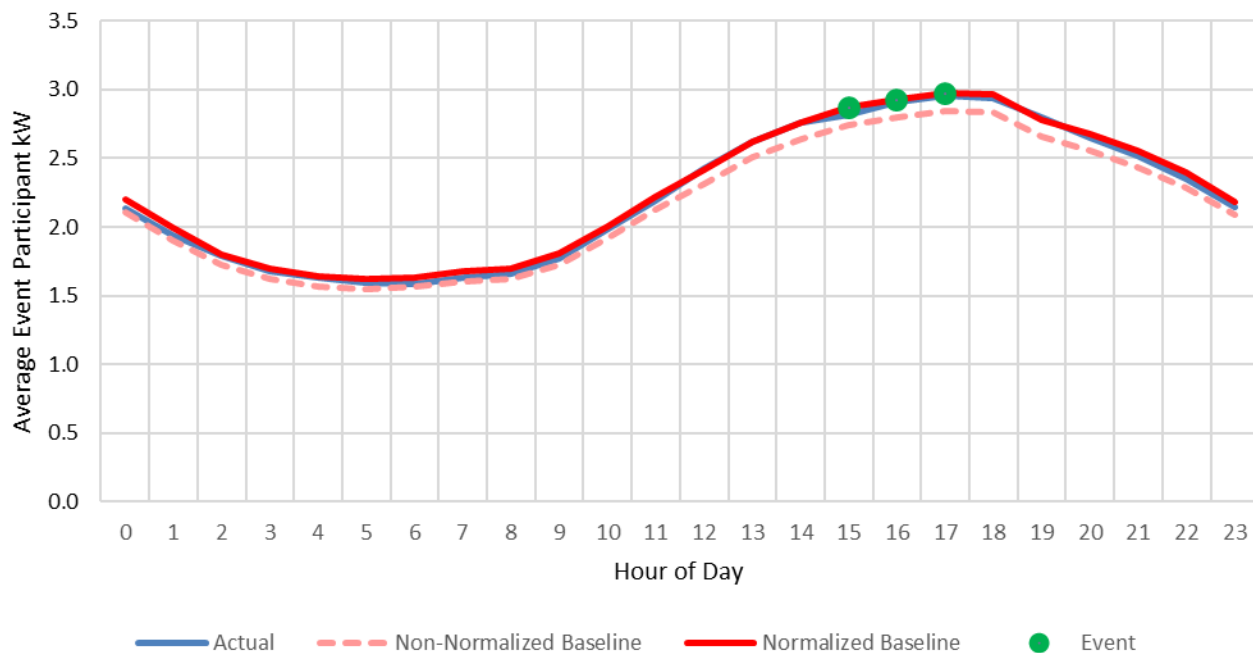


Figure 10-7 July 28, 2025 Event Average Participant Actual and Predicted Energy Usage

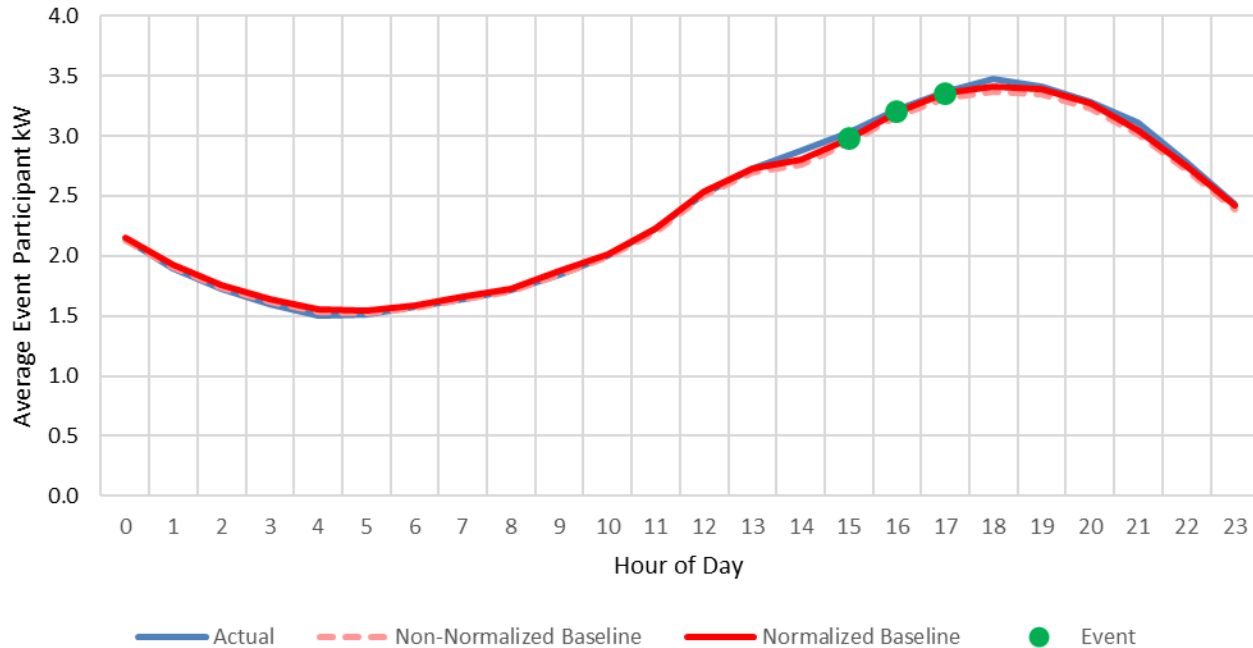


Figure 10-8 July 29, 2025 Event Average Participant Actual and Predicted Energy Usage

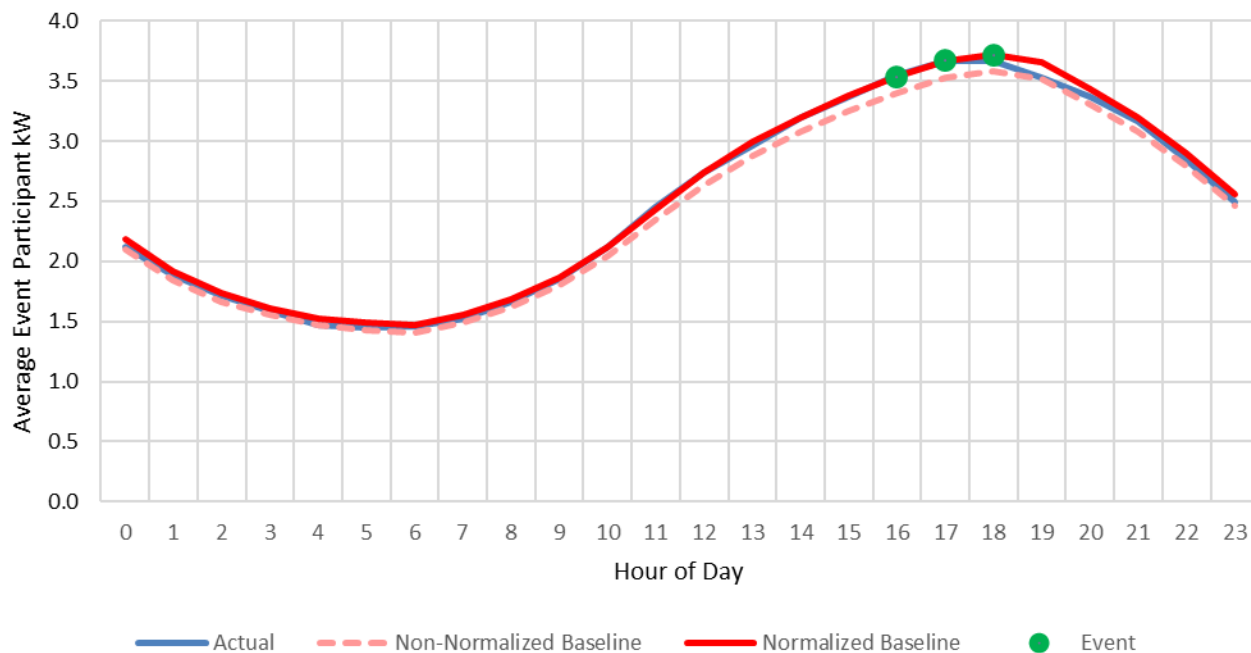
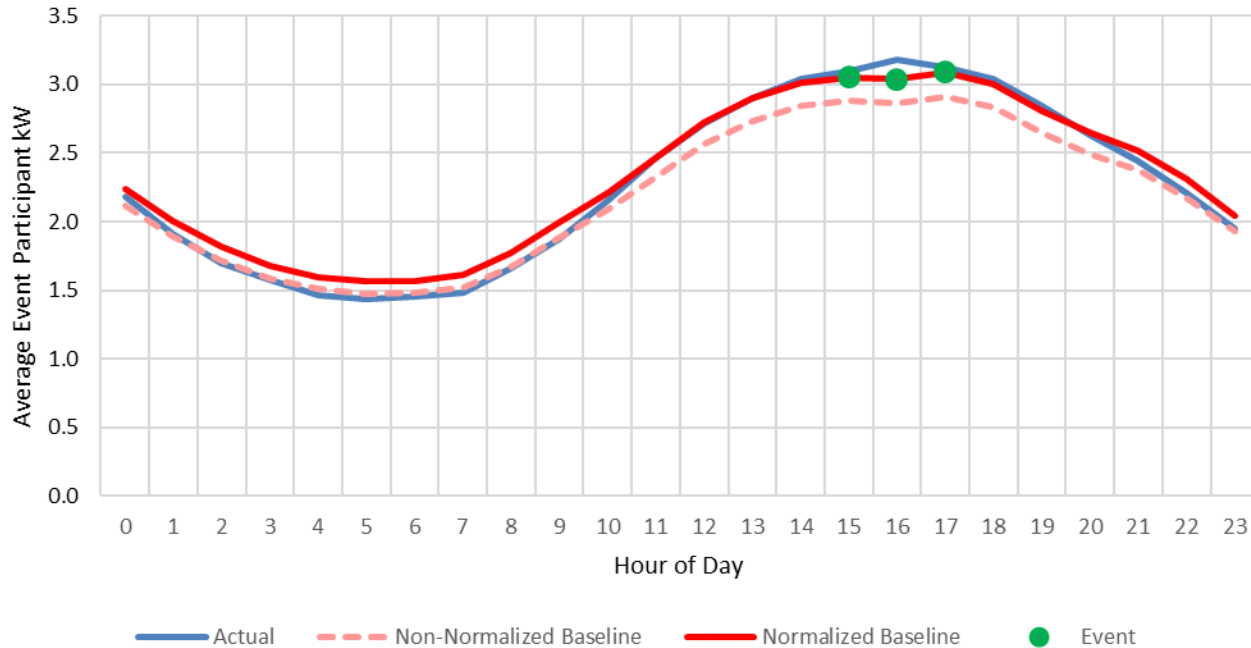


Figure 10-9 July 30, 2025 Event Average Participant Actual and Predicted Energy Usage



10.3.2.1. Ex Post Gross kWh Savings

Table 10-5 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 10-5 Program-Level Annual Gross kWh Savings

<i>Ex Ante Gross kWh Savings</i>	<i>Gross Audited kWh Savings</i>	<i>Gross Verified kWh Savings</i>	<i>Ex Post Gross kWh Savings</i>	<i>Gross Realization Rate</i>
13,994	13,994	13,994	9,919	71%

10.3.2.2. Ex Post Gross kW Savings

Table 10-6 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 10-6 Program-level Gross kW Reduction

<i>Ex Ante Gross kW Savings</i>	<i>Gross Audited kW Savings</i>	<i>Gross Verified kW Savings</i>	<i>Ex Post Gross kW Savings</i>	<i>Gross Realization Rate</i>
642.11	642.11	642.11	957.93	149%

10.4. Estimation of Ex Post Net Savings

10.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 10.3 net savings estimates.

10.4.2. Results of Ex Post Net Savings Estimation

Table 10-7 summarizes the ex post annual net kWh and kW savings of the Residential HVAC DLC Program. The annual net savings totaled 9,919 kWh and 957.93 kW.

Table 10-7 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	13,994	642.11
Gross Audited Savings	13,994	642.11
Gross Verified Savings	13,994	642.11
Ex Post Gross Savings	9,919	957.93
Gross Realization Rate	71%	149%

Category	kWh	kW
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	9,919	957.93
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	198,379	N/A

10.5. Findings and Recommendations

HVAC DLC delivered consistent, meaningful per-participant reductions in June, but device control failures prevented the program from delivering expected load reductions in July events. Average participant reductions during the June 23–25 events ranged from 0.75 to 0.92 kW per participant during the core event hours (4–6 PM), with event-level mean hourly reductions of 0.81–0.87 kW. This performance is consistent with typical residential HVAC DLC outcomes and demonstrates that devices and control logic were initially operating effectively. After June 25, events essentially produced no measurable load impacts because devices were not executing control signals. This control failure fully explains the sharp decline in performance in the late-season events, including negative or near-zero impacts during two PJM coincident peak hours.

- **Recommendation 1.** Establish protocols that reduce the risk of future event non-performance. I&M should require the implementation partner to monitor device responsiveness leading up to each event and report when units fail to communicate or acknowledge control signals within a defined timeframe (such as 24 hours prior to dispatch). Internally, the program should review device-level performance indicators before each event to ensure that the portfolio is operational and ready for dispatch. These steps would reduce the likelihood of multiple non-performing events and strengthen the program’s reliability during critical peak periods.

Event timing generally aligned well with PJM 5CP hours, but realized performance during some CP hours was weak or negative, reducing capacity value. I&M successfully dispatched events coincident with four of the five PJM 5CP days, and three of those 5CP hours aligned directly with evaluated events (June 23, June 24, July 28, July 29). However, the quality of load reduction during 5CP hours was highly variable: June 23 and 24 produced large reductions (2,132 kW and 1,725 kW), July 29 delivered only a modest 16 kW reduction, and July 28 produced a net increase of 42 kW during the CP hour. As a result, while the program demonstrated strong dispatch timing, the effective capacity contribution across all 5CP hours is diluted by poor July performance, limiting the program’s reliability from a system planning perspective.

11. Residential IQ Water Heater DLC

This chapter presents the evaluation of the Residential IQ Water Heater DLC Program that Indiana Michigan Power (I&M) offered its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2025.
- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.
- Provide recommendations for program improvement as appropriate.

11.1. Program Description

The Residential Residential IQ Water Heater DLC Program is offered to income qualified (income less than or equal to 200% of the federal poverty level) and/or senior citizen residential customers with AMI meters installed. Customers must own a working central air conditioning unit and have slow or unreliable internet service.

The Program is designed to test and demonstrate how AMI system connectivity can:

- Differently engage specific residential customer segments.
- Provide customers with a DLC demand response offering that requires little to no customer involvement.
- Require no customer ownership of DLC equipment.
- Augment I&M's demand response capabilities.

I&M will install a small device on participating customers' water heaters that will stop electricity consumption during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers can earn \$0.80 bill credit for one-hour events, \$1.00 for two-hour events, and \$1.10 for three-hour events.

I&M did not operate the Residential IQ Water Heater DLC Program in PY2025.

12. Residential Customer Engagement Demand Response

This chapter presents the evaluation of the Residential Customer Engagement Demand Response Program that Indiana Michigan Power (I&M) offered its residential customers during the period of January 2025 through December 2025.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2025;
- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods;
- Provide recommendations for program improvement as appropriate.

12.1. Program Description

The Residential Customer Engagement Demand Response Program is offered to I&M residential customers who live in the property and hold the account with I&M. Participating customers must have an AMI meter installed and opt-in to receive email and or text message peak energy use event alerts.

In this program, customers self-manage their energy used during peak events and can earn up to \$1.00 for each kWh of load reduced during each event.

12.2. Data Collection

Data used to support the impact evaluation of the program included:

- Program tracking data from the primary tracking database.
- Customer AMI billing data and associated tariff code.
- Location specific weather data.
- Data from relevant secondary sources.

12.3. Estimation of Ex Post Gross Savings

12.3.1. Methodology for Estimating Ex Post Gross Energy Savings

12.3.1.1. Analysis of Peak Event Reductions and Energy Savings

The methodology discussed in Section 9.3.1.1 was used to estimate the savings resulting from the Peak Event Reductions.

12.3.1.2. Effective Useful Life

A lifetime of 20 years is applied to program savings, consistent with the applicable program type referenced in the most recent I&M demand response market potential study.

No incremental costs are incurred as a result of program participation.

12.3.2. Results of Ex Post Gross Savings Estimation

This section presents the ex post annual gross energy savings and ex post gross demand reductions resulting from the 2025 Residential Customer Engagement Demand Response Program.

I&M initiated 9 load management events during the summer of 2025. As shown in Table 12-1 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 12-1 Demand Response Event Times

<i>Date</i>	<i>Event Start Time</i>	<i>Event Stop Time</i>	<i>Event Coincident with 5CP</i>	<i>PJM Coincident Peak Occurred During Hour Ending</i>
6/23/2025	4:00 PM	6:00 PM	Yes	6:00 PM
6/24/2025	4:00 PM	6:00 PM	Yes	6:00 PM
6/25/2025	4:00 PM	6:00 PM	No	
6/26/2025	2:00 PM	4:00 PM	No	
7/24/2025	4:00 PM	6:00 PM	No	
7/25/2025	3:00 PM	6:00 PM	No	
7/28/2025	3:00 PM	6:00 PM	Yes	6:00 PM
7/29/2025	4:00 PM	7:00 PM	Yes	6:00 PM
7/30/2025	3:00 PM	6:00 PM	No	

The demand reductions were calculated for each event hour. Aggregate hourly results are provided below for both the demand response events, as well as the one-hour precooling and one-hour snapback period following the event. In the table below, non-event hours are represented with gray fill, and PJM 5CP hours corresponding with events are represented with red font.

Table 12-2 kW Reductions for Event Days by Hour

<i>Date</i>	<i>1:00 PM - 2:00 PM</i>	<i>2:00 PM - 3:00 PM</i>	<i>3:00 PM - 4:00 PM</i>	<i>4:00 PM - 5:00 PM</i>	<i>5:00 PM - 6:00 PM</i>	<i>6:00 PM - 7:00 PM</i>	<i>Event-Level Mean Hourly kW Reduction</i>	<i>Maximum Event Hour kW Reduction</i>
6/23/2025			96.62	654.16	714.80	158.73	684.48	714.80
6/24/2025			76.17	693.90	888.86	599.06	791.38	888.86

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6/25/2025			-70.58	120.28	25.02	-517.97	72.65	120.28
6/26/2025	75.41	198.91	434.97	362.60			316.94	434.97
7/24/2025			-0.14	397.32	531.96	268.33	464.64	531.96
7/25/2025		157.28	168.45	236.81	185.02	-456.57	196.76	236.81
7/28/2025		140.28	795.76	830.19	966.75	367.63	864.24	966.75
7/29/2025			61.98	577.18	481.95	395.20	484.78	577.18
7/30/2025		-102.40	374.63	652.31	433.11	23.57	486.68	652.31

Table 12-3 presents average participant demand reductions for each event hour.

Table 12-3 Average Participant kW Reductions for Event Days by Hour

Date	1:00 PM - 2:00 PM	2:00 PM - 3:00 PM	3:00 PM - 4:00 PM	4:00 PM - 5:00 PM	5:00 PM - 6:00 PM	6:00 PM - 7:00 PM	Event-Level Mean Hourly kW Reduction	Maximum Event Hour kW Reduction
6/23/2025			0.01	0.08	0.08	0.02	0.08	0.08
6/24/2025			0.01	0.08	0.10	0.07	0.09	0.10
6/25/2025			-0.01	0.01	0.00	-0.06	0.01	0.01
6/26/2025	0.01	0.02	0.05	0.04			0.04	0.05
7/24/2025			0.00	0.04	0.06	0.03	0.05	0.06
7/25/2025		0.02	0.02	0.03	0.02	-0.05	0.02	0.03
7/28/2025		0.02	0.09	0.09	0.11	0.04	0.10	0.11
7/29/2025			0.01	0.07	0.05	0.04	0.05	0.07
7/30/2025		-0.01	0.04	0.07	0.05	0.00	0.06	0.07

A summary of the aggregate demand reductions occurring during PJM 5CP hours is presented below in Table 12-4.

Table 12-4 Summary of kW Reductions during PJM 5CP Events

Date	Hour Start	Hour End	Ex Post Net kW Savings
6/23/2025	5:00 PM	6:00 PM	714.80
6/24/2025	5:00 PM	6:00 PM	888.86
6/25/2025	2:00 PM	3:00 PM	n/a
7/28/2025	5:00 PM	6:00 PM	966.75
7/29/2025	5:00 PM	6:00 PM	481.95
Maximum Event Hour Peak kW Reduction			966.75
Average Event Hour Peak kW Reduction			763.09

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Figure 12-1 through Figure 12-9 graphically present average participant actual and predicted energy usage for each event day.

Figure 12-1 June 23, 2025 Event Average Participant Actual and Predicted Energy Usage

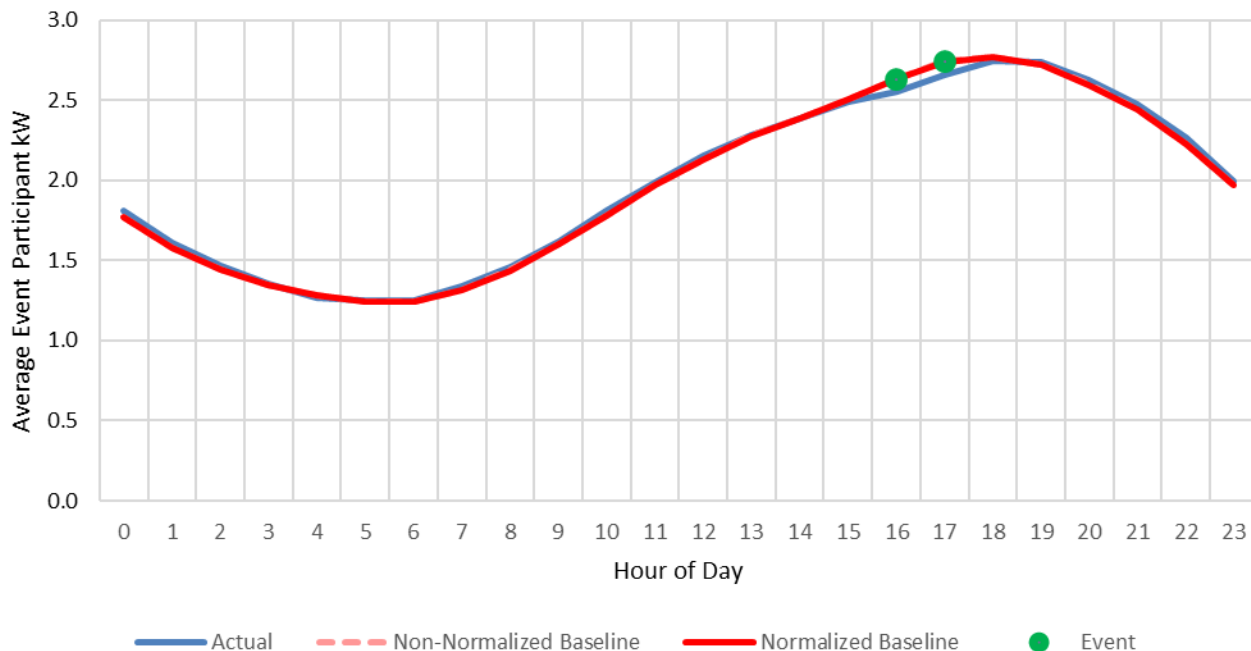


Figure 12-2 June 24, 2025 Event Average Participant Actual and Predicted Energy Usage

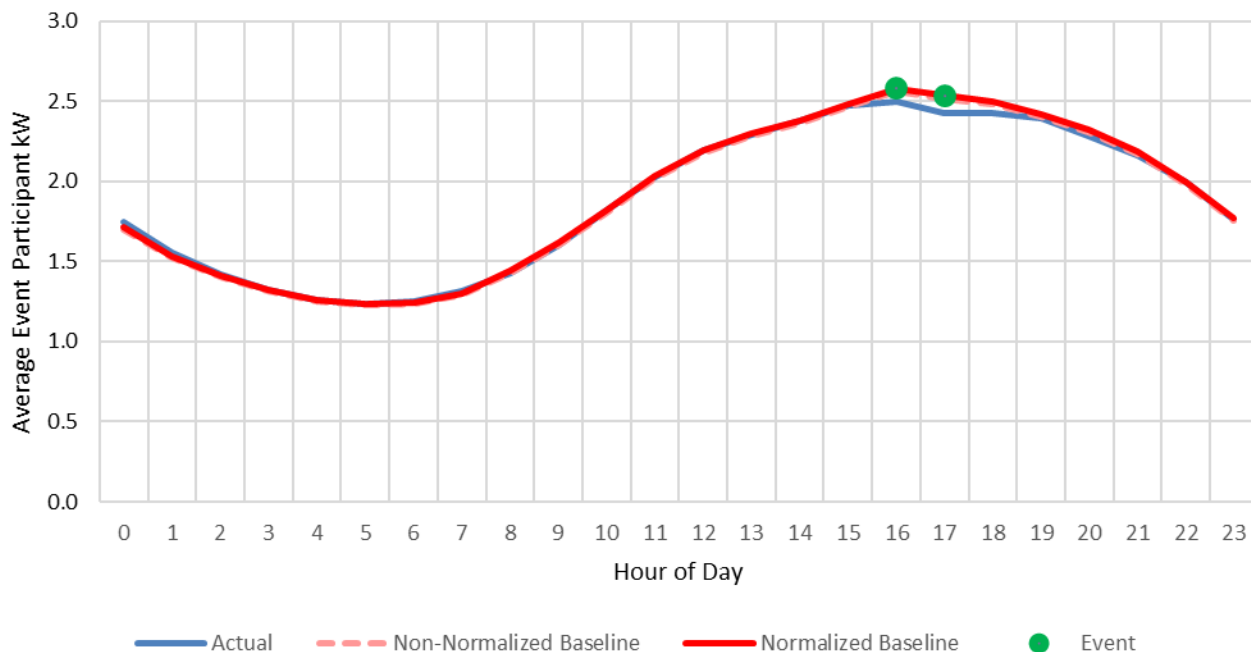


Figure 12-3 June 25, 2025 Event Average Participant Actual and Predicted Energy Usage

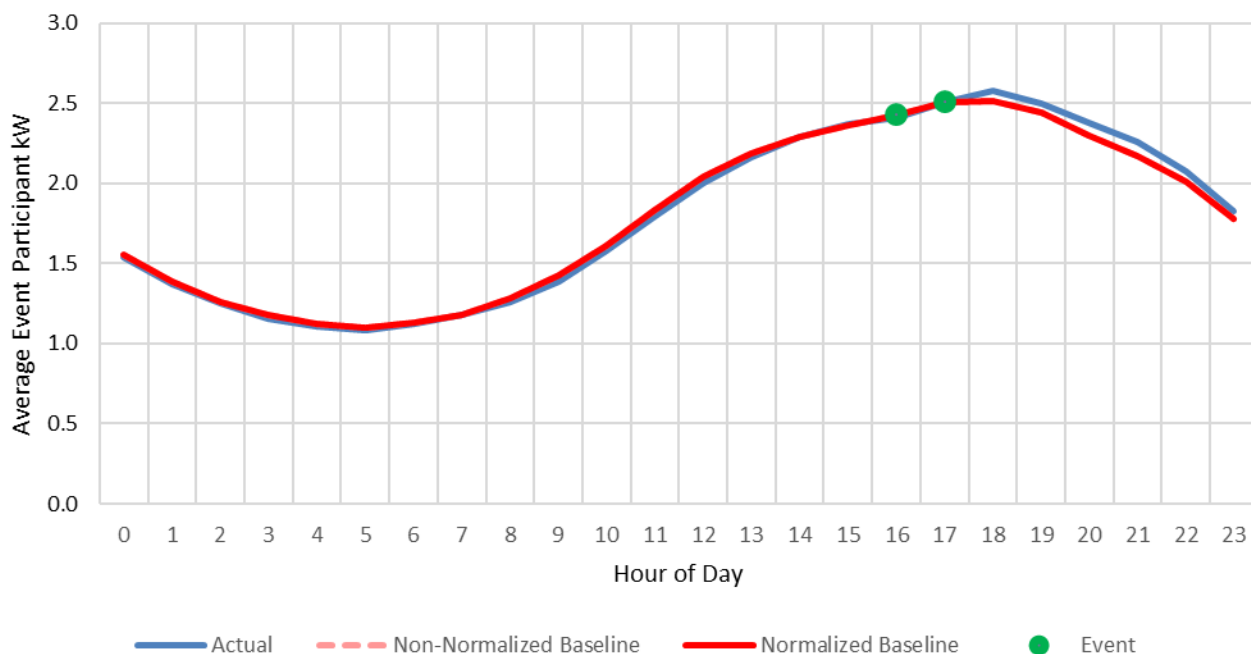


Figure 12-4 June 26, 2025 Event Average Participant Actual and Predicted Energy Usage

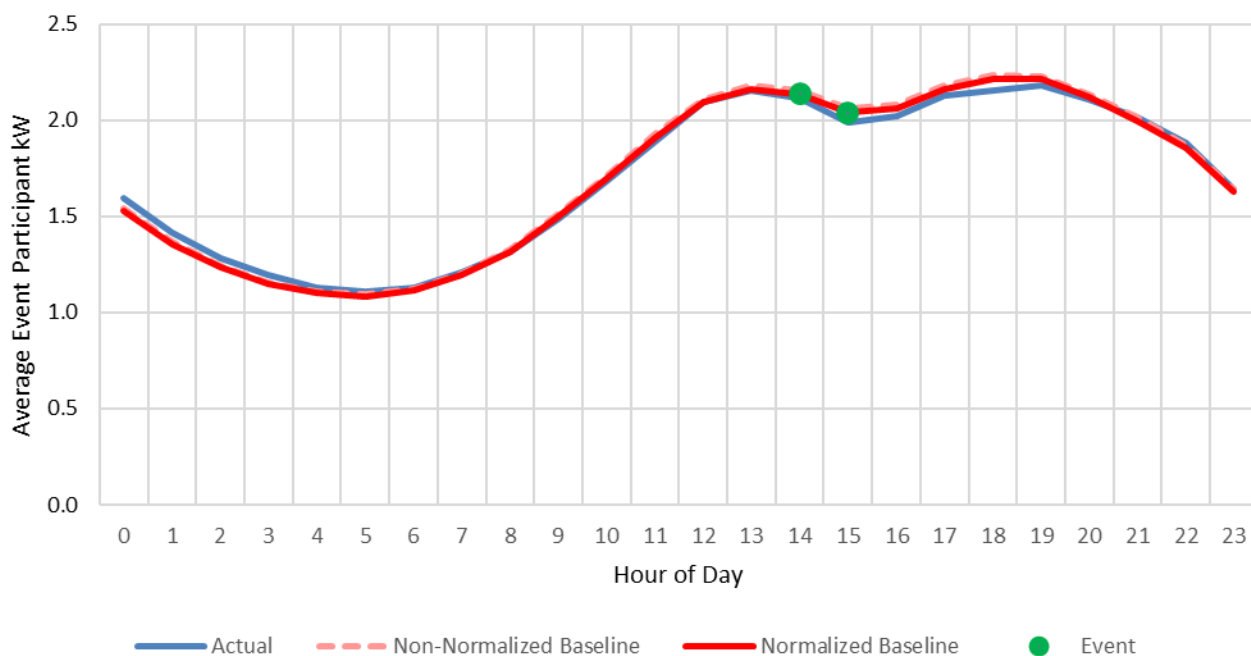


Figure 12-5 July 24, 2025 Event Average Participant Actual and Predicted Energy Usage

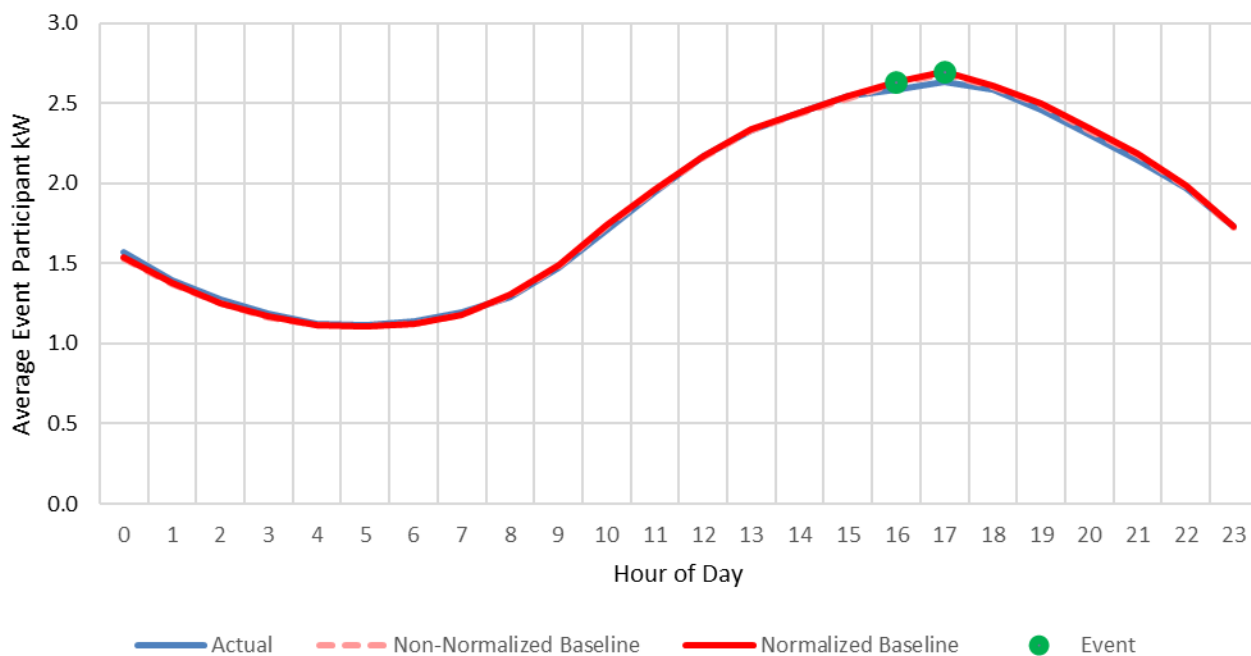


Figure 12-6 July 25, 2025 Event Average Participant Actual and Predicted Energy Usage

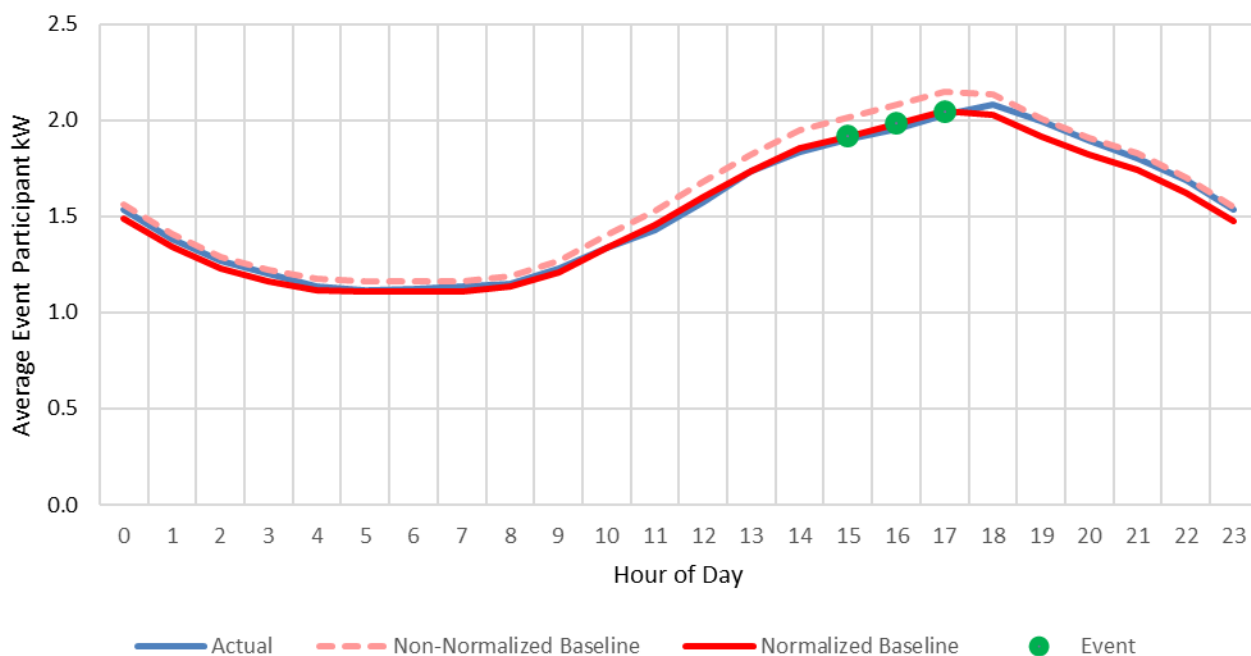


Figure 12-7 July 28, 2025 Event Average Participant Actual and Predicted Energy Usage

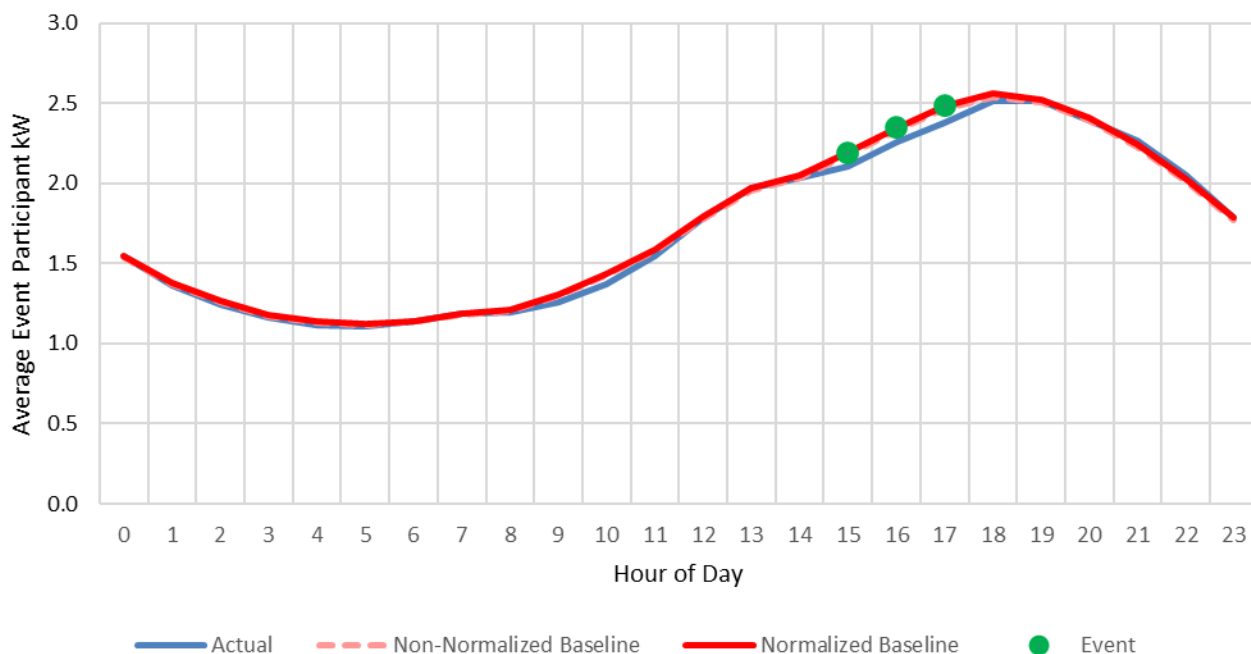


Figure 12-8 July 29, 2025 Event Average Participant Actual and Predicted Energy Usage

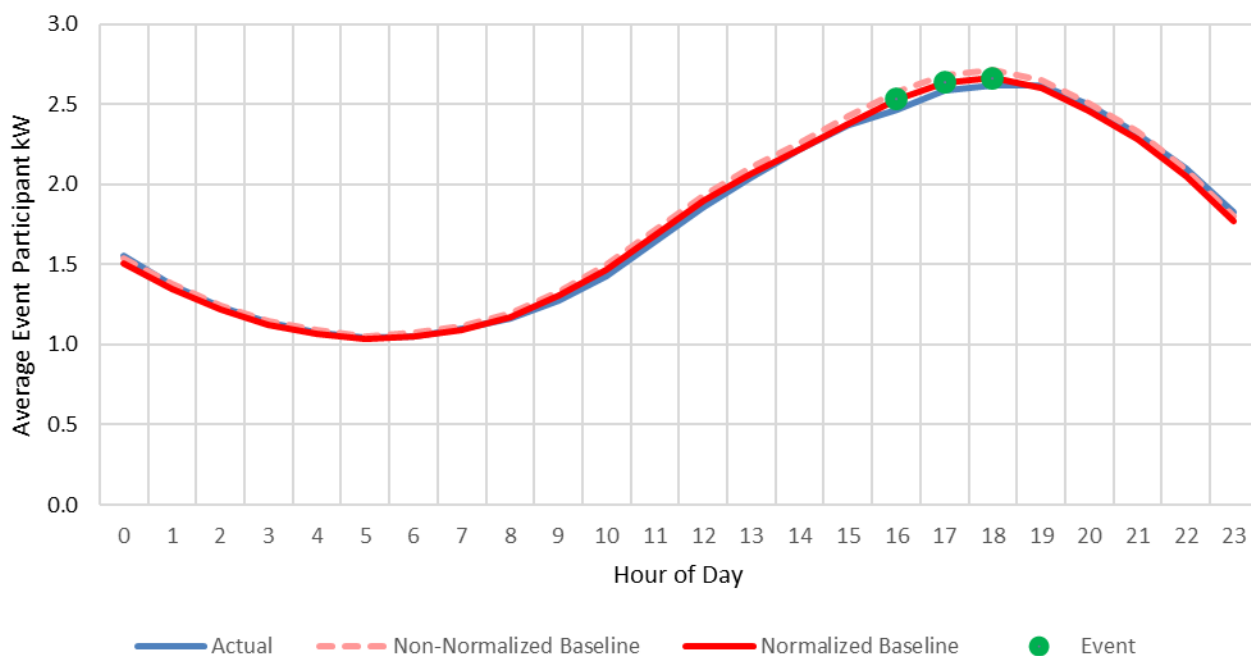
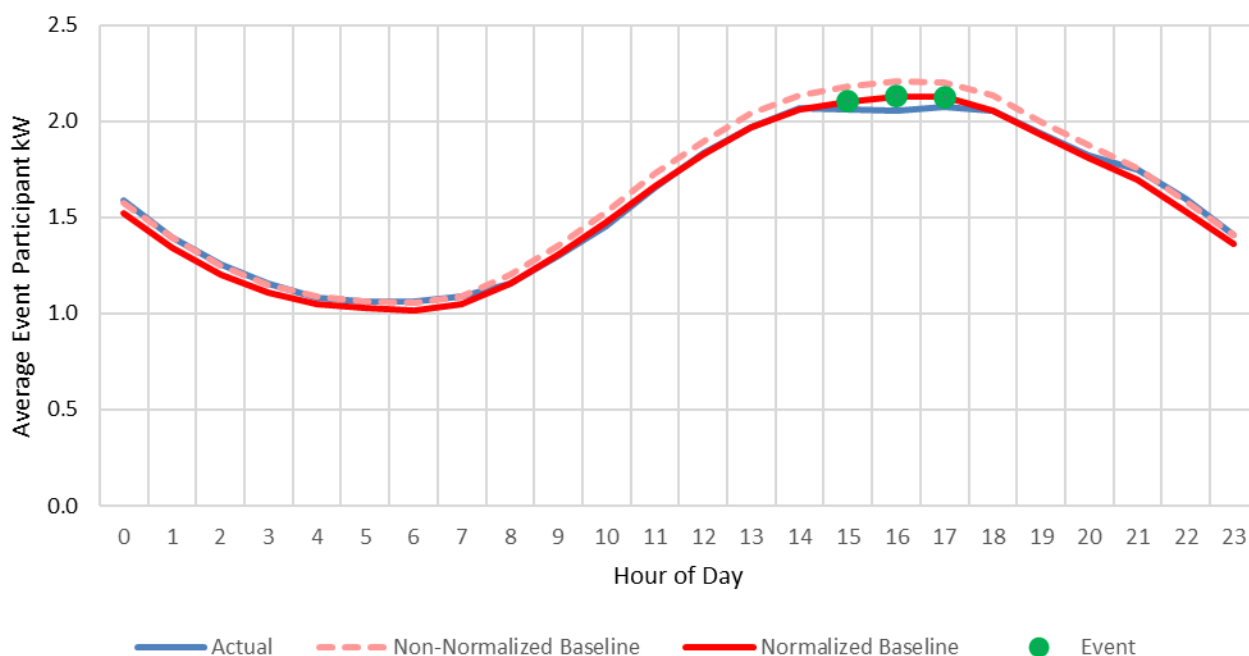


Figure 12-9 July 30, 2025 Event Average Participant Actual and Predicted Energy Usage



12.3.2.1. Ex Post Gross kWh Savings

Table 12-5 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 12-5 Program-Level Annual Gross kWh Savings

Ex Ante Gross kWh Savings	Gross Audited kWh Savings	Gross Verified kWh Savings	Ex Post Gross kWh Savings	Gross Realization Rate
12,561	12,561	12,561	11,998	96%

12.3.2.2. Ex Post Gross kW Savings

Table 12-6 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 12-6 Program-level Gross kW Reduction

Ex Ante Gross kW Savings	Gross Audited kW Savings	Gross Verified kW Savings	Ex Post Gross kW Savings	Gross Realization Rate
519.57	519.57	519.57	763.09	147%

12.4. Estimation of Ex Post Net Savings

12.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 12.3 are net savings estimates.

12.4.2. Results of Ex Post Net Savings Estimation

Table 12-7 summarizes the ex post annual net kWh and kW savings of the Residential Customer Engagement Demand Response Program. The annual net savings totaled 11,998 kWh and 763.09 kW.

Table 12-7 Program-Level Annual Net kWh and kW Savings

<i>Category</i>	<i>kWh</i>	<i>kW</i>
Ex Ante Gross Savings	12,561	519.57
Gross Audited Savings	12,561	519.57
Gross Verified Savings	12,561	519.57
Ex Post Gross Savings	11,998	763.09
Gross Realization Rate	96%	147%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	11,998	763.09
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	239,951	N/A

12.5. Findings and Recommendations

Four of the five PJM coincident peak (5CP) days aligned with program events, and these hours produced some of the strongest load impacts of the season. Reductions during 5CP hours ranged from 482 kW to 967 kW, with an average of 763 kW, indicating that customers reliably shifted or reduced usage during the highest-value hours. Aligning with 5CP days is crucial for capacity benefits, and the program demonstrated operational success in targeting these system peaks.

Several events, particularly 6/23, 6/24, 7/28, and 7/29, produced consistent reductions in the 4–6 PM window. Other events (e.g., 6/25 and 7/25) showed low or negative adjustments in

certain hours. Hour-over-hour variation reflects differences in weather, baseline usage, participant engagement, and the inherently voluntary nature of behavioral response.

Per-participant load impacts were modest but scale effectively given the large population.

Average participant reductions ranged from 0.04 to 0.10 kW in the core event hours. Although these impacts are small at the individual household level—as expected for a behavioral DR offering—they aggregate to substantial system benefits. Some hours show near-zero or slight positive usage increases, reflecting normal behavioral noise and the challenge of driving consistent customer action without automated controls.

Program performance was sustained across the summer without evidence of participant fatigue. Impacts in late-July events were as strong or stronger than early-season events. This indicates that customers remained attentive to event notifications and that messaging retained effectiveness throughout the summer. Behavioral programs can suffer declining engagement over time, but this pattern was not observed.

While event-level demand reductions varied in magnitude, the pattern of results does not indicate any decline in performance as the season progressed. Per-participant demand reductions fluctuated from one event to another, with average reductions in the 4 to 6 PM window generally ranging between 0.04 and 0.10 kW. Some hours showed lower or slightly negative values, which is typical for behavioral demand response due to normal variation in customer usage rather than controlled load curtailment. Importantly, several of the highest per-participant reductions occurred in late-season events, such as the 0.09–0.11 kW reductions on 7/28 and strong performance again on 7/29, indicating that participant responsiveness did not diminish as the summer progressed. The absence of a downward trend suggests that customers remained consistently engaged throughout the program season.

2025 Indiana Demand Response Portfolio Cost Effectiveness Report

Prepared for:

Indiana Michigan Power

April 30, 2026

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Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., a Qualus Company, (ADM) performed evaluation, measurement and verification (EM&V) activities that confirmed the energy savings (kWh) and demand reduction (kW) realized through the demand response programs that I&M implemented in Indiana during the during January 2025 through December 2025 (PY2025).

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

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

Variable	Definition	PCT		PACT		RIM		TRC	
		Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	Incentives paid to customers.	✓			✓		✓		
Installation Costs	Installation costs paid by program.				✓		✓		✓
Bill Savings / Lost Revenue	Reduction in electricity costs faced by customers as a result of implementation of 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.		✓						✓
Overhead Costs	costs other than incentive or installation costs.				✓		✓		✓

The test results for each program are presented in Table 2.

Table 2 Summary of PY2025 Benefit-Cost Ratios

<i>Program</i>	<i>Program Administrator Cost Test</i>	<i>Total Resource Cost Test</i>	<i>Ratepayer Impact Measure</i>	<i>Participant Cost Test</i>
Home Energy Management	1.38	2.20	1.36	N/A
Residential Customer Engagement Demand Response	0.77	1.91	0.76	N/A
Residential HVAC DLC	1.25	1.35	1.23	N/A
Portfolio Total	1.26	2.01	1.24	N/A

PY2025 Cost Effectiveness Evaluation

Table 3 through Table 5 summarize key financial benefit and cost inputs for the various tests along as well as the test results for each program.

Table 3 Home Energy Management Cost Test Inputs and Results

<i>Variable</i>	<i>PCT</i>		<i>UCT</i>		<i>RIM</i>		<i>TRC</i>	
	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>
Incentives	\$ 2,033,720			\$ 2,033,720		\$ 2,033,720		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 61,334							
Lost Revenue (NPV)						\$ 99,644		
Avoided Energy Costs (NPV)			\$ 41,113		\$ 41,113		\$ 41,113	
Avoided Capacity Costs (NPV)			\$ 6,049,774		\$ 6,049,774		\$ 6,049,774	
Avoided T&D Costs (NPV)			\$ 1,457,605		\$ 1,457,605		\$ 1,457,605	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 3,430,705		\$ 3,430,705		\$ 3,430,705
Total Benefits	\$ 2,095,054		\$ 7,548,492		\$ 7,548,492		\$ 7,548,492	
Total Costs	\$ -		\$ 5,464,425		\$ 5,564,069		\$ 3,430,705	
Test Score	N/A		1.38		1.36		2.20	

Table 4 Residential HVAC DLC Cost Test Inputs and Results

<i>Variable</i>	<i>PCT</i>		<i>UCT</i>		<i>RIM</i>		<i>TRC</i>	
	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>
Incentives	\$ 74,942			\$ 74,942		\$ 74,942		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 7,730							
Lost Revenue (NPV)						\$ 12,558		
Avoided Energy Costs (NPV)			\$ 5,182		\$ 5,182		\$ 5,182	
Avoided Capacity Costs (NPV)			\$ 974,475		\$ 974,475		\$ 974,475	
Avoided T&D Costs (NPV)			\$ 234,786		\$ 234,786		\$ 234,786	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 898,456		\$ 898,456		\$ 898,456
Total Benefits	\$ 82,672		\$ 1,214,442		\$ 1,214,442		\$ 1,214,442	
Total Costs	\$ -		\$ 973,398		\$ 985,956		\$ 898,456	
Test Score	N/A		1.25		1.23		1.35	

Table 5 Residential Customer Engagement Demand Response Cost Test Inputs and Results

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 752,279			\$ 752,279		\$ 752,279		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 9,350							
Lost Revenue (NPV)						\$ 15,190		
Avoided Energy Costs (NPV)			\$ 6,267		\$ 6,267		\$ 6,267	
Avoided Capacity Costs (NPV)			\$ 776,275		\$ 776,275		\$ 776,275	
Avoided T&D Costs (NPV)			\$ 187,032		\$ 187,032		\$ 187,032	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 508,196		\$ 508,196		\$ 508,196
Total Benefits	\$ 761,629		\$ 969,574		\$ 969,574		\$ 969,574	
Total Costs	\$ -		\$ 1,260,474		\$ 1,275,664		\$ 508,196	
Test Score	N/A		0.77		0.76		1.91	

PY2023 – PY2025 Cost Effectiveness Evaluation

Cost effectiveness of programs across PY2023 – PY2025 was also evaluated. Table 6 through Table 8 summarize key financial benefit and cost inputs for the various tests along as well as the test results for each demand response program during PY2023 – PY2025.

Table 6 Home Energy Management Cost Test Inputs and Results (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 2,277,769			\$ 2,277,769		\$ 2,277,769		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 69,160							
Lost Revenue (NPV)						\$ 107,470		
Avoided Energy Costs (NPV)			\$ 43,631		\$ 43,631		\$ 43,631	
Avoided Capacity Costs (NPV)			\$ 6,550,006		\$ 6,550,006		\$ 6,550,006	
Avoided T&D Costs (NPV)			\$ 1,686,395		\$ 1,686,395		\$ 1,686,395	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 4,270,785		\$ 4,270,785		\$ 4,270,785
Total Benefits	\$ 2,346,928		\$ 8,280,031		\$ 8,280,031		\$ 8,280,031	
Total Costs	\$ -		\$ 6,548,554		\$ 6,656,024		\$ 4,270,785	
Test Score	N/A		1.26		1.24		1.94	

Table 7 Residential HVAC DLC Cost Test Inputs and Results (PY2023 – PY2025)

Variable	PCT		UCT		RIM		TRC	
	Benefit	Cost	Benefit	Cost	Benefit	Cost	Benefit	Cost
Incentives	\$ 192,260			\$ 192,260		\$ 192,260		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 11,521							
Lost Revenue (NPV)						\$ 16,350		
Avoided Energy Costs (NPV)			\$ 6,412		\$ 6,412		\$ 6,412	
Avoided Capacity Costs (NPV)			\$ 1,079,711		\$ 1,079,711		\$ 1,079,711	
Avoided T&D Costs (NPV)			\$ 280,289		\$ 280,289		\$ 280,289	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 2,820,084		\$ 2,820,084		\$ 2,820,084
Total Benefits	\$ 203,782		\$ 1,366,412		\$ 1,366,412		\$ 1,366,412	
Total Costs	\$ -		\$ 3,012,345		\$ 3,028,694		\$ 2,820,084	
Test Score	N/A		0.45		0.45		0.48	

*Table 8 Residential Customer Engagement Demand Response Cost Test Inputs and Results
(PY2023 – PY2025)*

<i>Variable</i>	<i>PCT</i>		<i>UCT</i>		<i>RIM</i>		<i>TRC</i>	
	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>	<i>Benefit</i>	<i>Cost</i>
Incentives	\$ 817,889			\$ 817,889		\$ 817,889		
Program Installation Costs				\$ -		\$ -		\$ -
Bill Savings (NPV)	\$ 11,980							
Lost Revenue (NPV)						\$ 17,821		
Avoided Energy Costs (NPV)			\$ 7,116		\$ 7,116		\$ 7,116	
Avoided Capacity Costs (NPV)			\$ 842,577		\$ 842,577		\$ 842,577	
Avoided T&D Costs (NPV)			\$ 216,714		\$ 216,714		\$ 216,714	
Incremental Costs		\$ -						\$ -
Program Overhead Costs				\$ 807,929		\$ 807,929		\$ 807,929
Total Benefits	\$ 829,869		\$ 1,066,408		\$ 1,066,408		\$ 1,066,408	
Total Costs	\$ -		\$ 1,625,818		\$ 1,643,638		\$ 807,929	
Test Score	N/A		0.66		0.65		1.32	