2024 Indiana Demand Response Portfolio EM&V Report

Volume I of II

Prepared for:

Indiana Michigan Power

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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 2024 through December 2024 (PY2024) in Indiana.

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

In 2024, 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 PY2024 Program Status

Program	*PY2024 Program Status*
Small Business DLC	No enrollments
Work Thermostat	Inactive program
Commercial Critical Peak Pricing	No enrollments
Commercial Time-of-Use	Active program
Voluntary Curtailment Service	No enrollments
Commercial AMI Portal	Active program
Residential Critical Peak Pricing	No enrollments
Residential Time-of-Use	Active program
Home Energy Management	Active program
Residential HVAC DLC	Active program
Residential IQ Water Heater DLC	Inactive program
Residential Customer Engagement Demand Response	Active program

1.1. 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 PY2024 evaluation of I&M's DR programs.

Table 1-2 Summary of Data Collection

Survey	*Mode*	*Time Frame*	*Number of Contacts*	*Number of Completions*	*Completion Rate*
Power Rewards: Thermostats	Email	September 2024	1,270	23	1.8%
Power Rewards: Home AC	Email	September 2024	1,326	72	5.4%
Power Rewards: iControl	Email	September 2024	1,843	79	4.3%

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.
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

Program	*Tariff*	*Event Peak Demand Shed (Dispatchable DR)*	*Price Response Load Shift (Non-Dispatchable DR)*	*High-Cost Period*
	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. –LOAD MANAGEMENT-ON-PK	No	Yes	7 AM to 9 PM year-round

ADM performed EM&V activities for the portfolio of active demand response programs during PY2024. Total DR Portfolio ex post gross and ex post net energy savings are 101,750 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	18,585	18,585	18,585	46,550	250%	46,550	100%	930,994
Residential HVAC DLC	12,432	12,432	12,432	35,981	289%	35,981	100%	719,612
Residential Customer Engagement Demand Response	16,471	16,471	16,471	19,219	117%	19,219	100%	384,390
Residential Time-of-Use	-	-	-	-	N/A	-	N/A	-
Residential EV Time-of-Use	-	-	-	-	N/A	-	N/A	-
Commercial Time-of-Use	-	-	-	-	N/A	-	N/A	-
Commercial AMI Portal	-	-	-	-	N/A	-	N/A	-
Portfolio Totals	47,489	47,489	47,489	101,750	214%	101,750	100%	2,034,996

Total demand response portfolio ex post gross and ex post net peak demand savings are 7,485.58 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	4,101.00	4,101.00	4,101.00	4,585.29	112%	4,585.29	100%
Residential HVAC DLC	1,910.03	1,910.03	1,910.03	1,674.59	88%	1,674.59	100%
Residential Customer Engagement Demand Response	579.11	579.11	579.11	781.21	135%	781.21	100%
Residential Time-of-Use	147.75	147.75	147.75	211.53	143%	211.53	100%
Residential EV Time-of-Use	129.62	129.62	129.62	-	0%	-	N/A
Commercial Time-of-Use	296.15	296.15	296.15	232.96	79%	232.96	100%
Commercial AMI Portal	-	-	-	-	N/A	-	N/A
Portfolio Totals	7,163.66	7,163.66	7,163.66	7,485.58	104%	7,485.58	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 41% and 52 % 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	12	5,058	0.82	1.17	9%	52%	63% report no or slight impact
Residential HVAC DLC	12	477	0.64	0.99	10%	44%	96% report no or slight impact
Residential Customer Engagement Demand Response	9	7,016	0.07	0.14	4%	41%	Not asked due to the volitional nature of the program

1.4. Demand Response Residential Customer Segmentation Metrics

ADM developed metrics based on participation rates and incentive dollars received across various residential customer segments. These segments were created by integrating publicly available census tract-level data with customer account records, enabling classification based on specific demographic and environmental indicators.

The segmentation process involved geolocating customer premises, assigning each account to a corresponding census tract, and matching those tracts to publicly available data. This method provided indicators for characterizing customer segments and aligning them with program participation metrics.

The data sources and corresponding segmentation variables are summarized below:

- Energy Burdened Census Tracts: Sourced from the Climate and Economic Justice Screening Tool (CEJST), this variable indicates whether the average household energy cost in a census tract equals or exceeds 6% of the average household income. Tracts meeting this criterion are categorized as "Yes"; others are labeled "No."
- 50%+ of Households Below 200% FPL: Also derived from CEJST, this variable identifies census tracts where at least 50% of households fall below 200% of the Federal Poverty Level (FPL). Tracts meeting this threshold are categorized as "Yes"; others are labeled "No."

The metrics and customer segments developed through this methodology provide insights into participation trends and the distribution of incentive dollars. The metrics are defined in Table 1-8.

Table 1-8 Definitions of Metrics

Metric	*Definition*
Number of Households	The number of households is equal to the number of unique utility account numbers regardless of whether they participated in the program.
Participant Count	The number of unique utility account numbers that were enrolled in the program during the program year.
Incentive Payments	The sum of the incentive payments made by the program to the customer accounts during the program year.
Average Credit Amount	The sum of the incentive payments divided by the number of unique utility account numbers (i.e., participant count).
Share of Households Participating	The participant count divided by the number of households and expressed as a percentage.

The key findings from the analysis are as follows.

The demand response programs are reaching low income and energy-burdened households.

- The programs provided $13,441 in incentives and enrolled 132 households from customers in energy burdened census tracts.
- The programs provided $258,133 in incentives and enrolled 2,479 participants from customers in census tracts with more than 50% of households above the 200% federal poverty level.

Households in energy-burdened census tracts had lower participation rates and received smaller incentives in the HEM and HVAC DLC Programs. For example:

- HEM: 0.46% participation in energy-burdened tracts vs. 1.26% in non-energy-burdened tracts and average incentives of $242 vs. $305.
- HVAC DLC: 0.29% participation in energy-burdened tracts vs. 0.49% in non-energy-burdened tracts and average incentives of $289 vs. $307.

As discussed in greater detail below, these differences may be due to differences in the types of equipment that households own, namely, households in higher income and less energy burdened areas may be more likely to have smart thermostats and central air conditioners.

The iControl program showed smaller differences in participation rates and incentive amounts across customer segments, likely due to the flexibility in achieving demand reductions. The participation rate difference between energy-burdened and non-energy-burdened census tracts was similar to that of the HVAC DLC program but smaller than for the HEM. Among

the three programs, iControl had the smallest participation gap between lower- and higher-income tracts.

The following summarizes the key findings for the three residential demand response programs. [1]

1.4.1. HEM (Home Energy Management)

HEM participation rates and average credit amounts are higher in non-energy burdened tracts and in areas with lower percentages of households below 200% of the federal poverty level. Participation rates may be influenced by lower adoption rates of smart thermostats among lower-income households. For example, in Indiana, 12% of households with incomes over $60,000 per year have a smart thermostat, compared to 5% of households with lower incomes.[2] Additionally, lower incentive amounts in energy burdened census tracts may result from smaller demand reductions, as these households are more likely to have air conditioning systems with smaller capacity.

Table 1-9 Home Energy Management Customer Segmentation Summary

Metric	*Energy Burdened Census Tracts*	*Number of Households*	*Participant Count*	*Incentive Payments*	*Average Credit Amount*	*Share of Households Participating*
Energy Burdened Census Tracts	Yes	7,677	35	$7,910	$226	0.46%
	No	489,896	6,155	$1,673,052	$272	1.26%
50% + of Households Below 200% FPL	Yes	101,210	550	$139,260	$253	0.54%
	No	396,363	5,640	$1,541,702	$273	1.42%

* Higher scores indicate greater environmental challenges and population vulnerability.

Key points are:

- Energy Burdened Census Tracts:
  - 35 households participated out of 7,677, resulting in a participation rate of 0.46%.
  - Total incentive payments were $7,910, with an average credit amount of $226 per participant.
- Non-Energy Burdened Census Tracts:
  - 6,155 households participated out of 489,896, resulting in a participation rate of 1.26%.
  - Total incentive payments were $1,673,052, with an average credit amount of $272 per participant.

[1] We note that 2.4% of demand response participant accounts did not match to accounts listed in the segmentation file, which resulted in an underestimate of total incentive payments.

[2] Analysis of 2020 Residential Energy Consumption Survey (RECS).

- 50%+ of Households Below 200% FPL:
  - 550 households participated out of 101,210, resulting in a participation rate of 0.54%.
  - Total incentive payments were $139,260, with an average credit amount of $253 per participant.
- Less than 50% of Households Below 200% FPL:
  - 5,640 households participated out of 396,363, resulting in a participation rate of 1.42%.
  - Total incentive payments were $1,541,702, with an average credit amount of $273 per participant.

1.4.2. HVAC DLC (Heating, Ventilation, and Air Conditioning Direct Load Control)

Participation rates and average credit amounts are lower in energy burdened tracts and in areas with higher percentages of households below 200% of the federal poverty level. Barriers to participation among lower-income households may include lower ownership rates of central air conditioning systems. For example, in Indiana, 93% of households with incomes over $60,000 per year have central air conditioning, compared to 70% of households with lower incomes.[3]

Table 1-10 HVAC DLC Customer Segmentation Summary

Metric	*Energy Burdened Census Tracts*	*Number of Households*	*Participant Count*	*Incentive Payments*	*Average Credit Amount*	*Share of Households Participating*
Energy Burdened Census Tracts	Yes	7,677	22	$5,330	$242	0.29%
	No	489,896	2,391	$728,290	$305	0.49%
50% + of Households Below 200% FPL	Yes	101,210	397	$114,929	$289	0.39%
	No	396,363	2,016	$618,691	$307	0.51%

* Higher scores indicate greater environmental challenges and population vulnerability.

Key points are:

- Energy Burdened Census Tracts:
  - 22 households participated out of 7,677, resulting in a participation rate of 0.29%.
  - Total incentive payments were $5,330, with an average credit amount of $242 per participant.
- Non-Energy Burdened Census Tracts:

[3] Analysis of 2020 Residential Energy Consumption Survey (RECS).

- 2,391 households participated out of 489,896, resulting in a participation rate of 0.49%.
- Total incentive payments were $728,290, with an average credit amount of $305 per participant.

- 50%+ of Households Below 200% FPL:
  - 397 households participated out of 101,210, resulting in a participation rate of 0.39%.
  - Total incentive payments were $114,929, with an average credit amount of $289 per participant.

- Less than 50% of Households Below 200% FPL:
  - 2,016 households participated out of 396,363, resulting in a participation rate of 0.51%.
  - Total incentive payments were $618,691, with an average credit amount of $307 per participant.

1.4.3. iControl

Participation rates and credit amounts are similar across energy burdened and non-energy burdened census tracts, as well as across areas with higher and lower percentages of low-income households. The absence of specific equipment requirements for iControl may have contributed to the consistent participation rates. Additionally, the program's use of heterogeneous demand reduction strategies may have minimized differences in reductions achieved across these census tract groups.

Table 1-11 iControl Customer Segmentation Summary

Metric	*Energy Burdened Census Tracts*	*Number of Households*	*Participant Count*	*Incentive Payments*	*Average Credit Amount*	*Share of Households Participating*
Energy Burdened Census Tracts	Yes	7,677	75	$200	$3	0.98%
	No	489,896	8,599	$25,968	$3	1.76%
50% + of Households Below 200% FPL	Yes	101,210	1,532	$3,944	$3	1.51%
	No	396,363	7,142	$22,224	$3	1.80%

* Higher scores indicate greater environmental challenges and population vulnerability.

Key points are:

- Energy Burdened Census Tracts:
  - 75 households participated out of 7,677, resulting in a participation rate of 0.98%.

- Total incentive payments were $200 with an average credit amount of $3 per participant.

- Non-Energy Burdened Census Tracts:
  - 8,599 households participated out of 489,896, resulting in a participation rate of 1.76%.
  - Total incentive payments were $25,968, with an average credit amount of $3 per participant.

- 50%+ of Households Below 200% FPL:
  - 1,532 households participated out of 101,210, resulting in a participation rate of 1.51%.
  - Total incentive payments were $3,944, with an average credit amount of $3 per participant.

- Less than 50% of Households Below 200% FPL:
  - 7,142 households participated out of 396,363, resulting in a participation rate of 1.80%.
  - Total incentive payments were $22,224, with an average credit amount of $3 per participant.

1.5. Demand Response Emission Reductions

ADM estimated the emission reduction benefits of the demand response (DR) programs using tools provided by the U.S. Environmental Protection Agency (EPA). The methodology consisted of two primary steps: quantifying emission reductions and monetizing their value.

To estimate emission reductions, ADM utilized the EPA's AVERT (Avoided Emissions and Generation Tool).[4] AVERT performs regional analyses by grouping areas according to grid balancing authorities. For this analysis, ADM referenced the Mid-Atlantic region to align with the geographic area served by the DR programs.

ADM calculated emission reductions by summing the total demand reductions achieved by the four demand response programs during the hour and day of each event. Since AVERT uses historical data from 2023, ADM mapped 2024 event dates to corresponding 2023 dates based on the day of the week. For example, Tuesday, June 18, 2024, was mapped to Tuesday, June 20, 2023, to ensure consistency in the day of the week of the impacts.

ADM monetized the health impacts of emission reductions using the EPA's COBRA (Co-Benefits Risk Assessment Health Impacts Screening and Mapping Tool).[5] COBRA estimates the value of

[4] https://www.epa.gov/avert

[5] https://www.epa.gov/cobra

health benefits associated with reductions in these pollutants: SO_2, NO_x, CO_2, $PM_{2.5}$, VOCs, and NH_3. In applying COBRA, ADM used a 2% discount rate to calculate the present value of these health benefits.

The value of CO_2 reductions was monetized separately using the EPA's 2020 estimate of the social cost of carbon (SCC), which is $190 per metric ton at a 2% discount rate.[6] ADM acknowledges that SCC values can vary significantly depending on assumptions, with estimates ranging from $10 to $800 per ton. This variability underscores the importance of considering different scenarios when interpreting results.

The emission impacts and monetized benefits were allocated to the individual programs based on each program's share of the hourly impacts. The emission reductions are summarized in Table 1-12 and the monetized value of the emission impacts are summarized in Table 1-13.

Table 1-12 Summary of Emission Reductions

Emissions (lb)	*Total Emission Impacts from DR Programs*	*HEM*	*HVAC DLC*	*Customer Engagement*	*Small Business DLC*
SO2	-80	-36.6	-28.3	-15.1	0.0
NOX	-80	-36.6	-28.3	-15.1	0.0
Ozone season NOx	-80	-36.6	-28.3	-15.1	0.0
CO2	-161,330	-73,807.2	-57,049.3	-30,473.6	0.0
PM2.5	>0	-4.6	-3.5	-1.9	0.0
VOCs	>0	>0	>0	>0	>0
NH3	>0	>0	>0	>0	>0

Note: AVERT rounds impacts to the nearest 10 units. Values of >0 indicate non-zero results, but within +/- 10 units.

Table 1-13 Monetized Emission Impacts

Benefit	*Total Emission Impacts from DR Programs*	*HEM*	*HVAC DLC*	*Customer Engagement*
Total Health Effects from PM2.5	$5,700	$2,608	$2,016	$1,077
Total Health Effects from O3	$2,600	$1,189	$919	$491
CO2 Reduction Valuation @ $190 per metric ton	$13,904	$6,361	$4,917	$2,626
Total Value of Emission Reductions	$22,204	$10,158	$7,852	$4,194

[6] U.S. Environmental Protection Agency. (2023). Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances. Washington, DC: National Center for Environmental Economics, Office of Policy; Climate Change Division, Office of Air and Radiation.

1.6. Load Shifting Metrics

For each time-of-use program, Table 1-14 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 1-14 Load Shifting Program Metrics

Program	*kWh*	*kWh per Enrolled Account*
Commercial Time-of-Use Program	829,312	1,819
Residential Time-of-Use	661,913	444

1.7. Evaluation Findings and Recommendations

1.7.1. Commercial Time-of-Use

The account population decreased from 479 in 2023 to 456 in 2024, accompanied by a reduction in kW savings from 397.35 to 232.96. Similarly, the annualized on-peak kWh savings declined from 1,397,959 to 829,312.

- **Recommendation 1 (Applicable to Residential and Commercial Time of Use). Consider using customer analytics to identify and target marketing of the TOU rate plans to increase enrollment.**
  - Identify customers who have high energy consumption during peak pricing periods but exhibit variability in usage patterns across different days or weeks.
  - Customers with fluctuating peak-period usage may have some discretionary load that can be shifted.
  - Encourage these customers to enroll in the TOU rate and shift energy use to off-peak hours.

1.7.2. Commercial AMI Portal

Despite improvements in the data on portal interactions, we did not find evidence that the portal led to energy savings. ADM analyzed the effects of email communications, overall portal interactions, and interactions with specific widgets, and none of the analyses indicated that the service resulted in a decrease in energy use.

Customers interacting with the portal appear to derive value from it, as indicated by the ratio of interactions to unique accounts. Portal data shows that, on average, customers engage with several widgets hundreds of times per year. This frequency suggests they find the information valuable. The data also show that a relatively small share of customers are interacting with the portal.

1.7.3. Residential Time-of-Use

The account population grew from 783 in 2023 to 1,492 in 2024, while kW savings increased from 177.17 to 211.53. Similarly, the annualized on-peak kWh savings rose from 593,017 to 661,913.

1.7.4. Home Energy Management

Most participants reported satisfaction with the program, though some raised concerns about comfort, challenges with unenrollment, and thermostat issues, such as failure to return to normal settings after events. While dissatisfaction was limited to a minority, these findings highlight opportunities to improve aspects of the participant's experience.

Most participants enrolled for the financial benefits of earning bill credits and saving on energy costs. These reasons were cited by 78% and 57% of respondents, respectively, with smaller shares of respondents participating to reduce energy use for environmental reasons (35%), because of an I&M recommendation (26%), or the opportunity to participate in a program (26%).

Survey respondents point to ways that the information provided to customers about the program could be improved. While most survey respondents (65%) indicated that the information they sought out either completely or mostly addressed their questions, some indicated a preference for more information on how to unenroll, how much their thermostat temperature setting would change during an event, and on how the program might impact their overall costs.

Overall, the program's impact on comfort was relatively modest, with a majority of participants reporting no to moderate discomfort during Peak Energy Use Events. Comfort levels varied: 25% experienced no effect, 38% felt slight discomfort, 31% had moderate discomfort, and 6% reported significant discomfort.

1.7.5. Residential HVAC DLC

Direct to customer communications in the form of emails, mailers, and phone calls drove enrollments in the program. Eighty-nine percent of respondents learned about the program from one of these outreach approaches, with emails and mailers accounting for 73% of enrollments.

The information provided about the program met most participants needs. Sixty-eight percent reported that the information completely or mostly met their needs, while a few participants said it mostly did not meet their needs.

Most participants experienced minimal comfort impacts. Ninety-six reported no or minimal discomfort during events. Similarly, 65% were unaware of how long events lasted and 29% thought the duration of events was appropriate.

Participants were generally satisfied with the program overall. Sixty-three percent were somewhat or very satisfied with the program overall while a minority, 9%, expressed some dissatisfaction with the program.

1.7.6. Residential Customer Engagement Demand Response

The survey results indicate that event notification procedure is working well. A small share of respondents reported that they did not receive notification (6%). Most respondents received the notifications by email, text, or both.

Most respondents engaged in the program and tried to reduce energy during the events. Thirty-three percent of respondents reduced energy usage for all notified Peak Energy Use Events, 35% participated in most, 10% in half, 13% in less than half, and 9% did not take any steps to reduce energy. Most reasons for not taking action were unrelated to program actions, involving external issues like being away from home, forgetting to take action, weather, and other personal factors. A few participants mentioned not receiving enough notice or feeling that the incentives were insufficient to motivate action.

Participants are reading the post-event emails to see their results. Sixty-eight percent of participants reported reading all post-event emails detailing their earnings and energy consumption, while 17% read some of the emails.

Participants had varied opinions of the amount of bill credits they received. Twenty-six percent thought the bill credits were about right, 40% thought they were too low, and 26% did not have an opinion or did not know the amount of credit they received. These results were similar to the 2023 results.

Most participants rely on their monthly bill to track energy consumption, with occasional use of the I&M portal. Some participants check their usage infrequently throughout the year. Engagement with the I&M account portal remains relatively low, with only 38% of respondents reporting they use it. The portal provides hourly energy consumption data, which could help customers identify and adjust their usage during peak events. However, limited engagement with the portal suggests that many customers may not be aware of or know how to leverage this data to manage their energy use effectively.

- **Recommendation 1. To enhance the impact of the program, I&M could provide targeted education or in-portal guidance on how customers can use their hourly**

energy data to identify and reduce peak-period consumption. This could include interactive tutorials, alerts for high-usage periods, or examples of effective load-shifting strategies. Increasing customer awareness and usability of the portal's features may help drive greater participation in demand response efforts. For example, communications upon enrollment or in advance of the peak period season, could suggest that participants use the portal to develop strategies to reduce energy use during events. The guidance could suggest that customers:

- Review Your Typical Usage Patterns – Log into the portal and look at your past energy consumption, focusing on the same time of day that the peak event is scheduled for. This can help you see what appliances or activities contribute to high usage during that period.
- Identify High-Usage Appliances or Activities – If you see a spike in usage during the peak event hours, consider what could be causing it. For example, if you see high usage in the early evening, it might be your HVAC system, electric water heater, oven, or laundry.
- Plan Load-Reduction Strategies – Based on your findings, take steps to reduce your consumption during the event:
  - *Adjust Thermostat Settings – If your HVAC contributes significantly to your usage, pre-cool or pre-heat your home before the event and set the thermostat higher/lower during the peak period.*
  - *Shift Energy-Intensive Tasks – Reschedule activities like laundry, dishwashing, or cooking to earlier or later in the day.*
  - *Turn Off or Unplug Devices – If you notice that electronics, lights, or standby appliances are using power unnecessarily, make sure to turn them off or unplug them.*
  - *Use Alternative Cooking Methods – If your oven or stove is typically a major energy consumer during the peak period, opt for a microwave, slow cooker, or outdoor grill instead.*

1.8. 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 2024 program year. Volume I is organized as follows:

- Chapter 2: Small Business DLC
- Chapter 3: Commercial Water Heater DLC

- Chapter 4: Commercial Critical Peak Pricing
- Chapter 5: Commercial Time-of-Use
- Chapter 6: Voluntary Curtailment Service
- Chapter 7: Commercial AMI Portal
- Chapter 8: Residential Critical Peak Pricing
- Chapter 9: Residential Time-of-Use
- Chapter 10: Home Energy Management
- Chapter 11: Residential HVAC DLC
- Chapter 13: Residential IQ Water Heater DLC
- Chapter 14: 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 2024 through December 2024.

2.1. Program Description

The Commercial Small Business DLC Program is offered to small commercial I&M customers with an AMI meter.

Through this program, I&M will install a Pelican Wireless Energy Management System at no cost to customers. This system will enable I&M to make small adjustments to customers' air conditioner during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers earn a $1.95 bill credit for each event.

There were no customers enrolled in the Small Business DLC Program in PY2024.

3. Work Water Heater

This chapter presents the evaluation for the Work Water Heater Program that Indiana Michigan Power (I&M) is offering to its commercial customers during the period of January 2024 through December 2024.

3.1. Program Description

The Work Water Heater Program is offered to commercial I&M customers with an AMI meter.

Through this program, I&M will install a small device on participating customers' water heater that will stop electricity consumption during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers earn a $1.95 bill credit for each event.

I&M did not operate the Work Water Heater Program in PY2024.

4. Commercial Critical Peak Pricing

This chapter presents the evaluation of the Commercial Critical Peak Pricing Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2024 through December 2024.

4.1. Program Description

The Commercial Critical Peak Pricing Program is designed to motivate, through price response, general service customers to either manage the timing of, or to conserve, usage during I&M and PJM peak and critical peak hour periods.

The program offers participants seasonally tiered on peak electricity pricing and Critical Peak period pricing for demand response events to encourage customers to:

- Reduce usage during these high-cost periods (e.g., manage thermostat settings to decrease air conditioner run time),
- Shift usage to lower priced periods or to off peak periods set forth in the pricing structure of the CPP tariff, or
- Conserve usage during high-cost periods (e.g., change appliance settings to ‘off” to eliminate appliance energy use for the peak or high-cost periods).

Commercial Critical Peak Pricing is available to certain I&M Indiana commercial General Service tariff customers that have an advanced meter (i.e., AMI meter) installed.

Customers enrolled in the Commercial Critical Peak Pricing Program are subject to the pricing provisions set forth in the Commercial Critical Peak Pricing tariff. Customers must determine their own level of engagement in the CPP pricing tiers but can use tools provided by I&M through the AMI Data Portal to educate and inform themselves on their individual usage level and timing.

I&M may call Critical Peak events during a specified time period (e.g., 3 p.m. to 6 p.m. on a hot summer weekday) when it anticipates, or experiences high power system loads and/or emergency system conditions. During Critical Peak Events, Critical Peak Hours pricing applies, where the price for electricity during Critical Peak event hours is substantially higher than non-Critical Peak periods (i.e. all other pricing tiers set forth in Commercial Critical Peak Pricing).

No more than fifteen events will occur in a year. Events will be less than five hours per day.

Since Commercial Critical Peak Pricing electricity pricing is peak period focused and inherently encourages customers to take responsive action to reduce Critical Peak Hours usage, higher demand savings result during Critical Peak Events when compared to reductions during other Commercial Critical Peak Pricing cost tier periods.

Table 4-1 Summary of Commercial Peak Pricing Tariff (GS – CPP, Tariff Code 260)

Winter (Off Peak Season) Months: October 1 through April 30	*Billing Hours*	*Rates*
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	*Billing Hours*	*Rates*
Monthly Service Charge		$24.65
		Energy Charges (¢ per kWh)
Low-Cost Hours	Midnight – 7 AM and 9 PM - Midnight	5.906
Medium-Cost Hours	Cost Hours 7 AM – 1 PM and 7 PM – 9 PM	6.032
High-Cost Hours	1 PM – 7 PM	24.417
Critical Peak Hours	When Notified	49.3

There were no customers enrolled in the Commercial Critical Peak Pricing Program in PY2024.

5. Commercial Time-of-Use

This chapter presents the evaluation of the Commercial Time-of-Use Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2024 through December 2024.

5.1. Program Description

The Commercial Time-of-Use Program is available to General Service and Large General Service customers with an AMI meter who:

- Have 12-month average demands less than 10 kW (Tariff G.S. – TOD2).
- Have plug-in electric vehicles (PEV) (Tariff G.S – PES).
- Have 12-month average demand of less than 1,000 kW (Tariff L.G.S. – TOD).

The program is intended to shift customer energy usage from high-cost periods to low-cost periods.

The Commercial Time of Use Program includes three tariffs with variable time-of-day pricing, as summarized in Table 5-1.

Table 5-1 Summary of Commercial Time of Use Tariffs

Tariff Code	*Tariff Description*	*Price Information*
219	TARIFF G.S. – PEV (Stand-alone PEV Service)	All PEV Off – Peak kWh 7.36 ¢ per kWh All PEV On – Peak kWh 12.512 ¢ per kWh For the purpose of this tariff, the daily on-peak billing period is defined as 6 a.m. to 11 p.m. Off-peak billing period is defined as those hours not designated as on-peak hours
221	TARIFF G.S. – TOD2	Energy Charge: 10.440 ¢ per kWh for all low-cost hours 23.411 ¢ per kWh for all high-cost hours May through September, 2 PM to 6 PM on weekdays

Tariff Code	*Tariff Description*	*Price Information*
220	TARIFF G.S. – PEV (Submetered PEV Time-of-Day)	-3.362 ¢ (Credit) per kWh Off-Peak $ 1.58 second meter charge if monthly PEV use is < 250 kWh For the purpose of this tariff, the daily on-peak billing period is defined as 6 a.m. to 11 p.m. Off-peak billing period is defined as those hours not designated as on-peak hours.
255	Tariff L.G.S. – TOD (Primary)	On-Peak kWh 8.320 ¢ per kWh Off-Peak kWh 4.991 ¢ per kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.
253	Tariff L.G.S. – TOD (Secondary)	On-Peak kWh 9.540 ¢ per kWh Off-Peak kWh 5.371 ¢ per kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.

5.2. Data Collection

Data used to support the impact evaluation of the program included customer AMI interval electric energy usage data and associated tariff code.

5.3. Estimation of Ex Post Load Impact

5.3.1. Methodology for Estimating Ex Post Load Impact

This section outlines the methodological framework for assessing the effects of I&M's time-of-use (TOU) rate pricing on the distribution of energy usage between on-peak and off-peak periods. Given the challenges posed by insufficient pre-treatment data and the absence of an established treatment group, we used a quasi-experimental design with a matched control group. This control group served to establish a baseline for comparison, enabling the assessment of the impact of Time-of-Use (TOU) rates on energy consumption behaviors.

To establish a robust control group, we employed a distance matching approach. This method involves matching each account subject to TOU pricing (treatment group) with multiple non-TOU rate accounts (control group) based on their energy usage characteristics.

The variables for matching include:

- **kWh_total:** Mean daily kWh usage during the months the on-peak period applies, providing a baseline comparison of overall energy consumption.
- **kWh_total_month_j:** Mean daily kWh usage for each month j during the on-peak period, allowing for a comparison that accounts for monthly variations in energy usage.

The distance between each treatment account and potential control accounts is calculated using the following formula:

Distance = ((kWh_total_treatment - kWh_total_i)^2 + Σ(kWh_total_treatment_monthj - kWh_total_monthj_i)^2)^.5

This Euclidean distance serves as the basis for identifying the closest matches, ensuring comparability between treatment and control groups across observed aggregate energy usage characteristics.

For each treatment account, the five control accounts with the minimum distance are selected. This process aims to create a well-matched control group that mirrors the treatment group's characteristics as closely as possible, thus facilitating a more accurate estimation of the TOU pricing impact.

The analysis is predicated on two critical assumptions:

- **Shift in Energy Usage:** TOU rates are assumed to cause a shift in energy consumption from on-peak to off-peak periods without significantly altering the aggregate energy usage.
- **Absence of Self-Selection Bias:** It is assumed that individuals do not self-select into TOU rates based on their predisposition towards off-peak energy consumption.

5.3.1.1. Effective Useful Life and Incremental Costs

A lifetime of 20 years is applied to program energy impact, consistent with the applicable program type referenced in the most recent I&M demand response market potential study.

No incremental costs are incurred as a result of program participation.

5.3.2. Results of Ex Post Gross Load Impact

This section presents the ex post annual gross energy savings and ex post gross demand reductions associated with the 2024 Commercial Time-of-Use Program.

5.3.2.1. Load Impact Results

Table 5-2 presents the load impacts resulting from the Commercial Time-of-Use (TOU) Program, with results broken down according to each specific on-peak schedule. Over 98% of commercial TOU customer accounts fall under tariffs 253 and 255. On average, the hourly energy consumption during on-peak periods for the treatment group was 4.5% lower than that of the control group. In

the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 829,312 kWh.

This reduction of 829,312 kWh represents the estimated annual energy usage that occurred during off-peak periods, which would have otherwise been consumed during on-peak periods if the treatment group exhibited similar consumption patterns to the control group.

Table 5-2 Commercial Time-of-Use Program-level Load Impacts

Variable	*Time of Day*	*Group*	*Tariff 253 & 255*	*Tariff 221*	*Tariff 219 & 220*	*Total*
Average Hourly kWh Consumption	On-Peak	Treatment	10.89	2.20	0.06	n/a
		Control	11.41	1.63	0.30	n/a
	Off-Peak	Treatment	8.95	1.57	0.75	n/a
		Control	8.22	1.69	0.19	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.52	(0.57)	0.23	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			4.6%	-35.2%	78.9%	4.5%
Annualized Population Difference in Average kWh On-Peak Consumption			828,319	(1,010)	2,003	829,312
Account Population			450	4	2	456
Ex Post kW Savings			234.78	(2.29)	0.47	232.96

5.3.2.2. Ex Post Gross kW Savings

Table 5-3 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 5-3 Program-level Gross kW Reduction

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*
296.15	296.15	296.15	232.96	79%	232.96	100%

5.4. Estimation of Ex Post Load Impact

5.4.1. Methodology for Estimating Net Ex Post Load Impact

The kW and kWh savings estimated using the procedures outlined in Section 5.3 are net savings estimates.

5.4.2. Results of Ex Post Net Load Impact

Table 5-4 summarizes the ex post annual net kWh and kW savings of the Commercial Time-of-Use Program. The annual net savings totaled 0 kWh and 232.96 kW.

Table 5-4 Program-Level Annual Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	-	296.15
Gross Audited Savings	-	296.15
Gross Verified Savings	-	296.15
Ex Post Gross Savings	-	232.96
Gross Realization Rate	n/a	79%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	232.96
Net-to-Gross Ratio	n/a	100%
Ex Post Net Lifetime Savings	-	n/a

5.5. Findings and Recommendations

The account population decreased from 479 in 2023 to 456 in 2024, accompanied by a reduction in kW savings from 397.35 to 232.96. Similarly, the annualized on-peak kWh savings declined from 1,397,959 to 829,312.

- **Recommendation 1. Consider using customer analytics to identify and target marketing of the TOU rate plans to increase enrollment.**
  - Identify customers who have high energy consumption during peak pricing periods but exhibit variability in usage patterns across different days or weeks.
  - Customers with fluctuating peak-period usage may have some discretionary load that can be shifted.
  - Encourage these customers to enroll in the TOU rate and shift energy use to off-peak hours.

6. Voluntary Curtailment Service

This chapter presents the evaluation of the Voluntary Curtailment Service Program that Indiana Michigan Power (I&M) offered its commercial customers during the period of January 2024 through December 2024.

6.1. Program Description

The Voluntary Curtailment Service Program provides customers with the opportunity to reduce their cost of electric service by curtailing usage during Voluntary Curtailment Events requested by I&M. Upon each event, the customer has the option, but not the obligation, to curtail usage at their premises and be compensated for reducing their usage.

The Voluntary Curtailment Service Program is available to customers with a curtailable usage of at least 1,000 kW for a single account. Customers that participate in a third-party demand response program or who are receiving competitive energy services from a Curtailment Service Provider or aggregator are not eligible.

For each Voluntary Curtailment Event, Curtailed Demand is defined as the difference between the Customer's Average On-Peak Demand and the maximum sixty (60)-minute integrated demand in kW during the Voluntary Curtailment Event, and not less than zero. I&M reviews customer usage on Voluntary Curtailment Event day(s) and the non-event day immediately prior to Voluntary Curtailment Event day(s) and based on that review, issues curtailment credits any amount of customer usage reduced. The amount of the credit is the product of the curtailed demand and the number of voluntary curtailment event hours and the voluntary curtailment price, summed for each event in the calendar month.

I&M determines the Customer's Average On-Peak Demand in kW as specified in a contract addendum for service under this Rider. The Customer's Average On-Peak Demand will be reviewed at least annually. Annual, seasonal or monthly Average On-Peak Demands may be established based upon Customer's historic usage patterns. For the purpose of determining the Average On-Peak Demand, the on-peak period is defined as 7:00 a.m. to 11:00 p.m. ET for all weekdays, Monday through Friday.

There were no customers enrolled in the Voluntary Curtailment Service Program in PY2024.

7. Commercial AMI Portal

This chapter presents the results of both the impact and process evaluations of the 2024 Commercial AMI Portal that Indiana Michigan Power (I&M) offered to its commercial customers during the period of January 2024 through December 2024.

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.

7.1. 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. Evaluation Objectives

The objectives of the evaluation are to:

- Estimate the achieved demand reduction (kW) in summer 2024;
- Estimate energy (kWh) impacts associated with demand response events, inclusive of shoulder periods;
- Provide recommendations for program improvement as appropriate.

7.2. Data Collection

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

- Records of emails sent to customer. ADM requires records of each email sent with the following data:

1. The account number the email was sent to.
2. The date the email was sent.
3. The email label that indicates the type of email sent (e.g., FORECASTED_USAGE_ALERT, _ENERGY_USAGE_ACCOUNT_ALERT).

- Records of AMI portal interactions. ADM received data that included counts of account interactions with the different portal widgets. The data contained records of counts of interactions for each month for each account.

In addition to the portal records, ADM also used the following data sources.

- Customer AMI billing data;
- Customer monthly billing data;
- Location specific weather data; and
- Data from relevant secondary sources.

7.3. Estimation of Ex Post Net Savings

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

7.3.1. Methodology for Estimating Ex Post Net Energy Savings

7.3.1.1. Review of Program Data

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 7-1, most email communications contained a forecasted usage alert and a monthly energy usage alert.

Table 7-1 Summary of Email Communication Types

Email Type	*Number of Communications*	*Count of Unique Customers Receiving*
Monthly Energy Usage Account Alert	5,865	1,448
Forecasted Usage Alert	1,069	357
Weekly Energy Usage Alert	93	5

Table 7-2 summarizes the interactions with the portal widgets. We note that the number of total interactions reported were much greater than the count of unique accounts interacting with the portal, indicating that customers are interacting with the portal many times. However, a limited number of customers are interacting with the portal.

Table 7-2 Summary of Portal Interactions

Widget	*Total Interactions*	*Unique Accounts Interacting*
Bill Comparison	179,442	7,504
Cost And Usage Trends	144,448	2,184
Bill Over Time	14,444	1,270
Annual Demand Intensity	126,779	867
Annual End Use	131,244	867
My Usage Schedule	131,064	867
My Usage Weather Impact	131,232	867
My Usage Ytd	131,246	867
Peer Comparison	131,229	867
Buildings Business Profile	64	45
Portfolio Analyzer	13	9
Saving	10	7
Portfolio Bill Comparison	1	1

7.3.1.2. 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 7-3 Definition of Treatment Group and Customer Counts

Data Type	*Cohort Name*	*Treatment Group Description*	*Count of Customers in the Treatment Group (Sampled Cases)*	*Count of Customers in the Control Group*
AMI	Email	Customers that received an email.	376	130
	Accessed portal	Customers that accessed the AMI portal.	2,488	1,151
Monthly	Email	Customers that received an email.	533	532
	Accessed portal	Customers that accessed the AMI portal.	4,381	4,385

7.3.1.2.1. 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 7-1. The CDD/HDD base value combination that produced the highest adjusted R-square value was the CDD/HDD value used for that participant.

Equation 7-1 Cooling and Heating Degree Optimization Regression Model

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

Table 7-4 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.

7.3.1.2.2. 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 7-2 specifies the regression model.

Equation 7-2 Difference-in-Difference (DiD)Model

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

Table 7-5 Difference-in-Difference (DiD) Model Terms

Variable	*Definition*
$\mathrm{kWh_{imy}}$	Customer i's average daily electric usage in month m of year y.
β_0	The intercept term.
B_1	The coefficient for the main effect of post.
B_2	The coefficient for the main effect of treatment.
B_m	A matrix of coefficients for the main effect of month.
B_{hdd}	The coefficient for the main effect of HDD.
B_{cdd}	The coefficient for the main effect of CDD.
B_t	The coefficient for the post-treatment interaction.
$B_{t,hdd}$	The coefficient for the post-treatment-HDD interaction.
$B_{t,cdd}$	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.

7.3.1.2.3. 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 7-3 specifies the PPR regression model.

Equation 7-3 Post Period Regression (PPR) Model

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

Table 7-6 Post Period Regression Model Terms

Variable	*Definition*
$\mathrm{kWh_{imy}}$	Customer i's average daily electric usage in month m of year y.
β_0	The intercept term.
B_m	A matrix of coefficients for the main effect of month.
B_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.
B_{hdd}	The coefficient for the main effect of HDD.
B_{cdd}	The coefficient for the main effect of CDD.
B_t	The coefficient for the main effect of treatment.
$B_{t,hdd}$	The coefficient for the treatment-HDD interaction.
$B_{t,cdd}$	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.

7.3.1.3. Regression Model Findings

Table 7-7 presents the findings from the regression analyses. One model identified a statistically significant relationship between portal service use and energy consumption. The results suggest that customers who accessed the portal used more energy than those in the control group. This effect may be due to self-selection—customers experiencing higher energy use may have accessed the portal widgets in an effort to manage their consumption.

Table 7-7 Summary of Regression Results

Data Type	*Cohort*	*Model*	*Annual Savings*	*90% Confidence Interval*	*Statistically Significant*	*Estimate of Effect on Energy Use*
AMI	Email	DiD	5,835	-1,266 / 12,937	No	
	Email	PPR	5,317	-5,216 / 15,851	No	
	Accessed portal	DiD	-4,691	-8,736 / -645	Yes	Associated with increased energy use
	Accessed portal	PPR	-5,592	-19,398 / 8,213	No	
Monthly	Email	DiD	-4,144	-22,387 / 14,100	No	
	Email	PPR	3,226	-27,827 / 34,280	No	
	Accessed portal	DiD	-2,087	-7,432 / 3,259	No	
	Accessed portal	PPR	-2,464	-10,964 / 6,035	No	

7.3.1.4. Analysis of Portal Interactions

ADM received detailed data on account interactions with various portal widgets. We analyzed these records to assess whether interactions with the portal were associated with changes in energy use. We conducted these analyses using both monthly data and AMI data. Consistent with our approach for analyzing portal use and emails, we applied a difference-in-differences model and a post-period regression model. We used propensity score modeling to develop a matched comparison group.

Our analysis considered portal interactions in two ways. First, we examined groups of customers who interacted with only a single widget (referred to as mutually exclusive interactions below). Second, we evaluated the relationship between portal interactions and energy use among customers who may have interacted with a given widget as well as others.

For example, Table 7-8 presents results for three groups of portal interactions:

- bill.comparison
- bill.comparison/bill.over.time/cost.and.usage.trends
- bill.comparison/cost.and.usage.trends

In this table, the treatment group for the bill.comparison category consists of customers who interacted only with that widget and did not use the other widgets listed in the other group descriptions.

In contrast, Table 7-9 presents results for treatment groups in which customers may have interacted with multiple widgets, meaning they were not restricted to mutually exclusive interactions.

Table 7-8 and Table 7-9 present the results. As shown, we did not find any cases where portal interactions were associated with a statistically significant decrease in energy use.

Table 7-8 Interactions with Portal (Mutually Exclusive Interactions)

Data Type	*Portal Interaction*	*Model*	*Annual Savings*	*90% Confidence Interval*	*Statistically Significant*	*Estimate of Effect on Energy Use*	*Count of Customers in Treatment Group*	*Count of Customers in Control Group*
Monthly	bill.comparison	DiD	-2,136	-6,911 / 2,639	No		2,630	1,782
	bill.comparison	PPR	-848	-7,958 / 6,261	No		2,630	1,782
	bill.comparison/bill.over.time/cost.and.usage.trends	DiD	-9,069	-25,559 / 7,422	No		503	444
	bill.comparison/bill.over.time/cost.and.usage.trends	PPR	-9,295	-22,523 / 3,933	No		503	444
	bill.comparison/cost.and.usage.trends	DiD	3,867	-4,344 / 12,079	No		368	347
	bill.comparison/cost.and.usage.trends	PPR	4,656	-2,758 / 12,070	No		368	347
AMI	bill.comparison	DiD	-5,693	-8,151 / -3,234	Yes	Increased energy use	1,341	821
	bill.comparison	PPR	-4,926	-11,743 / 1,891	No		1,341	821
	bill.comparison/bill.over.time/cost.and.usage.trends	DiD	-21,186	-30,102 / -12,270	Yes	Increased energy use	311	263
	bill.comparison/bill.over.time/cost.and.usage.trends	PPR	-16,061	-36,953 / 4,832	No		311	263
	bill.comparison/cost.and.usage.trends	DiD	268	-2,291 / 2,827	No		259	236
	bill.comparison/cost.and.usage.trends	PPR	2,268	-4,156 / 8,692	No		259	236

Table 7-9 Interactions with Portal (Allowing for Multiple Interactions)

Data Type	*Portal Interaction*	*Model*	*Annual Savings*	*90% Confidence Interval*	*Statistically Significant*	*Estimate of Effect on Energy Use*	*Count of Customers in Treatment Group*	*Count of Customers in Control Group*
Monthly	annual.demand.intensity	DiD	2,608	-15,629 / 20,845	No		712	603
	annual.demand.intensity	PPR	-1,020	-21,176 / 19,135	No		712	603
	annual.end.use	DiD	2,608	-15,629 / 20,845	No		712	603
	annual.end.use	PPR	-1,020	-21,176 / 19,135	No		712	603
	bill.comparison	DiD	-1,416	-6,569 / 3,737	No		4,312	2,408
	bill.comparison	PPR	-2,651	-11,150 / 5,848	No		4,312	2,408
	bill.over.time	DiD	-8,043	-27,355 / 11,269	No		858	749
	bill.over.time	PPR	-7,454	-32,798 / 17,890	No		858	749
	cost.and.usage.trends	DiD	-2,054	-11,919 / 7,810	No		1,586	1,221
	cost.and.usage.trends	PPR	-504	-13,234 / 12,226	No		1,586	1,221
	my.usage.schedule	DiD	2,608	-15,629 / 20,845	No		712	603
	my.usage.schedule	PPR	-1,020	-21,176 / 19,135	No		712	603
	my.usage.weather.impact	DiD	2,608	-15,629 / 20,845	No		712	603
	my.usage.weather.impact	PPR	-1,020	-21,176 / 19,135	No		712	603
	my.usage.ytd	DiD	2,608	-15,629 / 20,845	No		712	603
	my.usage.ytd	PPR	-1,020	-21,176 / 19,135	No		712	603
	peer.comparison	DiD	2,608	-15,629 / 20,845	No		712	603
	peer.comparison	PPR	-1,020	-21,176 / 19,135	No		712	603
AMI	annual.demand.intensity	DiD	1,786	-6,317 / 9,888	No		482	369
	annual.demand.intensity	PPR	-4,034	-26,134 / 18,067	No		482	369
	annual.end.use	DiD	1,786	-6,317 / 9,888	No		482	369
	annual.end.use	PPR	-4,034	-26,134 / 18,067	No		482	369
	bill.comparison	DiD	-8,512	-12,411 / -4,613	Yes	Increased energy use	2,473	1,164

Data Type	*Portal Interaction*	*Model*	*Annual Savings*	*90% Confidence Interval*	*Statistically Significant*	*Estimate of Effect on Energy Use*	*Count of Customers in Treatment Group*	*Count of Customers in Control Group*
	bill.comparison	PPR	-11,713	-22,869 / -556	Yes	Increased energy use	2,473	1,164
	bill.over.time	DiD	9,254	-2,839 / 21,348	No		532	414
	bill.over.time	PPR	416	-42,619 / 43,451	No		532	414
	cost.and.usage.trends	DiD	-13,002	-18,331 / -7,673	Yes	Increased energy use	1,056	707
	cost.and.usage.trends	PPR	-12,815	-31,659 / 6,029	No		1,056	707
	my.usage.schedule	DiD	1,786	-6,317 / 9,888	No		482	369
	my.usage.schedule	PPR	-4,034	-26,134 / 18,067	No		482	369
	my.usage.weather.impact	DiD	1,786	-6,317 / 9,888	No		482	369
	my.usage.weather.impact	PPR	-4,034	-26,134 / 18,067	No		482	369
	my.usage.ytd	DiD	1,786	-6,317 / 9,888	No		482	369
	my.usage.ytd	PPR	-4,034	-26,134 / 18,067	No		482	369
	peer.comparison	DiD	1,786	-6,317 / 9,888	No		482	369
	peer.comparison	PPR	-4,034	-26,134 / 18,067	No		482	369

7.3.1.5. Study Limitations

We recognize the challenges in modeling impacts for this type of program. These challenges include the difficulty of developing truly equivalent comparison groups due to heterogeneity in energy use, as well as the potential for small decreases in energy use that may be difficult to detect through modeling.

7.4. Estimation of Ex Post Net Savings

7.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 7.4 are net savings estimates. No savings were estimated for the Commercial AMI Portal.

7.5. Process Evaluation

ADM did not perform a process evaluation for the program in 2024.

7.6. Findings and Recommendations

Despite improvements in the data on portal interactions, we did not find evidence that the portal led to energy savings. ADM analyzed the effects of email communications, overall portal interactions, and interactions with specific widgets, and none of the analyses indicated that the service resulted in a decrease in energy use.

Customers interacting with the portal appear to derive value from it, as indicated by the ratio of interactions to unique accounts. Portal data shows that, on average, customers engage with several widgets hundreds of times per year. This frequency suggests they find the information valuable. The data also show that a relatively small share of customers are interacting with the portal.

8. Residential Critical Peak Pricing

This chapter presents the evaluation for the Residential Critical Peak Pricing (CPP) Program that Indiana Michigan Power (I&M) is offering to its commercial customers during the period of January 2024 through December 2024.

8.1. Program Description

The Residential CPP Program is designed to motivate, through price response, residential customers to either manage the timing of, or to conserve, usage during I&M and PJM peak and critical peak hour periods.

The program offers participants seasonally tiered on peak electricity pricing and Critical Peak period pricing for demand response events to encourage customers to:

- Reduce usage during these high-cost periods (e.g., manage thermostat settings to decrease air conditioner run time),
- Shift usage to lower priced periods or to off peak periods set forth in the pricing structure of the CPP tariff, or
- Conserve usage during high-cost periods (e.g., change appliance settings to 'off" to eliminate appliance energy use for the peak or high-cost periods).

Customers enrolled in the Residential CPP Program are subject to the pricing provisions set forth in the CPP tariff. Customers must determine their own level of engagement in the CPP pricing tiers but can use tools provided by I&M through the AMI Data Portal to educate and inform themselves on their individual usage level and timing.

I&M may call Critical Peak events during a specified time period (e.g., 3 p.m. to 6 p.m. on a hot summer weekday) when it anticipates, or experiences high power system loads and/or emergency system conditions. During Critical Peak Events, Critical Peak Hours pricing applies, where the price for electricity during Critical Peak event hours is substantially higher than non-Critical Peak periods (i.e. all other pricing tiers set forth in CPP).

No more than fifteen events will occur in a year. Events will be less than five hours per day.

Since CPP electricity pricing is peak period focused and inherently encourages customers to take responsive action to reduce Critical Peak Hours usage, higher demand savings result during Critical Peak Events when compared to reductions during other CPP cost tier periods.

Table 8-1 Summary of Residential Peak Pricing Tariff (R.S. – CPP, Tariff Code 060)

Winter (Off Peak Season) *Months:* *October 1 through April 30*	*Billing* *Hours*	*Rates*
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	*Billing Hours*	*Rates*
Monthly Service Charge		$14.79
		Energy Charges (¢ per kWh)
Low-Cost Hours	Midnight – 7 AM and 9 PM – Midnight	5.647
Medium-Cost Hours	Cost Hours 7 AM – 1 PM and 7 PM – 9 PM	6.010
High-Cost Hours	1 PM – 7 PM	23.775
Critical Peak Hours	When Notified	49.3

There were no customers enrolled in the Residential Critical Peak Pricing Program in PY2024.

9. Residential Time-of-Use

This chapter presents the results of the impact evaluation for the Residential Time- of-Use Program that Indiana Michigan Power (I&M) is offering to its residential customers during the period of January 2024 through December 2024.

9.1. 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 9-1.

Table 9-1 Summary of Residential Service Time-of-Day Tariffs

Tariff Code	*Tariff Description*	*Price Information*
30	RESIDENTIAL - LOAD MANAGEMENT-ON-PK	18.465 ¢ per kWh for all on-peak kWh 6.330 ¢ per kWh for all off-peak kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.
32/34	RESIDENTIAL - LOAD MANAGEMENT-ON-PK	16.981 ¢ per kWh for all on-peak kWh 6.010 ¢ per kWh for all off-peak kWh For the purpose of this tariff, the on-peak billing period is defined as 7 a.m. to 9 p.m., local time, Monday through Friday.

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; and
- Data from relevant secondary sources.

9.3. Estimation of Ex Post Load Impact

Section 5.3 presents the methodology used to estimate the load impact of the Residential Time-of-Use rates.

9.3.1.1. 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.

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 associated with the 2024 Residential Time-of-Use Program.

9.3.2.1. Load Impact Results

Table 9-2 presents the load impacts resulting from the Residential Time-of-Use Program, with results broken down according to each specific on-peak schedule. Ninety-one percent of program TOU customer accounts fall under tariff 32. On average, the hourly energy consumption during on-peak periods for the treatment group was 8.5% lower than that of the control group. In the aggregate, the data shows an annualized reduction in on-peak energy consumption amounting to 661,913 kWh.

This reduction of 661,913 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 9-2 Residential Time-of-Use Program-level Load Impacts

Variable	*Time of Day*	*Group*	*Tariff 62*	*Tariff 30*	*Tariff 32*	*Tariff 34*	*Total*
Average Hourly kWh Consumption	On-Peak	Treatment	0.96	1.64		1.94	n/a
		Control	1.17	1.78		2.62	n/a
	Off-Peak	Treatment	0.86	1.71		2.37	n/a
		Control	0.82	1.52		1.69	n/a
Difference in Average On-Peak kWh Consumption (Control - Treatment)			0.20	0.14		0.67	n/a
Percentage Difference in On-Peak kWh Consumption (Control vs. Treatment)			17.5%	7.6%		25.7%	8.5%
Annualized Population Difference in Average kWh On-Peak Consumption			12,018	649,895		48,757	661,913
Account Population			134	1,358	6	24	1,492
Ex Post kW Savings			27.31	184.21	-	16.12	211.53

9.3.2.2. Ex Post Gross kW Savings

Table 9-3 below shows the estimated program-level ex post gross peak kW reduction resulting from the programs.

Table 9-3 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*
129.62	129.62	129.62	-	0%	-	n/a

9.4. Estimation of Ex Post Net Load Impact

9.4.1. Methodology for Estimating Ex Post Net Impacts

The load impacts estimated using the procedures outlined in Section 5.3 are assumed to be net savings estimates.

9.4.2. Results of Ex Post Net Load Impact

Table 9-4 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 129.62 kW.

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

Category	*kWh*	*kW*
Ex Ante Gross Savings	-	129.62
Gross Audited Savings	-	129.62
Gross Verified Savings	-	129.62
Ex Post Gross Savings	-	-
Gross Realization Rate	n/a	0%
Ex Post Free Ridership	-	-
Ex Post Non-Participant Spillover	-	-
Ex Post Participant Spillover	-	-
Ex Post Net Savings	-	-
Net-to-Gross Ratio	n/a	n/a
Ex Post Net Lifetime Savings	-	n/a

9.5. Findings and Recommendations

The account population grew from 783 in 2023 to 1,492 in 2024, while kW savings increased from 177.17 to 211.53. Similarly, the annualized on-peak kWh savings rose from 593,017 to 661,913.

- **Recommendation 1. Consider using customer analytics to identify and target marketing of the TOU rate plans to increase enrollment.**
  - Identify customers who have high energy consumption during peak pricing periods but exhibit variability in usage patterns across different days or weeks.
  - Customers with fluctuating peak-period usage may have some discretionary load that can be shifted.
  - Encourage these customers to enroll in the TOU rate and shift energy use to off-peak hours.

10. 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 2024 through December 2024.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2024.
- 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.

10.1. 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.

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 a survey of program participants to collect data on customer's experience with the program.

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. The sample size of 23 results in a realized precision of 17.0% under the assumption of p = 0.5.

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 10-1 summarizes the results of the survey data collection effort.

Table 10-1 Home Energy Management Survey

Mode	*Time Frame*	*Number of Contacts*	*Number of Completions*	*Completion Rate*
Email	September 2024	1,270	23	1.8%

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

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 10-1 Euclidean Distance Calculation

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

For each treatment account, the potential control account with the minimum distance was selected as the match account, applying a tie-breaking procedure if needed.

With the control group selected, we determined the average hourly event day usage. The control group's average usage served as a preliminary baseline. This baseline was adjusted by a normalization factor equal to ($\text{kWh}_{\text{treatment}}$ / $\text{kWh}_{\text{control}}$), based on usage values two hours prior to the first event hour. As the average non-event hour usage of treatment and control groups on event days was similar, the adjustment factor generally varied little from 1.0.

The table below shows the match days selected.

Table 10-2 Match Days

Event Date	*Match Days*
6/18/2024	5/21/2024
	6/12/2024
	7/30/2024
6/19/2024	6/12/2024

Event Date	*Match Days*
	6/17/2024
	8/26/2024
6/20/2024	6/12/2024
	9/12/2024
	9/16/2024
6/21/2024	6/12/2024
	6/17/2024
	8/26/2024
7/8/2024	8/30/2024
	9/17/2024
	9/18/2024
7/15/2024	5/21/2024
	7/30/2024
	8/29/2024
7/16/2024	6/3/2024
	7/11/2024
	7/23/2024
7/31/2024	7/3/2024
	8/16/2024
	8/29/2024
8/1/2024	7/11/2024
	7/23/2024
	8/16/2024
8/5/2024	6/24/2024
	8/14/2024
	8/16/2024
8/27/2024	6/17/2024
	8/26/2024
	9/16/2024
8/28/2024	7/22/2024
	8/8/2024
	9/4/2024

10.3.1.2. 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 10-2) 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 10-2 Estimation of Energy Savings

$$kWh_{saved} = \sum_{t} kW_t^{reduction}$$

10.3.1.3. 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.

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 2024 Home Energy Management.

I&M initiated 12 load management events during the summer of 2024. As shown in Table 10-3 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 10-3 Demand Response Event Times

Date	*Event Start Time*	*Event Stop Time*	*Event Coincident with 5CP*	*PJM Coincident Peak Occurred During Hour Ending*
6/18/2024	4:00 PM	6:00 PM	No	
6/19/2024	4:00 PM	6:00 PM	No	
6/20/2024	4:00 PM	6:00 PM	No	
6/21/2024	3:00 PM	6:00 PM	Yes	6:00 PM
7/8/2024	4:00 PM	6:00 PM	No	
7/15/2024	4:00 PM	6:00 PM	Yes	6:00 PM
7/16/2024	4:00 PM	6:00 PM	Yes	6:00 PM
7/31/2024	4:00 PM	6:00 PM	No	
8/1/2024	4:00 PM	6:00 PM	Yes	6:00 PM
8/5/2024	4:00 PM	6:00 PM	No	
8/27/2024	4:00 PM	6:00 PM	No	
8/28/2024	4:00 PM	6:00 PM	Yes	6:00 PM

ADM calculated the demand reductions for each event hour. Table 10-4 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 10-4 kW Reductions for Event Days by Hour

Date	*1:00 PM - 2:00 PM*	*2:00 PM - 3:00 PM*	*3:00 PM - 4:00 PM*	*4:00 PM - 5:00 PM*	*5:00 PM - 6:00 PM*	*6:00 PM - 7:00 PM*	*Event-Level Mean Hourly kW Reduction*	*Maximum Event Hour kW Reduction*
6/18/2024			-5,735.92	6,552.65	5,313.06	-2,765.95	5,932.86	6,552.65
6/19/2024			-4,316.72	7,696.01	5,724.76	-2,262.57	6,710.39	7,696.01
6/20/2024			-4,474.81	7,203.84	4,938.98	-2,810.79	6,071.41	7,203.84
6/21/2024		-4,550.76	7,565.15	5,847.70	4,038.60	-2,486.51	5,817.15	7,565.15
7/8/2024			-5,310.23	6,433.57	4,630.31	-2,872.41	5,531.94	6,433.57
7/15/2024			-4,965.98	7,232.86	5,547.25	-2,153.18	6,390.05	7,232.86
7/16/2024			-5,496.40	5,633.43	4,434.73	-2,503.65	5,034.08	5,633.43
7/31/2024			-5,674.35	6,367.73	5,184.85	-2,600.37	5,776.29	6,367.73
8/1/2024			-6,445.25	5,303.66	4,308.13	-2,734.75	4,805.90	5,303.66
8/5/2024			-5,852.74	6,462.70	5,588.48	-2,255.18	6,025.59	6,462.70
8/27/2024			-4,262.79	6,005.37	3,590.17	-4,429.38	4,797.77	6,005.37
8/28/2024			-5,566.07	5,969.05	4,597.76	-3,094.35	5,283.41	5,969.05

Table 10-5 presents average participant demand reductions for each event hour.

Table 10-5 Average Participant kW Reductions for Event Days by Hour

Date	*1:00 PM - 2:00 PM*	*2:00 PM - 3:00 PM*	*3:00 PM - 4:00 PM*	*4:00 PM - 5:00 PM*	*5:00 PM - 6:00 PM*	*6:00 PM - 7:00 PM*	*Event-Level Mean Hourly kW Reduction*	*Maximum Event Hour kW Reduction*
6/18/2024			-1.01	1.15	0.93	-0.48	1.04	1.15
6/19/2024			-0.75	1.34	1.00	-0.40	1.17	1.34
6/20/2024			-0.78	1.26	0.86	-0.49	1.06	1.26
6/21/2024		-0.79	1.32	1.02	0.70	-0.43	1.01	1.32
7/8/2024			-0.92	1.12	0.80	-0.50	0.96	1.12
7/15/2024			-0.86	1.25	0.96	-0.37	1.11	1.25
7/16/2024			-0.95	0.98	0.77	-0.43	0.87	0.98
7/31/2024			-0.98	1.10	0.89	-0.45	1.00	1.10
8/1/2024			-1.11	0.91	0.74	-0.47	0.83	0.91
8/5/2024			-1.01	1.12	0.97	-0.39	1.04	1.12
8/27/2024			-0.73	1.03	0.61	-0.76	0.82	1.03
8/28/2024			-0.95	1.02	0.79	-0.53	0.90	1.02

Table 10-6 presents a summary of the aggregate demand reductions occurring during PJM 5CP hours.

Table 10-6 Summary of kW Reductions during PJM 5CP Events

Date	*Hour Start*	*Hour End*	*Ex Post Net kW Savings*
6/21/2024	5:00 PM	6:00 PM	4,038.60
7/15/2024	5:00 PM	6:00 PM	5,547.25
7/16/2024	5:00 PM	6:00 PM	4,434.73
8/1/2024	5:00 PM	6:00 PM	4,308.13
8/28/2024	5:00 PM	6:00 PM	4,597.76
Maximum Event Hour Peak kW Reduction			5,547.25
Average Event Hour Peak kW Reduction			4,585.29

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

Figure 10-1 June 18, 2024 Event Average Participant Actual and Predicted Energy Usage

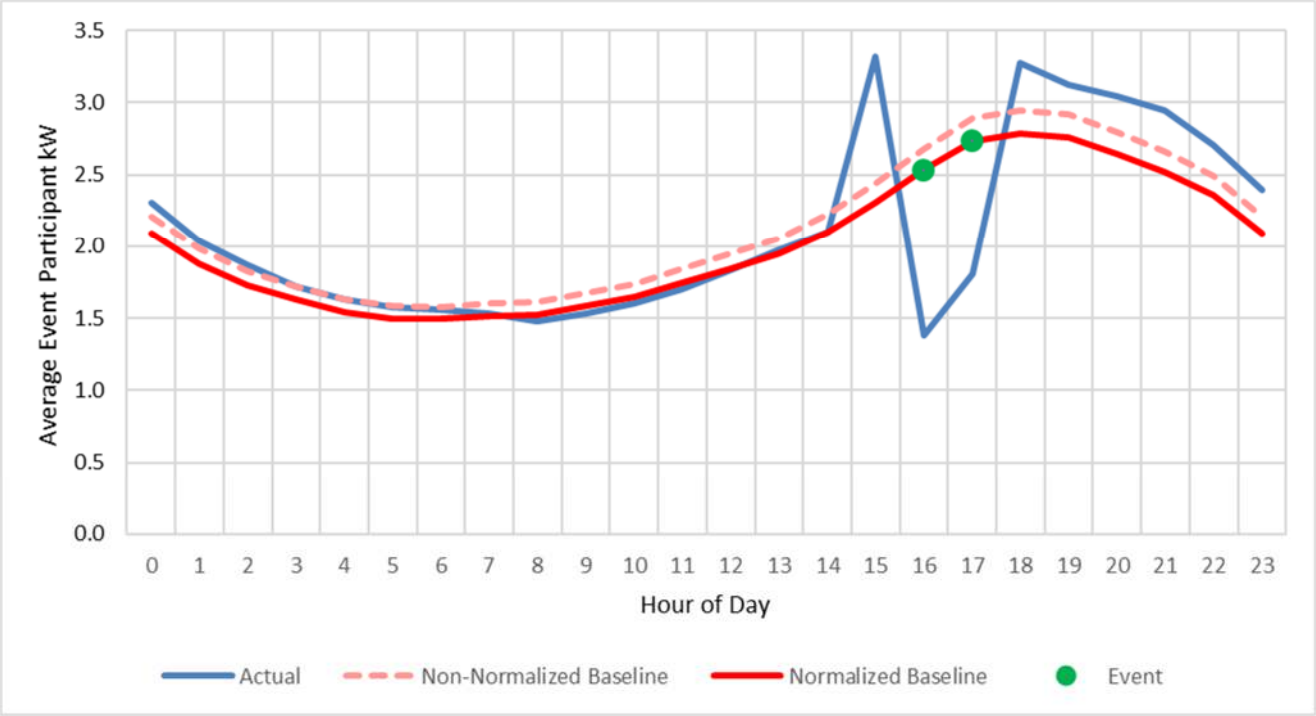


Figure 10-2 June 19, 2024 Event Average Participant Actual and Predicted Energy Usage

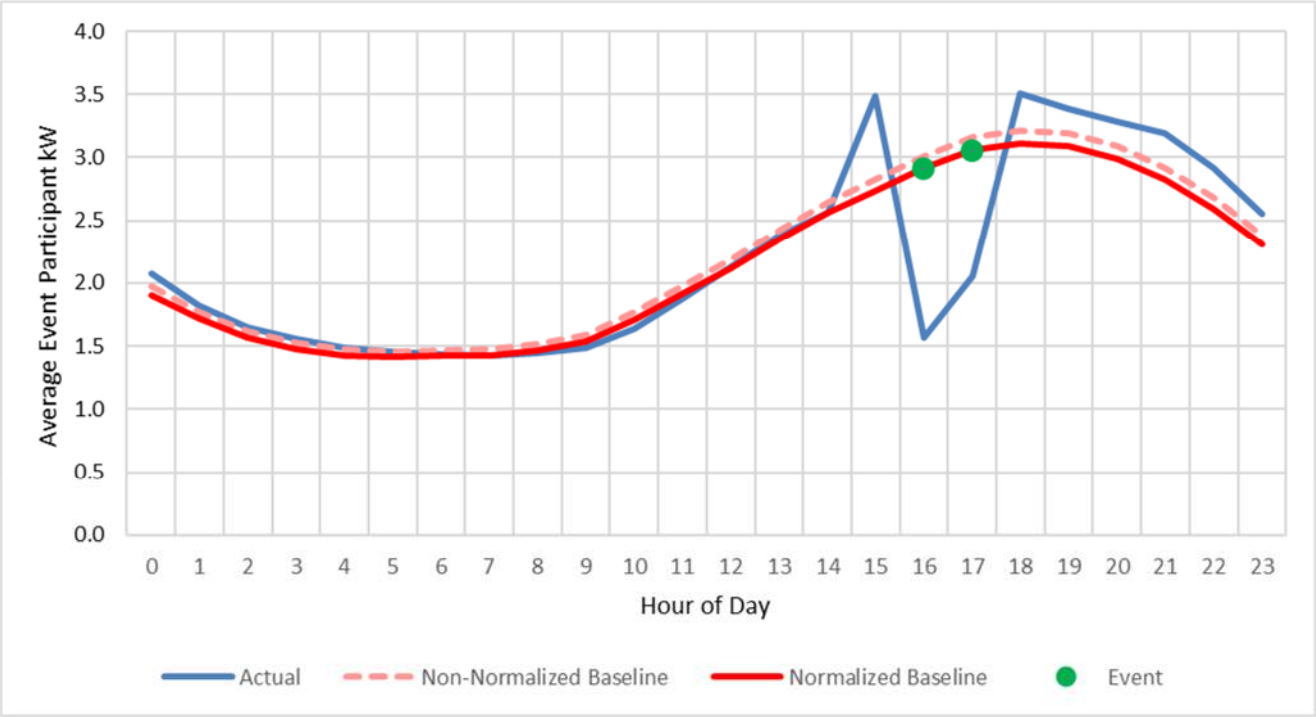


Figure 10-3 June 20, 2024 Event Average Participant Actual and Predicted Energy Usage

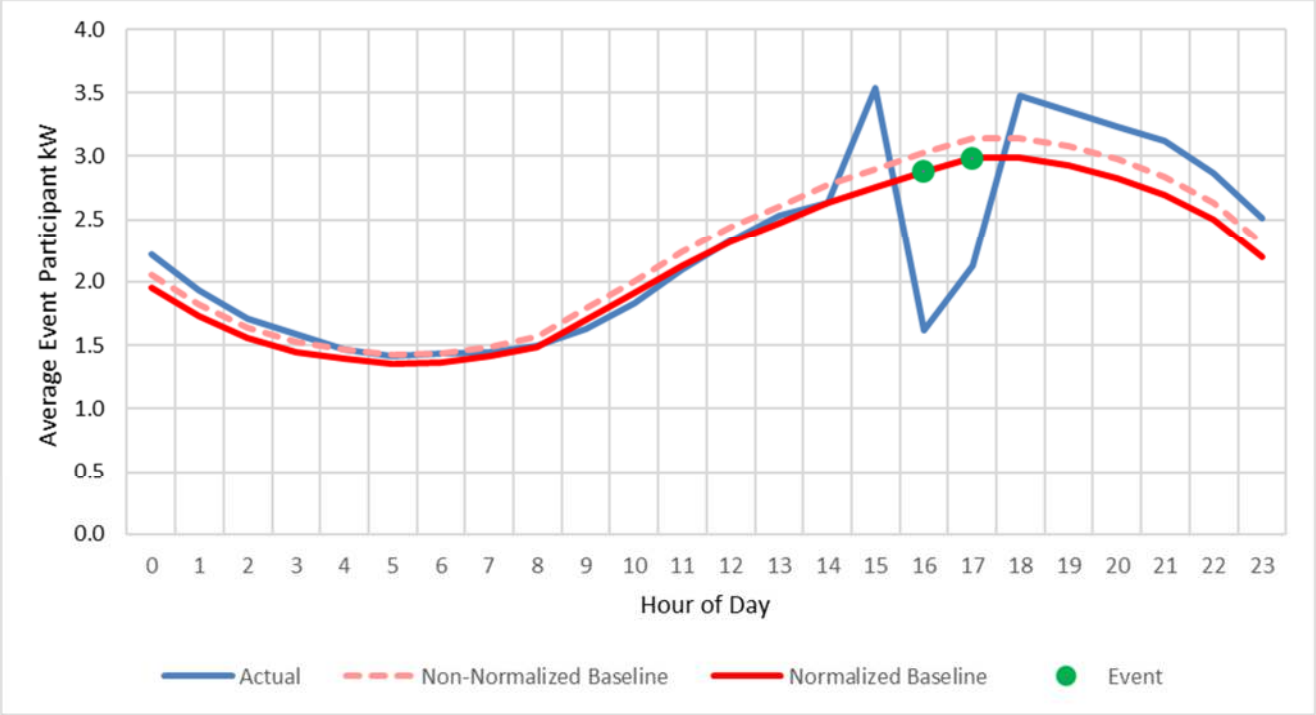


Figure 10-4 June 21, 2024 Event Average Participant Actual and Predicted Energy Usage

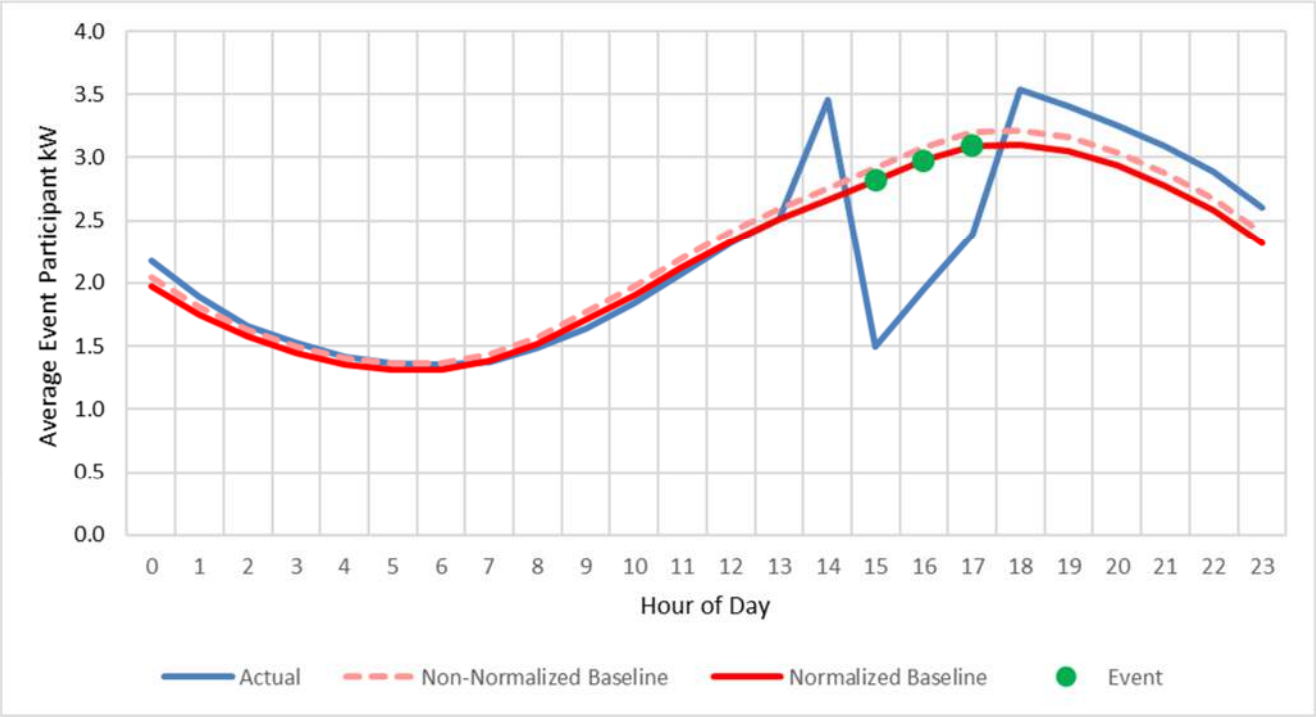


Figure 10-5 July 8, 2024 Event Average Participant Actual and Predicted Energy Usage

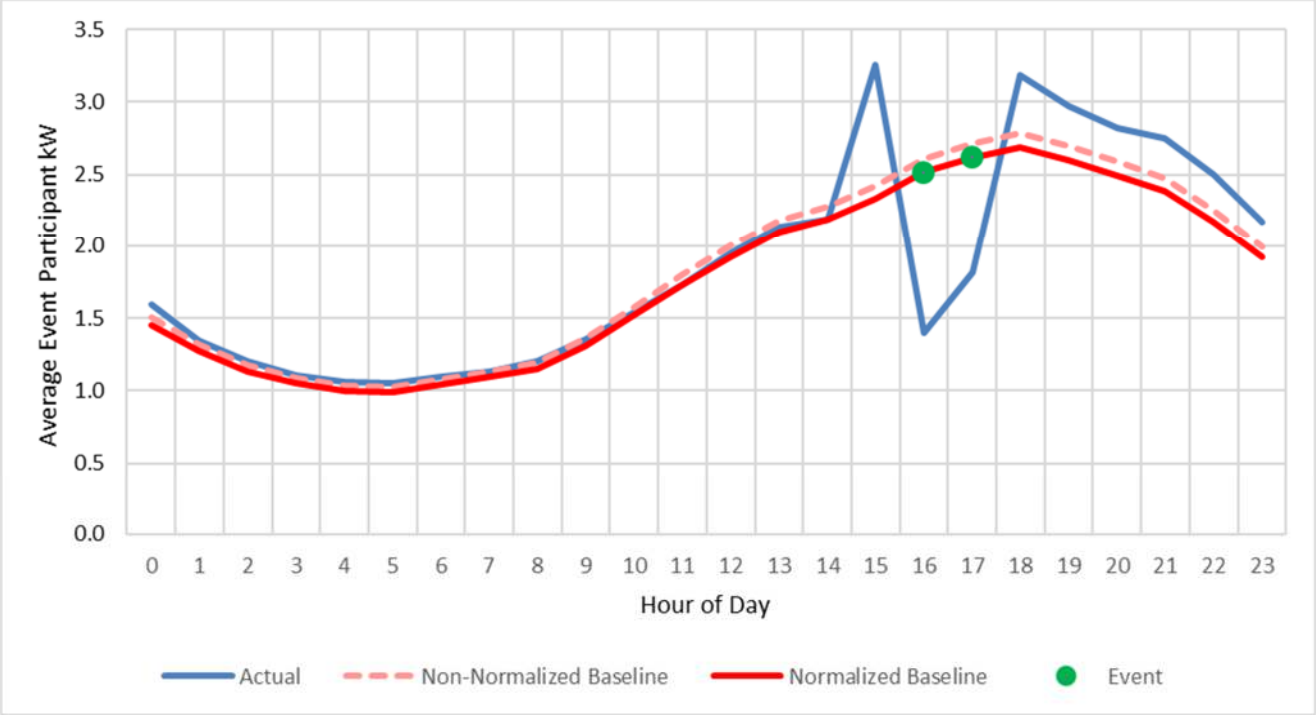


Figure 10-6 July 15, 2024 Event Average Participant Actual and Predicted Energy Usage

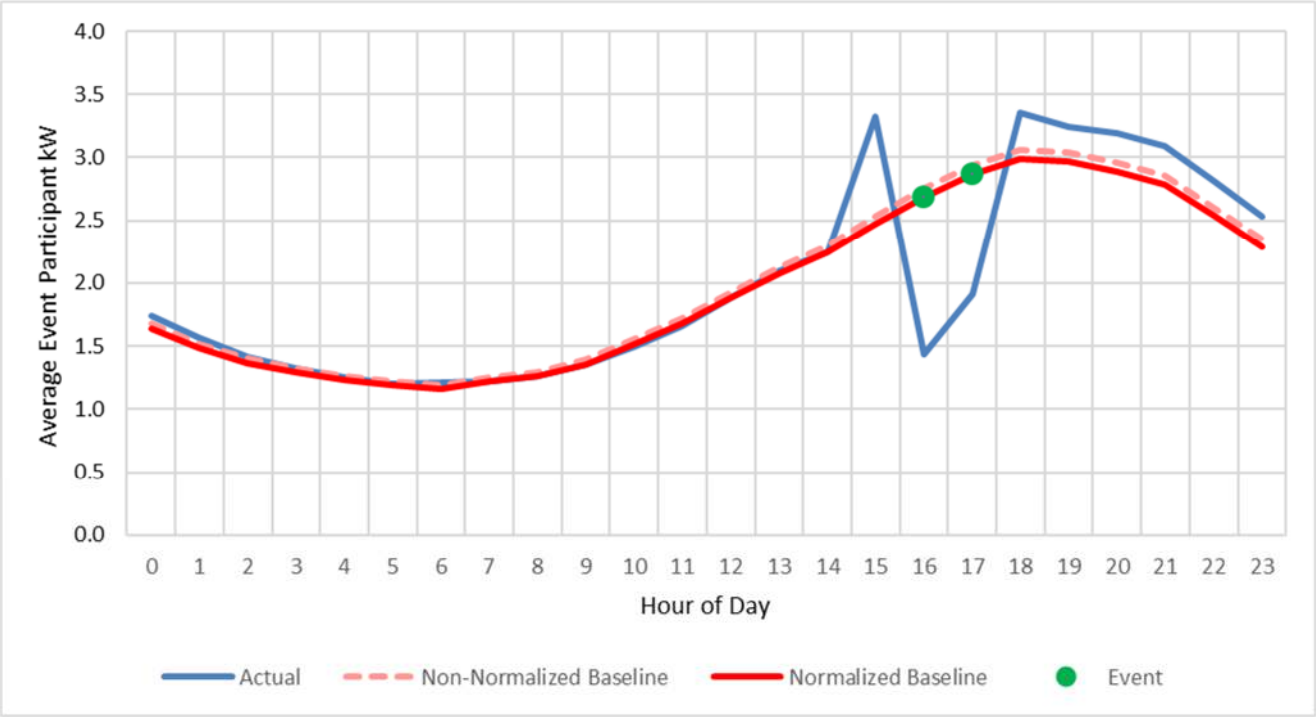


Figure 10-7 July 16, 2024 Event Average Participant Actual and Predicted Energy Usage

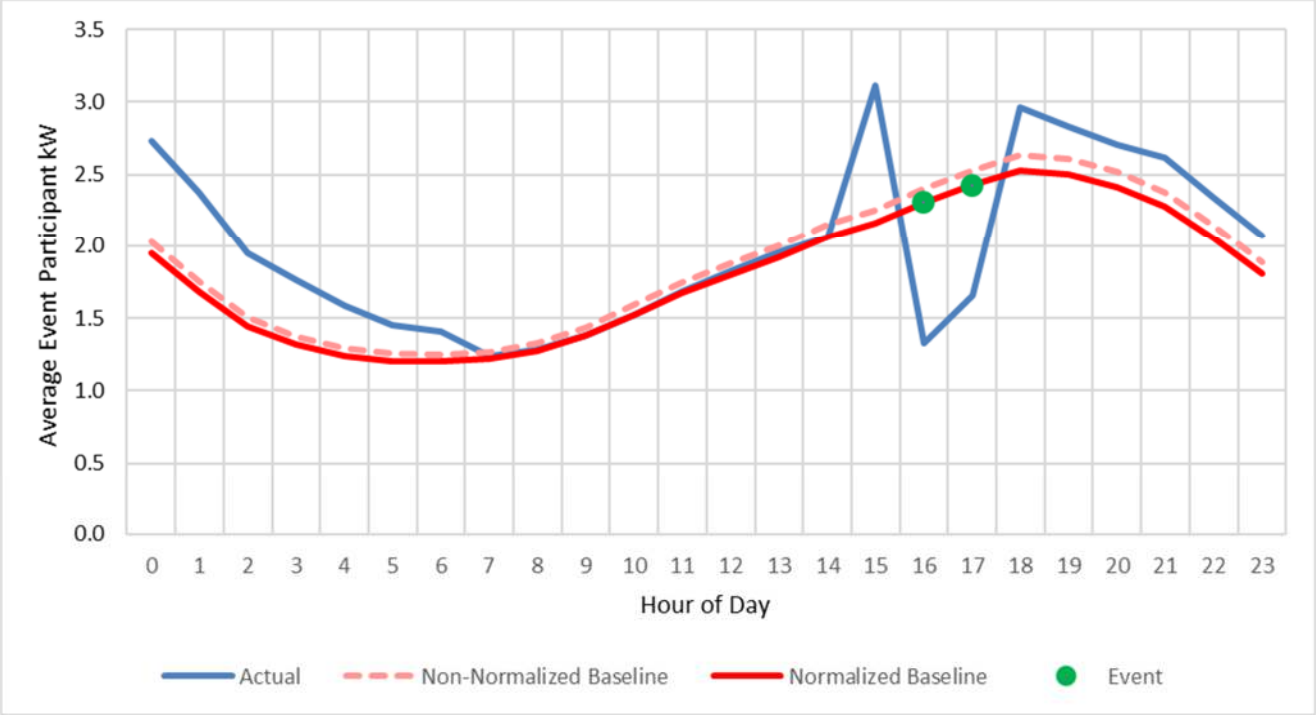


Figure 10-8 July 31, 2024 Event Average Participant Actual and Predicted Energy Usage

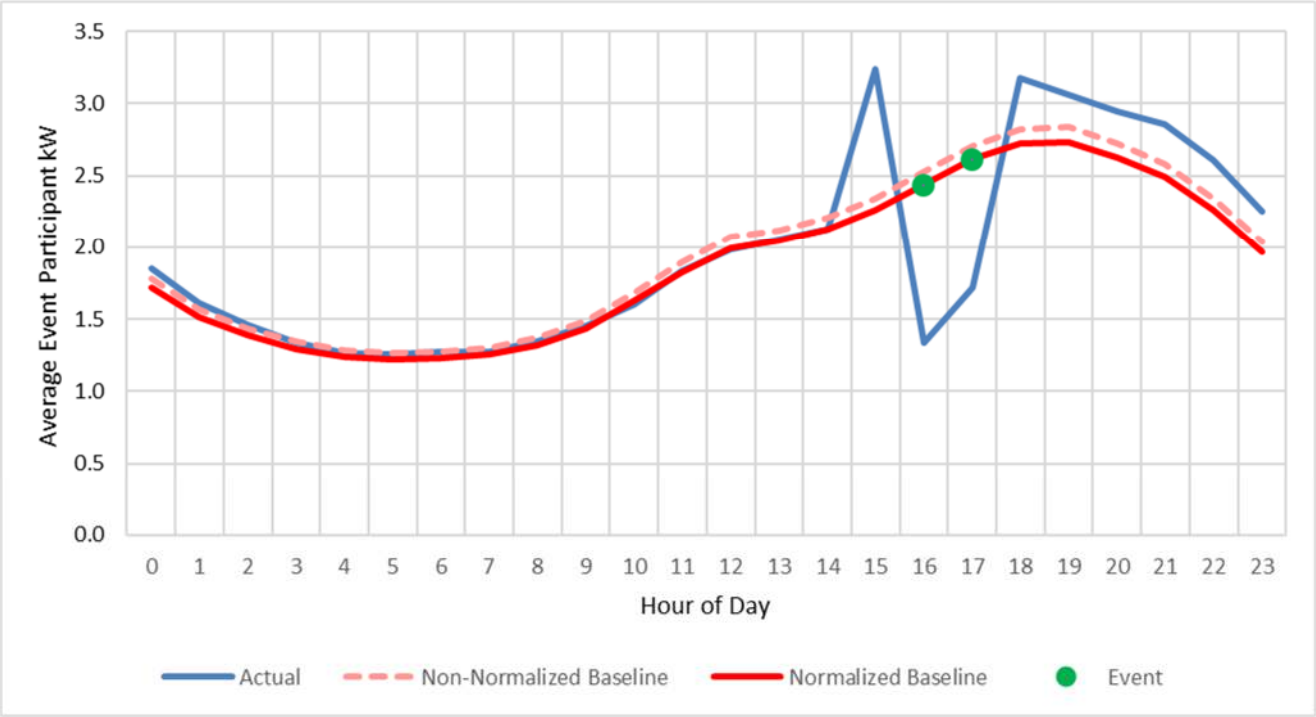


Figure 10-9 August 1, 2024 Event Average Participant Actual and Predicted Energy Usage

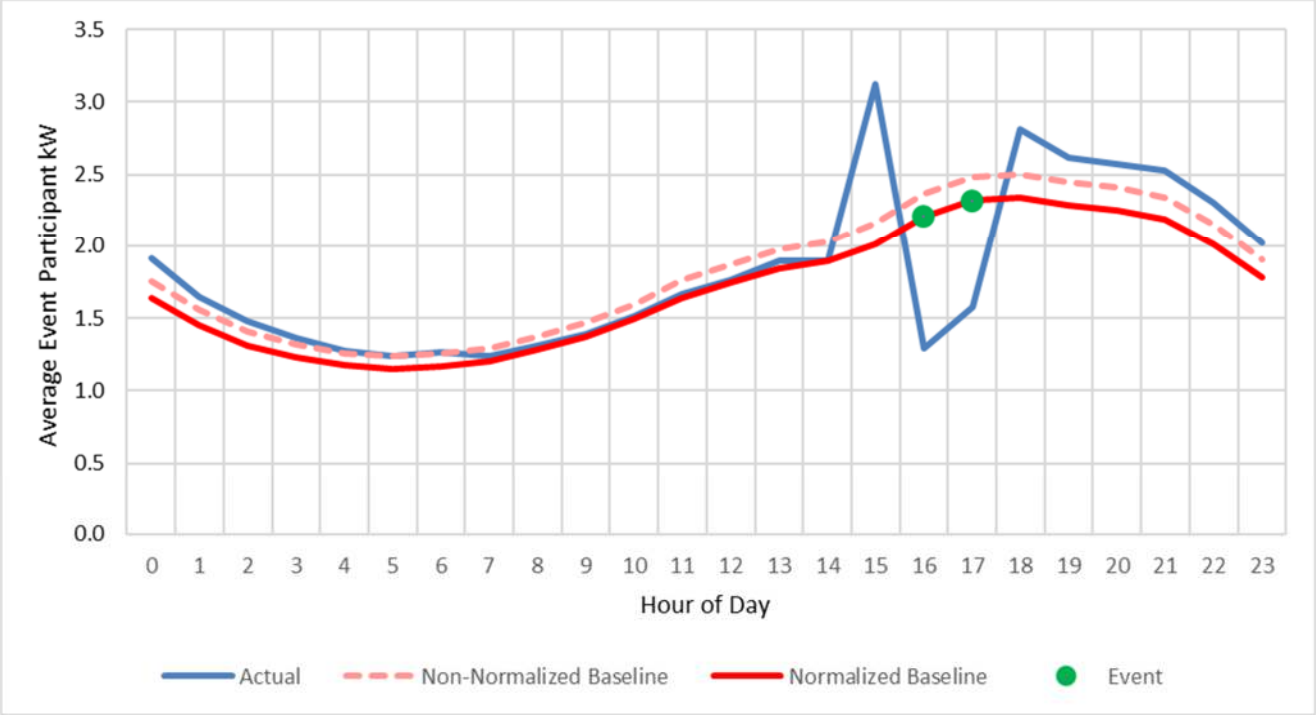


Figure 10-10 August 5, 2024 Event Average Participant Actual and Predicted Energy Usage

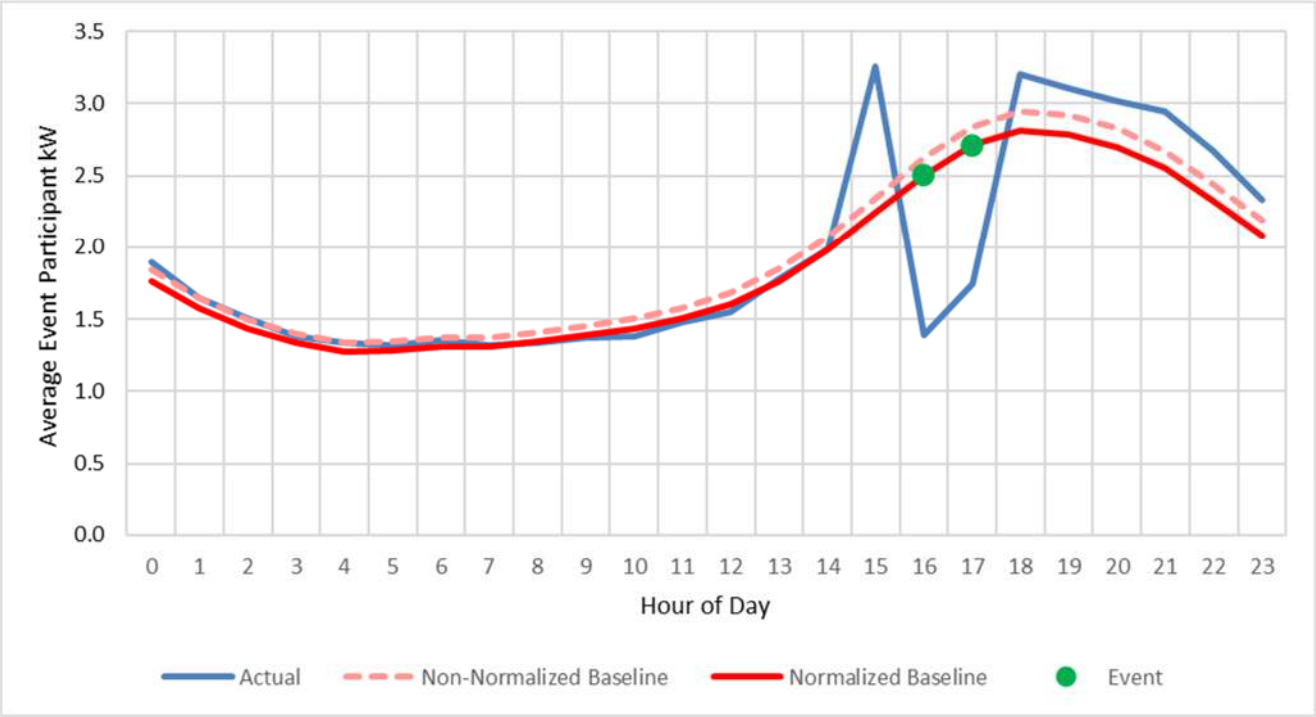


Figure 10-11 August 27, 2024 Event Average Participant Actual and Predicted Energy Usage

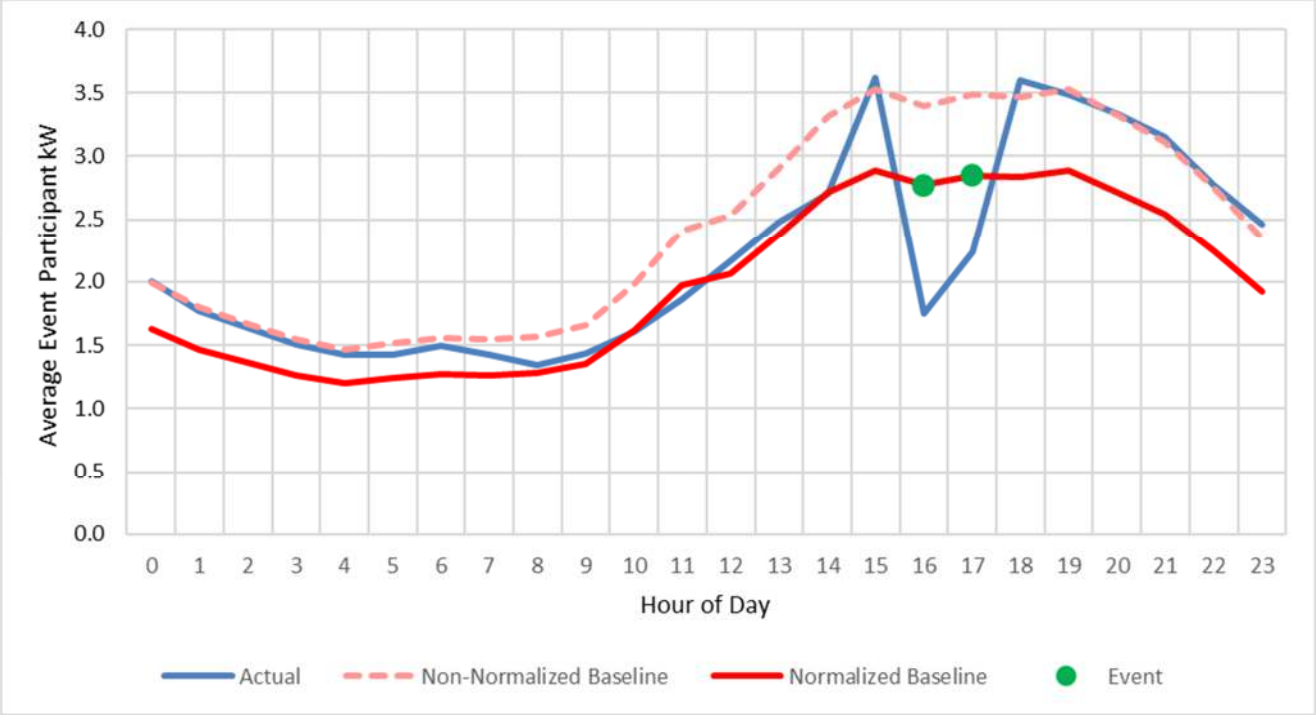
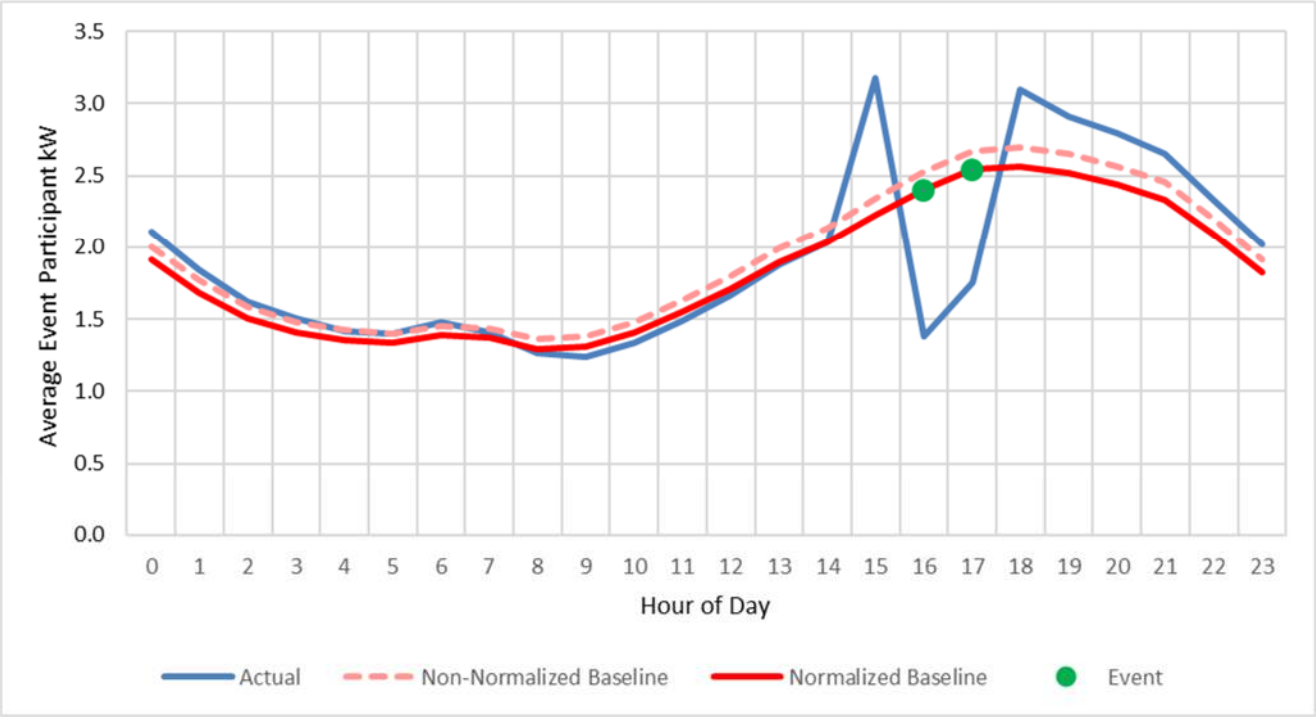


Figure 10-12 August 28, 2024 Event Average Participant Actual and Predicted Energy Usage



10.3.2.1. Ex Post Gross kWh Savings

Table 10-7 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 10-7 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*
18,585	18,585	46,550	46,550	250%

10.3.2.2. Ex Post Gross kW Savings

Table 10-8 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 112%.

Table 10-8 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*
4,101.00	4,101.00	4,101.00	4,585.29	112%

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 are net savings estimates.

10.4.2. Results of Ex Post Net Savings Estimation

Table 10-9 summarizes the ex post annual net kWh and kW savings of the Home Energy Management Program. The annual net savings totaled 46,550 kWh and 4,585.29 kW.

Table 10-9 Program-Level Annual Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	18,585	4,101.00
Gross Audited Savings	18,585	4,101.00
Gross Verified Savings	18,585	4,101.00
Ex Post Gross Savings	46,550	4,585.29
Gross Realization Rate	250%	112%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	46,550	4,585.29
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	930,994	N/A

10.5. 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:

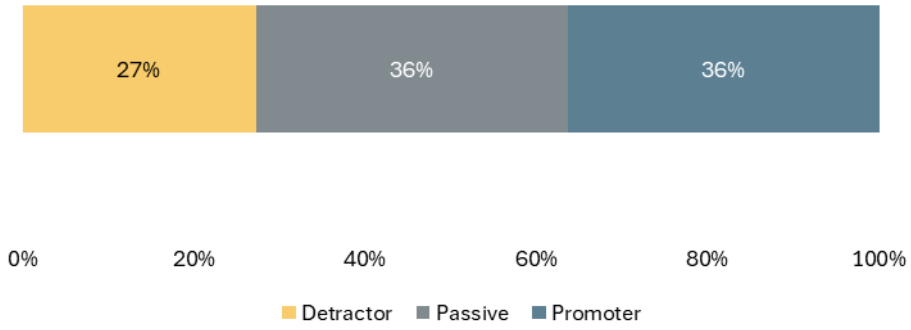
- Assess comfort impacts and user acceptance of the load events; and
- Assess participant satisfaction and willingness to recommend the program to others.

10.5.1. Participant Survey Findings

10.5.1.1. Net Promoter Score

Almost half of the respondents were net promoters.[7] Based on the survey findings, 27% of respondents are classified as Detractors, 36% as Passive, and 36% as Promoters in terms of their likelihood to recommend the program to others (see Figure 10-13). The Home Energy Management program had a Net Promoter Score (NPS) of 9%.

Figure 10-13 Net Promoter Score (n = 22)



Promoters found the program convenient and valuable, with a positive experience throughout. Promoters appreciated the program for its efficiency, user-friendliness, and financial perks. Participants liked its simplicity in registration and benefits without inconvenience. Many highlighted receiving rebates and saving money during events, with one stressing the value of savings during tough times.

Detractors raised concerns about control, costs, and the difficulty of unenrollment. Several participants said the system restricted temperature control or that their thermostat didn't recover after events. Some were upset about higher energy costs, with one person noting inefficient AC use increased their bills. Some found unenrollment complicated and frustrating. Additionally, some distrusted the program and criticized the lack of clear enrollment information.

Passive respondents provided mixed feedback, recognizing both the benefits and potential drawbacks of the program. Some respondents pointed out that the program is cost-effective, provides rebate credits, and is user-friendly. However, there were privacy and security concerns, with one person warning that it could make some uncomfortable by allowing external access to home networks. They recommend it for those who know how to set permissions and restrictions. While the program's convenience was appreciated, some hesitated to recommend it without these caveats.

[7] 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.

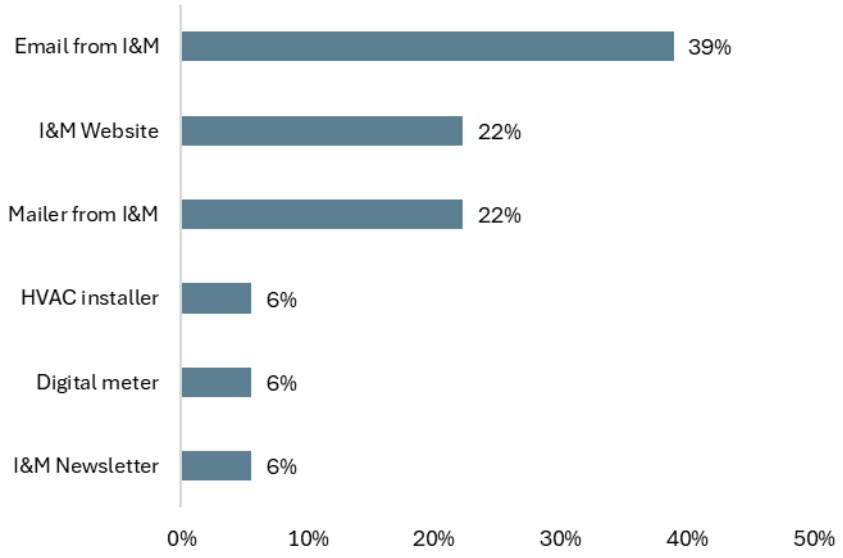
Table 10-10 Reason for NPS Rating

Promoters (n = 8)	*Number of Comments (n = 8)*
Program effectiveness and benefits	5
Ease of use and enrollment	3
Detractors (n = 6)	*Number of Comments (n = 5)*
Control issues or system limitations	4
Negative experience or cost impacts	3
Enrollment and communication issues	1
Credibility concerns	1
Passive (n = 8)	*Number of Comments (n = 4)*
Cost savings and benefits	3
Privacy and security issues	1

10.5.1.2. Awareness and Reasons for Participating

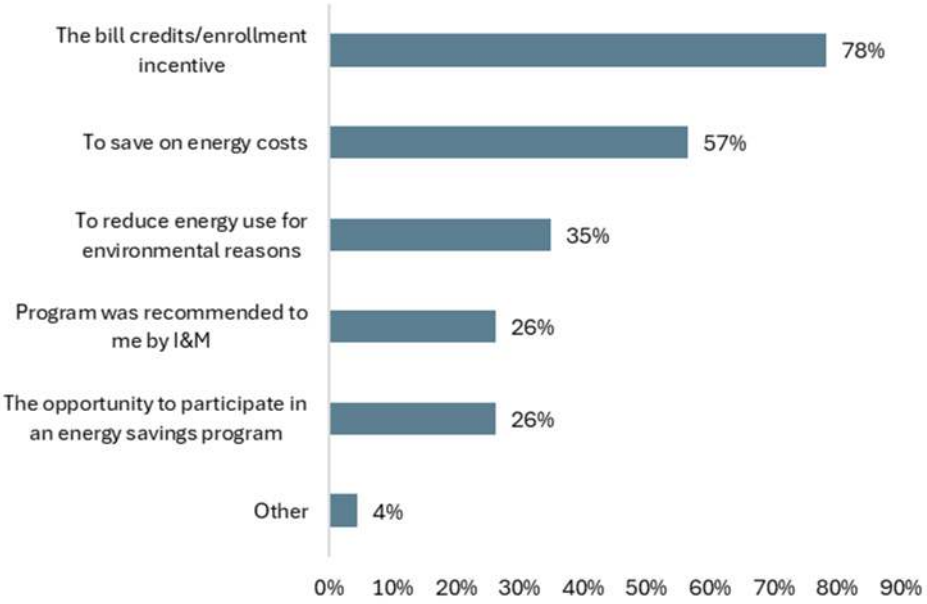
Email, the I&M website, and mailings were the most common ways that participants learned of the program. The most common source was an email from I&M, cited by 39% of respondents. Mailers and the I&M website were each mentioned by 22% of participants. Other sources included HVAC installers, digital meters, and the I&M newsletter, each accounting for 6% of responses (see Figure 10-14).

Figure 10-14 Source of Awareness (n = 18)



Participants cited various reasons for joining the program, with the most common being the bill credits or enrollment incentive (78%). Reducing energy costs was a motivator for 57% of participants, while 35% were driven by environmental concerns to decrease energy consumption. Twenty-six percent joined because of recommendations from I&M, and another 26% were attracted by the chance to engage in an energy savings program. See Figure 10-15 for more information.

Figure 10-15 Reasons for Participation (n = 23)



10.5.1.3. Enrollment

Most respondents did not have concerns prior to enrolling. Most survey respondents (74%) did not have concerns about participating in the program before enrolling, while 26% did. Among those six respondents with concerns, the most common concerns were discomfort with the utility controlling or shutting off their AC and worries about privacy or security. Additionally, one respondent expressed unease about being uncomfortable during energy reduction events or not being able to control the temperature.

The information about the program generally met participants needs, but some participants would have appreciated additional information. Most survey respondents (65%) indicated that the information they sought out either completely or mostly addressed their questions (see Table 10-11). On average, participants rated the information they received or viewed before deciding to participate as adequately addressing their questions, with a mean score of 3.65 on a scale from 1 to 5. Participants provided feedback on the questions they felt were unanswered. They desired more clarity on how to unenroll if dissatisfied with the thermostat's performance and the extent of temperature changes during events. Some sought explanations regarding potential higher costs

associated with the program. Additionally, there was confusion about what occurs if their thermostat is already set higher than the automatic adjustment during events and how credits would be managed and distributed.

In terms of sources for the information reviewed, most respondents got information on how the program worked from an I&M email (50%) or the program website (42%). Half of the survey respondents got details about the program from I&M emails or newsletters, while 42% used I&M's website. Other sources were I&M mailings and representatives. See Figure 10-16 for additional details.

Figure 10-16 Where Customers Got Information about the Program (n = 24)

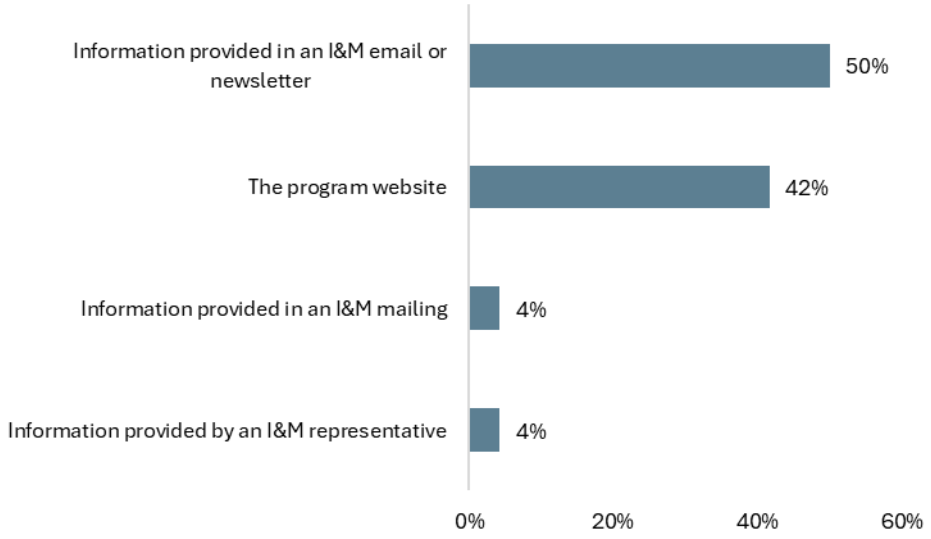


Table 10-11 Effectiveness of Obtained Information in Addressing Pre-Participation Questions

Response	*Percentage of Responses (n = 23)*
1 (Not at all)	13%
2	4%
3	17%
4	35%
5 (Completely)	30%
Did not review any information before deciding to participate	0%
Average	3.65

Enrollment in the program was easy for most participants. The majority of survey respondents (65%) found the enrollment process to be very easy, followed by an additional 22% who found it to be somewhat easy (see Table 10-12). Participants found the enrollment process challenging due

to insufficient information. Additionally, some were frustrated because they did not recall enrolling in the program.

Table 10-12 Ease of Enrollment

Response	*Percentage of Responses (n = 23)*
1 (Very difficult)	4%
2	4%
3	4%
4	22%
5 (Very easy)	65%

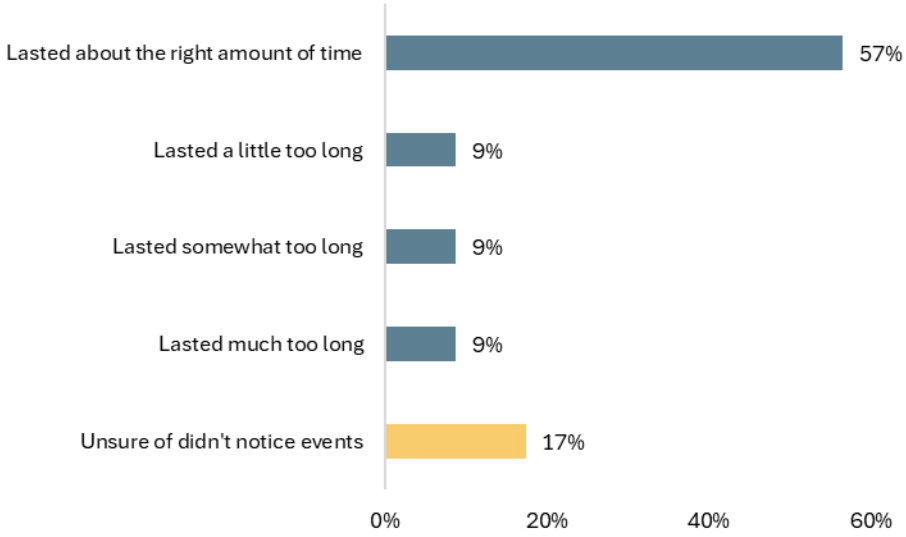
10.5.1.4. Peak Energy Use Events

Most participants were home during events and their experiences varied, with most considering the number of events appropriate, but differing opinions on event duration. Seventy percent of participants were home during Peak Energy Use Events, while 30% were not. Comfort levels varied: 25% experienced no effect, 38% felt slight discomfort, 31% had moderate discomfort, and 6% reported significant discomfort.

The majority of respondents (68%) felt that the frequency of Peak Energy Events was suitable. Conversely, 23% considered there to be an excessive number of events, while 9% felt that there were too few.

A significant proportion of participants (57%) believed that the duration of the Peak Energy Use Events was appropriate. Conversely, 27% felt the events were excessively long to varying extents, with 9% each stating they were much too long, somewhat too long, or a little too long. Moreover, 17% of respondents indicated that they were either unaware of or did not notice the events. See Figure 10-17 for more information.

Figure 10-17 Customer Feedback on Peak Events Duration



10.5.1.5. 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 (52%) 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, 17% 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. Seventeen percent expressed that they are not at all likely to participate next year. Participants expressed several reasons for potentially not continuing with the program next year. Some were frustrated with the thermostat's performance, noting that it failed to recover to their preferred settings after events or caused uncomfortable temperatures, such as the upstairs reaching the mid-80s. Others were dissatisfied with the unenrollment process, reporting difficulties, delays, and unexpected costs. One respondent mentioned that their spouse also wanted to discontinue participation, reinforcing their decision. Another concern was the possibility of forgetting to participate again.

Surveyed participants were generally satisfied with the Home Energy Management program, with 57% indicating they were very satisfied and 13% indicating they were somewhat satisfied. Participants were dissatisfied for several reasons, including discomfort during events. Others referred back to previously stated concerns.

Table 10-13 Satisfaction with the Home Energy Management Program

Response	*Percentage of Responses (n = 23)*
1 (Very dissatisfied)	13%
2	4%
3	13%
4	13%
5 (Very satisfied)	57%

10.5.1.6. Demographic Findings

The majority of participants enrolled in the program with either ecobee (39%) or Honeywell Home (26%) thermostats. Most respondents (83%) own their homes, with 91% living in their primary residence. The typical household type is a single-family detached home (78%). Common summer thermostat settings ranged between 72°F (17%) and 78°F (22%), with an average of 75°F. Households mainly consist of one or two people, with 27% reporting single-person occupancy and 41% having two residents. Annual household income varied, with 26% earning between $50,000 and $75,000, and 43% preferring not to disclose their income.

10.6. Findings and Recommendations

Most participants reported satisfaction with the program, though some raised concerns about comfort, challenges with unenrollment, and thermostat issues, such as failure to return to normal settings after events. While dissatisfaction was limited to a minority, these findings highlight opportunities to improve aspects of the participant's experience.

Most participants enrolled for the financial benefits of earning bill credits and saving on energy costs. These reasons were cited by 78% and 57% of respondents, respectively, with smaller shares of respondents participating to reduce energy use for environmental reasons (35%), because of an I&M recommendation (26%), or the opportunity to participate in a program (26%).

Survey respondents point to ways that the information provided to customers about the program could be improved. While most survey respondents (65%) indicated that the information they sought out either completely or mostly addressed their questions, some indicated a preference for more information on how to unenroll, how much their thermostat temperature setting would change during an event, and on how the program might impact their overall costs.

Overall, the program's impact on comfort was relatively modest, with a majority of participants reporting no to moderate discomfort during Peak Energy Use Events. Comfort levels varied: 25% experienced no effect, 38% felt slight discomfort, 31% had moderate discomfort, and 6% reported significant discomfort.

11. 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 2024 through December 2024.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2024.
- 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.

11.1. 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 and have slow or unreliable internet service.

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

- Differently engage specific residential customer segments.
- Provide customers with a DLC demand response offering that requires little to no customer involvement.
- Require no customer ownership of DLC equipment.
- Augment I&M's demand response capabilities.

I&M will install a small device on participating customers' exterior air conditioning equipment that will cycle the compressor during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers earn a $2.40 bill credit for each event.

11.2. Data Collection

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

- Program tracking data from the primary tracking database.
- Customer AMI billing data.
- Location specific weather data.
- Data from relevant secondary sources.

11.2.1. Participant Survey

ADM completed a survey of program participants to collect data on customer's experience with the program.

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. This target was exceeded with 72 responses.

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 11-1 summarizes the results of the survey data collection effort.

Table 11-1 Residential HVAC DLC Survey

Mode	*Time Frame*	*Number of Contacts*	*Number of Completions*	*Completion Rate*
Email	September 2024	1,326	72	5.4%

11.3. Estimation of Ex Post Gross Savings

11.3.1. Methodology for Estimating Ex Post Gross Energy Savings

11.3.1.1. Analysis of Peak Event Reductions and Energy Savings

The methodology discussed in Section 10.3.1.1 was used to estimate the savings resulting from the Peak Event Reductions.

11.3.1.2. 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.

11.3.2. 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 2024 Residential HVAC DLC.

I&M initiated 12 load management events during the summer of 2024. As shown in Table 11-2 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 11-2 Demand Response Event Times

Date	*Event Start Time*	*Event Stop Time*	*Event Coincident with 5CP*	*PJM Coincident Peak Occurred During Hour Ending*
6/18/2024	4:00 PM	6:00 PM	No	
6/19/2024	4:00 PM	6:00 PM	No	
6/20/2024	4:00 PM	6:00 PM	No	
6/21/2024	3:00 PM	6:00 PM	Yes	6:00 PM
7/8/2024	4:00 PM	6:00 PM	No	
7/15/2024	4:00 PM	6:00 PM	Yes	6:00 PM
7/16/2024	4:00 PM	6:00 PM	Yes	6:00 PM
7/31/2024	4:00 PM	6:00 PM	No	
8/1/2024	4:00 PM	6:00 PM	Yes	6:00 PM
8/5/2024	4:00 PM	6:00 PM	No	
8/27/2024	4:00 PM	6:00 PM	No	
8/28/2024	4:00 PM	6:00 PM	Yes	6:00 PM

The demand reductions were calculated for each event hour. Aggregate hourly results are provided below in Table 11-3 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 11-3 kW Reductions for Event Days by Hour

Date	*1:00 PM - 2:00 PM*	*2:00 PM - 3:00 PM*	*3:00 PM - 4:00 PM*	*4:00 PM - 5:00 PM*	*5:00 PM - 6:00 PM*	*6:00 PM - 7:00 PM*	*Event-Level Mean Hourly kW Reduction*	*Maximum Event Hour kW Reduction*
6/18/2024			117.21	1,662.56	1,782.90	-401.45	1,722.73	1,782.90
6/19/2024			-91.04	1,524.97	1,676.20	-529.65	1,600.59	1,676.20
6/20/2024			-32.37	1,700.78	1,866.38	-423.21	1,783.58	1,866.38
6/21/2024		51.74	1,827.88	1,947.44	2,017.18	-507.15	1,930.83	2,017.18
7/8/2024			-41.15	1,305.84	1,598.67	-413.12	1,452.26	1,598.67
7/15/2024			21.26	1,741.19	1,847.33	-486.97	1,794.26	1,847.33
7/16/2024			-61.18	1,354.37	1,244.13	-674.95	1,299.25	1,354.37
7/31/2024			63.95	1,467.21	1,587.48	-508.34	1,527.35	1,587.48
8/1/2024			29.54	1,576.01	1,520.90	-703.47	1,548.46	1,576.01
8/5/2024			79.58	1,550.71	1,956.13	-236.73	1,753.42	1,956.13
8/27/2024			-3.43	2,264.12	2,003.33	-736.51	2,133.72	2,264.12
8/28/2024			-20.88	1,799.13	1,743.43	-1,077.36	1,771.28	1,799.13

Table 11-4 presents average participant demand reductions for each event hour.

Table 11-4 Average Participant kW Reductions for Event Days by Hour

Date	*1:00 PM - 2:00 PM*	*2:00 PM - 3:00 PM*	*3:00 PM - 4:00 PM*	*4:00 PM - 5:00 PM*	*5:00 PM - 6:00 PM*	*6:00 PM - 7:00 PM*	*Event-Level Mean Hourly kW Reduction*	*Maximum Event Hour kW Reduction*
6/18/2024			0.06	0.86	0.92	-0.21	0.89	0.92
6/19/2024			-0.05	0.78	0.86	-0.27	0.82	0.86
6/20/2024			-0.02	0.87	0.96	-0.22	0.92	0.96
6/21/2024		0.03	0.94	1.00	1.03	-0.26	0.99	1.03
7/8/2024			-0.02	0.64	0.79	-0.20	0.72	0.79
7/15/2024			0.01	0.85	0.90	-0.24	0.88	0.90
7/16/2024			-0.03	0.66	0.61	-0.33	0.64	0.66
7/31/2024			0.03	0.68	0.73	-0.24	0.71	0.73
8/1/2024			0.01	0.73	0.71	-0.33	0.72	0.73
8/5/2024			0.04	0.72	0.91	-0.11	0.81	0.91
8/27/2024			0.00	0.93	0.83	-0.30	0.88	0.93
8/28/2024			-0.01	0.74	0.71	-0.44	0.72	0.74

A summary of the aggregate demand reductions occurring during PJM 5CP hours is presented below in Table 11-5.

Table 11-5 Summary of kW Reductions during PJM 5CP Events

Date	*Hour Start*	*Hour End*	*Ex Post Net kW Savings*
6/21/2024	5:00 PM	6:00 PM	2,017.18
7/15/2024	5:00 PM	6:00 PM	1,847.33
7/16/2024	5:00 PM	6:00 PM	1,244.13
8/1/2024	5:00 PM	6:00 PM	1,520.90
8/28/2024	5:00 PM	6:00 PM	1,743.43
Maximum Event Hour Peak kW Reduction			2,017.18
Average Event Hour Peak kW Reduction			1,674.59

Figure 11-1 through Figure 11-12 graphically present average participant actual and predicted energy usage for each event day.

Figure 11-1 June 18, 2024 Event Average Participant Actual and Predicted Energy Usage

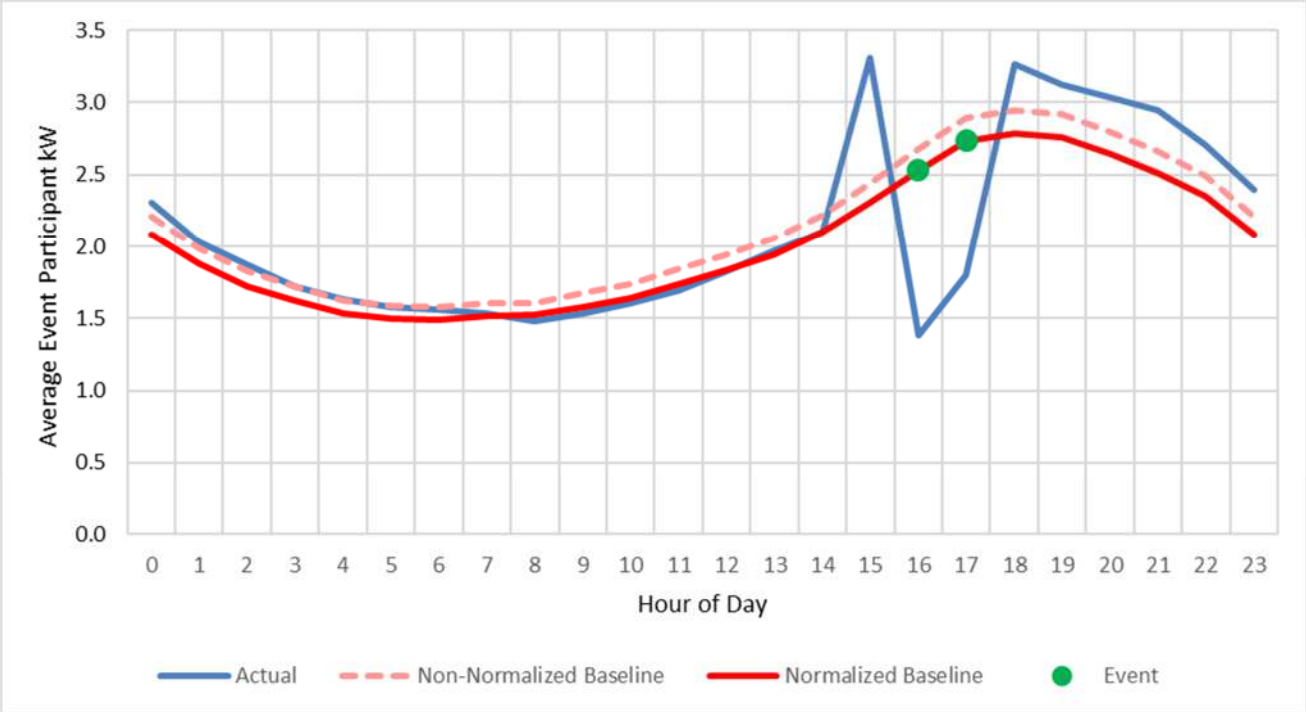


Figure 11-2 June 19, 2024 Event Average Participant Actual and Predicted Energy Usage

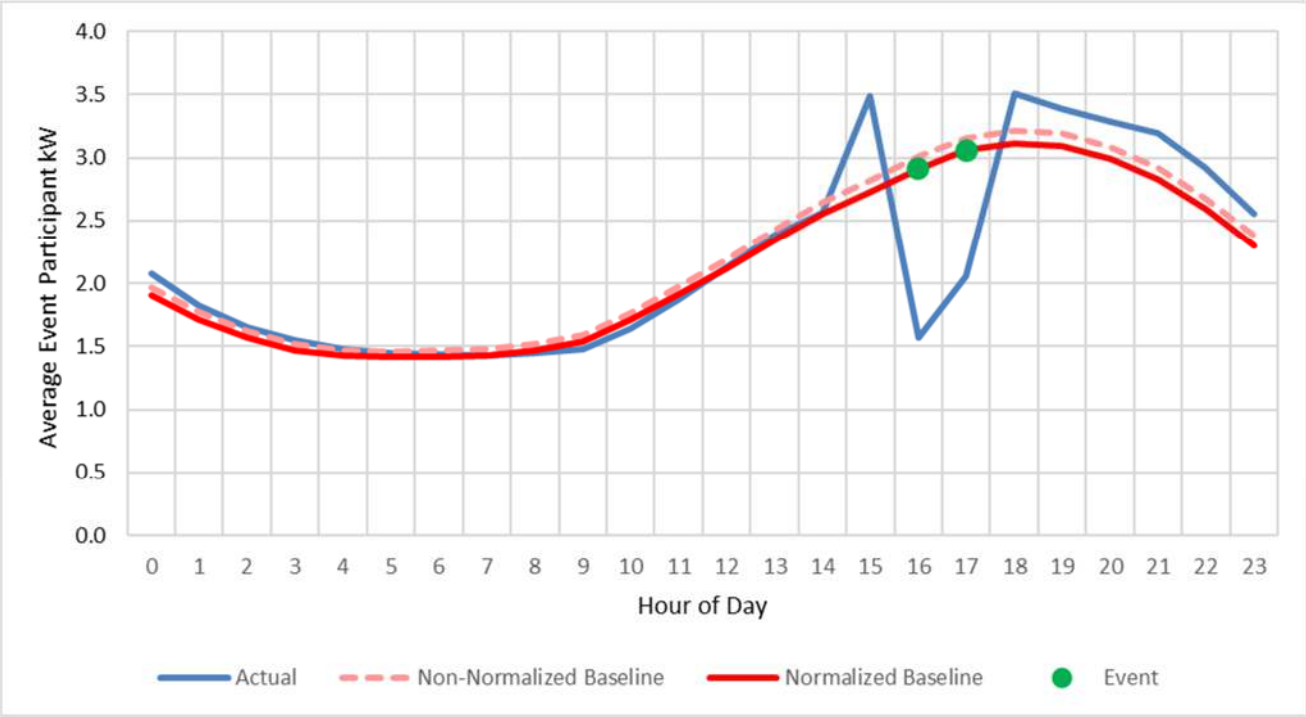


Figure 11-3 June 20, 2024 Event Average Participant Actual and Predicted Energy Usage

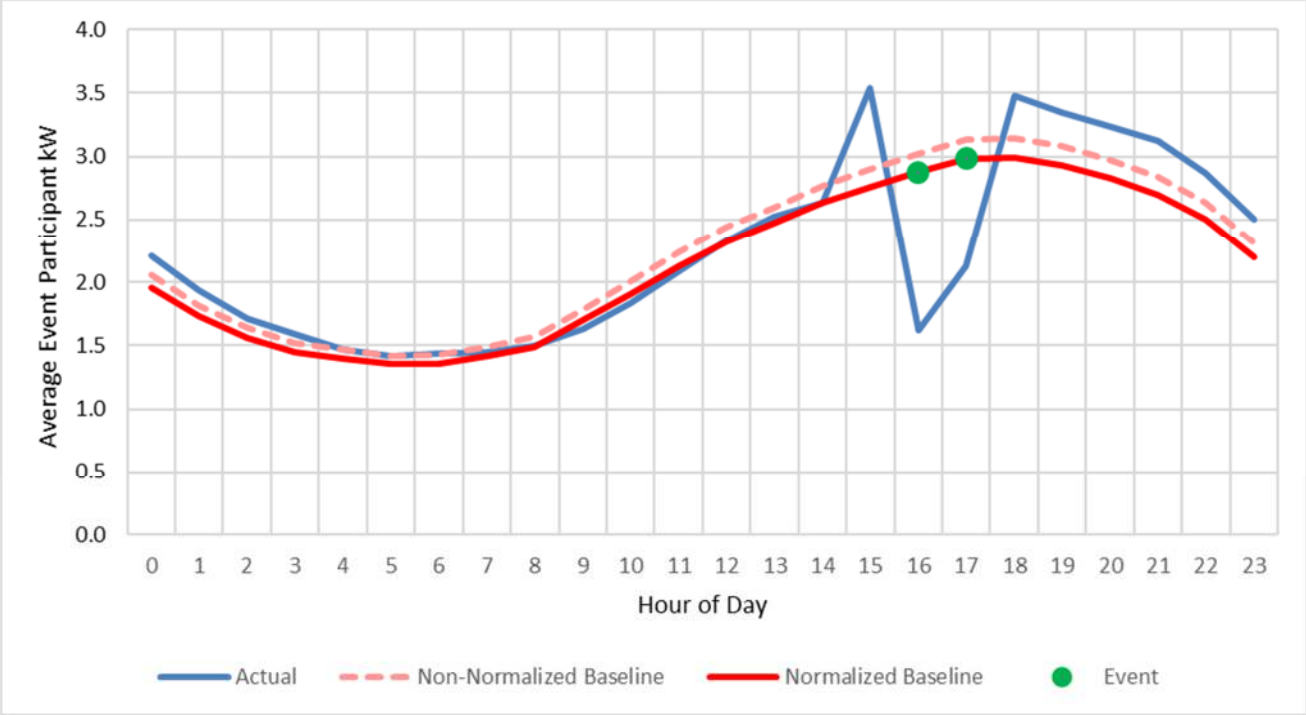


Figure 11-4 June 21, 2024 Event Average Participant Actual and Predicted Energy Usage

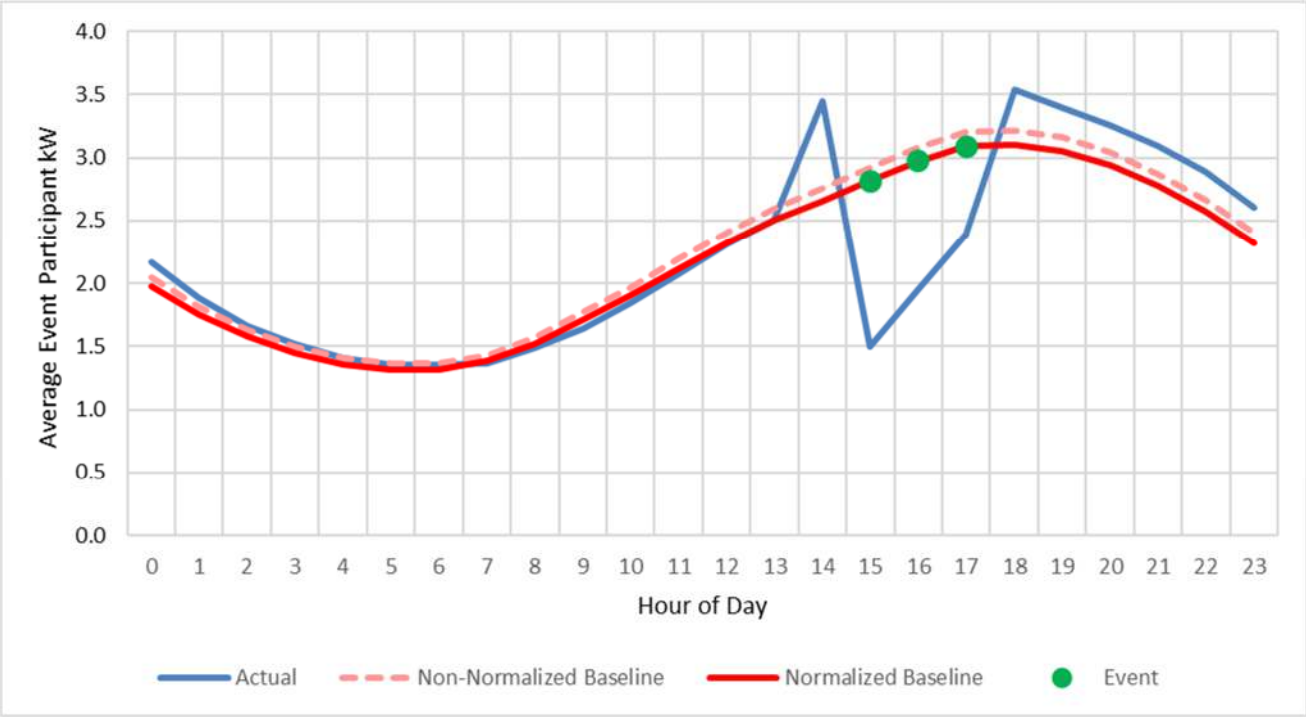


Figure 11-5 July 8, 2024 Event Average Participant Actual and Predicted Energy Usage

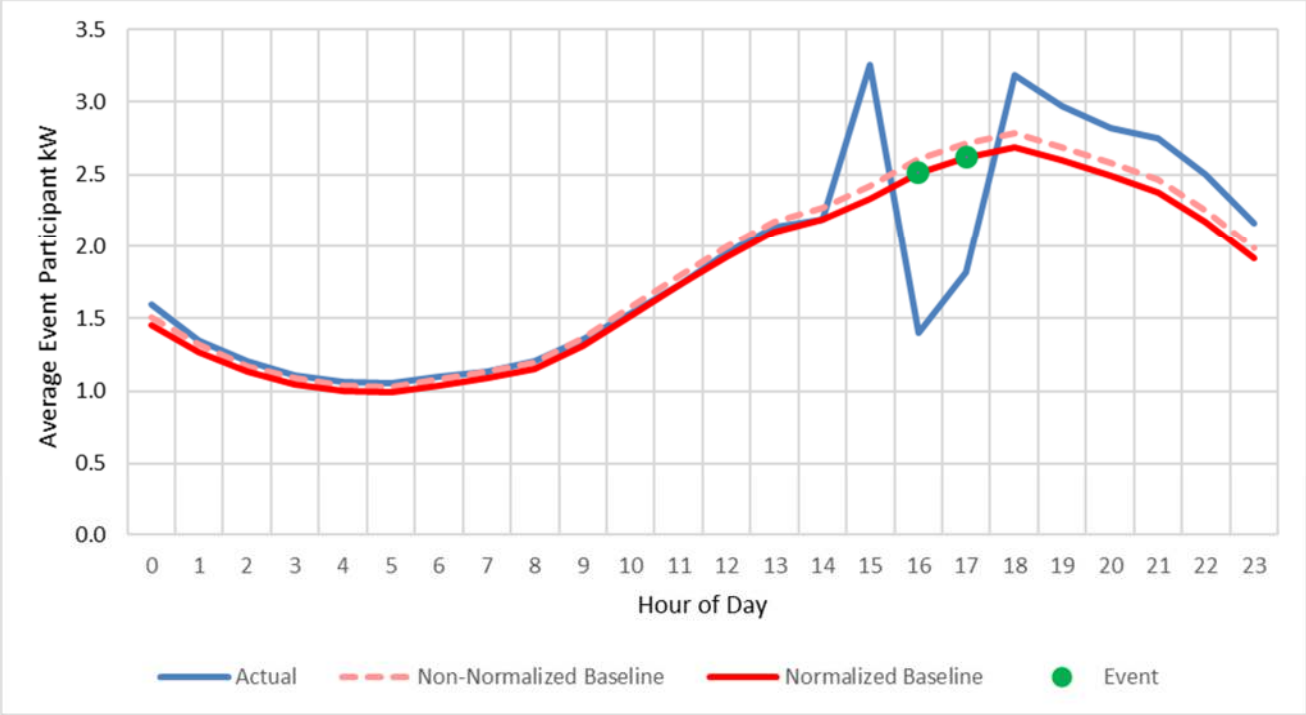


Figure 11-6 July 15, 2024 Event Average Participant Actual and Predicted Energy Usage

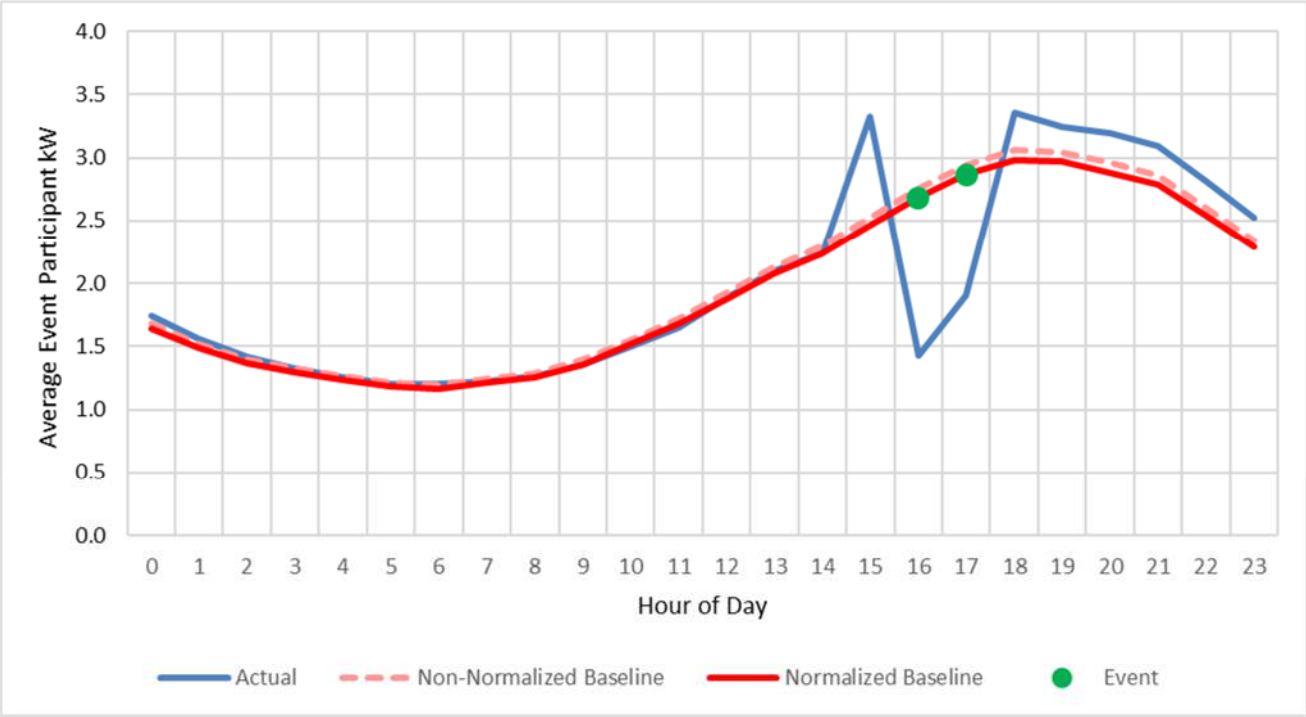


Figure 11-7 July 16, 2024 Event Average Participant Actual and Predicted Energy Usage

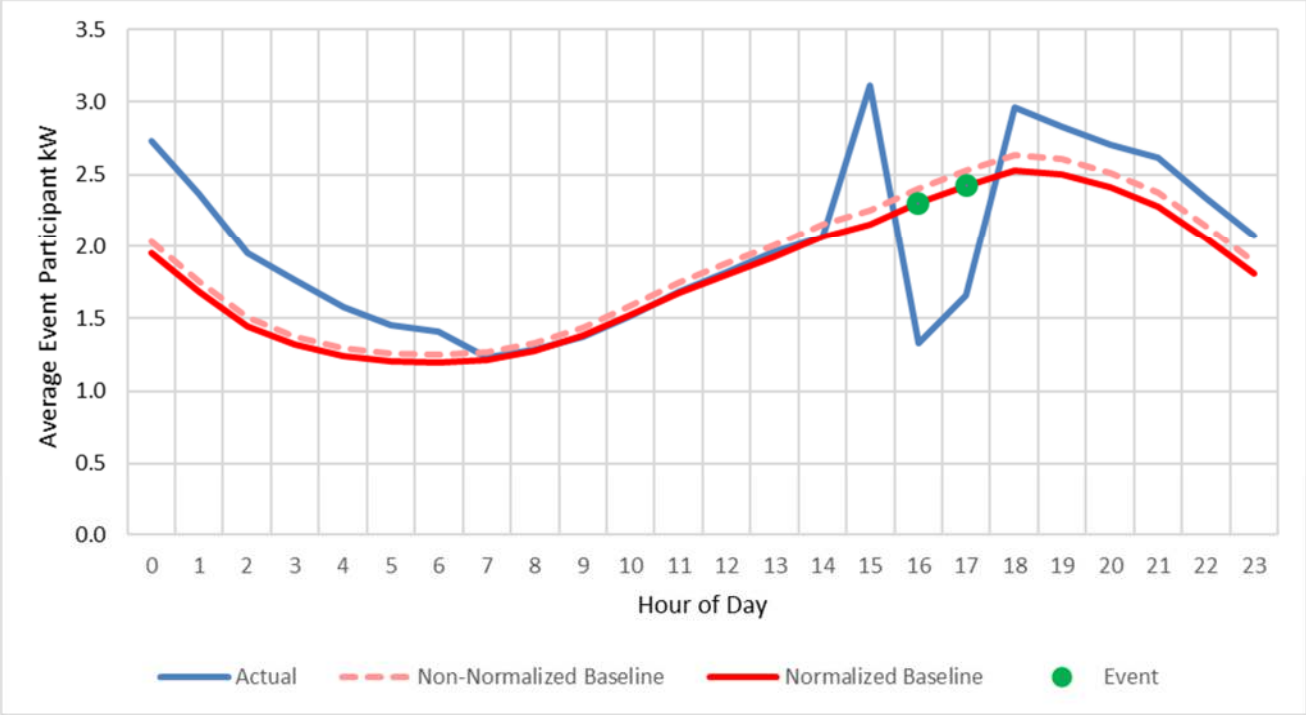


Figure 11-8 July 31, 2024 Event Average Participant Actual and Predicted Energy Usage

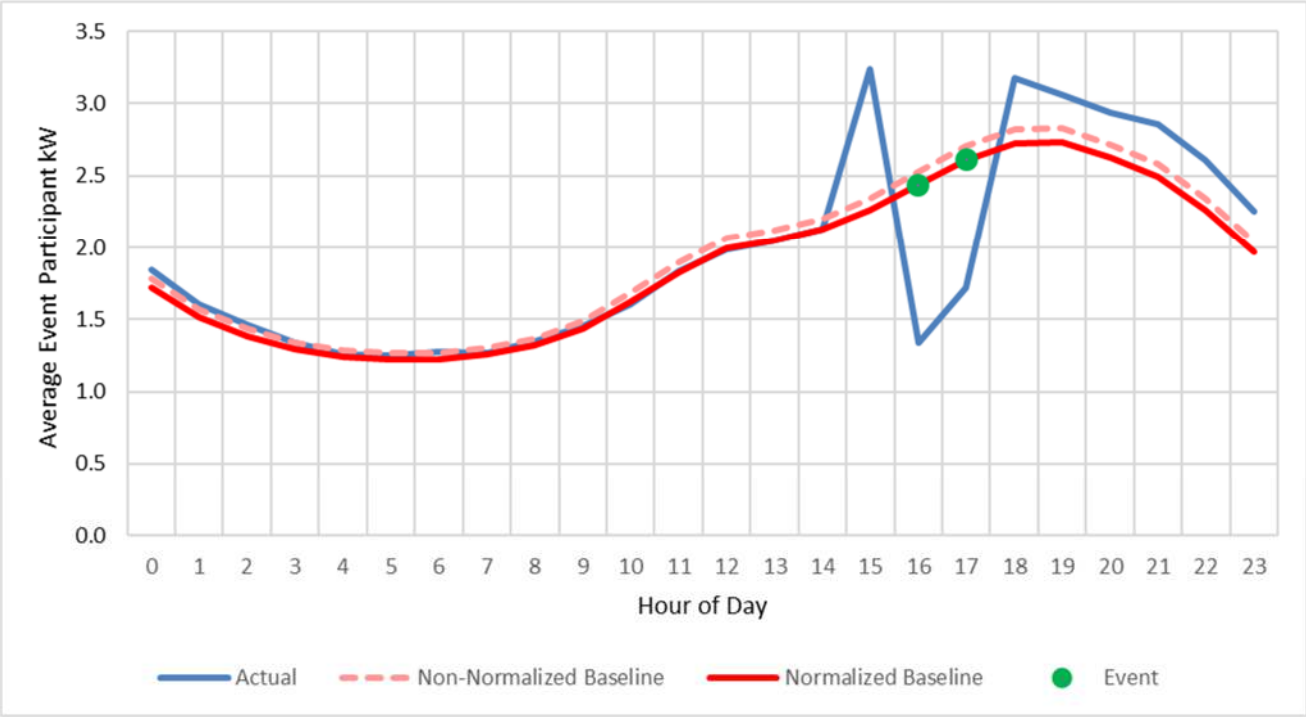


Figure 11-9 August 1, 2024 Event Average Participant Actual and Predicted Energy Usage

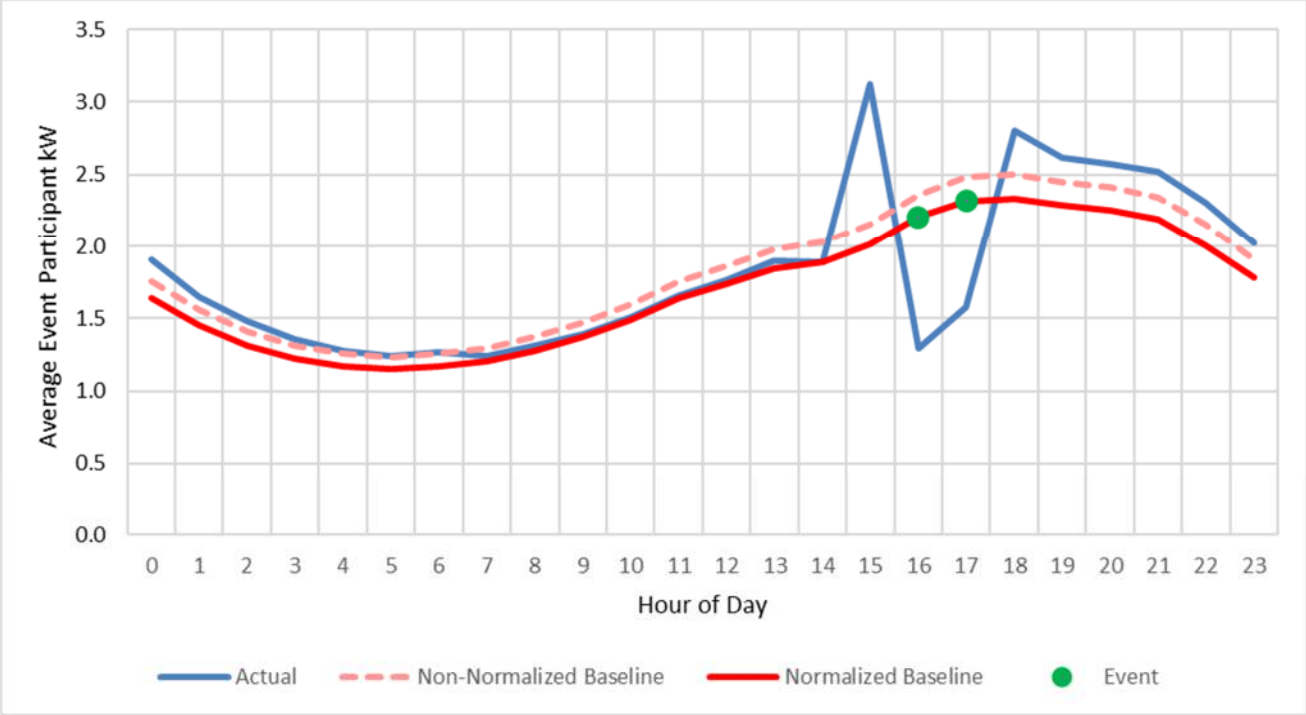


Figure 11-10 August 5, 2024 Event Average Participant Actual and Predicted Energy Usage

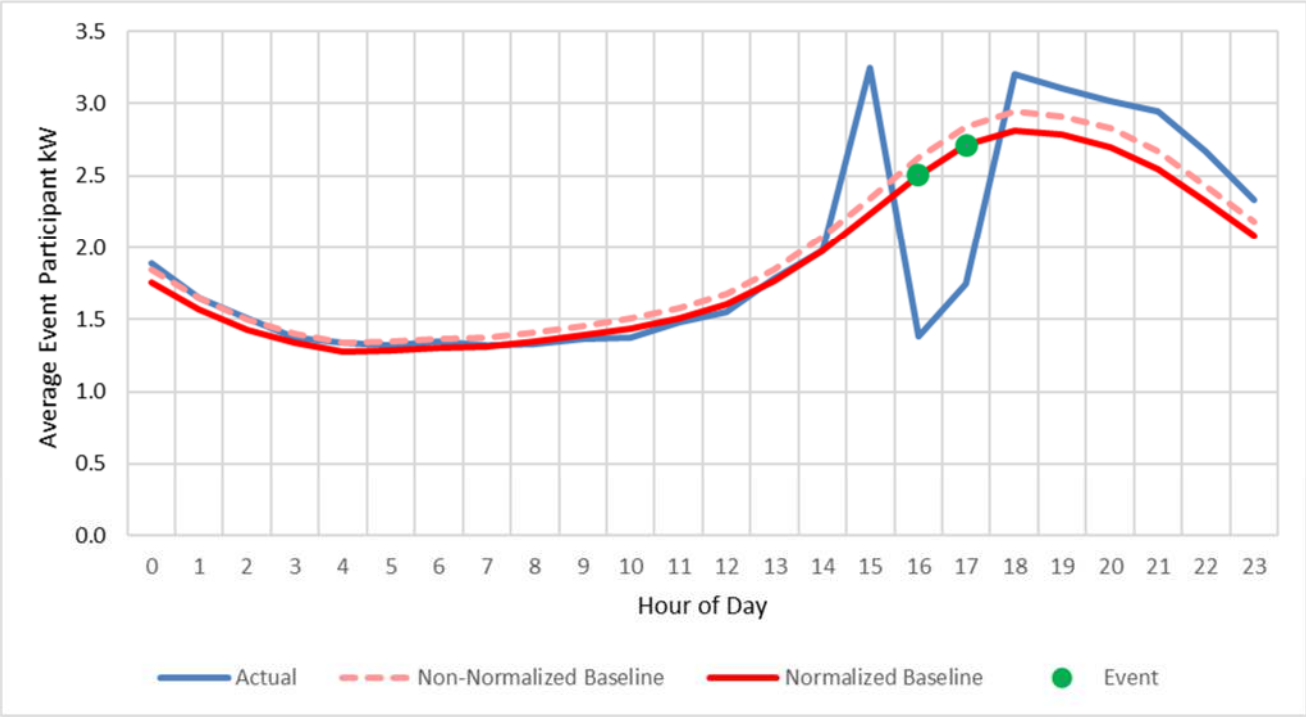


Figure 11-11 August 27, 2024 Event Average Participant Actual and Predicted Energy Usage

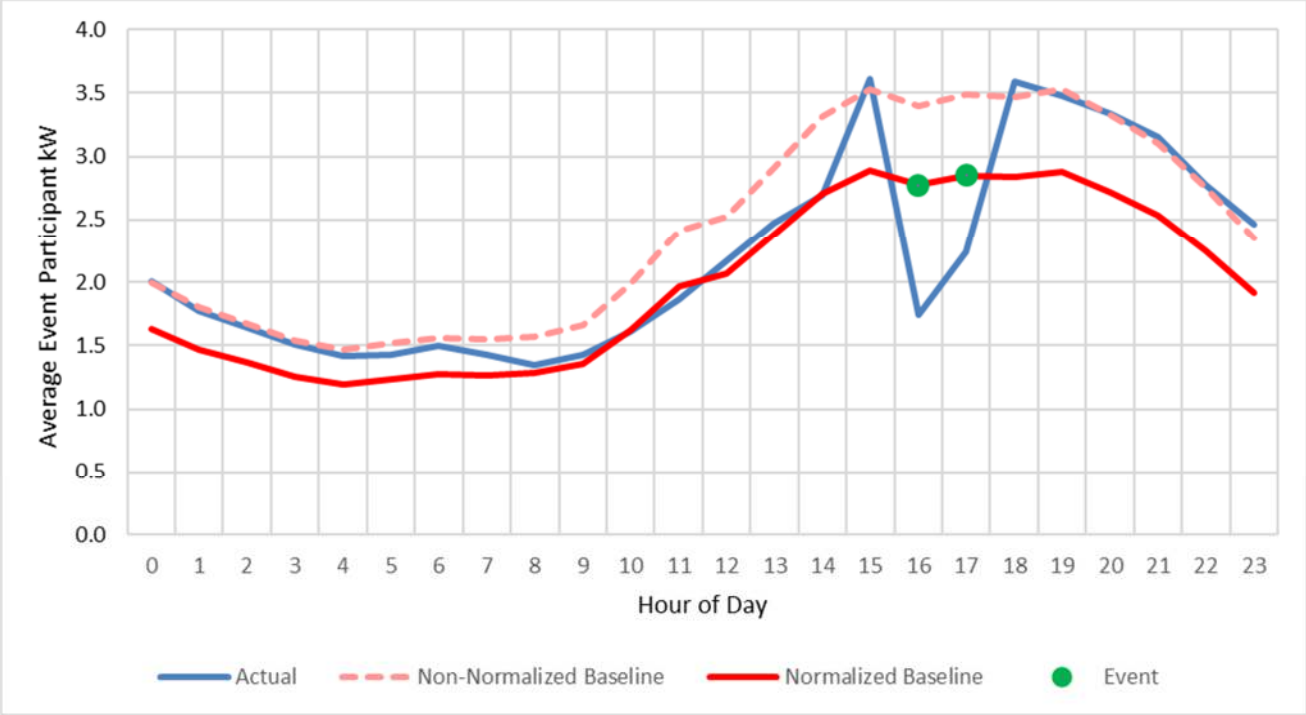
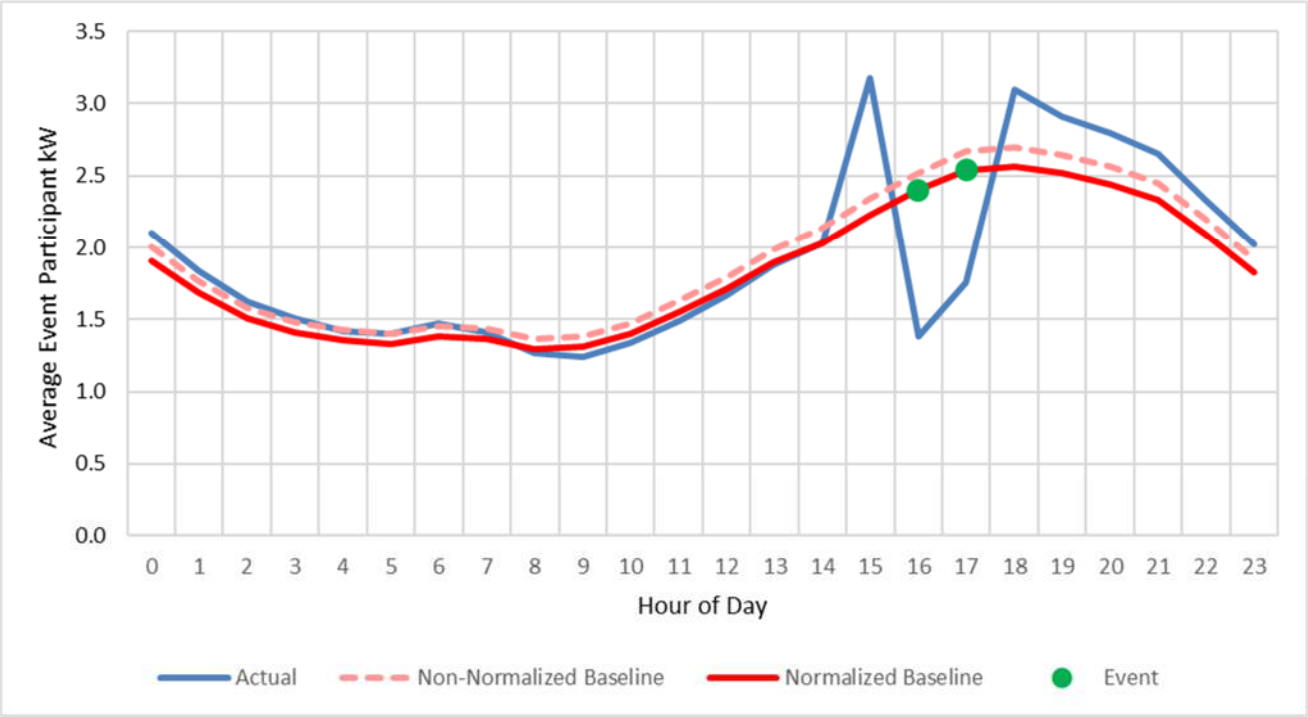


Figure 11-12 August 28, 2024 Event Average Participant Actual and Predicted Energy Usage



11.3.2.1. Ex Post Gross kWh Savings

Table 11-6 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 11-6 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*
12,432	12,432	12,432	35,981	289%

11.3.2.2. Ex Post Gross kW Savings

Table 11-7 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 11-7 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*
1,910.03	1,910.03	1,910.03	1,674.59	88%

11.4. Estimation of Ex Post Net Savings

11.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 11.3 net savings estimates.

11.4.2. Results of Ex Post Net Savings Estimation

Table 11-8 summarizes the ex post annual net kWh and kW savings of the Residential HVAC DLC Program. The annual net savings totaled 35,981 kWh and 1,647.59 kW.

Table 11-8 Program-Level Annual Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	12,432	1,910.03
Gross Audited Savings	12,432	1,910.03
Gross Verified Savings	12,432	1,910.03
Ex Post Gross Savings	35,981	1,674.59
Gross Realization Rate	289%	88%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	35,981	1,674.59
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	719,612	N/A

11.5. 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.

11.5.1. Participant Survey Findings

ADM surveyed customers who participated in the Residential HVAC DLC Program. Customers were surveyed online about their experience with peak events, program enrollment, satisfaction,

and home characteristics. Participants were contacted up to three times, resulting in 71 survey responses.

11.5.1.1. Net Promoter Score

More than half of the respondents were net promoters. Based on the survey findings, 16% of respondents are classified as Detractors, 25% as Passive, and 59% as Promoters in terms of their likelihood to recommend the program to others (see Figure 11-13). The Net Promoter Score (NPS) for the Residential HVAC DLC Program was 44%.

Figure 11-13 Net Promoter Score (n = 71)

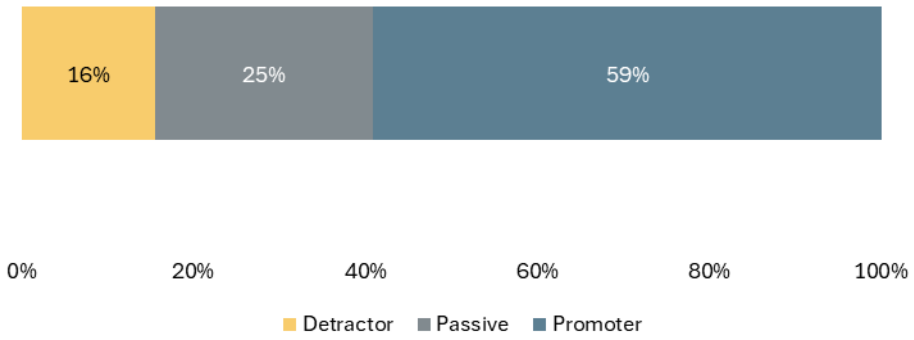


Table 11-9 summarizes the categorized reasons respondents gave for the likelihood of recommending the program rating that that they gave. The key findings are summarized below.

Promoters were pleased with the program, praising its ease, convenience, and lack of disruptions. Many enjoyed lower energy bills and didn't notice a decrease in comfort during hot days. The chance to earn rewards like gift cards was also valued. Positive customer service and clear communication about benefits were noted. Some participants recommended the program to friends and family, highlighting it as an easy and effective way to save money and energy.

Detractors expressed dissatisfaction primarily due to perceived low savings and lack of noticeable benefits. Some participants reported higher energy bills, with one frustrated over substantial increases in their bills. Equipment issues and dissatisfaction from technicians were noted. Several found the rewards insufficient for enduring hotter homes during peak hours. Others criticized poor notifications about energy events or found the program confusing, unsure of its benefits. A few mentioned difficulties with the program's processes, adding to their negative experiences.

Passive respondents had mixed or neutral opinions about the program. Some found it beneficial but were still exploring its advantages. Others needed more clarity on personal savings

or felt the program wasn't well explained initially. A few were unsure of its purpose or felt it was too soon to judge its benefits. Some had limited chances to recommend it due to personal.

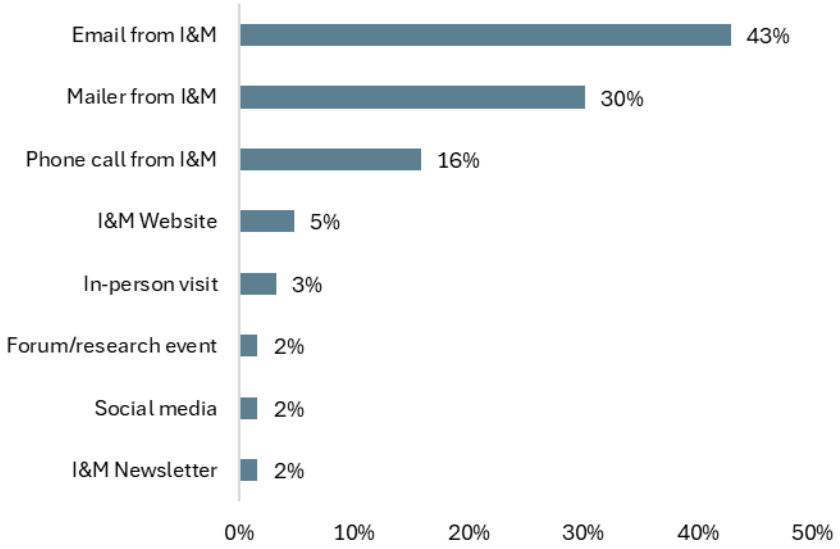
Table 11-9 Reason for NPS Rating

Promoters (n = 42)	*Number of Comments (n = 37)*
Ease and convenience	15
Savings and financial incentives	13
Advocacy and likely to recommend to others	6
Environmental and social responsibility	4
Detractors (n = 11)	*Number of Comments (n = 10)*
Dissatisfaction with program impact	5
Technical issues and equipment problems	3
Uncertainty or lack of clarity	2
Passive (n = 18)	*Number of Comments (n = 12)*
Lack of awareness or understanding of the program	6
Neutral opinion	3
Interest in savings and rewards	2
Found the program to be useful	1

11.5.1.2. Engagement

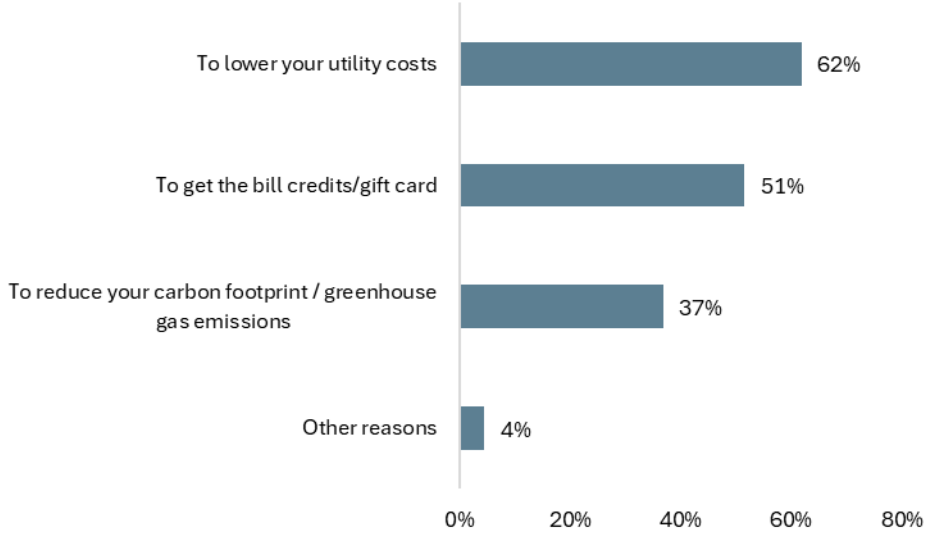
Most survey respondents learned of the Residential HVAC DLC program through an I&M email. Participants provided feedback on how they initially became aware of the program, with 43% learning about it through email communication from I&M, followed by 30% who discovered it via an I&M mailer, and 16% who learned of the program from a phone call from I&M (see Figure 11-14).

Figure 11-14 Source of Awareness



Most respondents were motivated to participate to reduce their utility expenses. Most participants cited their primary motivation as wanting to lower their utility costs, with 62% of respondents indicating this as a key factor. Additionally, 51% 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 37% of participants (see Figure 11-15).

Figure 11-15 Motivation for Participating in Residential HVAC DLC Program



11.5.1.3. Enrollment and AC Installation

Before enrolling in the program, participants accessed information through various channels. Nearly half (49%) received emails, 29% received mailed information, and 24% visited

the website. Additionally, 29% reported other methods, primarily involving phone calls or direct conversations with representatives, with some reaching out to the utility for more details. A few participants could not recall how they first learned about the program due to the time that had passed since enrollment.

Participants generally felt the information they received or viewed before deciding to participate in the program addressed their information needs. The majority, 68%, rated the information as a 4 or 5 on a 5-point scale (see Table 11-10). A small percentage (8%) rated the information as a 1 or 2, indicating that they found it less helpful in addressing their questions. Five percent of respondents did not receive or view any information before participating.

Table 11-10 Effectiveness of Obtained Information in Addressing Pre-Participation Questions

Response	*Percentage of Responses (n = 66)*
1 (Not at all)	2%
2	6%
3	20%
4	30%
5 (Completely)	38%
Did not receive or view information	5%

11.5.1.4. Peak Energy Use Events

Most respondents reported no impact on home comfort during these events and believed the number of events was about right. Seventy-seven percent indicated they were at home when these events occurred. Most (81%) indicated it did not affect their comfort, whereas 20% reported experiencing minor discomfort (see Table 11-11).

Table 11-11 Effect of Peak Events on Home Comfort

Response	Percentage of Responses (n = 48)
No effect of comfort	81%
Made the home a little uncomfortable	15%
Made the home moderately uncomfortable	2%
Made the home very uncomfortable	2%

The number and duration of the events were generally agreeable to participants. Most survey respondents (93%) indicated the number of Peak Energy Events was about right, while 3% thought there were too few and 3% believed there were too many. Most respondents (65%) did not observe the length of the Peak Energy Use Events. Of those who did, 29% believed the duration was

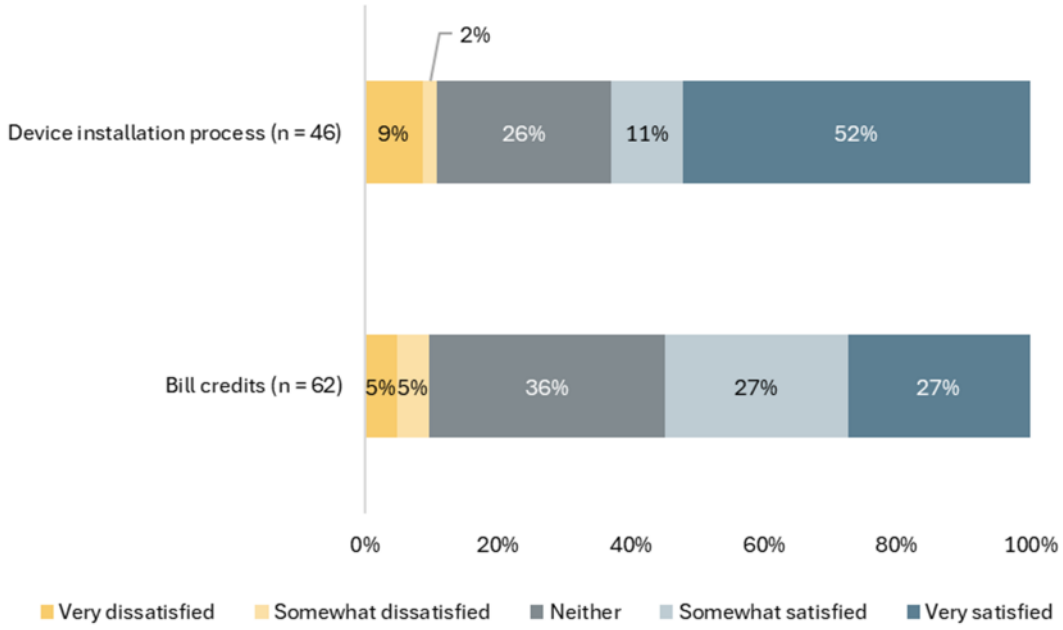
appropriate. Smaller groups thought the events were too long, with 3% saying they were much too lengthy, 2% feeling they were somewhat too long, and another 2% believing they were a little too long.

11.5.1.5. 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. Fifty-five percent of respondents expressed satisfaction with the bill credits for Peak Events, with 27% being very satisfied and 27% somewhat satisfied. See Figure 11-16 for more details.

Satisfaction with the device installation process was also high, with 52% indicating they were very satisfied and 11% somewhat satisfied. The issues noted by dissatisfied participants included a failed air compressor after installation and not receiving advance notice of the installation.

Figure 11-16 Satisfaction with Device Installation and Bill Credits



Overall satisfaction with the Residential HVAC DLC Program varied among participants. Specifically, 7% reported being very dissatisfied, 2% somewhat dissatisfied, and 29% indicated they were neither satisfied nor dissatisfied. In contrast, 24% of participants were somewhat satisfied, while a majority of 39% expressed that they were very satisfied with the program (see Table 11-12). More than half (59%) 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 11-12 Overall Satisfaction with the Residential HVAC DLC Program

Response	Percentage of Responses (n = 62)
Very dissatisfied	7%
Somewhat dissatisfied	2%
Neither satisfied nor dissatisfied	29%
Somewhat satisfied	24%
Very satisfied	39%

Participants offered suggestions to improve satisfaction with the program, focusing on better communication about results and events. They requested text alerts, detailed credit emails, and more notifications about upcoming activities. Some were confused due to a lack of information on peak energy times and credits. Concerns included the effectiveness of the program, with one participant noting that a $2.40 credit didn't lead to actual savings due to unit overtime. Others wanted higher rewards or incentives like gift cards. While some were very satisfied, many desired clearer communication and greater benefits.

11.5.1.6. Demographic Findings

Survey results show that 94% of participants own their homes, while 5% rent. All respondents' homes are their primary residences. Most homes (92%) are single-family detached houses, 3% are manufactured homes, and 3% are attached single-family houses like duplexes or townhomes.

The Residential HVAC DLC program targets lower-income households, seniors, and those lacking high-speed internet for demand response efforts. Surveys show it has successfully enrolled many older customers, with 70% of participants aged 65 or above. Comparative analysis indicates that HVAC DLC participants generally have lower incomes than those in the Home Energy Management program. Specifically, 38% of HVAC DLC participants reported an annual income of $50,000 or less.

11.6. Findings and Recommendations

Direct to customer communications in the form of emails, mailers, and phone calls drove enrollments in the program. Eighty-nine percent of respondents learned about the program from one of these outreach approaches, with emails and mailers accounting for 73% of enrollments.

The information provided about the program met most participants needs. Sixty-eight percent reported that the information completely or mostly met their needs, while a few participants said it mostly did not meet their needs.

Most participants experienced minimal comfort impacts. Ninety-six reported no or minimal discomfort during events. Similarly, 65% were unaware of how long events lasted and 29% thought the duration of events was appropriate.

Participants were generally satisfied with the program overall. Sixty-three percent were somewhat or very satisfied with the program overall while a minority, 9%, expressed some dissatisfaction with the program.

12. 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 2024 through December 2024.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2024.
- 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.

12.1. Program Description

The Residential Residential IQ Water Heater DLC Program is offered to income qualified (income less than or equal to 200% of the federal poverty level) and/or senior citizen residential customers with AMI meters installed. Customers must own a working central air conditioning unit and have slow or unreliable internet service.

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

- Differently engage specific residential customer segments.
- Provide customers with a DLC demand response offering that requires little to no customer involvement.
- Require no customer ownership of DLC equipment.
- Augment I&M's demand response capabilities.

I&M will install a small device on participating customers' water heaters that will stop electricity consumption during peak energy use events. Events are anticipated to typically last about two to three hours and up to 15 events may be called during the months of May through September. Participating customers can earn $0.80 bill credit for one-hour events, $1.00 for two-hour events, and $1.10 for three-hour events.

I&M did not operate the Residential IQ Water Heater DLC Program in PY2024.

13. 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 2024 through December 2024.

The objectives of the evaluation were to:

- Estimate the achieved demand reduction (kW) in summer 2024;
- 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.

13.1. Program Description

The Residential Customer Engagement Demand Response Program is offered to I&M residential customers who live in the property and hold the account with I&M. Participating customers must have an AMI meter installed and opt-in to receive email and or text message peak energy use event alerts.

In this program, customers self-manage their energy used during peak events and can earn up to $1.00 for each kWh of load reduced during each event.

13.2. Data Collection

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

- Program tracking data from the primary tracking database.
- Customer AMI billing data and associated tariff code.
- Location specific weather data.
- Data from relevant secondary sources.

13.2.1. Participant Survey

ADM completed a survey of program participants to collect data on customer's experience with the program.

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 a participant survey to customers enrolled in the Customer Engagement Demand Response Program. The survey included customers who enrolled in 2023 or 2024. Table 13-1 presents a summary of the survey data collection efforts. Thirty-five respondents enrolled in 2023 and 44 in 2024.

Table 13-1 Residential Customer Engagement Demand Response Survey

Mode	*Time Frame*	*Number of Contacts*	*Number of Completions*	*Completion Rate*
Email	September 2024	1,843	79	4.3%

13.3. Estimation of Ex Post Gross Savings

13.3.1. Methodology for Estimating Ex Post Gross Energy Savings

13.3.1.1. Analysis of Peak Event Reductions and Energy Savings

The methodology discussed in Section 10.3.1.1 was used to estimate the savings resulting from the Peak Event Reductions.

13.3.1.2. 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.

13.3.2. 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 2024 Residential Customer Engagement Demand Response Program.

I&M initiated 9 load management events during the summer of 2024. As shown in Table 13-2 below, I&M was successful in initiating events that coincided with four of the five PJM coincident peak (CP) days.

Table 13-2 Demand Response Event Times

Date	*Event Start Time*	*Event Stop Time*	*Event Coincident with 5CP*	*PJM Coincident Peak Occurred During Hour Ending*
6/18/2024	4:00 PM	6:00 PM	No	
6/19/2024	4:00 PM	6:00 PM	No	
6/20/2024	4:00 PM	6:00 PM	No	
6/21/2024	3:00 PM	6:00 PM	Yes	6:00 PM
7/8/2024	4:00 PM	6:00 PM	No	
7/15/2024	4:00 PM	6:00 PM	Yes	6:00 PM
7/16/2024	4:00 PM	6:00 PM	Yes	6:00 PM
7/31/2024	4:00 PM	6:00 PM	No	
8/1/2024	4:00 PM	6:00 PM	Yes	6:00 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.

Table 13-3 kW Reductions for Event Days by Hour

Date	*1:00 PM - 2:00 PM*	*2:00 PM - 3:00 PM*	*3:00 PM - 4:00 PM*	*4:00 PM - 5:00 PM*	*5:00 PM - 6:00 PM*	*6:00 PM - 7:00 PM*	*Event-Level Mean Hourly kW Reduction*	*Maximum Event Hour kW Reduction*
6/18/2024			111.54	728.51	773.33	351.20	750.92	773.33
6/19/2024			47.49	740.34	822.93	428.68	781.63	822.93
6/20/2024			159.15	688.15	862.09	122.11	775.12	862.09
6/21/2024		168.14	563.72	660.33	633.24	122.48	619.10	660.33
7/8/2024			250.38	1,117.54	1,415.25	458.06	1,266.39	1,415.25
7/15/2024			133.07	988.44	1,193.35	309.79	1,090.90	1,193.35
7/16/2024			19.61	577.35	653.19	296.50	615.27	653.19
7/31/2024			129.00	746.53	906.07	328.97	826.30	906.07
8/1/2024			135.49	826.47	645.06	105.94	735.76	826.47

Table 13-4 presents average participant demand reductions for each event hour.

Table 13-4 Average Participant kW Reductions for Event Days by Hour

Date	*1:00 PM - 2:00 PM*	*2:00 PM - 3:00 PM*	*3:00 PM - 4:00 PM*	*4:00 PM - 5:00 PM*	*5:00 PM - 6:00 PM*	*6:00 PM - 7:00 PM*	*Event-Level Mean Hourly kW Reduction*	*Maximum Event Hour kW Reduction*
6/18/2024			0.01	0.10	0.10	0.05	0.10	0.10
6/19/2024			0.01	0.10	0.11	0.06	0.10	0.11
6/20/2024			0.02	0.09	0.11	0.02	0.10	0.11
6/21/2024		0.02	0.07	0.09	0.08	0.02	0.08	0.09
7/8/2024			0.03	0.13	0.16	0.05	0.14	0.16
7/15/2024			0.02	0.11	0.14	0.04	0.12	0.14
7/16/2024			0.00	0.07	0.07	0.03	0.07	0.07
7/31/2024			0.01	0.09	0.10	0.04	0.09	0.10
8/1/2024			0.02	0.09	0.07	0.01	0.08	0.09

A summary of the aggregate demand reductions occurring during PJM 5CP hours is presented below in Table 13-5.

Table 13-5 Summary of kW Reductions during PJM 5CP Events

Date	*Hour Start*	*Hour End*	*Ex Post Net kW Savings*
6/21/2024	5:00 PM	6:00 PM	633.24
7/15/2024	5:00 PM	6:00 PM	1,193.35
7/16/2024	5:00 PM	6:00 PM	653.19
8/1/2024	5:00 PM	6:00 PM	645.06
8/28/2024	5:00 PM	6:00 PM	n/a
Maximum Event Hour Peak kW Reduction			1,193.35
Average Event Hour Peak kW Reduction			781.21

Figure 13-1 through Figure 13-7 graphically present average participant actual and predicted energy usage for each event day.

Figure 13-1 June 18, 2024 Event Average Participant Actual and Predicted Energy Usage

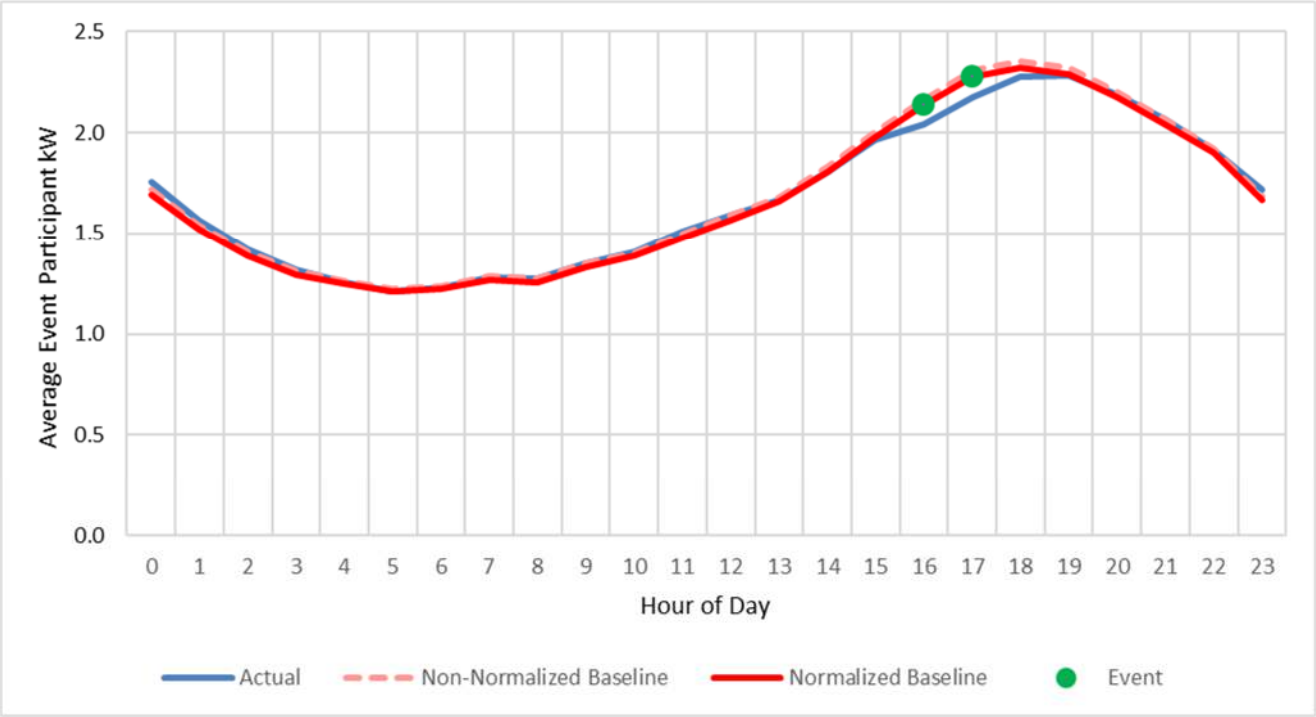


Figure 13-2 June 19, 2024 Event Average Participant Actual and Predicted Energy Usage

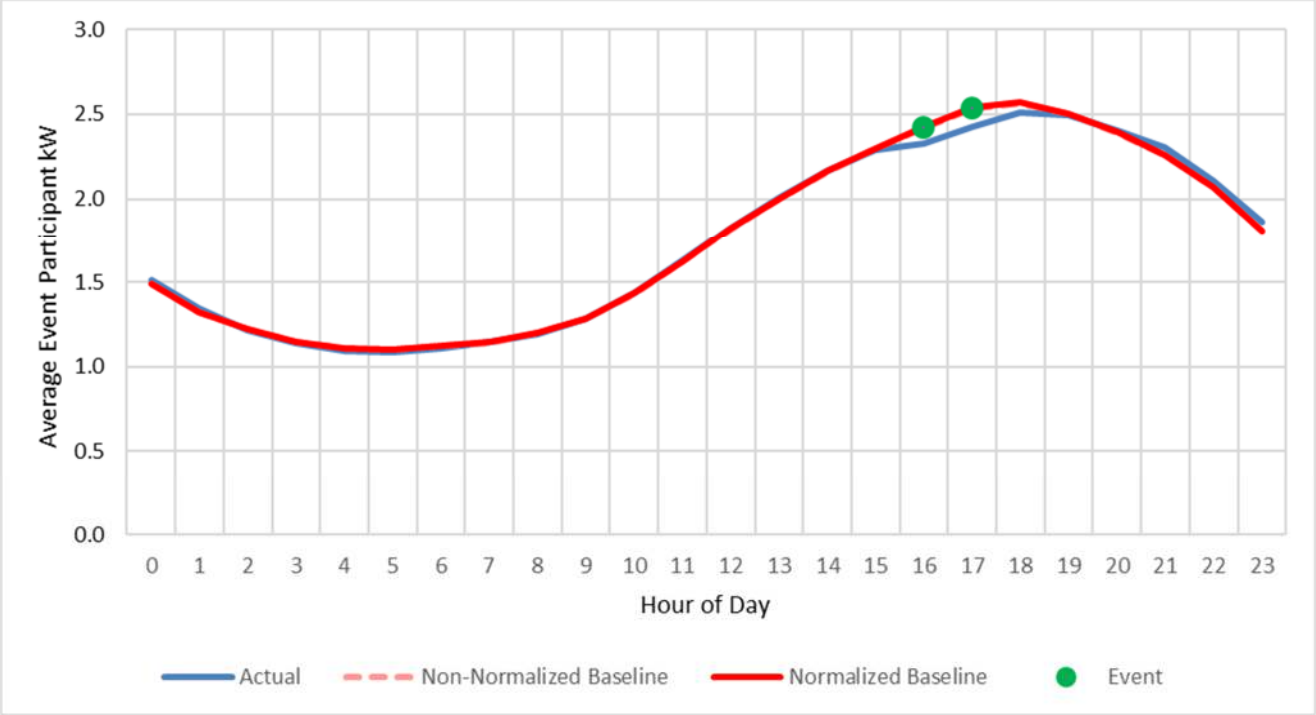


Figure 13-3 June 20, 2024 Event Average Participant Actual and Predicted Energy Usage

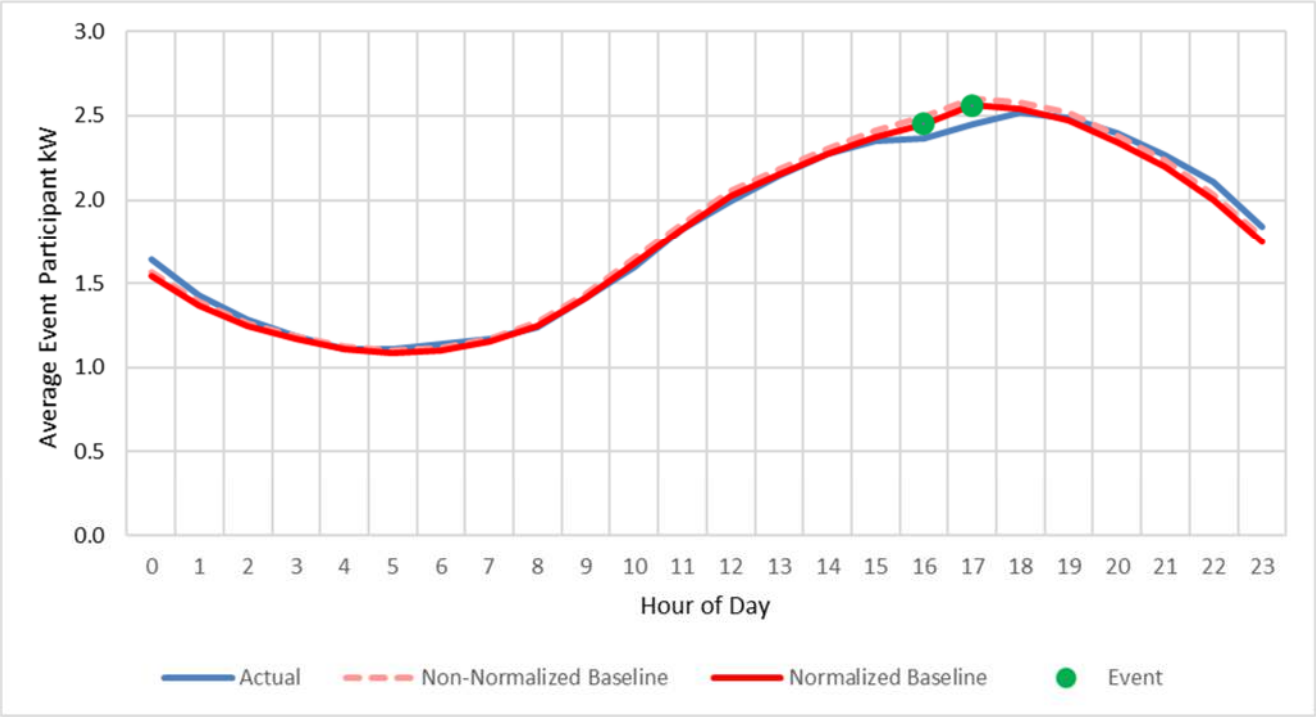


Figure 13-4 June 21, 2024 Event Average Participant Actual and Predicted Energy Usage

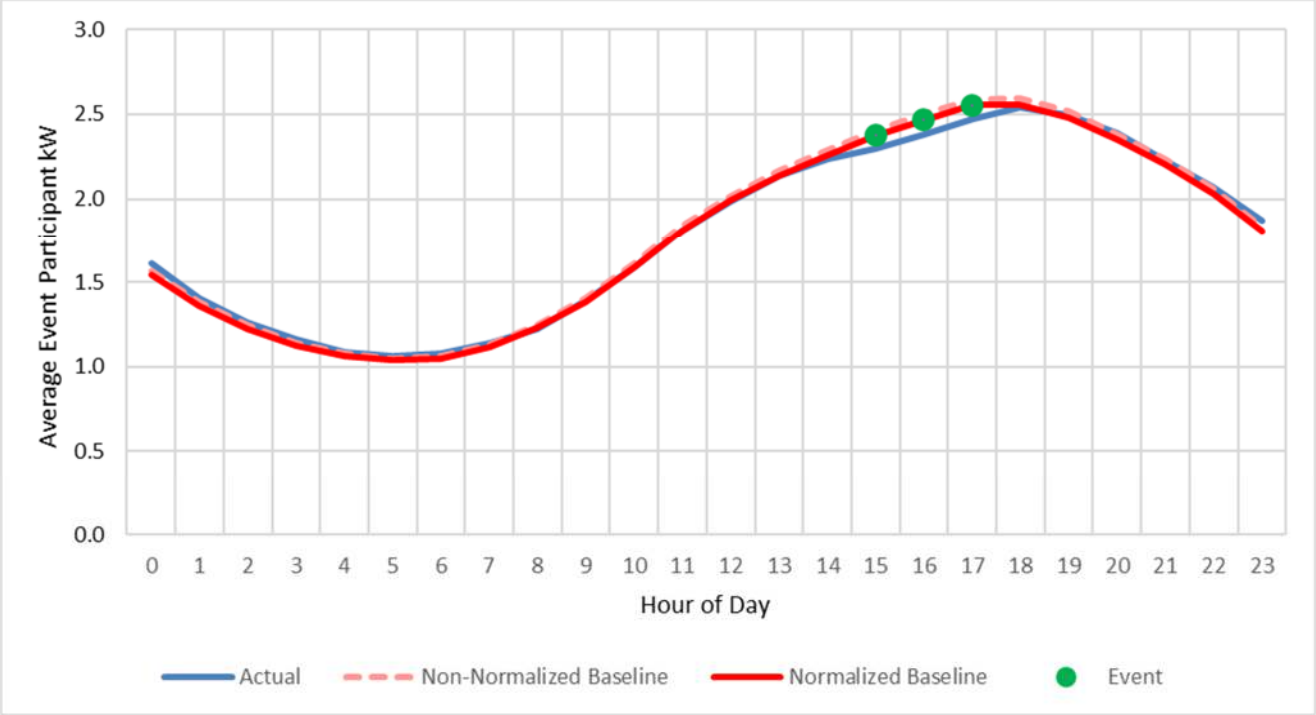


Figure 13-5 July 8, 2024 Event Average Participant Actual and Predicted Energy Usage

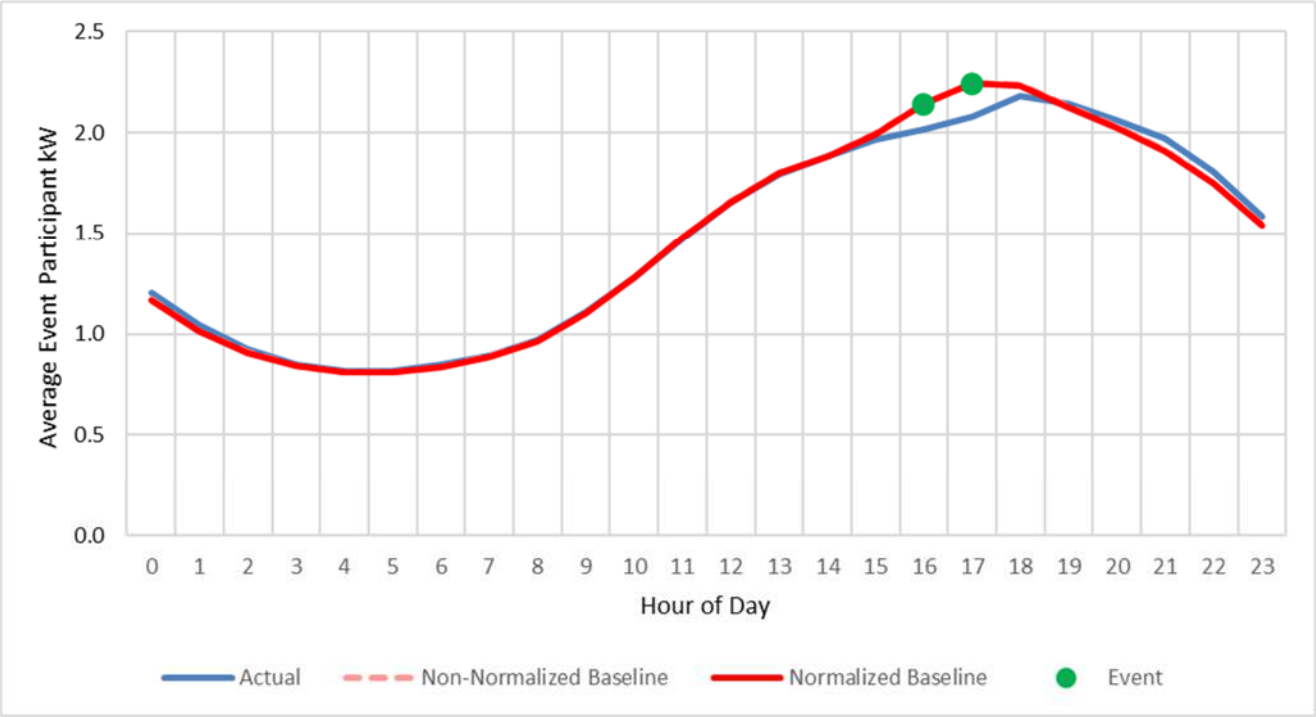


Figure 13-6 July 15, 2024 Event Average Participant Actual and Predicted Energy Usage

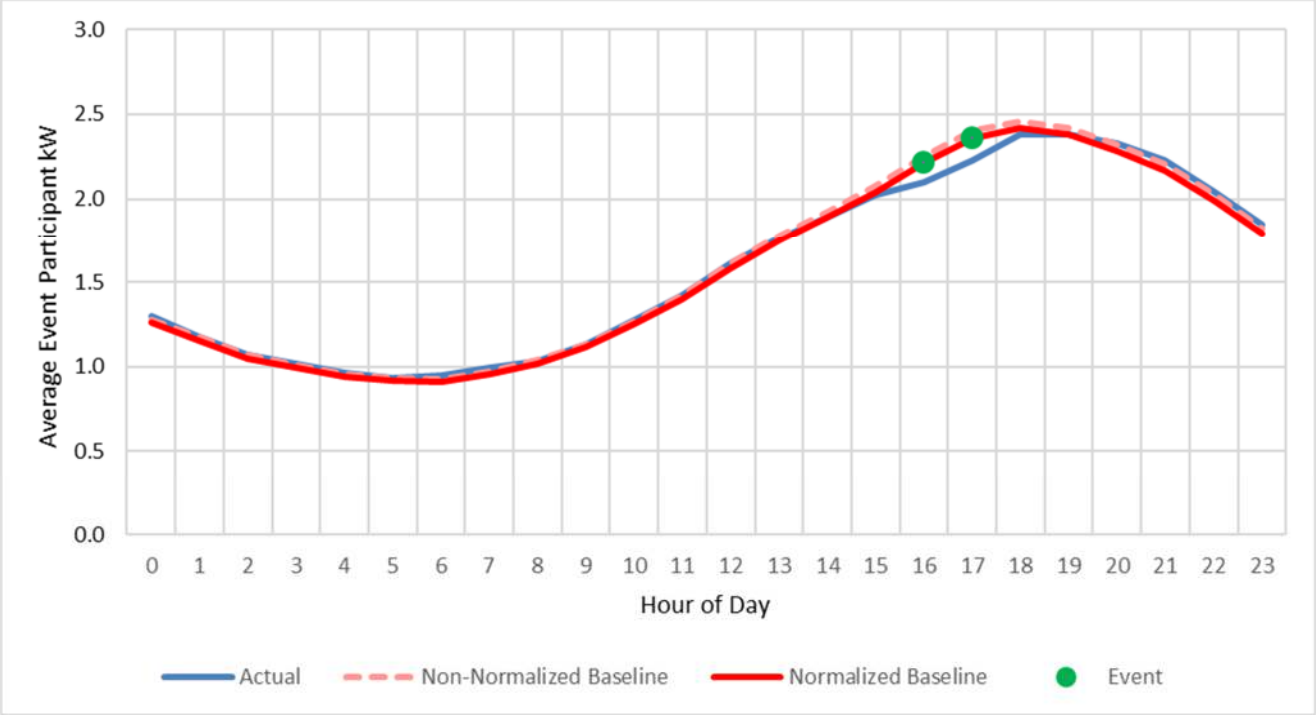


Figure 13-7 July 16, 2024 Event Average Participant Actual and Predicted Energy Usage

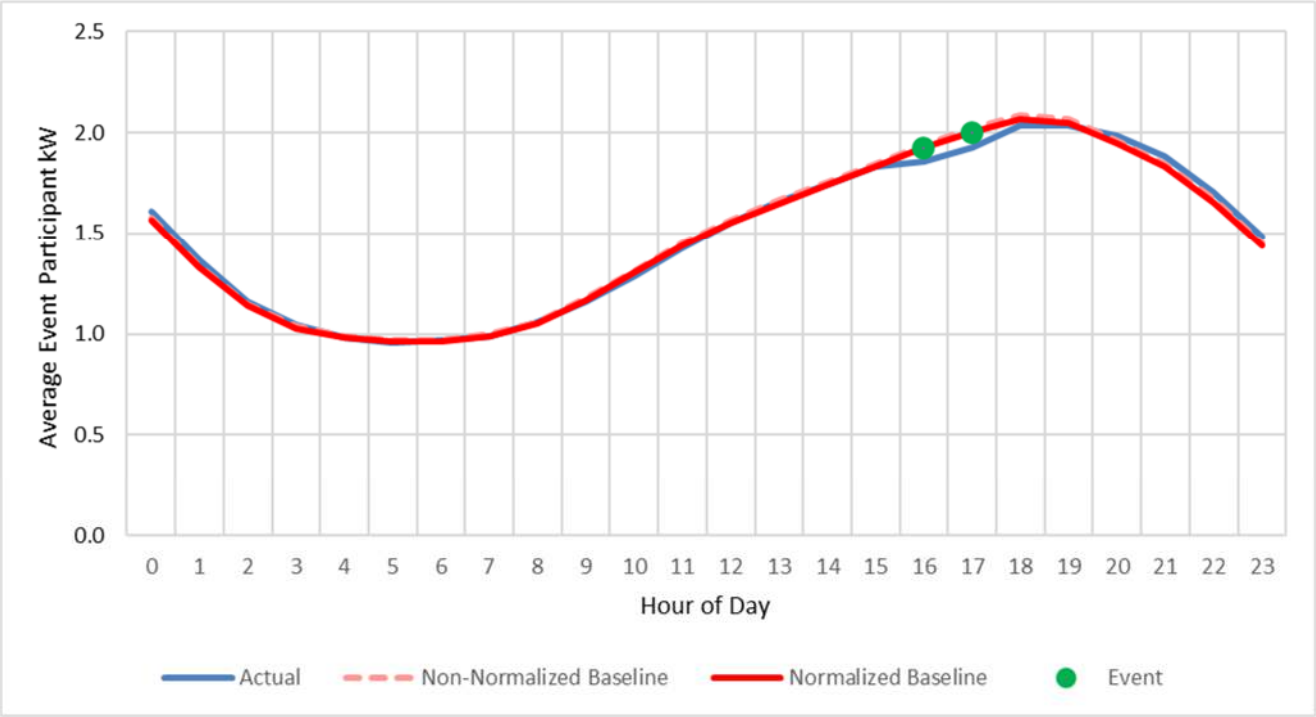


Figure 13-8 July 31, 2024 Event Average Participant Actual and Predicted Energy Usage

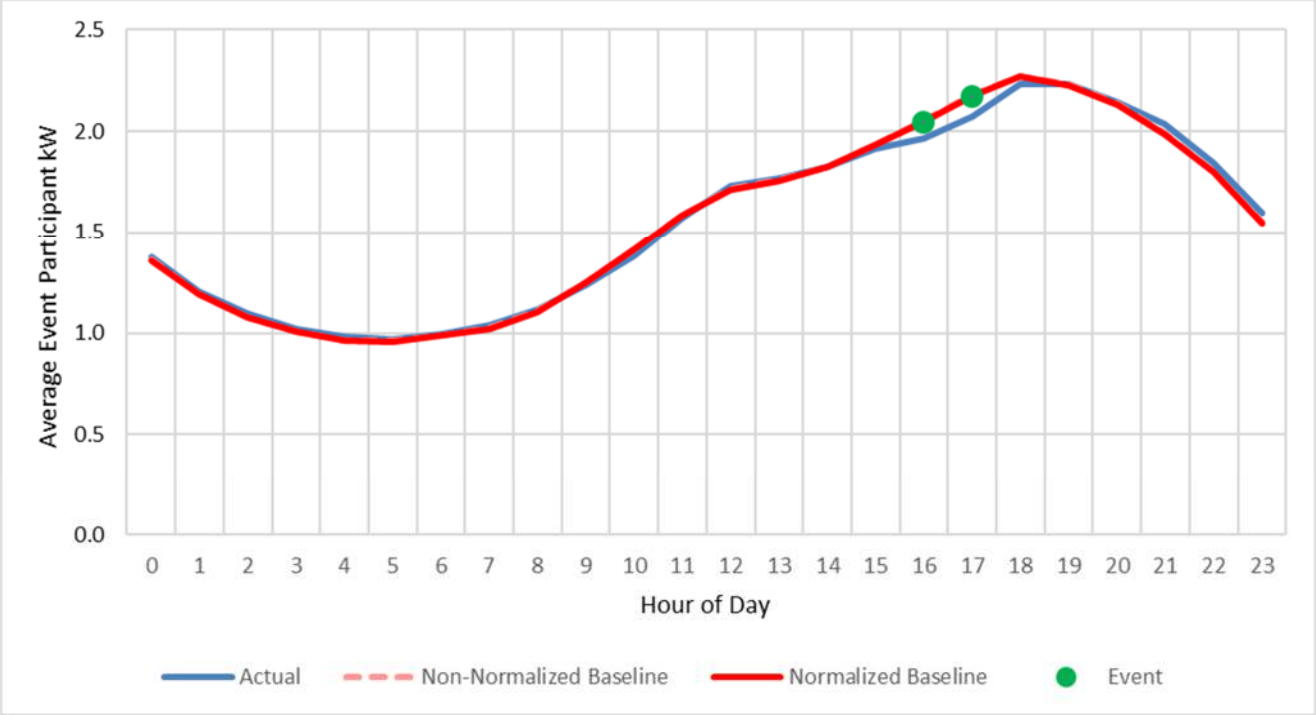
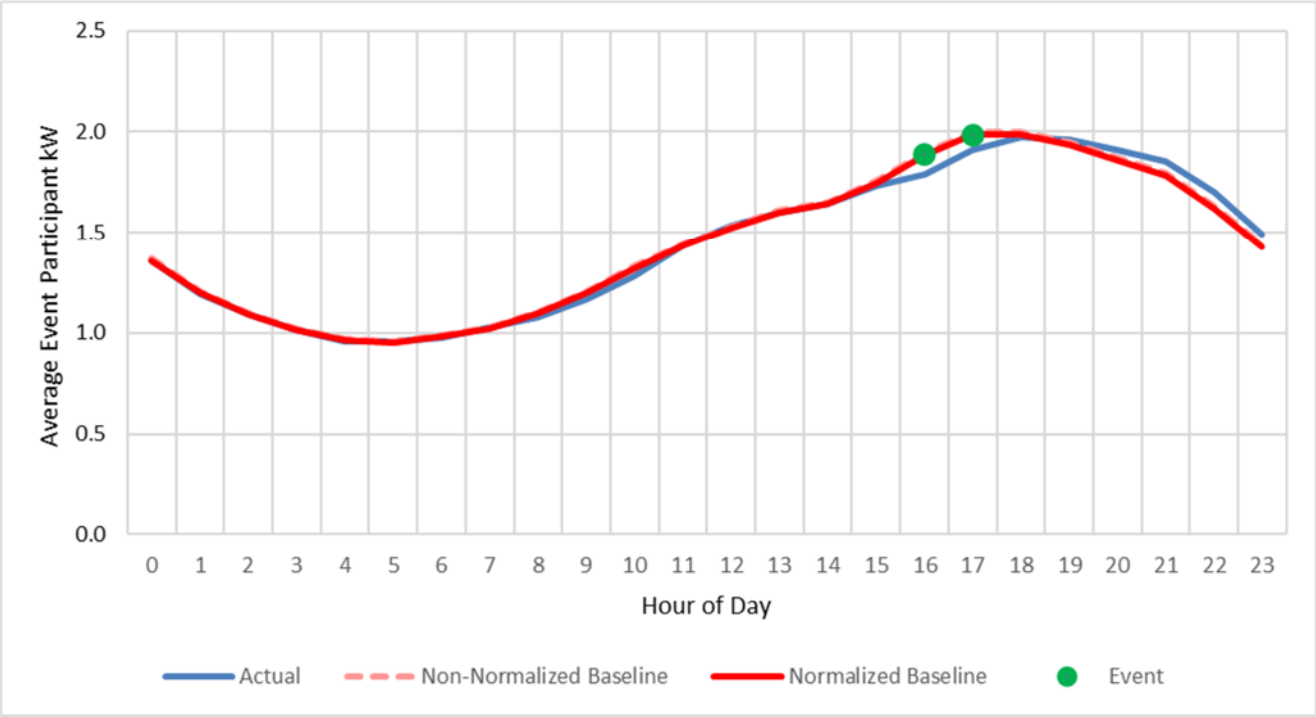


Figure 13-9 August 1, 2024 Event Average Participant Actual and Predicted Energy Usage



13.3.2.1. Ex Post Gross kWh Savings

Table 13-6 below shows the estimated program-level annual gross energy savings resulting from the program.

Table 13-6 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*
16,471	16,471	16,471	19,219	117%

13.3.2.2. Ex Post Gross kW Savings

Table 13-7 below shows the estimated program-level ex post gross peak kW reduction resulting from the program.

Table 13-7 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*
579.11	579.11	579.11	781.21	135%

13.4. Estimation of Ex Post Net Savings

13.4.1. Methodology for Estimating Ex Post Net Impacts

The kW and kWh savings estimated using the procedures outlined in Section 13.3 are net savings estimates.

13.4.2. Results of Ex Post Net Savings Estimation

Table 13-8 summarizes the ex post annual net kWh and kW savings of the Residential Customer Engagement Demand Response Program. The annual net savings totaled 19,219 kWh and 781.21 kW.

Table 13-8 Program-Level Annual Net kWh and kW Savings

Category	*kWh*	*kW*
Ex Ante Gross Savings	16,471	579.11
Gross Audited Savings	16,471	579.11
Gross Verified Savings	16,471	579.11
Ex Post Gross Savings	19,219	781.21
Gross Realization Rate	117%	135%
Ex Post Free Ridership	0	0.00
Ex Post Non-Participant Spillover	0	0
Ex Post Participant Spillover	0	0
Ex Post Net Savings	19,219	781.21
Net-to-Gross Ratio	100%	100%
Ex Post Net Lifetime Savings	384,390	N/A

13.5. 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.

13.5.1. Summary of Participation and Incentives

The table presents data on a residential behavioral demand response program for the PY2024 events. Initially, the engagement rate (as defined by the share receiving an incentive), ranged from 20% on June 19th to 50% on August 1st.

Table 13-9 Event Participation Metrics

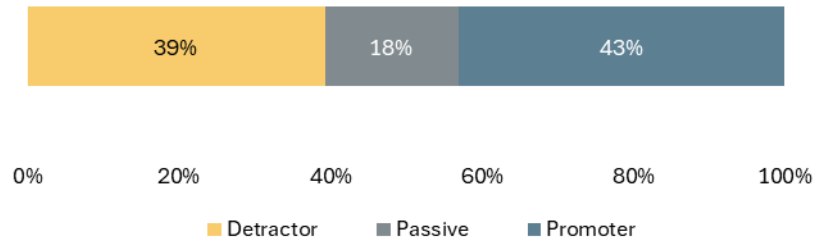
Date	*Number of Enrollees Notified of Event*	*Number of Event Participants Receiving Incentive*	*Percent of Notified Enrollees Receiving Incentive*	*Average Incentive Recipient Incentive Amount*	*Total Incentive*
6/18/2024	7,724	2,283	30%	$1.12	$2,559.60
6/19/2024	7,713	1,560	20%	$1.09	$1,701.80
6/20/2024	7,707	1,686	22%	$1.06	$1,795.30
6/21/2024	7,681	1,756	23%	$1.45	$2,546.70
7/8/2024	8,912	3,132	35%	$1.17	$3,676.70
7/15/2024	8,893	2,209	25%	$1.11	$2,450.50
7/16/2024	8,866	3,105	35%	$1.10	$3,426.40
7/31/2024	8,785	3,452	39%	$1.16	$3,993.00
8/1/2024	8,767	4,384	50%	$1.20	$5,240.80

13.5.2. Participant Survey Findings

13.5.2.1. Net Promoter Score

Less than half of respondents were net promoters. The net promoter score for end of year respondents was 4%. Forty-three percent of respondents were promoters compared to 39% who were detractors and 18% who were passive (see Figure 13-10).

Figure 13-10 Net Promoter Score (n = 79)



Survey respondents offered insights into the factors influencing their likelihood to recommend the program to others. See Table 13-10 for the main categories of comments among promoters, detractors, and passive respondents.

Promoters value the program for its financial perks, ease of use, and eco-friendliness. Many praise the savings, simple participation, and credit benefits. Others appreciate the support for vulnerable groups like seniors on fixed incomes. Some trust its effectiveness, while others suggest better participant notifications. Overall, it's seen as beneficial, user-friendly, and aligned with goals of saving money and being more energy conscious.

Detractors of the program pointed out minimal savings, unclear benefits, and confusion about its workings. Some were frustrated with the utility's pricing, while others struggled to participate due to time constraints or discomfort reducing electricity use. Complex household needs and the necessity to turn off essential appliances were also barriers. Many participants lacked awareness or understanding of the program's value, underscoring the importance of clearer communication.

Some passive respondents found the program easy and appreciated conserving energy, but others thought the savings were minimal, had trouble adjusting to event times, or wanted better alerts and scheduling. The minimal savings especially affected those with low usage or diverse electricity needs in their households. Although some found the discounts inadequate, they liked the ease of use. The main issues were adapting to the suggested hours and needing better notifications. A few enjoyed supporting energy conservation, though opinions on its impact varied.

Table 13-10 Reason for Likelihood of Recommending the Service Rating

Promoters (n = 34)	*Number of Comments (n = 25)*
Savings and financial benefits	10
Ease of use and accessibility	6
Program effectiveness and trust	5
Environmental impact	4
Support for vulnerable populations	1
Detractors (n = 31)	*Number of Comments (n = 30)*
Lack of impact or savings	10
Confusion or unawareness of the program	7
Frustration with utility or program design	5
Barriers to participation	3
Passive (n = 14)	*Number of Comments (n = 10)*
Minimal or conditional benefit	4
Limited savings or value	2
Participation or awareness challenges	2
Ease of use	1
Environmental impact or energy conservation	1

13.5.2.2. Awareness and Engagement

Participants predominantly join the iControl program to save on utility bills and earn bill credits, with some also aiming to lessen their carbon footprints. A majority of participants indicated lowering utility costs (66%) and obtaining bill credits (62%) as their main reasons (see Table 13-11). Motivations to reduce carbon footprints or greenhouse gas emissions were cited by 35% of participants. Six percent mentioned other reasons that included frustration with high utility fees, curiosity about potential savings, and efforts to offset additional charges.

Table 13-11 Motivations for Participating in iControl

Responses	*Percentage of Responses (n = 79)*
To get the bill credits	62%
To lower utility costs	66%
To reduce carbon footprint	35%
Other reasons	6%

13.5.2.3. Peak Energy Use Event Notification

Nearly all respondents reported that they received the Peak Energy Use Event notifications. Thirty-five percent recalled receiving both text and email messages. Additionally, 33% remembered receiving text messages only, 24% received email messages only, and 8% stated that they did not receive any notifications. Six respondents did not think that they received any notifications.

Regarding household notifications, 9% believed that someone else in their household had received Peak Energy Use Event notifications, while 91% stated that no one else in their household had received such notifications.

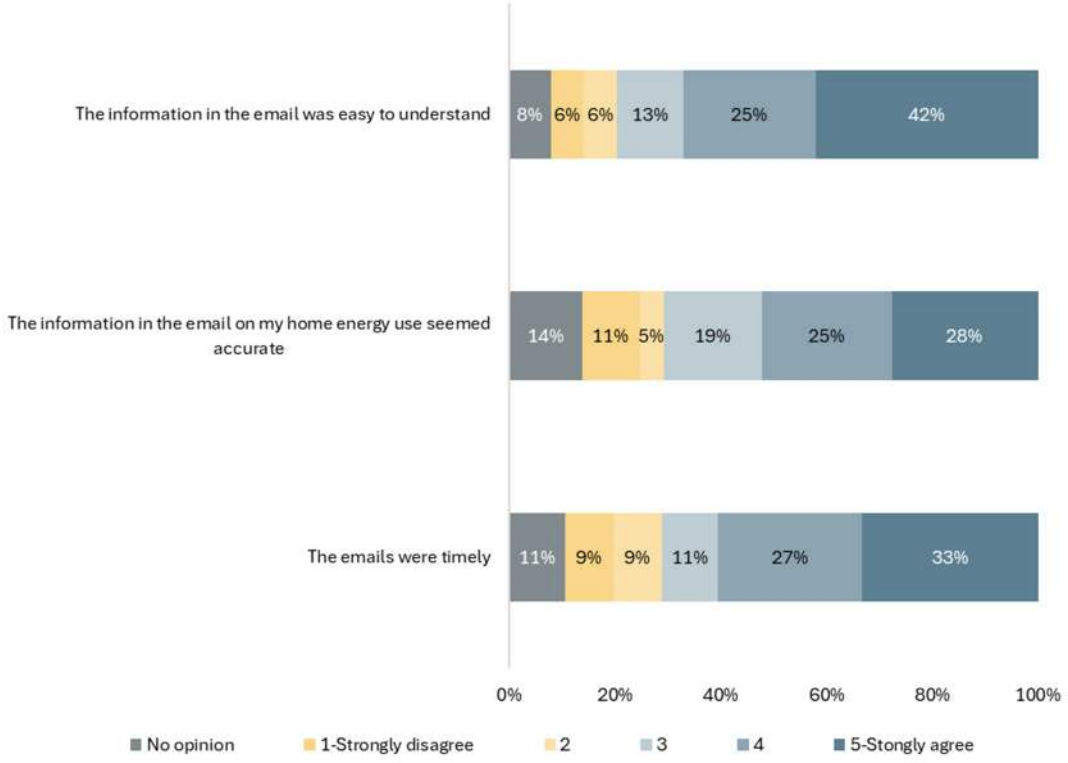
One-third (33%) of respondents actively reduced energy usage for all notified Peak Energy Use Events, while 35% participated in most events. About 10% took steps for half of the events, 13% for less than half, and 9% did not participate in any events.

Key barriers to participating in Peak Energy Use Events included being absent from home or at work during event times, forgetting to take action, lack of sufficient advance notice, and a perceived lack of financial incentives. Some participants highlighted issues related to health needs, extreme heat, and family care duties. Others mentioned the inconvenience caused by not receiving notifications or finding the process burdensome. Additionally, some respondents were skeptical about the utility savings and overall benefits of the program.

13.5.2.4. Energy Use Knowledge and Understanding

Most participants agreed that the emails were timely, easy to understand, and provided accurate information about their home energy use. Specifically, 60% found the emails timely, 67% found them easy to understand, and 53% believed they were accurate. However, some participants expressed disagreement, particularly regarding accuracy (16%) and timeliness (18%). A minority, ranging from 8% to 14%, reported having no opinion on these aspects. See Figure 13-11 for additional details.

Figure 13-11 Customer Perceptions of Email Timeliness, Accuracy, and Clarity



Most participants rely on their monthly bill to track energy consumption, with occasional use of the I&M portal, while others view usage infrequently throughout the year. Most participants (84%) monitored their household's energy consumption through their monthly bill, while 38% used the I&M account web portal. A small number (3%) utilized home energy management systems, and another 3% didn't track their energy use at all. One person mentioned getting updates via email. Most participants reviewed their energy usage about once a month (60%), with fewer doing so more frequently (12%) or less often (29%). (see Table 13-12).

Table 13-12 Frequency of Viewing Household Energy Usage

Response	*Percentage of Responses (n = 77)*
More than once a month	12%
About once a month	60%
A few times a year	25%
Once a year	4%

13.5.2.5. Post-Event Emails and Bill Credits

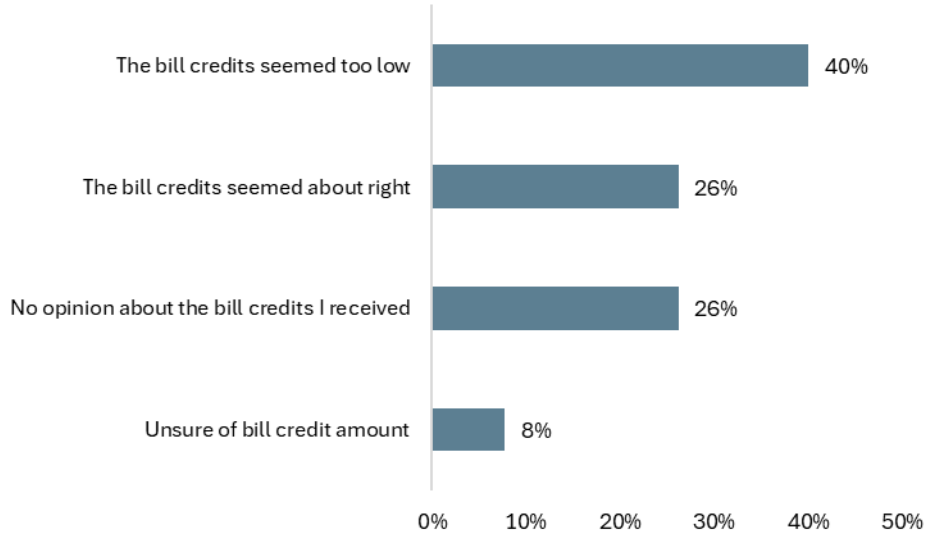
Almost every respondent reads at least a portion of the post-event emails, with the majority reading them in their entirety. Sixty-eight percent of participants reported that they read all the emails received after the event, which included details on their earnings and energy consumption during the event, while 17% mentioned they read some of the emails**.** See Table 13-13 for more details.

Table 13-13 Post-Event Email with Information on Earnings and Energy Usage

Response	*Percentage of Responses (n = 79)*
Read all emails	68%
Read some emails	17%
Did not read emails	4%
Did not recall receiving email	11%

Many participants thought that the bill credits they received were too low. Forty percent of respondents thought the bill credits were insufficient. Twenty-six percent had no opinion, while another 26% felt the credits were adequate. Eight percent were unsure about the amount, and none believed the credits were too high. See Figure 13-12.

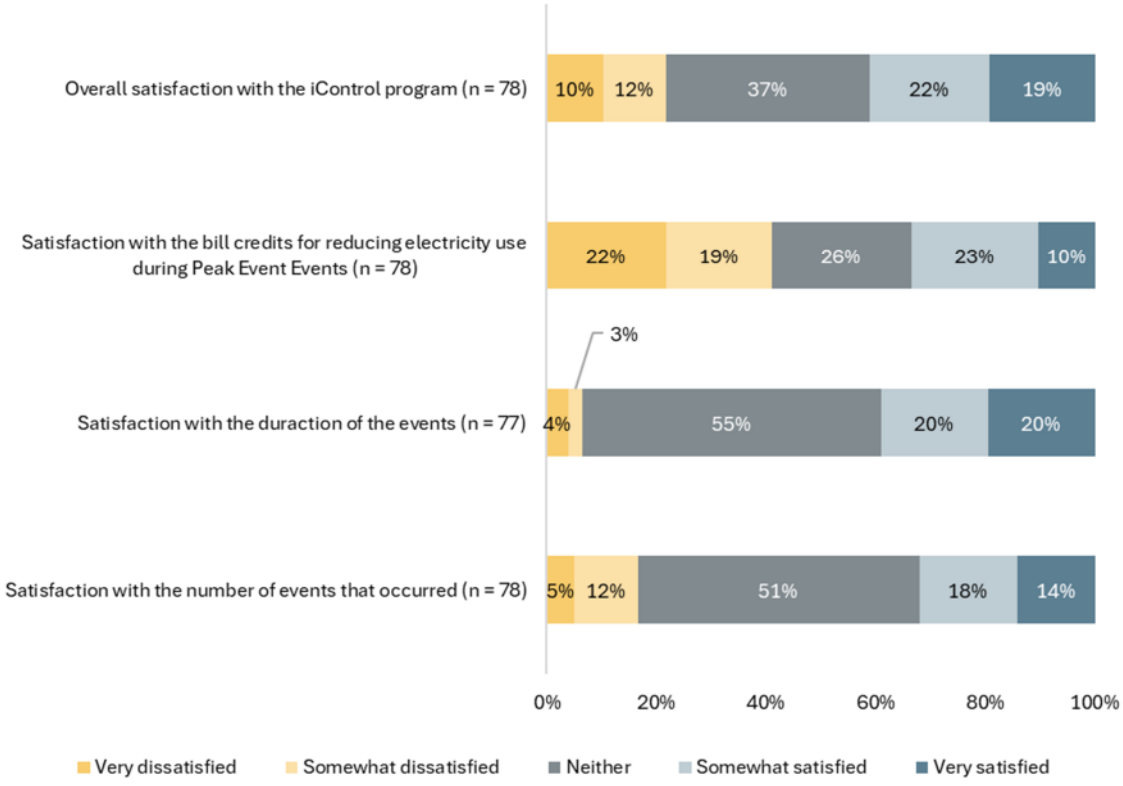
Figure 13-12 Bill Credit Perceptions



13.5.2.6. Satisfaction with iControl and Likelihood of Continuing Enrollment and Trying to Reduce Energy Use

Overall, participants expressed neutral to somewhat satisfied feelings regarding the iControl program, with notable dissatisfaction concerning the bill credits received for reducing electricity use during Peak Energy Use Events. Participants were generally neutral or somewhat satisfied with the number and duration of Peak Energy Use Events. However, satisfaction with bill credits was lower, with 41% expressing dissatisfaction. Overall satisfaction with the iControl program was mixed, with most participants falling between neutral and somewhat satisfied (see Figure 13-13). Participants rated the helpfulness of pre-participation information regarding the program, with 27% finding it completely helpful and 17% rating it as a 4. Additionally, 33% provided a neutral response of 3, while 6% found it not at all helpful. Fourteen percent stated they did not receive or view any relevant information.

Figure 13-13 Satisfaction with Bill Credits, Duration of Events, Number of Events and iControl Program



Participants expressed various suggestions for improving satisfaction with the iControl Program, including the need for more significant bill credits, better evaluation of energy savings over longer durations, and increased event frequency. Some felt that their efforts to adjust energy use were not rewarded adequately, while others mentioned high fees and a lack of tangible savings. A few

suggested that the program should not set unattainable goals and that the rewards should be more substantial, reflecting current high utility rates.

Forty-one percent of survey respondents indicated they were very likely to continue participating in the iControl program, while 10% expressed that they were not at all likely to continue. The average score was 6.97.

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, none were not at all likely to do so. The average score was 8.97.

Satisfaction with bill credits and the duration of the events emerged as the primary predictors 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, based on 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 year participants initially enrolled was not significantly related to overall satisfaction, likelihood of continuing participation, or likelihood of continuing to reduce energy during events.

Table 13-14 Regression Results for Overall Satisfaction and Likelihood of Continued Participation

	Overall Satisfaction			*Likelihood of Continuing Participation*			*Likelihood of Continuing to Reduce Energy Use*		
Predictor	*Relative Import-ance*	*Coeffic-ient*	*P-Value*	*Relative Import-ance*	*Coeffic-ient*	*P-Value*	*Relative Import-ance*	*Coeffic-ient*	*P-Value*
Satisfaction with bill credits	42.1%	0.33	0.00	45.1%	0.89	0.00	35.1%	0.38	0.03
Satisfaction with duration of events	29.2%	0.36	0.00	17.7%	0.66	0.53	34.7%	0.43	0.32
Satisfaction with number of events	4.7%	0.12	0.69	11.2%	0.53	0.09	7.1%	0.15	0.38
Thought credits were too low	6.6%	-0.35	0.59	3.1%	-0.37	0.11	3.5%	-0.33	0.83
Post-event emails were timely	0.7%	-0.03	0.94	1.2%	-0.19	0.29	2.8%	-0.26	0.52
Information on the program answered questions well	9.1%	0.17	0.30	9.2%	0.41	0.39	1.7%	0.03	0.51
Post-event emails were easy to understand	0.8%	-0.01	0.41	1.6%	0.10	0.62	4.6%	0.50	0.17
Post-event information on energy use appeared accurate	5.7%	0.12	0.23	8.0%	0.37	0.26	5.3%	-0.40	0.18
Cohort	0.9%			2.8%			5.3%	0.00	0.00
Cohort 2023 vs. 2024		0.01	0.11		-0.51	0.67	0.0%	0.34	0.36
R-Squared	72.8%			55.1%			33.6%		

Demographics

The survey responses regarding home ownership and type indicate that 82% of participants own their home and 17% 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 (78%) are single-family houses detached from any other house, 1% are manufactured homes, 15% are apartments, and 1% are single-family houses attached to one or more other houses (e.g., duplex, row house, or townhome). The average number of people currently living in participants' homes year-round is approximately 2.1. Participants reported a wide range of annual household incomes, with 34% indicating their income was more than $50,000 and 38% made less than $50,000.

Twenty-two percent of respondents reported having a Wi-Fi-connected smart thermostat, presenting an opportunity to increase adoption. Additionally, 4% owned or leased a plug-in electric vehicle, and 9% had a swimming pool.

13.6. Findings and Recommendations

The survey results indicate that event notification procedure is working well. A small share of respondents reported that they did not receive notification (6%). Most respondents received the notifications by email, text, or both.

Most respondents engaged in the program and tried to reduce energy during the events. Thirty-three percent of respondents reduced energy usage for all notified Peak Energy Use Events, 35% participated in most, 10% in half, 13% in less than half, and 9% did not take any steps to reduce energy. Most reasons for not taking action were unrelated to program actions, involving external issues like being away from home, forgetting to take action, weather, and other personal factors. A few participants mentioned not receiving enough notice or feeling that the incentives were insufficient to motivate action.

Participants are reading the post-event emails to see their results. Sixty-eight percent of participants reported reading all post-event emails detailing their earnings and energy consumption, while 17% read some of the emails.

Participants had varied opinions of the amount of bill credits they received. Twenty-six percent thought the bill credits were about right, 40% thought they were too low, and 26% did not have an opinion or did not know the amount of credit they received. These results were similar to the 2023 results.

Most participants rely on their monthly bill to track energy consumption, with occasional use of the I&M portal. Some participants check their usage infrequently throughout the year. Engagement with the I&M account portal remains relatively low, with only 38% of respondents reporting they use it. The portal provides hourly energy consumption data, which could help customers identify and adjust their usage during peak events. However, limited engagement with the portal suggests that many customers may not be aware of or know how to leverage this data to manage their energy use effectively.

- **Recommendation 1. To enhance the impact of the program, I&M could provide targeted education or in-portal guidance on how customers can use their hourly energy data to identify and reduce peak-period consumption.** This could include interactive tutorials, alerts for high-usage periods, or examples of effective load-shifting strategies. Increasing customer awareness and usability of the portal's features may help drive greater participation in demand response efforts. For example, communications upon enrollment or in advance of the peak period season, could suggest that participants use the portal to develop strategies to reduce energy use during events. The guidance could suggest that customers:
    - Review Your Typical Usage Patterns – Log into the portal and look at your past energy consumption, focusing on the same time of day that the peak event is scheduled for. This can help you see what appliances or activities contribute to high usage during that period.

- Identify High-Usage Appliances or Activities – If you see a spike in usage during the peak event hours, consider what could be causing it. For example, if you see high usage in the early evening, it might be your HVAC system, electric water heater, oven, or laundry.
- Plan Load-Reduction Strategies – Based on your findings, take steps to reduce your consumption during the event:
  - *Adjust Thermostat Settings – If your HVAC contributes significantly to your usage, pre-cool or pre-heat your home before the event and set the thermostat higher/lower during the peak period.*
  - *Shift Energy-Intensive Tasks – Reschedule activities like laundry, dishwashing, or cooking to earlier or later in the day.*
  - *Turn Off or Unplug Devices – If you notice that electronics, lights, or standby appliances are using power unnecessarily, make sure to turn them off or unplug them.*
  - *Use Alternative Cooking Methods – If your oven or stove is typically a major energy consumer during the peak period, opt for a microwave, slow cooker, or outdoor grill instead.*

2024 Indiana Demand Response Portfolio
EM&V Report
Volume II of II

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Indiana Michigan Power

March 2025

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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 2024.

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 2024 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 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 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 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

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?

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 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 Power Rewards: Smart Thermostat program, overall?

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

[Display if Q18 = 1 OR 2]

19. Why were you dissatisfied?

Demographics/Home Characteristics

20. The next questions are about the residence that participates in the program. These are confidential but it is okay to not answer any of these questions.
21. What brand of thermostat did you enroll in the program?

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

22. 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

23. Is this residence...

    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

24. 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

25. 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

26. 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

27. 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

Net Promoter Score

4. How likely is it that you would recommend the 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 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 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)

8. What information about the 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

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 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
5. Very satisfied

[Display Q22 if Q21 < 3]

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

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

Demographics / Home Characteristics

24. The next questions are about the residence that participates in the program. 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 out this residence?

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

27. Is this residence...

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

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

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

Net Promoter Question

Display as Embedded Question in Email Recruitment

1. How likely is it that you would recommend the 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?

Motivation for Participating

3. What are the main reasons why you 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

4. 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

5. 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 Q6 IF Q4 = 4 AND Q5 = 2]

6. 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 Q7 IF Q6 = 2]

7. Please explain how you received the event notifications.

8. For how many of the notified Peak Energy Use Events did you actively take steps to reduce your energy usage? Please select the option that best describes your participation.

    1. All events
    2. Most events
    3. About half of the events
    4. Less than half of the events
    5. None of the events

[DISPLAY Q9 > 1]

9. Could you share the reasons or barriers that prevented you from taking action during some events?

10. 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 Q10 = 1 or 2]

11. 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 Q10 = 1 or 2]

12. 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

Engagement in Home Energy Use

13. 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 Q13 = 4]

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

[Display if Q13 <> 5]

15. 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

16. 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]

17. 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 Q18 if Q17 < 3]

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

1. Too many
2. Too few

19. 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

20. 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

21. 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 Q22 if Q21 < 3]

22. What would make you more satisfied with the iControl Program?

23. 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)]

[Display Q24 if Q23 > 5]

24. 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?

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

Demographics / Home Characteristics

25. The next questions are about the residence that participates in the program. These are confidential and will be used solely for combining different customers' responses. It is okay to not answer any of these Questions.
26. 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

27. Do you own, rent, or own and rent out this residence?

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

28. Is this residence...

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

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 at home
99. Don't know/Prefer not to state

31. 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

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

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

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

1. Yes

2. No

[Display if Q33 = 1]

34. 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

35. Do you have a swimming pool?

1. Yes
2. No

36. 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

37. 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

38. 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

5. Home Energy Management Participant Survey Results

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

#	Group	%	Count
1	Detractor	27.3%	6
2	Passive	36.4%	8
3	Promoter	36.4%	8
	Total	100%	22

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

#	Answer	%	Count
1	Mailer from I&M	17.4%	4
2	Email from I&M	30.4%	7
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	17.4%	4
4	Friend or Relative (word-of-mouth)	0.0%	0
5	I&M Newsletter	4.3%	1
6	Social media	0.0%	0
7	Other (Please Specify)	8.7%	2
98	Don't know	21.7%	5
	Total	100%	23

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	26.1%	6
2	Program was recommended to me by I&M	26.1%	6
3	The bill credits/enrollment incentive	78.3%	18
4	To reduce energy use for environmental reasons	34.8%	8
5	To save on energy costs	56.5%	13
6	Other (please specify)	4.3%	1
	Total	100%	23

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

#	Answer	%	Count
1	Yes	26.1%	6
2	No	73.9%	17
	Total	100%	23

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

#	Answer	%	Count
1	Concerns about being uncomfortable during energy reduction events	16.7%	1
2	Concerns about the utility having the ability to control or shut off my AC	50.0%	3
3	Concerns about not being able to control the temperature	16.7%	1
4	Concerns about privacy/security	50.0%	3
5	Other (Please specify)	33.3%	2
	Total	100%	6

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	4.3%	1
2	The program website	43.5%	10
3	Information provided in an I&M email or newsletter	52.2%	12
4	Information from an I&M flyer	0.0%	0
5	Information provided in an I&M mailing	4.3%	1
6	Other (please specify)	4.3%	1
98	Do not recall	13.0%	3
	Total	100%	23

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)	13.0%	3
2	2	4.3%	1
3	3	17.4%	4
4	4	34.8%	8
5	5 (Completely)	30.4%	7
6	I did not review any information before I decided to participate	0.0%	0
	Total	100%	23

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

#	Answer	%	Count
1	1 (Very difficult)	4.3%	1
2	2	4.3%	1
3	3	4.3%	1
4	4	21.7%	5
5	5 (Very easy)	65.2%	15
	Total	100%	23

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

#	Answer	%	Count
1	Yes	69.6%	16
2	No, not that you are aware of	30.4%	7
	Total	100%	23

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

#	Answer	%	Count
1	No effect of comfort	25.0%	4
2	Made the home a little uncomfortable	37.5%	6
3	Made the home moderately uncomfortable	31.3%	5
4	Made the home very uncomfortable	6.3%	1
	Total	100%	16

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	68.2%	15
2	Too many	22.7%	5
3	Too few	9.1%	2
	Total	100%	22

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

#	Answer	%	Count
1	Lasted much too long	8.7%	2
2	Lasted somewhat too long	8.7%	2
3	Lasted a little too long	8.7%	2
4	Lasted about the right amount of time	56.5%	13
99	Don’t know – didn’t notice events	17.4%	4
	Total	100%	23

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

#	Answer	%	Count
0	0 (Not at all likely)	17.4%	4
1	1	0.0%	0
2	2	0.0%	0
3	3	0.0%	0
4	4	0.0%	0
5	5	4.3%	1
6	6	4.3%	1
7	7	4.3%	1
8	8	13.0%	3
9	9	4.3%	1
10	10 (Very likely)	52.2%	12
	Total	100%	23

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

#	Answer	%	Count
1	Very dissatisfied	13.0%	3
2	Somewhat dissatisfied	4.3%	1
3	Neither satisfied nor dissatisfied	13.0%	3
4	Somewhat satisfied	13.0%	3
5	Very satisfied	56.5%	13
	Total	100%	23

Q166 - What brand of thermostat did you enroll in the program?

#	Answer	%	Count
1	Alarm.com	0.0%	0
2	Amazon	0.0%	0
3	ecobee	39.1%	9
4	Honeywell Home	26.1%	6
5	Nest	17.4%	4
6	Sensi	17.4%	4
	Total	100%	23

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	82.6%	19
2	Rent	13.0%	3
3	Own and rent to someone else	0.0%	0
99	Prefer not to answer	4.3%	1
	Total	100%	23

Q23 - Is this residence...

#	Answer	%	Count
1	Your primary residence	91.3%	21
2	A residence that you rent to someone else	0.0%	0
3	A vacation property that is not occupied year-round	4.3%	1
4	Something else	4.3%	1
	Total	100%	23

Q24 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	4.3%	1
2	Single-family house detached from any other house	78.3%	18
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	8.7%	2
4	Apartment in a building with 2 to 3 units	0.0%	0
5	Apartment in a building with 4 or more units	8.7%	2
6	Other (Please describe)	0.0%	0
7	Prefer not to answer	0.0%	0
	Total	100%	23

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

#	Answer	%	Count
66	66 degrees or cooler	0.0%	0
67	67	0.0%	0
68	68	4.3%	1
69	69	0.0%	0
70	70	0.0%	0
71	71	0.0%	0
72	72	17.4%	4
73	73	13.0%	3
74	74	13.0%	3
75	75	13.0%	3
76	76	8.7%	2
77	77	0.0%	0
78	78	21.7%	5
79	79	4.3%	1
80	80 degrees or warmer	4.3%	1
99	Do not use a thermostat setting to control air conditioner	0.0%	0
	Total	100%	23

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

#	Answer	%	Count
1	1	27.3%	6
2	2	40.9%	9
3	3	13.6%	3
4	4	0.0%	0
5	5	9.1%	2
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
99	I prefer not to state	9.1%	2
	Total	100%	22

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

#	Answer	%	Count
1	Less than $10,000	0.0%	0
2	$10,000 to less than $20,000	0.0%	0
3	$20,000 to less than $30,000	0.0%	0
4	$30,000 to less than $40,000	0.0%	0
5	$40,000 to less than $50,000	0.0%	0
6	$50,000 to less than $75,000	26.1%	6
7	$75,000 to less than $100,000	8.7%	2
8	$100,000 to less than $150,000	13.0%	3
9	$150,000 to less than $200,000	4.3%	1
10	$200,000 or more	4.3%	1
99	I prefer not to state	43.5%	10
	Total	100%	23

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	15.5%	11
2	Passive	25.4%	18
3	Promoter	59.2%	42
	Total	100%	71

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

#	Answer	%	Count
1	Mailer from I&M	27.5%	19
2	Email from I&M	36.2%	25
3	I&M Website (www.electricideas.com or indianamichiganpower.com)	4.3%	3
4	Friend or Relative (word-of-mouth)	0.0%	0
5	I&M Newsletter	1.4%	1
6	Social media	1.4%	1
7	Other (Please Specify)	20.3%	14
8	Don’t know	8.7%	6
	Total	100%	69

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

#	Answer	%	Count
1	To get the bill credits	48.5%	33
2	To lower your utility costs	61.8%	42
3	To reduce your carbon footprint / greenhouse gas emissions	36.8%	25
4	For some other reason (Please describe)	7.4%	5
	Total	100%	68

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	24.2%	16
2	Email information sent by I&M	48.5%	32
3	Information mailed to me by I&M	28.8%	19
4	Something else (Please describe)	28.8%	19
	Total	100%	66

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)	1.5%	1
2	2	6.1%	4
3	3	19.7%	13
4	4	30.3%	20
5	5 (Completely)	37.9%	25
6	Did not receive or view any information	4.5%	3
	Total	100%	66

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	42.4%	28
2	No	57.6%	38
	Total	100%	66

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

#	Answer	%	Count
1	Yes	56.9%	37
2	No	43.1%	28
	Total	100%	65

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	24.6%	16
2	No	75.4%	49
	Total	100%	65

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

#	Answer	%	Count
1	Yes	77.4%	48
2	No	22.6%	14
	Total	100%	62

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

#	Answer	%	Count
1	No effect of comfort	81.3%	39
2	Made the home a little uncomfortable	14.6%	7
3	Made the home moderately uncomfortable	2.1%	1
4	Made the home very uncomfortable	2.1%	1
	Total	100%	48

Q35 - 10. How much do you agree or disagree that reducing your electricity use during times when electrici

#	Question	1 (Strongly disagree)		2		A moderate amount		A lot		5 (Strongly agree)		Total
1	Lower your utility costs	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0
2	Reduce greenhouse gas emissions	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0
3	Help make the grid more reliable	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0

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	93.2%	55
2	Too many	3.4%	2
3	Too few	3.4%	2
	Total	100%	59

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

#	Answer	%	Count
1	Lasted much too long	3.2%	2
2	Lasted somewhat too long	1.6%	1
3	Lasted a little too long	1.6%	1
4	Lasted about the right amount of time	28.6%	18
5	Don’t know – didn’t notice events	65.1%	41
	Total	100%	63

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

#	Answer	%	Count
1	Very dissatisfied	4.8%	3
2	Somewhat dissatisfied	4.8%	3
3	Neither satisfied nor dissatisfied	35.5%	22
4	Somewhat satisfied	27.4%	17
5	Very satisfied	27.4%	17
	Total	100%	62

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

#	Answer	%	Count
1	Very dissatisfied	8.7%	4
2	Somewhat dissatisfied	2.2%	1
3	Neither satisfied nor dissatisfied	26.1%	12
4	Somewhat satisfied	10.9%	5
5	Very satisfied	52.2%	24
	Total	100%	46

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	6.5%	4
2	Somewhat dissatisfied	1.6%	1
3	Neither satisfied nor dissatisfied	29.0%	18
4	Somewhat satisfied	24.2%	15
5	Very satisfied	38.7%	24
	Total	100%	62

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

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Using the scale below, how likely are you to continue to participate in the IM Power Rewards: Home AC Program?	1.0	11.0	9.3	2.6	6.7	63

Q24 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	3.2%	2
2	Single-family house detached from any other house	91.9%	57
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	3.2%	2
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	1.6%	1
	Total	100%	62

Q25 - Do you own, rent, or both own and rent out this residence?

#	Answer	%	Count
1	Own	93.5%	58
2	Rent	4.8%	3
3	I prefer not to state	1.6%	1
	Total	100%	62

Q26 - Is this residence …

#	Answer	%	Count
1	Your primary residence	100.0%	62
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	0.0%	0
	Total	100%	62

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

#	Answer	%	Count
66	66 degrees or cooler	0.0%	0
67	67	0.0%	0
68	68	3.3%	2
69	69	1.7%	1
70	70	10.0%	6
71	71	6.7%	4
72	72	10.0%	6
73	73	15.0%	9
74	74	16.7%	10
75	75	15.0%	9
76	76	5.0%	3
77	77	5.0%	3
78	78	8.3%	5
79	79	0.0%	0
80	80 degrees or warmer	0.0%	0
99	Do not use a thermostat setting to control air conditioner	3.3%	2
	Total	100%	60

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

#	Answer	%	Count
1	Electricity	15.0%	9
2	Natural Gas	73.3%	44
3	Propane	6.7%	4
4	Something else (Please explain)	5.0%	3
5	Don’t heat home	0.0%	0
6	Don’t know/Prefer not to state	0.0%	0
	Total	100%	60

Q29 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	25.0%	15
2	Natural Gas	63.3%	38
3	Propane	6.7%	4
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	5.0%	3
	Total	100%	60

Q29_4_TEXT - Something else (Please explain) Something else (Please explain) - Text

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

#	Answer	%	Count
1	Yes	16.7%	10
2	No	71.7%	43
3	Don’t know/Prefer not to state	11.7%	7
	Total	100%	60

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

#	Answer	%	Count
1	1	35.0%	21
2	2	38.3%	23
3	3	13.3%	8
4	4	10.0%	6
5	5	0.0%	0
6	6	1.7%	1
7	7	0.0%	0
8	8 or more	0.0%	0
9	I prefer not to state	1.7%	1
	Total	100%	60

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

#	Answer	%	Count
1	Yes	70.0%	42
2	No	28.3%	17
3	I prefer not to state	1.7%	1
	Total	100%	60

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

#	Answer	%	Count
1	Yes	88.3%	53
2	No	10.0%	6
3	Don’t know/Prefer not to state	1.7%	1
	Total	100%	60

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

#	Answer	%	Count
1	Less than $10,000	1.7%	1
2	$10,000 to less than $20,000	6.7%	4
3	$20,000 to less than $30,000	13.3%	8
4	$30,000 to less than $40,000	10.0%	6
5	$40,000 to less than $50,000	6.7%	4
6	$50,000 to less than $75,000	13.3%	8
7	$75,000 to less than $100,000	3.3%	2
8	$100,000 to less than $150,000	16.7%	10
9	$150,000 to less than $200,000	3.3%	2
10	$200,000 or more	0.0%	0
11	I prefer not to state	25.0%	15
	Total	100%	60

7. Residential Customer Engagement Demand Response Survey Results

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

#	Group	%	Count
1	Detractor	39.2%	31
2	Passive	17.7%	14
3	Promoter	43.0%	34
	Total	100%	79

Q3 - What are the main reasons why you participate in the iControl program? Please select all that apply.

#	Answer	%	Count
1	To get the bill credits	62.0%	49
2	To lower your utility costs	65.8%	52
3	To reduce your carbon footprint / greenhouse gas emissions	35.4%	28
4	For some other reason (Please describe)	6.3%	5
	Total	100%	79

Q4 - 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	32.9%	26
2	Yes, email messages	24.1%	19
3	Yes, text and email messages	35.4%	28
4	No	7.6%	6
	Total	100%	79

Q5 - 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	8.9%	7
2	No	91.1%	72
	Total	100%	79

Q6 - 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	100.0%	6
2	No	0.0%	0
	Total	100%	6

Q8 - For how many of the notified Peak Energy Use Events did you actively take steps to reduce your energy usage? Please select the option that best describes your participation.

#	Answer	%	Count
1	All events	32.9%	26
2	Most events	35.4%	28
3	About half of the events	10.1%	8
4	Less than half of the events	12.7%	10
5	None of the events	8.9%	7
	Total	100%	79

Q10 - 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	68.4%	54
4	Yes, some of them	16.5%	13
5	No, did not read them	3.8%	3
6	No, do not recall receiving them	11.4%	9
	Total	100%	79

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	26.2%	17
2	The bill credits seemed too low	40.0%	26
3	The bill credits seemed too high	0.0%	0
4	I don't have an opinion about the bill credits I received	26.2%	17
5	I do not know how much the bill credits I got were	7.7%	5
	Total	100%	65

Q12 - 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	9.1%	6	9.1%	6	10.6%	7	27.3%	18	33.3%	22	10.6%	7	66
2	The information in the email on my home energy use seemed accurate	10.8%	7	4.6%	3	18.5%	12	24.6%	16	27.7%	18	13.8%	9	65
3	The information in the email was easy to understand	6.3%	4	6.3%	4	12.5%	8	25.0%	16	42.2%	27	7.8%	5	64

Q13 - 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	83.5%	66
2	I&M account web portal	38.0%	30
3	A home energy management system (e.g., energy monitor)	2.5%	2
4	Another source (Please describe)	1.3%	1
5	I have not viewed information on my household's energy use	2.5%	2
	Total	100%	79

Q15 - How often do you view your household energy use information?

#	Answer	%	Count
1	More than once a month	11.7%	9
2	About once a month	59.7%	46
3	A few times a year	24.7%	19
4	Once a year	3.9%	3
	Total	100%	77

Q16 - 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)	6.4%	5
2	2	2.6%	2
3	3	33.3%	26
4	4	16.7%	13
5	5 (Completely)	26.9%	21
98	Did not receive or view any information	14.1%	11
	Total	100%	78

Q17 - How satisfied are you with the number of events that occurred?

#	Answer	%	Count
1	Very dissatisfied	5.1%	4
2	Somewhat dissatisfied	11.5%	9
3	Neither satisfied nor dissatisfied	51.3%	40
4	Somewhat satisfied	17.9%	14
5	Very satisfied	14.1%	11
	Total	100%	78

Q18 - Do you think too many or too few events were called?

#	Answer	%	Count
1	Too many	15.4%	2
2	Too few	84.6%	11
	Total	100%	13

Q19 - How satisfied are you with the duration of the events?

#	Answer	%	Count
1	Very dissatisfied	3.9%	3
2	Somewhat dissatisfied	2.6%	2
3	Neither satisfied nor dissatisfied	54.5%	42
4	Somewhat satisfied	19.5%	15
5	Very satisfied	19.5%	15
	Total	100%	77

Q20 - How satisfied are you with the bill credits for reducing your electricity use during Peak Energy Use Events?

#	Answer	%	Count
1	Very dissatisfied	21.8%	17
2	Somewhat dissatisfied	19.2%	15
3	Neither satisfied nor dissatisfied	25.6%	20
4	Somewhat satisfied	23.1%	18
5	Very satisfied	10.3%	8
	Total	100%	78

Q21 - Overall, how satisfied are you with the iControl Program that your household is enrolled in?

#	Answer	%	Count
1	Very dissatisfied	10.3%	8
2	Somewhat dissatisfied	11.5%	9
3	Neither satisfied nor dissatisfied	37.2%	29
4	Somewhat satisfied	21.8%	17
5	Very satisfied	19.2%	15
	Total	100%	78

Q23 - Using the scale below, how likely are you to continue to participate in the iControl Program?

#	Answer	%	Count
0	0 (Not at all likely)	10.1%	8
1	1	2.5%	2
2	2	6.3%	5
3	3	2.5%	2
4	4	2.5%	2
5	5	5.1%	4
6	6	6.3%	5
7	7	3.8%	3
8	8	11.4%	9
9	9	8.9%	7
10	10 (Very likely)	40.5%	32
	Total	100%	79

Q24 - 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	0.0%	0
2	2	0.0%	0
3	3	0.0%	0
4	4	0.0%	0
5	5	3.6%	2
6	6	10.7%	6
7	7	5.4%	3
8	8	7.1%	4
9	9	10.7%	6
10	10 (Very likely)	62.5%	35
	Total	100%	56

Q26 - Which of the following best describes your home?

#	Answer	%	Count
1	Manufactured home	1.3%	1
2	Single-family house detached from any other house	78.2%	61
3	Single family house attached to one or more other houses, for example, duplex, row house, or townhome	1.3%	1
4	Apartment in a building with 2 to 3 units	1.3%	1
5	Apartment in a building with 4 or more units	14.1%	11
6	Other (Specify)	2.6%	2
7	I prefer not to state	1.3%	1
	Total	100%	78

Q27 - Do you own, rent, or own and rent out this property?

#	Answer	%	Count
1	Own	82.1%	64
2	Rent	16.7%	13
3	I prefer not to state	1.3%	1
	Total	100%	78

Q28 - Is this residence...

#	Answer	%	Count
1	Your primary residence	98.7%	75
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	1.3%	1
	Total	100%	76

Q29 - What is the main fuel used for heating your home?

#	Answer	%	Count
1	Electricity	23.1%	18
2	Natural Gas	69.2%	54
3	Propane	1.3%	1
4	Something else (Please explain)	3.8%	3
5	Don’t heat home	0.0%	0
99	Don’t know/Prefer not to state	2.6%	2
	Total	100%	78

Q30 - What fuel does your main water heater use?

#	Answer	%	Count
1	Electricity	36.7%	29
2	Natural Gas	57.0%	45
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	6.3%	5
	Total	100%	79

Q31 - What is the fuel source for your clothes dryer?

#	Answer	%	Count
1	Natural gas	30.4%	24
2	Electricity	63.3%	50
3	Propane	1.3%	1
4	Other	0.0%	0
5	I don’t have a clothes dryer	2.5%	2
99	Don’t know/Prefer not to state	2.5%	2
	Total	100%	79

Q32 - Do you have a Wi-Fi connect smart thermostat?

#	Answer	%	Count
1	Yes	21.5%	17
2	No	72.2%	57
99	Don't know/Prefer not to state	6.3%	5
	Total	100%	79

Q33 - Do you or any member of your household own or lease a plug-in electric vehicle?

#	Answer	%	Count
1	Yes	3.8%	3
2	No	96.2%	76
	Total	100%	79

Q34 - Do you have a plug-in hybrid vehicle or a battery electric vehicle?

#	Answer	%	Count
1	Plug-in hybrid	33.3%	1
2	Battery electric vehicle	66.7%	2
3	Both	0.0%	0
99	Don’t know/Prefer not to state	0.0%	0
	Total	100%	3

Q35 - Do you have a swimming pool?

#	Answer	%	Count
1	Yes	8.9%	7
2	No	91.1%	72
	Total	100%	79

Q36 - What is the fuel source for your oven and range?

#	Answer	%	Count
1	Natural gas	41.8%	33
2	Electricity	55.7%	44
3	Propane	2.5%	2
4	Other	0.0%	0
5	I don’t have an oven/range	0.0%	0
99	Don’t know	0.0%	0
	Total	100%	79

Q37 - Including yourself, how many people currently live in your home year-round?

#	Answer	%	Count
1	1	36.7%	29
2	2	35.4%	28
3	3	8.9%	7
4	4	10.1%	8
5	5	5.1%	4
6	6	0.0%	0
7	7	0.0%	0
8	8 or more	0.0%	0
99	I prefer not to state	3.8%	3
	Total	100%	79

Q38 - Which of the following best describes your annual household income?

#	Answer	%	Count
1	Less than $10,000	2.5%	2
2	$10,000 to less than $20,000	6.3%	5
3	$20,000 to less than $30,000	8.9%	7
4	$30,000 to less than $40,000	10.1%	8
5	$40,000 to less than $50,000	10.1%	8
6	$50,000 to less than $75,000	19.0%	15
7	$75,000 to less than $100,000	7.6%	6
8	$100,000 to less than $150,000	5.1%	4
9	$150,000 to less than $200,000	2.5%	2
10	$200,000 or more	0.0%	0
99	I prefer not to state	27.8%	22
	Total	100%	79