

MidAmerican Energy Company

Residential SummerSaverSM Impact and Process Evaluation



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The Tetra Tech team was made up of the following individuals: Sue Hanson, Jonathan Hoechst, Jessica Thompson, and Nick Richter of Tetra Tech.

1.0 EXECUTIVE SUMMARY

MidAmerican Energy Company (MidAmerican) offers energy efficiency and demand response programs to their customers throughout their Iowa and Illinois service territories. These programs cover electric and natural gas energy efficiency measures, as well as, other services such as technical assistance. This report details the activities, results, and recommendations from the evaluation of program year (PY) 2021 for the Residential SummerSaverSM program in Iowa and Illinois.

1.1 BACKGROUND

MidAmerican's Residential SummerSaver program provides an opportunity for its residential electricity customers to reduce demand during peak hours. In exchange for an incentive, MidAmerican is able to control their central air conditioning¹ or air-source heat pump on hot summer days when MidAmerican is forecasting peak demand, or when operational conditions warrant. Cycling periods run from 2pm to 7pm when called from June through September² and may be called by MidAmerican or the Midcontinent Independent Transmission Operator, Inc. (MISO). The program controls the air conditioning systems via signals sent to either a load control receiver (LCR) or a customer-provided smart thermostat.

1.2 EVALUATION METHODOLOGY

The evaluation of this program included impact and process evaluation activities. To help guide both impact and process evaluation activities, the Tetra Tech team conducted interviews with MidAmerican program staff to identify evaluation activities and key researchable questions. The Tetra Tech team also met with CLEAResult staff periodically throughout the evaluation to discuss data and savings methodologies for the smart thermostats.

For the impact evaluation, the Tetra Tech team reviewed the data and methods for both the LCRs and the smart thermostats.

- **LCR impacts.** The Tetra Tech team assessed MidAmerican's savings for the LCRs, including an analysis of interval meter data, extrapolation techniques to develop total program electricity loads, statistical models, and participant data from the program database. LCR interval meter data came from a subset of program participants with whole-house interval meters that record energy consumption over 15-minute intervals. These participants serve as a permanent load research sample for the program³. In total, 146 program participants had the 15-minute meter data, serving as the foundation for program impacts. The Tetra Tech team utilized the permanent load research sample data, MidAmerican's statistical extrapolation to the program population, and MidAmerican's regression modeling of hourly loads as the basis for the LCR component of the impact evaluation.
- **Smart thermostats impacts.** The Tetra Tech team collaborated with CLEAResult and MidAmerican to estimate savings impacts from the 3,921 smart thermostats included in the SummerSaver program. Data from the smart thermostats measured runtime of participating

¹ Certain models of central air conditioners may not be compatible with the LCR technology and, therefore, will not be able to participate. Also, customers with geothermal heat pumps are not eligible for the program.

² Participants leaving the program prior to September 30 receive checks for prorated incentives.

³ The data collection, use, and application of a control group reflect an industry best practice absent broad deployment of smart meters.

thermostats during the summer in 5- or 15-minute increments, depending on the Original Equipment Manufacturer (OEM). The Tetra Tech team worked with the program team to determine an average kW for the time period, per device. When taken in combination with the number of participating devices during a specific interval, the result provided an estimate of the demand from smart thermostat participants during the interval. Like the LCR component, Tetra Tech ran the analysis using three different days and both MISO adjustment methods.

For the process evaluation, the Tetra Tech team reviewed program materials and conducted a telephone survey of program participants to understand customers’ experiences with the program, reasons for participating, satisfaction with various aspects of the program, and MidAmerican as their energy provider. A general nonparticipant telephone survey was conducted to better understand customers’ needs for energy efficiency programs and services and assess current program awareness and general customer demographics. Additionally, a benchmarking review of similar programs from peer-utilities was completed, focusing on those with both direct control units and smart thermostats.

1.3 SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS

Overall, it is the opinion of the Tetra Tech team that the SummerSaver program operated effectively in PY2021, resulting in substantial demand savings and high participant satisfaction. In PY2021, there were 64,074 unique program participants, and there were two demand response events (June 10 and September 27). Ninety-five percent of participants were associated with Iowa (60,804) and five percent in Illinois (3,270). The June 10 event included customers in both the LCR and smart thermostat participant groups. The September 27 event included only smart thermostat participants.

In terms of customer experiences and satisfaction related to maintaining enrollment levels, the program is on-track to maintain participation levels. It operates smoothly, with well-defined responsibilities understood and practiced by program staff and the implementer. Overall, the Tetra Tech team determined that the program achieved a peak kW reduction of 46,844 kW during the 5pm to 6pm hour on June 10 (44,382 peak kW in Iowa and 2,462 peak kW in Illinois) and achieved total energy savings of 196,463 kWh during the two events (185,367 kWh in Iowa and 11,096 kWh in Illinois).

Table 1. PY2021 Estimated Savings Impacts by State*

Impact Type	Tracked Gross Savings**	Evaluated Gross Savings	Evaluated Realization Rate***
Iowa			
Total – kWh	164,890	185,367	112%
Total – Peak kW	39,445	44,382	113%
Illinois			
Total – kWh	9,535	11,096	116%
Total – Peak kW	2,241	2,462	114%

* Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology. Additionally, savings were apportioned between Iowa and Illinois based on the proportion of participants for each state (95 percent to Iowa and five percent to Illinois).

** Tracked savings for LCRs included in the overall numbers from data received from MidAmerican in October of 2021.

*** The realization rate is the ratio of evaluated gross savings to reported gross savings.

Table 2, below, shows the estimated savings impacts by state and by device type. The data used to develop the LCR savings estimate came from interval meters that recorded whole-house loads across 146 program participants. The loads from this sample were extrapolated to the program population

using Oracle’s Lodestar program to arrive at the total load of the program population for each hour of the summer. A regression model was used to develop a statistical estimate of load reduction during each event hour based on the actual performance of the load research sample. The Tetra Tech team applied the MISO symmetrical multiplicative adjustment baseline approach to develop estimated savings and found that MidAmerican had underestimated kW savings, with an overall realization rate of 105 percent for kWh savings and 114 percent for peak kW.

Through the smart thermostat impact evaluation, the Tetra Tech team used data provided by Virtual Peaker to develop the estimated savings. Similar to the LCR evaluation, the Tetra Tech team apportioned savings between Iowa and Illinois based on the proportion of participants for each state and applied the MISO symmetrical multiplicative adjustment baseline approach to developing savings⁴. Smart thermostat event-level findings included:

- For the June 10 event, the highest level of smart thermostat kW savings was during the 15:00 to 16:00 hour (3pm to 4pm), reflecting an evaluated total of 6,736 kW saved at the participants’ meter.
- The September 27 event consisted of only participants in the smart thermostat portion of the program, produced peak kW savings during the 14:00 to 15:00 hour (2pm to 3pm), with an evaluated total of 9,429 kW saved at the participants’ meter.

Table 2. PY2021 Estimated Savings Impacts by State and Device Type*

Device Type	Impact Type	Tracked Gross Savings**	Evaluated Gross Savings	Evaluated Realization Rate***
Iowa				
LCR****	kWh	133,817	141,168	105%
	Peak kW	33,872	33,480	99%
Smart Thermostats	kWh	31,073	44,199	142%
	Peak kW	5,572	6,241	112%
Total – kWh		164,890	185,367	112%
Total – Peak kW		39,445	39,721	101%
Illinois				
LCR****	kWh	7,197	7,592	105%
	Peak kW	1,822	1,801	99%
Smart Thermostats	kWh	2,338	3,504	150%
	Peak kW	419	495	118%
Total – kWh		9,535	11,096	116%
Total – Peak kW		2,241	2,295	102%

* Savings were apportioned between Iowa and Illinois based on the proportion of participants for each state (95 percent to Iowa and five percent to Illinois for LCRs, and 93 percent to Iowa and seven percent to Illinois for smart thermostats).

** Tracked savings for LCRs included in the overall numbers from data received from MidAmerican in October of 2021.

*** The realization rate is the ratio of evaluated gross savings to reported gross savings.

**** Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology.

⁴ The Tetra Tech team ending up using the average of June 7, 8, and 9 (like CLEAResult) and then the MISO symmetric adjustment to get a reasonable match to the tracked (reported) values.

While the Tetra Tech team found no need for major program adjustments, we did identify the following key findings and recommendations for consideration by MidAmerican.

Finding #1: MidAmerican's continued approach to using a load research sample is a best practice for utilities that do not have a broad deployment of smart meters.

MidAmerican's approach uses a sample of 146 participants with whole-house interval meters installed to obtain granular load data. MidAmerican extrapolates this sample to the program population using Oracle's Lodestar analysis, widely used for load research and forecasting. This approach provides data at the granularity needed in lieu of advanced meter infrastructure and remains a typical industry approach.

Recommendation #1: As MidAmerican continues to rely on a sample of program participants to develop program savings, the current approach is appropriate.

Finding #2: The LCR estimated savings calculation methods applied to PY2021 participants were developed by MidAmerican and the smart thermostat estimated savings were developed by CLEARResult, rather than following one of the three MISO Business Practice Manual (BPM) methods.

MidAmerican's current method to estimate savings from LCRs relies on either load modeling using hourly regression models of the program population's loads that were extrapolated from the load research sample or a method similar to the MISO symmetric multiplicative adjustment. The current method also relies on identifying 'like' days for construction of the initial baseline. The MISO BPM methods allow for baseline construction from days regardless of their similarity in temperature profile and also a simpler adjustment. Although accepted by MISO, MidAmerican's current method may be underestimating performance relative to goals and with a methodology that is complex relative to MISO methods. In this case, because the event day was preceded by much cooler weather, the MISO method of using 10 previous days (non-weekend or holiday) resulted in an artificially low baseline event with adjustment. The Tetra Tech team found that using three previous days rather than 10 provided a good match to the event day. The CLEARResult method for estimating savings from smart thermostats, similar to MidAmerican, used a slightly different adjustment method similar to the MISO symmetric multiplicative adjustment.

Recommendation #2: Consider utilizing one of the three MISO BPM methods for calculating estimated savings for settlement with MISO. MidAmerican should continue utilizing a load analysis model for internal purposes.

Finding #3: Smart thermostat data is incomplete.

The SummerSaver program allows customers who bring their own smart thermostats to the program to use three different brands (OEM) of thermostats—Nest, ecobee, and Honeywell. Data from Nest and ecobee was mostly complete, though measured in different time intervals. However, no runtime data was available for the Honeywell devices, only setpoint data. Fortuitously, Honeywell had the lowest number of program participants, and the Tetra Tech team had to base estimated savings for the Honeywell devices on an average value from the Nest and ecobee devices.

Recommendation #3: MidAmerican should continue working with CLEARResult and its smart thermostat data provider to determine if additional data could be available from each OEM. In particular, MidAmerican should explore options for obtaining annual runtime data (at a minimum) from Honeywell.

Finding #4: The current method for calculating smart thermostat estimated savings relies heavily on a uniform assumption of HVAC system size.

The current CLEARResult kWh estimated savings calculation assumes an HVAC system size of 2.5 tons (8.8 kW). While the Tetra Tech team, MidAmerican, and CLEARResult reviewed historical HVAC system size information tracked by MidAmerican, the SummerSaver program does not collect HVAC size as part of the participant intake form. MidAmerican does collect QAQC data on HVAC system size, but this information has been limited to integers, thus requiring non-integer sizes to be rounded for recording purposes. Tetra Tech completed an analysis of how much the savings over an event may vary based on this unknown rounding and found a difference of 18 percent from the mean HVAC system size method.

Recommendation #4a: While the Iowa Technical Reference Manual recommends using 2.5 tons in the absence of a known system rating, MidAmerican could improve smart thermostat estimated savings calculations by collecting information about HVAC system ratings. Because collecting this information could be an onerous process, using the QAQC data already collected by MidAmerican could be used instead. However, the QAQC HVAC data would need to be used in combination with actual smart thermostat runtime data.

Recommendation 4b: The Tetra Tech team discussed with MidAmerican that the QAQC HVAC data should be stored as an integer rather than a whole number. MidAmerican has already made this change.

Finding #5: The SummerSaver program continues to have high satisfaction, and attrition can be expected to be low.

Satisfaction continues to be high across all elements of the program. Incentives were found to be the primary motivation for customers to enroll in the program. While a very high percentage of participant respondents indicated their intent to continue participating in the program (95 percent overall), the incentive level being a primary motivator creates an element of program risk, should incentives change.

Recommendation #5: Continue to maintain high program standards for customer interactions but monitor the effect of incentive changes on program participant retention.

Finding #6: Program awareness is primarily created through utility bill messaging, emails from MidAmerican, and the thermostat app.

Overall, 38 percent of respondents (39 percent Iowa, 36 percent Illinois) mentioned learning about the SummerSaver program through MidAmerican's utility bill messaging, followed by emails from MidAmerican (23 percent overall), and the thermostat app (22 percent overall). Only four percent of respondents mentioned learning of the program through a friend, family member, or coworker.

Recommendation #6: The Tetra Tech team understands that MidAmerican's SummerSaver program is fully subscribed, but still plans to grow the smart thermostat program component, as the program allows. Given the program's high satisfaction scores and participants' willingness to recommend the program (38 percent of respondents said they were extremely likely to recommend the program to a friend or family member), as MidAmerican seeks to grow the smart thermostat program component, greater awareness could be created through a "refer a friend" program.

Finding #7: Although few participants had any concerns about the program, those who did have concerns were worried about uncomfortable temperatures.

Many surveyed respondents (81 percent Iowa, 78 percent Illinois) said they had no initial concerns about participating in the SummerSaver program. However, of the respondents that did have concerns (n = 35), 74 percent (76 percent Iowa, 71 percent Illinois) mentioned being concerned about uncomfortable temperature increases. Both LCR and smart thermostat surveyed participants shared these concerns.

Recommendation #7: To improve smart thermostat customer comfort levels, conduct pre-cooling for future events.

2.0 INTRODUCTION

This report presents the detailed results for the program year (PY) 2021 evaluation of the Residential SummerSaverSM program offering in MidAmerican's Iowa and Illinois service territories.

2.1 PROGRAM DESCRIPTION

MidAmerican's Residential SummerSaver program provides an opportunity for its residential electricity customers to reduce demand during peak hours. In exchange for an incentive, MidAmerican is able to control their central air conditioning⁵ or air-source heat pump on hot summer days when MidAmerican is forecasting peak demand, or when operational conditions warrant. Cycling periods run from 2pm to 7pm when called from June through September⁶ and may be called by MidAmerican or the Midcontinent Independent Transmission Operator, Inc. (MISO). The program controls the air conditioning systems via signals sent to either a load control receiver (LCR) or a customer-provided smart thermostat.

- **LCR participants.** Each LCR is located near the participant's air conditioner. The LCR is wired to a home's thermostat, acting as a switch to cycle the relevant equipment on and off. The home's plenum fan is able to continue operating, circulating air through the home, regardless of whether the cooling equipment would otherwise be running. New LCR program participants receive a \$30 end-of-season bill credit, with subsequent years earning a \$20 bill credit. The program pays for the installation of any LCR equipment necessary for participation. On a rolling basis, the program replaces aging LCR equipment and also replaces LCR equipment that may have failed, as identified by the program's quality assurance / quality control (QA/QC) process.

Starting in PY2016, a sample of 146 participants were selected for use as a load research sample to facilitate savings calculations⁷. For this sample, MidAmerican has installed whole-house interval meters that supply 15-minute electricity consumption data to MidAmerican. This granular data is used to calculate savings by the MISO stipulated methods.

- **Smart thermostat participants.** In 2021, MidAmerican opened the program to customers with eligible smart thermostats⁸, and had 3,921 devices signed up. The smart thermostat option allows MidAmerican to adjust participants' thermostat temperature setting through the home's Wi-Fi⁹. Currently, only certain Google Nest, ecobee, and Honeywell Home smart thermostats are eligible. Participants receive a \$30 end-of-season incentive if they remain enrolled the entire season.

Prior to the 2017 program year (PY2017), participants were reminded of their enrollment in the program before the start of the load control season via a mailed postcard. In PY2017, MidAmerican determined

⁵ Certain models of central air conditioners may not be compatible with the LCR technology and, therefore, will not be able to participate. Also, customers with geothermal heat pumps are not eligible for the program.

⁶ Participants leaving the program prior to September 30 receive checks for prorated incentives.

⁷ The data collection, use, and application of a control group reflect an industry best practice absent broad deployment of smart meters.

⁸ Customers already participating in the program with an LCR are not eligible to transition to participation via a smart thermostat until the LCR replacement date or the end of their LCR's useful life.

⁹ Customers participating through a qualifying smart thermostat have the temperature remotely adjusted by the thermostat's manufacturer during an event.

that due to the high number of customers who had been participating over many years and the low opt-out rate, mass postcard notifications to all participants were no longer needed; however, new participants were notified.

MidAmerican staff provides overall strategic direction, research and development, customer outreach, and other administrative functions for the program. MidAmerican contracts with CLEARResult to manage the program. CLEARResult provides a call center, enrolls new participants, manages the process for installing equipment, manages the QA/QC process for replacing old or failed equipment, and generally tracks the participants. They also manage the smart thermostat enrollment process with their subcontractor, Virtual Peaker. MidAmerican markets the program and decides when to call events based on temperature forecasts, grid operating conditions, or at MISO’s request.

2.2 EVALUATION METHODS

2.2.1 Summary of Researchable Questions and Evaluation Activities

This section describes the analytic methods and data collection activities implemented as part of the PY2021 evaluation of the SummerSaver program. The methodology was designed to evaluate the program and address the researchable questions outlined in the program’s Detailed Evaluation Plan (DEP)¹⁰, as well as addressed other issues that became relevant during the evaluation process.

2.2.1.1 Key Researchable Questions

Based on discussions with MidAmerican staff, key researchable questions were developed and prioritized for the evaluation of the SummerSaver program. The table below outlines the researchable questions that this evaluation examined along with the activities performed to address each.

Table 3. Researchable Questions

Researchable Questions	Activity to Support the Question
Program Design	
What is the customer experience? Is the program meeting customer and MidAmerican needs? Are program communications understood for enrollment, event participation, and incentive payment?	<ul style="list-style-type: none"> • Program staff interviews • Participant survey
What drives customers to participate in the program?	<ul style="list-style-type: none"> • Participant survey
What issues may affect future program participation (e.g., experiences during events, rate of attrition, and net enrollments)?	<ul style="list-style-type: none"> • Participant survey
Customer Education, Outreach, and Marketing	
How effective are program communications among all program stakeholders (utility, implementer, and participants)?	<ul style="list-style-type: none"> • Program staff interviews • Participant survey
Do program participants also participate in other MidAmerican energy efficiency programs?	<ul style="list-style-type: none"> • Review of historical energy efficiency program participation records
How effective is the program outreach and marketing?	<ul style="list-style-type: none"> • Participant survey • General population survey

¹⁰ The final SummerSaver DEP was approved by MidAmerican on October 27, 2021.

Researchable Questions	Activity to Support the Question
What is the level of consumer awareness of the program? What more can/should MidAmerican do to increase program awareness among consumers?	<ul style="list-style-type: none"> • General population survey
Program Administration, Processes, and Resources	
Is the program being implemented effectively and appropriately?	<ul style="list-style-type: none"> • Program staff interviews • Participant survey
Is the customer tracking data effective for understanding QA/QC results, enrollment and equipment installation timing, and incentive payment?	<ul style="list-style-type: none"> • Program staff interviews • Tracking data review
Are program QA/QC processes adequate and effective? If not, how can they be improved?	<ul style="list-style-type: none"> • Program staff interviews • Program information review
Program Satisfaction	
Are participating customers satisfied with the program?	<ul style="list-style-type: none"> • Participant surveys
Are customers happy with program components, such as enrollment, event communications, and incentive payments?	<ul style="list-style-type: none"> • Participant surveys
How are customers influenced by the program incentives? How important is the incentive level to their continued participation?	<ul style="list-style-type: none"> • Participant surveys
Program Impacts	
What are PY2021 savings for Iowa and Illinois? For LCR participants, is the load research sample being accurately used to calculate savings? Are the MISO settlement savings accurately calculated following a MISO Business Practices Manual (BPA) method?	<ul style="list-style-type: none"> • Review of MISO Business Practices Manual • Savings calculations based on MISO's methodology • Load research sample data review
For the smart thermostat participants, is the baseline calculation reasonable? What are the savings from these participants?	<ul style="list-style-type: none"> • Review of CLEAResult savings methodology • Assess smart thermostat data
Is the appropriate information being collected to support the program's savings assumptions? Are there any issues or concerns regarding data quality?	<ul style="list-style-type: none"> • Program staff interviews • Data review

2.2.2 Detailed Evaluation Activities

The table below documents the activities performed to support the evaluation of this program.

Table 4. Program Evaluation Activities Summary

	Activities
Overarching Evaluation Activities	Program staff interviews. Conducted an initial in-depth interview with MidAmerican program staff and had ad hoc meetings throughout the course of the evaluation. For evaluation items related to the smart thermostat program component, some of these discussions included CLEAResult and Virtual Peaker staff as well.
Impact Evaluation Activities	Database and savings calculation review. The Tetra Tech team reviewed MidAmerican’s program database, supporting documentation, meter data, and method for calculating program savings. Additionally, we calculated program savings with several baseline scenarios to compare results with MidAmerican’s method.
Process Evaluation Activities	<p>Participant customer survey. Completed 177 surveys with program participants. The survey was conducted with a sample of both LCR and smart thermostat program participants across MidAmerican’s Iowa and Illinois service territories.</p> <p>Nonparticipant customer survey. Completed 198 customer surveys with a random sample of residential customers in MidAmerican’s service territory who had not previously participated in an energy efficiency program.</p> <p>Literature review and other secondary research. The Tetra Tech team conducted secondary research to gather information on peer utility offerings for other similar programs to MidAmerican’s Residential SummerSaver program.</p>

Below is more detail related to the methodologies used for the different evaluation activities associated with MidAmerican SummerSaver program evaluation.

- Program staff interviews.** The Tetra Tech team conducted an initial interview with MidAmerican program staff on August 31, 2021, and had ongoing discussions with program and CLEAResult smart thermostat implementation staff throughout the evaluation. These discussions were used to ensure the Tetra Tech team had a comprehensive understanding of the program and its various functions, and to identify and prioritize researchable questions for the evaluation.
- Database and savings calculation review.** The Tetra Tech team conducted a tracking system review of all PY2021 participant tracking and load research sample meter data. Additionally, we reviewed the regression modeling developed by MidAmerican to calculate savings and the Lodestar methodology used to extrapolate load research sample interval meter data to the program population. The Tetra Tech team calculated savings using the program participant hourly loads developed from Lodestar, utilizing three MISO baseline methods. For PY2021, the Tetra Tech team reviewed the methods used to determine estimated savings from the smart thermostats and calculated savings independently, including utilizing three MISO baseline methods.
- Participant customer survey.** The Tetra Tech team completed 177 customer surveys—112 with MidAmerican’s Iowa program participants and 65 with MidAmerican’s Illinois program participants. The participant customer surveys were used to inform process evaluation objectives. The surveys investigated program delivery processes, interactions with the program staff, preferred communication channels, satisfaction with different facets of the program, and demographic information. We leveraged past survey instruments to identify questions that warranted being tracked over time. The surveys were administered through

Tetra Tech's in-house survey research center in November of 2021. A copy of the participant survey can be found in Appendix A.

- **Nonparticipant customer survey.** The Residential SummerSaver program evaluation included a series of questions for comparison to responses from a general population telephone survey that the Tetra Tech team conducted for the MidAmerican residential programs. Among other items, the questions assessed consumer awareness of different program offerings, interest in program participation and rebates, energy efficiency attitudes, and recent energy efficiency activity. The surveys contained the same demographic information as the participant surveys to provide insight into the population and inform the analysis. The general population surveys were administered through Tetra Tech's in-house CATI lab in September 2020. A copy of the nonparticipant survey can be found in Appendix B.
- **Literature review and other secondary research.** In addition to primary research activities, the Tetra Tech team conducted secondary research to gather information on peer utility programs for other similar programs to MidAmerican's Residential SummerSaver program to provide additional context to evaluation results.

3.0 PROGRAM SAVINGS AND IMPACT EVALUATION FINDINGS

This section presents the results of the quantitative and qualitative gross impact results for the PY2021 SummerSaver impact evaluation. The impact evaluation was designed around the key researchable questions identified in the methodology section. The purpose of the impact evaluation was to verify the approach and results of MidAmerican’s calculated PY2021 savings and provide insight into additional methods that may be useful for MidAmerican to consider.

3.1 PROGRAM SAVINGS

Through the impact analysis, we found that MidAmerican’s approach to calculating savings was reasonable and that the resulting savings were similar to alternative methodologies. Across LCRs and smart thermostats and both 2021 events, we compared MidAmerican’s tracked (claimed) savings to hour-specific savings developed by the Tetra Tech team using MISO’s weather-adjusted baseline approach. Savings were apportioned between the states based on the number of participants in the events. For PY2021, the participation split was 95 percent to Iowa and five percent to Illinois.

Overall, the Tetra Tech team determined that the program achieved a peak kW reduction of 46,844 kW during the 5pm to 6pm hour on June 10 and achieved total energy savings of 196,463 kWh during the two events. As the program’s goal setting was based on the highest-performing hour, the Tetra Tech team compared its results for the highest performing hour to that reported by MidAmerican. The demand and kWh savings realization rates for Iowa and Illinois are presented in the table below.

Table 5. PY2021 Tracked and Evaluated Estimated Savings by State*

Impact	Tracked Gross Savings	Evaluated Gross Savings**	Evaluated Realization Rate***
Iowa			
kWh	164,890	185,367	112%
Peak kW	39,445	36,436	92%
Illinois			
kWh	9,535	11,096	116%
Peak kW	2,030	2,035	100%

* Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology. Additionally, savings were apportioned between Iowa and Illinois based on the proportion of participants for each state (95 percent to Iowa and five percent to Illinois for LCRs, and 93 percent to Iowa and seven percent to Illinois for smart thermostats).

** Tracked savings for LCRs included in the overall numbers from data received from MidAmerican in October of 2021.

*** The realization rate is the ratio of evaluated gross savings to reported gross savings.

Absent widespread deployment of smart meters, MidAmerican’s approach to developing savings from the LCR devices using a permanent load research sample’s interval meters is a reasonable alternative and similar to other utilities without smart meters. The permanent load research sample (M&V sample) has been used to provide estimates of total program population savings based on stratification and statistical extrapolation that leads to an estimate of total program population hourly consumption in each hour of the summer load control season.

Similarly, the methodology MidAmerican used to estimate demand reductions and energy savings among the smart thermostat group was reasonable and produced valid results. The combination of

runtime data and HVAC system kW draw provides sufficient information to estimate load across participants. A key input to the smart thermostat savings methodology is the size of the central air conditioner (tons). Because the SummerSaver program does not collect this information from each participant, an average size is used. The average—2.5 tons—is based on the Iowa TRM value, which MidAmerican QAQC data aligns with. Absent the ability to identify each air conditioner’s size, using an average unit size is methodologically sound, though having the actual size is ideal. The table below presents the overall evaluated estimated energy savings for each event day and by the type of device.

Table 6. Evaluated Results by Event and Device Type*

Event Date	Device Type	kWh	Peak kW	Peak Hour
June 10, 2021	LCR	148,759	43,654	5-6pm
June 10, 2021	Smart Thermostat**	17,046	6,735	3-4pm
September 27, 2021	Smart Thermostat**	30,657	9,429	2-3pm

* Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology.

** The smart thermostat evaluated results do not equal the results in Table 5. This is because the program’s goal setting was based on the highest-performing hour, which was from the LCRs for the June 10 event. Thus, the Tetra Tech team reported the program’s impacts based on the highest performing hour.

3.2 IMPACT EVALUATION METHODOLOGY

The focus of the impact evaluation was estimating savings from the two demand response events called in 2021. The events occurred on June 10 and September 27, each lasting four hours. The initial event, which included both the LCR participants and the smart thermostat customers, started at 3pm and ended at 7pm. The purpose of the events was to respond to high temperatures and resulting system peak loads. The second event, called on September 27, was limited to smart thermostat program participants and lasted from 2pm until 6pm.

3.2.1 Load Control Receivers

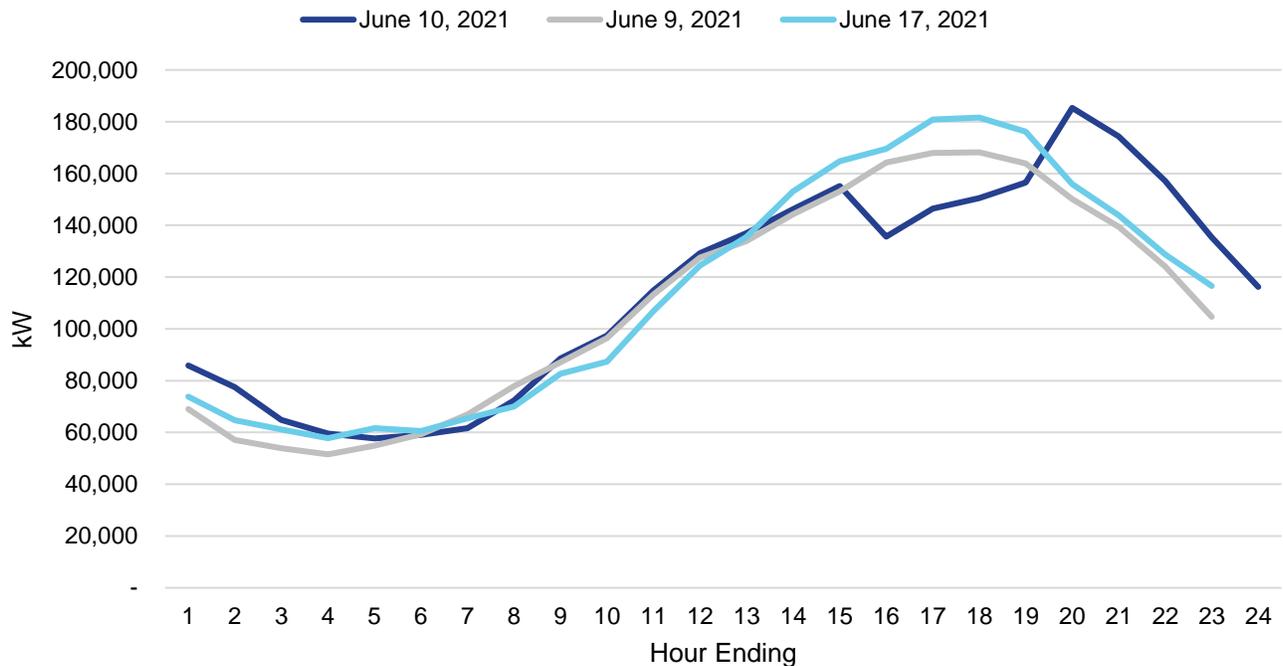
To assess savings among participants with an LCR, the Tetra Tech team used a similar methodology to the last evaluation of this program. MidAmerican provided hourly data of the consumption from each of the 146 load research sample members. The Tetra Tech team reviewed this data and the analysis workbooks that presented MidAmerican’s regression models and the calculations used to report savings. Additionally, we reviewed the methodology to extrapolate loads from the load research sample to the program population. To evaluate the savings, the Tetra Tech team developed a regression model and results using MISO’s weather-adjusted baseline methodology and MISO’s symmetric multiplicative method. The MISO methods are flexible, thus allowing the Tetra Tech team to develop hourly weather adjustment factors using the total program load data provided by MidAmerican to align with MidAmerican’s use of hourly data.

The load research sample has interval data recorded that describes each home’s energy consumption for a 15-minute period. The 15-minute periods were summed to create an hourly consumption number, which was the basis of the analysis. The data are extrapolated to the program population to create an hourly profile of energy use of the entire program population for the summer (June 1 through August 31). This total program load data served as the basis for developing the regression models and program savings for MidAmerican and the Tetra Tech team.

Both MidAmerican and Tetra Tech models used weather observations from the Des Moines Airport weather station to develop the regression model of loads for the summer of 2021. For the MISO weather-adjustment method, the average temperature for a given event hour was developed from the prior seven non-holiday, non-event weekdays¹¹.

MISO called the June 10 event due to high temperatures and the corresponding strain on system operations—the average temperature during the event was 92°F. Following a MISO-called event, MidAmerican must submit results from that event to MISO within 45 days. This condensed timeline greatly limited the pool of days to use when building a comparable baseline for estimating demand reductions achieved during the June 10 event because such warm weather so early in the summer season is not common. Temperatures during the 10 previous non-holiday, non-weekend days averaged 78°F during the same four-hour period as the June 10 event. MidAmerican identified two days with similar load profiles and temperatures to build a baseline period—one prior to the event (June 9) and one following the event (June 17). The figure below shows hourly loads during the event day as well as each of the two days in the constructed baseline period.

Figure 1. June 10 LCR Load and Baseline



The Tetra Tech team reviewed MidAmerican’s methodology in selecting the abbreviated baseline period and determined that the days were adequately similar to provide an accurate baseline for estimating demand reduction. In addition to reviewing MidAmerican’s results, the Tetra Tech team estimated savings among the LCR population using three methods detailed in MISO’s BPM 26¹² to triangulate results and provide a check for reasonableness of results.

¹¹ MISO methods call for 10 days of non-event, non-holiday weekday data preceding the event for constructing baselines. However, the M&V sample contains load data corresponding to the MidAmerican summer load control season, which begins on June 1. Therefore, the Tetra Tech team used as many non-event, non-holiday weekdays (7) as possible from the data to construct the MISO baselines.

¹² *Business Practices Manual No. 26, Demand Response*. MISO, July 2, 2021. Appendix A.

The Tetra Tech team ran the analysis using three different groups of days to adjust the baseline—1) June 9 and 17; 2) June 7, 8, and 9; and 3) the full previous seven non-weekend June days—and both MISO adjustment methods (weather and symmetric multiplicative). The Tetra Tech team’s results of the different methods compared to MidAmerican’s results (italicized) are summarized in the table below. It is apparent that baseline construction is key to savings estimates, as even after weather adjustment, the full MISO baseline did not fit very well to the actual event day load.

Table 7. Event-Level LCR Savings Methods Comparisons*

Baseline	Adjustment Method	Peak kW	Total kWh
<i>June 9,17</i>	<i>MidAmerican</i>	<i>38,346</i>	<i>141,014</i>
June 9,17	MISO Weather	25,265	72,337
June 9,17	MISO Symmetric	47,160	175,563
June 7,8,9	MISO Weather	31,140	98,950
June 7,8,9	MISO Symmetric	43,654	148,760
June 1,2,3,4,7,8,9	MISO Weather	16,911	49,665
June 1,2,3,4,7,8,9	MISO Symmetric	13,684	34,590

* Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology.

3.2.2 Smart Thermostats

Data from the smart thermostat program component measured runtime of participating thermostats during the summer in 5- or 15-minute increments, depending on the OEM. An average central air conditioner system size of 2.5 tons (8.8 kW), which was based on primary data within MidAmerican’s territory, was assigned to each participating device. Using this information, the full program team (MidAmerican, CLEAResult, and Tetra Tech) collaborated on the method to estimate demand across the population of participating smart thermostats should be determined by:

- Summing runtime seconds per interval across all devices, then converting this to hours.
- This aggregated runtime value was multiplied by the system draw (8.8 kW) to get kWh and divided by the minute increment (5/60 or 15/60 hours) to get kW demand.
- Similar days were selected for baseline construction. This baseline was then adjusted based on the average of all pre-event hour differences between the event day and baseline load.

The Tetra Tech team calculated load during a specific interval by comparing the observed runtime against potential runtime¹³ and multiplying the runtime percentage by 8.8 kW. This number provided the average kW for the time period, per device. When taken in combination with the number of participating devices during a specific interval, the result provides estimates of the demand from smart thermostat participants during the interval. Like the LCR evaluation, the Tetra Tech team ran the analysis using three different days and both MISO adjustment methods. The Tetra Tech team’s results of the different methods compared to MidAmerican’s results (italicized) are summarized in the table below.

¹³ Potential runtime = interval length (seconds) x number of devices.

Table 8. Event-Level Smart Thermostat Savings Methods Comparison

Baseline	Adjustment Method	Peak kW	Total kWh
June 10, 2021			
June 7, 8, 9 and 14, 15, 16 (by OEM)	MidAmerican	5,992	14,607
June 9 and 17	MISO Weather	5,372	13,744
June 9 and 17	MISO Symmetric	7,297	19,854
June 7, 8, and 9	MISO Weather	5,524	12,002
June 7, 8, and 9	MISO Symmetric	6,512	16,153
June 1, 2, 3, 4, 7, 8, and 9	MISO Weather	4,107	7,596
June 1, 2, 3, 4, 7, 8, and 9	MISO Symmetric	3,728	4,962
September 27, 2021			
September 28, 29, and 30	MidAmerican	6,056	18,805
September 22, 23, and 24	MISO Weather	6,638	16,645
September 22, 23, and 24	MISO Symmetric	3,016	554
September 28, 29, and 30	MISO Weather	7,846	25,351
September 28, 29, and 30	MISO Symmetric	9,133	29,471
September 13, 14, 15, 16, 17, 20, 21, 22, 23, and 24	MISO Weather	5,446	14,075
September 13, 14, 15, 16, 17, 20, 21, 22, 23, and 24	MISO Symmetric	3,841	4,340

3.3 IMPACT EVALUATION MODELING

The impact evaluation of the SummerSaver events utilized three models, described below, to determine estimated savings. The LCR analysis utilized the load research sample as the base and extrapolated to the program population; thus, all models were based on identical consumption data. Smart thermostat data were also analyzed using the methods below. These models included:

- 1) MISO Calculated Baseline (without adjustment)
- 2) MISO Calculated Baseline (with symmetrical multiplicative adjustment)
- 3) MISO Calculated Baseline (with weather adjustment).

3.3.1 MidAmerican’s Reported Savings Model

MidAmerican’s model relies on constructing a baseline of similar non-event days. The hourly load difference between this baseline and the event day was then calculated, and two averages found: pre-event and post-event differences. The constructed baseline is then adjusted in three parts. For the pre-event hours, the baseline hourly load has the average pre-event difference added to it. The post-event hours were adjusted in the same manor. For the event hours, the adjusted baseline was constructed by adding the pre-event average difference as well as a fraction of the event time (e.g., 1/5 for the first hour of a four-hour event) multiplied by the difference between the post-event and pre-event average differences.

This adjusted baseline then has the actual metered loads subtracted from it to arrive at hourly event savings. MidAmerican took the extra step of averaging the hourly savings for each event hour to develop average event-hour savings as the basis for reported savings.

3.3.2 Tetra Tech's Impact Evaluation Model

Based on each of the three MISO Business Practices Manual baseline modeling approaches, the Tetra Tech team developed three separate models. Of note is that the MISO baseline approaches provide standardized modeling methods and flexibility in their application to each participant. Descriptions of the three MISO models are:

- Model 1: Calculated Baseline (without adjustment).** This method is the most straightforward approach described in the MISO BPM. For a given hour, the same hour on the 10 prior event-eligible days has the hourly loads averaged to serve as the baseline. Savings were derived by subtracting the actual load experienced during the event from the baseline. This method is also called the “unadjusted baseline.” Due to data limitations, the Tetra Tech team used the seven prior non-holiday, non-event weekdays to serve as the baseline days, with hours selected based on the event hour.
- Model 2: Calculated Baseline (with symmetrical multiplicative adjustment, or SMA).** This method builds from the unadjusted baseline method but adds additional information to adjust the baseline (similar to MidAmerican’s calculation method). The three hours that occur prior to one hour before the event are compared between the event day and the same baseline days selected from Model 1. For the baseline days, the three hours prior to one hour before the event have their loads averaged. For the event day, the event day’s three hours prior to one hour before the event has the hourly loads averaged. The ratio of the pre-event hours, event-day to non-event day, becomes a multiplicative adjustment to the otherwise unadjusted baseline. For example, if the event day’s three hours have loads that are 10 percent higher than the baseline days, the ratio of 1.1 is multiplied with the unadjusted baseline to arrive at the SMA baseline. The SMA is applied to all event hour baselines. MISO caps the SMA at no more than +/- 20 percent, meaning an SMA cannot be lower than 0.8 or higher than 1.2.

The SMA allows for capturing differences between event days and baseline days that may be evident in loads prior to an event. For example, an unusually warm morning may lead to higher loads during the morning, indicating higher than normal loads would exist in the afternoon during an event. But the approach can also capture non-weather-dependent factors. For example, an industrial customer may have non-weather-dependent loads that are lower or higher due to production schedules on the baseline days compared to the event day, which may be captured or indicated through the SMA.

- Model 3: Calculated Baseline (with weather adjustment).** This method explicitly incorporates temperature into the baseline calculation. The approach was based on having a temperature regression coefficient developed to capture how loads change relative to temperature. The coefficient describes the load per unit of temperature (e.g., kW per degree F). The regression coefficient is developed by analyzing non-event day loads. MISO does not specify the structure of the regression equation, allowing for flexibility in the approach.

Once the temperature effect on load was developed through the regression model, the average temperature of the baseline days’ equivalent event hour was compared to the same hour on the event day. The difference of the average temperature of the 10 prior eligible days (non-event, non-holiday weekdays) to that on the event day is multiplied by the temperature coefficient. For example, if a customer was found to have a temperature coefficient of 10 kW

per degree F and the temperature difference of the event day and the baseline days was 10 degrees, the increase in load is 100 kW. This adjustment was added to the unadjusted baseline described in Model 1.

The following equation summarizes the calculation of the baseline for a given hour of the day:

$$\text{Baseline kW} = \text{Baseline days' Average Load} + \text{Temperature Coefficient} * (\text{Event Day Temperature} - \text{Baseline Days' Average Temperature}).$$

Given the poor match of the original three models to actual event data, the Tetra Tech team also calculated these three models for multiple groups of similar days, other than the MISO standard 10 previous non-event weekdays. The comparisons of these calculations were shown in the tables above. The selection of days for the baseline had a substantial impact on estimates. The Tetra Tech team found that MidAmerican’s calculations fell within the reasonable range of load savings estimates.

3.4 PROGRAM IMPACT ESTIMATES

The tables below present the kW load reductions for each PY2021 event hour for Iowa and Illinois, along with the aggregate kWh savings for each state. Events were called on June 10 from 3pm to 7pm, and September 27 from 2pm to 6pm. As noted earlier, because MidAmerican provided savings in aggregate across the two states using a single analysis, those savings were allocated to each state based on their respective counts of event participants—95 percent in Iowa and five percent in Illinois.

The evaluated savings were calculated using the MISO symmetrical multiplicative baseline method. The total kWh is the sum of each hour’s kW savings. MidAmerican’s savings reflect the results of their analysis using their own regression model. Both the Tetra Tech team and MidAmerican identified June 10, 2021, hour ending 17:00 as the peak performing hour. In comparing the average hourly evaluated kW results, many hours exhibited close agreement between the calculation methods. The primary driver between the Tetra Tech team’s hourly analysis and MidAmerican’s analysis is the choice of days to calculate a baseline. Because the weather was extremely variable around both events, the baseline sometimes did not closely match event day load even after weather or symmetric multiplicative adjustment. As a result, the realization rates were driven less by differences in calculation methods and more by the selection of days to construct the initial baseline.

Table 9. SummerSaver Estimated Energy Savings (kWh) - Iowa

Date	Hour Ending	Reported Gross Savings	Evaluated Gross Savings
June 10, 2021	15:00	39,445	39,721
June 10, 2021	16:00	35,848	38,117
June 10, 2021	17:00	39,148	44,382
June 10, 2021	18:00	32,959	34,742
September 27, 2021	14:00	5,632	8,737
September 27, 2021	15:00	5,311	7,866
September 27, 2021	16:00	4,209	6,748
September 27, 2021	17:00	2,337	5,054
Total kWh		164,889	185,367

* Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology.

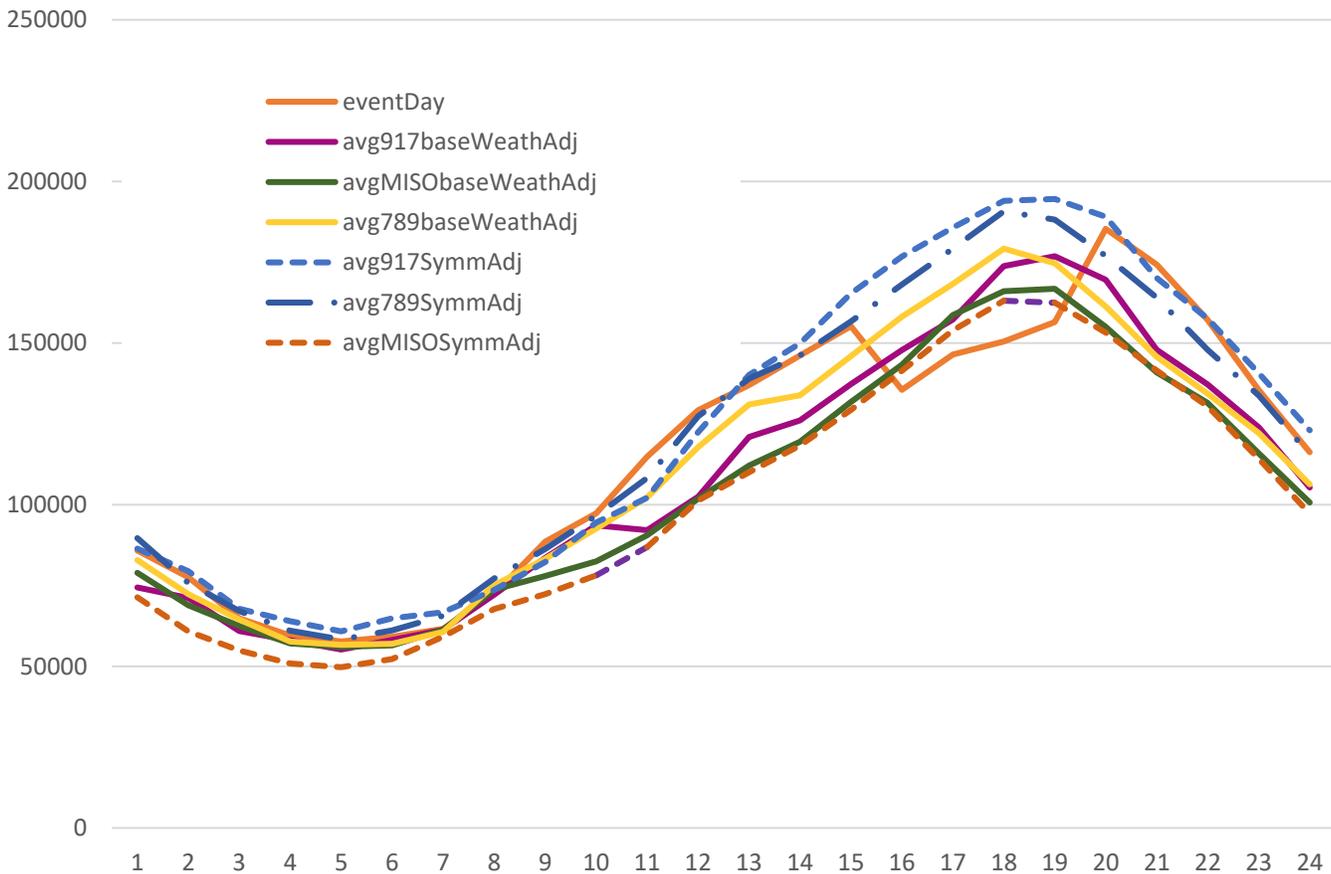
Table 10. SummerSaver Estimated Energy Savings (kWh) - Illinois

Date	Hour Ending	Reported Gross Savings	Evaluated Gross Savings
June 10, 2021	15:00	2,241	2,295
June 10, 2021	16:00	2,014	2,162
June 10, 2021	17:00	2,165	2,462
June 10, 2021	18:00	1,799	1,924
September 27, 2021	14:00	424	693
September 27, 2021	15:00	400	624
September 27, 2021	16:00	317	535
September 27, 2021	17:00	176	401
Total kWh		9,536	11,096

* Evaluated LCR savings estimates incorporate loss factor of 1.0836 in order to remain consistent with MidAmerican’s estimated savings methodology.

The figure below illustrates the similarity between the actual (Lodestar) program population loads and the baseline forecasts of the different Tetra Tech team LCR models for June 10. The baselines constructed using the seven previous days are clearly underestimating savings.

Figure 2. Comparison of Each Baseline Model



4.0 PROCESS EVALUATION FINDINGS

This section details the methodology of the process evaluation activities, along with detailed findings. The process evaluation was designed around the key researchable questions identified in the methodology section. Process evaluation activities involved interviews with program staff and telephone surveys with both participating and nonparticipating customers.

The participating customer survey was used to understand the perspectives of program participants; questions explored participants' awareness, experience, and satisfaction with the SummerSaver program. The nonparticipant survey was conducted as part of a cross-program survey effort to understand MidAmerican's general population and their awareness of MidAmerican's demand side management programs, including SummerSaver.

4.1 INTERVIEWED PARTICIPANT AND NONPARTICIPANT CHARACTERISTICS

The Tetra Tech team completed interviews with a total of 112 participating customers in Iowa and 65 in Illinois. The participating customer survey targeted homeowners. In addition, the Tetra Tech team conducted a nonparticipant survey with 198 residential customers to support all Iowa residential program evaluations.

4.1.1 Participant Characteristics

The Tetra Tech team received participant tracking data for the SummerSaver program from MidAmerican on November 2, 2021. The tracking data file contained a total of 68,381 records—64,858 in Iowa and 3,523 in Illinois. The Tetra Tech team sampled based on service territory and device type for evaluation purposes. The table below reflects the number of completed participant surveys and the total number of participants by device type in the population for Iowa and Illinois.

Table 11. Summary of PY2021 Participants Surveyed and Population

Device Type	Iowa		Illinois	
	Surveyed	Population	Surveyed	Population
	Number of Participants	Number of Participants	Number of Participants	Number of Participants
LCRs	46	61,225	27	3,235
Smart Thermostats	66	3,633	38	288
Total	112	64,858	65	3,523

As shown in the table below, most SummerSaver participants lived in single-family detached homes, similar to MidAmerican customers who were interviewed as part of the nonparticipant survey. Other home characteristics varied between surveyed program participants and nonparticipants, even between Iowa and Illinois participants. For example, SummerSaver participants have lived in their homes, on average, far less than nonparticipants—the average Iowa program participant has lived in their home 10.0 years, Illinois program participants 9.5 years, and nonparticipants 17.2 years. Another example is that, on average, LCR program participants had longer average tenancy than smart thermostats participants.

Table 12. Survey Respondents' Home Characteristics*

House Characteristic	Iowa Participants			Illinois Participants			Nonparticipants
	LCR	ST	Total	LCR	ST	Total	
Type of home							
Single-family detached house	93.5%	81.5%	86.5%	92.6%	86.1%	88.9%	85.5%
Single-family attached house	6.5%	13.8%	10.8%	3.7%	2.8%	3.2%	7.5%
Apartment building with 2-4 units	0.0%	0.0%	0.0%	3.7%	0.0%	1.6%	0.5%
Apartment building with 5+ units	0.0%	3.1%	1.8%	0.0%	8.3%	4.8%	4.3%
Mobile home or house trailer**	0.0%	1.5%	0.9%	0.0%	2.8%	1.6%	2.2%
Respondents (n)	46	65	111	27	36	63	186
Year home built							
1930s or earlier	15.6%	10.8%	12.7%	25.9%	20.6%	23.0%	17.7%
1940s	6.7%	3.1%	4.5%	0.0%	5.9%	3.3%	7.7%
1950s	20.0%	10.8%	14.5%	25.9%	14.7%	19.7%	8.3%
1960s	13.3%	7.7%	10.0%	11.1%	11.8%	11.5%	14.9%
1970s	17.8%	10.8%	13.6%	14.8%	8.8%	11.5%	9.4%
1980s	6.7%	1.5%	3.6%	3.7%	5.9%	4.9%	5.5%
1990s	11.1%	6.2%	8.2%	7.4%	5.9%	6.6%	13.3%
2000s	8.9%	18.5%	14.5%	11.1%	11.8%	11.5%	14.9%
2010s	0.0%	26.2%	15.5%	0.0%	11.8%	6.6%	8.3%
2020s	0.0%	4.6%	2.7%	0.0%	2.9%	1.6%	0.0%
Respondents (n)	45	65	110	27	34	61	181
Years lived in home							
Average number of years	16.2	5.7	10.0	12.3	7.4	9.5	17.2
Respondents (n)	45	65	110	27	35	62	184
Square footage of home							
Less than 1,000 square feet	4.9%	0.0%	1.9%	3.7%	5.9%	4.9%	13.1%
1,000 to 1,500 square feet	24.4%	31.3%	28.6%	40.7%	41.2%	41.0%	32.7%
1,501 to 2,000 square feet	41.5%	34.4%	37.1%	25.9%	35.3%	31.1%	26.8%
2,001 to 3,000 square feet	19.5%	26.6%	23.8%	25.9%	8.8%	16.4%	18.5%
More than 3,000 square feet	9.8%	7.8%	8.6%	3.7%	8.8%	6.6%	8.9%
Respondents (n)	41	64	105	27	34	61	168

Source: Questions DEM1, DEM3, DEM8, DEM9 (Participant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

** Mobile home or house trailers do not qualify for the SummerSaver LCR program component.

The presence of central air conditioning was nearly 100 percent among program participant respondents, a core requirement of program eligibility¹⁴. As expected, the nonparticipant survey respondents were less likely to have air conditioning, though a large proportion (87 percent) indicated having central air conditioning. The use of natural gas for space heating was prevalent among both program participants and nonparticipants—approximately three-quarters of surveyed participants and nonparticipants indicated that they used natural gas for space heating. Natural gas was also the prevalent fuel source for water heaters among program participants.

Table 13. Survey Respondents’ Energy Use Characteristics*

Energy Use Characteristics	Iowa Participants			Illinois Participants			Nonparticipants
	LCR	ST	Total	LCR	ST	Total	
Home has central air conditioning							
Yes	100.0%	100.0%	100.0%	100.0%	97.1%	98.4%	86.9%
No	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	13.1%
Respondents (n)	45	65	110	27	35	62	198
Main fuel used for space heating							
Natural Gas	71.7%	71.4%	71.6%	81.5%	85.3%	83.6%	74.0%
Electricity	23.9%	20.6%	22.0%	7.4%	14.7%	11.5%	16.1%
Bottled gas propane	2.2%	6.3%	4.6%	11.1%	0.0%	4.9%	7.8%
Other	2.2%	0.0%	0.9%	0.0%	0.0%	0.0%	1.6%
Wood	0.0%	1.6%	0.9%	0.0%	0.0%	0.0%	0.5%
Respondents (n)	46	63	109	27	34	61	192
Main fuel used for water heating							
Natural Gas	75.0%	66.7%	70.1%	84.6%	82.4%	83.3%	Not available
Electricity	25.0%	27.0%	26.2%	11.5%	17.6%	15.0%	
Bottled gas propane	0.0%	6.3%	3.7%	3.8%	0.0%	1.7%	
Respondents (n)	44	63	107	26	34	60	

Source: Questions DEM6, DEM4, DEM5 (Participant Survey); Questions CW6, CW5 (General Population Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

In looking across demographic information collected from survey respondents, there were some similarities and some differences between SummerSaver participant respondents and nonparticipant survey respondents. For example, both program participant and nonparticipant survey respondents had a similar average number of people in their households—2.9 for both Iowa and Illinois participants compared to 2.6 for nonparticipants. However, surveyed participants and nonparticipants had differences in age and income levels. As an example, SummerSaver participant respondents in both Iowa (19 percent) and Illinois (18 percent) had noticeably fewer respondents who were in the 65 or older age category than nonparticipants (37 percent). Household income was generally higher overall

¹⁴ SummerSaver requires the presence of a central air conditioner or heat-pump. One participant respondent indicated not having central air conditioning, suggesting that either the term was either unfamiliar to them or that they may have a heat pump providing the air conditioning service, confusing the terminology.

for program participant respondents—45 percent of Iowa and 44 percent of Illinois participant respondents were in the \$100,000 or more income category compared to 26 percent of surveyed nonparticipants.

Table 14. Survey Respondents' Demographics*

Demographics	Iowa Participants			Illinois Participants			Nonparticipants
	LCR	ST	Total	LCR	ST	Total	
Average number of people in household							
Average number of people in the home	2.3	3.2	2.9	3.0	2.9	2.9	2.6
Respondents (n)	46	65	111	25	35	60	184
Respondent age on last birthday							
18-24	2.2%	0.0%	0.9%	0.0%	0.0%	0.0%	1.1%
25-34	8.9%	41.5%	28.2%	19.2%	34.3%	27.9%	8.9%
35-44	13.3%	33.8%	25.5%	11.5%	25.7%	19.7%	15.1%
45-54	11.1%	12.3%	11.8%	19.2%	20.0%	19.7%	16.2%
55-64	24.4%	7.7%	14.5%	19.2%	11.4%	14.8%	21.2%
65 or older	40.0%	4.6%	19.1%	30.8%	8.6%	18.0%	37.4%
Respondents (n)	45	65	110	26	35	61	179
Household income							
Less than \$24,000	11.4%	0.0%	4.3%	14.3%	2.9%	7.3%	12.3%
\$24,000 to less than \$50,000	31.4%	5.3%	15.2%	19.0%	14.7%	16.4%	19.2%
\$50,000 to less than \$75,000	20.0%	12.3%	15.2%	9.5%	8.8%	9.1%	19.9%
\$75,000 to less than \$100,000	17.1%	22.8%	20.7%	23.8%	23.5%	23.6%	22.6%
\$100,000 or greater	20.0%	59.6%	44.6%	33.3%	50.0%	43.6%	26.0%
Respondents (n)	35	57	92	21	34	55	146

Source: Questions DEM10, DEM13, DEM14, (Participant Survey); Questions D7, D10, D11 (General Population Survey)
Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

4.2 PROGRAM PROCESSES

MidAmerican's Residential SummerSaver program provides an opportunity for its residential electricity customers to reduce demand during peak hours. In exchange for an incentive, MidAmerican is able to control their central air conditioning¹⁵ or air-source heat pump on hot summer days when MidAmerican is forecasting peak demand, or when operational conditions warrant. Cycling periods run from 2pm to 7pm when called from June through September¹⁶ and may be called by MidAmerican or the MISO. The

¹⁵ Certain models of central air conditioners may not be compatible with the LCR technology and, therefore, will not be able to participate. Also, customers with geothermal heat pumps are not eligible for the program.

¹⁶ Participants leaving the program prior to September 30 receive checks for prorated incentives.

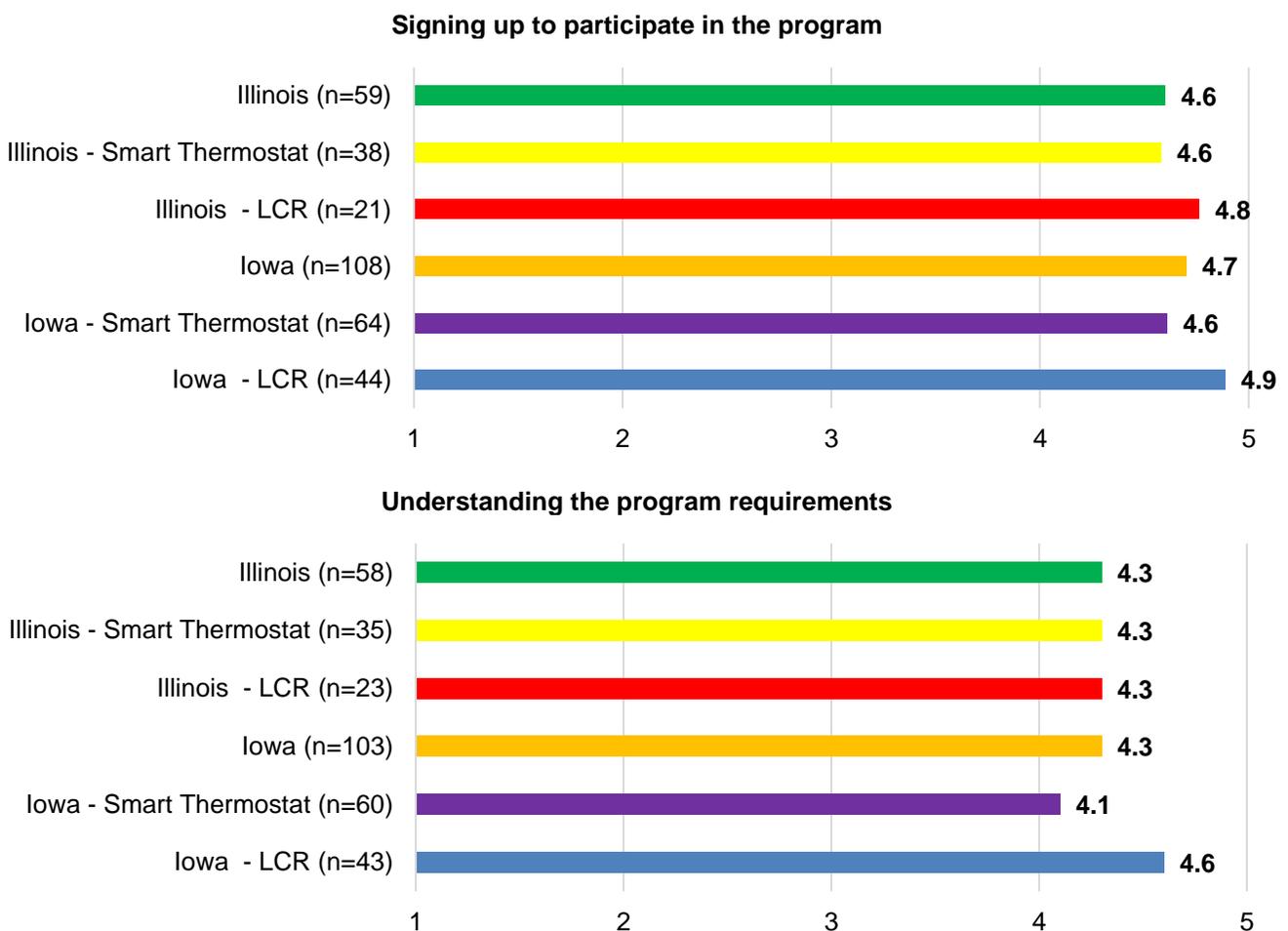
program controls the air conditioning systems via signals sent to either an LCR or a customer-provided smart thermostat. In PY2021, new LCR program participants received a \$30 end-of-season bill credit, with subsequent years earning a \$20 bill credit. The program pays for the installation of any LCR equipment necessary for participation. Smart thermostat program participants also received a \$30 end-of-season incentive if they remained enrolled the entire season.

4.2.1 Program Design

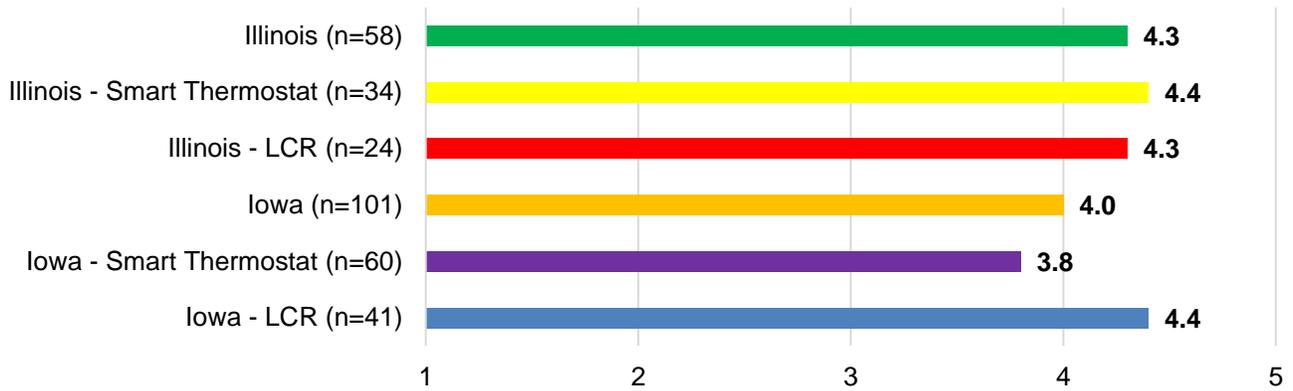
4.2.1.1 Ease of Enrollment

Program participant survey respondents were asked to rate their ease or difficulty regarding key aspects of enrolling in the program on a 1 to 5 scale, where 1 was “very difficult” and 5 was “very easy.” These aspects included signing up for the program, understanding the requirements for the program, understanding the payment they would receive, scheduling the appointment for LCR equipment installation, interacting with the LCR equipment installation contractor, and registering and understanding the smart thermostat aspects. In all cases, respondents indicated high levels of “ease” on average. The figure below summarizes the results across these program aspects. Information is organized by those program aspects that pertained to all program participants first, followed by LCR-specific program aspects, and then smart thermostat-specific aspects.

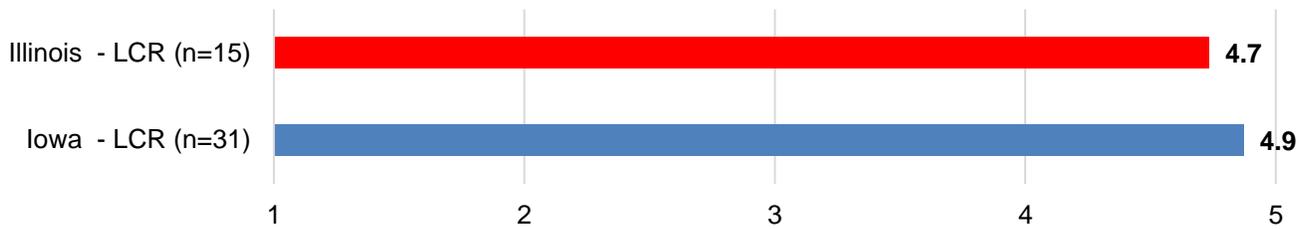
Figure 3. Respondent Rating to the Ease of the Enrollment Process*



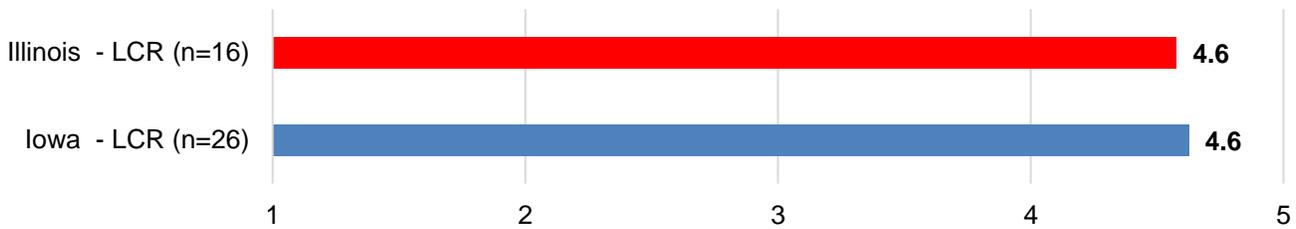
Understanding the payment received for participating



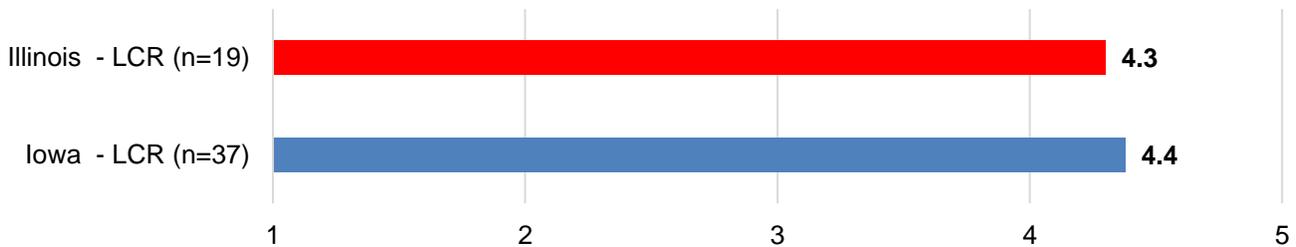
Interacting with the contractors installing or servicing the equipment



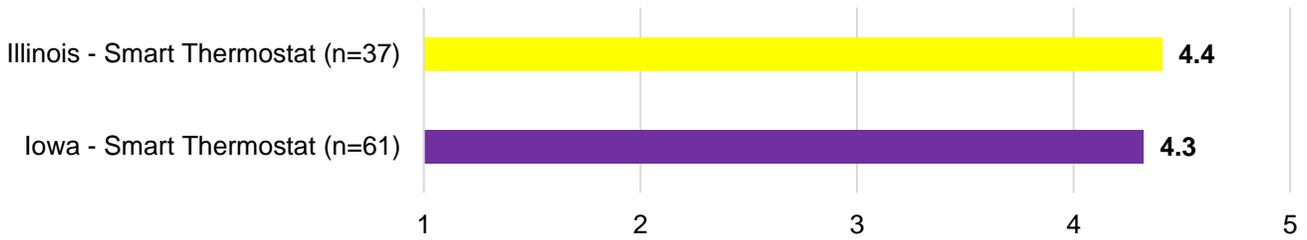
Scheduling an appointment to have the load control receiver installed



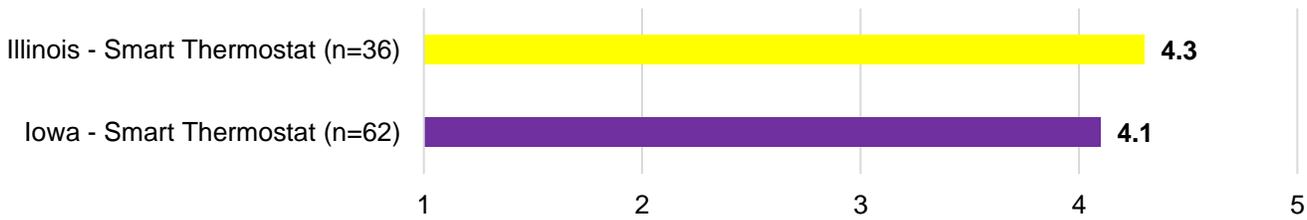
Understanding how the receiver worked



Registering your smart thermostat in the program



Understanding how the smart thermostat works during an event



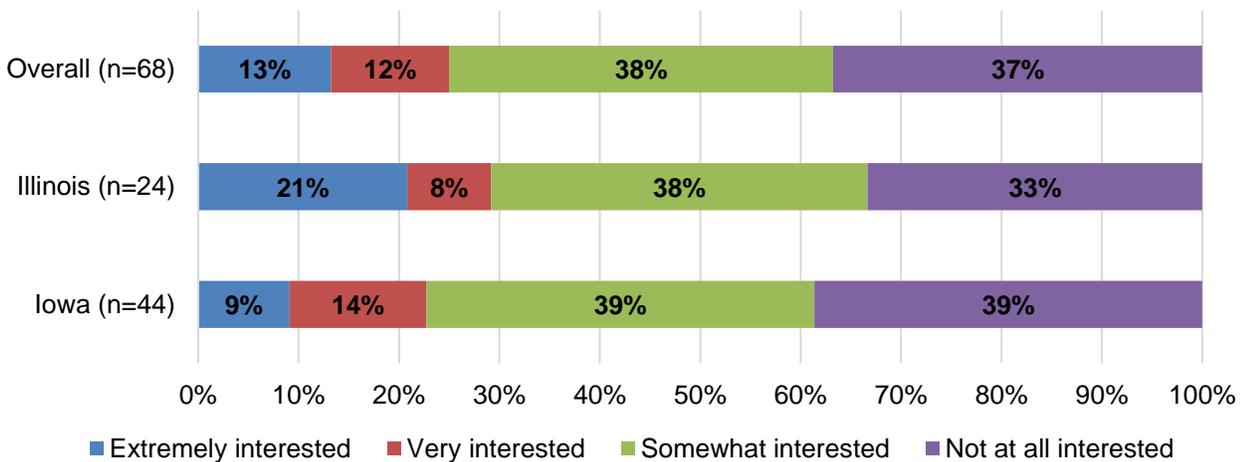
Source: Questions P1A, P1B, P1C, P1D, P1E, P1F, P1G, P1H (Participant Survey)

Don't know and refused responses were excluded

* As relevant, data is presented at the device level, but is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

LCR program participants were asked how interested they would be in participating in the SummerSaver program via a smart thermostat, where they had to supply the smart thermostat. Participant interest was limited, with 75 percent of respondents saying they were “somewhat” or “not at all interested.” As seen in the figure below, Illinois survey respondents had slightly more interest than Iowa survey respondents.

Figure 4. LCR Participant Interest in Bring Your Own Thermostat Program



Source: Question PE10 (Participant Survey)

Don't know and refused responses were excluded

4.2.1.2 Estimates of Cycling Events

During events, air conditioners will operate differently than household occupants have them programmed to. However, MidAmerican designs and operates the program with the intent of minimizing discomfort. To help understand the perceptions of program event, surveyed participants were asked to identify the number of events they thought MidAmerican called during the summer of 2021. Most survey respondents (66 percent) estimated that five or fewer cycling events were called during the summer.

Table 15. Participant Estimates of Number of Cycling Events*

Category	Iowa Participants			Illinois Participants		
	LCR	ST	Total	LCR	ST	Total
Average number of estimated cycling events**	7.6	4.8	5.3	7.5	4.8	5.0
Respondents (n)	7	33	40	2	22	24

Source: Question PE1 (Participant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

** Survey respondents who said they recalled more than 20 events (n = 7) were removed from the valid counts in determining the averaging number of cycling events.

Those that offered a response were then asked to describe how they could tell an event was occurring. Of those who indicated they could tell when an event was occurring, approximately one-third of all respondents said they noticed an alert on their thermostat app¹⁷. This was the most common response from smart thermostat participants—34 percent of Iowa and 45 percent of Illinois smart thermostat survey respondents mentioned noticing an alert. Looking at LCR survey respondents, eight of the 10 respondents said they really could not tell and that the number of events provided was more of a guess. Overall, 15 percent of respondents (16 percent in Iowa and 13 percent in Illinois) said they noticed the cycling event because their house became uncomfortably hot.

Smart thermostat participants were asked if they adjusted their thermostat when a cycling event was called. Approximately half of the 55 respondents (51 percent) said they never changed their thermostat when an event was called. Another 45 percent of respondents said they sometimes adjusted their thermostat, and four percent said they always adjusted theirs during a cycling event. Responses were similar between the Iowa and Illinois respondents—only one respondent in each state said they always adjusted their thermostat during a cycling event. Almost all respondents who adjusted their thermostats said they lowered their air conditioner temperature.

4.2.2 Customer Education, Outreach, and Marketing

4.2.2.1 Program Awareness

MidAmerican has been responsible for program outreach. The most common response for surveyed participants (Iowa 39 percent and Illinois 36 percent) was that they heard about the program through the MidAmerican bill insert. In discussing the bill insert item with MidAmerican, staff indicated that they have been using more electronic and paper newsletters with residential customers rather than bill

¹⁷ For this question, there was a “noticed an alert on my thermostat” response and a “I looked at my thermostat and saw an alert” response. Both responses were common, but the “noticed an alert” response was more common.

inserts. Similarly, a small number of surveyed respondents noted they heard about the program through television ads, but MidAmerican does not run television ads for this program. Due to these types of discrepancies, the Tetra Tech team cautions how this information is interpreted and used.

The second most mentioned source of awareness overall was the thermostat app. Looking just at participants with a smart thermostat, 31 percent of Iowa respondents and 46 percent of Illinois respondents mentioned the thermostat app as a source of awareness. Other popular sources of awareness included email (21 percent overall), MidAmerican’s website (13 percent overall), and brochures (10 percent overall).

Table 16. Source of Program Awareness Among Participant Respondents*

Source of Awareness	Iowa Participants			Illinois Participants		
	LCR	ST	Total	LCR	ST	Total
MidAmerican utility bill inserts	63.2%	24.2%	39.0%	57.7%	20.0%	36.1%
Email from MidAmerican	7.9%	33.9%	24.0%	11.5%	28.6%	21.3%
Through the thermostat app	0.0%	30.6%	19.0%	3.8%**	45.7%	27.9%
MidAmerican website	7.9%	21.0%	16.0%	11.5%	14.3%	13.1%
MidAmerican brochure	2.6%	3.2%	3.0%	7.7%	11.4%	9.8%
MidAmerican call center representative	5.3%	3.2%	4.0%	15.4%	0.0%	6.6%
Friend / Family member / Coworker	10.5%	1.6%	5.0%	3.8%	2.9%	3.3%
Previous Owner	7.9%	0.0%	3.0%	7.7%	0.0%	3.3%
Previous Experience	5.3%	3.2%	4.0%	0.0%	2.9%	1.6%
Respondents (n)	38	62	100	26	35	61

Source: Question C1

Refused responses were excluded

Multiple responses allowed; only those categories that were mentioned by at least 5 percent of overall respondents were included.

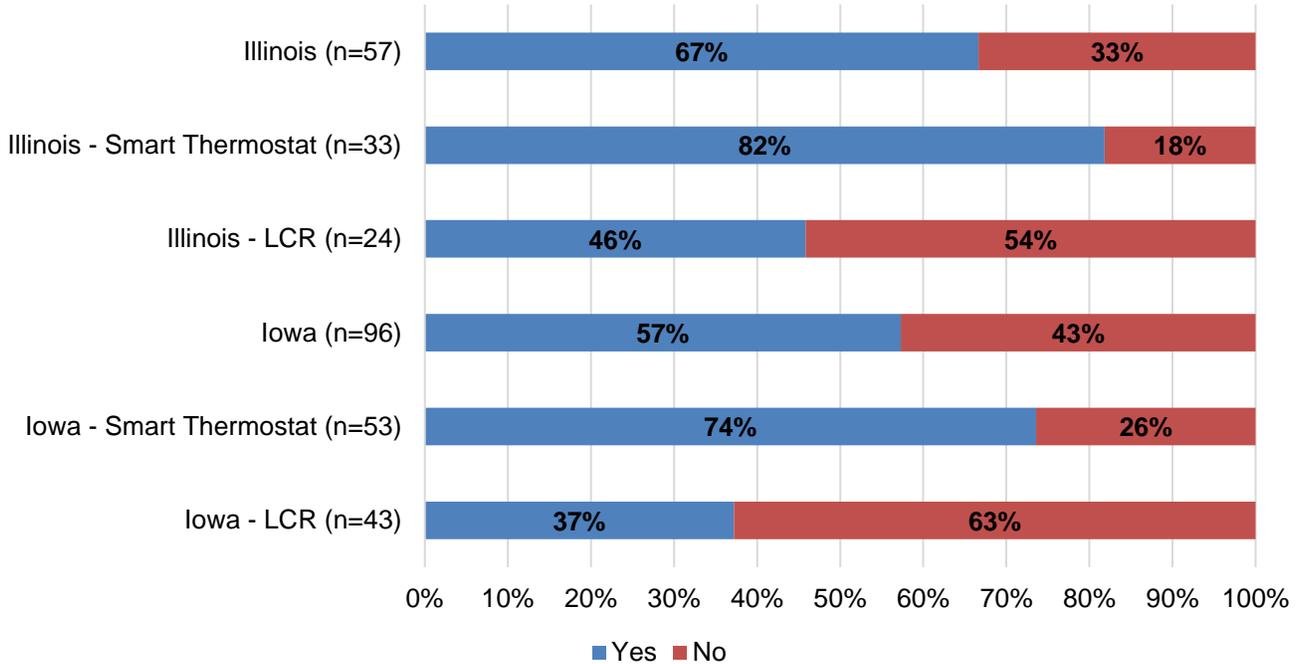
* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

** This response came from an LCR participant and noted they heard about the program through the thermostat app.

4.2.2.2 Website Visits

Overall, over 60 percent of surveyed program participant respondents said they had visited the MidAmerican website in the past year. As shown in the figure below, a greater percentage of smart thermostat participants than LCR participants visited the MidAmerican website. When asked why they had visited the MidAmerican website, most respondents (68 percent overall) said they visited it to pay their bills. The next most commonly mentioned reason for visiting the website was to look for additional opportunities to save energy or money (22 percent overall). Responses were similar regardless of the participant’s service territory or device type.

Figure 5. Percent Visiting the MidAmerican Website*



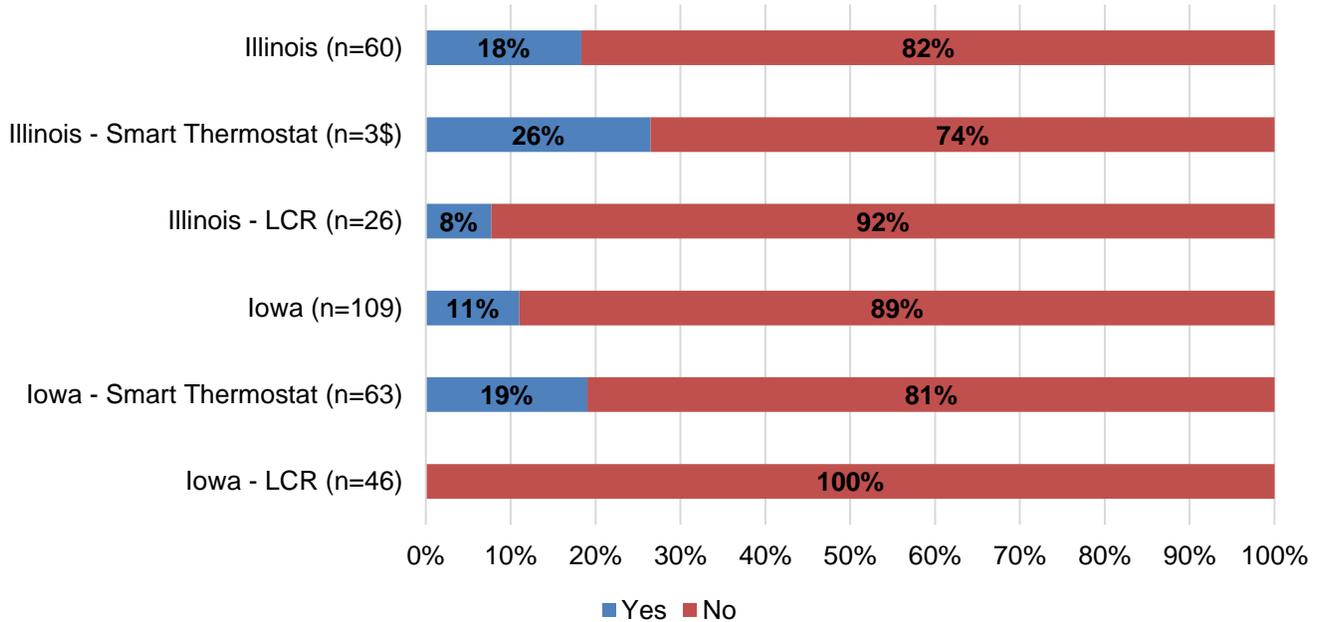
Source: Question C2 (Participant Survey)

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

When asked about their experiences using the MidAmerican website, 72 percent of program participant surveyed respondents said it was “very easy” or “extremely easy” to find the information they were looking for on the website. Additionally, 68 percent of respondents overall said the information they found was “very helpful” or “extremely helpful.” Participant satisfaction with the MidAmerican website was similar regardless of the participant’s service territory or device type.

Participants were asked if they had visited the SummerSaver website. As might be expected, and is reflected in the figure below, far fewer participants visited the SummerSaver website (14 percent overall) than the MidAmerican website (61 percent overall). A noticeably larger percentage of smart thermostat surveyed participants visited the SummerSaver website than LCR surveyed participants. Of the 23 respondents that said they visited the SummerSaver website, almost 70 percent described the website’s information as “very” or “extremely helpful.”

Figure 6. Percent Visiting the SummerSaver Website



Source: Question C5A (Participant Survey)

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

Almost all of the surveyed participants (97 percent overall) said they did not call MidAmerican this year with questions or concerns about the program. Four of the seven respondents who called MidAmerican said they called to enroll, cancel, or check to see if they were enrolled.

4.2.3 Program Satisfaction

4.2.3.1 Net Promoter Score

A new metric presented for MidAmerican programs in this evaluation cycle is the Net Promoter or Net Promoter Score (NPS)¹⁸. The NPS is calculated based on responses to a single question: How likely is it that you would recommend our company/product/service to a friend or colleague? The NPS is then the percentage of customers rating their likelihood to recommend a company, a product, or a service to a friend or colleague as 9 or 10 ("promoters") minus the percentage rating this at 6 or below ("detractors") on a scale from 0 to 10. Respondents who provide a score of 7 or 8 are referred to as "passives." The result of the calculation is expressed without the percentage sign. Promoters are considered likely to exhibit value-creating behaviors, such as buying more, remaining customers for

¹⁸ NPS is a management tool used as a measure of customer satisfaction and has been shown to correlate with revenue growth relative to competitors. NPS has been widely adopted by Fortune 500 companies and other organizations. Scores vary substantially among industries, so a good score is simply one whose trend is better than that of competitors in the same industry, as measured by double-blind benchmark research. The metric was developed by (and is a registered trademark of) Fred Reichheld, Bain & Company and Satmetrix. It was introduced by Reichheld in his 2003 Harvard Business Review article, "The One Number You Need to Grow". Its popularity and broad use have been attributed to its simplicity and its openly available methodology.

longer, and making more positive referrals to other potential customers. Detractors are believed to be less likely to exhibit the value-creating behaviors.

Figure 7. Net Promoter Score Scale



Based on telephone survey respondent answers, the SummerSaver program in Iowa has an NPS of 19 (46 percent – 27 percent = 19) and an NPS of 37 in Illinois (57 percent – 20 percent = 37).

Table 17. Iowa and Illinois NPS

NPS Score and Category	Iowa Participants	Illinois Participants
NPS Score		
Promoters (rating 9 or 10)	46%	57%
Passives (rating 7 or 8)	27%	23%
Detractors (rating 0 – 6)	27%	20%
Respondents	111	65

Source: SAT4 (Participant Survey)

Don't know and refused responses were excluded

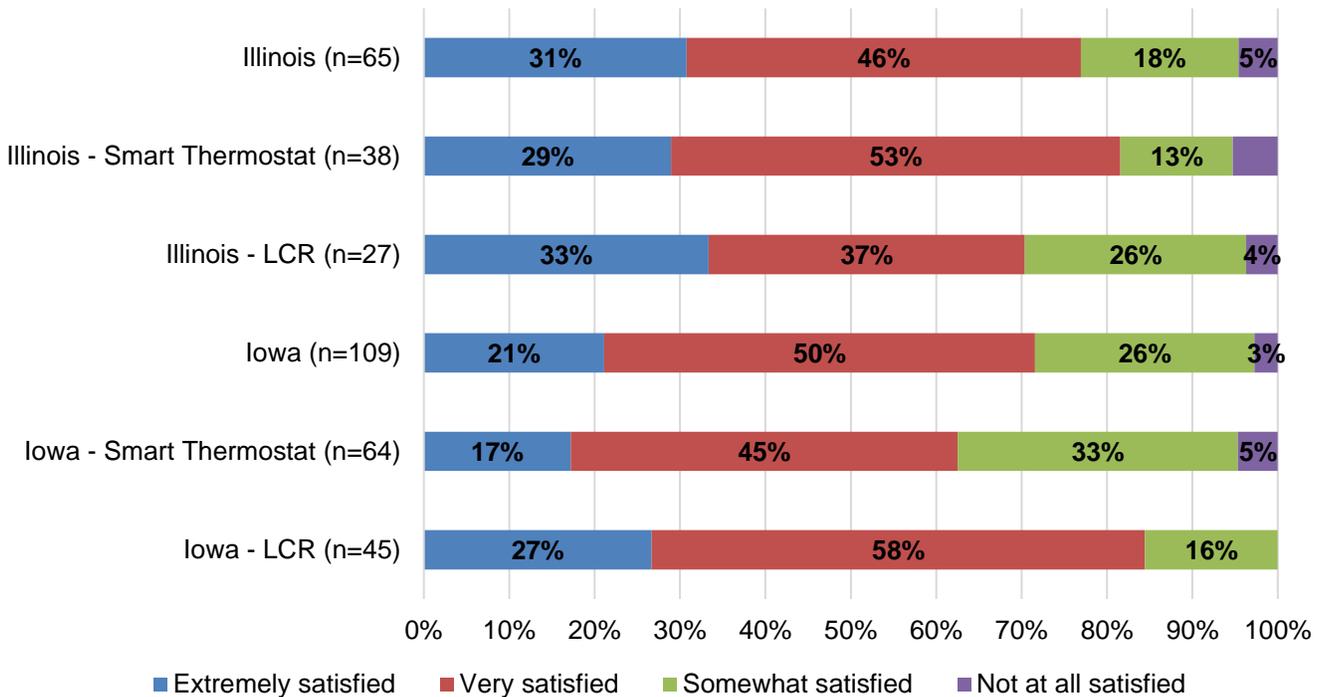
Rated on a scale of 0 to 10, where 0 was "extremely unlikely" and 10 was "extremely likely"

4.2.3.2 Customer Satisfaction

Surveyed participants were asked to rate their overall program satisfaction using a scale of “extremely satisfied,” “very satisfied,” “somewhat satisfied,” or “not at all satisfied.” As shown in the figure below, overall program satisfaction was high, with 74 percent of participant survey respondents describing their satisfaction as “extremely satisfied” (25 percent) or “very satisfied” (49 percent).

Satisfaction was consistent when comparing the responses by service territory—71 percent of Iowa respondents said they were “extremely satisfied” or “very satisfied,” compared to 79 percent of Illinois respondents. The same was true across device types—79 percent of LCR respondents said they were “extremely satisfied” or “very satisfied” compared to 70 percent of smart thermostat respondents. The Tetra Tech team notes that Illinois smart thermostat surveyed respondents were noticeably more satisfied than those in Iowa—82 percent of Illinois smart thermostat surveyed respondents said they were “extremely satisfied” or “very satisfied” compared to 62 percent of Iowa smart thermostat respondents.

Figure 8. Overall Program Satisfaction*



Source: Question SAT1 (Participant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

When given the opportunity to provide an explanation for their satisfaction rating, many survey respondents indicated attributes such as receiving an incentive while not noticing an effect of the program on their comfort or lifestyle. Others mentioned the ease of participation:

"I've never had any problems. I truthfully forget I even have it until I get the bill in the fall and it has the savings on it."

"I don't even notice the program running. If you can't tell a difference whether or not they are cycling it and you are saving money, there is no problem in that."

"(It was) very hassle free and easy to participate in. When they did the cycling, it wasn't to an extreme temperature that made it uncomfortable."

"I trusted the thermostat and we were fine with it. Until I got the discount on my bill, I didn't even think about it. It did its thing, and we didn't notice. I had thought it would be some dramatic thing where I would sit here, and I would notice it as uncomfortable, and I never did."

For those expressing less satisfaction, interest in receiving a higher incentive was the primary reason for their satisfaction rating. Two respondents were complained that they never knew when cycling events were going to happen:

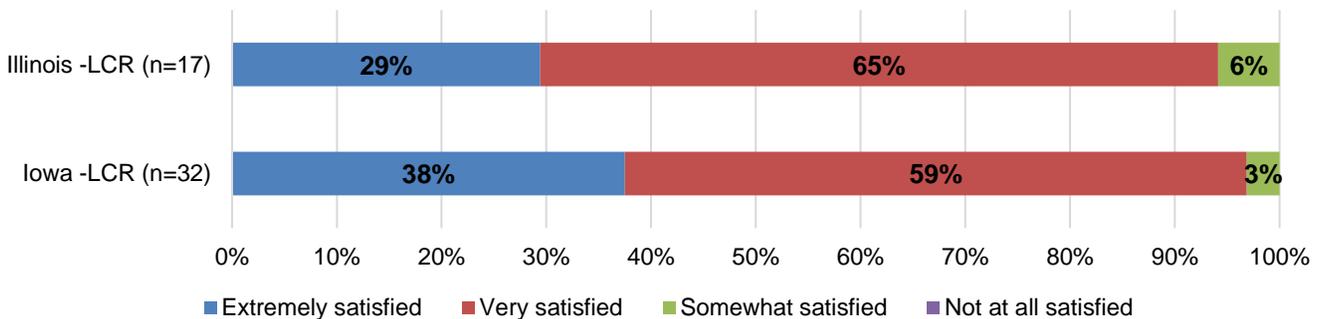
"Because I didn't see any savings, instead my bill went up compared to last year."

“Because I don’t remember getting many notifications, if any, about the SummerSaver program and I don’t feel like I saved anything on any bills this year.”

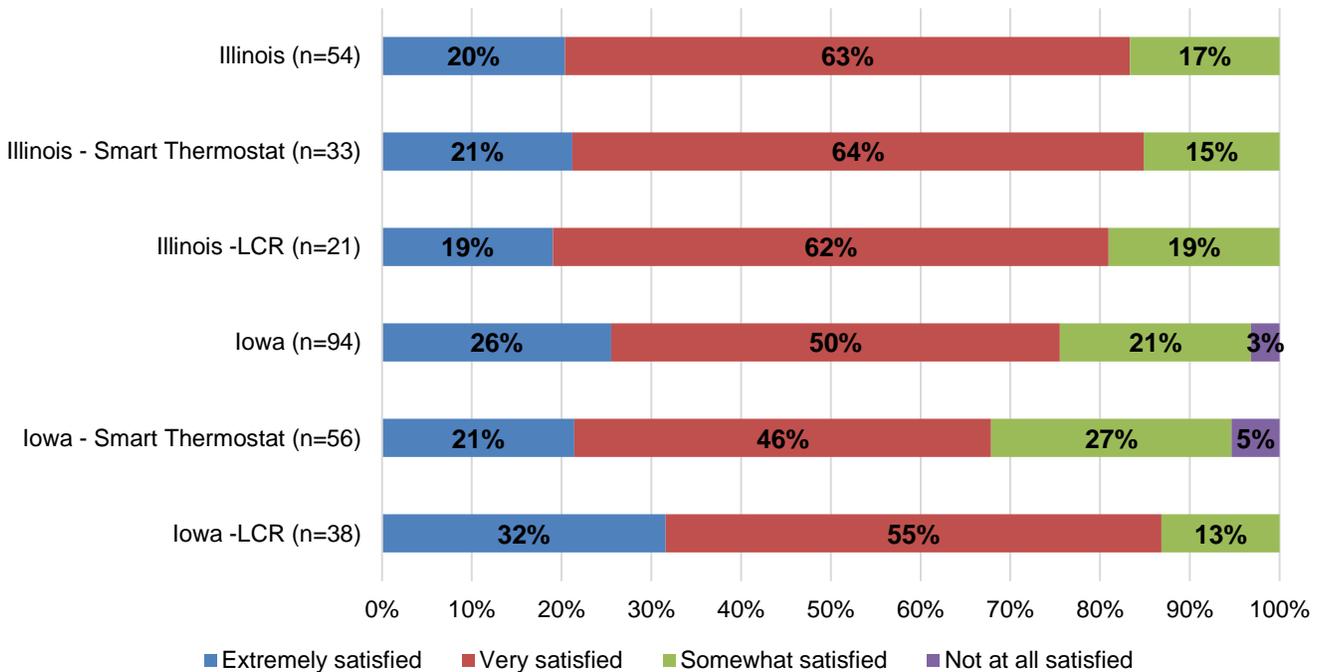
Participant survey respondents were also asked to rate their satisfaction with various program components using the same “extremely satisfied” to “not at all satisfied” categories. As can be seen in the figures below, the vast majority of participants indicated being “extremely satisfied” or “very” satisfied with all aspects of the program. The service professionals who installed LCR equipment received the highest satisfaction score, and the amount credited received the lowest. These results were fairly consistent when looking at location and device type. And, while some respondents indicated they were “not at all satisfied” with some aspects of the program, they were “somewhat satisfied” with the program overall.

Figure 9. Satisfaction Ratings for Program Components*

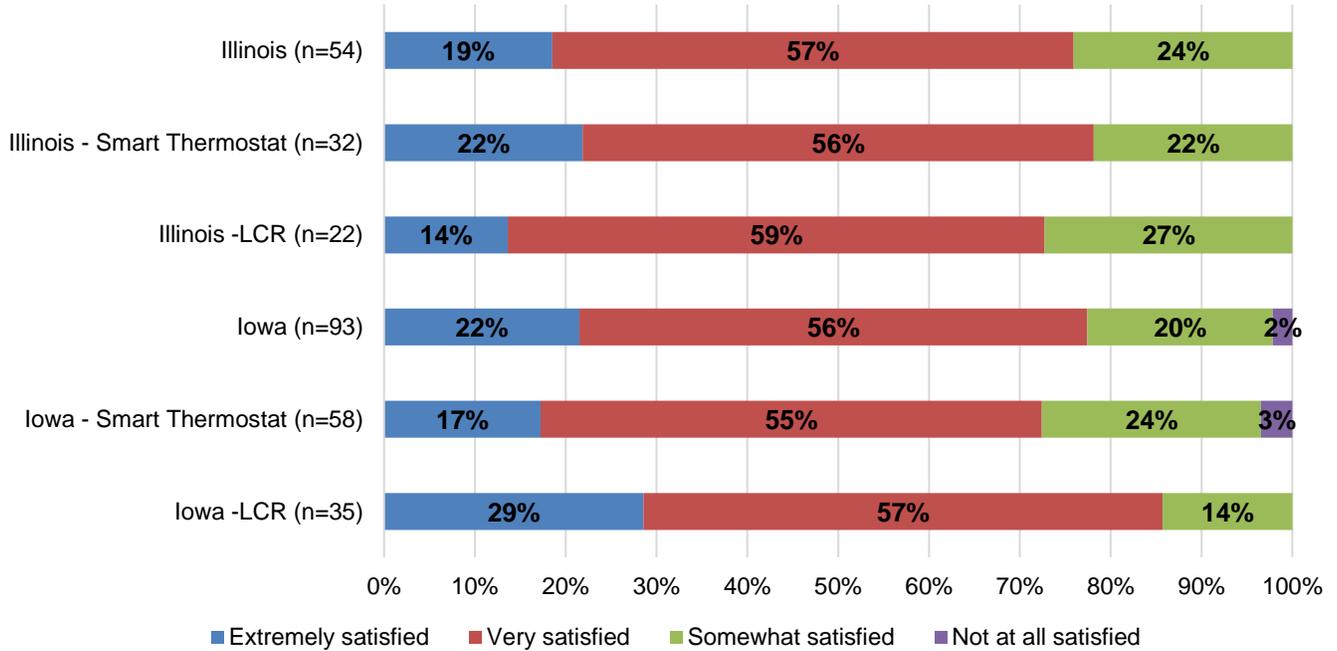
Service professional who installed your load control receiver



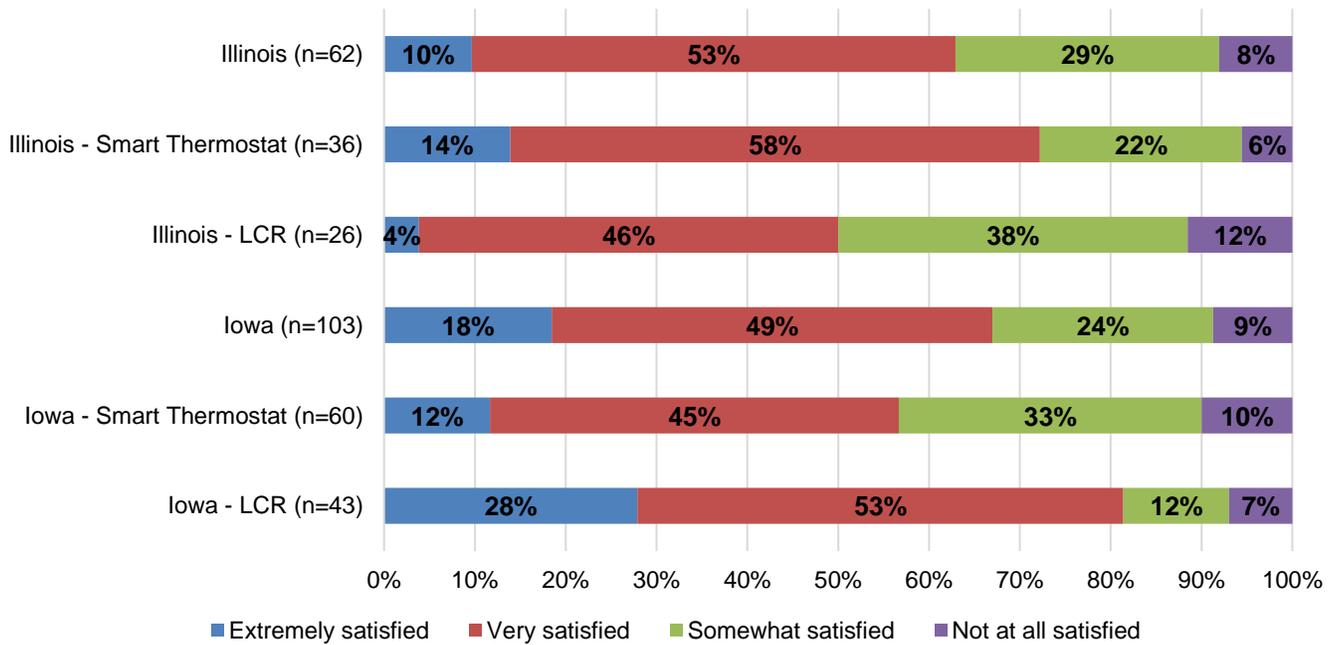
Number of days MidAmerican called a cycling event



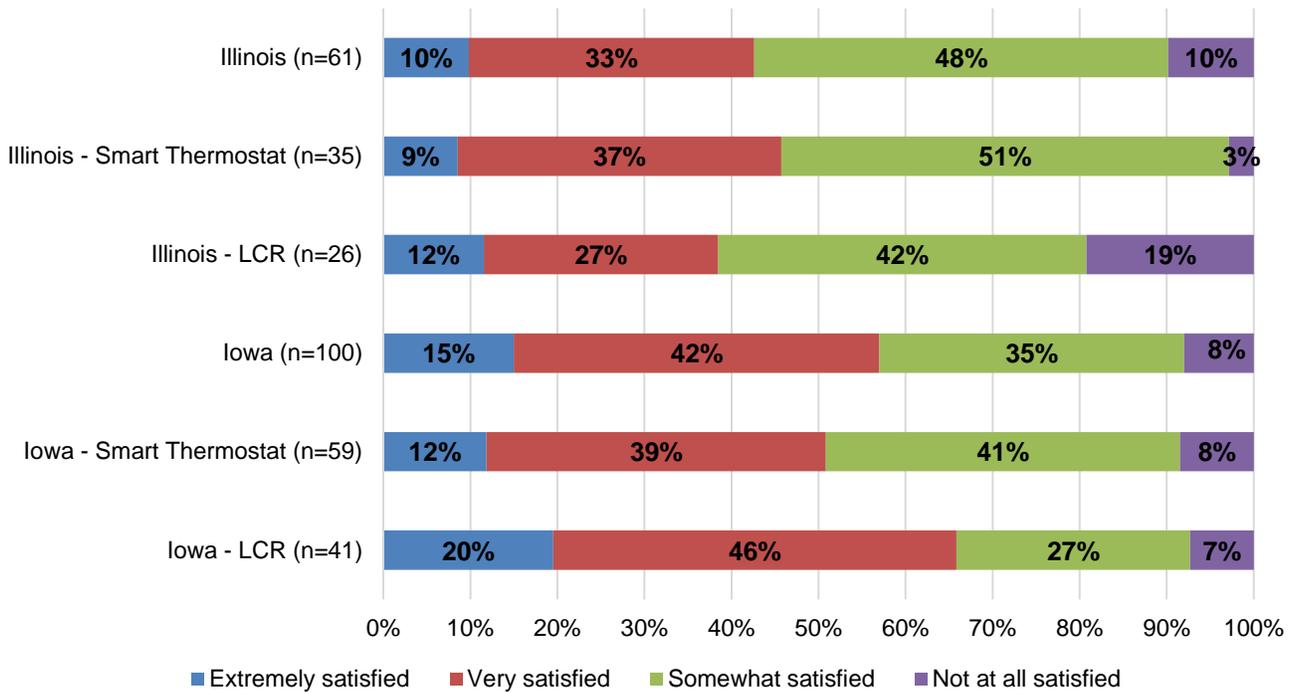
Number of hours during the day that MidAmerican cycled the system



Communications from MidAmerican about participating in the program



Amount of money applied as bill credit



Source: Questions SAT3A, SAT3B, SAT3C, SAT3D, SAT3E (Participant Survey)

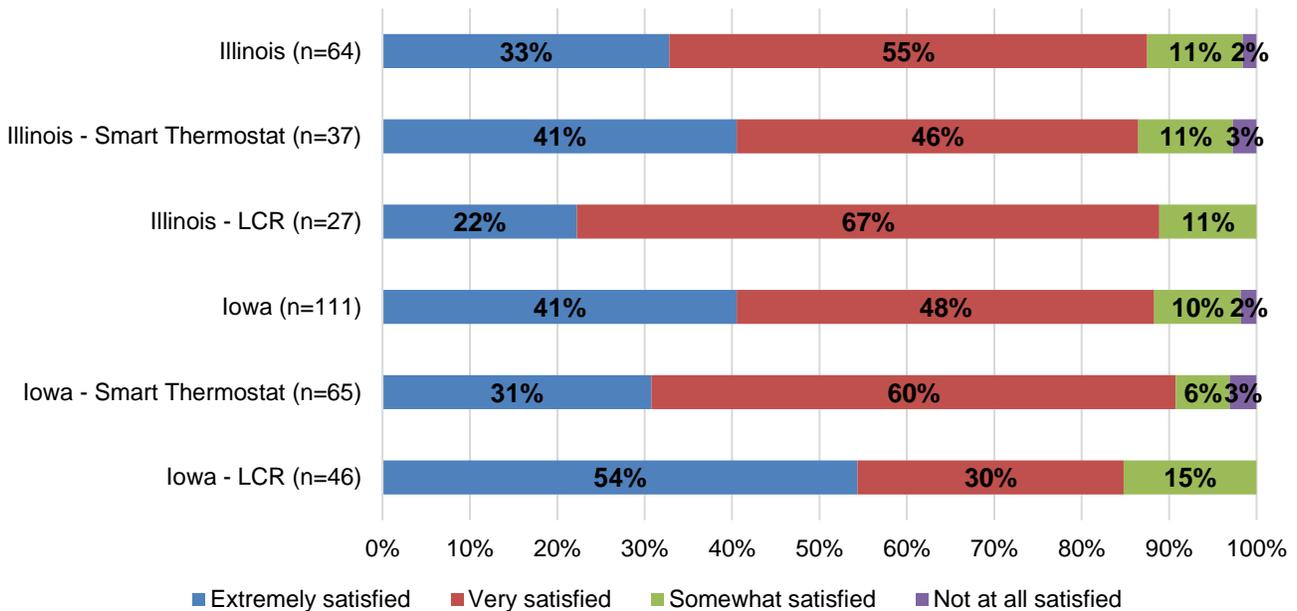
Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

Participant survey respondents were asked about their intention to continue participating in the program the following summer (2022). Almost all surveyed participants (95 percent) indicated that they intended to continue participating. This finding was consistent when comparing Iowa respondents to Illinois respondents (95 percent in both states) and LCR respondents (97 percent) to smart thermostat respondents (93 percent).

Surveyed participants were asked to rate their satisfaction with MidAmerican as their energy provider using a scale of “extremely satisfied,” “very satisfied,” “somewhat satisfied,” or “not at all satisfied.” The vast majority of participant respondents (88 percent) indicated being “extremely satisfied” or “very satisfied.” As shown in the table below, energy provider satisfaction was high regardless of the respondent’s service territory or device type.

Figure 10. Satisfaction with MidAmerican as an Energy Provider*



Source: Questions SAT5 (Participant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

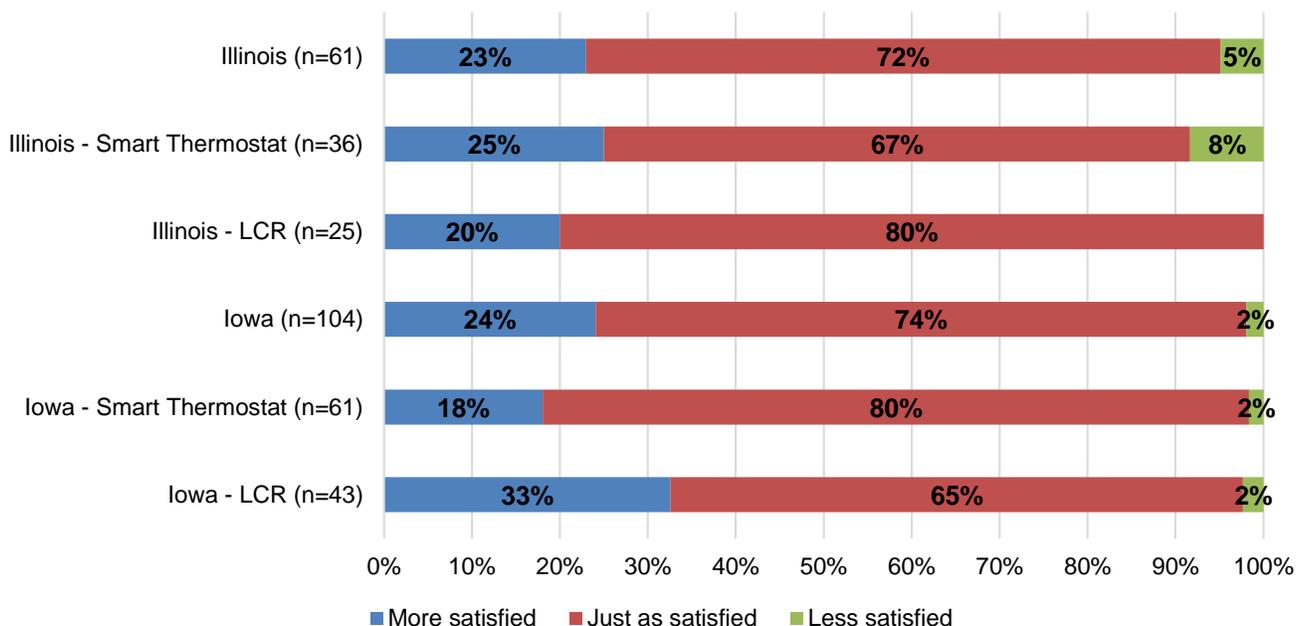
The participant respondents were asked to gauge how their satisfaction with MidAmerican has changed since participating in the program. As reflected in the figure below, while most (73 percent) indicated that they were “just as satisfied,” 24 percent indicated being “more satisfied.” Overall, three percent of respondents said they were less satisfied with MidAmerican since participating in the program. These findings were consistent regardless of the respondent’s service territory—24 percent of Iowa respondents were more satisfied with MidAmerican, compared to 23 percent in Illinois. There was some variation by device type across service territories—ranging from 18 percent of Iowa smart thermostat respondents to 33 percent of Iowa LCR surveyed respondents.

Respondents who said they were less satisfied with MidAmerican mentioned the credit being too small and being dissatisfied with their energy bill:

“I didn't see any (sic) difference in my bill. My bill was so high.”

“1. The statement credit applied every year is too low. 2. Despite my temperature not changing the monthly bill (on the energy saver program) my bill has gone up \$30 a month.”

Figure 11. Change in Satisfaction with MidAmerican Since Participating in the Program*



Source: Questions SAT8 (Participant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence.

4.2.4 Future Plans and COVID-19 Effect

Participating and nonparticipating survey respondents were asked to indicate how likely they were to take various actions over the next six months. As highlighted in the table below, a high proportion of both participating and nonparticipating respondents said they were “not at all likely” to take some of the proposed actions in the next six months, such as building a new house or starting a major home remodel. However, when looking for additional ways to save energy in their homes and allow a contractor into their home, survey respondents were more likely to say it was a possibility. As might be expected, participants were more likely to look for additional ways to save energy in their homes than nonparticipants.

Table 18. Household Actions Likely in the Next 6 Months*

Homeowner Actions	Iowa Participants			Illinois Participants			Nonparticipants
	LCR	ST	Total	LCR	ST	Total	
Purchase new energy efficient equipment or appliances for your home							
Extremely likely	4.3%	6.3%	5.5%	0.0%	13.9%	7.9%	2.2%
Very likely	28.3%	15.6%	20.9%	14.8%	13.9%	14.3%	10.9%
Somewhat likely	6.5%	18.8%	13.6%	18.5%	36.1%	28.6%	27.2%
Not at all likely	60.9%	59.4%	60.0%	66.7%	36.1%	49.2%	60.0%
Respondents (n)	46	64	110	27	36	63	184

Homeowner Actions	Iowa Participants			Illinois Participants			Nonparticipants
	LCR	ST	Total	LCR	ST	Total	
Allow a contractor into your home to service existing equipment or appliances							
Extremely likely	13.0%	9.2%	10.8%	3.7%	11.1%	7.9%	7.6%
Very likely	28.3%	21.5%	24.3%	40.7%	36.1%	38.1%	30.4%
Somewhat likely	39.1%	35.4%	36.9%	25.9%	30.6%	28.6%	28.3%
Not at all likely	19.6%	33.8%	27.9%	29.6%	22.2%	25.4%	33.7%
Respondents (n)	46	65	111	27	36	63	184
Look for additional ways to save energy in your home that are low cost or no cost							
Extremely likely	10.9%	15.4%	13.5%	18.5%	27.0%	23.4%	6.5%
Very likely	43.5%	35.4%	38.7%	44.4%	40.5%	42.2%	24.5%
Somewhat likely	28.3%	33.8%	31.5%	33.3%	24.3%	28.1%	44.6%
Not at all likely	17.4%	15.4%	16.2%	3.7%	8.1%	6.3%	24.5%
Respondents (n)	46	65	111	27	37	64	184
Start a major home renovation or remodeling project							
Extremely likely	6.5%	1.5%	3.6%	0.0%	2.8%	1.6%	5.9%
Very likely	6.5%	7.7%	7.2%	3.7%	11.1%	7.9%	9.0%
Somewhat likely	8.7%	20.0%	15.3%	11.1%	25.0%	19.0%	13.3%
Not at all likely	78.3%	70.8%	73.9%	85.2%	61.1%	71.4%	71.8%
Respondents (n)	46	65	111	27	36	63	188
Build a new home							
Extremely likely	2.2%	0.0%	0.9%	0.0%	0.0%	0.0%	0.5%
Very likely	0.0%	3.1%	1.8%	0.0%	0.0%	0.0%	1.6%
Somewhat likely	0.0%	1.5%	0.9%	0.0%	5.6%	3.2%	0.5%
Not at all likely	97.8%	95.4%	96.4%	100.0%	94.4%	96.8%	97.3%
Respondents (n)	46	65	111	27	36	63	187

Source: Questions C10A-C10E (Participant and Nonparticipant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

Participants and nonparticipants were then asked to think about whether or not their responses were influenced by COVID-19. As shown in the table below, more than 80 percent of surveyed participants (87 percent Iowa, 89 percent Illinois) and nonparticipants (83 percent) said their answers were not influenced by COVID-19. Surveyed participants who were influenced by COVID-19 mostly mentioned being uncomfortable with letting contractors into their homes (six respondents):

“I always ask them to wear a mask, so it would be very likely that I would ask them.”

“(I am) likely to let people in, however I would prefer safer contactors.”

“(I am unsure about) letting a contractor in, we’ve been pretty strict about being secluded.”

Others mentioned increasing prices (four respondents) and the need to save money (four respondents). One respondent said, “the government gave us a bunch of money,” and they were more likely to start a major renovation.

Table 19. 6 Influence of COVID-19 on Household Actions*

Were Actions Influenced	Iowa Participants			Illinois Participants			Nonparticipants
	LCR	ST	Total	LCR	ST	Total	
No	91.3%	84.6%	87.4%	81.5%	94.4%	88.9%	83.4%
Yes	8.7%	15.4%	12.6%	18.5%	5.6%	11.1%	16.6%
Respondents (n)	46	65	111	27	36	63	187

Source: Question C11 (Participant Survey)

Don't know and refused responses were excluded

* Data is presented at the device level is for informational purposes only, as sample sizes are too small to draw conclusions within any reasonable level of confidence. Iowa and Illinois total cells are highlighted for ease of reference.

4.3 BENCHMARKING COMPARISON

The Tetra Tech team conducted a benchmarking study to characterize programs similar to the SummerSaver program to provide a synopsis of general industry trends to MidAmerican. Information collected included program control strategy (both LCR-type and smart thermostats), eligibility requirements, and incentive structures. The benchmarking information gathered was collected by assessing publicly-available program documentation for the following 10 utilities and their residential demand response programs:

- AES Indiana
- Alabama Power
- Alliant Energy
- Consumers Energy
- Duke Energy
- Entergy Arkansas
- Evergy Kansas
- Georgia Power
- Idaho Power
- Public Service Company of Colorado (PSCo)

The table below outlines each utility, its service territory, and the number of residential customers served¹⁹.

¹⁹ U.S. Energy Information Administration, Form EIA-861 2020 data files, released November 3, 2021. EIA-861 includes self-reported data on accounts, revenues, demand response portfolios, and other pertinent utility data. The report is released annually in November for the prior operating year. More can be found at <https://www.eia.gov/electricity/data/eia861>.

Table 20. Utility Territory and Residential Customer Base

Utility	Service Territory	Number of Residential Customers Served
MidAmerican	Iowa	604,126
AES Indiana	Indiana	253,794
Alabama Power	Alabama	1,291,390
Alliant Energy	Iowa	401,675
Consumers Energy	Michigan	1,626,062
Duke Energy	Kentucky and Florida	1,341,724
Entergy Arkansas	Arkansas	598,506
Evergy Kansas	South and Central Kansas	623,091
Georgia Power	Georgia	2,288,312
Idaho Power	Idaho	469,546
PSCo	Colorado	33,653

4.3.1 Key Findings

We determined that MidAmerican’s SummerSaver program has similar elements to other utilities through the benchmarking study. For example, direct control units remain a common approach to managing air conditioning loads, though smart thermostats are growing. MidAmerican’s program incentives are in alignment with others. Other than those with smart thermostats, utilities oversee and manage event-day communications and controls. We also found some differences in approaches. For example, MidAmerican’s program focuses on the single family sector, and other utilities include the multifamily and small business sectors. Particular findings included:

- While usage of direct control units remains a common approach, smart thermostats (and even smart metering) have been rolling out into program offerings of researched utilities as a means of controlling peak loads. These two-way technologies allow customers more control over their energy use during demand response events. However, and similar to MidAmerican, utilities adopting smart devices are typically running the smart device options in parallel to the direct control units. This is largely due to direct control device costs incurred by utilities and the longevity of the device life.
- While one-way direct control units are an effective means of reducing peak loads during a demand response event, two-way smart metering and smart thermostats allow for energy savings to accrue beyond demand response events. When applied across customer segments, behavioral changes and technological adaptation to customer needs can allow energy savings to accrue beyond event days. This is primarily due to an additional degree of customer engagement with these technologies. When combined with customer-accessible software platforms, smart thermostats allow customers to monitor their energy use, receive tips on how to reduce energy use, and gain insight into their historical energy use.
- The growth of smart technologies in demand response is expected to continue over the coming years. The Southeast Power Administration (SEPA)²⁰ noted that demand response programs

²⁰ <https://www.energy.gov/sepa/southeastern-power-administration>

using smart thermostats are growing in popularity and that a substantial amount of enrolled capacity was dispatched among this subset of demand response participants, a high participation level in demand response events. Further, SEPA noted that more utilities are looking towards pairing distributed energy resources with demand response programs and are planning to harness the growing inventory of electric vehicles being utilized nationwide to store excess generated renewable energy and curtail charging during event hours.

4.3.2 Detailed Results

Below are detailed findings from the benchmarking research, summarized under program control strategies, eligibility requirements, incentive structures, and demand response event timing. All program details are reflective of research completed in December of 2021.

4.3.2.1 Program Control Strategies

For the past couple of decades, residential demand response programs have involved one-way direct control units. In 2018, 82.9 percent of programs used one-way direct control units²¹. Similar to benchmarking completed for MidAmerican in 2018, some utilities have maintained the use of one-way direct control units as a sole means of controlling demand during peak demand days, including Duke Energy and Idaho Power. In contrast, others like Alliant Energy have expanded their residential demand response programs to include smart technologies.

Over the past decade, the emergence of smart technologies (and AMI deployment) has provided utilities with options to employ in demand response programs and other offerings that aid customers in managing their energy consumption. The growth is primarily due to the utilities' need to offset demand during peak periods or emergencies and reduce total demand. Demand response programs are transitioning away from one-way devices to two-way communication because of these technological changes. Eight of the 10 utilities in this benchmarking study now have smart thermostats included in their residential demand response programs.

Table 21. Technologies Employed

Utility	Technologies Employed
MidAmerican	Direct Control Unit, Smart Thermostat
AES Indiana	Direct Control Unit, Smart Thermostat
Alabama Power Co	Smart Thermostat
Alliant Energy	Direct Control Unit, Smart Thermostat
Consumers Energy	Direct Control Unit, Smart Thermostat, Critical Peak Pricing, Peak Time Rewards
Duke Energy	Direct Control Unit
Entergy Arkansas	Direct Control Unit, Smart Thermostat
Eergy	Smart Thermostat
Georgia Power	Smart Thermostat
Idaho Power	Direct Control Unit
PSCo	Direct Control Unit, Smart Thermostat

²¹ Ibid., 2.

4.3.2.2 Eligibility Requirements

Eligibility requirements are generally consistent across the benchmarked programs. To participate in any of the programs involving direct control unit installation, customers need to own their home or be approved eligible renters and have a central air conditioner, water heater, or heat pump. Some utilities like Consumers Energy and Duke Energy have expanded their programs to include pool pumps and home generators. Households hoping to participate in demand response programs with smart thermostats must have a Wi-Fi-enabled internet connection.

AES Indiana and Entergy Arkansas invite small businesses to participate in their respective programs via a smart thermostat which the utility installs at no additional cost to the small business. The equipment controlled through the smart thermostat is similar to the equipment cycled by direct control units: electric heat or central air-cooling systems such as furnaces, air conditioners, and heat pumps. The table below summarizes eligibility requirements across the 10 benchmarked utilities.

Table 22. Eligibility Requirements

Utility	Program Name	Eligibility Requirements
MidAmerican	SummerSaver	Residential homeowner Central air conditioning or air-source heat pump
AES Indiana	Cool Cents	Homeowners or approved renters with a smart thermostat Past participants being transitioned to a smart thermostat or upgraded smart switch replacing the original one-way switch Small businesses with a smart thermostat may be eligible to participate based on the size of the air conditioning system
Alabama Power	Smart Advantage and Time Advantage Energy Rate	Residential electric customer with central air conditioning and/or electric furnace or single-stage heat pump and a qualifying thermostat and Wi-Fi availability Participants must also enroll in Time Advantage Energy Rate (TOD)
Alliant Energy	Appliance Cycling	Homeowners with central air conditioning Requires direct control unit to be installed Must not be participating in Smart Hours thermostat program
Alliant Energy	Smart Hours	Home with Wi-Fi availability Wi-Fi-enabled smart thermostats, central air conditioning (for summer program only), and/or a gas or electric furnace (summer and winter program) Must not enroll in TOD or Appliance Cycling
Consumers Energy	Smart Thermostat Program	Residential customer with Wi-Fi-enabled smart thermostat
Consumers Energy	AC Peak Cycling Program	Residential customers with central air conditioning not participating in Smart Thermostat Cycling program Requires direct control unit to be installed
Consumers Energy	Peak Time Rewards	Residential customers must be willing to shift energy use, typically from 2 - 6 p.m., Monday – Friday Up to 19 Energy Savings Event Days per year

Utility	Program Name	Eligibility Requirements
Consumers Energy	Critical Peak Pricing	Residential customers must be willing to adjust their habits to consume energy outside of peak load times from June – September Up to 14 events per year
Consumers Energy	Electric Water Heater Cycling Program	Residential customer with electric water heating unit Requires direct control unit to be installed
Consumers Energy	Generator Cycling Program	Homeowners with a generator unit Up to 50 hours annually Requires direct control unit to be installed
Duke Energy (KY)	EnergyWise Home (FL) Power Manager (KY)	Homeowners or approved renters with electric water heating, pool pumps, and central air conditioning (air conditioning only in Kentucky) Must meet minimum energy consumption requirements Requires direct control unit to be installed Must be in the coverage area for wireless paging signal to be received
Entergy Arkansas	Smart Direct Load Control	Residential and non-residential customers who: <ul style="list-style-type: none"> • Have central heating and air conditioning • Have an in-home or in-business Wi-Fi service • Have an existing qualifying smart thermostat or a qualifying thermostat that can be replaced at no additional cost to the customer for an Emerson Sensi Touch Thermostat • Are not already enrolled in the Summer Advantage Program (if enrolled, customers may unenroll from the Summer Advantage Program to participate) Funds are limited, and services are available on a first-come, first-served basis. If the customer decides to terminate the services, annual incentive payments cease, and the customer is not be eligible for a re-enrollment incentive until 12 months following the date of termination. The customer is allowed to re-enroll at any time. Renter must certify that he/she has received consent from the landlord or homeowner for receipt of the direct installation of equipment.
Entergy Arkansas	Summer Advantage Program	Any Entergy Arkansas residential customer (renter or owner) who has a central air conditioner or heat pump Customers participate through a smart thermostat
Evergy Kansas	Thermostat Cycling Program	Homeowners or approved renters Wi-Fi availability Wi-Fi-enabled smart thermostat and central air conditioning
Georgia Power	Temp ✓™ and Flex Hours	Homeowners or approved renters with Wi-Fi availability Wi-Fi enabled smart thermostat, all-electric heat pump No participation in any disqualifying electric rate programs
Idaho Power	A/C Cool Credit	Homeowners or approved renters with a central air system or an air-source heat pump Requires direct control unit to be installed

Utility	Program Name	Eligibility Requirements
PSCo	Saver's Switch	Homeowners with central air conditioning Apartment or condominium dwellers with owner approval and with an air conditioner dedicated to the apartment located outside on the ground level near the building Requires direct control unit to be installed Cannot also participate in AC Rewards program
PSCo	AC Rewards Smart Thermostat Program	Homeowners with eligible Wi-Fi-enabled smart thermostat Natural gas customers with gas heating are eligible if they also have electric service and central air conditioning Cannot also participate in Saver's Switch program

4.3.2.3 Incentive Structures

Incentives varied depending on the type of technologies employed in each demand response program. Whether the demand response program included direct control units, smart thermostats, or other technologies, the customer participation incentives were typically provided in the form of bill credits on either a monthly or annual basis and ranged from \$5 to \$100. On the higher end, Duke Energy provides its Kentucky participants bill credits totaling up to \$53 between May and September.

In addition to participation incentives, many demand response programs provide additional incentives at the time of enrollment or installation of equipment employed by the program. In particular, those including smart thermostats. These other incentives may be distributed to customers through a prepaid or gift Mastercard or bill credit. A detailed summary of incentives is shown in the table below.

Table 23. Incentive Levels

Utility	Program Name	Incentive Levels
MidAmerican	SummerSaver	<i>New LCR program participants receive a \$30 end-of-season bill credit, with subsequent years earning a \$20 bill credit. The program pays for the installation of any LCR equipment necessary for participation.</i> <i>Smart thermostat participants receive a \$30 end-of-season incentive if they remain enrolled the entire season.</i>
AES Indiana	Cool Cents	Residential: \$5 bill credit per summer month, up to \$20; \$50 smart thermostat rebate available as well Business: \$5 - \$15 (based on the size of cooling equipment) bill credit per summer month; smart thermostat installed at no additional charge Incentives paid without events
Alabama Power	Smart Advantage and Time Advantage Energy Rate	\$100 prepaid Mastercard for enrolling with already owned eligible thermostat (\$50 for enrolling an eligible thermostat obtained from the utility) Economy pricing all day on weekends, all year long, and economy pricing all day, every day in April, May, and October
Alliant Energy	Appliance Cycling	The amount of credit depends on which specific program Ranges from \$20 to \$40 annually Incentives paid without events

Utility	Program Name	Incentive Levels
Alliant Energy	Smart Hours	\$50 prepaid Mastercard for enrolling \$25 prepaid Mastercard for each season (summer and winter) of participation Incentives paid without events
Consumers Energy	Smart Thermostat Program	\$75 prepaid Mastercard for enrolling \$25 prepaid Mastercard at the end of each season of participation Incentives paid without events
Consumers Energy	AC Peak Cycling Program	\$32 in bill credits on customers' summer energy bills annually Incentives paid without events
Consumers Energy	Peak Time Rewards	Bill credits equal \$1 per kWh for customer shifts during energy savings event days Risk-free best fit when unsure of how much electric use can be shifted
Consumers Energy	Critical Peak Pricing	18% discounted rate for energy used from midnight to 2 p.m. and 7 p.m. to midnight on weekdays, weekends, and holidays from June through September in exchange for when an energy savings event day is called If the customer cannot reduce energy use, a charge of \$1 per kWh per event will be applied to the bill
Consumers Energy	Electric Water Heater Cycling Program	\$75 gift card for enrolling in the program Incentives paid without events
Consumers Energy	Generator Cycling Program	Incentive paid upon enrollment and annually for participation in the program Incentives paid without events
Duke Energy	Power Manager (KY)	Up to \$53 in monthly bill credits Incentives paid without events
Duke Energy	EnergyWise Home (FL)	Up to \$147 in monthly bill credits Incentives paid without events
Entergy Arkansas	Smart Direct Load Control	For those who qualify for a no-additional-cost installation, customers receive a professionally installed thermostat at no additional cost, a \$225 value Participating customers also receive an annual enrollment incentive up to \$40 for residential customers and up to \$100 for business customers For those who already have a qualifying Sensi or Honeywell Thermostat, the customer receives an enrollment incentive up to \$50 for residential and \$100 for non-residential for participating in the program An additional annual participation incentive is also issued to qualifying customers after the demand response event season with incentives up to \$40 for residential customers and \$100 for business customers

Utility	Program Name	Incentive Levels
Entergy Arkansas	Summer Advantage Program	<p>Customers can choose if they want the Direct Cycling Unit (DCU) to cause their air conditioner to run 50% or 75% less.</p> <p>If the customer chooses to run 50% less: Earn \$25 just for installing the DCU Earn up to \$25 each year for participation during cooling season Total First Year Incentives: \$50 (\$25/year after year one)</p> <p>If the customer chooses to run 75% less: Earn \$40 just for installing the DCU Earn up to \$40 each year for participation during cooling season Total First Year Incentives: \$80 (\$40/year after year one)</p>
Entergy Kansas	Thermostat Cycling Program	Various activation rewards and a \$25 annual bill credit
Georgia Power	TEMP ✓™ and Flex Hours	\$50 prepaid Mastercard upon enrollment in TEMP✓™ \$50 smart thermostat rebate available as well
Idaho Power	A/C Cool Credit	\$5 bill credit per summer month Incentives paid without events
PSCo	Saver's Switch	\$40 annual bill credit in October Incentives paid without events
PSCo	AC Rewards Smart Thermostat	\$100 bill credit for enrolling \$25 annual bill credit Incentives paid without events

4.3.2.4 Demand Response Event Timing

During an event, the utility can control eligible equipment for a set amount of time during each day during a specified period. More details on the timing of and the maximum number of demand response events are summarized in the table below. Not all information was readily available through publicly-available documentation or filings.

Table 24. Load Control Details

Utility and Program (as needed)	Load Control Season	Load Control Times	Load Control Limitations
MidAmerican - SummerSaver	June 1 st – September 30 th , not including holidays and weekends.	2:00 PM – 7:00 PM	5 hours per event Maximum events per year unknown
AES Indiana	June – September	Unknown	Unknown
Alabama Power	Summer: June 1 – September 30 Winter: November 1 – March 31	Summer: 1:00 p.m. – 7:00 p.m. Winter: 5:00 p.m. – 9:00 p.m.	Unknown

Utility and Program (as needed)	Load Control Season	Load Control Times	Load Control Limitations
Alliant Energy – Appliance Cycling	May – September Not including weekends and holidays	1:00 p.m. – 7:00 p.m.	Up to 15 minutes on and off for up to 6 hours a day
Alliant Energy – Smart Hours	Summer: June 1 – September 30 Winter: December 1 – March 31 Not on weekends or holidays	Summer: 1:00 p.m. – 7:00 p.m. Winter: 6:00 a.m. – 10:00 a.m.	Up to 15 times each season Events will not last longer than 4 hours
Consumers Energy – Smart Thermostat Program	Select Summer days	Unknown	Unknown
Consumers Energy – AC Peak Cycling Program	Select Summer days	Unknown	Unknown
Consumers Energy – Peak Time Rewards	All year, not including weekends	2:00 p.m. – 6:00 p.m.	Up to 19 energy saving event days
Consumers Energy – Critical Peak Pricing	June – September, not including weekends	2:00 p.m. – 7:00 p.m.	Up to 14 Summer and 5 Winter energy savings event days
Consumers Energy – Electric Water Heater Cycling Program	Select Summer days	Unknown	When a cycling event is happening, the electric water heater will turn off but the hot water in the tank will still be available for use After the cycling event ends, the unit will resume normal operations
Consumers Energy – Generator Cycling Program	Select Summer days	Unknown	During a limited number of days, up to 50 hours annually
Duke Energy (KY)	Between May and September	Events typically occur on weekdays (rarely on weekends or holidays) 2 to 3.5 hours on weekday afternoons between 2 p.m. and 6 p.m.	None, per se Cycling events may occur a few times per month when electricity demand reaches peak levels If the weather is mild, cycling may not occur at all
Duke Energy (FL)	Summer: April – October Winter: November – March Rarely on holidays and weekends	Summer: 1:00 p.m. – 11:00 p.m. Winter: 6:00 a.m. – 11:00 and/or 6:00 p.m. – 11:00 p.m.	Cycling can only occur for up to 16.5 minutes per 30-minute period

Utility and Program (as needed)	Load Control Season	Load Control Times	Load Control Limitations
Entergy Arkansas - Smart Direct Load Control	June 1 - September 30	Non-holiday weekdays (Monday-Friday), Noon to 7 p.m.	<p>Conservation periods typically last approximately four hours in any single day and usually occur for no more than three consecutive days</p> <p>The customer may override conservation periods; overriding conservation periods may reduce annual participation incentive</p> <p>To opt out of a mandatory event, the customer must make a phone call</p>
Entergy Arkansas - Summer Advantage Program	June 1 - September 30	Non-holiday weekdays (Monday-Friday), Noon to 7 p.m.	<p>Entergy Arkansas tells customers that on average, they can expect their home to increase in temperature:</p> <p>Two or three degrees during a four-hour event at the 50% rate</p> <p>Temperatures will be slightly higher at the 75% rate</p> <p>The air conditioner's fans continue to run and circulate cool air throughout the home</p>
Energys Kansas	Summer: June – September Not including holidays and weekends	12:00 p.m. – 9:00 p.m.	No more than one event per day or three per week
Georgia Power	Summer: June 1 – September 30 Winter: December 1 – March 31 Not including weekends and holidays	Unknown	Up to 10 flex hour events each season. Up to 4 hours per event
Idaho Power	June 15 – August 15 Not including weekends and holidays	4:00 p.m. – 8:00 p.m.	Unknown
PSCo – Saver's Switch	Summer	2:00 p.m. – 7:00 p.m.	Cycled in 15 – 20-minute intervals
PSCo – AC Rewards Smart Thermostat	Summer	Unknown	Unknown

APPENDIX A: PARTICIPANT SURVEY

MidAmerican Energy SummerSaver Program Process and Verification Participant Survey

This document will be used to conduct telephone surveys with program participants. The list of survey sections includes:

- Introduction
- Phone Screening
- Program Awareness
- Participation Process
- Program Experience
- Program and General Satisfaction
- Final Process
- Demographics
- Conclusion

INTRODUCTION

INTRO [INTERVIEWER INSTRUCTION: Please dial the phone number **<TELEPHONE>** and enter the call result.]

Hello, my name is _____ calling from Tetra Tech on behalf of MidAmerican Energy. We are conducting a study about MidAmerican's SummerSaver program. Your responses will be used to inform MidAmerican about your experience with the program. I'm not selling anything; I'd just like to ask your opinion about this program.

Our records show that your household at **<ADDRESS>** participates in this program. May I speak to the person that is most familiar with your participation in the program?

[IF CONTACT_NAME IS NOT BLANK SHOW: "The name we have on file is **<CONTACT_NAME>**."]]

[IF NEEDED: You would have agreed to receive incentives in exchange for allowing MidAmerican Energy to control the operation of your home's air-conditioner or heat pump when demand for electricity is the highest.]

- | | | |
|----|----------------------------------|---------------------|
| 01 | Yes | |
| 02 | No, R not knowledgeable | [SKIP TO OTHER_R] |
| 03 | No, R is not currently available | [SCHEDULE CALLBACK] |
| 04 | Did not connect | [DISPO CASE OUT] |

PREAMBLE

I'm with Tetra Tech, an independent research firm. I am calling to learn about your experiences with MidAmerican's SummerSaver program. Let me assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone unless you grant permission.

Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

01 Continue [SKIP TO CELL1]

FAQ [THE FOLLOWING IS AVAILABLE ONLY IF NEEDED:

Who is doing this study: MidAmerican Energy has hired our firm to evaluate this program. As part of the evaluation, we're talking with customers that participated in the program to understand their experiences with the program.

Why are you conducting this study: Studies like this help MidAmerican Energy better understand customers' need for energy efficiency programs and services.

Timing: This survey should only take about 15 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALLBACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.

Sales concern: I am not selling anything; we would simply like to learn about your experience with the program. Your responses will be kept confidential and not revealed to anyone unless you grant permission. If you would like to talk with someone from MidAmerican Energy about this study, feel free to call MidAmerican Energy's call center at (888) 427-5632.

PHONE SCREEN QUESTIONS

S1 Our records indicate that you began participating in MidAmerican Energy's SummerSaver program around <DATE>. Is that correct?

- 01 Yes [SKIP TO I3]
- 02 No
- 88 Don't know [SKIP TO OTHER_R]
- 99 Refused [SKIP TO OTHER_R]

S2 Is it the date you disagree with, or have you never participated in the SummerSaver program?

- 01 Disagree with the date
- 02 Did not participate in the program [END SURVEY INT82]
- 88 Don't know [END SURVEY INT81]
- 99 Refused [END SURVEY INT91]

StartYr [ASK IF S2 = 1] What would the correct starting year be?

- _____ [1900-2021] Correct Starting Year
- 8888 Don't know
- 9999 Refused

I3 Are you, or is anyone in your household, a current or former employee of MidAmerican Energy?
[SELECT ONE]

- 01 Yes [THANK & TERMINATE INT83]
- 02 No
- 88 Don't know [THANK & TERMINATE INT83]
- 99 Refused [THANK & TERMINATE INT91]

OTHER_R Is there someone else that is knowledgeable about your household's participation in the SummerSaver program?

- 01 Yes, there's somebody else
- 02 No [THANK & TERMINATE INT81]
- 88 Don't know [THANK & TERMINATE INT81]
- 99 Refused / Prefer not to answer [THANK & TERMINATE INT91]

AVAILABLE_R May I please speak with that person?

- 01 Yes [RETURN TO INT01]
- 02 Yes, but R is not currently available [SCHEDULE CALLBACK INT15]
- 03 No [THANK AND TERMINATE INT91]
- 99 Refused [THANK AND TERMINATE INT91]

PROGRAM AWARENESS

[ASK OF ALL]

Now I would like to ask you about your experience with the SummerSaver program.

C1 How did you learn about this program? [DO NOT READ; SELECT ALL THAT APPLY]

For C1C01 to C1C99

- 0 Not mentioned
- 1 Mentioned

- C1C01** MidAmerican utility bill insert
- C1C02** MidAmerican website
- C1C03** MidAmerican brochure
- C1C04** MidAmerican call center representative
- C1C05** Retail store
- C1C06** Contractor
- C1C07** Home show / Conference / Trade show
- C1C08** Newspaper
- C1C09** Radio
- C1C10** Television
- C1C11** Billboard
- C1C12** Friend / Family member / Other business
- C1C13** Email from MidAmerican
- C1C14** Key Account Manager [nonresidential only]
- C1C15** Signage at local event such as school or sporting event?
- C1C16** Other [SPECIFY]
- *C1C17** Through the thermostat app
- C1C88** Don't know
- C1C99** Refused

C1C160 [ASK IF C1C16 = 1] By what alternate method did you learn about the SummerSaver program?

CA4 What would you say was your main motivation to participate in this program offered by MidAmerican Energy? [DO NOT READ; SELECT ONE]

- 01 Previous program participation
- 02 The available incentive
- 03 Other [SPECIFY]
- 88 Don't know
- 99 Refused

CA40 [ASK IF CA4 = 3] Tell me in your own words what your main motivation was to participate.

C2 [SKIP IF C1C02 = 1] In the past year, have you visited the MidAmerican Energy website?

- 01 Yes
- 02 No [SKIP TO C5a]
- 88 Don't know [SKIP TO C5a]
- 99 Refused [SKIP TO C5a]

C3 Why did you visit the MidAmerican Energy website? [DO NOT READ; SELECT ALL THAT APPLY]

For C3C01 through C3C88:

- 0 Not mentioned
- 1 Mentioned

C3C01 Look for information on the program

C3C02 Look for additional ways/opportunities that MidAmerican offers to help me save energy/money at home

C3C03 Information on energy efficient appliances

C3C04 Information on energy efficiency in general

C3C05 Information on COVID-19

C3C06 Other [SPECIFY]

***C3C07** Pay bill

***C3C08** Check on power outage

C3C88 Don't know

C3C060 [ASK IF C3C06 = 1] What was your reason for visiting the MidAmerican website?

C4 How easy was it to find the information you were looking for on the website? Was it not at all easy, somewhat easy, very easy, or extremely easy? [SELECT ONE]

- 01 Not at all easy
- 02 Somewhat easy
- 03 Very easy
- 04 Extremely easy
- 88 Don't know

C5 How helpful was the information you found on the website? Was it not at all helpful, somewhat helpful, very helpful, or extremely helpful? [SELECT ONE]

- 01 Not at all helpful
- 02 Somewhat helpful
- 03 Very helpful
- 04 Extremely helpful
- 88 Don't know

C5A [ASK OF ALL] In the past year, have you visited the SummerSaver website?

- 01 Yes
- 02 No
- 88 Don't know

C5B [ASK IF C5A = 01] How helpful was the information you found on the SummerSaver website? Was it not at all helpful, somewhat helpful, very helpful, or extremely helpful? [SELECT ONE]

- 01 Not at all helpful
- 02 Somewhat helpful
- 03 Very helpful
- 04 Extremely helpful
- 88 Don't know

PARTICIPATION PROCESS

P1 On a scale of 1 to 5, where 1 is very difficult and 5 is very easy, how difficult or easy did you find it to...

[FOR P1A-P1H] [RANDOMIZE ORDER]

___ [RECORD 1-5]

- 77 Not applicable
- 88 Don't know

P1A Understand the program requirements

P1B Sign up to participate in the program

P1C [ASK IF DEVICE_TYPE = 1] Schedule an appointment to have the load control receiver installed

P1D [ASK IF DEVICE_TYPE = 1] Understand how the receiver worked

P1E Understand the payment you would receive for participating

P1F [ASK IF DEVICE_TYPE = 1] Interact with the contractors installing or servicing the equipment

P1G [ASK IF DEVICE_TYPE = 2] Register your smart thermostat in the program

P1H [ASK IF DEVICE_TYPE = 2] Understand how the smart thermostat works during an event

P3A Did you have any initial concerns about participating in the program?

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

P4A [ASK IF P3A = 1] What concerns did you have? [DO NOT READ; SELECT ALL THAT APPLY]
For P4AC01 to P4AC99

- 0 Not mentioned
- 1 Mentioned

- P4AC01** Was not sure I'd receive/did not receive the credit
- P4AC02** Understanding the way the receiver worked
- P4AC03** Having MidAmerican Energy control my energy use
- P4AC04** The temperature increase is/would be uncomfortable
- P4AC05** Understanding how the program works
- P4AC06** It might damage my central air conditioner or air source heat pump
- P4AC07** The time periods of events
- P4AC08** The number of days a year when events would occur
- P4AC09** Health reasons
- P4AC10** Concerns about the device installation
- P4AC11** Payment was not worth the effort
- P4AC12** Other [SPECIFY]
- P4AC88** Don't know
- P4AC99** Refused

P4AC120 [ASK IF P4AC12 = 1] What other concerns did you have?

PROGRAM EXPERIENCE

PE1 [SHOW IF DEVICE_TYPE = 1: The SummerSaver program cycles your air conditioner or air source heat pump when MidAmerican Energy needs to reduce load. These cycling events can be called from June through September and occur between the hours of 2pm and 7pm, Monday through Friday.]
[SHOW IF DEVICE_TYPE = 2: The SummerSaver program adjusts your smart thermostat temperature setting when MidAmerican Energy needs to reduce load. These cycling events can be called from June through September and occur between the hours of 2pm and 7pm, Monday through Friday.]

How many events do you think MidAmerican Energy called this past summer?

[INTERVIEWER PROBE: IF RESPONSE IS MORE THAN 85: "There are 85 possible control days in the season. How many cycling events do you think MidAmerican Energy called this summer"?)

- ___ Number of events [0-85]
- 88 Don't know

PE2 [IF PE1 = 0, 88 SKIP TO P16] How could you tell that MidAmerican Energy called a SummerSaver event? [DO NOT READ; SELECT ALL THAT APPLY]

For PE2C01 to PE2C99

- 0 Not mentioned
- 1 Mentioned

- PE2C01 The house got uncomfortably warm
- PE2C02 I didn't hear the air conditioner run as often
- PE2C03 I looked at the thermostat and saw that the temperature had been increased
- PE2C04 I called MidAmerican Energy to see if they had adjusted the temperature
- PE2C05 I noticed the alert on my smart thermostat app
- PE2C06 I looked at the thermostat and saw the alert there
- PE2C07 Other [SPECIFY]
- PE2C88 Don't know
- PE2C99 Refused

PE2C07O [ASK IF PE2C07 = 1] How could tell MidAmerican Energy called a cycling event?

PE4 How did it affect you or your home when MidAmerican Energy called a cycling event? [DO NOT READ; SELECT ALL THAT APPLY]

For PE4C01 to PE4C99

- 0 Not mentioned
- 1 Mentioned

- PE4C01 No affect
- PE4C02 House got uncomfortably warm
- PE4C03 We had to adjust the temperature setting
- PE4C04 We used fans
- PE4C05 We left the house
- PE4C06 Other [SPECIFY]
- PE4C88 Don't know
- PE4C99 Refused

PE4C06O [ASK IF PE4C06 = 1] How it affected you when MidAmerican Energy called a cycling event?

PE5 Did you change the thermostat every time, sometimes, or never when MidAmerican Energy called a cycling event?

- 01 Every time
- 02 Sometimes
- 03 Never
- 88 Don't know
- 99 Refused

PE5A [ASK IF PE5 = 1 OR 2] What change did you make to your air conditioner temperature? [RECORD VERBATIM]

P16 At what temperature do you usually set your air conditioner to...?

For P16A through P16D

____ Enter degrees [50-100]

777 Turn off

888 Don't know

P16A When no one is home?

P16B During the day when someone is at home?

P16C During the evening when someone is at home?

P16D During sleeping hours?

PE7 Did you call MidAmerican Energy with questions or concerns about the program this year?

01 Yes

02 No [SKIP TO PE10]

88 Don't know [SKIP TO PE10]

99 Refused [SKIP TO PE10]

PE8 Why did you call MidAmerican Energy about the program this year? [DO NOT READ; SELECT ALL THAT APPLY]

For PE8C01 to PE8C99

0 Not mentioned

1 Mentioned

PE8C01 Wanted to know if MidAmerican Energy had called a cycling event or was adjusting my air conditioner at that time

PE8C02 General questions about the program

PE8C03 My air conditioner was not cooling my house and I wanted to know if it was because of the program.

PE8C04 I wanted someone to come to my house to check that the program's equipment was not malfunctioning or causing problems with my air conditioner/air source heat pump.

PE8C05 Other [SPECIFY]

PE8C88 Don't know

PE8C99 Refused

PE8C050 [ASK IF PE8C05 = 1] Other reason called MidAmerican Energy

PE9 Overall, how satisfied are you with MidAmerican's response to your call this year? Would you say not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied? [SELECT ONE]

01 Not at all satisfied

02 Somewhat satisfied

03 Very satisfied

04 Extremely satisfied

88 Don't know

99 Refused

PE10 [ASK IF DEVICE_TYPE=1] How interested would you be in participating in the SummerSaver program via a smart thermostat, where you had to supply the smart thermostat? Would you say not at all interested, somewhat interested, very interested, or extremely interested? [SELECT ONE]

- 01 Not at all interested
- 02 Somewhat interested
- 03 Very interested
- 04 Extremely interested
- 88 Don't know
- 99 Refused

PROGRAM AND GENERAL SATISFACTION

SAT1 Overall, how satisfied are you with the SummerSaver program? Would you say not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied? [SELECT ONE]

- 01 Not at all satisfied
- 02 Somewhat satisfied
- 03 Very satisfied
- 04 Extremely satisfied
- 88 Don't know
- 99 Refused

SAT2 [SKIP IF SAT1=88,99] Why did you rate your satisfaction with the program that way? [RECORD VERBATIM]

SAT3 How satisfied are you with the following aspects of the program? Would it be not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied? [FOR SAT3A TO SAT3E] [RANDOMIZE ORDER]

- 01 Not at all satisfied
- 02 Somewhat satisfied
- 03 Very satisfied
- 04 Extremely satisfied
- 77 Not applicable
- 88 Don't know
- 99 Refused

SAT3A The number of days MidAmerican Energy called a cycling event

SAT3B The number of hours during the day that MidAmerican Energy cycled your system

SAT3C The amount of money MidAmerican Energy applies as a bill credit to participate in the program

SAT3D Communications from MidAmerican Energy about participating in the program

SAT3E [ASK IF DEVICE_TYPE = 1] The service professional who installed your load control receiver

PM2 Do you plan to continue participating in the program next summer?

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

PM3 [ASK IF PM2 = 02 OR 88] Why do you say that?
[RECORD VERBATIM]

SAT4 How likely are you to recommend the SummerSaver program to a family member or friend?
Please answer on a scale of 0 to 10, where 0 is extremely unlikely and 10 is extremely likely.

- ___ [NUMERIC 0-10]
- 88 Don't know
- 99 Refused

SAT5 The next questions ask about your experience with MidAmerican Energy in general as your energy provider.

How would you rate the service provided by MidAmerican? Would you say not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied? [SELECT ONE]

- 01 Not at all satisfied
- 02 Somewhat satisfied
- 03 Very satisfied
- 04 Extremely satisfied
- 88 Don't know
- 99 Refused

SAT8 Compared to prior to your participation in the SummerSaver program, are you more satisfied, just as satisfied, or less satisfied with MidAmerican as your energy provider? [SELECT ONE]

- 01 More satisfied
- 02 Just as satisfied
- 03 Less satisfied
- 88 Don't know
- 99 Refused

SAT9 [ASK IF SAT8 = 01 OR 03] Why do you say that?
[RECORD VERBATIM]

FINAL PROCESS

C10 Thinking about your household over the next six months, are you... not at all likely, somewhat likely, very likely, or extremely likely to do the following?

[PROGRAMMER NOTE: RANDOMIZE ORDER]

For C10A through C10E:

- 01 Not at all likely
- 02 Somewhat likely
- 03 Very likely
- 04 Extremely likely
- 88 Don't know
- 99 Refused

- C10A** To purchase new energy efficient equipment or appliances for your home?
- C10B** To allow a contractor into your home to service existing equipment or appliances?
- C10C** To look for additional ways to save energy in your home that are low cost or no cost?
- C10D** To start a major home renovation or remodeling project?
- C10E** To build a new home?

C11 Thinking about the last five statements that I read to you, did the COVID-19 pandemic influence any of your responses?

- 01 Yes
- 02 No
- 88 Don't know

C12 [ASK IF C11 = 01] How did it influence your responses?
[RECORD VERBATIM]

DEMOGRAPHICS

We are almost done; I just have a few final questions.

DEM1 What type of home do you live in? Is it a... [READ CATEGORIES; CHECK ONE]

- 01 Single-family detached house
- 02 Single-family attached house [townhouse, row house, or duplex]
- 03 Apartment building with 2 to 4 units
- 04 Apartment building with 5 or more units
- 05 Mobile home or house trailer
- 06 Or something else [SPECIFY]
- 88 Don't know
- 99 Refused

DEM10 [ASK IF DEM1 = 06] Other type of home

DEM2 Do you own your home or are you renting? [SELECT ONE]

- 01 Own / Buying
- 02 Renting
- 88 Don't know
- 99 Refused

DEM3 In approximately what year was your home built?

- _____ 1800-2021 [RECORD YEAR]
- 8888 Don't know

DEM3a [ASK IF DEM3 = 8888] In what decade was your home built? [READ LIST UNTIL R ANSWERS; CHECK ONE]

- 01 1930s or earlier
- 02 1940s
- 03 1950s
- 04 1960s
- 05 1970s
- 06 1980s
- 07 1990s
- 08 2000s
- 09 2010s
- 10 2020s
- 88 Don't know
- 99 Refused

DEM4 What is the **main** fuel used to heat your home? [DO NOT READ; SELECT ONE ANSWER]

- 01 Electricity
- 02 Natural gas
- 03 Bottled gas propane
- 04 Fuel oil
- 05 Wood
- 06 Other [SPECIFY]
- 88 Don't now
- 99 Refused

DEM4O [ASK IF DEM4 = 06] What other type of main fuel is used to heat your home?

DEM5 What is the main fuel used to heat **your water**? [DO NOT READ; SELECT ONE ANSWER]

- 01 Electricity
- 02 Natural gas
- 03 Bottled gas propane
- 04 Fuel oil
- 05 Wood
- 06 Other [SPECIFY]
- 88 Don't know
- 99 Refused

DEM50 [ASK IF DEM5 = 05] What other type of main fuel is used to heat your water?

DEM6 Do you have central air conditioning in your home? [SELECT ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

DEM7 How many working **room or window air conditioners** do you have in your home?

- ___ Number of units [0-20]
- 88 Don't know
- 99 Refused

DEM8 How many years have you lived in your home? [ENTER 0 IF LESS THAN ONE FULL YEAR]

- ___ Number of years [0-100]
- 888 Don't know
- 999 Refused

DEM9 Not including unfinished basements or crawlspace, which of the following best describes the square footage of your home? Is it... [READ LIST UNTIL R ANSWERS; SELECT ONE ANSWER]

- 01 Less than 1,000 square feet
- 02 1,000 to 1,500 square feet
- 03 1,501 to 2,000 square feet
- 04 2,001 to 3,000 square feet
- 05 More than 3,000 square feet
- 88 Don't know
- 99 Refused

DEM10 Counting yourself, how many people normally live in this household on a full-time basis?

- ___ Number of people [0-20]
- 88 Don't know
- 99 Refused

DEM13 How old were you on your last birthday? Were you... [READ LIST UNTIL R ANSWERS;
SELECT ONE ANSWER]

- 01 18 to 24
- 02 25 to 34
- 03 35 to 44
- 04 45 to 54
- 05 55 to 64
- 06 65 or older
- 88 Don't know
- 99 Refused

DEM14 Including wages, salaries, pensions, Social Security and other sources of income for all members of your household, what is your estimated total household income before taxes in 2021? Please select from the following categories. Is it... [READ LIST UNTIL R ANSWERS;
SELECT ONE ANSWER]

- 01 Less than \$24,000
- 02 \$24,000 to less than \$50,000
- 03 \$50,000 to less than \$75,000
- 04 \$75,000 to less than \$100,000
- 05 \$100,000 or greater
- 88 Don't know
- 99 Refused

CONCLUSION

E2 Thank you for taking the time to complete this survey. Do you have any additional comments or questions?

- 01 Yes [SPECIFY comment]
- 02 No

E20 [ASK IF E2=01] Additional comments from respondent

DEM15 [DO NOT ASK] Record respondent gender

- 01 Male
- 02 Female
- 88 Don't know

INT99 [Count case as complete]

- CP Completed

APPENDIX B: NONPARTICIPANT SURVEY

MidAmerican Energy Residential Nonparticipant Customer Survey

INTRODUCTION

INTRO [INTERVIEWER INSTRUCTION: Please dial the phone number [TELEPHONE] and enter the call result.]

01	Connected	[PROCEED]
02	Did not connect	[DISPO CASE OUT]

INT01 Hello, my name is [SURVEYOR NAME] calling from Tetra Tech on behalf of MidAmerican Energy. We are conducting a study about MidAmerican's energy efficiency offerings. This is not a sales call, and your responses will provide MidAmerican Energy with the opportunity to collect direct customer feedback that will inform and improve MidAmerican Energy's energy efficiency programs.

May I speak with one of the people in your household that is most knowledgeable about your household's energy usage?

01	Yes	
02	No, R not knowledgeable	[SKIP TO OTHER_R]
03	No, R is not currently available	[SCHEDULE CALLBACK]
04	Did not connect	[DISPO CASE OUT]

PREAMBLE I'm with Tetra Tech, an independent research firm. We are conducting a study about MidAmerican's energy efficiency offerings.

I'm not selling anything; I'd just like to ask your opinions. Let me assure you that your responses will be kept confidential and your individual responses will not be revealed to anyone unless you grant permission.

This survey will only take about 15 minutes of your time. Before we start, I would like to inform you that for quality control purposes, this call will be recorded and monitored.

[THE FOLLOWING IS AVAILABLE ONLY IF NEEDED:]

Who is doing this study: MidAmerican Energy has hired our firm to gather this information.

Why are you conducting this study: Studies like this help MidAmerican Energy better understand customers' need for energy efficiency programs and services.

Timing: This survey should take less than 15 minutes of your time. Is this a good time for us to speak with you? IF NOT, SET UP CALLBACK APPOINTMENT OR OFFER TO LET THEM CALL US BACK AT 1-800-454-5070.

Sales concern: I am not selling anything; we would simply like to hear about your experiences with MidAmerican and their programs. Your responses will be kept confidential and not revealed to anyone unless you grant permission. If you would like to talk with someone from MidAmerican Energy about this study, feel free to call the MidAmerican Energy call center at 888-427-5632.

OTHER_R Is it possible that someone else in your household would be more knowledgeable about your household's energy usage?

- 01 Yes
- 02 No [INT81—INELIGIBLE]
- 03 Did not participate [INT82—INELIGIBLE]
- 88 Don't know [INT81—INELIGIBLE]
- 99 Refused [INT91—REFUSAL]

AVAILABLE_R May I please speak with that person?

- 01 Yes [SKIP TO INT01]
- 02 Yes, but R is not currently available [INT15—CALLBACK]
- 03 No [INT91—REFUSAL]
- 88 Don't know [INT81—INELIGIBLE]
- 99 Refused [INT91—REFUSAL]

PHONE SCREENING QUESTIONS

I1 Are you currently talking to me on a regular landline phone or a cell phone? [CHECK ONE]

- 01 Landline phone [SKIP TO I3]
- 02 Cell Phone
- 88 Don't know
- 99 Refused

I2 Are you currently driving a motorized vehicle? [CHECK ONE]

- 01 Yes [Schedule callback]
- 02 No
- 88 Don't know [Schedule callback]
- 99 Refused [Schedule callback]

HOUSEHOLD CHARACTERISTICS

We would first like to understand a little bit more about your household.

I3 Are you, or is anyone in your household, a current or former employee of MidAmerican? [CHECK ONE]

- 01 Yes [THANK & TERMINATE - INELIGIBLE]
- 02 No
- 88 Don't know [THANK & TERMINATE - INELIGIBLE]
- 99 Refused [THANK & TERMINATE - INELIGIBLE]

I4 Are you over 18 years old? [CHECK ONE]

- 01 Yes
- 02 No [SCHEDULE CALLBACK]
- 88 Don't know [SCHEDULE CALLBACK]
- 99 Refused [SCHEDULE CALLBACK]

D2 Do you own your home or are you renting? [CHECK ONE]

- 01 Own/ buying
- 02 Rent
- 88 Don't know
- 99 Refused

CW1 Which of the following type of appliances do you have in your home? [READ LIST; CHECK ALL THAT APPLY]

- 01 Refrigerator (with or without freezer)
- 02 Secondary refrigerator (with or without freezer) that is plugged in and in use
- 03 Secondary stand-alone freezer(s) that is plugged in and in use
- 88 Don't know [SKIP TO CW3]
- 99 Refused [SKIP TO CW3]

[ASK IF CW1=01]

CW2A Approximately how old is the primary refrigerator? [CHECK ONE]

- 01 Less than 5 years old
- 02 6-10 years old
- 03 11-20 years old
- 04 Over 20 years old
- 05 *5 years old
- 88 Don't know
- 99 Refused

[ASK IF CW1=02]

CW2B Approximately how old is the secondary refrigerator? [CHECK ONE]

- 01 Less than 5 years old
- 02 6-10 years old
- 03 11-20 years old
- 04 Over 20 years old
- 88 Don't know
- 99 Refused

[ASK IF CW1=03]

CW2C Approximately how old is the secondary stand-alone freezer? [CHECK ONE]

- 01 Less than 5 years old
- 02 6-10 years old
- 03 11-20 years old
- 04 Over 20 years old
- 88 Don't know
- 99 Refused

CW3 What is the primary heating system you use in your home? [CHECK ONE]

- 01 Forced air system
- 02 Radiant heat system
- 03 Hydronic system (hot water baseboard)
- 04 Steam radiant system
- 05 Geothermal system
- 06 Other (SPECIFY)
- 88 Don't know [SKIP TO CW5]
- 99 Refused [SKIP TO CW5]

CW4 Approximately how old is the [FILL WITH CW3 CATEGORY]? [CHECK ONE]

- 01 Less than 5 years old
- 02 6-10 years old
- 03 11-20 years old
- 04 Over 20 years old
- 05 *5 years old
- 88 Don't know
- 99 Refused

CW5 What is the main fuel used to heat your home? [CHECK ONE]

- 01 Electricity
- 02 Natural gas
- 03 Propane
- 04 Fuel oil
- 05 Wood
- 06 Other (SPECIFY)
- 88 Don't know
- 99 Refused

CW6 What is the primary cooling system you use in your home? [CHECK ONE]

- 01 Central air conditioning
- 02 Geothermal system
- 03 Room air conditioner
- 04 Other (SPECIFY)
- 05 No cooling system
- 88 Don't know
- 99 Refused

[ASK IF CW6=03]

CW7 How many room air conditioners do you have? [IF NONE, ENTER ZERO]

- _____ [RECORD NUMBER]
- 888 Don't know
- 999 Refused

[SKIP IF CW6 = 2,5, 88, 99]

CW8 Approximately how old is the [IF CW7>1 oldest] [CW6]?

- 01 Less than 5 years old
- 02 6-10 years old
- 03 11-20 years old
- 04 Over 20 years old
- 05 *5 years old
- 88 Don't know
- 99 Refused

CW9 Do you have a "smart" or wi-fi enabled thermostat, such as a Nest? [INTERVIEWER NOTE: THIS IS NOT A PROGRAMMABLE THERMOSTAT] [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

OVERALL PROGRAM AWARENESS

Next, I would like to ask you some questions about MidAmerican's energy efficiency efforts.

P1 MidAmerican Energy offers rebates and services to customers to help them save energy. You may have seen MidAmerican's "Save Some Green" messages. Before today, had you heard or seen these messages? [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO W1]
- 88 Don't know [SKIP TO W1]
- 99 Refused [SKIP TO W1]

P2 Please tell me if you've noticed any information about Save Some Green through the following sources. [READ LIST; ROTATE OPTIONS; CHECK ALL THAT APPLY]

- 01 MidAmerican utility bill insert or other mailing
- 02 MidAmerican website
- 03 Retail store or contractor
- 04 Radio or television advertisement
- 05 Billboard
- 06 Signage at local event such as school or sporting event
- 07 Anywhere else? (SPECIFY)
- 88 Don't know [SKIP TO W1]
- 99 Refused [SKIP TO W1]

[SKIP IF NUMBER OF SELECTED IN P2=1]

P2A Of the sources you just mentioned, which of them is most effective in providing information about energy efficiency or MidAmerican’s efficiency programs?

[SHOW P2 ITEMS IDENTIFIED, READ ITEMS, SELECT ONE]

- 01 MidAmerican utility bill insert or other mailing
- 02 MidAmerican website
- 03 Retail store or contractor
- 04 Radio or television advertisement
- 05 Billboard
- 06 Signage at local event such as school or sporting event
- 07 Anywhere else? (SPECIFY)
- 88 Don’t know
- 99 Refused

MIDAMERICAN WEBSITE

Next I would like to ask you a few questions about MidAmerican’s website.

W1 In the past year, have you visited the MidAmerican website? [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO HC1]
- 88 Don’t know [SKIP TO HC1]
- 99 Refused [SKIP TO HC1]

W2 Why did you visit the MidAmerican Website? [DO NOT READ; CHECK ALL THAT APPLY]

- 01 Look for information on the program (Follow-up: Which programs?)
- 02 Look for additional ways/opportunities that MidAmerican offers to help me save energy/money at home
- 03 Information on energy efficient appliances
- 04 Information on energy efficiency in general
- 05 Pay my bill
- 06 Other (SPECIFY)
- 88 Don’t know
- 99 Refused

W3 How easy was it to find the information you were looking for? Was it... [READ CATEGORIES; CHECK ONE]

- 01 Not at all easy
- 02 Somewhat easy
- 03 Very easy
- 88 Don’t know
- 99 Refused

PROGRAM SPECIFIC AWARENESS

Next I'd like to ask if you're aware of some of the specific energy efficiency programs MidAmerican offers its customers.

[SKIP TO REA1 IF D2 = 2, 88, 99]

HC1 The HomeCheck program offers free in-home energy audits and rebates for installing recommended efficiency measures. The auditor may also directly install low-cost equipment such as efficient light bulbs. Before today had you heard of this program? [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO HC3]
- 88 Don't know [SKIP TO HC3]
- 99 Refused [SKIP TO HC3]

HC2 Has your household ever participated in the HomeCheck program? [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

[ASK IF HC2=01]

HC2A When was your most recent year of participation?

- _____ Year
- 8888 Don't know
- 9999 Refused

[SKIP IF HC2 = 1]

HC3 How interested would you be in learning more about this program? Would you say you are... [READ CATEGORIES; CHECK ONE]

- 01 Not at all interested
- 02 Somewhat interested
- 03 Very interested
- 04 Extremely interested
- 88 Don't know
- 99 Refused

REA1 MidAmerican also provides rebates for the purchase of energy efficient equipment such as heating and cooling equipment, thermostats, and appliances. Before today had you heard anything about the rebates available for this equipment? [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO REA4]
- 88 Don't know [SKIP TO REA4]
- 99 Refused [SKIP TO REA4]

REA2 Has your household ever received a rebate for these types of high efficiency equipment? [IF NEEDED: heating and cooling equipment, thermostats, and appliances] [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO REA4]
- 88 Don't know [SKIP TO REA4]
- 99 Refused [SKIP TO REA4]

[ASK IF REA2=01]

REA2A When did you receive the rebate? [READ LIST]

- 01 Less than 6 months ago
- 02 6 months to less than 1 year
- 03 1 year to less than 2 years
- 04 2 or more years
- 88 Don't know
- 99 Refused

REA3 For what type of equipment did you apply for a rebate? [DO NOT READ; CHECK ALL THAT APPLY]

- 01 High efficiency heating equipment (furnace/boiler/furnace fan)
- 02 Water heater
- 03 Central air conditioner
- 04 Room air conditioner
- 05 Programmable thermostat
- 06 Heat pump (geothermal, air-source, etc.)
- 07 Refrigerator
- 08 Freezer
- 09 Clothes washer
- 10 Dishwasher
- 11 Duct work improvement
- 12 Other (SPECIFY)
- 88 Don't know
- 99 Refused

[ASK IF REA1 = 2 OR REA2 = 2, 88, 99]

REA4 How interested would you be in learning more about rebates for energy efficient equipment such as heating and cooling equipment, thermostats, and appliances? Would you say you are... [READ CATEGORIES; CHECK ONE]

- 01 Not at all interested
- 02 Somewhat interested
- 03 Very interested
- 04 Extremely interested
- 88 Don't know
- 99 Refused

[ASK IF CW6 = 1 OR 2]

LM1 MidAmerican Energy offers a program called SummerSaver to customers with central air conditioners or air-source heat pumps. This program provides \$30 per summer for allowing MidAmerican Energy to control their cooling equipment when MidAmerican Energy experiences high demand for electricity. Before today had you heard anything about the rebate available through this program? [CHECK ONE]

- 01 Yes
- 02 No **[SKIP TO LM3]**
- 88 Don't know **[SKIP TO LM3]**
- 99 Refused **[SKIP TO LM3]**

[ASK IF CW6 = 1 AND LM1 = 1]

LM2 Has your household participated in the Summer Saver program? [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

[ASK IF LM2=01]

LM2A When was your most recent year of participation?

- ____ Year
- 8888 Don't know
- 9999 Refused

[ASK IF CW6 = 1 AND LM1 = 2, 88, 99]

LM3 How interested would you be in participating in the Summer Saver program? Would you say you are... [READ CATEGORIES; CHECK ONE]

- 01 Not at all interested
- 02 Somewhat interested
- 03 Very interested
- 04 Extremely interested
- 88 Don't know
- 99 Refused

NC1 MidAmerican Energy offers a Residential New Homes program, which provides builders with rebates for building energy efficient homes that exceed National Standards. Before today had you heard anything about this program? [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

NC2 Are you considering building a new home in the next two years? [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

[SKIP IF NC1 = 2, 88, 99 OR NC2 = 2, 88, 99]

NC3 In your home search, how much of a factor would the home or builder's participation in the Residential New Homes program be in your purchasing decision? Would it be...

[IF NEEDED: The Residential New Homes program provides builders with rebates for building energy efficient homes that exceed National Standards]
[READ CATEGORIES; CHECK ONE]

- 01 Not at all a factor
- 02 A small factor
- 03 A major factor
- 88 Don't know
- 99 Refused

AR1 MidAmerican Energy also offers an Appliance Recycling program, which gives customers \$25 to \$50 for recycling older refrigerators, freezers, and window air conditioners. MidAmerican Energy picks up and recycles the appliances so they cannot be used again. Before today had you heard anything about the Appliance Recycling program? [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO AR3]
- 88 Don't know [SKIP TO AR3]
- 99 Refused [SKIP TO AR3]

AR2 Has your household recycled a refrigerator, freezer or window air conditioner through this program? [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

[ASK IF AR2=01]

AR2A When was your most recent year of participation?

- ____ Year
- 8888 Don't know
- 9999 Refused

[SKIP IF AR1 = 1 OR AR2 = 1]

AR3 How interested would you be in participating in the Appliance Recycling program? Would you say you are... [READ CATEGORIES; CHECK ONE]

- 01 Not at all interested
- 02 Somewhat interested
- 03 Very interested
- 04 Extremely interested
- 88 Don't know
- 99 Refused

LIGHTING

I would next like to ask you a few questions about your lighting.

LT1 Are you aware that MidAmerican provides funds to select retailers that enable them to reduce the price of compact fluorescent light bulbs, or CFLs, and LED [SAY THE LETTERS L-E-D], bulbs? [CHECK ONE]

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

LT2 Have you ever had CFLs installed in the interior or exterior of your home? [IF NEEDED: CFLs usually do not look like regular incandescent bulbs. The most common type of compact fluorescent bulb is made with a glass tube bent into a spiral, resembling soft-serve ice cream, and it fits in a regular light bulb socket.] [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO LT4]
- 88 Don't know [SKIP TO LT4]
- 99 Refused [SKIP TO LT4]

LT3 Thinking about all of the sockets inside and outside your home that are for screw-in type bulbs, what percent of these sockets have CFLs currently installed?

[RECORD PERCENT 0-100]

- 888 Don't know
- 999 Refused

LT4 A newer type of light bulb that is also being used in homes and is called an LED [SAY THE LETTERS L-E-D]. These bulbs look like regular lightbulbs. We are not referring to battery-operated LEDs, holiday lights, or decorative strands. Have you ever had LEDs installed in the interior or exterior of your home? [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO LT6]
- 88 Don't know [SKIP TO LT6]
- 99 Refused [SKIP TO LT6]

LT5 Thinking about all of the sockets inside and outside your home that are for screw-in type bulbs, what percent of these sockets have LEDs currently installed?

[RECORD PERCENT 0-100]

- 888 Don't know
- 999 Refused

LT6 Have you purchased [FILL WITH LT6A TO LT6D] in the past six months?

For LT6A—LT6D

- 01 Yes
- 02 No
- 88 Don't know
- 99 Refused

- LT6A** CFLs
- LT6B** LEDs
- LT6C** halogen bulbs
- LT6D** any other types of light bulbs [SPECIFY]

[ASK IF LT6A, LT6B, OR LT6C = 1]

LT7 When you bought light bulbs in the past six months, did you see any lighting signs, displays, or other materials near the light bulbs? These would be signs other than the price of the bulb. [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO LT9]
- 88 Don't know [SKIP TO LT9]
- 99 Refused [SKIP TO LT9]

LT8 What signs, messaging, displays, or other materials did you see? [DO NOT READ; SELECT ALL THAT APPLY]

- 01 Told me the bulb was part of a BeBright program
- 02 Told me that the bulb was part of a utility or energy-efficiency program
- 03 Displayed different types of light bulbs
- 04 Tried to help me choose the best bulb for my needs
- 05 Explained what bulbs I should use to replace an incandescent
- 06 Compared energy use or savings of different light bulbs
- 07 Explained that some bulb types would not be sold anymore
- 08 Explained lighting terms like lumens, wattage, bulb color, Kelvin, color rendition
- 09 Other (SPECIFY)
- 88 Don't know
- 99 Refused

LT9 Where do you typically buy light bulbs from? [DO NOT READ; RECORD UP TO THREE RESPONSES]

- 01 Grocery store or supermarket [Shaw's, Stop n Shop, Whole Foods]
- 02 Warehouse store [Sam's Club, BJ's, Costco]
- 03 Home improvement store [Home Depot, Lowe's]
- 04 Hardware store [TruValue, ACE Hardware]
- 05 Mass merchandise or discount department store [Wal-Mart, Kohl's, K-Mart, Target]
- 06 Drugstore [Walgreen's, CVS]
- 07 Convenience store [7-Eleven, White Hen Pantry, Cumberland Farms]
- 08 Specialty lighting or electrical store
- 09 Home furnishing store [Bed Bath and Beyond, Linens and Things, Pottery Barn]
- 10 Mail order catalogs
- 11 Through the Internet
- 12 Bargain store [the Building 19, Dollar Store, or Family Dollar]
- 13 Office supply store [Office Depot, Staples]
- 14 Other (SPECIFY)
- 88 Don't know
- 99 Refused

[ASK IF LT6B = 1]

LT10 When shopping for an LED light bulbs, how easy or difficult is it to find the right brightness? Would you say it is... [READ CATEGORIES; CHECK ONE]

- 01 Very difficult
- 02 Somewhat difficult
- 03 Somewhat easy
- 04 Very easy
- 88 Don't know
- 99 Refused

ENERGY EFFICIENCY ATTRIBUTED AND BARRIERS

EEA1 When considering an appliance or equipment purchase for your home, how important are each of the following factors in your decision? Please respond with not at all important, somewhat important, or very important. [READ LIST; ROTATE OPTIONS]

- 01 Not at all important
- 02 Somewhat important
- 03 Very important
- 77 Not applicable
- 88 Don't know
- 99 Refused

EEA1A Saving money on my energy bills

EEA1B Cost of equipment

EEA1C Availability of a rebate, such as those offered by MidAmerican or the manufacturer

EEA1D Equipment features

EEA1E The equipment was recommended to you by a contractor or retailer

EEA2 What challenges, if any, do you face in saving energy in your home?
[RECORD VERBATIM]

FINANCING

[IF D2 = 2, 88, 99, SKIP TO S1]

Some households could save money over the long run by upgrading their home or equipment to be more energy efficient. I have some questions about financing options that could increase your ability to install energy efficient equipment.

FN1 First, have you made any major home equipment purchases over the past five years? This would include equipment or appliances over \$2,000 such as heating, cooling, water heating, and insulation purchases. [CHECK ONE]

- 01 Yes
- 02 No [SKIP TO FN3]
- 88 Don't know [SKIP TO FN3]
- 99 Refused [SKIP TO FN3]

FN2 I'd like to understand how you funded these purchases. Did you...

- 01 Pay cash / debit card / check
- 02 Put the purchase on a credit card
- 03 Finance the project, either through the bank, store, or contractor you purchased from
- 04 Other (SPECIFY)
- 88 Don't know
- 99 Refused

FN3 Using a scale of 1 to 5 where 1 means "does not increase at all" and 5 means "increases a great deal," please indicate whether the following financing options would increase your likelihood of installing energy efficient equipment like insulation or high-efficiency heaters, air conditioners, hot water heaters or appliances . [READ LIST; ROTATE STATEMENTS]

For FN3A through FN3E
[RECORD LIKELIHOOD (1-5)]

- 88 Don't know
- 99 Refused

How much would...

FN3A On-bill financing [READ: On-bill financing is a loan that MidAmerican would offer to you to pay for energy efficiency improvements. The loan repayments are collected on the utility bill until the loan is repaid. This is not something MidAmerican currently offers as an option, they are just trying to assess interest.]

FN3B A mortgage or home equity loan through a bank or financial institution specifically offered for qualifying energy efficiency upgrades

FN3C A non-mortgage loan through a local bank or financial institution

FN3D A payment plan or financing through your contractor

[IF NECESSARY, READ FOR FN3B] Energy Efficiency mortgages help homebuyers or homeowners finance the cost of energy efficiency features as part of their home purchase or refinancing mortgage.]

SATISFACTION

S1 The next questions ask about your experience with MidAmerican Energy in general as your energy provider. How would you rate the service provided by MidAmerican Energy? Would you say not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied? [CHECK ONE]

- 01 Not at all satisfied
- 02 Somewhat satisfied
- 03 Very satisfied
- 04 Extremely satisfied
- 88 Don't know [SKIP TO D1]
- 99 Refused [SKIP TO D1]

S1a Why did you rate your satisfaction with MidAmerican Energy as [FILL RATING FROM S1]? [RECORD VERBATIM]

DEMOGRAPHICS

We are almost done; I just have a few final questions.

D1 What type of home do you live in? Is it a... [READ CATEGORIES; CHECK ONE]

- 01 Single family detached house
- 02 Single family attached house (townhouse, row house, or duplex)
- 03 Apartment building with 2-4 units
- 04 Apartment building with 5 or more units
- 05 Mobile home or house trailer
- 06 Other (SPECIFY)
- 88 Don't know
- 99 Refused

D3 In approximately what year was your home built?

- [RECORD YEAR]
- 8888 Don't know

[ASK IF D3 = 8888]

D3a In what decade was your home built? [READ LIST; CHECK ONE]

- 01 1930s or earlier
- 02 1940s
- 03 1950s
- 04 1960s
- 05 1970s
- 06 1880s
- 07 1990s
- 08 2000s
- 09 2010s
- 88 Don't know
- 99 Refused

D5 How many years have you lived in your home? [ENTER 0 IF LESS THAN ONE FULL YEAR]

_____ [RECORD YEARS]

888 Don't know

999 Refused

D6 Not including unfinished basements or crawlspaces, which of the following best describes the square footage of your home? Is it... [READ LIST; CHECK ONE]

01 Less than 1,000 square feet

02 1,000 to 1,500 square feet

03 1,501 to 2,000 square feet

04 2,001 to 3,000 square feet

05 More than 3,000 square feet

88 Don't know

99 Refused

D7 Counting yourself, how many people normally live in this household on a full time basis?

_____ [RECORD RESPONSE 0-20]

88 Don't know

99 Refused

[ASK IF D7 > 1]

D8 How many household members are children under 19 years old?

_____ [RECORD RESPONSE 0-20]

88 Don't know

99 Refused

[ASK IF D7 > 1]

D9 How many household members are 65 years old or older?

_____ [RECORD RESPONSE 0-20]

88 Don't know

99 Refused

D10 How old were you on your last birthday? Were you... [READ CATEGORIES; CHECK ONE]

01 18-24

02 25-34

03 35-44

04 45-54

05 55-64

06 65 or older

88 Don't know

99 Refused

D11 Including wages, salaries, pensions, Social Security and other sources of income for all members of your household, what was your total household income before taxes in 2015? Please select from the following categories. Was it... [CHECK ONE]

- 01 Less than \$24,000
- 02 \$24,000 to less than \$50,000
- 03 \$50,000 to less than \$75,000
- 04 \$75,000 to less than \$100,000
- 05 \$100,000 or greater
- 88 Don't know
- 99 Refused

D12 And finally, I'm required to ask this question. What is your gender?

- 01 Male
- 02 Female
- 99 Refused

THANK YOU AND CLOSING

Those are all the questions I have for you today. Thank you so much for your time. MidAmerican Energy appreciates your participation in this survey.