2023 Indiana Demand Response Portfolio EM&V Report

Volume I of II

Prepared for:

Indiana Michigan Power

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Table of Contents

Tables

Figures

1. Introduction

Under contract with Indiana Michigan Power (I&M), ADM Associates, Inc., (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 2023 through December 2023 (PY2023) in Indiana.

This chapter provides a summary of evaluation findings for the DR Portfolio and presents information regarding the organization of the report.

In 2023, 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 PY2023 Program Status

Program	PY2023 Program Status
Small Business DLC	No customer enrollment
Commercial Critical Peak Pricing	No customer enrollment
Commercial Time-of-Use	Active program
Voluntary Curtailment Service	No curtailment events occurred
Residential Critical Peak Pricing	No customer enrollment
Residential Time-of-Use	Active program
Home Energy Management	Active program
Residential HVAC DLC	Active program
Residential IQ Water Heater DLC	No customer enrollment
Residential Customer Engagement Demand Response	Active program

1.1. Summary of Data Collection

Data collection for the DR programs consisted of surveys of program feedback. Table 1-2 summarizes data collection activities that supported the PY2023 evaluation of I&M's DR programs.

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 8 of 180

Indiana Demand Response Portfolio

2023 EM&V Report

Table 1-2 Summary of Data Collection

Survey	Mode	Time Frame	Number of Contacts	Number of Completions
Home Energy Management Participant Survey	Email	October 2023	1,029	73
Residential HVAC DLC Participant Survey	Email	September 2023	450	92
Residential Customer Engagement End of Year Survey	Email	October 2023	1,132	86
Residential Customer Engagement Post Event Survey 1	Email	July 2023	1,500	138
Residential Customer Engagement Post Event Survey 2	Email	September 2023	1,441	132

1.2. Impact Evaluation Findings

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

Table 1-3 Savings-Related Terminology

Variable	Definition
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 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.

Variable	Definition
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).

Table 1-4 Summary of Rate Based Programs

Program	Tariff	Event Peak Demand Shed (Dispatchable DR)	Price Response Load Shift (Non-Dispatchable DR)	High-Cost Period
Commercial Critical Peak Pricing	GS – CPP	Yes	Yes	1 pm – 7 pm, May 1 through September 30
Commercial Time of Use	G.S. – TOD2	No	Yes	2 PM to 6 PM during the period May 1 - September 30
	G.S. – PEV	No	Yes	6 AM to 11 PM year-round
	L.G.S. – TOD	No	Yes	7 AM to 9 PM year-round
Residential Critical Peak Pricing	R.S. – CPP	Yes	Yes	1 pm – 7 pm, May 1 through September 30
Residential Time of Use	R.S. – TOD2	No	Yes	2 PM to 6 PM during the period May 1 - September 30
	R.S. – PEV	No	Yes	6 AM to 11 PM year-round
	R.S. – OPES	No	Yes	7 AM to 9 PM year-round

ADM performed EM&V activities for the portfolio of active demand response programs during PY2023. Total DR Portfolio ex post gross and ex post net energy savings are 47,930 kWh.

Table 1-5 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	67,097	67,097	67,097	35,667	53%	35,667	100%	713,343
Residential HVAC DLC	3,533	3,533	3,533	3,848	109%	3,848	100%	76,952
Residential Customer Engagement Demand Response	9,055	9,055	9,055	8,416	93%	8,416	100%	168,311
Residential Time-of-Use	208	208	208	-	0%	-	N/A	-
Residential EV Time-of-Use	1,920	1,920	1,920	-	0%	-	N/A	-
Commercial Time-of-Use	1,800	1,800	1,800	-	0%	-	N/A	-
Commercial AMI Portal	-	-	-	-	N/A	-	N/A	-
Portfolio Totals	83,613	83,613	83,613	47,930	57%	47,930	100%	958,606

Total demand response portfolio ex post gross and ex post net peak demand savings are 7,104.91 kW.

Table 1-6 Summary of Peak Demand Impacts

Program Name	Ex Ante Gross kW Savings	Gross Audited kW Savings	Gross Verified kW Savings	Ex Post Gross kW Savings	Gross Realization Rate	Ex Post Net kW Savings	Net-to-Gross Ratio
Home Energy Management	4,653.59	4,653.59	4,653.59	5,502.78	118%	5,502.78	100%
Residential HVAC DLC	233.90	233.90	233.90	348.82	149%	348.82	100%
Residential Customer Engagement Demand Response	613.37	613.37	613.37	531.74	87%	531.74	100%
Residential Time-of-Use	0.19	0.19	0.19	177.17	94789%	177.17	100%
Residential EV Time-of-Use	1.73	1.73	1.73	147.06	8524%	147.06	100%
Commercial Time-of-Use	5.25	5.25	5.25	397.35	7570%	397.35	100%
Commercial AMI Portal	-	-	-	-	N/A	-	N/A
Portfolio Totals	5,508.02	5,508.02	5,508.02	7,104.91	129%	7,104.91	100%

1.3. Demand Response Metrics

I&M offered a variety of demand response programs to its customers and Table 1-7 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 customer experience metrics across the programs indicate a high degree of acceptability.** The Net Promoter Scores were in the "good" range (0 – 20) and between

48% and 61% of participants said they were very likely to continue to participate. Most participants in Home Energy Management and HVAC DLC reported slight or no comfort impacts.

Table 1-7 Demand Response Program Metrics

Program	Participation Metrics		Load Reduction Metrics		Participant Experience Metrics		
	Number of Events During the Year	*Largest Number of Participants Enrolled*	*Average Per Participant Hourly kW Reduction (Season Low)*	*Average Per Participant Hourly kW Reduction (Season High)*	*Net promoter Score*	*Percent Very Likely to Continue Participation*	*Comfort Impacts*
Home Energy Management	7	5,425	0.79	1.34	18%	61%	78% report no or slight impact
Residential HVAC DLC	7	477	0.50	0.86	10%	57%	90% report no or slight impact
Residential Customer Engagement Demand Response	7	7,016	0.04	0.15	13%	48%	Not asked due to the volitional nature of the program

1.4. Load Shifting Metrics

For each time-of-use program, Table 1-8 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 1-8 Load Shifting Program Metrics

Program	kWh	kWh per Enrolled Account
Commercial Time-of-Use Program	1,397,959	2,918
Residential Time-of-Use	593,017	757
Residential EV Time-of-Use	630,019	1,465

1.5.   Evaluation Findings and Recommendations

1.5.1.   Commercial Time-of-Use

The commercial time-of-use (TOU) tariffs led to a noticeable load shift compared to accounts with similar consumption not on a TOU tariff. On average, accounts under TOU tariffs exhibited a 6.7% decrease in energy consumption during on-peak periods. This reduction in consumption was accompanied by a decrease in peak-period power demand, averaging 395.35 kW. While there was notable variability in how much load was shifted across different tariffs, these variations are likely attributable to the limited number of accounts participating. Therefore, it is premature to conclude that specific tariffs are more effective at shifting load.

1.5.2.   Commercial AMI Portal

ADM's analysis did not identify energy saving impacts resulting from the Commercial AMI email communications. This outcome contrasts with the results from PY2022, where a positive impact of email communications on energy savings was observed. The discrepancy between the two years does not seem to stem from changes in email communication strategies, as the level of email activity remained consistent with that of PY2022. Instead, the variance may be attributed to the minimal impact of the intervention on energy consumption and the fluctuating energy use patterns among commercial and industrial customers.

1.5.3.   Residential Time-of-Use

The residential time-of-use (TOU) rates led to a noticeable load shift compared to accounts with similar consumption not enrolled in a TOU rate. On average, accounts under TOU tariffs exhibited a 11.4% decrease in energy consumption during on-peak periods for the TOU tariffs and a 23.8% decrease for the electric vehicle tariff. Combined, the tariffs resulted in kW reductions of 324.23.

1.5.4.   Home Energy Management

The program achieved average event-level per participant demand kW reductions ranging from .79 kW to 1.34 kW. The ex post kW savings were 5,502.78 and ex post energy savings totaled 35,667 kWh.

Overall, participants had a positive experience with the Home Energy Management program. Most participants said it was easy to enroll in the program. Three quarters of participants thought the events lasted the right amount of time or that they did not notice or have an opinion on the length of the event, suggesting the events were generally unobtrusive. Similarly, 77% thought that the number of events was about right.

Nearly half of respondents were classified as net promoters and the overall Net Promoter Score was 18%. Based on the survey findings, 32% of respondents are classified as Detractors,

19% as Passive, and 49% as Promoters in terms of their likelihood to recommend the program to others.

I&M marketing of the program is driving program awareness. Seventy-five percent of respondents learned of the program through an I&M communication, which included 52% from an I&M email, 17% from the I&M website, 16% from an I&M mailer. Relatively few learned from a thermostat manufacture message (10%).

- **Recommendation 1:** Consider increased use of thermostat manufacture messaging to drive additional enrollments if needed. ADM has seen this type of marketing increase enrollments in BYOT programs in the past.

The program materials have generally met participant information needs, but some participants suggested additional information that would be beneficial. Twenty-seven percent rate the adequacy of the information somewhat lower (1 to 3 on a five-point scale). The additional information these participants sought included understanding the extent of control I&M would have over their thermostats, specifics about thermostat adjustments and their impact on others, clarity on how they would know if the program was beneficial, the degree to which the thermostat would be adjusted, the methodology behind temperature changes, and the process for opting out of the program. However, the program website covers most of these topics suggesting that the information gaps reported by participants may be more due to poor recall of the information or they are not reviewing the website thoroughly.

- **Recommendation 2:** Consider additional strategies for communicating information about the program to improve customer experience. Some specific tactics that could be used are:

  - Provide a post enrollment email or mailer communication reiterating information on how the program makes thermostat adjustments, when I&M would make adjustments to the thermostat and the duration of the adjustment period, the benefits to the customer of participating, and the process for unenrolling as well as on the 12 month enrollment requirement.

  - Prior to the first event, communicate to enrollees' basic information about how the program works with the thermostat, what to expect during events, and what the benefits of their participation are.

  - Consider customer testimonials or brief videos demonstrating how the program events are communicated and what is done to reduce electricity during the period.

1.5.5. Residential HVAC DLC

The program achieved average event-level per participant demand kW reductions ranging from .50 kW to .86 kW. The ex post kW savings were 348.82 and ex post energy savings totaled 3,848 kWh.

About two-thirds of participants were somewhat satisfied with the program overall. Fifteen percent of participants reported some dissatisfaction. The most common reasons were that participants wanted larger credits or lower cost electricity, however providing higher credits may not be financially feasible.

Nearly half of respondents were classified as net promoters and the overall Net Promoter Score was 10%. Based on the survey findings, 34% of respondents are classified as Detractors, 23% as Passive, and 44% as Promoters in terms of their likelihood to recommend the program to others.

I&M marketing of the program is driving program awareness. Eighty-five percent of respondents learned of the program through an I&M communication, which included 59% from an I&M email, 29% from an I&M mailer, and 7% from the I&M website.

Participants generally reported no or slight impacts on home comfort and the event frequency and duration were generally acceptable. Ninety percent of respondents said the events had no or little effect on home comfort. Eighty-six percent of respondents thought the number of events was about right and nearly all either did not notice the duration of the events or thought the length was about right.

The program reached the older and lower income customer segments it targeted. Survey data reveal that the program has successfully enrolled a significant proportion of older customers, with 74% of participants being 65 years of age or older. Comparative analysis indicates that HVAC DLC participants generally have lower incomes than those in the Home Energy Management program. Specifically, 49% of HVAC DLC participants reported an annual income of $50,000 or less, in contrast to 18% among Home Energy Management participants. Additionally, 8% of respondents indicated a lack of high-speed internet access, with another 8% unsure of their access status.

1.5.6. Residential Customer Engagement Demand Response

The post event and end of year survey results indicate that event notification procedure is working well. Across the two post-event surveys, 97% of participants reported that they had received the notification of the event date. A small share of participants reported that they did not have sufficient notification to take action during the events (14%).

Most participants reported that they took steps to lower household energy use, and the actions reported generally aligned with the best approaches for reducing energy use during the events. Eighty-three percent of households said they took steps to lower energy use. The most impactful action that respondents reported, reducing air conditioner use, was taken by 94% of respondents to the July post-event survey and 88% of respondents to the September post-event survey. Respondents also reported taking actions less likely to be impactful such as reducing lighting, avoiding using laundry appliances, and avoiding cooking appliances.

Post-event emails have been generally effective in communicating event results to participants. Most participants read the post-event email providing information on their credits earned. Across the July and September post-event surveys, 84% reported reading the emails sent after the event. The end of year survey results were consistent with this, with 76% reporting they read all the emails and 17% reporting they read some of the emails. Furthermore, about half of the participants thought that the bill credit emails were easy to understand, that the information on their home energy use was accurate, and that the emails were timely, and relatively few disagreed with this.

Participants had varied opinions of the amount of bill credits they received. Across the July and September events, 36% thought the credits were too low and 29% thought they were about right. Respondents to the end of year survey tended to skew towards thinking the bill credits seemed too low to a greater extent – 46% thought this and 26% thought they were about right. Satisfaction with the bill credits were also the strongest predictors of overall satisfaction with the program, likelihood of continuing to participate, and likelihood of continuing to try to reduce energy use.

- ▪ **Recommendation 1:** Monitor enrollment in the program overtime and if participation or engagement decreases, consider cost-effective increases in the amount that participants received. Higher credits may increase engagement and participation.

1.6.   Organization of Report

This report is divided into two volumes that provide information on the evaluation of the Indiana Michigan Power portfolio of residential programs implemented in Indiana during the 2023 program year. Volume I is organized as follows:

- ▪ Chapter 2: Small Business DLC
- ▪ Chapter 3: Commercial Critical Peak Pricing
- ▪ Chapter 4: Commercial Time-of-Use
- ▪ Chapter 5: Voluntary Curtailment Service
- ▪ Chapter 6: Commercial AMI Portal
- ▪ 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

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

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 2023 through December 2023.

2.1. Program Description

The Small Business DLC Program, marketed by I&M under the name Power Rewards: Work AC, 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.

Water heating demand response may be added to the program in the future.

No customers enrolled in the Small Business DLC Program in 2023.

3. 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 2023 through December 2023.

3.1. 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 3-1 Summary of Commercial Peak Pricing Tariff (GS – CPP, Tariff Code 260)

Season	Billing Hours	Rates
Winter (Off Peak Season) Months: October 1 through April 30		
Monthly Service Charge ($)		24.65
Energy Charge (¢ per kWh)	All Except Critical Peak	10.317
Critical Peak Hours (¢ per kWh)	When Notified	49.3
Summer (On Peak Season) Months: May 1 through September 30		
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

No customers enrolled in Commercial Critical Peak Pricing in 2023.

4. 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 2023 through December 2023.

The objectives of the evaluation were to:

▪ Estimate the achieved demand reduction (kW) in summer 2023.

▪ Estimate kWh shifts from high-cost hours (i.e., 1 PM – 7 PM, May 1 through September 30).

▪ Provide recommendations for program improvement as appropriate.

4.1. 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 4-1 through Table 4-3.

Table 4-1 Summary of General Service Time-of-Day Tariff (Tariff G.S. – TOD2, Tariff Code 221)

Season	Billing Hours	Rates
Winter (Off Peak Season) Months: October 1 through April 30		
Monthly Service Charge ($)		24.65
Energy Charge (¢ per kWh)	All	9.101
Summer (On Peak Season) Months: May 1 through September 30		
Monthly Service Charge		$24.65
		Energy Charges (¢ per kWh)

Season	Billing Hours	Rates
Low-Cost Hours	Midnight to 2 PM, 6 PM to Midnight	5.906
High-Cost Hours	2 PM to 6 PM	31.507
Critical Peak Hours	When Notified	49.3

Table 4-2 Summary of General Service PEV Tariff (Tariff G.S. – PEV, Option 1: Tariff Code 219, Option 2 (Sub Metered PEV): Tariff Code 220)

Season	Billing Hours	Rates
Monthly Service Charge		$24.65
		Energy Charges (¢ per kWh)
Option 1: Off peak hours	11 PM to 6 AM	7.001
Option 1: On peak hours	6 AM to 11 PM	11.717
Option 2: Off peak hours	11 PM to 6 AM	-3.362

Table 4-3 Summary of Large General Service Time-of-Day Tariff (Tariff L.G.S. – TOD (Primary Service Voltage Tariff Code 255, Secondary Service Voltage Tariff Code 253)

Season	Billing Hours	Rates
Primary Service Voltage		
Monthly Service Charge		$177.48
Demand Charge ($/kW)		$4.67
		Energy Charges (¢ per kWh)
On peak hours	7 AM to 9 PM	8.320
Off peak hours	9 PM to 7 AM	4.991
Secondary Service Voltage		
Monthly Service Charge		$24.65
Demand Charge ($/kW)		$7.44
		Energy Charges (¢ per kWh)
On peak hours	7 AM to 9 PM	9.446
Off peak hours	9 PM to 7 AM	5.046

4.2. 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.

4.3. Estimation of Ex Post Load Impact

4.3.1. 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:

$$\text{Distance} = ((\text{kWh\_total\_treatment} - \text{kWh\_total\_i})^2 + \Sigma(\text{kWh\_total\_treatment\_monthj} - \text{kWh\_total\_monthj\_i})^2)^{.5}$$

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.

4.3.1.1. *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.

4.3.2. Results of Ex Post Gross Load Impact

This section presents the ex post annual gross energy savings and ex post gross demand reductions resulting from the 2023 Commercial Time-of-Use.

4.3.2.1. *Load Impact Results*

Table 4-4 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 6.7% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 1,397,959 kWh.

This reduction of 1,397,959 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 4-4 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	14.03	0.87	0.01	n/a
		Control	14.87	1.32	0.08	n/a
	Off-Peak	Treatment	11.35	0.90	0.25	n/a
		Control	10.17	0.81	0.07	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.84	0.45	0.07	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			5.6%	34.0%	89.9%	6.7%
Annualized Population Difference in Average kWh On-Peak Consumption			1,395,850	591	1,518	1,397,959
Account Population			471	3	5	479
Ex Post kW Savings			395.65	1.34	0.35	397.35

4.3.2.2. Ex Post Gross kW Savings

Table 4-5 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 4-5 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	Ex Post Net kW Savings	Net-to-Gross Ratio
5.25	5.25	5.25	397.35	7570%	397.35	100%

4.4. Estimation of Ex Post Load Impact

4.4.1. Methodology for Estimating Net Ex Post Load Impact

The kW and kWh savings estimated using the procedures outlined in Section 4.3 are net savings estimates.

4.4.2. Results of Ex Post Net Load Impact

Table 4-6 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 397.35 kW.

Table 4-6 Program-Level Annual Net kWh and kW Savings

Category	kWh	kW
Ex Ante Gross Savings	1,800	5.25
Gross Audited Savings	1,800	5.25
Gross Verified Savings	1,800	5.25
Ex Post Gross Savings	-	397.35
Gross Realization Rate	0%	7570%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	397.35
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	0	n/a

4.5.   Findings and Recommendations

The commercial time-of-use (TOU) tariffs led to a noticeable load shift compared to accounts with similar consumption not on a TOU tariff. On average, accounts under TOU tariffs exhibited a 6.7% decrease in energy consumption during on-peak periods. This reduction in consumption was accompanied by a decrease in peak-period power demand, averaging 395.35 kW. While there was notable variability in how much load was shifted across different tariffs, these variations are likely attributable to the limited number of accounts participating. Therefore, it is premature to conclude that specific tariffs are more effective at shifting load.

5. Commercial Interruptible

This chapter presents the evaluation of the Commercial Interruptible Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2023 through December 2023.

5.1. Program Description

The Commercial Interruptible 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 Commercial Interruptible 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.

No customers enrolled in the Commercial Interruptible Program in 2023.

6. Commercial AMI Portal

This chapter presents the results of both the impact and process evaluations of the 2023 Commercial AMI Portal that Indiana Michigan Power (I&M) offered to its commercial customers during the period of January 2023 through December 2023.

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 asses the design of the Commercial AMI Portal service; and
- Provide recommendations for program improvement as appropriate.

6.1. Program Description

The Commercial AMI Portal service provides commercial customers with AMI meters detailed information on their energy usage. Customers may log on to their account to view their energy usage. The portal provides customers with historical data on their energy usage and costs, information on energy usage and weather trends, and a heat map of times of energy use intensity by time of day. In addition to the portal, I&M communicates with customers in three ways about their energy use. Customers may receive:

- A high bill alerts when their bill is 30% higher compared to the same month during the previous year;
- A monthly cumulative energy report; and
- A weekly energy report, if customers opt to receive it.

Customers who had an AMI meter at the time the portal service became available gained access to the portal. For all other customers, the customer must enroll to gain access to the Commercial AMI Portal service.

6.2. Data Collection

To support the estimation of program energy impacts, ADM analyzed interval energy usage data, and location-specific weather for samples of program participants that received email communications through the portal service. ADM also used records or customers accessing I&M website that contains the AMI Portal in the analysis.

6.3. Estimation of Ex Post Net Savings

The following sections describe the methodology used to estimate the savings of the Commercial AMI Portal service.

6.3.1. Methodology for Estimating Ex Post Net Energy Savings

6.3.1.1. Review of Program Data

Data on what accounts accessed the portal and what aspects of the portal were used was not available, however, prior evaluations have not identified an effect for access to the portal.

Table 6-1 summarizes the email communications sent to customers.

Table 6-1 Summary of Email Treatment

Number of Accounts	Minimum Number of Emails Received	Average Number of Emails Received	Maximum Number of Emails Received
660	1	16	48

The following types of email communications were sent:

- Monthly building/account energy usage alert
- Forecasted usage alert.
- Weekly energy usage alert.

As shown in Table 6-2, most email communications contained a forecasted usage alert and a monthly energy usage alert.

Table 6-2 Summary of Email Communication Types

Communication Type	Number of Communications
Monthly Energy Usage Account Alert	5,294
Forecasted Usage Alert	1,058
Weekly Energy Usage Alert	45
Forecasted Usage Alert, Monthly Energy Usage Account Alert	22
Monthly Energy Usage Account Alert, Weekly Energy Usage Alert	1

6.3.1.2. Modeling Approaches

ADM estimated the impact of the AMI portal using different definitions of the treatment group and developed matched comparison groups. The matched comparison group was developed using propensity score matching to identify a group of similar non-participating customers. ADM developed the propensity scores using pre-period energy usage and zip code.

Table 6-3 Definition of Treatment Group and Customer Counts

Cohort Name	Treatment Group Description	Count of Customers in the Treatment Group (Sampled Cases)	Count of Customers in the Control Group
Email	Customers that received an email. The dependent variable was developed from the monthly billing data. The comparison group was non-AMI customers.	472	459
Email (AMI Comparison Group)	Customers that received an email. The dependent variable was developed from the AMI data. The comparison group was AMI customers that did not get an email.	506	506
Email (Revised to Exclude Customers that Accessed Portal)	Customers that received an email. The dependent variable was developed from the monthly billing data. This group excludes customers that accessed the portal. The comparison group was non-AMI customers.	397	396
Email (Revised to Exclude Customers that Accessed Portal, AMI Comparison Group)	Customers that received an email. The dependent variable was developed from the AMI data. This group excludes customers that accessed the portal. The comparison group was AMI customers that did not get an email.	355	354
Accessed portal	Customers that accessed the website. The dependent variable was developed from the monthly billing data. The comparison group was non-AMI customers.	8366	8384
Accessed portal (AMI Comparison Group)	Customers that accessed the website. The dependent variable was developed from the monthly billing data. The comparison group was non-AMI customers.	1413	1413

6.3.1.2.1. Regression Model Specification

The regression models used in the analysis are described below. Both models included terms for cooling degree days (CDD) and heating degree days (HDD) to account for weather-related changes in energy use. CDD and HDD were developed using local temperature data retrieved from the National Oceanic and Atmospheric Administration (NOAA). The CDD and HDD were optimized for each participant, rather than using a fixed value across all participants. To optimize the CDD and HDD, combinations of CDD base values (CDD65, CDD70, CDD75, CDD80) and HDD base values (HDD50, HDD55, HDD60, HDD65) were iteratively run using Equation 6-1. The CDD/HDD base value combination that produced the highest adjusted R-square value was the CDD/HDD value used for that participant.

Equation 6-1 Cooling and Heating Degree Optimization Regression Model

$$\text{kWh}_{imy} = \beta_0 + \beta_{hdd,it} * HDD_{it} + \beta_{cdd,it} * CDD_{it} + \varepsilon_{it}$$

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 30 of 180

Indiana Demand Response Portfolio

2023 EM&V Report

Table 6-4 Cooling and Heating Degree Day Model Terms

Variable	Definition
kWh_{imy}	Customer i's average daily electric usage in month m of year y.
β_0	The intercept term.
$\beta_{hdd,it}$	The coefficient for the main effect of HDD.
$\beta_{cdd,it}$	The coefficient for the main effect of CDD.
HDD_{it}	The HDD variable calculated for iteration t for customer i.
CDD_{it}	The CDD variable calculated for iteration t for customer i.
ε_{it}	The error term for the iteration.

6.3.1.2.2. Difference-in-Difference (DiD) Model

The difference-in-difference (DiD) regression model is a statistical technique used to estimate the effect of a treatment by comparing the change in outcomes over time between a group of participants and a comparison group. This model allows for the analysis of data across pre- and post-treatment periods, providing insights into the treatment's impact. Although it's possible to specify the model with a fixed effects term, this approach often leads to a loss of degrees of freedom for the main effect of "treatment" due to perfect collinearity with the intercept term. As a result, the random effects model is typically preferred for its enhanced interpretability, maintaining the ability to assess the treatment effect while avoiding the limitations associated with fixed effects specification. Equation 6-2 specifies the regression model.

Equation 6-2 Difference-in-Difference (DiD)Model

$$kWh_{imy} = \beta_0 + \beta_1 * post_{imy} + \beta_2 * treatment_i + \sum_{m=1}^{12} \beta_m * month + \beta_{hdd} * HDD_{imy}$$
$$+ \beta_{cdd} * CDD_{imy} + \beta_t * post_{imy} * treatment_i + \beta_{t,hdd} * post_{imy}$$
$$* treatment_i * HDD_{imy} + \beta_{t,cdd} * post_{imy} * treatment_i * CDD_{imy} + \varepsilon$$

Table 6-5 Difference-in-Difference (DiD) Model Terms

Variable	Definition
kWh_{imy}	Customer i's average daily electric usage in month m of year y.
β_0	The intercept term.
β_1	The coefficient for the main effect of post.
β_2	The coefficient for the main effect of treatment.
β_m	A matrix of coefficients for the main effect of month.
β_{hdd}	The coefficient for the main effect of HDD.
β_{cdd}	The coefficient for the main effect of CDD.
β_t	The coefficient for the post-treatment interaction.
$\beta_{t,hdd}$	The coefficient for the post-treatment-HDD interaction.
$\beta_{t,cdd}$	The coefficient for the post-treatment-CDD interaction.

$post_{i,my}$	An indicator variable which indicates whether a given month falls into a customer's post-treatment period.
$treatment_i$	An indicator variable which indicates whether a customer falls into the treatment group or not.
$HDD_{i,my}$	The HDD calculated for a given customer for a given month.
$CDD_{i,my}$	The CDD calculated for a given customer for a given month.
ε	The error term.

6.3.1.2.3. Post Period Regression (PPR) Model

The post-period regression (PPR) model is designed to assess the impact of interventions by comparing observations from participants after the treatment with those from a comparison group. Unlike models that assess changes over time, the PPR model focuses specifically on the period following the intervention. It incorporates pre-treatment consumption data, segmented across four distinct seasons, as variables. This approach allows for the control of individual differences that could influence consumption patterns. By using these seasonal consumption figures as control variables, the model aims to provide a more accurate estimate of the treatment effect by accounting for variations in consumption that are not related to the treatment. This method is particularly useful in studies where external factors, such as seasonal changes, could significantly affect the outcome variable. Equation 6-3 specifies the PPR regression model.

Equation 6-3 Post Period Regression (PPR) Model

$$
kWh_{imy} = \beta_0 + \sum_{m=1}^{12} \beta_m * month + \sum_{s=spring}^{winter} \beta_s * pre_{s,i} + \sum_{m=1}^{12} \sum_{s=spring}^{winter} \beta_{m,s} * month * pre_{s,i}
$$
$$
+ \beta_{hdd} * HDD_{imy} + \beta_{cdd} * CDD_{imy} + \beta_t * treatment_i + \beta_{t,hdd} * treatment_i
$$
$$
* HDD_{imy} + \beta_{t,cdd} * treatment_i * CDD_{imy} + \varepsilon
$$

Table 6-6 Post Period Regression Model Terms

Variable	Definition
kWh_{imy}	Customer i's average daily electric usage in month m of year y.
β_0	The intercept term.
β_m	A matrix of coefficients for the main effect of month.
β_s	A matrix of coefficients for the main effect of pre-usage in each of the four seasons (spring, summer, fall, winter) for customer i.
$\beta_{m,s}$	A matrix of coefficients for the interaction between month and season.
β_{hdd}	The coefficient for the main effect of HDD.
β_{cdd}	The coefficient for the main effect of CDD.
β_t	The coefficient for the main effect of treatment.
$\beta_{t,hdd}$	The coefficient for the treatment-HDD interaction.
$\beta_{t,cdd}$	The coefficient for the treatment-CDD interaction.

$treatment_i$	An indicator variable which indicates whether a customer falls into the treatment group or not.
$pre_{s,i}$	The average daily consumption during spring, summer, fall, and winter for customer i. Spring was defined as March through May. Summer was defined as June through September. Fall was defined as October/November. Winter was defined as December, January, and February.
$HDD_{i,my}$	The HDD calculated for a given customer for a given month.
$CDD_{i,my}$	The CDD calculated for a given customer for a given month.
ε	The error term.

6.3.1.3. Regression Model Findings

Table 6-7 presents the findings from the regression analyses. Two models indicate a statistically significant relationship between the portal service and energy use. Both of these models assessed the impact of accessing the website and excluded customers who received emails through the service. One model that used AMI data for the analysis found an increase in energy use for those customers that accessed the portal. The other model that used monthly data found a decrease in energy use for those that accessed the portal.

Given the inconsistency of the results and the fact that most analyses did not find a statistically significant effect of the service on energy use, ADM concluded that there was not sufficient evidence to support a claim that the service decreased energy use.

Table 6-7 Summary of Regression Results

Cohort	Model	Annual Savings	90% Confidence Interval	Statistically Significant	Estimate of Effect on Energy Use
Email	DiD	494	-517.12 / 1505.76	No	None
Email	PPR	353	-221.61 / 927.23	No	None
Email (AMI Comparison Group)	DiD	1,742	-959.01 / 4442.3	No	None
Email (AMI Comparison Group)	PPR	-143	-1871.27 / 1584.92	No	None
Email (Revised to Exclude Customers that Accessed Portal)	DiD	8,348	-7506.38 / 24201.63	No	None
Email (Revised to Exclude Customers that Accessed Portal)	PPR	-2,109	-6750.2 / 2532.86	No	None
Email (Revised to Exclude Customers that Accessed Portal, AMI Comparison Group)	DiD	1,123	-1753.88 / 3999.31	No	None
Email (Revised to Exclude Customers that Accessed Portal, AMI Comparison Group)	PPR	556	-1593.94 / 2706.6	No	None

Cohort	Model	Annual Savings	90% Confidence Interval	Statistically Significant	Estimate of Effect on Energy Use
Accessed Portal/Website (Excludes Customers that Received Emails)	DiD	587	19.86 / 1154.04	Yes	Decreased Energy Use
Accessed Portal/Website (Excludes Customers that Received Emails)	PPR	279	-108.81 / 666.12	No	None
Accessed Portal/Website (AMI Comparison Group, Excludes Customers that Received Emails)	DiD	-215	-516.22 / 86.57	No	None
Accessed Portal/Website (AMI Comparison Group, Excludes Customers that Received Emails)	PPR	-330	-593.54 / -66.77	Yes	Increased Energy Use

6.4. Estimation of Ex Post Net Savings

6.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 6.4 are net savings estimates. No savings were estimated for the Commercial AMI Portal.

6.5. Findings and Recommendations

ADM's analysis did not identify energy saving impacts resulting from the Commercial AMI email communications. This outcome contrasts with the results from PY2022, where a positive impact of email communications on energy savings was observed. The discrepancy between the two years does not seem to stem from changes in email communication strategies, as the level of email activity remained consistent with that of PY2022. Instead, the variance may be attributed to the minimal impact of the intervention on energy consumption and the fluctuating energy use patterns among commercial and industrial customers.

7. Residential Critical Peak Pricing

This chapter presents the evaluation of the Residential Critical Peak Pricing Program that Indiana Michigan Power (I&M) offered its residential customers during the period of January 2023 through December 2023.

7.1. Program Description

The Residential Critical Peak Pricing 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 Critical Peak Pricing 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 Residential 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 Residential Critical Peak Pricing cost tier periods.

Table 7-1 Summary of Residential Peak Pricing Tariff (R.S. – CPP, Tariff Code 060)

Season	Billing Hours	Rates
Winter (Off Peak Season) Months: October 1 through April 30		
Monthly Service Charge ($)		$14.79
Energy Charge (¢ per kWh)	All Except Critical Peak	10.318
Critical Peak Hours (¢ per kWh)	When Notified	49.3
Summer (On Peak Season) Months: May 1 through September 30		
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

No customers enrolled in Residential Critical Peak Pricing in 2023.

8. Residential Time-of-Use

This chapter presents the evaluation of the Residential Time-of-Use Program that Indiana Michigan Power (I&M) offered its residential customers during the period of January 2023 through December 2023.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2023.

- Estimate kWh shifts from high-cost hours.

- Provide recommendations for program improvement as appropriate.

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 through Table 8-3.

Table 8-1 Summary of Residential Service Time-of-Day Tariff (Tariff R.S.. – TOD2, Tariff Code 021)

Season	Billing Hours	Rates
Winter (Off Peak Season) Months: October 1 through April 30		
Monthly Service Charge ($)		$16.76
Energy Charge (¢ per kWh)	All	9.056
Summer (On Peak Season) Months: May 1 through September 30		
Monthly Service Charge		$16.76
		Energy Charges (¢ per kWh)
Low-Cost Hours	Midnight to 2 PM, 6 PM to Midnight	9.056
High-Cost Hours	2 PM to 6 PM	36.578

Table 8-2 Summary of Residential Service PEV Tariff (Tariff R.S. – PEV, Tariff Code 029)

Season	Billing Hours	Rates
		Energy Charges (¢ per kWh)
Off peak hours	11 PM to 6 AM	-3.317

Table 8-3 Summary of Residential Off-Peak Energy Storage Tariff (Tariff R.S. – OPES, Tariff Code 032)

Season	Billing Hours	Rates
Monthly Service Charge		$16.75
		Energy Charges (¢ per kWh)
On peak hours	7 AM to 9 PM	6.01
Off peak hours	9 PM to 7 AM	16.981

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.

8.3. Estimation of Ex Post Load Impact

Section 4.3 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 resulting from the 2023 Residential Time-of-Use.

8.3.2.1. Load Impact Results

Table 8-4 presents the load impacts resulting from the Residential Time-of-Use Program, with results broken down according to each specific on-peak schedule. Nearly 80% of program TOU customer accounts fall under tariffs 32. On average, the hourly energy consumption during on-peak periods for the treatment group was 11.4% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 593,017 kWh.

This reduction of 593,017 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 8-4 Residential Time-of-Use Program-level Load Impacts

Variable	Time of Day	Group	Tariff 21	Tariff 32	Tariff 36	Total
Average Hourly kWh Consumption	On-Peak	Treatment	1.03	1.69	1.88	n/a
		Control	1.07	1.92	2.95	n/a
	Off-Peak	Treatment	0.79	2.01	3.12	n/a
		Control	0.78	1.69	2.05	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.04	0.23	1.07	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			4.0%	11.9%	36.2%	11.4%
Annualized Population Difference in Average kWh On-Peak Consumption			2,491	503,194	87,332	593,017
Account Population			131	625	27	783
Ex Post kW Savings			5.66	142.63	28.88	177.17

Table 8-5 presents the load impacts resulting from the Residential Electric Vehicles Time-of-Use Program. On average, the hourly energy consumption during on-peak periods for the treatment group was 23.8% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 630,019 kWh.

Table 8-5 Residential Electric Vehicles Time-of-Use Program-level Load Impacts

Variable	Time of Day	Group	Value
Average Hourly kWh Consumption	On-Peak	Treatment	1.09
		Control	1.44
	Off-Peak	Treatment	1.90
		Control	1.07
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.34
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			23.8%
Annualized Population Difference in Average kWh On-Peak Consumption			630,019
Account Population			430
Ex Post kW Savings			147.06

8.3.2.2. Ex Post Gross kW Savings

Table 8-6 below shows the estimated program-level ex post gross peak kW reduction resulting from the programs.

Table 8-6 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	0.19	0.19	0.19	177.17	94789%	177.17	100%
Residential EV Time-of-Use	1.73	1.73	1.73	147.06	8524%	147.06	100%
Total	1.91	1.91	1.91	324.23	16956%	324.23	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 4.3 are assumed to be net savings estimates.

8.4.2. Results of Ex Post Net Load Impact

Table 8-7 summarize the ex post annual net kWh and kW savings of the Residential Time-of-Use Program and Residential EV Time-of-Use Program. Across both programs, the annual net savings totaled 0 kWh and 324.23 kW.

Table 8-7 Program-Level Annual Net kWh and kW Savings: Residential Time-of-Use Program

Category	kWh	kW
Ex Ante Gross Savings	208	0.19
Gross Audited Savings	208	0.19
Gross Verified Savings	208	0.19
Ex Post Gross Savings	-	177.17
Gross Realization Rate	0%	94789%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	177.17
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	0	n/a

Table 8-8 Program-Level Annual Net kWh and kW Savings: Residential EV Time-of-Use Program

Category	kWh	kW
Ex Ante Gross Savings	1,920	1.73
Gross Audited Savings	1,920	1.73
Gross Verified Savings	1,920	1.73
Ex Post Gross Savings	-	147.06
Gross Realization Rate	0%	8524%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	147.06
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	0	n/a

8.5. Findings and Recommendations

The residential time-of-use (TOU) rates led to a noticeable load shift compared to accounts with similar consumption not enrolled in a TOU rate. On average, accounts under TOU tariffs exhibited a 11.4% decrease in energy consumption during on-peak periods for the TOU tariffs and a 23.8% decrease for the electric vehicle tariff. Combined, the tariffs resulted in kW reductions of 324.23.

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 2023 through December 2023.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2023.

- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.

- Complete a process evaluation of the program in the form of a participant survey.

- 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, and Honeywell Home thermostats qualify for the program.

The program is marketed by I&M under the name Power Rewards: Smart Thermostat.

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.

- ▪ Participant survey responses.

- ▪ Data from relevant secondary sources.

9.2.1. Participant Survey

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

The sample size requirement was estimated using the following formula:

$$n = \frac{N * (Z^2 * p * (1-p))}{(TP^2 * (N-1) + TP^2 * p * 1 - p))}$$

Where,

N = is the total size of the population.

Z = is the Z score, 1.645 for the 90% confidence interval

p = the proportion of respondents endorsing a response, ADM assumed a value of 0.5

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 census of unique contacts Home Energy Management Program. ADM contacted each participant up to three times by email to ask them to complete the survey. Table 9-1 summarizes the results of the survey data collection effort.

Table 9-1 Home Energy Management Survey

Mode	Time Frame	Number of Contacts	Number of Completions
Email	October 2023	1029	73

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

$$\text{Distance} = ((\text{kWh\_12\_14}_{treatment} - \text{kWh\_12\_14}_i)^2 + (\text{kWh\_15\_17}_{treatment} - \text{kWh\_15\_17}_i)^2 + (\text{kWh\_18\_20}_{treatment} - \text{kWh\_18\_20}_i)^2 + (\text{kWh}_{treatment} - \text{kWh}_i)^2)^{.5}$$

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 ($\text{kWh}_{treatment}$ / $\text{kWh}_{control}$), 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 9-2 Match Days

Event Date	Match Days
7/5/2023	7/14/2023
	8/4/2023
	8/23/2023

Event Date	Match Days
7/26/2023	6/30/2023
	7/3/2023
	7/7/2023
7/27/2023	7/14/2023
	8/4/2023
	8/23/2023
7/28/2023	7/14/2023
	7/25/2023
	8/23/2023
8/21/2023	7/11/2023
	7/25/2023
	8/4/2023
8/24/2023	7/14/2023
	7/25/2023
	8/23/2023
9/5/2023	7/14/2023
	8/4/2023
	8/23/2023

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 2023 Home Energy Management.

Indiana Demand Response Portfolio   2023 EM&V Report

I&M initiated 7 load management events during the summer of 2023. As shown in Table 9-3 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 9-3 Demand Response Event Times

Date	Event Start Time	Event Stop Time	Event Coincident with 5CP	PJM Coincident Peak Occurred During Hour Ending
7/5/2023	2:00 PM	6:00 PM	Yes	6:00 PM
7/26/2023	3:00 PM	7:00 PM	No	
7/27/2023	3:00 PM	7:00 PM	Yes	6:00 PM
7/28/2023	3:00 PM	7:00 PM	Yes	6:00 PM
8/21/2023	3:00 PM	7:00 PM	No	
8/24/2023	2:00 PM	6:00 PM	No	
9/5/2023	3:00 PM	7:00 PM	Yes	5:00 PM
9/6/2023	No Event		No	5:00 PM

ADM calculated the demand reductions for each event hour. Table 9-4 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.

Table 9-4 kW Reductions for Event Days by Hour

Date	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
7/5/2023		-4,421.18	6,733.49	5,277.06	-2,248.63	6,005.28	6,733.49
7/26/2023		-5,878.15	4,350.08	4,113.58	-2,305.24	4,231.83	4,350.08
7/27/2023		-3,821.10	6,797.13	4,974.11	-2,222.70	5,885.62	6,797.13
7/28/2023		-4,065.72	6,399.36	5,477.78	-2,004.95	5,938.57	6,399.36
8/21/2023		-3,331.68	6,434.54	4,895.68	-2,484.52	5,665.11	6,434.54
8/24/2023	-3,339.53	7,154.27	5,958.47	-1,775.76		6,556.37	7,154.27
9/5/2023		-3,396.49	6,282.18	4,835.03	-2,719.98	5,558.61	6,282.18

Table 9-5 presents average participant demand reductions for each event hour.

Indiana Demand Response Portfolio   2023 EM&V Report

Table 9-5 Average Participant kW Reductions for Event Days by Hour

Date	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
7/5/2023		-0.81	1.24	0.97	-0.41	1.11	1.24
7/26/2023		-1.10	0.81	0.77	-0.43	0.79	0.81
7/27/2023		-0.71	1.27	0.93	-0.41	1.10	1.27
7/28/2023		-0.76	1.19	1.02	-0.37	1.11	1.19
8/21/2023		-0.62	1.20	0.92	-0.46	1.06	1.20
8/24/2023	-0.62	1.34	1.11	-0.33		1.23	1.34
9/5/2023		-0.63	1.17	0.90	-0.51	1.04	1.17

Table 9-6 presents a summary of the aggregate demand reductions occurring during PJM 5CP hours.

Table 9-6 Summary of kW Reductions during PJM 5CP Events

Date	Hour Start	Hour End	Ex Post Net kW Savings
7/5/2023	5:00 PM	6:00 PM	5,277.06
7/27/2023	5:00 PM	6:00 PM	4,974.11
7/28/2023	5:00 PM	6:00 PM	5,477.78
9/5/2023	4:00 PM	5:00 PM	6,282.18
9/6/2023	4:00 PM	5:00 PM	
Maximum Event Hour Peak kW Reduction			6,282.18
Average Event Hour Peak kW Reduction			5,502.78

Figure 9-1 through Figure 9-7 graphically present average participant actual and predicted energy usage for each event day.

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 48 of 180

Indiana Demand Response Portfolio

2023 EM&V Report

Figure 9-1 July 5, 2023 Event Average Participant Actual and Predicted Energy Usage
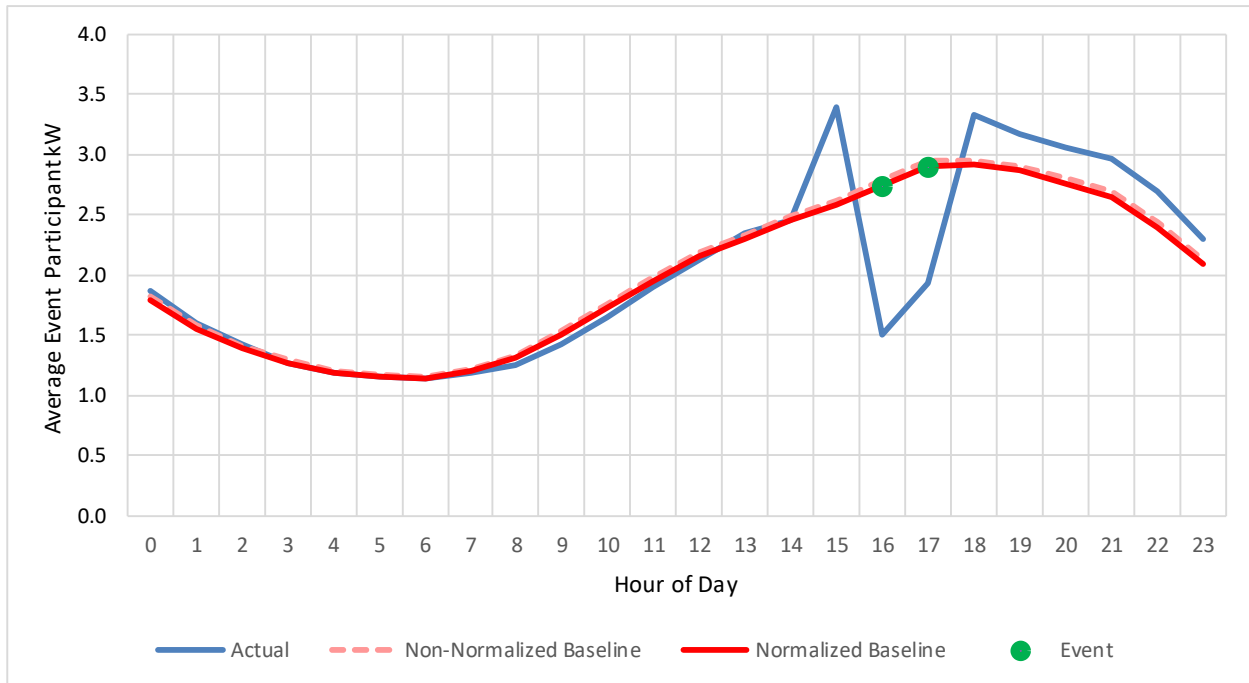
Figure 9-2 July 26, 2023 Event Average Participant Actual and Predicted Energy Usage
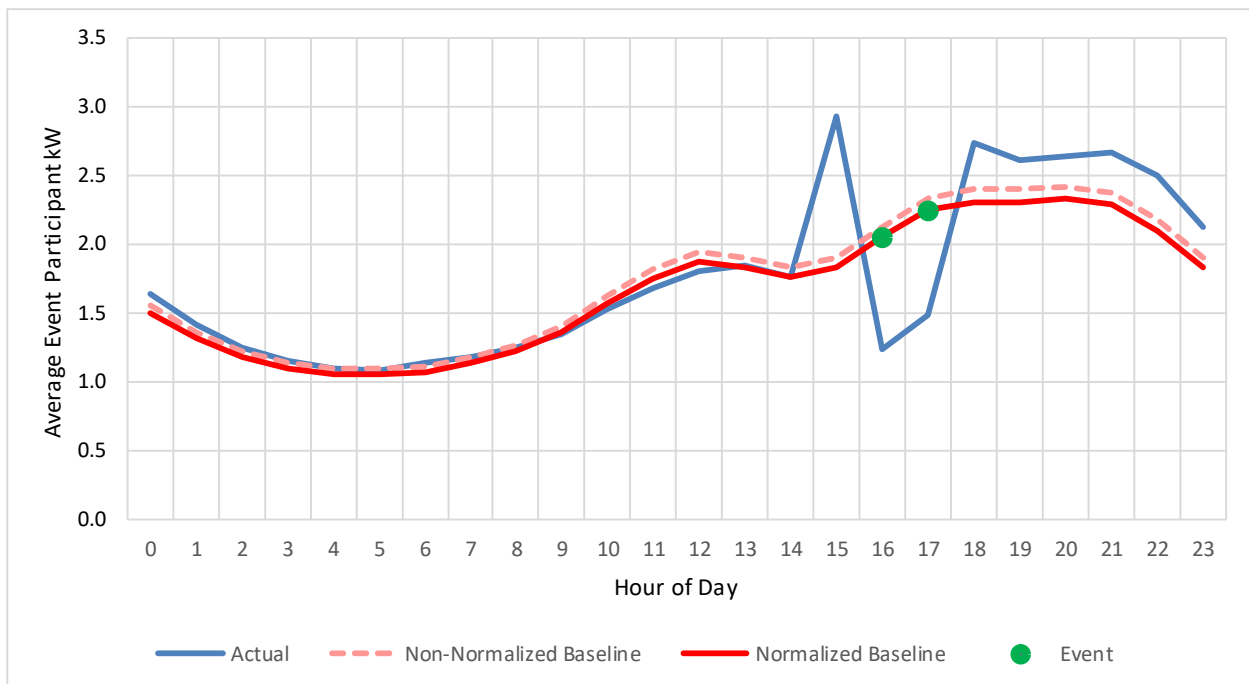
Figure 9-3 July 27, 2023 Event Average Participant Actual and Predicted Energy Usage
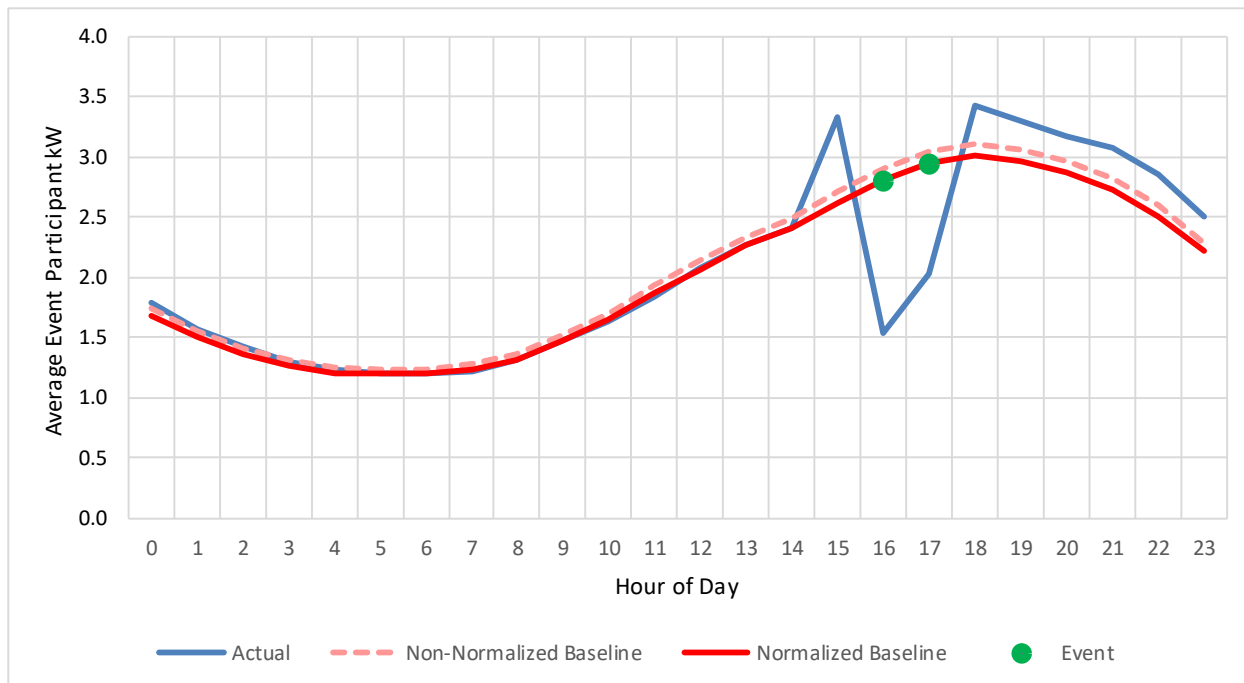
Figure 9-4 July 28, 2023 Event Average Participant Actual and Predicted Energy Usage

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 50 of 180

Indiana Demand Response Portfolio

2023 EM&V Report
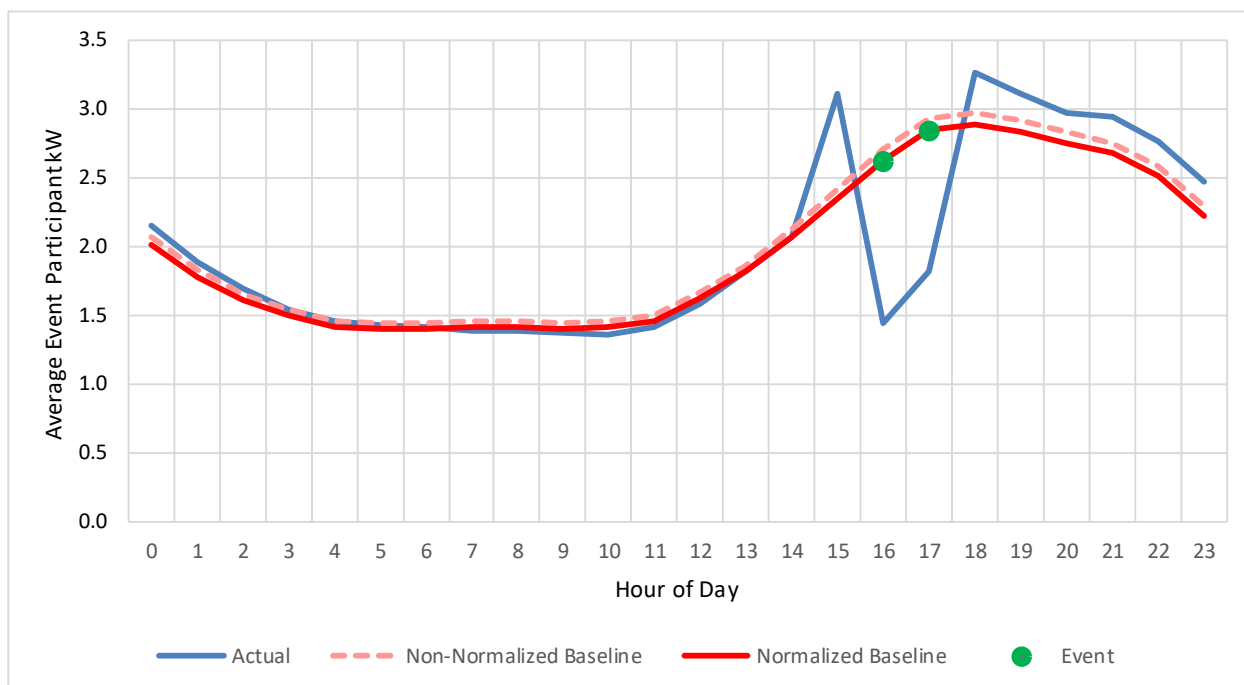
Figure 9-5 August 21, 2023 Event Average Participant Actual and Predicted Energy Usage
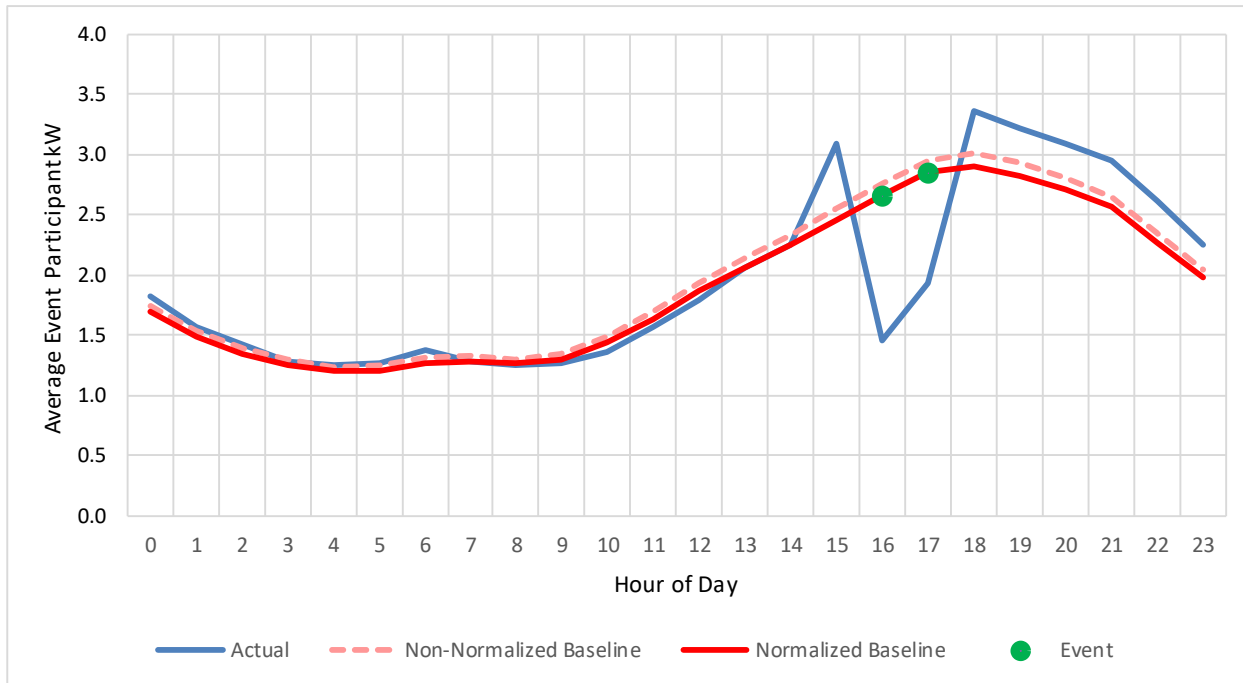
Figure 9-6 August 24, 2023 Event Average Participant Actual and Predicted Energy Usage
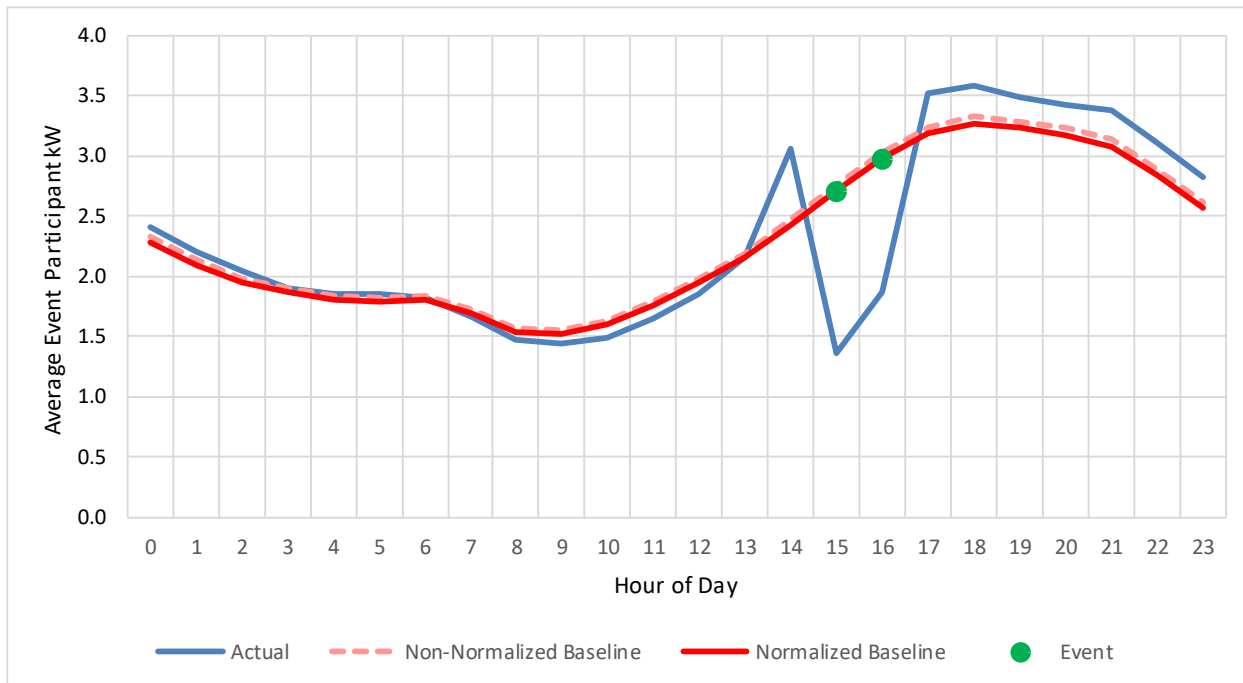
Figure 9-7 September 5, 2023 Event Average Participant Actual and Predicted Energy Usage
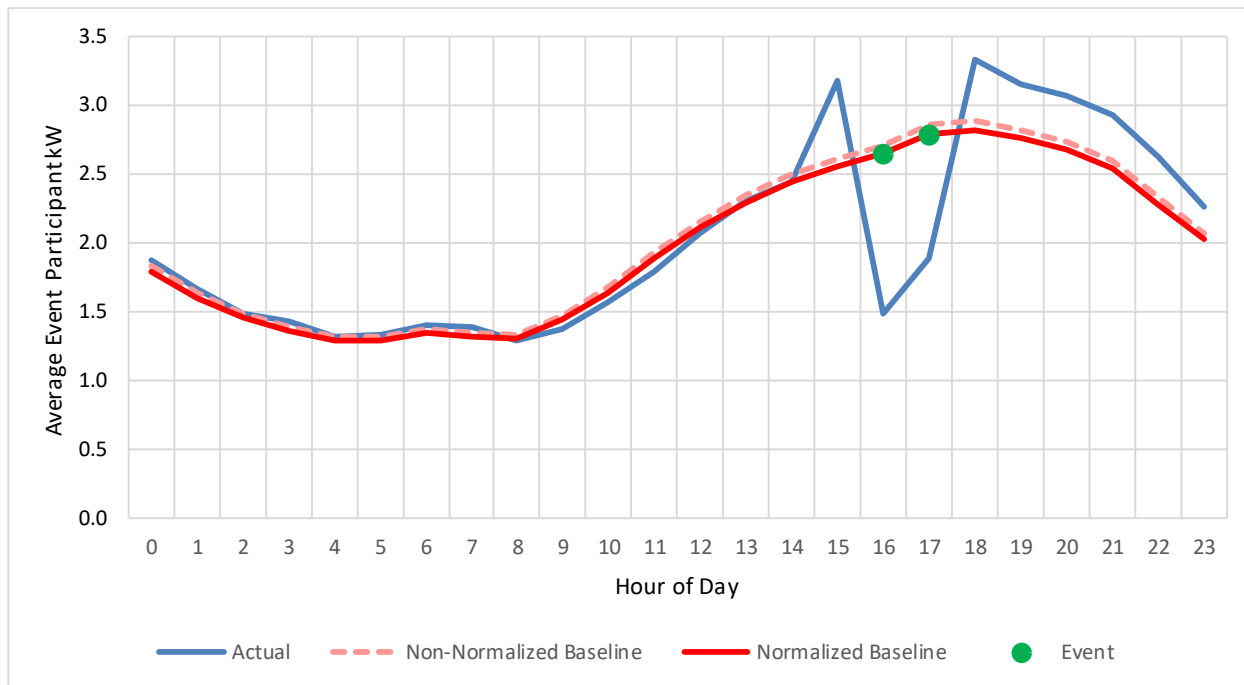
9.3.2.1. Ex Post Gross kWh Savings

Table 9-7 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 9-7 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
67,097	67,097	67,097	35,667	53%

9.3.2.2. Ex Post Gross kW Savings

Table 9-8 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 118%.

Table 9-8 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
4,653.59	4,653.59	4,653.59	5,502.78	118%

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 9-9 summarizes the ex post annual net kWh and kW savings of the Home Energy Management Program. The annual net savings totaled 35,667 kWh and 5,502.78 kW.

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

Category	kWh	kW
Ex Ante Gross Savings	67,097	4,653.59
Gross Audited Savings	67,097	4,653.59
Gross Verified Savings	67,097	4,653.59
Ex Post Gross Savings	35,667	5,502.78
Gross Realization Rate	53%	118%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	35,667	5,502.78
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	713,343	N/A

9.4.3. Process Evaluation

ADM completed a process evaluation of the Home Energy Management Program. The process evaluation was primarily based on a survey of program participants. The objectives of the process evaluation were to:

- Assess comfort impacts and user acceptance of the load events; and
- Assess participant satisfaction and willingness to recommend the program to others.

9.4.3.1. Participant Survey Findings

ADM surveyed customers who enrolled their smart thermostat in the Home Energy Management Program. Customers completed an online survey that asked questions about their experience with the peak events, enrollment, satisfaction with the program, and their home characteristics. We

contacted participants up to three times to complete the survey. Among those customers contacted, 73 completed the survey.

9.4.3.2. Net Promoter Score

Almost half of the respondents were net promoters.[1] Based on the survey findings, 32% of respondents are classified as Detractors, 19% as Passive, and 49% as Promoters in terms of their likelihood to recommend the program to others (see Figure 9-8). The Net Promoter Score (NPS) for the Home Energy Management program was 18%.

Figure 9-8 Net Promoter Score (n = 73)
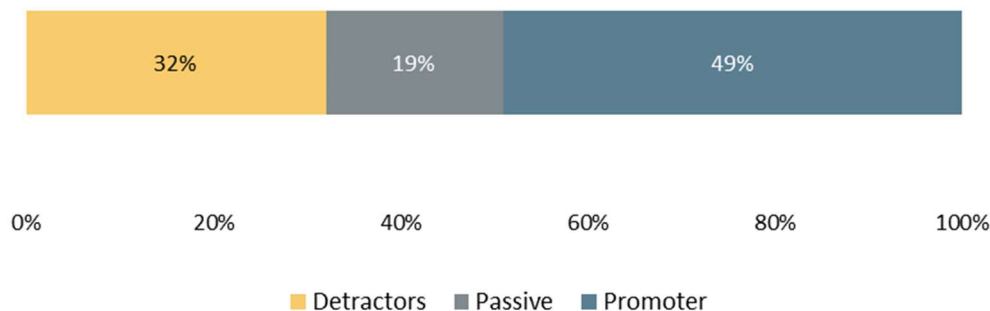
The program is seen by promoters as a valuable means to save energy and reduce the reliance on polluting power plants during peak hours, aligning with participants' energy-conscious and money-saving goals. The ease of participating and convenience were the most frequently cited reasons for recommending the program. Participants generally find the program easy to engage with, compatible with thermostats for efficient cooling, leading to lower energy bills. The program is perceived positively, offering financial benefits, environmental improvements, and convenience through smart thermostat usage, among promoters. Some participants appreciate rebates, simplicity, and energy conservation, while a few reported inconvenience and lack of comfort. See Table 9-10 for the common themes of comments by group.

However, some detractors expressed difficulties with the program, such as the inability to unsubscribe and challenges in temperature control, particularly when the house heats up before bedtime. There was a general hesitancy to recommend the program among detractors, with several respondents being new to it and experiencing unpleasant thermostat adjustments, especially at inconvenient times. Concerns included increased energy bills when setting temperatures higher during peak hours, a lack of advanced warnings, delayed bill credits, and dissatisfaction with communication and rewards. Participants were unsure of the program's benefits, including cost

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[1] The net promoter score is equal to the % of Promoters - % of Detractors. Promoters are respondents who rate the likelihood of recommending the service as 9 or higher on a 0-10 point scale. Detractors are those who rate it as 6 or lower on the same scale.

savings, and questioned its execution. Some experienced technical issues, such as thermostat settings perceived as improper, while others noted minimal financial gains, leading to limited enthusiasm for recommending the program.

Table 9-10 Reason for NPS Rating

Promoters (n = 36)	*Number of Comments (n = 24)*
Ease of Participation and Convenience	8
Savings and Cost Benefits	7
Environmental Impact	4
Overall Satisfaction/Positive Feedback	4
Detractors (n = 23)	*Number of Comments (n = 21)*
Negative User Experience and Inconvenience	10
Uncertainty and Lack of Information	4
Savings and Cost Considerations	2
Lack of Control and Choice	2
Technical or Installation Issues	1
Specific Temperature Concerns	2
Passive (n = 14)	*Number of Comments (n = 12)*
Positive Feedback	6
Uncertainty and Lack of Information	5
Comfort and Convenience	4
Experience and History	2

9.4.3.3. Engagement

Most survey respondents learned of the Home Energy Management program through an I&M email. Participants provided feedback on how they initially became aware of the program, with 52% learning about it through email communication from I&M, followed by 17% who discovered it via the program's website, 16% who received information through a mailer from I&M, and 10% who received a message from their thermostat manufacturer (see Figure 9-9).

Figure 9-9 Source of Awareness
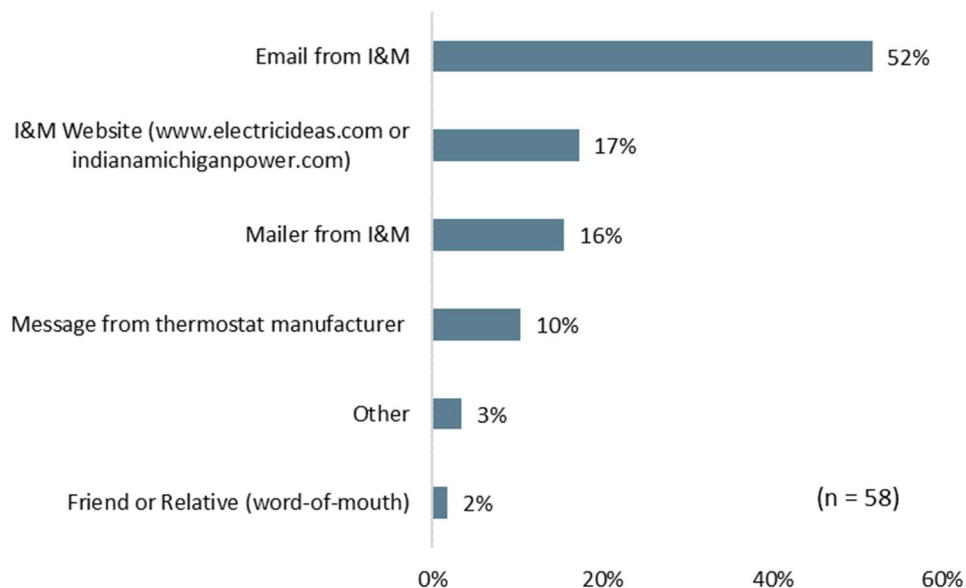
Most respondents participated in the program to get bill credits and save on energy costs.
Participants were motivated to participate in the program because of the bill credits or enrollment
incentives, saving on energy costs, saw it as an opportunity to participate in an energy savings
program, and to reduce energy consumption for environmental reasons (see Figure 9-10). Thus,
financial considerations were the primary motivation for participating.

Figure 9-10 Reasons for Participation
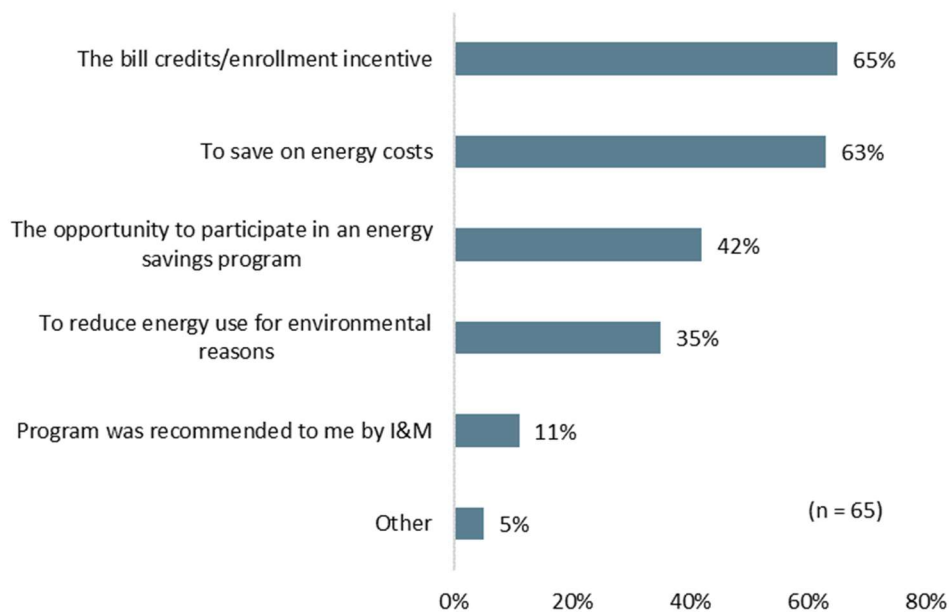
9.4.3.4. Enrollment

Most respondents did not have concerns prior to enrolling and learned about how the program worked through the program's website. Most survey respondents (83%) did not have concerns about participating in the program before enrolling, while 17% did. Among those 28 respondents with concerns, the most common worry was about being uncomfortable during energy reduction events, cited by 32% of respondents. Additionally, 29% expressed concerns about the utility's ability to control or shut off their air conditioner, 25% were worried about not being able to control the temperature, 11% had privacy or security concerns, and 4% were concerned they would not actually receive the incentive.

Most survey respondents (52%) obtained information about how the program works through the program's website, followed by 42% who received information from I&M emails or newsletters. Other sources of information included I&M flyers, I&M mailings, and I&M representatives. See Figure 9-11 for additional details.

Figure 9-11 Where Customers Got Information about the Program
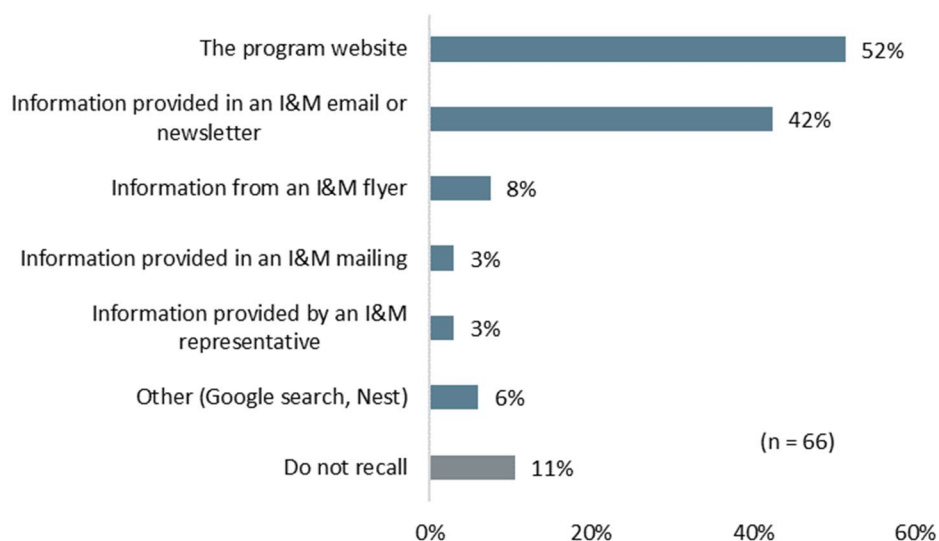
The information about the program generally met participants needs, but some participants would have appreciated additional information. Most survey respondents (61%) indicated that the information they sought out either completely or mostly addressed their questions (see Table 9-11). On average, participants found that the information they received or viewed before deciding to participate addressed their questions relatively well, with a mean rating of 4.11 on a scale of 1 to 5. Participants provided feedback about the questions that the information did not address. These included questions about the realistic savings compared to their bills, what to do if the thermostat didn't function correctly, details about when and how the program would activate the thermostat savings mode, a desire for more information, understanding the extent of control I&M would have over their thermostats, specifics about thermostat adjustments and their impact on others, clarity

on how they would know if the program was beneficial, the degree to which the thermostat would be adjusted, the methodology behind temperature changes, and the process for opting out of the program.

Table 9-11 Effectiveness of Obtained Information in Addressing Pre-Participation Questions

Response	Percentage of Responses (n = 66)
1 (Not at all)	6%
2	6%
3	15%
4	29%
5 (Completely)	32%
Did not review any information before deciding to participate	12%

Enrollment in the program was easy for most participants. The majority of survey respondents (75%) found the enrollment process to be very easy, followed by an additional 13% who found it to be somewhat easy (see Table 9-12). The enrollment process was reported as difficult by some participants due to issues such as multiple unsuccessful attempts, requiring up to five tries in one case, and a lack of feedback during the initial enrollment attempt, which made it challenging to confirm successful enrollment.

Table 9-12 Ease of Enrollment

Response	Percentage of Responses (n = 64)
1 (Very difficult)	2%
2	3%
3	8%
4	13%
5 (Very easy)	75%

9.4.3.5. Peak Energy Use Events

Most participants were home during events and their experiences varied, with most considering the number of events appropriate, but differing opinions on event duration. Eighty percent of surveyed participants indicated that they were home during one or more of the Peak Energy Use Events, while 20% were not home. The impact of peak events on the comfort of participants' homes varied, with 33% reporting no effect on comfort, 35% indicating a slight discomfort, 14% stating a moderate level of discomfort, and 18% reporting a significant discomfort during these events.

Most respondents (77%) believed that the number of Peak Energy Events called was appropriate. In contrast, 8% thought there were too many events, and 15% believed there were too few events called.

Customer feedback on the duration of Peak Energy Events indicates that 46% of respondents felt the events lasted about the right amount of time. Meanwhile, 29% either did not notice or did not know the duration of the events. A smaller percentage found the events lasted too long, with 3% saying they lasted much too long, 8% somewhat too long, and 14% a little too long. See Figure 9-12 for more information.

Figure 9-12 Customer Feedback on Peak Events Duration
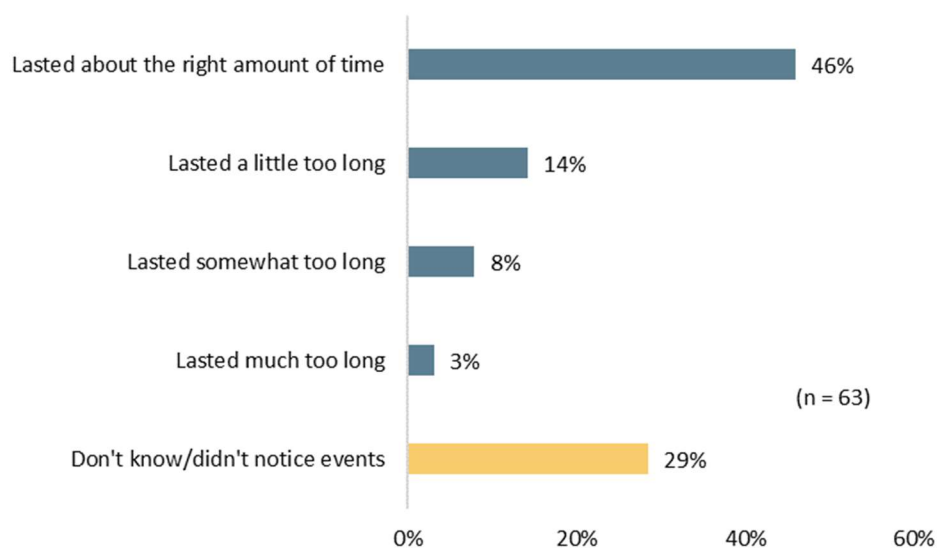
9.4.3.6. *Program Satisfaction*

Overall satisfaction with the program was generally positive and the majority expressed a high likelihood of participating again the next year. The majority of respondents (61%) are very likely to participate in the Home Energy Management program next year (that is, they rated their likelihood of continuing as a 10). Additionally, 18% of respondents rated their likelihood of participation between 8 and 9 on the scale, indicating a generally high level of interest in continuing with the program. A small minority (6%) expressed that they are not at all likely to participate next year. Participants provided several reasons for their potential non-participation in the program next year. These reasons include the perception that the program is not beneficial to the customer, concerns about discomfort caused by temperature adjustments, dissatisfaction with the level of incentives, and the program's poor definition and explanation. Some participants noted that they are at home all the time and found the adjustments too aggressive or undesirable. Others mentioned that their experiences during the events were uncomfortable, with concerns about overheating and increased electric bills. Some respondents indicated that their decision would depend on their experience in the current year.

Surveyed participants were generally satisfied with the Home Energy Management program, with 42% indicating they were very satisfied and 27% indicating they were somewhat satisfied. Among those who were dissatisfied, common concerns included not seeing any benefits or rewards, experiencing issues or discomfort as previously mentioned, and expressing uncertainty about how the program works or its effectiveness in addressing high bills. Some participants were specifically disappointed by the lack of rewards or the inability to achieve a comfortable night's sleep.

Table 9-13 Satisfaction with the Home Energy Management Program

Response	Percentage of Responses (n = 62)
1 (Very dissatisfied)	5%
2	10%
3	16%
4	27%
5 (Very satisfied)	42%

9.4.3.7. Demographic Findings

The survey responses regarding the home's ownership and type indicate that 92% of participants own their home, 6% rent it, and 2% rent it to someone else. Additionally, 97% of the homes are the respondents' primary residences, while 3% are vacation properties not occupied year-round. In terms of home type, the majority (84%) are single-family houses detached from any other house, 6% are manufactured homes, 3% are single-family houses attached to one or more other houses (e.g., duplex, row house, or townhome), and 2% live in apartments within buildings. The average number of people currently living in participants' homes year-round is approximately 2.8. Participants reported a wide range of annual household incomes, with 62% indicating their income was between $50,000 or more and 18% making less than $50,000.

Most survey respondents have a Honeywell Home (44%), or Nest (39%) enrolled in the program. On average, survey respondents set their thermostat at 73 degrees during the summer months.

9.5. Findings and Recommendations

The program achieved average event-level per participant demand kW reductions ranging from .79 kW to 1.34 kW. The ex post kW savings were 5,502.78 and ex post energy savings totaled 35,667 kWh.

Overall, participants had a positive experience with the Home Energy Management program. Most participants said it was easy to enroll in the program. Three quarters of participants thought the events lasted the right amount of time or that they did not notice or have an opinion on the length of the event, suggesting the events were generally unobtrusive. Similarly, 77% thought that the number of events was about right.

Nearly half of respondents were classified as net promoters and the overall Net Promoter Score was 18%. Based on the survey findings, 32% of respondents are classified as Detractors, 19% as Passive, and 49% as Promoters in terms of their likelihood to recommend the program to others.

I&M marketing of the program is driving program awareness. Seventy-five percent of respondents learned of the program through an I&M communication, which included 52% from an I&M email, 17% from the I&M website, 16% from an I&M mailer. Relatively few learned from a thermostat manufacture message (10%).

- **Recommendation 1:** Consider increased use of thermostat manufacture messaging to drive additional enrollments if needed. ADM has seen this type of marketing increase enrollments in BYOT programs in the past.

The program materials have generally met participant information needs, but some participants suggested additional information that would be beneficial. Twenty-seven percent rate the adequacy of the information somewhat lower (1 to 3 on a five-point scale). The additional information these participants sought included understanding the extent of control I&M would have over their thermostats, specifics about thermostat adjustments and their impact on others, clarity on how they would know if the program was beneficial, the degree to which the thermostat would be adjusted, the methodology behind temperature changes, and the process for opting out of the program. However, the program website covers most of these topics suggesting that the information gaps reported by participants may be more due to poor recall of the information or they are not reviewing the website thoroughly.

- **Recommendation 2:** Consider additional strategies for communicating information about the program to improve customer experience. Some specific tactics that could be used are:

  o Provide a post enrollment email or mailer communication reiterating information on how the program makes thermostat adjustments, when I&M would make adjustments to the thermostat and the duration of the adjustment period, the benefits to the customer of participating, and the process for unenrolling as well as on the 12 month enrollment requirement.

  o Prior to the first event, communicate to enrollees' basic information about how the program works with the thermostat, what to expect during events, and what the benefits of their participation are.

  o Consider customer testimonials or brief videos demonstrating how the program events are communicated and what is done to reduce electricity during the period.

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 2023 through December 2023.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2023.

- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.

- Complete a process evaluation of the program in the form of a participant survey; and

- 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 residential customers with AMI meters installed. Customers must own a working central air conditioning unit.

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.

The program is marketed by I&M under the name Power Rewards: Home AC.

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 and associated tariff code.

- Location specific weather data.

- Participant survey responses.

- Data from relevant secondary sources.

10.2.1. Participant Survey

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

The sample size requirement was estimated using the following formula:

$$n = \frac{N * (Z^2 * p * (1 - p))}{(TP^2 * (N - 1) + TP^2 * p * 1 - p))}$$

Where,

N = is the total size of the population.

Z = is the Z score, 1.645 for the 90% confidence interval

p = the proportion of respondents endorsing a response, ADM assumed a value of 0.5

TP = Targeted Precision, 10% in this evaluation

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

ADM administered the survey to a census of unique contacts Residential HVAC DLC Program. For the email survey, ADM contacted each participant up to three times to ask them to complete the survey. For contacts without an email address available, ADM contacted participants up to four times to complete the survey. Table 10-1 summarizes the results of the survey data collection effort.

Table 10-1 Residential HVAC DLC Survey

Mode	Time Frame	Number of Contacts	Number of Completions
Email	September 2023	450	92

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 2023 Residential HVAC DLC.

I&M initiated 7 load management events during the summer of 2023. As shown in Table 10-2 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 10-2 Demand Response Event Times

Date	Event Start Time	Event Stop Time	Event Coincident with 5CP	PJM Coincident Peak Occurred During Hour Ending
7/5/2023	2:00 PM	6:00 PM	Yes	6:00 PM
7/26/2023	3:00 PM	7:00 PM	No	
7/27/2023	3:00 PM	7:00 PM	Yes	6:00 PM
7/28/2023	3:00 PM	7:00 PM	Yes	6:00 PM
8/21/2023	3:00 PM	7:00 PM	No	
8/24/2023	2:00 PM	6:00 PM	No	
9/5/2023	3:00 PM	7:00 PM	Yes	5:00 PM
9/6/2023	No Event		No	5:00 PM

The demand reductions were calculated for each event hour. Aggregate hourly results are provided below in Table 10-3 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 10-3 kW Reductions for Event Days by Hour

Date	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
7/5/2023		23.38	357.48	342.25	-218.03	349.86	357.48
7/26/2023		12.32	229.78	238.10	-219.42	233.94	238.10
7/27/2023		34.92	402.78	402.39	-121.47	402.58	402.78
7/28/2023		-30.57	268.86	296.87	-108.51	282.87	296.87
8/21/2023		14.01	379.76	386.26	-146.69	383.01	386.26
8/24/2023	5.01	384.74	460.37	-157.84		422.55	460.37
9/5/2023		7.75	353.77	381.11	-131.78	367.44	381.11

Table 10-4 presents average participant demand reductions for each event hour.

Table 10-4 Average Participant kW Reductions for Event Days by Hour

Date	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
7/5/2023		0.05	0.78	0.75	-0.48	0.76	0.78
7/26/2023		0.03	0.49	0.51	-0.47	0.50	0.51
7/27/2023		0.07	0.86	0.86	-0.26	0.86	0.86
7/28/2023		-0.07	0.57	0.63	-0.23	0.60	0.63
8/21/2023		0.03	0.75	0.76	-0.29	0.76	0.76
8/24/2023	0.01	0.73	0.88	-0.30		0.81	0.88
9/5/2023		0.01	0.67	0.72	-0.25	0.70	0.72

A summary of the aggregate demand reductions occurring during PJM 5CP hours is presented below in Table 10-5.

Indiana Demand Response Portfolio   2023 EM&V Report

Table 10-5 Summary of kW Reductions during PJM 5CP Events

Date	Hour Start	Hour End	Ex Post Net kW Savings
7/5/2023	5:00 PM	6:00 PM	342.25
7/27/2023	5:00 PM	6:00 PM	402.39
7/28/2023	5:00 PM	6:00 PM	296.87
9/5/2023	4:00 PM	5:00 PM	353.77
9/6/2023	4:00 PM	5:00 PM	
Maximum Event Hour Peak kW Reduction			402.39
Average Event Hour Peak kW Reduction			348.82

Figure 10-1 through Figure 10-7 graphically present average participant actual and predicted energy usage for each event day.

Figure 10-1 July 5, 2023 Event Average Participant Actual and Predicted Energy Usage
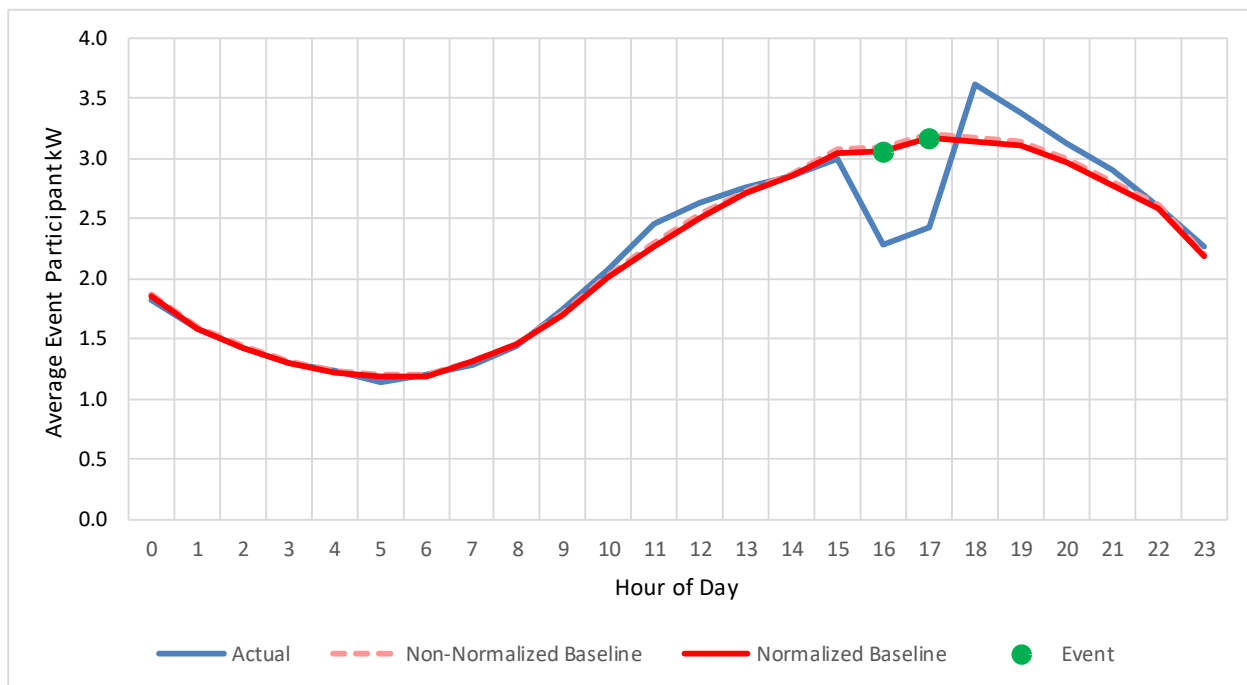
Figure 10-2 July 26, 2023 Event Average Participant Actual and Predicted Energy Usage

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 67 of 180

Indiana Demand Response Portfolio

2023 EM&V Report
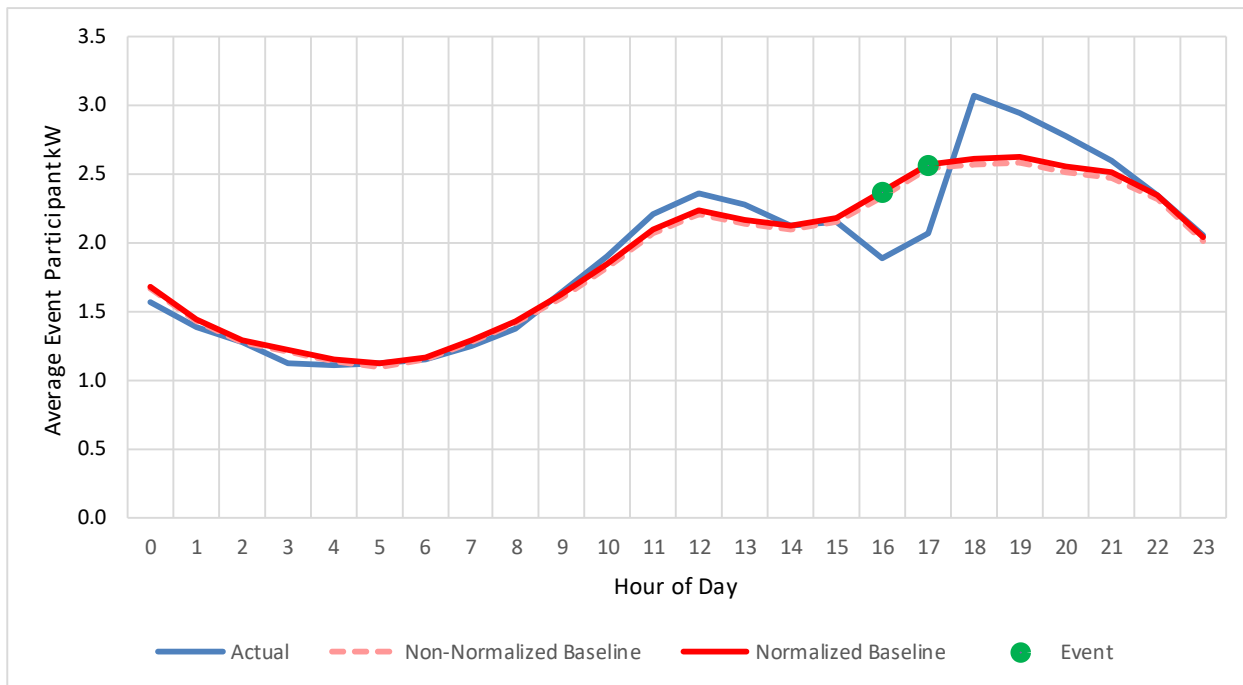
Figure 10-3 July 27, 2023 Event Average Participant Actual and Predicted Energy Usage
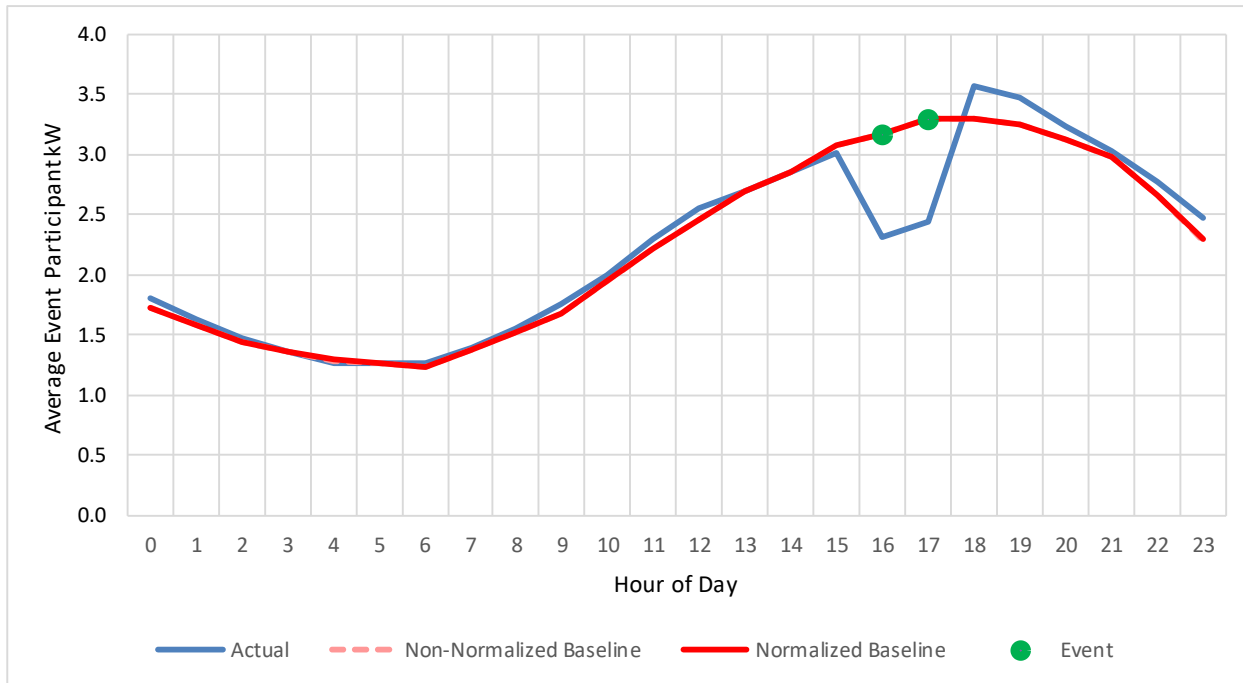
Figure 10-4 July 28, 2023 Event Average Participant Actual and Predicted Energy Usage
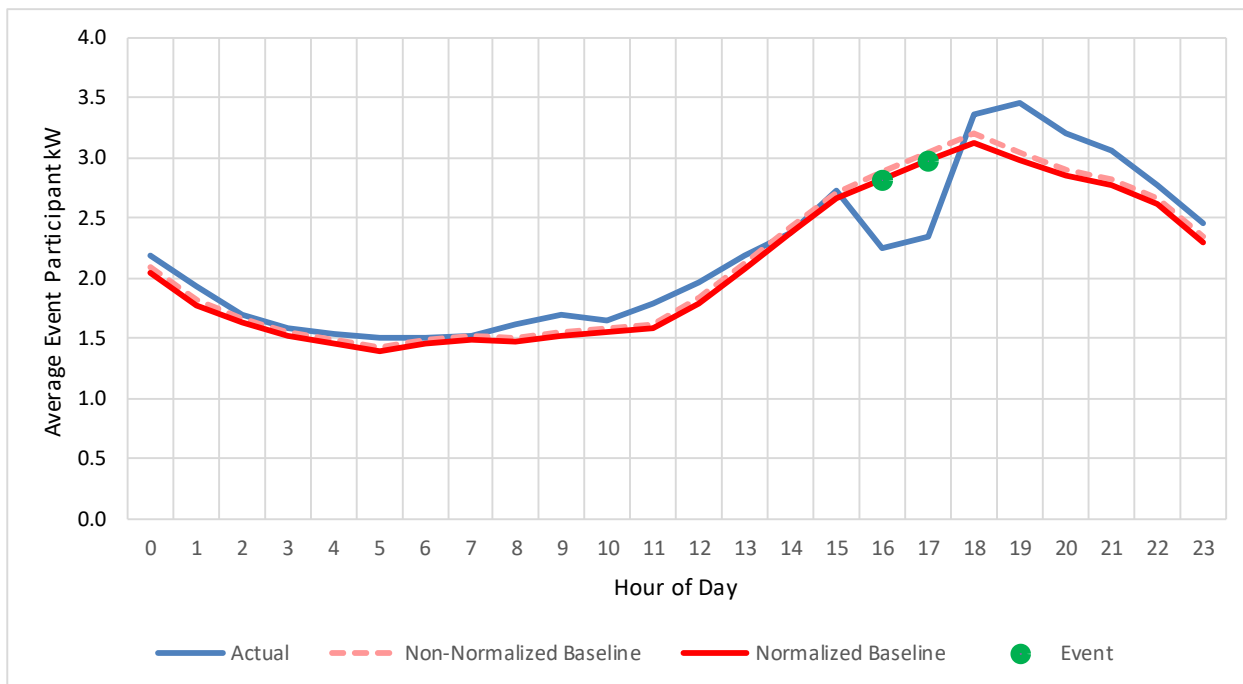
Figure 10-5 August 21, 2023 Event Average Participant Actual and Predicted Energy Usage
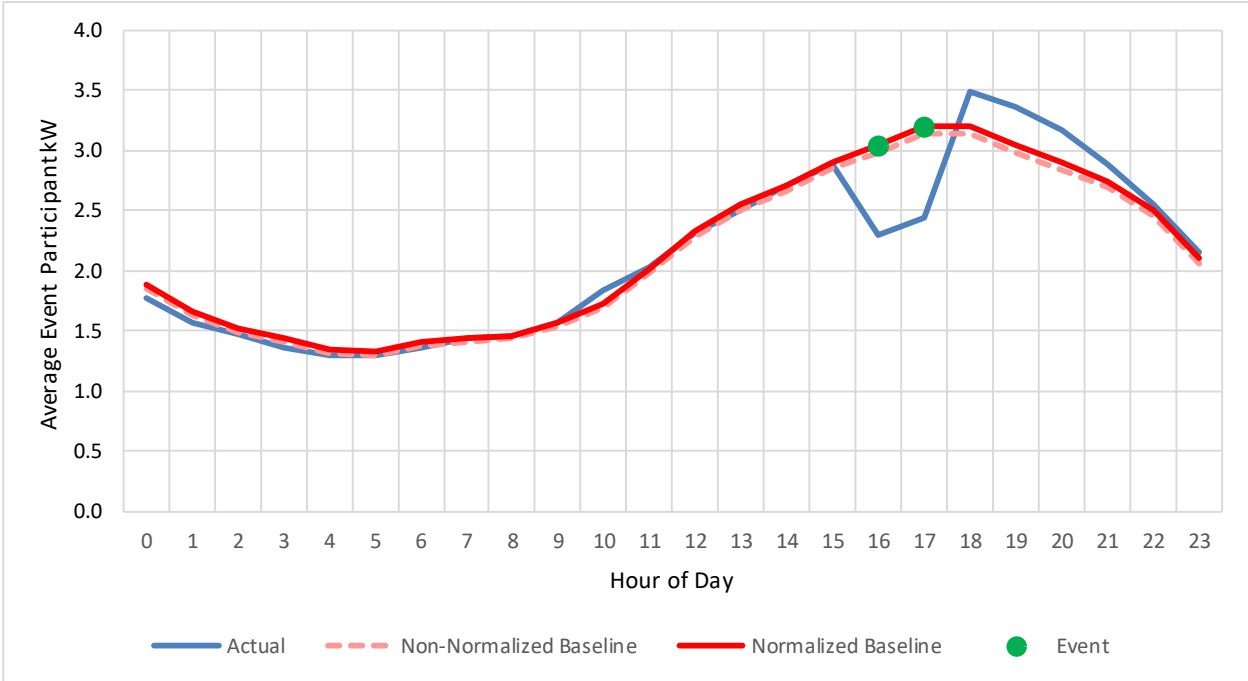
Figure 10-6 August 24, 2023 Event Average Participant Actual and Predicted Energy Usage
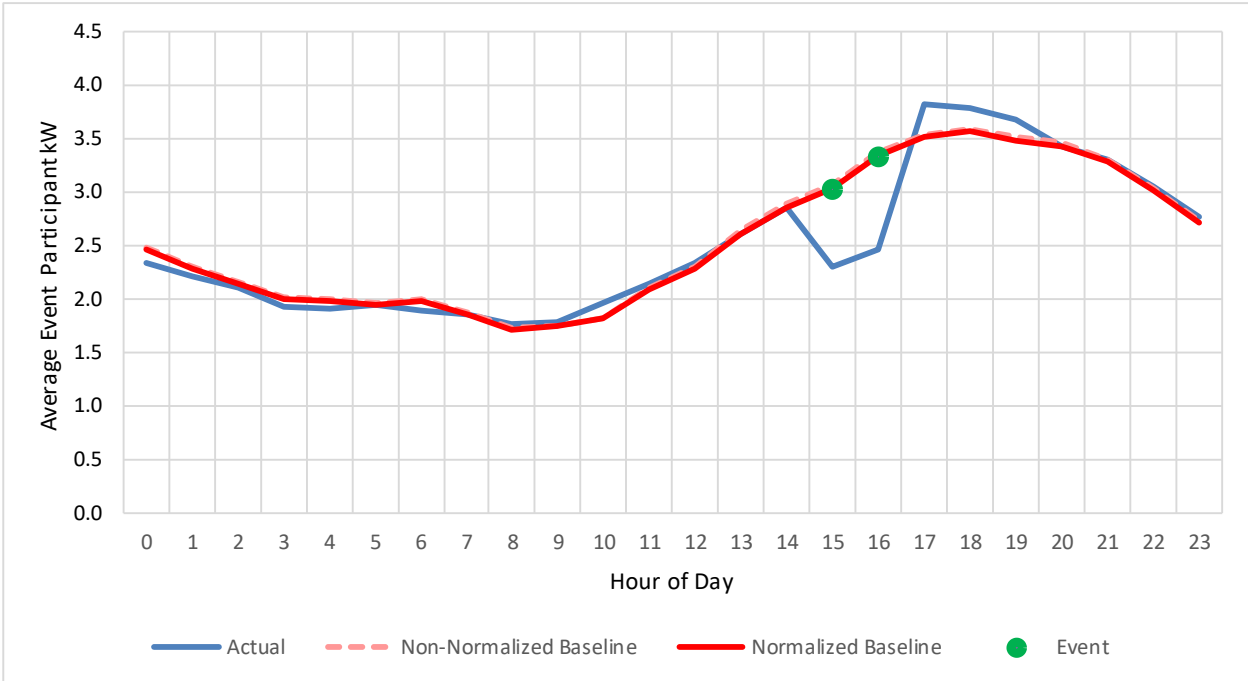
Figure 10-7 September 5, 2023 Event Average Participant Actual and Predicted Energy Usage
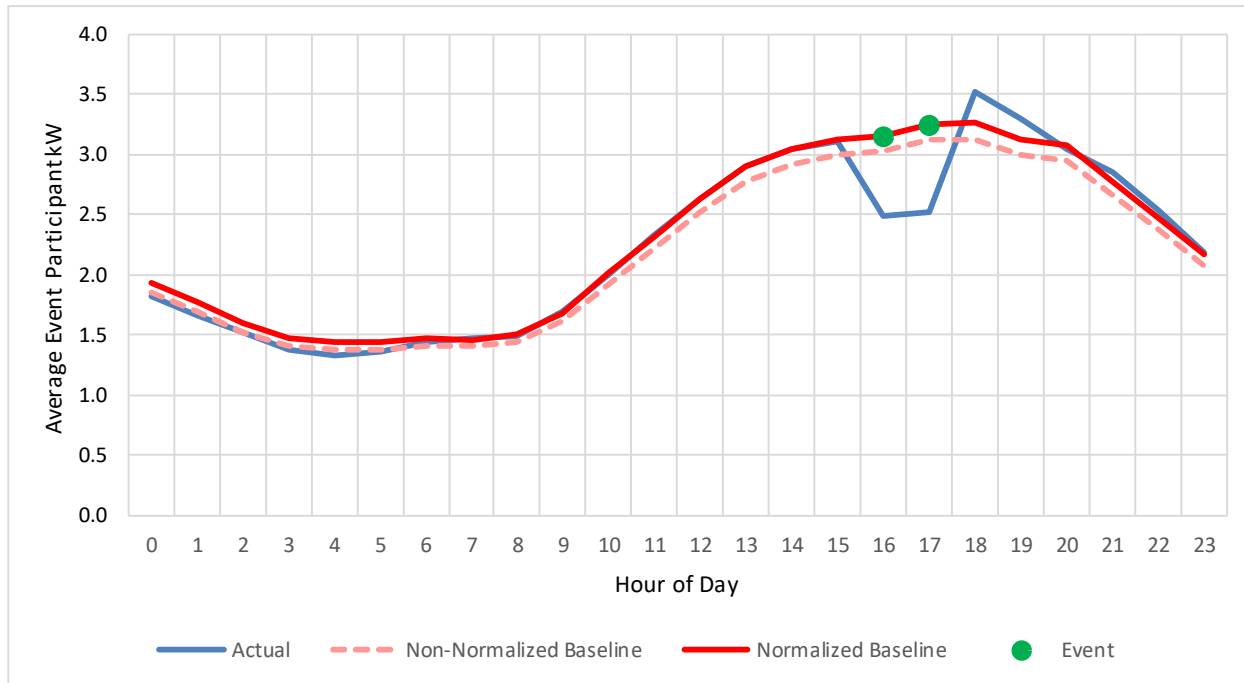
10.3.2.1. Ex Post Gross kWh Savings

Table 10-6 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 10-6 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
3,533	3,533	3,533	3,848	109%

10.3.2.2. Ex Post Gross kW Savings

Table 10-7 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 10-7 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
233.90	233.90	233.90	348.82	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 10-8 summarizes the ex post annual net kWh and kW savings of the Residential HVAC DLC Program. The annual net savings totaled 3,848 kWh and 348.82kW.

Table 10-8 Program-Level Annual Net kWh and kW Savings

Category	kWh	kW
Ex Ante Gross Savings	3,533	233.90
Gross Audited Savings	3,533	233.90
Gross Verified Savings	3,533	233.90
Ex Post Gross Savings	3,848	348.82
Gross Realization Rate	109%	149%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	3,848	348.82
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	76,952	N/A

10.4.3. Process Evaluation

ADM completed a process evaluation of the Residential HVAC DLC Program. The process evaluation was primarily based on a survey of program participants. The objectives of the process evaluation were to:

- Assess comfort impacts and user acceptance of the load events; and

- Assess participant satisfaction and willingness to recommend the program to others.

10.4.3.1. Participant Survey Findings

ADM surveyed customers who participated in the Residential HVAC DLC Program. Customers completed an online survey that asked questions about their experience with the peak events,

enrollment, satisfaction with the program, and their home characteristics. Participants were contacted up to three times to complete the survey. Among those customers contacted, 92 completed the survey.

10.4.3.2. Net Promoter Score

Less than half of the respondents were net promoters. Based on the survey findings, 34% of respondents are classified as Detractors, 23% as Passive, and 44% as Promoters in terms of their likelihood to recommend the program to others (see Figure 10-8). The Net Promoter Score (NPS) for the Residential HVAC DLC Program was 10%.

Figure 10-8 Net Promoter Score (n = 92)
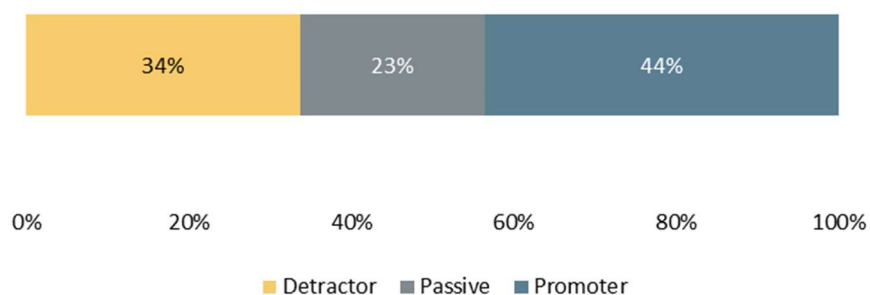
Table 10-9 summarizes the categorized reasons respondents gave for the likelihood of recommending the program rating that that they gave. The key findings are summarized below.

Promoters' feedback on the program primarily revolved around positive aspects, with users benefiting financially and contributing to environmental goals. Many Promoters reported energy bill savings and improved efficiency because of the program, highlighting its financial benefits. They also emphasized the program's role in supporting environmental conservation and grid stability. A considerable number of Promoters found the program user-friendly and easy to use, while some appreciated the minimal impact it had on their daily lives, with no interruptions in power. Some were generally satisfied with the service and its capability to offer bill credits.

Detractors' comments highlight their mixed experiences with the program, with some expressing a degree of skepticism and uncertainty about the program's effectiveness. Some Detractors reported a lack of noticeable changes or savings in their bills, with a few even observing increasing costs. We note that I&M does not communicate to customers that the program will reduce their monthly bills, although some respondents seem to have expected that. Others expressed concerns about the installation and functionality of the program, mentioning issues with their HVAC systems. Additionally, several Detractors mentioned difficulties in receiving incentives or facing confusion and inconvenience regarding the program's impact. I&M noted that that the delay some customers perceived may have been due to customers not realizing that the

incentive for enrolling would be provided upon installation of the device, not once they enroll. I&M further noted that they will review their customer communications to better inform customers of when they can expect to receive the enrollment gift cards.

Passive respondents' comments express uncertainty and a lack of clarity regarding the program's benefits, which highlights the diverse range of experiences among participants. Others cite issues and delays in communication, particularly in receiving gift cards. Several respondents share mixed feelings, noting minimal impact on their comfort or energy usage. Some respondents accept the program, recognizing that it may not be suitable for everyone and acknowledging both positive and negative aspects. Others appreciate the cost savings and commend the dedication of program workers. Some respondents express a need to wait and observe actual results while explaining limited usage due to infrequent air conditioning use. Additionally, a group of respondents indicates insufficient knowledge or understanding about the program's workings.

2023 EM&V Report

Table 10-9 Reason for NPS Rating

Promoters (n = 40)	Number of Comments (n = 36)
Energy Bill Savings and Efficiency	9
Environmental Benefits and Grid Support	9
User-Friendly and Ease of Use	6
Minimal Impact and No Interruptions	6
Satisfied with Service	2
Bill Credits	1
Detractors (n = 31)	**Number of Comments (n = 26)**
No Noticeable Impact	13
HVAC Issues	6
Incentive and Communication Problems	7
Skepticism and Confusion	3
Cost Increase Concerns	2
Limited Experience with Program	5
Neutral Opinion of Program	3
Passive (n = 21)	**Number of Comments (n = 17)**
Uncertain about Benefits or Lack of Clarity	10
Delayed Gift Card and Communication Issues	1
Mixed Satisfaction and Minimal Impact	4
Appreciation for Savings and Workers	2
Waiting to See Results and Limited Usage	4
Insufficient Knowledge or Understanding	7

10.4.3.3. Engagement

Most survey respondents learned of the Residential HVAC DLC program through an I&M email. Participants provided feedback on how they initially became aware of the program, with 59% learning about it through email communication from I&M, followed by 29% who discovered it via an I&M mailer, and 7% who learned of the program through an I&M website (see Figure 10-9).

Figure 10-9 Source of Awareness
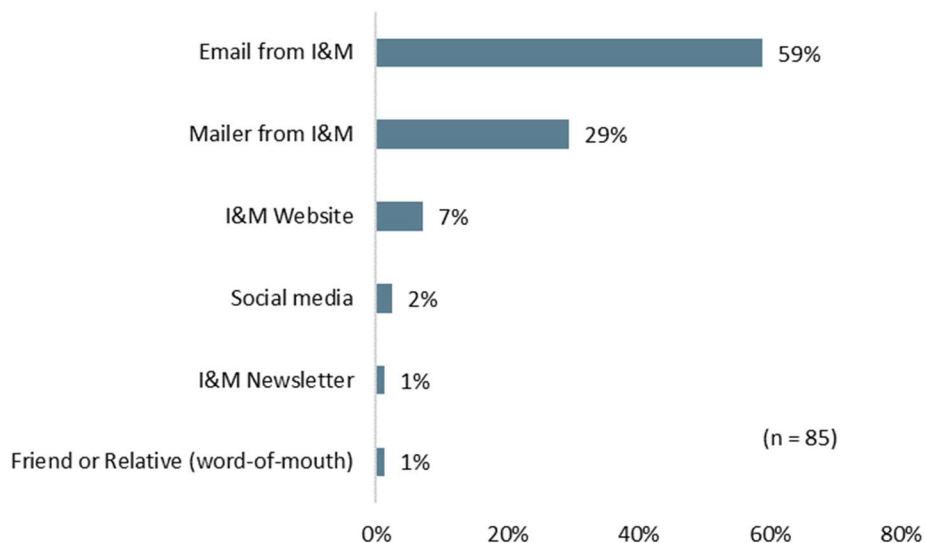
Most respondents were interested in participating to lower their utility costs. Most participants cited their primary motivation as wanting to lower their utility costs, with 73% of respondents indicating this as a key factor. Additionally, 60% participated with the aim of receiving bill credits or gift cards as an incentive. Reducing carbon footprints and greenhouse gas emissions was a priority for 35% of participants (see Figure 10-10).

Figure 10-10 Motivation for Participating in Residential HVAC DLC Program
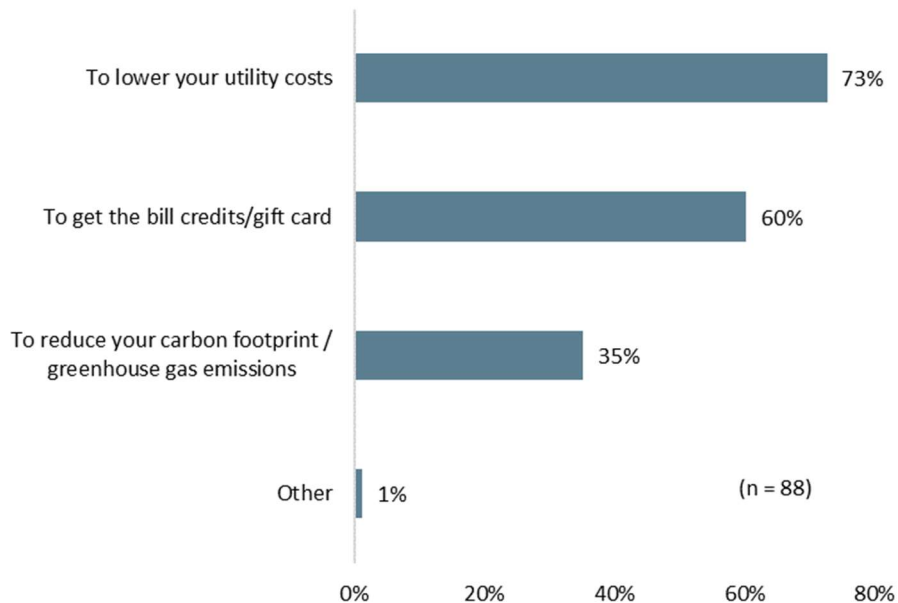
10.4.3.4. Enrollment and AC Installation

Before enrolling in the program, participants accessed information from various sources and were satisfied with the information they viewed. The most common information source was email communication from I&M, with 59% of participants reporting they relied on this source. Information available on I&M's website was another significant source, with 35% of respondents finding details there. Additionally, 33% of participants received information via a mailer from I&M as part of their pre-enrollment research.

Participants were generally satisfied with the information they received or viewed before deciding to participate in the program. The majority, 70%, rated the information as a 4 or 5 on a 5-point scale (see Table 10-10). A small percentage (11%) rated the information as a 1 or 2, indicating that they found it less helpful in addressing their questions. Three percent of respondents did not receive or view any information before participating.

Table 10-10 Effectiveness of Obtained Information in Addressing Pre-Participation Questions

Response	Percentage of Responses (n = 88)
1 (Not at all)	3%
2	8%
3	16%
4	30%
5 (Completely)	40%
Did not receive or view information	3%

10.4.3.5. Peak Energy Use Events

Relatively few participants are using the I&M website to view Peak Energy Use Event notifications. Nineteen percent of survey respondents indicated that they visited the I&M website to view the Peak Energy Use Event notifications.

Most respondents reported no impact on home comfort during these events and believed the number of events was about right. Seventy-four percent reported being at home during these events. The majority (70%) stated there was no impact on their comfort, while 20% mentioned a slight discomfort (see Table 10-11).

Table 10-11 Effect of Peak Events on Home Comfort

Response	Percentage of Responses (n = 60)
No effect of comfort	70%
Made the home a little uncomfortable	20%
Made the home moderately uncomfortable	7%
Made the home very uncomfortable	3%

The number and duration of the events were generally agreeable to participants. Most survey respondents (86%) indicated the number of Peak Energy Events was about right, while 9% thought there were too few and 5% believed there were too many. The majority of respondents (74%) didn't notice the duration of the Peak Energy Use Events. Among those who did, 19% felt that the events lasted about the right amount of time. Smaller percentages mentioned the events lasted too long, with 4% finding it somewhat too long and 2% considering it a little too long.

10.4.3.6. Program Satisfaction

The majority of respondents expressed satisfaction with bill credits for Peak Events, and overall, participants were content with the device installation process, with varying suggestions for improvement. Sixty-nine percent of respondents expressed satisfaction with the bill credits for Peak Evens, with 33% being very satisfied and 36% somewhat satisfied. See Figure 10-11 for more details.

Satisfaction with the device installation process was also high, with 65% indicating they were very satisfied and 14% somewhat satisfied. Respondents had varying suggestions on improving the installation process. Some were dissatisfied due to incorrect installations and suggested more comprehensive training for the installers. Others mentioned issues with follow-up service, such as the need for additional visits.

Figure 10-11 Satisfaction with Device Installation and Bill Credits
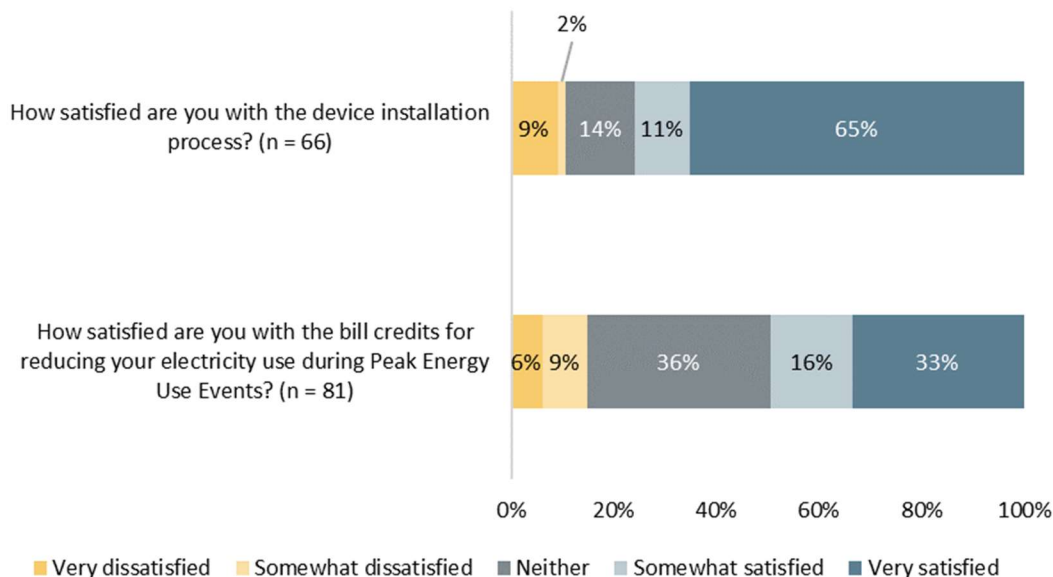
About two-thirds of participants were somewhat satisfied with the program overall. The overall satisfaction levels with the Residential HVAC DLC Program indicate a positive view, with 44% of participants reporting being very satisfied, with an additional 17% being somewhat satisfied. Conversely, 15% reported being dissatisfied (see Table 10-12). More than half (57%) indicated they were very likely to recommend this program to others, with an average score of 8.3 on a scale from 0 to 10.

Table 10-12 Overall Satisfaction with the Residential HVAC DLC Program

Response	Percentage of Responses (n = 81)
Very dissatisfied	4%
Somewhat dissatisfied	11%
Neither satisfied nor dissatisfied	24%
Somewhat satisfied	17%
Very satisfied	44%

Respondents offered various suggestions to enhance their satisfaction with the Residential HVAC DLC Program. These suggestions included larger credits on their bills, better communication and explanation of the program, notifications about peak energy events. Some mentioned wanting lower electric bills, improved program understanding, and visible differences in their bills. Others expressed satisfaction with the program or noted that they were already satisfied. Improvements in communication and providing more information to participants were common themes in the responses. Additionally, three customers reported they had not yet received a $50 gift card offered for enrolling in the program.

10.4.3.7. Demographic Findings

The survey responses regarding the home's ownership and type indicate that 92% of participants own their home and 2% rent it. Additionally, 98% of the homes are the respondents' primary residences, while 2% said it was something else. In terms of home type, the majority (94%) are single-family houses detached from any other house, 1% are manufactured homes, and 4% are single-family houses attached to one or more other houses (e.g., duplex, row house, or townhome).

The Residential HVAC DLC program aims to engage lower-income households, older customers, and those without access to high-speed internet in demand response initiatives. Survey data reveal that the program has successfully enrolled a significant proportion of older customers, with 74% of participants being 65 years of age or older. Comparative analysis indicates that HVAC DLC participants generally have lower incomes than those in the Home Energy Management program. Specifically, 49% of HVAC DLC participants reported an annual income of $50,000 or less, in contrast to 18% among Home Energy Management participants. Additionally, 8% of respondents indicated a lack of high-speed internet access, with another 8% unsure of their access status.

Figure 10-12 Reported Income for HVAC DLC and Home Energy Management Participants

10.5. Findings and Recommendations

The program achieved average event-level per participant demand kW reductions ranging from .50 kW to .86 kW. The ex post kW savings were 348.82 and ex post energy savings totaled 3,848 kWh.

About two-thirds of participants were somewhat satisfied with the program overall. Fifteen percent of participants reported some dissatisfaction. The most common reasons were that participants wanted larger credits or lower cost electricity, however providing higher credits may not be financially feasible.

Nearly half of respondents were classified as net promoters and the overall Net Promoter Score was 10%. Based on the survey findings, 34% of respondents are classified as Detractors, 23% as Passive, and 44% as Promoters in terms of their likelihood to recommend the program to others.

I&M marketing of the program is driving program awareness. Eighty-five percent of respondents learned of the program through an I&M communication, which included 59% from an I&M email, 29% from an I&M mailer, and 7% from the I&M website.

Participants generally reported no or slight impacts on home comfort and the event frequency and duration were generally acceptable. Ninety percent of respondents said the events had no or little effect on home comfort. Eighty-six percent of respondents thought the number of events was about right and nearly all either did not notice the duration of the events or thought the length was about right.

The program reached the older and lower income customer segments it targeted. Survey data reveal that the program has successfully enrolled a significant proportion of older customers, with 74% of participants being 65 years of age or older. Comparative analysis indicates that HVAC DLC participants generally have lower incomes than those in the Home Energy Management program. Specifically, 49% of HVAC DLC participants reported an annual income of $50,000 or less, in contrast to 18% among Home Energy Management participants. Additionally, 8% of respondents indicated a lack of high-speed internet access, with another 8% unsure of their access status.

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 2023 through December 2023.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2023.

- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.

- Complete a process evaluation of the program in the form of a participant survey.

- Provide recommendations for program improvement as appropriate.

11.1. Program Description

The 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, who live in a multifamily property. Participants must have an electric tank water heater to participate in the program.

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 earn a $1.95 bill credit for each event.

There were no events or participants for the Residential IQ Water Heater DLC Program.

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 2023 through December 2023.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2023.

- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods.

- Calculate incentive payments payable to participating customers.

- Complete a process evaluation of the program in the form of a participant survey, including understanding what actions customers take to reduce their energy use through a post-event survey.

- Provide recommendations for program improvement as appropriate.

The program is marketed by I&M under the name Power Rewards: iControl.

12.1. Program Description

The Residential Customer Engagement DR 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.

The Program is designed to test and demonstrate how AMI system connectivity can:

- Differently engage specific residential customer segments.

- Provide customers with a demand response offering that requires self-action to reduce load during peak energy use events.

- Augment I&M's demand response capabilities.

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.

 ▪ Participant survey responses.

 ▪ Data from relevant secondary sources.

12.2.1. Participant Survey

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

The sample size requirement was estimated using the following formula:

$$n = \frac{N * (Z^2 * p * (1 - p))}{(TP^2 * (N - 1) + TP^2 * p * 1 - p))}$$

Where,

 N = is the total size of the population.

 Z = is the Z score, 1.645 for the 90% confidence interval

 p = the proportion of respondents endorsing a response, ADM assumed a value of 0.5

 TP = Targeted Precision, 10% in this evaluation

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

ADM administered two types of surveys during the program year. The first type, a post-event survey, aimed to evaluate customer actions following the event, their awareness of the event, and whether they viewed the post-event results email. This survey was deployed twice, following two separate events, and was conducted within one week of each event's conclusion. The second survey type, the end-of-year survey, focused on assessing participants' overall satisfaction with the program.

To prevent survey fatigue, ADM administered each of the three surveys to a randomly selected sample of program participants. The method of administration for all surveys was email. For the post-event survey, participants were contacted once, while for the end-of-year survey, participants could be contacted up to three times. Table 12-1 presents a summary of the survey data collection efforts.

Table 12-1 Residential Customer Engagement Demand Response Survey

Survey	Mode	Time Frame	Number of Contacts	Number of Completions
End of Year Survey	Email	October 2023	1,132	86
Post Event Survey 1	Email	July 2023	1,500	138
Post Event Survey 2	Email	September 2023	1,441	132

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 2023 Residential Customer Engagement Demand Response.

I&M initiated 7 load management events during the summer of 2023. As shown in Table 12-2 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 12-2 Demand Response Event Times

Date	Event Start Time	Event Stop Time	Event Coincident with 5CP	PJM Coincident Peak Occurred During Hour Ending
7/5/2023	2:00 PM	6:00 PM	Yes	6:00 PM
7/26/2023	3:00 PM	7:00 PM	No	
7/27/2023	3:00 PM	7:00 PM	Yes	6:00 PM
7/28/2023	3:00 PM	7:00 PM	Yes	6:00 PM
8/21/2023	3:00 PM	7:00 PM	No	
8/24/2023	2:00 PM	6:00 PM	No	
9/5/2023	3:00 PM	7:00 PM	Yes	5:00 PM
9/6/2023	No Event		No	5:00 PM

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.

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 84 of 180

Indiana Demand Response Portfolio

2023 EM&V Report

Table 12-3 kW Reductions for Event Days by Hour

Date	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
7/5/2023		38.05	153.60	189.73	112.55	171.67	189.73
7/26/2023		25.00	189.70	240.18	24.26	214.94	240.18
7/27/2023		-4.20	293.87	331.92	62.80	312.90	331.92
7/28/2023		72.49	468.91	493.17	247.61	481.04	493.17
8/21/2023		94.19	569.56	646.73	-4.49	608.15	646.73
8/24/2023	132.60	557.13	726.12	75.51		641.62	726.12
9/5/2023		253.19	1,112.12	1,036.60	276.64	1,074.36	1,112.12

Table 12-4 presents average participant demand reductions for each event hour.

Table 12-4 Average Participant kW Reductions for Event Days by Hour

Date	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
7/5/2023		0.01	0.03	0.04	0.02	0.04	0.04
7/26/2023		0.01	0.04	0.05	0.00	0.04	0.05
7/27/2023		0.00	0.06	0.07	0.01	0.06	0.07
7/28/2023		0.01	0.09	0.10	0.05	0.10	0.10
8/21/2023		0.02	0.10	0.12	0.00	0.11	0.12
8/24/2023	0.02	0.10	0.13	0.01		0.12	0.13
9/5/2023		0.04	0.16	0.15	0.04	0.15	0.16

A summary of the aggregate demand reductions occurring during PJM 5CP hours is presented below in Table 12-5.

Table 12-5 Summary of kW Reductions during PJM 5CP Events

Date	Hour Start	Hour End	Ex Post Net kW Savings
7/5/2023	5:00 PM	6:00 PM	189.73
7/27/2023	5:00 PM	6:00 PM	331.92
7/28/2023	5:00 PM	6:00 PM	493.17
9/5/2023	4:00 PM	5:00 PM	1,112.12
9/6/2023	4:00 PM	5:00 PM	
Maximum Event Hour Peak kW Reduction			1,112.12
Average Event Hour Peak kW Reduction			531.74

Figure 12-1 through Figure 12-7 graphically present average participant actual and predicted energy usage for each event day.

Figure 12-1 July 5, 2023 Event Average Participant Actual and Predicted Energy Usage
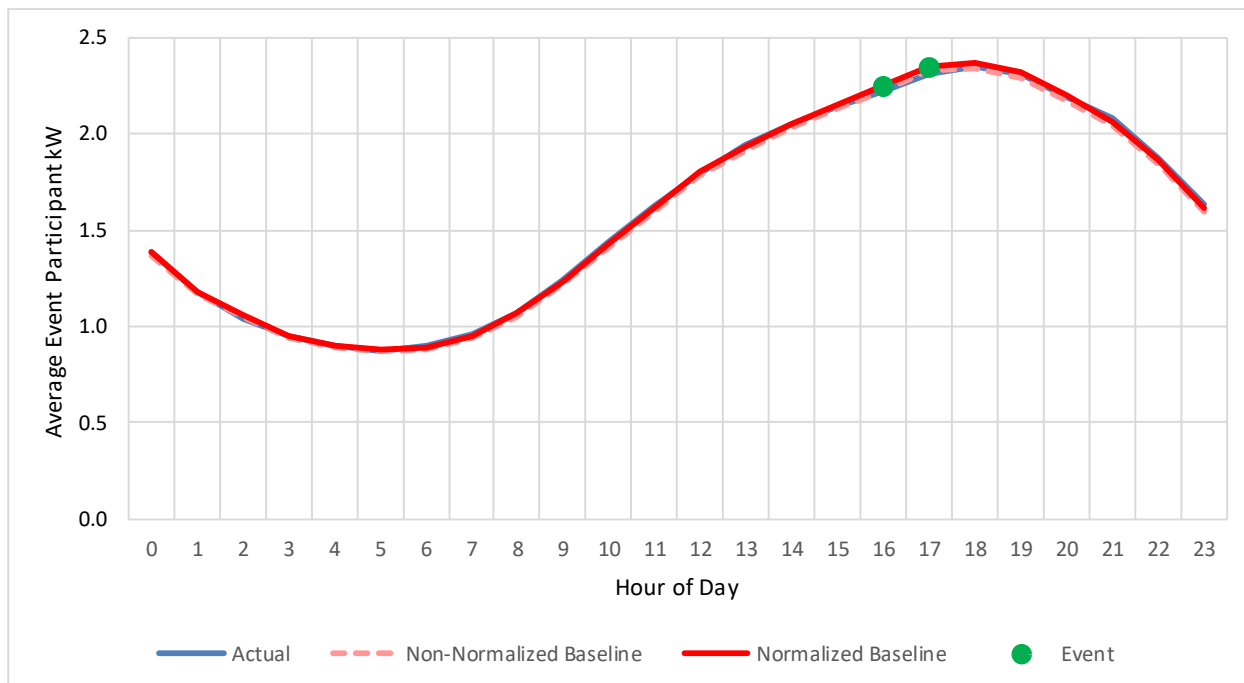
Figure 12-2 July 26, 2023 Event Average Participant Actual and Predicted Energy Usage
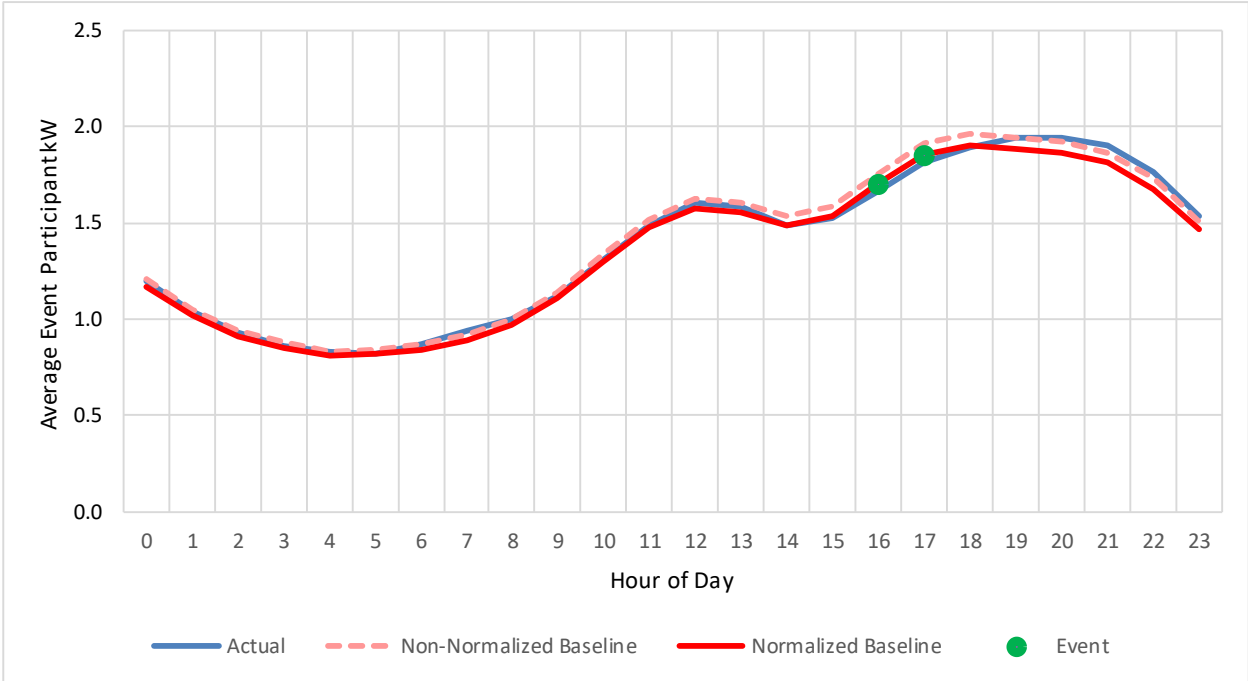
Figure 12-3 July 27, 2023 Event Average Participant Actual and Predicted Energy Usage
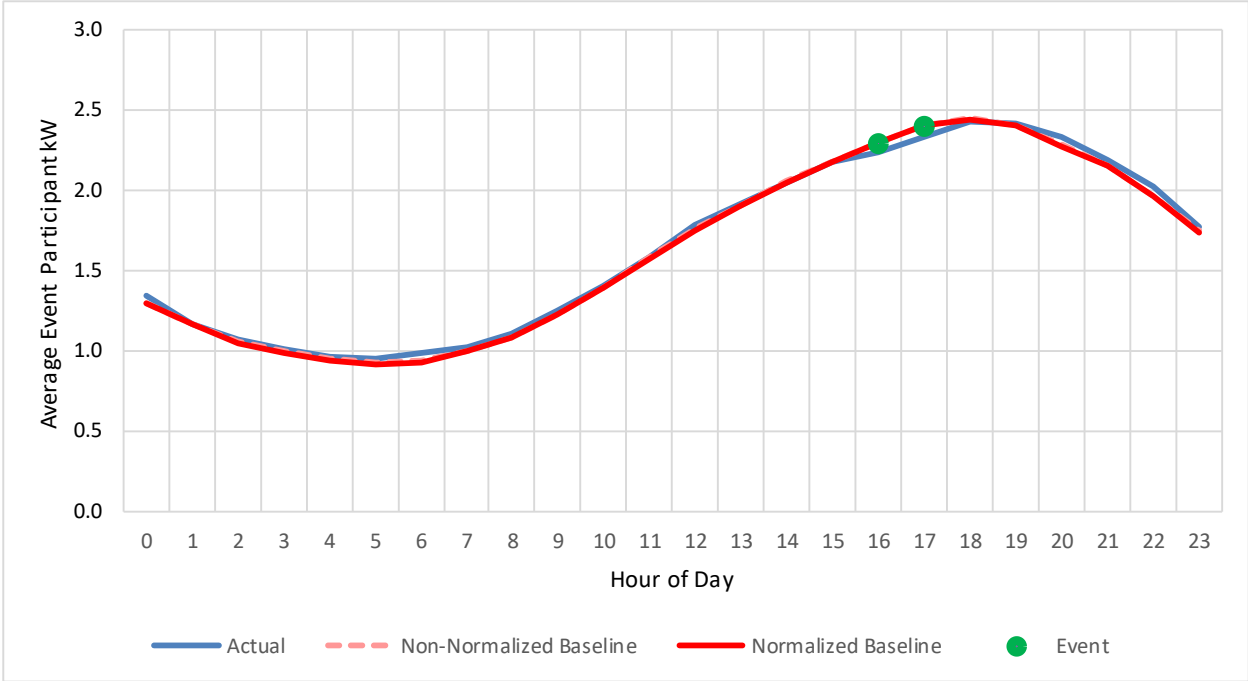
Figure 12-4 July 28, 2023 Event Average Participant Actual and Predicted Energy Usage
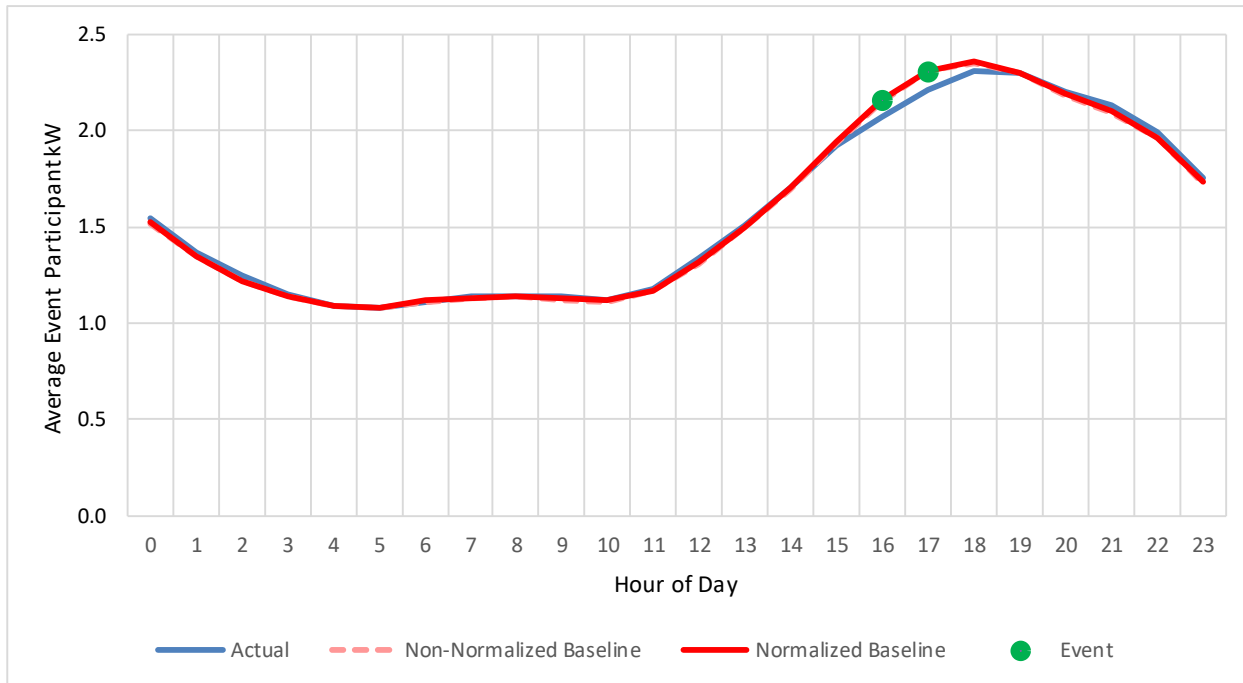
Figure 12-5 August 21, 2023 Event Average Participant Actual and Predicted Energy Usage

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 88 of 180

Indiana Demand Response Portfolio

2023 EM&V Report
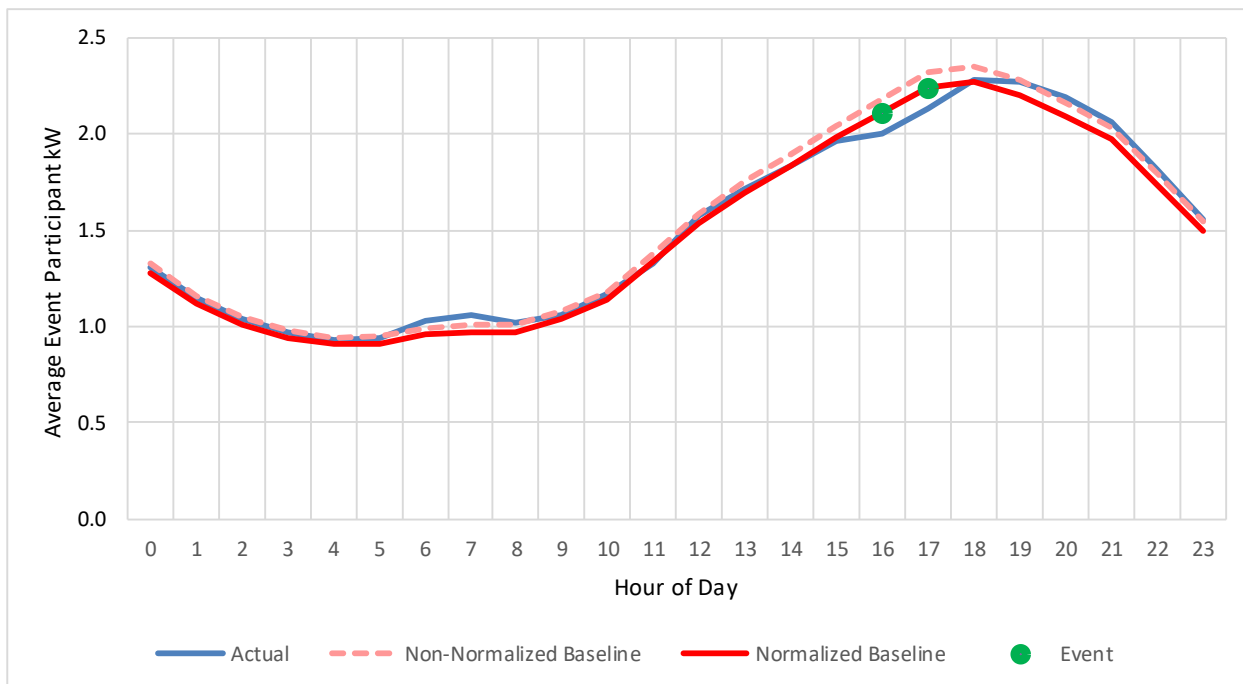
Figure 12-6 August 24, 2023 Event Average Participant Actual and Predicted Energy Usage
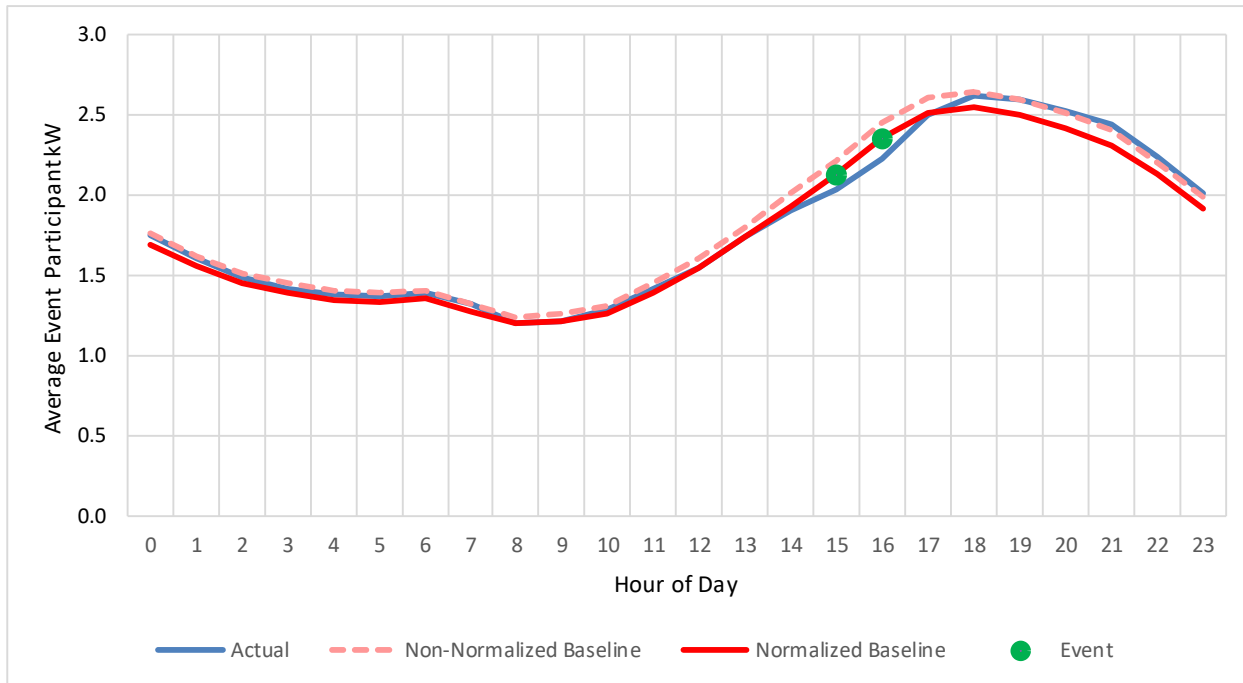
Figure 12-7 September 5, 2023 Event Average Participant Actual and Predicted Energy Usage
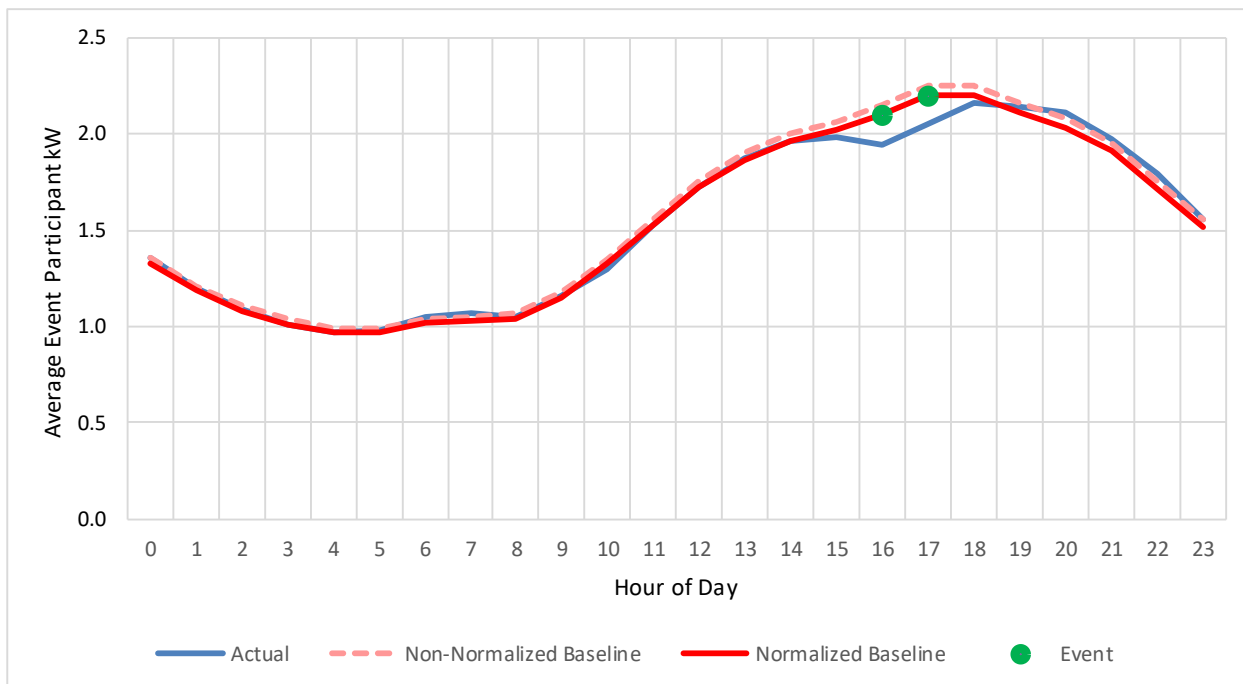
12.3.2.1. Ex Post Gross kWh Savings

Table 12-6 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 12-6 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
9,055	9,055	9,055	8,416	93%

12.3.2.2. Ex Post Gross kW Savings

Table 12-7 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 12-7 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
613.37	613.37	613.37	531.74	87%

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 12-8 summarizes the ex post annual net kWh and kW savings of the Residential Customer Engagement Demand Response Program. The annual net savings totaled 8,416 kWh and 531.74 kW.

Table 12-8 Program-Level Annual Net kWh and kW Savings

Category	kWh	kW
Ex Ante Gross Savings	9,055	613.37
Gross Audited Savings	9,055	613.37
Gross Verified Savings	9,055	613.37
Ex Post Gross Savings	8,416	531.74

Category	kWh	kW
Gross Realization Rate	93%	87%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	8,416	531.74
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	168,311	N/A

12.5. Process Evaluation

ADM completed a process evaluation of the Residential Customer Engagement Demand Response Program. The process evaluation was primarily based on a survey of program participants. The objectives of the process evaluation were to:

- Assess comfort impacts and user acceptance of the load events; and

- Assess participant satisfaction and willingness to recommend the program to others.

12.5.1.1. Summary of Participation and Incentives

The table presents data on a residential behavioral demand response program for the PY2023 events. Initially, the program experienced a modest engagement rate (as defined by the share receiving an incentive), with an 8% engagement rate in early July. This could be due to the timing of the event following the July 4th holiday which may have affected customer response to the event. However, there was a significant increase in engagement by late July, peaking at a 56% engagement rate. The average incentive rate fluctuated some during the period, with the highest average incentive being issued for the first event. It is also notable that enrollment increased by 49% between the first and last event.

Indiana Michigan Power Company
Cause No. 45701
Exhibit D

Indiana Demand Response Portfolio

2023 EM&V Report
Page 91 of 180

Table 12-9 Event Participation Metrics

Date	Number of Enrollees Notified of Event	Number of Event Participants Receiving Incentive	Percent of Notified Enrollees Receiving Incentive	Average Incentive Recipient Incentive Amount	Total Incentive
7/5/2023	4,753	384	8%	$1.93	$740.50
7/26/2023	4,975	2,784	56%	$1.34	$3,716.90
7/27/2023	4,973	1,321	27%	$1.16	$1,530.90
7/28/2023	4,962	1,636	33%	$1.18	$1,934.00
8/21/2023	5,558	1,243	22%	$1.02	$1,267.60
8/24/2023	5,550	1,093	20%	$0.97	$1,056.30
9/5/2023	7,065	2,075	29%	$1.08	$2,237.40

12.5.1.2. Participant Survey Findings

ADM completed two types of surveys of participants in the Residential Customer Engagement Demand Response Program. A post event survey was administered to participants approximately one week after an event. The survey collected participant feedback on their experience with the event notifications, the actions taken to lower energy use during the events, and their view of the bill credits. The survey was completed online, and participants were sent one email asking them to complete the survey. The post-event survey was administered twice during the year to two independent random samples of participants.

An end of year survey was also administered to a separate random sample of participants. The goal of the end of year survey was to get general feedback on the program from participants.

The following summarizes the key findings of the survey and highlights differences between the event dates.

12.5.1.2.1. Post-Event Survey Results

Peak Event Notifications

Nearly all survey respondents (97%) indicated they received notification of the event. No significant differences were detected between the two groups (July vs. September) surveyed. Those respondents who were surveyed about their experiences in July mostly learned of the event from a text message from I&M, compared to 50% of those who participated in the September event. However, this difference was likely because the July survey did not include a response option for email notification, which was added as a channel for notifying participants about the events. See Table 12-10 for more details and differences between the two groups.

Table 12-10 How Participants Learned of the Event Occurring

Response	All Participants (n = 225)	July Participants (n = 119)	September Participants (n = 106)
Text message from I&M	69%	87%	50%
On the I&M website	8%	13%	2%
Email notification	23%	0%	48%
From another household member	0%	1%	0%
The email notification response option was not included in the July event survey.			

Household Actions to Reduce Energy Consumption

Most households (83%) took steps to lower their energy consumption during the events. There were no differences between the groups. Among those who did not take steps to lower their energy use during the events, many were not home during the event. Those who participated in the July event were more likely to indicate they did not know what actions to take to reduce energy compared to those surveyed September participants. The decrease in this figure for the September event may have been due to participants continuing to learn and develop routines for reducing their energy use during events, although the number of responses is small, which makes it difficult to draw firm conclusions. See Table 12-11 for additional details.

Table 12-11 Reasons Participants did not Take Steps to Lower Energy Use During Event

Response	All Participants (n = 37)	July Participants (n = 19)	September Participants (n = 18)
Did not have enough notification of the event to take action.	14%	5%	22%
Did not know what actions to take to reduce energy during the event.	16%	32%*	0%
Did not believe that my actions would have a noticeable impact on energy consumption.	19%	26%	11%
Was not at home during the event.	46%	42%	50%
Other Reason	27%	21%	33%
The asterisk (*) indicates statistically significant differences between the groups.			

Among those who indicated they did not take steps for other reasons, those surveyed July participants indicated multiple factors. Some individuals cited "working from home" as a reason, which might have interfered with their ability to take steps to reduce energy usage during events. Others mentioned "forgetting to adjust the thermostat before leaving for work." Additionally, some respondents indicated that they attempted to save energy but faced difficulties due to working from home and time constraints, with energy-saving efforts often being forgotten until after 5 pm.

Participants surveyed in September provided insight into their other reasons as to why they did not take steps to reduce energy. Some mentioned that other people in the house were using power, while others found it too cumbersome for the limited energy savings. Guests' presence during an event led to energy-saving measures being skipped. Some respondents couldn't act on energy-saving notifications because they were at work. Forgetting to save energy while being at home was also cited as a reason. Lastly, one respondent mentioned not checking email until the evening.

Respondents employed a variety of energy-reduction actions during events, aligning with those most impactful for load reduction. The actions taken by participants are summarized in Figure 12-8. More impactful actions on load reductions would be avoiding use of items that use a lot of power and are typically operating during the peak event hours. Among these actions, reducing air conditioner use stands out as the most impactful step taken by most respondents. The most frequently mentioned action was avoiding the use of clothes washer and dryers, and dishwashers. Though appliances like washers, dryers, and dishwashers consume considerable power, their less frequent use during peak hours limits their potential for load reduction. Reducing lighting usage, while common, offers limited energy savings due to its generally low power consumption. Similarly, cooking appliances, though power-intensive, are used briefly and contribute less to overall load reduction. Less common actions, such as turning off fans and electronics, also have a minor impact on load reduction.

Figure 12-8 Actions Taken to Reduce Electricity Usage during Peak Energy Use Event
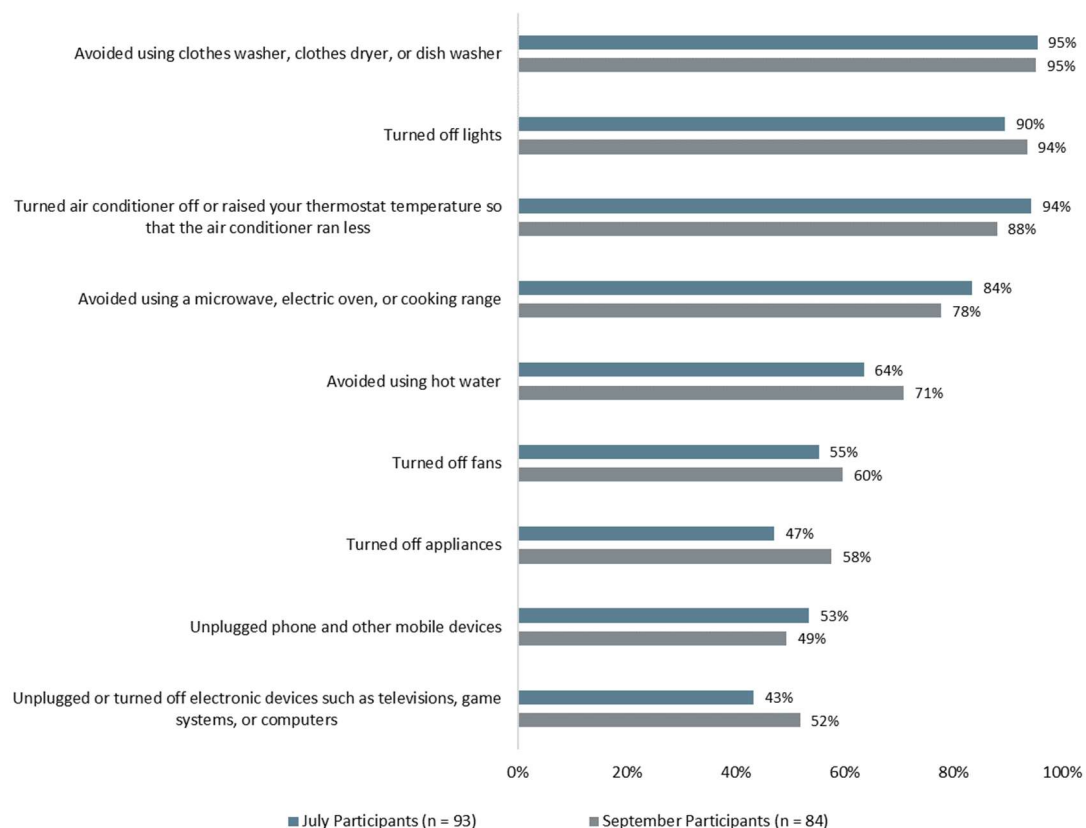
Post-Event Emails and Bill Credits

Post-event emails are generally reaching customers and being read. Eighty-four percent of all participants indicated they read the email sent to them after the event that provided information on how much they earned and their energy usage during the event. See Table 12-12 for more details.

Table 12-12 Post-Event Email with Information on Earnings and Energy Usage

Response	All Participants (n = 212)	July Participants (n = 111)	September Participants (n = 101)
Read email	84%	81%	87%
Received email but did not read	3%	4%	3%
Did not recall receiving email	13%	15%	10%

There are varying perceptions about the adequacy of bill credits among respondents, with a notable portion believing the amounts were too low. Specifically, 29% of all respondents felt the credits were appropriate, compared to 36% who deemed them too low, and 35% who had no opinion. In the July group, 32% agreed the bill credits were suitable, while 30% found them inadequate, and 38% remained neutral. Among September respondents, 26% were satisfied with the credits, in contrast to 43% who viewed them as insufficient, and 31% expressed no opinion. See Figure 12-9 for more information.

Figure 12-9 Bill Credit Perceptions

Figure 12-9 Bill Credit Perceptions

- No opinion about the bill credits received: All respondents 35%, July respondents 38%, September respondents 31%
- The bill credits seemed too low: All respondents 36%, July respondents 30%, September respondents 43%
- The bill credits seemed about right: All respondents 29%, July respondents 32%, September respondents 26%

■ All respondents (n = 176) ■ July respondents (n = 90) ■ September respondents (n = 86)

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 95 of 180

Indiana Demand Response Portfolio

2023 EM&V Report

12.5.1.2.2. End of Year Results

Almost half of respondents were net promoters. The net promoter score for end of year respondents was 13%. Forty-four percent of respondents were promoters compared to 31% who were detractors and 24% who were passive (see Figure 12-10).

Figure 12-10 Net Promoter Score (n = 86)
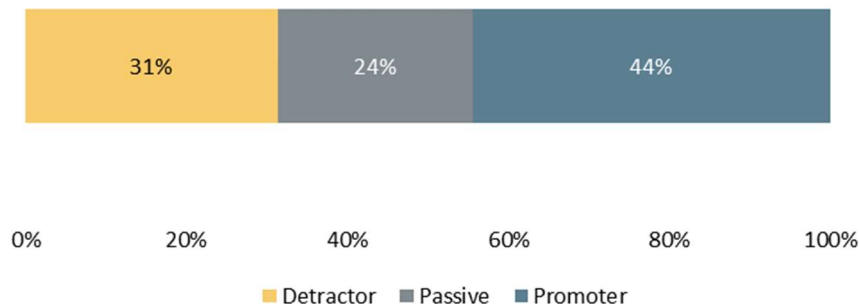
Survey respondents offered insights into the factors influencing their likelihood to recommend the program to others. See Table 12-13 for the main categories of comments among promoters, detractors, and passive respondents.

Promoters feedback generally reflects a positive sentiment toward the program, with participants expressing satisfaction in various aspects. They appreciate the program's ease of enrollment and proactive notifications, emphasizing the convenience and simplicity of participation. Many participants highlight the financial benefits, noting that the program allowed them to save money and was an easy way to do so. There is also a strong sense of personal responsibility for energy conservation during peak hours, with participants feeling that their efforts not only reduce their bills but also contribute to the broader goal of energy conservation. Additionally, participants value the program's communication and updates regarding peak times, which helps them stay informed and make a positive impact.

Detractors feedback indicates a mix of frustration, skepticism, and challenges among participants. Many detractors expressed dissatisfaction with bill changes, highlighting their perception that the program did not lead to significant savings and raising skepticism about its cost-effectiveness. Others expressed uncertainty and challenges in understanding the program's measurements and parameters, particularly in achieving meaningful reductions in energy consumption. Some participants find the program's rewards to be minimal and question its effectiveness in promoting energy conservation. Additionally, inconvenience and lack of notice for peak events are recurring themes, causing frustration among participants who feel limited in their ability to adjust their energy usage.

Passive feedback conveys a neutral sentiment among participants. Some expressed that they found the program easy to enroll in but did not derive significant enthusiasm or benefits from it.

Others acknowledged the program's societal value and general positivity without highlighting personal experiences or rewards. Some participants reported minimal personal benefits and disappointing experiences, including challenges in achieving energy reductions, and raised questions about the program's cost-effectiveness. There is also a group of participants willing to endorse the program to others, but they consider factors such as expense and ease of use while mentioning receiving credits as a positive aspect.

Table 12-13 Reason for Likelihood of Recommending the Service Rating

Promoters (n = 38)	Number of Comments (n = 29)
Easy enrollment and participation	8
Saves money and being informed	6
Contributes to energy conservation	9
Detractors (n = 27)	**Number of Comments (n = 26)**
Negative perception of bill changes	2
Uncertainty about effectiveness	1
Dissatisfaction with savings and challenges with energy conservation	6
Inconvenience or lack of notice for program participation	3
Not worth the effort	3
Passive (n = 21)	**Number of Comments (n = 15)**
Minimal personal benefit and challenges with program	2
Mixed/neutral sentiment, minor rewards, and interest	3
Acknowledged program value and general positive views	3
Willingness to endorse with considerations (e.g., expense, ease of use, and credits)	4

Awareness and Engagement

Most respondents (78%) first learned about the iControl program through emails from I&M. Other sources included mailers from I&M (8%) and the I&M website (11%). See Figure 12-11 for more information.

Figure 12-11 How Participants Learned of the iControl Program
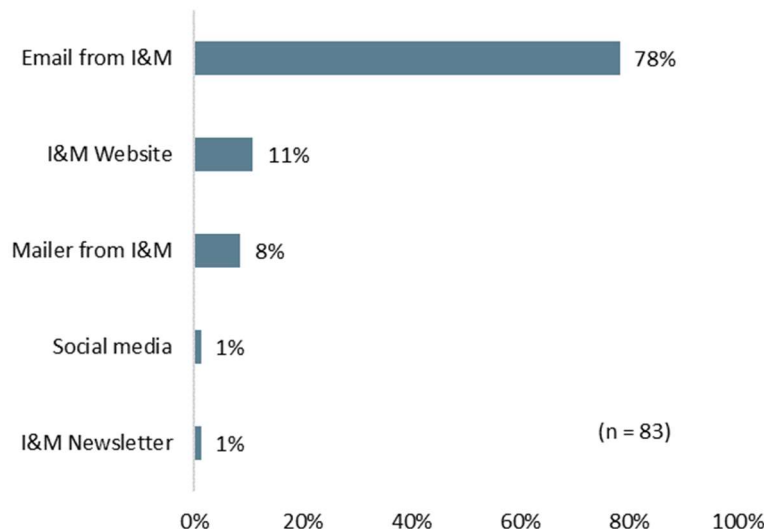
When considering the information participants received or viewed before deciding to participate in the program, a significant portion found that the information addressed their questions effectively. Specifically, 37% felt it addressed their questions well (rated as 4 on the 5-point scale), and an additional 23% found it completely addressed their questions (rated as 5). A small percentage found the information not very effective in addressing their questions, with 6% stating it did not address their questions at all (rated as 1 or 2 on the 5-point scale). Additionally, 6% mentioned that they did not receive or view any information before participating.

Financial considerations were the primary motivations for enrolling in iControl. The majority (78%) joined to receive bill credits, while 63% wanted to lower their utility costs (see Table 12-14). Additionally, 31% mentioned reducing their carbon footprint and greenhouse gas emissions as a motivating factor for participation. Among those who had other reasons, some mentioned curiosity, wanting to evaluate the program's worth, or uncertainty as reasons for their involvement. Others expressed a broader motivation, such as preventing power grid collapse during high-demand periods and a desire to see if the program made a noticeable impact.

Table 12-14 Motivations for Participating in iControl

Responses	Percentage of Responses (n = 86)
To get the bill credits	78%
To lower utility costs	63%
To reduce carbon footprint	31%
Other reasons	6%

Peak Energy Use Event Notification

Nearly all respondents reported that they received the Peak Energy Use Event notifications. Forty-one percent recalled receiving both text and email messages. Additionally, 29% remembered receiving text messages only, 27% received email messages only, and 4% stated that they did not receive any notifications. Two respondents did not think that they received any notifications.

The website was also used to learn of the Peak Energy Use Events. Thirty percent of respondents reported visiting the I&M website to read Peak Energy Use Event notifications, while the remaining 70% did not use the website for this purpose. Regarding household notifications, 7% believed that someone else in their household had received Peak Energy Use Event notifications, while 93% stated that no one else in their household had received such notifications.

Energy Use Knowledge and Understanding

Participants felt well informed on how to reduce energy use during an event, although they were less confident in their knowledge of how to reduce their energy use. The majority (57%) reported feeling at least somewhat well informed on appliance electricity use and 23% feeling well informed and 11% feeling very well informed. Regarding their awareness of ways to reduce electricity usage during high-demand periods, 14% considered themselves very well informed, while 43% felt well informed, and 42% felt somewhat well informed. See Figure 12-12 for additional details.

Figure 12-12 Awareness of Ways to Reduce Energy Use
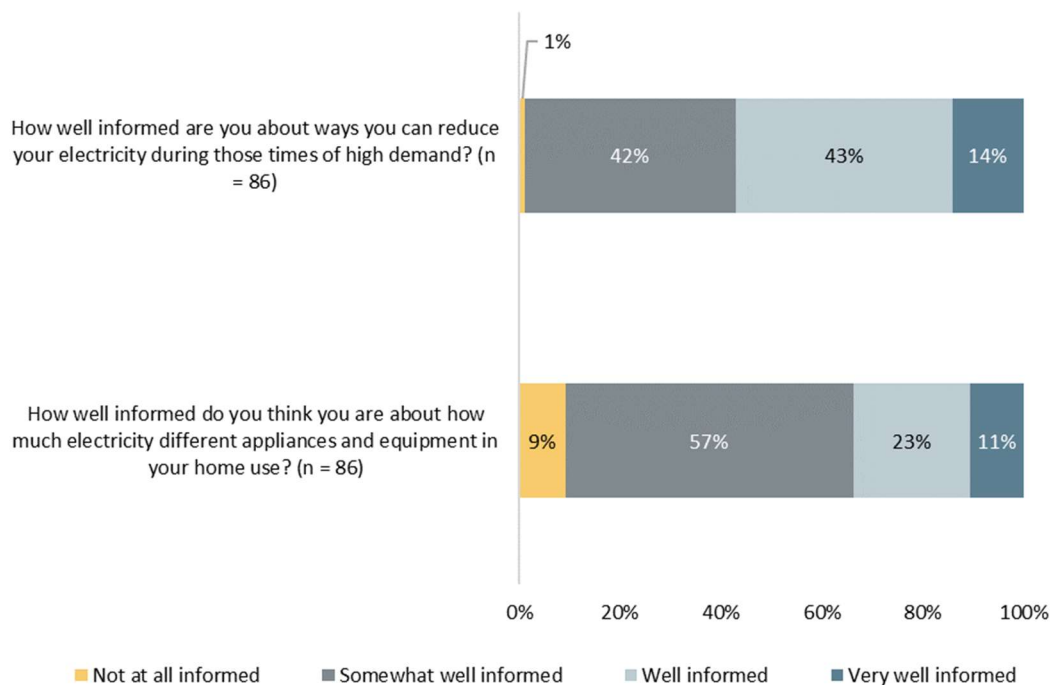
While most participants reported that they are checking their household energy use throughout the year, the most common source of information is the monthly bill which may not provide as much insight into power use during peak energy use hours as the hourly disaggregated data in the AMI Portal. The monthly bill was the most common source that customers used to understand their home energy use, with 78% of respondents utilizing it. The I&M account web portal was also frequently used, with 36% of participants accessing information through it. A smaller percentage, 4%, reported using a home energy management system, such as an energy monitor. Additionally, 4% mentioned using other sources, including emails and the I&M app. Eight percent of participants stated that they had not viewed information on their household's energy use. Most respondents (60%) view their household energy usage about once a month (see Table 12-15).

Table 12-15 Frequency of Viewing Household Energy Usage

Response	Percentage of Responses (n = 78)
More than once a month	21%
About once a month	60%
A few times a year	19%

Reductions in Electricity Usage

The survey findings on self-reported ease of reducing energy use during Peak Energy Use Events reveals a diverse range of experiences among participants. A total of 14% of respondents found it very difficult to reduce electricity usage during peak events, while 12% considered it somewhat difficult. The largest group, comprising 31%, indicated that it was neither easy nor difficult. On the other end, 22% found it somewhat easy, and 21% reported it to be very easy (see Table 12-16).

Table 12-16 Ease of Reducing Electricity Use During Peak Event

Responses	Percentage of Responses (n = 86)
Very difficult	14%
Somewhat difficult	12%
Neither easy nor difficult	31%
Somewhat easy	22%
Very easy	21%

The top reasons that made it hard for participants to reduce their electricity use during the Peak Energy Use Events included feeling that they had already minimized energy use as much as possible, not typically being at home during events, and family members not being

cooperative or having conflicting needs. Other factors included having guests over or special occasions that required higher energy use, reducing energy use at the suggested times not being convenient, feeling occupied with work-related tasks that required energy use, and not understanding how to reduce energy use effectively. See Figure 12-13 for more information.

Figure 12-13 Reasons it was Difficult to Reduce Electricity Use during Events
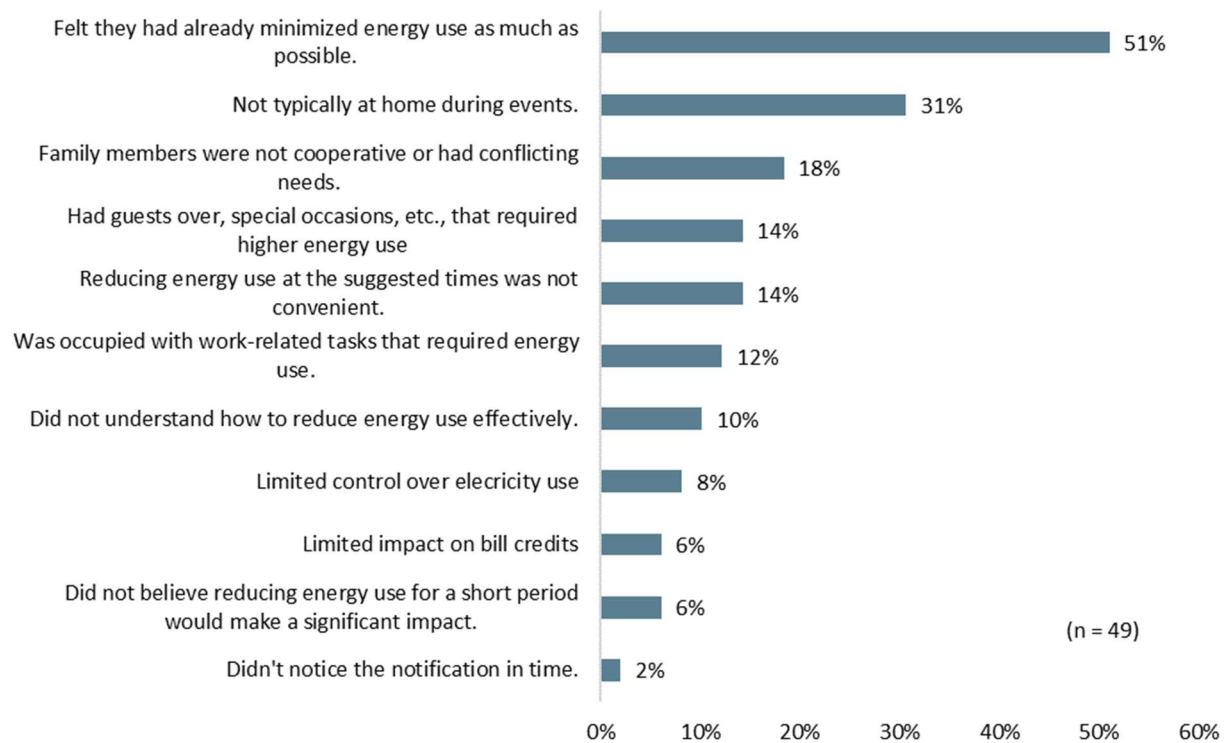
Post-Event Emails and Bill Credits

Nearly all respondents read at least some of the post-event emails and most read all of them. Seventy-six percent of participants indicated they read all the emails sent to them after the event that provided information on how much they earned and their energy usage during the event, followed by 17% who read some of them. See Table 12-17 for more details.

Table 12-17 Post-Event Email with Information on Earnings and Energy Usage

Response	Percentage of Responses (n = 86)
Read all emails	76%
Read some emails	17%
Did not read emails	1%

Response	Percentage of Responses (n = 86)
Did not recall receiving email	6%

A plurality of participants thought that the bill credits they received were too low. Among survey respondents, 26% believe the bill credits were about right compared to 46% who thought they were too low and 1% who thought they were too high. Ten percent did not know how much the bill credits were and 17% had no opinion on the bill credits. See Figure 12-14.

Figure 12-14 Bill Credit Perceptions
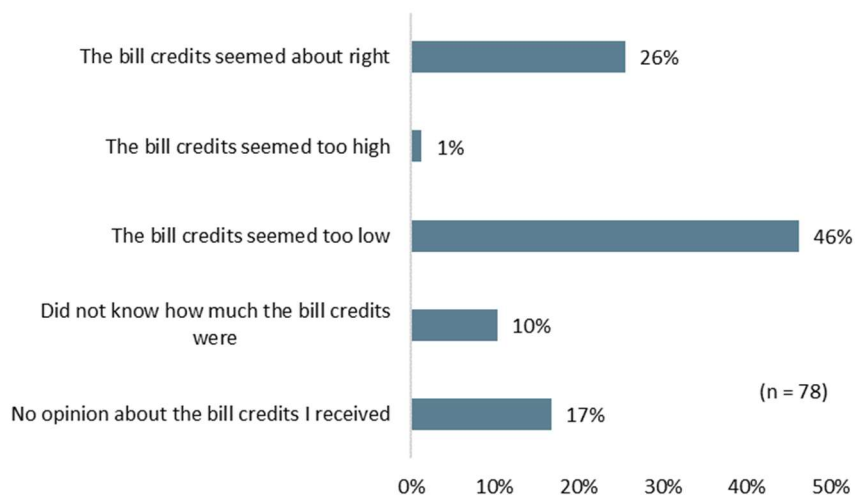
About half of the participants thought that the bill credit emails were easy to understand, that the information on their home energy use was accurate, and that the emails were timely. Sixty-two percent of respondents agreed that the information in the email was easy to understand, while 7% disagreed with this. Forty-nine percent agreed that the information on home energy use was accurate, while 15% disagreed with this. Fifty-nine percent thought that the emails were timely while 14% disagreed with this. See Figure 12-15 for additional details.

Figure 12-15 Opinion of Bill Credit Emails
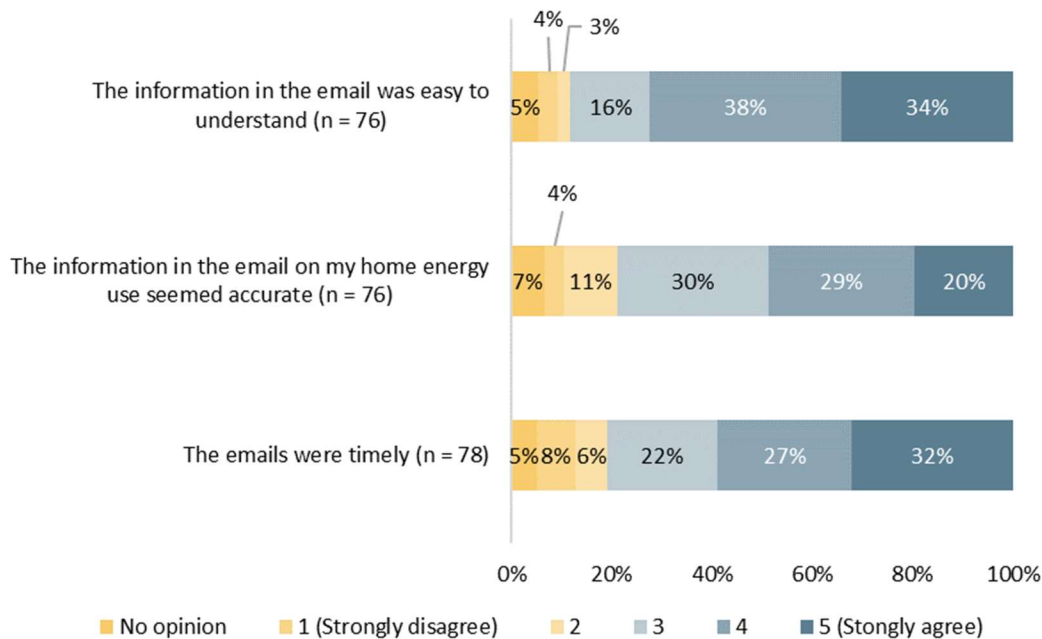
Satisfaction with iControl and Likelihood of Continuing Enrollment and Trying to Reduce Energy Use

While nearly half of respondents were satisfied with the program overall, a sizable share was dissatisfied, and a larger share were neither satisfied nor dissatisfied. Dissatisfaction with the bill credits appear to be the aspect of the program that was most problematic for participants, with 40% reporting dissatisfaction with this component. Comparatively fewer respondents were dissatisfied with the number and duration of events (see Figure 12-16).

Figure 12-16 Satisfaction with Bill Credits, Duration of Events, Number of Events and iControl Program
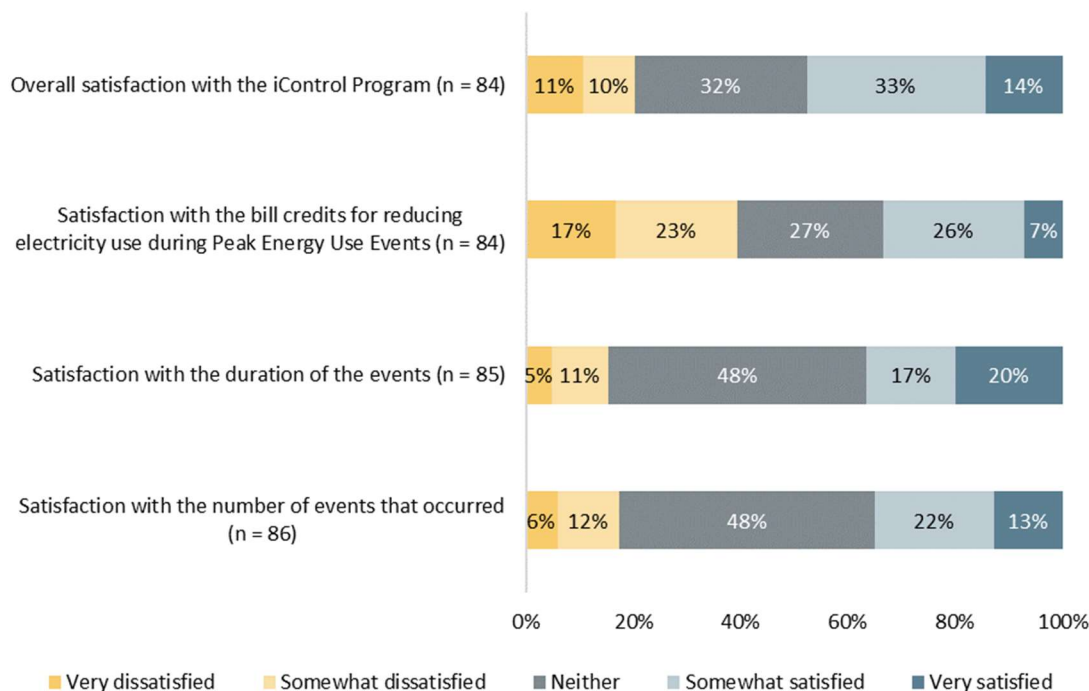
Participants provided various suggestions for improving their satisfaction with the iControl Program. Some highlighted the importance of advanced notice for conserving power, especially during more convenient times that do not coincide with extreme heat. Others emphasized the need for more equitable credit systems, particularly for those with unconventional energy usage patterns, such as seasonal residents. Some participants wanted to earn credits more easily, while others wished for a senior discount. There was a desire for rewards tailored to low-energy users during peak times. Participants also suggested paying closer attention to energy use, extending the duration of events, and providing information about electricity consumption and calculations. Additionally, better communication regarding the timing of events and understanding the weather forecast was noted as necessary.

Forty-eight percent of survey respondents indicated they were very likely to continue participating in the iControl program, while 6% expressed that they were not at all likely to continue. The average score was 5.3.

The majority of respondents (63%) indicated that they were very likely to try to reduce their energy use during peak events in the future should they remain in the program. On the other hand, 2% were not at all likely to do so. The average score was 7.5.

Satisfaction with bill credits emerged as the primary predictor of participants' likelihood to continue participation, their willingness to reduce energy use during events, and their overall satisfaction with the energy efficiency program. This analysis, conducted by ADM through a series of regression models, assessed the impact of various predictors, including:

- Satisfaction with bill credits.

- Satisfaction with the duration of events.

- Satisfaction with the number of events.

- Participants' views on the timeliness, understandability, and accuracy of information in post-event emails.

- Perceptions regarding the adequacy of the bill credits.

The findings underscore the important role of perceived fairness and adequacy of financial incentives in influencing participant engagement and satisfaction within energy efficiency programs. While the clarity and timeliness of communication, as reflected through post-event emails, contribute to these outcomes, their impact is comparatively minor. This highlights that, above all, ensuring participants feel fairly compensated is key to customer acceptability (refer to Table 12-18 for detailed results).

Table 12-18 Regression Results for Overall Satisfaction and Likelihood of Continued Participation

Predictor	Overall Satisfaction			Likelihood of Continuing Participation			Likelihood of Continuing to Reduce Energy Use		
	Relative Importance	Coefficient	P-Value	Relative Importance	Coefficient	P-Value	Relative Importance	Coefficient	P-Value
Satisfaction with bill credits	57.1%	0.54	0.00	50.3%	0.74	0.00	48.6%	0.45	0.01
Satisfaction with duration of credits	35.7%	0.49	0.00	21.8%	0.51	0.12	17.3%	0.25	0.30
Satisfaction with number of events	15.6%	0.24	0.70	15.6%	0.42	0.86	8.4%	0.16	0.62
Thought credits were too low	3.7%	0.21	0.01	2.8%	-0.04	0.30	7.1%	0.43	0.08
Post-event emails were timely	1.6%	0.00	0.91	1.6%	0.00	0.58	3.1%	0.02	0.19
Information on the program answered questions well	0.9%	0.00	0.18	1.8%	0.00	0.78	1.6%	-0.01	0.99
Post-event emails were easy to understand	0.6%	0.00	0.51	1.4%	0.01	0.30	12.6%	0.02	0.08
Post-event information on energy use appeared accurate	0.5%	0.00	0.87	4.6%	-0.01	0.20	1.3%	0.00	0.50
R-Squared	57.4%			32.2%			21.6%		

Demographics

The survey responses regarding the home's ownership and type indicate that 78% of participants own their home and 19% rent it. Additionally, 99% of the homes are the respondents' primary residences, while 1% said it was something else. In terms of home type, the majority (73%) are single-family houses detached from any other house, 7% are manufactured homes, 13% are apartments, and 4% are single-family houses attached to one or more other houses (e.g., duplex,

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
2023 EM&V Report
Page 105 of 180

Indiana Demand Response Portfolio

row house, or townhome). The average number of people currently living in participants' homes year-round is approximately 1.6. Participants reported a wide range of annual household incomes, with 24% indicating their income was between $50,000 or more and 57% making less than $50,000.

12.6. Findings and Recommendations

The post event and end of year survey results indicate that event notification procedure is working well. Across the two post-event surveys, 97% of participants reported that they had received the notification of the event date. A small share of participants reported that they did not have sufficient notification to take action during the events (14%).

Most participants reported that they took steps to lower household energy use, and the actions reported generally aligned with the best approaches for reducing energy use during the events. Eighty-three percent of households said they took steps to lower energy use. The most impactful action that respondents reported, reducing air conditioner use, was taken by 94% of respondents to the July post-event survey and 88% of respondents to the September post-event survey. Respondents also reported taking actions less likely to be impactful such as reducing lighting avoiding using laundry appliances and avoiding cooking appliances.

The post-event emails have been generally effective in communicating event results to participants. Most participants read the post-event email providing information on their credits earned. Across the July and September post-event surveys, 84% reported reading the emails sent after the event. The end of year survey results were consistent with this, with 76% reporting they read all the emails and 17% reporting they read some of the emails. Furthermore, about half of the participants thought that the bill credit emails were easy to understand, that the information on their home energy use was accurate, and that the emails were timely, and relatively few disagreed with this.

Participants had varied opinions of the amount of bill credits they received. Across the July and September events, 36% thought the credits were too low and 29% thought they were about right. Respondents to the end of year survey tended to skew towards thinking the bill credits seemed too low to a greater extent – 46% thought this and 26% thought they were about right. Satisfaction with the bill credits were also the strongest predictors of overall satisfaction with the program, likelihood of continuing to participate, and likelihood of continuing to try to reduce energy use.

- **Recommendation 1:** Monitor enrollment in the program overtime and if participation or engagement decreases, consider cost-effective increases in the amount that participants received. Higher credits may increase engagement and participation.

2023 Indiana Demand Response Portfolio

EM&V Report

Volume II of II

Prepared for:

Indiana Michigan Power

April 2024

Prepared by:

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Table of Contents

1. Introduction

Under contract with the Indiana Michigan Power (I&M), ADM Associates, Inc., (ADM) performed evaluation, measurement and verification (EM&V) activities to confirm the energy savings (kWh) and demand reduction (kW) realized through the demand side management programs that I&M implemented in Indiana in 2023.

This report is divided into two volumes providing information on the impact, process, and cost-effectiveness evaluation of the I&M portfolio of demand response programs implemented in Indiana during the 2023 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 Management Participant Survey Instrument

- Chapter 3: Residential HVAC DLC Participant Survey Instrument

- Chapter 4: Residential Customer Engagement Demand Response Participant Survey Instruments

- Chapter 5: Home Energy Management Participant Survey Results

- Chapter 6: Residential HVAC DLC Participant Survey Results

- Chapter 7: Residential Customer Engagement Demand Response Survey Results

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

2. Home Energy Management Participant Survey Instrument

Net Promoter Score

1. How likely is it that you would recommend the IM Power Rewards: Smart Thermostat program to a friend, family member, or colleague?

[Net Promoter score: Scale: 0 (Not at all likely) - 10 (Very likely)]

2. Why did you provide that rating?

Introduction

3. How did you first learn about I&M's IM Power Rewards program?

[Randomize order of 1-8]

1.	Mailer from I&M
2.	Email from I&M
3.	I&M Website (www.electricideas.com or indianamichiganpower.com)
4.	Friend or Relative (word-of-mouth)
5.	I&M Newsletter
6.	Social media
9.	Other (Please Specify)
98.	Don't know

Program Participation

4. Why did you choose to participate in this program? (Select all that apply)

[Multiselect] [Randomize order of 1-5]

1.	The opportunity to participate in an energy savings program
2.	Program was recommended to me by I&M
3.	The bill credits/enrollment incentive
4.	To reduce energy use for environmental reasons
5.	To save on energy costs
6.	Other (please specify)

5. Did you have any concerns about participating in the IM Power Rewards: Smart Thermostat program before enrolling in it?

| 1. | Yes |
| 2. | No |

[Display if Q5 = 1]

6. What concerns did you have? (Please select all that apply)

[Multiselect] [Randomize order of 1 -5]

| 1. | Concerns about being uncomfortable during energy reduction events |

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 110 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

    2.   Concerns about the utility having the ability to control or shut off my AC
    3.   Concerns about not being able to control the temperature
    4.   Concerns about privacy/security
    5.   Other (Please specify)

7. Where did you get information about how the program works? (Select all that apply)

[Multiselect] [Randomize order of 1 -5]

    1.   Information provided by an I&M representative
    2.   The program website
    3.   Information provided in an I&M email or newsletter
    4.   Information from an I&M flyer
    5.   Information provided in an I&M mailing
    6.   Other (please specify)
    98.   Do not recall

8. Thinking about any information that you received or viewed before you decided to participate, how well did that information address any questions you had?

    1.   1 (Not at all)
    2.   2
    3.   3
    4.   4
    5.   5 (Completely)
    6.   I did not review any information before I decided to participate

[Display if Q8 < 4]

9. What questions did that information not address well?

10. Using the scale below, how would you rate the process of enrolling your thermostat in the program?

    1.   1 (Very difficult)
    2.   2
    3.   3
    4.   4
    5.   5 (Very easy)

[Display if Q9 < 3]

11. What made the enrollment process difficult?

Indiana Demand Response Portfolio

2023 EM&V

Report

Peak Energy Use Events

12. Were you at home during any Peak Energy Use Events?

    1.   Yes
    2.   No, not that you are aware of

[Display if Q12 = 1]

13. What effect did the Peak Energy Use Events have on the comfort of your home?

    1. No effect of comfort
    2. Made the home a little uncomfortable
    3. Made the home moderately uncomfortable
    4. Made the home very uncomfortable

14. Do you think the number of Peak Energy Events called was about right or were there too many or too few events called?

    1.   About right
    2.   Too many
    3.   Too few

15. Would you say that the Peak Energy Use Events...

    1.   Lasted much too long
    2.   Lasted somewhat too long
    3.   Lasted a little too long
    4.   Lasted about the right amount of time
    98.   Don't know – didn't notice events

16. How likely is it that you will participate in the IM Power Rewards: Smart Thermostat program next year?

[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]

[Display if Q16 < 7]

17. Why might you not participate in the program next year?

18. How satisfied are you with the IM Power Rewards: Smart Thermostat program, overall?

    1.   Very dissatisfied
    2.   Somewhat dissatisfied
    3.   Neither satisfied nor dissatisfied
    4.   Somewhat satisfied
    5.   Very satisfied

Indiana Demand Response Portfolio

Report

[Display if Q18 = 1 OR 2]

19. Why were you dissatisfied?

Demographics/Home Characteristics

20. What brand of thermostat did you enroll in the program for the residence located at [ADDRESS]?

    1.   Alarm.com
    2.   Amazon
    3.   ecobee
    4.   Honeywell Home
    5.   Nest
    6.   Sensi

21. Do you own the home that participated in the program, rent it, 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

22. 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

23. 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)
    99. Prefer not to answer

Indiana Demand Response Portfolio

2023 EM&V

Report

24. What temperature is your thermostat typically set at to control the cooling during the summer?

66.	66 degrees or cooler
67.	67
68.	68
69.	69
70.	70
71.	71
72.	72
73.	73
74.	74
75.	75
76.	76
77.	77
78.	78
79.	79
80.	80 degrees or warmer
99.	Do not use a thermostat setting to control air conditioner

25. 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.	I prefer not to state

26. 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.	I prefer not to state

3. Residential HVAC DLC Participant Survey Instrument

Introduction

2. Thank you for taking this survey to tell us about your experience with I&M's IM Power Rewards: Home AC. Your feedback is very important to us and will help us improve our programs for customers like you. This survey should take about 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: 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. 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.

3. Captcha Element

Net Promoter Score

4. How likely is it that you would recommend the IM Power Rewards: Home AC Program to a friend, family member, or colleague?

[Net Promoter score: Scale: 0 (Not at all likely) - 10 (Very likely)]

5. Why did you provide that rating?

Program Awareness and Motivations

6. How did you first learn about the IM Power Rewards: Home AC program?

1.	Mailer from I&M
2.	Email from I&M
3.	I&M Website (www.electricideas.com or indianamichiganpower.com)
4.	Friend or Relative (word-of-mouth)
5.	I&M Newsletter
6.	Social media
9.	Other (Please Specify)
98.	Don't know

7. Why did you decide to participate in the IM Power Rewards: Home AC program?

[Multiselect]

1.	To get the bill credits
2.	To lower your utility costs
3.	To reduce your carbon footprint / greenhouse gas emissions
4.	For some other reason (Please describe)

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 115 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

8. What information about the IM Power Rewards: Home AC Program did you receive or look at before you enrolled in the program? (Select all that apply)

    1.   Information on I&M's website
    2.   Email information sent by I&M
    3.   Information mailed to me by I&M
    4.   Something else (Please describe)

9. Thinking about any information that you received or viewed before you decided to participate, how well did that information address any questions you had?

[Scale: 1 (Not at all) – 5 (Completely), 98 = Did not receive or view any information]]

[Display if Q9 < 4]

10. What questions did that information not address well?

Acceptability of Technology

11. As part of this program, a device was installed on your outdoor central AC unit.
    Did you schedule the installation of the device?

    1. Yes
    2. No

12. Were you or anyone else at home when the device was installed on your air conditioning unit?

    1. Yes
    2. No

13. The next few questions are about the Peak Energy Use Events.
    Have you visited the I&M website to view the Peak Energy Use Event notifications?

    1. Yes
    2. No

14. Were you at home during any Peak Energy Use Events?

    1. Yes
    2. No
    98. Not sure

[Display Q15 if Q14 =1]

15. What effect did the Peak Energy Use Events have on the comfort of your home?

    1. No effect of comfort
    2. Made the home a little uncomfortable
    3. Made the home moderately uncomfortable
    4. Made the home very uncomfortable

Indiana Demand Response Portfolio

Report

Satisfaction

16. Do you think the number of Peak Energy Events called was about right or were there too many or too few events called?

   1. About right
   2. Too many
   3. Too few

17. Would you say that the Peak Energy Use Events…

   1. Lasted much too long
   2. Lasted somewhat too long
   3. Lasted a little too long
   4. Lasted about the right amount of time
   98. Don't know – didn't notice events

18. How satisfied are you with the bill credits for reducing your electricity use during Peak Energy Use Events?

   1. Very dissatisfied
   2. Somewhat dissatisfied
   3. Neither satisfied nor dissatisfied
   4. Somewhat satisfied
   5. Very satisfied

[Display Q19 if Q12 = 1 OR Q11 =1]

19. How satisfied are you with the device installation process?

   1. Very dissatisfied
   2. Somewhat dissatisfied
   3. Neither satisfied nor dissatisfied
   4. Somewhat satisfied
   5. Very satisfied

[Display Q20 if Q19 < 3]

20. How could the installation process be improved?
21. Overall, how satisfied are you with the IM Power Rewards: Home AC Program that your household is enrolled in?

   1. Very dissatisfied
   2. Somewhat dissatisfied
   3. Neither satisfied nor dissatisfied
   4. Somewhat satisfied

Indiana Demand Response Portfolio

Report

5.   Very satisfied

[Display Q22 if Q21 < 3]

22. What would make you more satisfied with the IM Power Rewards: Home AC Program?
23. Using the scale below, how likely are you to continue to participate in the IM Power Rewards: Home AC Program?

[Scale: 0 (Not at all likely) to 10 (Very likely)]

Demographics / Home Characteristics

24. The next questions are about this residence. These are confidential but it is okay to not answer any of these questions.
25. 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 (Specify)
99.   I prefer not to state

26. Do you own, rent, or own and rent to someone else the property located at [ADDRESS]?

1.   Own
2.   Rent
99.   I prefer not to state

27. 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

Indiana Demand Response Portfolio

2023 EM&V

Report

28. What temperature is your thermostat typically set at to control the cooling during the summer?

66.	66 degrees or cooler
67.	67
68.	68
69.	69
70.	70
71.	71
72.	72
73.	73
74.	74
75.	75
76.	76
77.	77
78.	78
79.	79
80.	80 degrees or warmer
99.	Do not use a thermostat setting to control air conditioner

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

1.	Electricity
2.	Natural Gas
3.	Propane
4.	Something else (Please explain)
5.	Don't heat home
99.	Don't know/Prefer not to state

30. What fuel does your main water heater use?

1.	Electricity
2.	Natural Gas
3.	Propane
4.	Something else (Please explain)
5.	Don't heat water in home
99.	Don't know/Prefer not to state

31. Do you have a Wi-Fi connect smart thermostat?

1.	Yes
2.	No
99.	Don't know/Prefer not to state

Indiana Demand Response Portfolio

2023 EM&V

Report

32. 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. I prefer not to state

33. Are you or another member of your household 65 years of age or older?

1. Yes
2. No
99. I prefer not to state

34. Does your home have broadband (high speed) internet service such as cable, fiber optic, or DSL service?

1. Yes
2. No
99. Don't know/Prefer not to state

35. 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. I prefer not to state

4. Residential Customer Engagement Demand Response Participant Survey Instruments

4.1. Post Event Survey Instrument

Event Awareness

1. Did you receive notification of the event on [EVENT_DATE]?

   1. Yes
   2. No

[Display if Q1 = 2]

2. Did any member of your household receive notification of this event?

   1. Yes
   2. No

[If Q1 = 2 and Q2 = 2, Terminate Survey]

3. How did you learn that the event was going to happen?

   1. Text message from I&M
   2. On the I&M website
   3. From another member in your household

4. Did your household take steps to lower your energy use during the event?

   1. Yes
   2. No

[Display if Q4 = 2]

5. Why did you not take steps to save energy? Please select all that apply.

   1. I did not have enough notification of the event to take action.
   2. I did not know what actions to take to reduce energy during the event.
   3. I did not believe that my actions would have a noticeable impact on energy consumption.
   4. I was not at home during the event.
   5. For some other reason (Please explain)

[Display if Q4 = 1]

Indiana Demand Response Portfolio

2023 EM&V

Report

6. Which of the following actions did you take to reduce your electricity use during Peak Energy Use Events?

[Matrix table with 1 = Yes, took this action and 2 = No, did not do this. Randomize order of list.]

a. Turned air conditioner off or raised your thermostat temperature so that the air conditioner ran less
b. Avoided using a microwave, electric oven, or cooking range
c. Avoided using clothes washer, clothes dryer, or dish washer
d. Unplugged or turned off electronic devices such as televisions, game systems, or computers
e. Unplugged phone and other mobile devices
f. Avoided using hot water
g. Turned off lights
h. Turned off fans
i. Turned off appliances
j. Avoided charging your electric vehicle [Anchor]
k. Turned off pool or spa filter [Anchor]

7. Did you run your air conditioning more than usual before the Peak Energy Use event to keep your home cooler during the event?

1. Yes
2. No

8. After the event an email was sent that provided information on how much you earned and your energy usage during the event.

Did you read the email from I&M about how much you earned and your energy usage during the event?

1. Yes
2. No, received it but did not read it
3. No, do not recall receiving it

[Display if Q8 = 1]

9. Which of the following best describes your view of the bill credits that you received?

1. The bill credits seemed about right
2. The bill credits seemed too low
3. The bill credits seemed too high
4. I don't have an opinion about the bill credits I received

10. Do you have any additional feedback for I&M on event communications?

Indiana Demand Response Portfolio

2023 EM&V

Report

4.2. Participant Survey Instrument

Net Promoter Question

Display as Embedded Question in Email Recruitment

1. How likely is it that you would recommended the IM Power Rewards: iControl Program to a friend, family member, or colleague?

[Net Promoter score: SCALE: 0 (Not at all likely) - 10 (Very likely)]

2. Why did you give it that score?

Program Awareness and Motivation for Participating

3. How did you first learn about the iControl program?

   1. Mailer from I&M
   2. Email from I&M
   3. I&M Website (www.electricideas.com or indianamichiganpower.com)
   4. Friend or Relative (word-of-mouth)
   5. I&M Newsletter
   6. Social media
   7. Other (Please Specify)
   98. Don't know

4. Why did you decide to participate in the iControl program? Please select all that apply.

[MULTISELCT]

   1. To get the bill credits
   2. To lower your utility costs
   3. To reduce your carbon footprint / greenhouse gas emissions
   4. For some other reason (Please describe)

Event Communication

5. The program uses emails and text messages to notify participants that a Peak Energy Use Event is scheduled. Do you recall receiving messages about Peak Energy Use Events?

   1. Yes, text messages
   2. Yes, email messages
   3. Yes, text and email messages
   4. No

6. Notifications of Peak Energy Use Events are also posted on the I&M website. Have you visited the I&M website to read the Peak Energy Use Event notifications?

   1. Yes
   2. No

Indiana Demand Response Portfolio

2023 EM&V

Report

7. To the best of your knowledge, has anyone else in your household received notifications about Peak Energy Use Events by receiving a text message or by viewing the I&M website?

    1.   Yes
    2.   No

[DISPLAY Q8 IF Q5 = 4 AND Q6 = 2 AND Q7 = 2]

8. Based on your responses, it sounds like you have not received any notification of a Peak Energy Use Event from I&M. Is that correct?

    1.   Yes
    2.   No

[DISPLAY Q9 IF Q8 = 2]

9. Please explain how you received the event notifications.

10. How well informed do you think you are about how much electricity different appliances and equipment in your home use?

    1.   Not at all informed
    2.   Somewhat well informed
    3.   Well informed
    4.   Very well informed

11. Demand for electricity is often highest during summer afternoons when the weather is hottest. How well informed are you about ways you can reduce your electricity during those times?

    1.   Not at all informed
    2.   Somewhat well informed
    3.   Well informed
    4.   Very well informed

12. How easy or difficult did you find the task of reducing your electricity use during Peak Energy Use Events this summer?

[SCALE: 1 (Very Difficult) – 5 (Very easy)]

[DISPLAY Q13 IF Q12. < 4]

13. What made it hard to reduce your electricity use during the Peak Energy Use Events? Please select all that apply.

[Randomize 1 -9]

    1. Lack of Awareness: Didn't notice the notification in time.
    2. Inconvenience: Reducing energy use at the suggested times was not convenient.

Indiana Demand Response Portfolio

2023 EM&V

Report

3. Lack of Understanding: Did not understand how to reduce energy use effectively.

4. Family Constraints: Family members were not cooperative or had conflicting needs.

5. Work Commitments: Was occupied with work-related tasks that required energy use.

6. Special Circumstances: Had guests over, special occasions, etc., that required higher energy use.

7. Skepticism: Did not believe reducing energy use for a short period would make a significant impact.

8. Limited Options: Felt they had already minimized energy use as much as possible.

9. Not at home: Not typically at home during events.

10. Other: Please specify.

14. After the Peak Energy Events emails were sent that provided information on how much you earned and your energy usage during the events.

Did you read the emails from I&M about how much you earned and your energy usage during the event?

1. Yes, all of them

2. Yes, some of them

3. No, did not read them

4. No, do not recall receiving them

[Display if Q14 = 1 or 2]

15. Which of the following best describes your view of the bill credits that you received?

1. The bill credits seemed about right

2. The bill credits seemed too low

3. The bill credits seemed too high

4. I don't have an opinion about the bill credits I received

5. I do not know how much the bill credits I got were

[Display if Q14 = 1 or 2]

16. Thinking about the emails that you received about the bill credits, how much do you agree or disagree with the following:

[Scale: 1 = Strongly disagree to 5 Strongly agree, 98 = No opinion]

1. The emails were timely

2. The information in the email on my home energy use seemed accurate

3. The information in the email was easy to understand

2023 EM&V

Report

Engagement in Home Energy Use

17. From which of the following sources have you viewed information about your household's energy consumption? (Select all that apply.)

[Multiselect]

1. Monthly bill
2. I&M account web portal
3. A home energy management system (e.g., energy monitor)
4. Another source (Please describe)
5. I have not viewed information on my household's energy use

[Display if Q17 = 4]

18. Where else do you view your household energy use?

[Display if Q17 <> 5]

19. How often do you view your household energy use information?

1. More than once a month
2. About once a month
3. A few times a year
4. Once a year

Participant Satisfaction

20. Thinking about any information that you received or viewed before you decided to participate, how well did that information address any questions you had?

[Scale: 1 (Not at all) – 5 (Completely), 98 = did not receive or view any information]

21. How satisfied are you with the number of events that occurred?

1. Very dissatisfied
2. Somewhat dissatisfied
3. Neither satisfied nor dissatisfied
4. Somewhat satisfied
5. Very satisfied

[Display Q22 if Q21 < 3]

22. Do you think too many or too few events were called?

1. Too many
2. Too few

Indiana Demand Response Portfolio

2023 EM&V

Report

23. How satisfied are you with the duration of the events?

1. Very dissatisfied
2. Somewhat dissatisfied
3. Neither satisfied nor dissatisfied
4. Somewhat satisfied
5. Very satisfied

24. How satisfied are you with the bill credits for reducing your electricity use during Peak Energy Use Events?

1. Very dissatisfied
2. Somewhat dissatisfied
3. Neither satisfied nor dissatisfied
4. Somewhat satisfied
5. Very satisfied

25. Overall, how satisfied are you with the iControl Program that your household is enrolled in?

1. Very dissatisfied
2. Somewhat dissatisfied
3. Neither satisfied nor dissatisfied
4. Somewhat satisfied
5. Very satisfied

[Display Q26 if Q25 < 3]

26. What would make you more satisfied with the iControl Program?
27. Using the scale below, how likely are you to continue to participate in the iControl Program?

[SCALE: 0 (Not at all likely) to 10 (Very likely)]

Demographics / Home Characteristics

28. The next Questions are about this residence. These are confidential and will be used solely for combining different customers' responses. It is okay to not answer any of these Questions.
29. 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 (Specify)
99. I prefer not to state

Indiana Demand Response Portfolio

2023 EM&V

Report

30. Do you own, rent, or own and rent to someone else the property located at [ADDRESS]?

1. Own
2. Rent
99. I prefer not to state

31. 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

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

1. Electricity
2. Natural Gas
3. Propane
4. Something else (Please explain)
5. Don't heat home
99. Don't know/Prefer not to state

33. What fuel does your main water heater use?

1. Electricity
2. Natural Gas
3. Propane
4. Something else (Please explain)
5. Don't heat water at home
99. Don't know/Prefer not to state

34. What is the fuel source for your clothes dryer?

1. Natural gas
2. Electricity
3. Propane
4. Other
5. I don't have a clothes dryer
99. Don't know/Prefer not to state

35. Do you have a Wi-Fi connect smart thermostat?

1. Yes
2. No
99. Don't know/Prefer not to state

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 128 of 180

Indiana Demand Response Portfolio
2023 EM&V

Report

36. Do you or any member of your household own or lease a plug-in electric vehicle?

1. Yes
2. No

[Display if Q36 = 1]

37. Do you have a plug-in hybrid vehicle or a battery electric vehicle?

1. Plug-in hybrid
2. Battery electric vehicle
3. Both
99. Don't know/Prefer not to state

38. Do you have a swimming pool?

1. Yes
2. No

39. What is the fuel source for your oven and range?

1. Natural gas
2. Electricity
3. Propane
4. Other
5. I don't have an oven/range
99. Don't know

40. 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. I prefer not to state

41. 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. I prefer not to state

5. Home Energy Management Participant Survey Results

Q2 - How likely is it that you would recommend the IM Power Rewards: Smart Thermostat program to a friend, family member, or colleague?

#	Group	%	Count
1	Detractor	31.51%	23
2	Passive	19.18%	14
3	Promoter	49.32%	36
	Total	100%	73

Q4 - How did you first learn about I&M's IM Power Rewards program?

#	Answer	%	Count
1	Mailer from I&M	13.64%	9
2	Email from I&M	45.45%	30
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	15.15%	10
4	Friend or Relative (word-of-mouth)	1.52%	1
5	I&M Newsletter	0.00%	0
6	Social media	0.00%	0
7	Other (Please Specify)	12.12%	8
98	Don't know	12.12%	8
	Total	100%	66

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 130 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

Q5 - Why did you choose to participate in this program? (Select all that apply)

#	Answer	%	Count
1	The opportunity to participate in an energy savings program	18.88%	27
2	Program was recommended to me by I&M	4.90%	7
3	The bill credits/enrollment incentive	29.37%	42
4	To reduce energy use for environmental reasons	16.08%	23
5	To save on energy costs	28.67%	41
6	Other (please specify)	2.10%	3
	Total	100%	143

Q6 - Did you have any concerns about participating in the IM Power Rewards: Smart Thermostat program before enrolling in it?

#	Answer	%	Count
1	Yes	16.67%	11
2	No	83.33%	55
	Total	100%	66

Q7 - What concerns did you have? (Please select all that apply)

#	Answer	%	Count
1	Concerns about being uncomfortable during energy reduction events	32.14%	9
2	Concerns about the utility having the ability to control or shut off my AC	28.57%	8
3	Concerns about not being able to control the temperature	25.00%	7
4	Concerns about privacy/security	10.71%	3
5	Other (Please specify)	3.57%	1

Indiana Demand Response Portfolio

Report

	Total	100%	28

Indiana Demand Response Portfolio

Report

Q8 - Where did you get information about how the program works? (Select all that apply)

#	Answer	%	Count
1	Information provided by an I&M representative	2.44%	2
2	The program website	41.46%	34
3	Information provided in an I&M email or newsletter	34.15%	28
4	Information from an I&M flyer	6.10%	5
5	Information provided in an I&M mailing	2.44%	2
6	Other (please specify)	4.88%	4
98	Do not recall	8.54%	7
	Total	100%	82

Q9 - Thinking about any information that you received or viewed before you decided to participate, how well did that information address any questions you had?

#	Answer	%	Count
1	1 (Not at all)	6.06%	4
2	2	6.06%	4
3	3	15.15%	10
4	4	28.79%	19
5	5 (Completely)	31.82%	21
6	I did not review any information before I decided to participate	12.12%	8
	Total	100%	66

Indiana Demand Response Portfolio

Report

Q11 - Using the scale below, how would you rate the process of enrolling your thermostat in the program?

#	Answer	%	Count
1	1 (Very difficult)	1.56%	1
2	2	3.13%	2
3	3	7.81%	5
4	4	12.50%	8
5	5 (Very easy)	75.00%	48
	Total	100%	64

Q13 - Were you at home during any Peak Energy Use Events?

#	Answer	%	Count
1	Yes	79.69%	51
2	No, not that you are aware of	20.31%	13
	Total	100%	64

Q14 - What effect did the Peak Energy Use Events have on the comfort of your home?

#	Answer	%	Count
1	No effect of comfort	33.33%	17
2	Made the home a little uncomfortable	35.29%	18
3	Made the home moderately uncomfortable	13.73%	7
4	Made the home very uncomfortable	17.65%	9
	Total	100%	51

Indiana Demand Response Portfolio

2023 EM&V

Report

Indiana Demand Response Portfolio

Report

Q15 - Do you think the number of Peak Energy Events called was about right or were there too many or too few events called?

#	Answer	%	Count
1	About right	77.05%	47
2	Too many	8.20%	5
3	Too few	14.75%	9
	Total	100%	61

Q16 - Would you say that the Peak Energy Use Events…

#	Answer	%	Count
1	Lasted much too long	3.17%	2
2	Lasted somewhat too long	7.94%	5
3	Lasted a little too long	14.29%	9
4	Lasted about the right amount of time	46.03%	29
99	Don't know – didn't notice events	28.57%	18
	Total	100%	63

Indiana Demand Response Portfolio

Report

Q17 - How likely is it that you will participate in the IM Power Rewards: Smart Thermostat program next year?

#	Answer	%	Count
0	0 (Not at all likely)	6.45%	4
1	1	0.00%	0
2	2	0.00%	0
3	3	1.61%	1
4	4	4.84%	3
5	5	4.84%	3
6	6	3.23%	2
7	7	0.00%	0
8	8	9.68%	6
9	9	8.06%	5
10	10 (Very likely)	61.29%	38
	Total	100%	62

Q19 - How satisfied are you with the IM Power Rewards: Smart Thermostat program, overall?

#	Answer	%	Count
1	Very dissatisfied	4.84%	3
2	Somewhat dissatisfied	9.68%	6
3	Neither satisfied nor dissatisfied	16.13%	10
4	Somewhat satisfied	27.42%	17
5	Very satisfied	41.94%	26
	Total	100%	62

Indiana Demand Response Portfolio

2023 EM&V

Report

Q166 - What brand of thermostat did you enroll in the program for the residence located at [Field-ADDRESS]?

#	Answer	%	Count
1	Alarm.com	1.64%	1
2	Amazon	3.28%	2
3	ecobee	4.92%	3
4	Honeywell Home	44.26%	27
5	Nest	39.34%	24
6	Sensi	6.56%	4
	Total	100%	61

Q22 - Do you own the home that participated in the program, rent it, or own it and rent it to someone else?

#	Answer	%	Count
1	Own	91.94%	57
2	Rent	6.45%	4
3	Own and rent to someone else	0.00%	0
99	Prefer not to answer	1.61%	1
	Total	100%	62

Q23 - Is the residence located at [Field-ADDRESS]...

#	Answer	%	Count
1	Your primary residence	96.77%	60
2	A residence that you rent to someone else	0.00%	0
3	A vacation property that is not occupied year-round	3.23%	2
4	Something else	0.00%	0
	Total	100%	62

Indiana Demand Response Portfolio

Report

Indiana Demand Response Portfolio

Report

Q24 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	6.45%	4
2	Single-family house detached from any other house	83.87%	52
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	3.23%	2
4	Apartment in a building with 2 to 3 units	1.61%	1
5	Apartment in a building with 4 or more units	1.61%	1
6	Other (Please describe)	3.23%	2
7	Prefer not to answer	0.00%	0
	Total	100%	62

Indiana Demand Response Portfolio

Report

Q25 - What temperature is your thermostat typically set at to control the cooling during the summer?

#	Answer	%	Count
66	66 degrees or cooler	0.00%	0
67	67	1.61%	1
68	68	1.61%	1
69	69	1.61%	1
70	70	12.90%	8
71	71	9.68%	6
72	72	14.52%	9
73	73	12.90%	8
74	74	16.13%	10
75	75	6.45%	4
76	76	12.90%	8
77	77	6.45%	4
78	78	3.23%	2
79	79	0.00%	0
80	80 degrees or warmer	0.00%	0
99	Do not use a thermostat setting to control air conditioner	0.00%	0
	Total	100%	62

Indiana Demand Response Portfolio

Report

Q26 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	19.35%	12
2	2	30.65%	19
3	3	16.13%	10
4	4	19.35%	12
5	5	8.06%	5
6	6	0.00%	0
7	7	0.00%	0
8	8 or more	3.23%	2
99	I prefer not to state	3.23%	2
	Total	100%	62

Indiana Demand Response Portfolio

Report

Q27 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than $10,000	0.00%	0
2	$10,000 to less than $20,000	1.61%	1
3	$20,000 to less than $30,000	6.45%	4
4	$30,000 to less than $40,000	1.61%	1
5	$40,000 to less than $50,000	8.06%	5
6	$50,000 to less than $75,000	16.13%	10
7	$75,000 to less than $100,000	8.06%	5
8	$100,000 to less than $150,000	14.52%	9
9	$150,000 to less than $200,000	8.06%	5
10	$200,000 or more	14.52%	9
99	I prefer not to state	20.97%	13
	Total	100%	62

6. Residential HVAC DLC Participant Survey Results

Q4 - How likely are you to recommend the IM Power Rewards: Home AC Program to a friend, family member, or colleague?

#	Group	%	Count
1	Detractor	33.7%	31
2	Passive	22.8%	21
3	Promoter	43.5%	40
	Total	100%	92

#	How likely are you to recommend the IM Power Rewards: Home AC Program to a friend, family member, or colleague?	Net Promoter Score®
1	How likely are you to recommend the IM Power Rewards: Home AC Program to a friend, family member, or colleague?	9.8

Q6 - How did you first learn about the IM Power Rewards: Home AC program?

#	Answer	%	Count
1	Mailer from I&M	28.1%	25
2	Email from I&M	56.2%	50
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	6.7%	6
4	Friend or Relative (word-of-mouth)	1.1%	1
5	I&M Newsletter	1.1%	1
6	Social media	2.2%	2
7	Other (Please Specify)	1.1%	1
8	Don't know	3.4%	3
	Total	100%	89

Indiana Demand Response Portfolio

Report

Q7 - Why did you decide to participate in the IM Power Rewards: Home AC program?

#	Answer	%	Count
1	To get the bill credits	54.5%	48
2	To lower your utility costs	71.6%	63
3	To reduce your carbon footprint / greenhouse gas emissions	34.1%	30
4	For some other reason (Please describe)	6.8%	6
	Total	100%	88

Q8 - What information about the IM Power Rewards: Home AC Program did you receive or look at before you enrolled in the program? (Select all that apply)

#	Answer	%	Count
1	Information on I&M's website	34.6%	28
2	Email information sent by I&M	58.0%	47
3	Information mailed to me by I&M	32.1%	26
4	Something else (Please describe)	2.5%	2
	Total	100%	81

Indiana Demand Response Portfolio

2023 EM&V

Report

Q9 - Thinking about any information that you received or viewed before you decided to participate, how well did that information address any questions you had?

#	Answer	%	Count
1	1 (Not at all)	3.4%	3
2	2	8.0%	7
3	3	15.9%	14
4	4	29.5%	26
5	5 (Completely)	39.8%	35
6	Did not receive or view any information	3.4%	3
	Total	100%	88

Q10 - As part of this program, a device was installed on your outdoor central AC unit. Did you schedule the installation of the device?

#	Answer	%	Count
1	Yes	59.3%	51
2	No	40.7%	35
	Total	100%	86

Q11 - Were you or anyone else at home when the device was installed on your air conditioning unit?

#	Answer	%	Count
1	Yes	68.6%	59
2	No	31.4%	27
	Total	100%	86

Indiana Demand Response Portfolio

Report

Q12 - The next few questions are about the Peak Energy Use Events. Have you visited the I&M website to view the Peak Energy Use Event notifications?

#	Answer	%	Count
1	Yes	18.6%	16
2	No	81.4%	70
	Total	100%	86

Q13 - Were you at home during any Peak Energy Use Events?

#	Answer	%	Count
1	Yes	74.1%	60
2	No	25.9%	21
	Total	100%	81

Q14 - What effect did the Peak Energy Use Events have on the comfort of your home?

#	Answer	%	Count
1	No effect of comfort	70.0%	42
2	Made the home a little uncomfortable	20.0%	12
3	Made the home moderately uncomfortable	6.7%	4
4	Made the home very uncomfortable	3.3%	2
	Total	100%	60

Indiana Demand Response Portfolio

Report

Q15 - Do you think the number of Peak Energy Events called was about right or were there too many or too few events called?

#	Answer	%	Count
1	About right	85.5%	65
2	Too many	5.3%	4
3	Too few	9.2%	7
	Total	100%	76

Q16 - Would you say that the Peak Energy Use Events…

#	Answer	%	Count
1	Lasted much too long	1.2%	1
2	Lasted somewhat too long	3.6%	3
3	Lasted a little too long	2.4%	2
4	Lasted about the right amount of time	19.0%	16
5	Don't know – didn't notice events	73.8%	62
	Total	100%	84

Indiana Demand Response Portfolio

2023 EM&V

Report

Q17 - How satisfied are you with the bill credits for reducing your electricity use during Peak Energy Use Events?

#	Answer	%	Count
1	Very dissatisfied	6.2%	5
2	Somewhat dissatisfied	8.6%	7
3	Neither satisfied nor dissatisfied	35.8%	29
4	Somewhat satisfied	16.0%	13
5	Very satisfied	33.3%	27
	Total	100%	81

Q18 - How satisfied are you with the device installation process?

#	Answer	%	Count
1	Very dissatisfied	9.1%	6
2	Somewhat dissatisfied	1.5%	1
3	Neither satisfied nor dissatisfied	13.6%	9
4	Somewhat satisfied	10.6%	7
5	Very satisfied	65.2%	43
	Total	100%	66

Indiana Demand Response Portfolio

2023 EM&V

Report

Q20 - Overall, how satisfied are you with the IM Power Rewards: Home AC Program that your household is enrolled in?

#	Answer	%	Count
1	Very dissatisfied	3.7%	3
2	Somewhat dissatisfied	11.1%	9
3	Neither satisfied nor dissatisfied	23.5%	19
4	Somewhat satisfied	17.3%	14
5	Very satisfied	44.4%	36
	Total	100%	81

Q22 - Using the scale below, how likely are you to continue to participate in the IM Power Rewards: Home AC Program?

#	Answer	%	Count
1	0 (Not at all likely)	6.0%	5
2	1	0.0%	0
3	2	1.2%	1
4	3	1.2%	1
5	4	1.2%	1
6	5	14.5%	12
7	6	2.4%	2
8	7	4.8%	4
9	8	3.6%	3
10	9	8.4%	7
11	10 (Very likely)	56.6%	47
	Total	100%	83

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 150 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

Q24 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	1.2%	1
2	Single-family house detached from any other house	94.0%	78
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	3.6%	3
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 (Specify)	0.0%	0
7	I prefer not to state	1.2%	1
	Total	100%	83

Q25 - Do you own, rent, or own and rent to someone else the property located at [Field-ADDRESS]?

#	Answer	%	Count
1	Own	91.6%	76
2	Rent	2.4%	2
3	I prefer not to state	6.0%	5
	Total	100%	83

Q26 - Is the residence located at [Field-ADDRESS]…

#	Answer	%	Count
1	Your primary residence	97.6%	81
2	A residence that you rent to someone else	0.0%	0
3	A vacation property that is not occupied year-round	0.0%	0
4	Something else	2.4%	2
	Total	100%	83

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 151 of 180
2023 EM&V

Indiana Demand Response Portfolio

Report

Q27 - What temperature is your thermostat typically set at to control the cooling during the summer?

#	Answer	%	Count
66	66 degrees or cooler	4.9%	4
67	67	0.0%	0
68	68	1.2%	1
69	69	4.9%	4
70	70	9.8%	8
71	71	6.1%	5
72	72	17.1%	14
73	73	7.3%	6
74	74	15.9%	13
75	75	9.8%	8
76	76	6.1%	5
77	77	8.5%	7
78	78	4.9%	4
79	79	0.0%	0
80	80 degrees or warmer	2.4%	2
99	Do not use a thermostat setting to control air conditioner	1.2%	1
	Total	100%	82

Indiana Demand Response Portfolio

Report

Q28 - What is the main fuel used for heating your home?

#	Answer	%	Count
1	Electricity	11.3%	9
2	Natural Gas	83.8%	67
3	Propane	2.5%	2
4	Something else (Please explain)	0.0%	0
5	Don't heat home	0.0%	0
6	Don't know/Prefer not to state	2.5%	2
	Total	100%	80

Q29 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	34.6%	27
2	Natural Gas	60.3%	47
3	Propane	0.0%	0
4	Something else (Please explain)	0.0%	0
5	Don't heat water in home	0.0%	0
6	Don't know/Prefer not to state	5.1%	4
	Total	100%	78

Indiana Demand Response Portfolio

2023 EM&V

Report

Q30 - Do you have a Wi-Fi connect smart thermostat?

#	Answer	%	Count
1	Yes	13.8%	11
2	No	83.8%	67
3	Don't know/Prefer not to state	2.5%	2
	Total	100%	80

Q31 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	23.5%	19
2	2	39.5%	32
3	3	14.8%	12
4	4	11.1%	9
5	5	2.5%	2
6	6	2.5%	2
7	7	1.2%	1
8	8 or more	1.2%	1
9	I prefer not to state	3.7%	3
	Total	100%	81

Indiana Demand Response Portfolio

2023 EM&V

Report

Q32 - Are you or another member of your household 65 years of age or older?

#	Answer	%	Count
1	Yes	74.1%	60
2	No	23.5%	19
3	I prefer not to state	2.5%	2
	Total	100%	81

Q33 - Does your home have broadband (high speed) internet service such as cable, fiber optic, or DSL service?

#	Answer	%	Count
1	Yes	84.8%	67
2	No	7.6%	6
3	Don't know/Prefer not to state	7.6%	6
	Total	100%	79

Indiana Demand Response Portfolio

Report

Q34 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than $10,000	1.3%	1
2	$10,000 to less than $20,000	10.0%	8
3	$20,000 to less than $30,000	6.3%	5
4	$30,000 to less than $40,000	13.8%	11
5	$40,000 to less than $50,000	17.5%	14
6	$50,000 to less than $75,000	15.0%	12
7	$75,000 to less than $100,000	10.0%	8
8	$100,000 to less than $150,000	2.5%	2
9	$150,000 to less than $200,000	1.3%	1
10	$200,000 or more	2.5%	2
11	I prefer not to state	20.0%	16
	Total	100%	80

7. Residential Customer Engagement Demand Response Survey Results

7.1. Post Event Survey Results (Combined July and September Events)

Q1 - Did you receive notification of the event on [Field-EVENT_DATE]?

#	Answer	%	Count
1	Yes	97.4%	258
2	No	2.6%	7
	Total	100%	265

Q2 - Did any member of your household receive notification of this event?

#	Answer	%	Count
1	Yes	100.0%	1
2	No	0.0%	0
	Total	100%	1

Q3 - How did you learn that the event was going to happen?

#	Answer	%	Count
4	Email notification	22.7%	51
3	From another member in your household	0.4%	1
2	On the I&M website	7.6%	17
1	Text message from I&M	69.3%	156
	Total	100%	225

Indiana Demand Response Portfolio

Report

Q4 - Did your household take steps to lower your energy use during the event?

#	Answer	%	Count
1	Yes	82.8%	183
2	No	17.2%	38
	Total	100%	221

Q5 - Why did you not take steps to save energy? Please select all that apply.

#	Answer	%	Count
1	I did not have enough notification of the event to take action.	13.5%	5
2	I did not know what actions to take to reduce energy during the event.	16.2%	6
3	I did not believe that my actions would have a noticeable impact on energy consumption.	18.9%	7
4	I was not at home during the event.	45.9%	17
5	For some other reason (Please explain)	27.0%	10
	Total	100%	37

Indiana Demand Response Portfolio

Report

Q6 - Which of the following actions did you take to reduce your electricity use during the Peak Energy Use Event?

#	Question	Yes, took this action.		No, did not do this.		Total
1	Turned air conditioner off or raised your thermostat temperature so that the air conditioner ran less	91.3%	157	8.7%	15	172
2	Avoided using a microwave, electric oven, or cooking range	80.8%	139	19.2%	33	172
3	Avoided using clothes washer, clothes dryer, or dish washer	95.3%	163	4.7%	8	171
4	Unplugged or turned off electronic devices such as televisions, game systems, or computers	47.4%	81	52.6%	90	171
5	Unplugged phone and other mobile devices	51.5%	85	48.5%	80	165
6	Avoided using hot water	67.1%	112	32.9%	55	167
7	Turned off lights	91.5%	150	8.5%	14	164
8	Turned off fans	57.4%	93	42.6%	69	162
9	Turned off appliances	52.1%	86	47.9%	79	165
10	Avoided charging your electric vehicle	42.9%	66	57.1%	88	154
11	Turned off pool or spa filter	37.7%	58	62.3%	96	154

Q7 - Did you take any other actions to reduce energy during the Peak Energy Use Event?

#	Answer	%	Count
1	Yes	22.0%	39
2	No	78.0%	138
	Total	100%	177

Indiana Demand Response Portfolio

Report

Q9 - Did you run your air conditioning more than usual before the Peak Energy Use event to keep your home cooler during the event?

#	Answer	%	Count
1	Yes	17.0%	36
2	No	83.0%	176
	Total	100%	212

Q10 - After the event an email was sent that provided information on how much you earned and your energy usage during the event.   Did you read the email from I&M about how much you earned and your energy usage during the event?

#	Answer	%	Count
1	Yes	84.0%	178
2	No, received it but did not read it	3.3%	7
3	No, do not recall receiving it	12.7%	27
	Total	100%	212

Q11 - Which of the following best describes your view of the bill credits that you received?

#	Answer	%	Count
1	The bill credits seemed about right	29.0%	51
2	The bill credits seemed too low	36.4%	64
3	The bill credits seemed too high	0.0%	0
4	I don't have an opinion about the bill credits I received	34.7%	61
	Total	100%	176

Indiana Demand Response Portfolio

Report

7.2. End of Year Participant Survey Results

Q1 - How likely is it that you would recommended the IM Power Rewards: iControl Program to a friend, family member, or colleague?

#	Answer	%	Count
1	Promoter	44%	
2	Passive	24%	
3	Detractor	31%	
4	NPS	13%	

Q3 - How did you first learn about the iControl program?

#	Answer	%	Count
1	Mailer from I&M	8.1%	7
2	Email from I&M	75.6%	65
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	10.5%	9
4	Friend or Relative (word-of-mouth)	0.0%	0
5	I&M Newsletter	1.2%	1
6	Social media	1.2%	1
7	Other (Please Specify)	0.0%	0
98	Don't know	3.5%	3
	Total	100%	86

Indiana Demand Response Portfolio

Report

Q4 - Why did you decide to participate in the iControl program? Please select all that apply.

#	Answer	%	Count
1	To get the bill credits	77.9%	67
2	To lower your utility costs	62.8%	54
3	To reduce your carbon footprint / greenhouse gas emissions	31.4%	27
4	For some other reason (Please describe)	5.8%	5
	Total	100%	86

Q5 - The program uses emails and text messages to notify participants that a Peak Energy Use Event is scheduled. Do you recall receiving messages about Peak Energy Use Events?

#	Answer	%	Count
1	Yes, text messages	29.1%	25
2	Yes, email messages	26.7%	23
3	Yes, text and email messages	40.7%	35
4	No	3.5%	3
	Total	100%	86

Q6 - Notifications of Peak Energy Use Events are also posted on the I&M website. Have you visited the I&M website to read the Peak Energy Use Event notifications?

#	Answer	%	Count
1	Yes	30.2%	26
2	No	69.8%	60
	Total	100%	86

Indiana Demand Response Portfolio

Report

Q7 - To the best of your knowledge, has anyone else in your household received notifications about Peak Energy Use Events by receiving a text message or by viewing the I&M website?

#	Answer	%	Count
1	Yes	7.2%	6
2	No	92.8%	77
	Total	100%	83

Q8 - Based on your responses, it sounds like you have not received any notification of a Peak Energy Use Event from I&M. Is that correct?

#	Answer	%	Count
1	Yes	66.7%	2
2	No	33.3%	1
	Total	100%	3

Q10 - How well informed do you think you are about how much electricity different appliances and equipment in your home use?

#	Answer	%	Count
1	Not at all informed	9.3%	8
2	Somewhat well informed	57.0%	49
3	Well informed	23.3%	20
4	Very well informed	10.5%	9
	Total	100%	86

Indiana Demand Response Portfolio

2023 EM&V

Report

Q11 - Demand for electricity is often highest during summer afternoons when the weather is hottest. How well informed are you about ways you can reduce your electricity during those times?

#	Answer	%	Count
1	Not at all informed	1.2%	1
2	Somewhat well informed	41.9%	36
3	Well informed	43.0%	37
4	Very well informed	14.0%	12
	Total	100%	86

Q12 - How easy or difficult did you find the task of reducing your electricity use during Peak Energy Use Events this summer?

#	Answer	%	Count
1	Very difficult	14.0%	12
2	2	11.6%	10
3	3	31.4%	27
4	4	22.1%	19
5	Very easy	20.9%	18
	Total	100%	86

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 165 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

Q13 - What made it hard to reduce your electricity use during the Peak Energy Use Events?   Please select all that apply.

#	Answer	%	Count
4	Lack of Awareness: Didn't notice the notification in time.	2.0%	1
7	Inconvenience: Reducing energy use at the suggested times was not convenient.	14.3%	7
8	Lack of Understanding: Did not understand how to reduce energy use effectively.	10.2%	5
9	Family Constraints: Family members were not cooperative or had conflicting needs.	18.4%	9
10	Work Commitments: Was occupied with work-related tasks that required energy use.	12.2%	6
11	Special Circumstances: Had guests over, special occasions, etc., that required higher energy use	14.3%	7
12	Skepticism: Did not believe reducing energy use for a short period would make a significant impact.	6.1%	3
13	Limited Options: Felt they had already minimized energy use as much as possible.	51.0%	25
14	Not at home: Not typically at home during events.	26.5%	13
15	Other: Please specify.	16.3%	8
	Total	100%	49

Indiana Demand Response Portfolio

Report

Q14 - After the Peak Energy Events emails were sent that provided information on how much you earned and your energy usage during the events. Did you read the emails from I&M about how much you earned and your energy usage during the event?

#	Answer	%	Count
1	Yes, all of them	75.6%	65
4	Yes, some of them	17.4%	15
5	No, did not read them	1.2%	1
6	No, do not recall receiving them	5.8%	5
	Total	100%	86

Q15 - Which of the following best describes your view of the bill credits that you received?

#	Answer	%	Count
1	The bill credits seemed about right	25.6%	20
2	The bill credits seemed too low	46.2%	36
3	The bill credits seemed too high	1.3%	1
4	I don't have an opinion about the bill credits I received	16.7%	13
5	I do not know how much the bill credits I got were	10.3%	8
	Total	100%	78

Indiana Demand Response Portfolio

Report

Q16 - Thinking about the emails that you received about the bill credits, how much do you agree or disagree with the following:

#	Question	1(Strongly disagree)		2		3		4		5(Stongly agree)		No opinion		Total
1	The emails were timely	7.7%	6	6.4%	5	21.8%	17	26.9%	21	32.1%	25	5.1%	4	78
2	The information in the email on my home energy use seemed accurate	3.9%	3	10.5%	8	30.3%	23	28.9%	22	19.7%	15	6.6%	5	76
3	The information in the email was easy to understand	3.9%	3	2.6%	2	15.8%	12	38.2%	29	34.2%	26	5.3%	4	76

Indiana Demand Response Portfolio

Report

Q17 - From which of the following sources have you viewed information about your household's energy consumption? (Select all that apply.)

#	Answer	%	Count
1	Monthly bill	77.9%	67
2	I&M account web portal	36.0%	31
3	A home energy management system (e.g., energy monitor)	3.5%	3
4	Another source (Please describe)	3.5%	3
5	I have not viewed information on my household's energy use	8.1%	7
	Total	100%	86

Q19 - How often do you view your household energy use information?

#	Answer	%	Count
1	More than once a month	20.5%	16
2	About once a month	60.3%	47
3	A few times a year	19.2%	15
4	Once a year	0.0%	0
	Total	100%	78

Indiana Demand Response Portfolio

Report

Q20 - Thinking about any information that you received or viewed before you decided to participate, how well did that information address any questions you had?

#	Answer	%	Count
1	Not at all	4.7%	4
2	2	5.8%	5
3	3	23.3%	20
4	4	37.2%	32
5	Completely	23.3%	20
98	Did not receive or view any information	5.8%	5
	Total	100%	86

Q21 - How satisfied are you with the number of events that occurred?

#	Answer	%	Count
1	Very dissatisfied	5.8%	5
2	Somewhat dissatisfied	11.6%	10
3	Neither satisfied nor dissatisfied	47.7%	41
4	Somewhat satisfied	22.1%	19
5	Very satisfied	12.8%	11
	Total	100%	86

Q22 - Do you think too many or too few events were called?

#	Answer	%	Count
1	Too many	7.1%	1
2	Too few	92.9%	13
	Total	100%	14

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 170 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

Indiana Demand Response Portfolio

Report

Q23 - How satisfied are you with the duration of the events?

#	Answer	%	Count
1	Very dissatisfied	4.7%	4
2	Somewhat dissatisfied	10.6%	9
3	Neither satisfied nor dissatisfied	48.2%	41
4	Somewhat satisfied	16.5%	14
5	Very satisfied	20.0%	17
	Total	100%	85

Q24 - How satisfied are you with the bill credits for reducing your electricity use during Peak Energy Use Events?

#	Answer	%	Count
1	Very dissatisfied	16.7%	14
2	Somewhat dissatisfied	22.6%	19
3	Neither satisfied nor dissatisfied	27.4%	23
4	Somewhat satisfied	26.2%	22
5	Very satisfied	7.1%	6
	Total	100%	84

Indiana Demand Response Portfolio

Report

Q25 - Overall, how satisfied are you with the iControl Program that your household is enrolled in?

#	Answer	%	Count
1	Very dissatisfied	10.7%	9
2	Somewhat dissatisfied	9.5%	8
3	Neither satisfied nor dissatisfied	32.1%	27
4	Somewhat satisfied	33.3%	28
5	Very satisfied	14.3%	12
	Total	100%	84

Q27 - Using the scale below, how likely are you to continue to participate in the iControl Program?

#	Answer	%	Count
0	0 (Not at all likely)	5.8%	5
1	1	1.2%	1
2	2	4.7%	4
3	3	2.3%	2
4	4	2.3%	2
5	5	8.1%	7
6	6	2.3%	2
7	7	5.8%	5
8	8	15.1%	13
9	9	4.7%	4
10	10 (Very likely)	47.7%	41
	Total	100%	86

Indiana Demand Response Portfolio

Report

Q28 - Using the scale below, how likely are you to try to reduce your energy use during peak events should you continue to participate in the iControl program?

#	Answer	%	Count
0	0 (Not at all likely)	0.0%	0
1	1	1.6%	1
2	2	0.0%	0
3	3	0.0%	0
4	4	1.6%	1
5	5	3.1%	2
6	6	1.6%	1
7	7	6.3%	4
8	8	10.9%	7
9	9	12.5%	8
10	10 (Very likely)	62.5%	40
	Total	100%	64

Q30 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	7.1%	6
2	Single-family house detached from any other house	72.6%	61
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	3.6%	3
4	Apartment in a building with 2 to 3 units	0.0%	0
5	Apartment in a building with 4 or more units	13.1%	11
6	Other (Specify)	3.6%	3
7	I prefer not to state	0.0%	0
	Total	100%	84

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 174 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

Indiana Demand Response Portfolio

Report

Q31 - Do you own, rent, or own and rent to someone else the property located at [Field-ADDRESS]?

#	Answer	%	Count
1	Own	78.3%	65
2	Rent	19.3%	16
3	I prefer not to state	2.4%	2
	Total	100%	83

Q32 - Is the residence located at [Field-ADDRESS]…

#	Answer	%	Count
1	Your primary residence	98.8%	83
2	A residence that you rent to someone else	0.0%	0
3	A vacation property that is not occupied year-round	0.0%	0
4	Something else	1.2%	1
	Total	100%	84

Q33 - What is the main fuel used for heating your home?

#	Answer	%	Count
1	Electricity	23.5%	20
2	Natural Gas	67.1%	57
3	Propane	2.4%	2
4	Something else (Please explain)	4.7%	4
5	Don't heat home	0.0%	0
99	Don't know/Prefer not to state	2.4%	2

Indiana Demand Response Portfolio

2023 EM&V

Report

	Total	100%	85

Indiana Demand Response Portfolio

Report

Q34 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	45.9%	39
2	Natural Gas	48.2%	41
3	Propane	0.0%	0
4	Something else (Please explain)	0.0%	0
5	Don't heat water at home	0.0%	0
99	Don't know/Prefer not to state	5.9%	5
	Total	100%	85

Q35 - What is the fuel source for your clothes dryer?

#	Answer	%	Count
1	Natural gas	23.5%	20
2	Electricity	69.4%	59
3	Propane	0.0%	0
4	Other	0.0%	0
5	I don't have a clothes dryer	4.7%	4
99	Don't know/Prefer not to state	2.4%	2
	Total	100%	85

Q36 - Do you have a Wi-Fi connect smart thermostat?

#	Answer	%	Count
1	Yes	16.5%	14
2	No	77.6%	66
99	Don't know/Prefer not to state	5.9%	5
	Total	100%	85

Indiana Demand Response Portfolio

Report

Q37 - Do you or any member of your household own or lease a plug-in electric vehicle?

#	Answer	%	Count
1	Yes	2.4%	2
2	No	97.6%	83
	Total	100%	85

Q38 - Do you have a plug-in hybrid vehicle or a battery electric vehicle?

#	Answer	%	Count
1	Plug-in hybrid	50.0%	1
2	Battery electric vehicle	50.0%	1
3	Both	0.0%	0
99	Don't know/Prefer not to state	0.0%	0
	Total	100%	2

Q39 - Do you have a swimming pool?

#	Answer	%	Count
1	Yes	5.9%	5
2	No	94.1%	80
	Total	100%	85

Indiana Demand Response Portfolio

Report

Q40 - What is the fuel source for your oven and range?

#	Answer	%	Count
1	Natural gas	41.2%	35
2	Electricity	54.1%	46
3	Propane	2.4%	2
4	Other	0.0%	0
5	I don't have an oven/range	0.0%	0
99	Don't know	2.4%	2
	Total	100%	85

Q41 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	36.5%	31
2	2	30.6%	26
3	3	12.9%	11
4	4	7.1%	6
5	5	7.1%	6
6	6	2.4%	2
7	7	0.0%	0
8	8 or more	0.0%	0
99	I prefer not to state	3.5%	3
	Total	100%	85

Indiana Michigan Power Company
Cause No. 45701
Exhibit D
Page 180 of 180

Indiana Demand Response Portfolio

2023 EM&V

Report

Q42 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than $10,000	4.7%	4
2	$10,000 to less than $20,000	11.8%	10
3	$20,000 to less than $30,000	10.6%	9
4	$30,000 to less than $40,000	22.4%	19
5	$40,000 to less than $50,000	7.1%	6
6	$50,000 to less than $75,000	8.2%	7
7	$75,000 to less than $100,000	5.9%	5
8	$100,000 to less than $150,000	4.7%	4
9	$150,000 to less than $200,000	2.4%	2
10	$200,000 or more	2.4%	2
99	I prefer not to state	20.0%	17
	Total	100%	85