MidAmerican Energy Company

Residential Equipment Program Impact and Process Evaluation (Iowa)

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1.0 EXECUTIVE SUMMARY

MidAmerican Energy Corporation (MidAmerican) offers energy efficiency 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 provided through their Residential Equipment program. This report details the activities, results, and recommendations from the evaluation of program year (PY) 2016 for the Residential Equipment program in Iowa.

1.1 BACKGROUND

The Residential Equipment program encourages residential customers to purchase energy efficient equipment by providing rebates to offset the higher purchase cost of efficient equipment, as well as customer education of energy efficiency opportunities. The program also encourages quality installation of heating and cooling equipment by tying rebates for heating, ventilation, and air conditioning (HVAC) equipment to quality installation by a System Adjustment and Verified Efficiency (SAVE) certified contractor. The program is available to all residential customers and landlords for both new and existing buildings in MidAmerican's service territory.

In PY2016, the Residential Equipment program offered rebates for the following measures:

- Central air conditioners (including ductless mini-split systems)
- Air-source and ground source heat pumps (including ductless mini-split systems)
- Natural gas furnaces
- Furnace fans
- Window air conditioners
- Programmable thermostats
- Appliances – freezers and refrigerators
- Heat pump water heaters
- Quality installation of central HVAC equipment (by SAVE certified contractors).

MidAmerican contracted with a third-party program implementer (A-TEC Energy Corporation), who has been responsible for application processing, tracking program data, trade partner outreach, answering questions from dealers and customers, verifying equipment installations meet program guidelines, providing quality assurance for SAVE installations, and coordinating rebate distribution to customers.

Beginning in PY2017, the program implemented a few key design changes. Rebate amounts were reduced for air-source heat pumps, central air conditioners, ductless mini-split air conditioners, heat pump water heaters, ground source heat pumps, furnaces, and furnace fans. In addition, minimum efficiency requirements were raised for central air conditioners, ductless mini-split air conditioners, heat pump water heaters, and ground source heat pumps. Finally, a number of additional required home and product-specific characteristics were added to the 2017 program application.

1.2 EVALUATION METHODOLOGY

The evaluation included both impact and process components. For the impact evaluation, the Tetra Tech team reviewed MidAmerican's engineering inputs and algorithms and the resulting energy savings to make sure they were complete and reasonable. The Tetra Tech team also reviewed the Iowa Technical Reference Manual (IA TRM)[1] approach to relevant residential equipment measures. Additionally, the Tetra Tech team conducted primary net-to-gross research, as well as a literature review to help inform net-to-gross findings for Iowa. Findings can be found in Appendix B.

For the process evaluation, the Tetra Tech team reviewed program materials and conducted interviews with MidAmerican program staff and implementation staff from A-TEC. Following this series of internal interviews, the Tetra Tech team interviewed participating trade allies. The Tetra Tech team also included equipment-related questions in an omnibus telephone survey of MidAmerican residential customers who had not participated in an energy efficiency program over the past two years, and analyzed those results to better understand the current state of the equipment market and consumers' understanding, use, and purchasing behaviors.

1.3 SUMMARY OF KEY FINDINGS AND RECOMMENDATIONS

Overall, it is the opinion of the Tetra Tech team that the Residential Equipment program operated effectively in PY2016, resulting in substantial energy and demand savings and high participant satisfaction. Staff roles and responsibilities were clearly delineated and understood by all team members, and program and implementation staff reported strong working relationships. Participating customers and trade allies interviewed spoke highly of the program and their interactions with program staff. The program was well designed to address key implementation barriers and evidence suggests the program has influenced trade ally practices and customer purchase decisions. While the evaluation found no needs for major program changes, it did identify a few opportunities for potential refinements.

The Tetra Tech team found that savings were calculated in accordance with MidAmerican's filed measure sheets for nearly all measures, though some measure-level adjustments were made. The vast majority of adjustments were for furnaces, where the input capacity was incorrectly being used instead of output capacity in the measure sheet algorithms. Additionally, in our review of the IA TRM, the Tetra Tech team found that the IA TRM may contain an error in terms of assumed furnace equivalent full load hours (EFLH)[2]. Besides these adjustments for furnaces, adjustments were only required for four other projects. The evaluation resulted in realization rates of 98.8 percent for kWh, 99.8 percent for peak kW, 94.2 percent for natural gas therms savings, and 94.3 percent for natural gas peak therms for PY2016.

[1] IA TRM version dated August of 2016.
[2] At the time this report was drafted, the Tetra Tech team was working to obtain the original source document for the EFLHs.

Table ES-1-1. PY2016 Iowa Savings Goals and Impacts

Impact	Goal	Reported Gross Savings*	Evaluated Gross Savings	Evaluated Realization Rate**
kWh	22,803,941	19,422,409	19,191,249	98.8%
Peak kW	6,461	9,485	9,468	99.8%
Therms	2,598,340	2,352,451	2,217,022	94.2%
Peak Therms	31,854	30,323	28,609	94.3%

*Reported savings shown are from PY2016 tracking data received from MidAmerican on February 2, 2017.

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

The following section presents the key findings from the evaluation and associated recommendations. Additional details can be found in Section 5, Key Findings and Recommendations.

Finding #1: The measure sheets treat the residential HVAC mechanical equipment measures and their quality installation as two separate savings algorithms, which is a less accurate approach to calculating savings than combining measures.

Efficient HVAC equipment and their quality installation have a combined effect—while the equipment itself is more efficient than the baseline, the quality installation improves the operation of that equipment. Thus, a more accurate representation of the entire system would be for the new high efficiency equipment to be installed and include a SAVE quality installation in order to achieve the equipment's nameplate efficiency. Absent quality installation, the measure would likely not achieve its nameplate efficiency. To account for this, the IA TRM provides de-rate factors for equipment that is installed using a standard installation whereas the measure sheet algorithms use a savings factor multiplied by capacity to determine quality installation savings and a separate algorithm to determine savings for the efficient equipment.

> *Recommendation #1: Consider consolidating the standard installation algorithm and quality installation algorithm into one and utilize a de-rate factor for base equipment, similar to the approach taken by the IA TRM.*

Finding #2: The current measure sheet algorithms for air-source heat pumps and ground source heat pumps incorrectly use cooling capacity to determine both cooling and heating.

Heat pump heating capacities are generally lower than their cooling capacities. In addition, air-source heat pumps in particular have substantially lower heating capacities at lower temperatures. Using heat pump cooling capacity in both the heating and cooling portion of the savings calculation tends to overstate heating-mode energy savings.

> *Recommendation #2: Use cooling capacity for the portion of the algorithm that calculates cooling energy savings and heating capacity for the portion of the algorithm that calculates heating energy savings.*

Finding #3: Reported furnace savings estimates used input capacities in the measure sheet algorithms rather than output capacities, resulting in savings being overstated.

The measure sheet algorithm for furnace energy savings includes a calculation of furnace capacity divided by furnace AFUE. Although the measure sheet does not specify whether furnace input capacity

or furnace output capacity should be used, the fact that AFUE is in the denominator of the algorithm indicates that the furnace output capacity would be the correct capacity to use.

> *Recommendation #3: Specify the use of furnace output capacity in the furnace measure sheet algorithm, or modify the furnace measure sheet algorithm so that furnace input capacity is the correct input for the algorithm.*

Finding #4: The heat pump water heater measure sheet algorithm yields reasonable savings at minimum efficiency, but much higher than expected savings at higher efficiencies.

The Tetra Tech team reviewed the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential and found that savings shown in the study matched the savings calculated by the heat pump water heater measure sheet algorithm when the water heater energy factor was set to 2.0 (the minimum efficiency for heat pump water heaters). This was also similar to savings predicted by other algorithms with an energy factor of 2.0 as the input. At higher efficiency levels (EF=3.0 or 4.0), however, the measure sheet algorithm predicted energy savings that were much higher than energy savings predicted by other engineering algorithms, such as the ones in the IA TRM and the IL TRM.

> *Recommendation #4: Consider reviewing the heat pump water heater measure sheet algorithm to determine if an alternate algorithm or multiple savings factors may be needed to produce reasonable savings for heat pump water heaters with higher energy factors. The IA TRM approach appears to be sound for determining savings for heat pump water heaters.*

Finding #5: Measure sheet savings approaches for furnace fans, thermostats, refrigerators, and freezers are reasonable.

The furnace fan measure sheet uses a deemed savings value of 469 kWh. This is similar to the value used in the IA TRM for single family homes in Des Moines (553 kWh), and perhaps even slightly conservative. Thermostat savings appear to be reasonable, but the measure sheet does not include documentation of assumptions, beyond referencing the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential. Refrigerator and freezer savings are to be determined from the ENERGY STAR database based on model number energy use in comparison to standard refrigerator energy use. The Tetra Tech team was able to replicate savings for all of these measures.

> *Recommendation #5: We recommend no changes to the current measure sheets for refrigerators, freezers, furnace fans, and thermostats.*

Finding #6: The IA TRM savings algorithms and input assumptions appear reasonable, with the exception of Equivalent Full Load Hours (EFLH) for furnaces.

The Equivalent Full Load Hours (EFLH) heating value listed in the IA TRM for the high efficiency furnaces is 612 EFLH, which seems unreasonably low. This estimate is considerably lower than EFLH assumptions referenced in TRMs in nearby territories with similar climates, include Illinois and Missouri. In addition, despite being a predominantly heating climate, the heating EFLH estimate is lower than the EFLH cooling value specified in the IA TRM for Des Moines (811 EFLH cooling). The Tetra Tech team reviewed the equivalent full load hour heating values specified for Rockford, IL in the IL TRM (1,969 EFLH heating), as well as the approach described for calculating this value. Based on these reviews and our own independent calculations, we determined that a more reasonable estimate for EFLH heating value for Des Moines may be 1,830 EFLH heating.

> *Recommendation #6: Consider suggesting a revised Equivalent Full Load Hour heating value for the IA TRM high efficiency furnace measure, perhaps even based on actual furnace energy use data and furnace capacity data for Iowa.*

Finding #7: Program marketing and outreach efforts have been successful in raising general customer awareness of program rebates—trade allies and bill inserts have been most successful in driving participation.

The vast majority of both participants and nonparticipants surveyed recognized MidAmerican's "Save Some Green" messaging (82 percent and 74 percent, respectively). MidAmerican utility bill inserts or mailings, radio or television advertisement, and the MidAmerican website were the most commonly mentioned sources of awareness of "Save Some Green" messages. In addition, two-thirds of customers interviewed as part of the nonparticipant survey reported having heard of MidAmerican rebates for energy efficient heating and cooling equipment, thermostats, or appliances.

Most participating trade allies thought that customers are generally aware of the availability of MidAmerican rebates, and a couple of interviewees observed customer awareness increasing over time. While generally aware rebates are available, trade allies indicated customers are less knowledgeable about specifics on eligibility criteria or rebate amounts. This feedback underscores the importance of leveraging trade allies to help educate customers on program specifics.

Participants surveyed most commonly reported learning about the Residential Equipment program through a contractor (39 percent) or retailer (25 percent), illustrating the key role program trade allies play in generating customer awareness and interest in the program. Participating trade allies reported routinely discussing program rebates with customers and incorporating MidAmerican rebates into price estimates and comparisons.

> *Recommendation #7: Continue using direct marketing campaigns (e.g., bill inserts) and leveraging trade allies to educate customers on program offerings.*

Finding #8: The program's rebate offerings and customer education initiatives directly address key customer decision-making factors and barriers.

The rebates provided through the Residential Equipment program, along with the customer education provided through MidAmerican's marketing and outreach efforts, are designed to help overcome key decision-making factors and barriers mentioned by customers. When asked why they decided to participate in the Residential Equipment program, participants most often mentioned the financial incentive or rebate offered by the program (45 percent), followed by a desire to save money on their energy bills (32 percent). Saving money on energy bills and the cost of the equipment were also the two highest rated decision-making factors when considering equipment purchases among nonparticipant survey respondents (71 percent and 70 percent saying "very important," respectively). Regarding challenges faced implementing energy saving actions, nonparticipant survey respondents most commonly mentioned cost barriers, lack of awareness of energy saving opportunities, and low prioritization of energy conservation.

Participating HVAC trade allies that the Tetra Tech team spoke with consistently reported using the program rebates in their sales processes, including incorporating rebates into price quotes and comparisons. Several trade allies also reported that their recommendations, or customers' interest, in high efficiency equipment would be negatively affected if MidAmerican's program was not available. Several trade allies noted the reductions in PY2017 rebate amounts for some measures and cautioned against lowering incentive levels much further. Declining rebate amounts was one of the only risks to future participation mentioned by trade allies.

> *Recommendation #8: Continue to provide rebates coupled with customer outreach, targeting marketing messages to highlight both equipment cost savings and energy cost savings. Monitor the impact of reduced PY017 rebate levels on participation levels.*

Finding #9: Participating customers and trade allies were highly satisfied with the program.

Participating surveyed customers generally expressed high satisfaction with the program overall as well as individual aspects of their participation experience. Nearly 90 percent of survey respondents said they were either "extremely satisfied" or "very satisfied" with the program overall. SAVE participants were also highly satisfied with the contractor who installed their equipment and the rebate application process. Echoing the high satisfaction ratings, over half of all participant respondents (53 percent) reported having recommended the Residential Equipment program to others.

Like customers, participating trade allies we spoke with also reported high satisfaction with both the program's technical support as well as MidAmerican's residential program portfolio overall. Among SAVE-certified contractors, 11 of 14 interviewees rated their satisfaction with the program's technical support a 4 or 5, with 1 being "not at all satisfied" and 5 being "very satisfied." Similarly, 10 of 14 rated their satisfaction with MidAmerican's residential programs overall a 4 or 5 using the same scale.

The only source of dissatisfaction commonly mentioned by trade allies related to the additional required information added to the PY2017 program application—especially having to disclose labor and equipment costs. Notably, program staff have already taken steps to address this concern, providing trade allies with default labor and equipment cost factors that can be used if they are unable to provide the actual itemized costs.

> *Recommendation #9: Continue efforts to proactively inform trade allies of program changes and respond to their concerns to maintain trade ally engagement and satisfaction levels. To the extent possible, when changes are made, ensure trade allies understand the rationale behind those changes. Additionally, to avoid unnecessary burden, only require information on the program application that are being used purposefully for administration or QA/QC purposes specific to the rebated measure(s).*

Finding #10: SAVE quality installation verification protocols are well documented, systematic, and rigorous.

MidAmerican has established rigorous QA/QC protocols for SAVE rebate applications, which are clearly documented in the program operations manual. In addition to paper verification on a census of SAVE projects, A-TEC conducts field verification on the first three applications for each participating trade ally (Tier 1), followed by 1 in 10 installations (Tier 2), then 1 in 30 installations (Tier 3). Program staff noted that SAVE test scores have improved over time with additional contractor training and experience; however, the program's SAVE verification protocols are costly to implement.

Considering the SAVE program is now in its fourth year and the improvement seen among participating contractors, the same frequency of field verifications may no longer be necessary to maintain the same level of quality installation in the future. While the Tetra Tech team recommends the program continue to perform field verifications on the first three projects for new contractors (Tier 1) as an industry best practice, the program might consider eliminating the second Tier of field verification and instead following Tier 3 protocols thereafter for continuing quality control. The program should also continue to support ongoing training and support for participating contractors.

> *Recommendation #10: Continue paper verification and Tier 1 field verification protocols for SAVE installations, as well as provide ongoing training and support to participating contractors. To reduce administrative costs, consider eliminating Tier 2 field verification protocols and instead following Tier 3 protocols thereafter.*

2.0 INTRODUCTION

This report presents the detailed results for the program year (PY) 2016 impact and process evaluation of the Residential Equipment program offering in MidAmerican Energy Corporation's (MidAmerican) Iowa service territory.

2.1 PROGRAM DESCRIPTION

The Residential Equipment program encourages residential customers to purchase energy efficient equipment by providing rebates to offset the higher purchase cost of efficient equipment, as well customer education of energy efficiency opportunities. The program also encourages quality installation of heating and cooling equipment by tying rebates for heating, ventilation, and air conditioning (HVAC) equipment to quality installation by a System Adjustment and Verified Efficiency (SAVE) certified contractor. The program is available to all residential customers and landlords for both new and existing buildings in MidAmerican's service territory.

MidAmerican staff provide overall strategic direction, research and development, customer outreach, trade ally support, evaluation support, and other administrative functions for the program. MidAmerican contracted with a third-party program implementer (A-TEC Energy Corporation), who was responsible for application processing, tracking program data, trade partner outreach, answering questions from dealers and customers, verifying equipment installations meet program guidelines, providing quality assurance for SAVE installations, and coordinating rebate distribution to customers. The MidAmerican product manager and A-TEC have a measurement and verification (M&V) criteria worksheet that is reviewed at least quarterly to address known program issues or concerns that may require additional M&V or adjustments to the random M&V criteria.

The table below summarizes qualifying measures and rebate levels for the Residential Equipment program in PY2016. Beginning in PY2017, the program increased minimum efficiency requirements and lowered rebate levels for several measures (changes indicated in bold in the table below). Prior to PY2016 the program also offered subsidized financing through a partnering financial institution as an alternative to rebates for selected measures; however, MidAmerican has since suspended this financing option due to low consumer uptake and loss of the financing partner.

Table 2-1. PY2016 and PY2017 Residential Equipment Measure Summary

Measure	PY2016		PY2017*	
	Qualifying Efficiency	Rebate	Qualifying Efficiency	Rebate
Natural Gas Furnace	AFUE 95+	$900	AFUE 95+	**$700**
Furnace Fan	CEE < 0.02	$75	CEE < 0.02	**$60**
Central Air Conditioner	SEER 14-14.9	$675	**SEER 14.5**-14.9	**$350**
	SEER 15-15.9	$850	SEER 15-15.9	**$550**
	SEER 16+	$1,050	SEER 16+	**$750**
Ductless Mini-Split Air Conditioner	SEER 14-14.9	$375	**SEER 14.5**-14.9	**$350**
	SEER 15-15.9	$550	SEER 15-15.9	$550
	SEER 16+	$750	SEER 16+	$750
Room Air Conditioner	ENERGY STAR®	$35	ENERGY STAR®	$35
Programmable Thermostat	2+ setbacks	$25	2+ setbacks	$25
Heat Pump Water Heater	EF 2-2.29	$300	**EF 2.4+**	**$300**
	EF2.3+	$400		
Air-Source Heat Pump		$300		**N/A**
	and/or			
	SEER 15-15.9	$550	SEER 15-15.9	$550
	SEER 16+	$750	SEER 16+	$750
	and/or		*and/or*	
	HSPF 8.5-8.9	$25	HSPF 8.5-8.9	$25
	HSPF 9+	$50	HSPF 9+	$50
Ductless Mini-Split Air-Source Heat Pump	SEER 15-15.9	$550	SEER 15-15.9	$550
	SEER 16+	$750	SEER 16+	$750
	and/or		*and/or*	
	HSPF 8.5-8.9	$25	HSPF 8.5-8.9	$25
	HSPF 9+	$50	HSPF 9+	$50
Ground Source Heat Pump		$300		**N/A**
	and/or			
	EER 14-17.9	$1,200	**EER 14.5**-17.9	$1,200
	EER 18-22.9	$1,800	EER 18-22.9	$1,800
	EER 23+	$2,400	EER 23+	$2,400
	and/or		*and/or*	
	COP 3-3.9	$200	COP 3-3.9	$200
	COP 4-4.9	$400	COP 4-4.9	$400
	COP 5+	$600	COP 5+	$600
Refrigerator	ENERGY STAR®	$50	ENERGY STAR®	$50
Freezer	ENERGY STAR®	$50	ENERGY STAR®	$50

*Bold indicates change from PY2016.

The program partners with a robust network of trade allies. The following types of trade allies are most active in the Residential Equipment program:

- HVAC dealers and contractors
- Plumbing and mechanical contractors
- Appliance dealers
- Retail outlets.

Trade allies play a key role in the implementation and delivery of the program. Trade allies are one of the primary customer outreach arms of the program, informing customers of the program and available rebates for qualifying energy efficient equipment. Trade allies also commonly build program rebates into their project quotes to customers, and help customers complete and submit rebate applications. MidAmerican maintains an active trade ally program to keep participating contractors informed of program opportunities and changes. Specific outreach efforts include MidAmerican's Trade Ally Central website and an annual meeting with participating trade allies.

Direct program customer outreach is primarily driven through traditional portfolio-level mass marketing and outreach efforts, such as quarterly newsletters and the MidAmerican website. Being a largely trade ally driven program, the program generally does not perform program-specific direct marketing campaigns. MidAmerican regularly reviews and updates customer-facing program informational materials and needs based on program adjustments and market characteristics.

Along with the efficiency and rebate level changes made in PY2017 and summarized above, the program also added a number of additional required home and product-specific characteristics to the PY2017 program application to further support energy savings and cost effective calculations. Specifically, the following globally required information was added to the program application:

- Type of home (single family, multifamily, manufactured)
- Year home built
- Home square footage
- Number of bedrooms in home
- Existing heating, cooling, and water heating system characteristics (fuel type, capacity, quantity, age, efficiency rating)
- Equipment cost
- Labor cost.

2.1.1 2016 Budget and Savings Goals

Table 2-2 below summarizes the program budget, gross savings goals, and peak savings goals for PY2016.

Table 2-2. PY2016 Target Budget and Savings for Iowa

Type	PY2016 Target
kWh Budget	$11,139,680
kWh	22,803,941
Peak kW	6,461
Gas Budget	$11,865,925
Therms	2,598,340
Peak Therms	31,854

Source: Appendix A. MidAmerican Energy Company Energy Efficiency Monitoring and Verification Plan, provided as part of the MidAmerican EM&V Request for Proposal and Program Staff.

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 PY2016 impact and process evaluation of the MidAmerican Residential Equipment program. The Tetra Tech team designed a methodology to evaluate the program and address the researchable questions outlined in the program's Detailed Evaluation Plan[3], as well addressed other issues that became relevant during the evaluation process.

2.2.1.1 Key Researchable Questions

Based on discussions with MidAmerican staff, the implementation contractor, and a documentation review, key researchable questions were developed and prioritized for the evaluation of the Residential Equipment program, and then addressed within the customer and trade ally research as well as the impact evaluation activities. The table below outlines the researchable questions that this evaluation examined.

Table 2-3. Residential Equipment Program Researchable Questions

Researchable Questions	Activity to Support the Question
Program Design	
How has the addition of HVAC SAVE quality installation requirements been working? Are any changes needed? To what degree do cross-utility interactions affect trade allies?	• Program and implementation staff interviews • Trade ally interviews • Participant surveys
What implications does the overlap in measures and rebates with other MidAmerican programs (Tune-Up, New Homes) have on the portfolio and market response?	• Program and implementation staff interviews • Trade ally interviews

[3] A select group of Iowa Stakeholders were provided an opportunity to review and comment on the draft Residential Equipment Detailed Evaluation Plan in August of 2016.

Researchable Questions	Activity to Support the Question
What are the primary barriers preventing customers to installing program-qualifying equipment? How effective has the program been at addressing these barriers?	• Trade ally interviews • Nonparticipant survey
Are there any opportunities for adjustments to program offerings or eligible measures? Is it possible to assess market share for the program's high impact measures?	• Program and implementation staff interviews • Secondary research
What is the level of customer interest in financing options? How prevalent is financing options among other peer utilities programs and how are these financing options structured?	• Participant survey • Nonparticipant survey • Secondary research
Customer Education, Outreach, and Marketing	
How effective are marketing efforts undertaken as part of the program?	• Participant survey • Trade ally interviews • Nonparticipant survey
How effective is education of trade allies on program requirements, marketing, and sales? What additional support could be provided?	• Program and implementation staff interviews • Trade ally interviews
Are program requirements clear to trade allies and customers?	• Participant survey • Nonparticipant survey • Trade ally interviews
Program Administration, Processes, and Resources	
How effective is the process for verifying HVAC SAVE quality installation? Are there any opportunities to streamline or improve these processes? How often are trade allies following up with customer during the SAVE process?	• Program and implementation staff interviews • Trade ally interviews
Are program quality assurance and quality control processes adequate and effective? If not, how can they be improved?	• Program and implementation staff interviews • Trade ally interviews • Program documentation review
Are there any program processes that could be more efficient and/or effective (e.g., rebate fulfillment for SAVE)? If so, how can those processes be improved?	• Program and implementation staff interviews • Trade ally interviews • Program documentation review
Program Satisfaction	
What is the level of trade ally satisfaction with the program? How can trade ally satisfaction be improved, if at all?	• Trade ally interviews
What is the level of customer satisfaction with the program? How can customer satisfaction be improved, if at all?	• Participant survey
How satisfied are customers with the HVAC SAVE quality installation verification process?	• Participant survey • Trade ally interviews
How satisfied are customers with their HVAC SAVE contractor?	• Participant survey

Researchable Questions	Activity to Support the Question
Program Impacts	
What are gross savings for the evaluation period?	• Engineering review • Program documentation review
Are energy savings assumptions for HVAC SAVE installations reasonable?	• Engineering review • Program documentation review
What is an appropriate net-to-gross (NTG) ratio for the program?	• Participant survey • Trade ally interviews • Secondary research

2.2.2 Detailed Evaluation Activities

Table 2-3 documents the activities that were completed as part of this evaluation. The evaluation focused on estimating and verifying program impacts and providing key feedback on the functionality of program processes.

Table 2-4. Summary of Residential Equipment Program Evaluation Activities

	Activities
Overarching Evaluation Activities	**Program staff interviews:** Conducted three in-depth interviews with the product manager, product administrator, energy efficiency director, and program implementation contractor staff. **Program documentation review:** Reviewed program tracking databases, reported savings, and related program documentation. **Net-to-Gross:** Estimated free-ridership and spillover effects from participant customer self-reports, triangulated with trade ally views (qualitative only), and a secondary review. NTG also informed program design elements. **Secondary research:** Reviewed measures, incentive levels, NTG values, and financing offerings for other similar programs in nearby territories to provide additional context to evaluation results.
Impact Evaluation Activities	**Engineering/desk reviews, including review of supporting impact data documentation:** Conducted a total of 74 engineering desk reviews on a sample of PY2016 completed projects. Reviewed measure sheet engineering inputs, assumptions, calculations, and documentation. Compared MidAmerican's measure sheets to the IA TRM.
Process Evaluation Activities	**Participant customer survey:** Completed 325 customer surveys. The survey was conducted with a sample of the population of PY2016 Iowa program participants. **Nonparticipant customer survey:** Completed 415 customer surveys with a random sample of residential customers in Iowa who had not participated in MidAmerican's energy efficiency programs. **Trade ally interviews:** Conducted 20 semi-structured interviews with participating SAVE-certified HVAC contractors and appliance retailers in Iowa and Illinois[4].

[4] Due to the smaller number of trade allies in the Illinois service territory, Iowa and Illinois trade ally survey results are combined to help ensure confidentiality. Additionally, the program is implemented the same in both Iowa and Illinois.

Below is more detail related to the methodologies used for the different evaluation activities associated with MidAmerican's Residential Equipment program evaluation.

- **Program and implementation staff interviews.** The Tetra Tech team conducted interviews the MidAmerican product manager, A-TEC Energy Corporation implementation staff, and ESI staff involved with the HVAC SAVE quality installation component of the Residential Equipment program. These interviews 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.
- **Program documentation review.** The Tetra Tech team reviewed the program's tracking data, reported savings, and related documentation. As part of assessing the appropriateness and effectiveness of program marketing, point-of-sale, and educational materials the Tetra Tech team also reviewed program marketing and informational materials made available to customers and trade allies.
- **Participant customer survey.** We conducted a total of 325 customer surveys with a sample of PY2016 program participants in Iowa to inform process and NTG evaluation objectives. Specifically, the surveys investigated program delivery processes, preferred communication channels, NTG effects (free-ridership and spillover), satisfaction with different facets of the program, and demographic information. The participant customer surveys were administered through Tetra Tech's in-house computer-assisted telephone interview (CATI) Survey Research Center between February 14 and March 3, 2017. A copy of the participant survey can be found in Appendix C.
- **Nonparticipant customer survey.** The Tetra Tech team conducted a nonparticipant survey, completing interviews with 415 residential customers to support the evaluations of MidAmerican's residential programs in its Iowa service territory. The nonparticipant survey assessed consumer awareness of different program offerings, understanding of audit benefits, interest in program participation and rebates, energy efficiency attitudes, and any recent energy efficiency activity. The surveys were administered through Tetra Tech's in-house CATI Survey Research Center between July 26 and August 9, 2016. A copy of the nonparticipant survey can be found in Appendix E.
- **Trade ally interviews.** The Tetra Tech team conducted a total of 20 semi-structured interviews with participating trade allies in Iowa and Illinois, including 15 HVAC installation contractors and five big-box retailers. Interviews with participating trade allies explored perceptions on the program's design, interactions with the program staff, program operations, customer communications, customer decision-making, and market trends. Trade ally interviews were conducted by Tetra Tech team senior staff between February 14 and March 23, 2017. A copy of the trade ally interview guide can be found in Appendix D.
- **NTG assessment.** The participant customer survey estimated free-ridership and participant spillover effects from customer self-reports. The trade ally interviews also investigated qualitative indicators of the program's influence on customer decision-making and trade ally practices. In addition to primary research, the Tetra Tech team reviewed relevant studies addressing residential NTG for states or service territories with characteristics similar to MidAmerican's service territory and the Residential Equipment program. NTG results for Iowa can be found in Appendix B.
- **Engineering/desk reviews.** The Tetra Tech team reviewed MidAmerican's assumptions in their filed measure sheets regarding engineering inputs and algorithms for Residential Equipment program measures and assessed these assumptions relative to industry practices. This included reviewing supporting impact inputs, assumptions, and documentation and compared

MidAmerican's measure sheets to the Iowa Technical Reference Manual (IA TRM)[5]. The Tetra Tech team also reviewed a random sample of 74 project applications to check that the measure sheet algorithms have been applied correctly and that the savings appeared reasonable. Project-specific results where adjustments were made can be found in Appendix A.

- **Education and outreach evaluation activities.** As part of the cross-cutting Education program evaluation, the Tetra Tech team developed a set of standardized questions to ask of each customer surveyed as part of the residential nonparticipant survey. These questions focused on initial source of awareness, notice of MidAmerican's messaging, use of MidAmerican's website, etc. We also developed a set of standardized questions to ask of trade allies to investigate awareness of and engagement as an EnergyAdvantage Trade Ally Partner, awareness of and participation in training initiatives, their primary sources of information and education (outside of utility programs), and other needs they have from MidAmerican to most effectively promote energy efficiency to their customers.
- **Secondary research.** In addition to primary research activities, we also conducted secondary research to gather information on peer utility program rebate and financing offerings, incentive levels, and NTG estimates for other similar programs in nearby territories to provide additional context to evaluation results.

[5] IA TRM version dated August 2016.

3.0 PROGRAM SAVINGS AND IMPACT EVALUATION FINDINGS

This section presents the results of the quantitative and qualitative gross impact results for the PY2016 Residential Equipment impact evaluation. The impact evaluation was designed around the key researchable questions identified in the methodology section 2.2.1. Key impact evaluation activities involved interviews with program and implementation staff, a review of MidAmerican's filed program measure sheets, and project-level documentation. First, we present the program savings and then discuss the tracking, engineering, and data reviews.

3.1 PROGRAM SAVINGS

In this subsection we present the electric and natural gas energy and demand savings results. The Tetra Tech team sampled 74 projects for review across a range of measures. We provide detailed results for the project level reviews in Appendix A for those projects where the evaluation made adjustments to savings. The vast majority of these adjustments were the result of input capacities for furnaces being incorrectly used to calculate savings rather than the output capacity in the furnace measure sheet algorithms. Besides these adjustments for furnaces, adjustments were only required for four other projects.

In PY2016, Residential Equipment program participants completed 24,641 projects that included 40,834 measures, for an average of almost 1.7 individual measures per participant project[6]. The Tetra Tech team selected a sample for desk reviews that was stratified based on measure end use, and weighting based on overall reported energy savings in MMBtu (combined electricity and natural gas savings). Table 3-1 shows the number of sampled projects by measure end use compared with participants and reported electricity and natural gas savings through October 2016.

Table 3-1. Residential Equipment Engineering/Desk Review Sample by Measure End Use*

Measure End Use	Measure Count	Unique Participant Count	Total Gross Savings (kWh)	Total Gross Savings (therms)	Number of Sampled Projects
Appliance	2,198	2,168	191,501	N/A	2
Central Air Conditioner	11,660	5,790	2,762,527	N/A	17
Furnace	12,434	6,511	N/A	1,098,124	15
Furnace Fan	3,622	3,577	1,698,899	N/A	12
Heat Pump	1,001	562	3,122,711	N/A	18
Room Air Conditioner	117	107	3,360	N/A	1
Thermostat	9,782	5,906	585,145	110,495	8
Water Heater	20	20	66,493	N/A	1
Total	**40,834**	**24,641**	**8,430,636**	**1,208,619**	**74**

* Numbers reflected in this table are from PY2016 tracking data received from MidAmerican on November 21, 2016, and were presented in the Sample Memo dated January 6, 2017. Due to the timing of the evaluation, we did not include participants from the last two months of PY2016. Because of the nature of participants and measures, we do not believe this introduced any bias by not including these participants.

[6] SAVE quality installation is tracked as a separate measure from high efficiency central heating and cooling equipment. So for example, a single SAVE quality-installed high efficiency furnace is tracked is two separate measures—one for the high efficiency furnace and one for SAVE quality furnace installation.

Overall, the Tetra Tech team's impact evaluation found realization rates on most electricity-saving measures to be over 99 percent. The exception was appliances, which had a realization rate of 57.9 percent due to an error in determining savings from ENERGY STAR refrigerator data in one of the two projects sampled. As shown in Table 3-2 below, total reported electricity savings were 19,422,409 kWh and 9,485 peak kW. Total evaluated electricity savings for all Iowa projects were 19,191,249 kWh and 9,468 peak kW, resulting in overall realization rates of 98.8 percent for kWh savings and 99.8 percent for peak kW savings.

Overall realization rates on natural gas measures were lower than for electricity-related savings, with realization rates of 94.2 percent for therm savings and 94.3 percent of peak therm savings. The primary driver of the natural gas realization rates was due to an error in inputs used for furnace savings. With furnace savings accounting for over 90 percent of the reported natural gas savings, adjustments to furnace savings had a large effect on the program's total natural gas savings. Evaluated natural gas savings were 2,217,022 therms and 28,609 peak therms, with measure specific savings and realization rates described in Table 3-2, below.

Table 3-2. PY2016 Residential Equipment Program Reported and Evaluated Impacts

Measure Category	Reported (kWh)**	Evaluated (kWh)	kWh Realization Rate
Appliance	338,722	196,120	57.9%
Central Air Conditioner	4,898,586	4,900,619	100.0%
Furnace Fan	3,442,358	3,442,358	100.0%
Heat Pump	8,369,957	8,316,314	99.4%
Room Air Conditioner	5,107	13,207	258.6%
Thermostat	1,233,020	1,233,020	100.0%
Water Heater	125,054	125,054	100.0%
Clothes Washer*	964,557	964,557	100.0%
All Iowa Projects	**19,422,409**	**19,191,249**	**98.8%**
Measure Category	**Reported (Peak kW)****	**Evaluated (Peak kW)**	**Peak kW Realization Rate**
Appliance	46	27	57.9%
Central Air Conditioner	6,510	6,513	100.0%
Furnace Fan	0.00	0.00	100.0%
Heat Pump	1,784	1,768	99.1%
Room Air Conditioner	6	20	337.6%
Thermostat	1,010	1,010	100.0%
Water Heater	15	15	100.0%
Clothes Washer*	115	115	100.0%
All Iowa Projects	**9,485**	**9,468**	**99.8%**

Measure Category	Reported (Therms)**	Evaluated (Therms)	Therms Realization Rate
Furnace	2,126,692	1,991,262	93.6%
Thermostat	195,001	195,001	100.0%
Clothes Washer*	30,759	30,759	100.0%
All Iowa Projects	**2,352,451**	**2,217,022**	**94.2%**
Measure Category	**Reported (Peak Therms)****	**Evaluated (Peak Therms)**	**Peak Therms Realization Rate**
Furnace	27,653	25,939	93.8%
Thermostat	2,535	2,535	100.0%
Clothes Washer*	135	135	100.0%
All Iowa Projects	**30,323**	**28,609**	**94.3%**

* As part of PY2016 evaluation activities, The Tetra Tech team did not evaluate clothes washers given they were discontinued on 12/31/2015. The clothes washers included here were installed in 2015 and paid in 2016, thus they are included in the reported savings.

** Reported savings shown are from PY2016 tracking data received from MidAmerican on February 2, 2017.

3.2 ENGINEERING/DESK REVIEWS

The Tetra Tech team reviewed Residential Equipment program filed measure sheet algorithms for all measures eligible in PY2016. First, we assessed the algorithms and assumptions for reasonableness with industry standard approaches for each measure. Sources for comparison included industry studies, ENERGY STAR information, the IA TRM, and the IL TRM[7]. Next, the Tetra Tech team reviewed the measure sheet algorithms themselves to ensure there were not inadvertent errors in the algorithms and to evaluate the reasonableness of assumptions used in default values or savings factors. Based on this review, we determined that MidAmerican's measure sheet algorithms, assumptions, and deemed savings were all reasonable compared to industry standards, and that there were no instances in which there was a clear error in an algorithm. In the case of deemed energy savings measures or measures with energy savings specified by ENERGY STAR, the MidAmerican measure sheet algorithms specified that peak demand savings should be calculated by an algorithm based on measure-specific load factors that were derived from MidAmerican residential load shapes. The measure-specific load factors were appropriately included in the relevant measure sheets.

As part of the overall measure-specific assessments, the Tetra Tech team reviewed baseline assumptions. For most measures affected by federal minimum standards, we found that baseline assumptions for Residential Equipment program measures were informed by current federal standards. The Tetra Tech team found two exceptions—ground source heat pumps and heat pump water heaters. We have summarized the baselines for each of the measures in the PY2016 Residential Equipment program below, including providing baseline consumption examples that would be seen for an assumed capacity using the measure sheet algorithms[8]:

[7] Illinois Statewide Technical Reference Manual, Manual for Energy Efficiency, Version 6.0, p.86. http://ilsagfiles.org/SAG_files/Technical_Reference_Manual/Version_6/Final/IL-TRM_Effective_010118_v6.0_Vol_3_Res_020817_Final.pdf.

[8] Note that the baseline consumption will be different for different capacities, which means that essentially for every project, the baseline consumption will be different.

- **Central Air Conditioners.** The measure sheet indicates a baseline efficiency equal to that of the minimum federal standard central air conditioner, SEER (Seasonal Energy Efficiency Ratio) 13. This matches the IA TRM baseline for central air conditioners and is consistent with our findings based on research. As an example, a SEER 13 central air conditioner with 30,000 BTUH (2 ½ ton) capacity would produce a baseline annual energy consumption of 1,871 kWh according to the measure sheet. The Tetra Tech team finds this reasonable for a unit of this capacity.

- **Air-Source Heat Pumps.** The measure sheet indicates a baseline efficiency equal to that of the minimum federal standard air-source heat pump, SEER 14 and 8.2 HSPF (Heating Seasonal Performance Factor). This matches the IA TRM baseline for air-source heat pumps and is consistent with our findings based on research. As an example, a SEER 14 and 8.2 HSPF air-source heat pump of 30,000 BTUH (2 ½ ton) cooling capacity would have a cooling baseline of 1,701 kWh according to the measure sheet algorithm, and a heating baseline of 8,349 kWh. The Tetra Tech team finds that the estimated cooling baseline consumption is appropriate in this case, but that the estimated heating baseline consumption is likely overstated, as heating capacities for air-source heat pumps are generally lower than cooling capacities due to lower output capacities at test conditions.

- **Ground Source Heat Pumps.** The MidAmerican measure sheet indicates that the assumed baseline is a less efficient ground source heat pump. The Tetra Tech team believes this is a typographical error and that MidAmerican intends an air-source heat pump to be the baseline technology. The baseline equipment specifications for heating performance align with ASHRAE 90.1 guidelines for operations at 17F, which reflect a reasonable performance specification and estimate for actual heating performance and not the federal minimum standards, which reflect heating performance at specific test conditions (47F). The MidAmerican baseline heating specifications appear reasonable. However, the heating capacity of the baseline and efficient ground source heat pump use the cooling capacity as the basis from which to calculate consumption and savings. For both air-source and ground source heat pumps, heating capacity is typically less than the cooling capacity. As such, consumption based on EFLHs would be overstated for the heating system (baseline or efficient condition). Both the IA TRM and MidAmerican measure sheet approaches are reasonable, with the exception of MidAmerican using cooling capacity to represent the heating capacity of the baseline and efficient technology.

- **Furnaces.** The MidAmerican measure sheet indicates a baseline efficiency equal to that of the minimum federal standard of 80 percent AFUE and <250 MBTUH. As an example, a 55,000 BTUH furnace with baseline efficiency of 80 percent would have an annual natural gas consumption of 630 therms, according to the measure sheet algorithm. The Tetra Tech team finds that this is reasonable for a unit of this capacity. The IA TRM assumes an AFUE of 85 percent, stating that this value was agreed to by the Technical Advisory Committee to account for “significant demand” above the federal standard of 80 percent, a different approach to baseline selection based on assumed market adoption rates.

- **Room Air Conditioners.** The federal standard is a CEER ranging from 9.0 to 11.0, depending on the capacity of the equipment and whether or not the unit has louvered sides. This is consistent with the IA TRM baseline, and both the measure sheet and the IA TRM provide tables from which the baseline CEER needs to be selected. As an example using the measure sheet algorithm, an 8,000 BTUH capacity room air conditioner without louvered sides would have a baseline efficiency of 9.6 CEER from the measure sheet baseline table, and an annual consumption of 243 kWh. The Tetra Tech team finds that this is reasonable for a unit of this capacity.

- **Refrigerators and Freezers.** The federal standard is annual kWh consumption, as specified in the ENERGY STAR database for refrigerators and freezers. Additionally, MidAmerican measure sheet baseline values appear to be consistent with the values used in the IA TRM.
- **Heat Pump Water Heaters.** The MidAmerican measure sheet baseline is based on a federal standard electric resistance water heater with an energy factor of 0.92. The baseline appears to be based on the previous federal standard of EF=0.97-(0.00132*storage volume), as this produces an energy factor of 0.92 with a 40 gallon water heater. The IA TRM uses the new federal standard that went into effect in April 2015, which is EF=0.96-(0.0003*storage volume). The new federal standard would produce a slightly higher baseline energy factor of 0.948 for a 40 gallon water heater.
- **Furnace Fan.**[9] A standard motor is indicated as the baseline in the MidAmerican measure sheets, but no baseline performance specifications are listed. The industry standard furnace fan would be a permanent split capacitor (PSC) induction motor with an efficiency of approximately 50 percent. A 1/3 hp (horse power) PSC motor might be expected to have an annual baseline energy consumption of over 1,900 kWh. Given that the MidAmerican savings are based on the installation of an electronically commutated motor (ECM), which can be expected to operate at a minimum of 70 percent efficiency, the measure sheet savings for an ECM furnace fan (469 kWh) are reasonable. The IA TRM assumes the same baseline technology for furnace fans—— a non-brushless permanent magnet motor.
- **Programmable Thermostats.** The MidAmerican measure sheet uses a non-programmable thermostat as the baseline technology assumption. A 55,000 BTUH, 80 percent efficient standard furnace would be expected to have an annual natural gas heating baseline of 630 therms, according to the furnace measure sheet algorithm, and a 13 SEER, 30,000 BTUH central air conditioner would be expected to have an annual electric cooling baseline of 1,871 kWh. Based on the measure savings, this example would result in approximately three percent savings for heating and approximately four percent savings for cooling, reasonable savings for the measure given the implied baseline consumption. The IA TRM also states that the baseline is a non-programmable thermostat and that for an unknown location, 578 therms should be used as base heating consumption, though the thermostats are assumed to save 6.8 percent of the heating load. In the IA TRM, cooling savings are assumed to be 0 for a programmable thermostat so no baseline consumption is provided.

Our review of the measure sheet energy savings algorithms revealed the following key findings for program-eligible measures:

- The measure sheet savings approaches for furnace fans, thermostats, refrigerators, and freezers are reasonable and are in-line with industry standards based on engineering calculation for single family homes and in comparison to the IA TRM.
- For SAVE heating and cooling measures, the measure sheet algorithms use a savings factor multiplied by capacity to determine quality installation savings and a separate algorithm to determine savings for the efficient equipment. A more accurate representation is a single algorithm in which the new high efficiency equipment installed by means of a quality installation is able to fully achieve, or achieve close to, its nameplate efficiency while the existing equipment being replaced is likely not able to achieve its nameplate efficiency because quality installation

[9] The Tetra Tech team did not provide an example of estimated baseline consumption for a standard furnace fan motor, as it requires an assumption about the hp of the motor and total annual hours of operation, neither of which is provided in the measure sheet or the IA TRM.

was not performed (represented by a de-rate factor for the standard equipment). The IA TRM calculation uses one algorithm and a de-rate factor is applied to the standard equipment.

- The heat pump water heater measure sheet algorithm applies a savings factor to default water heater energy loads to estimate energy savings, which yields reasonable savings at minimum efficiency (EF=2.0). However, at higher efficiency levels (EF=3.0 or 4.0) the measure sheet algorithm predicted energy savings that were much higher than energy savings predicted by other algorithms, such as the ones in the IA TRM and the IL TRM.

3.2.1 Project Level Tracking Data and Documentation

The engineering analysis also included an assessment of the appropriateness of the information collected to support program quality assurance and quality control (QA/QC), as well as the impact evaluation activities. The Tetra Tech team received and reviewed the Residential Equipment program population data queried from the EEMIS database for projects completed in PY2016. The Residential Equipment program tracking data is provided at the project level. The type of data that was captured and reviewed by the Tetra Tech team is further described below

EEMIS data that was key to the evaluation effort included:

- Customer information (e.g., address, site contact information)
- Project level energy savings by fuel type
- Project number (EEMIS Project ID, EEIS Project number)
- Equipment model number (to crosscheck with application)
- Equipment size and efficiency information (to crosscheck with application)
- Dates (e.g., install date, paid date, other date).

Key documentation captured and reviewed for each sampled project included:

- Customer participation forms
- Contractor invoices
- Equipment specifications
- AHRI (Air Conditioning, Heating, and Refrigeration Institute) performance data for heating and cooling equipment
- SAVE test data for quality installations.

For the sampled projects, the Tetra Tech team completed engineering desk reviews to confirm equipment specifications, quantities, and that savings recorded in the EEMIS database match the results from the Residential Equipment program measure sheet algorithms. The Tetra Tech team reviewed all information and crosschecked data sources for consistency. Customer information, equipment model numbers, capacities, and efficiencies recorded on the customer participation forms were compared to the supporting equipment specifications provided, as well as with the information entered in the EEMIS database. In the event that equipment specifications were not provided with the project documents, the Tetra Tech team gathered this information through research based on the model number provided.

Specific findings from the desk reviews include the following:

- Reported furnace savings estimates used input capacities in the measure sheet algorithms rather than output capacities, resulting in savings being overstated. The measure sheet algorithm for furnace energy savings includes a calculation of furnace capacity divided by furnace AFUE. Although the measure sheet does not specify whether furnace input capacity or furnace output capacity should be used, the fact that AFUE is in the denominator of the algorithm indicates that the furnace output capacity would be the correct capacity to use to calculate the expected consumption of natural gas.
- The savings calculations for air-source heat pumps and ground source heat pumps incorrectly use cooling capacity to determine both cooling and heating. Heat pump heating capacities are generally lower than their cooling capacities and should be differentiated for their respective space-conditioning savings.
- There was one room air conditioner project sampled, and our engineering review indicated that an incorrect baseline may have been selected from the table in the measure sheet. This resulted in energy savings being understated, and a realization rate of 258.6 percent for the room air conditioner measure. This measure sheet algorithm is somewhat difficult to apply correctly, as it is dependent on details that are not always immediately evident form application data (such as whether or not the air conditioner has louvers).
- An error in the reported savings for one of the two refrigerator projects reviewed resulted in a lower realization rate for appliances (57.9 percent).

3.3 IA TRM COMPARISON

In addition to determining evaluated savings following the MidAmerican measure sheet algorithms, the Tetra Tech team compared program evaluated savings to the IA TRM algorithms for the same measures. All measures within the MidAmerican Residential Equipment program measure sheets were able to be compared to measures listed in the IA TRM, as all required inputs for the IA TRM algorithms were available from the project information supplied. The Tetra Tech team applied the IA TRM to the projects sampled for the impact evaluation to understand how savings calculation may have differing results from the MidAmerican measure sheets.

As shown below in Table 3-3, the IA TRM algorithms and assumptions would have a fairly significant impact on savings calculations for of the sampled projects. For certain measures, such as central air conditioners, appliances, and room air conditioners, the IA TRM approach resulted in similar evaluated savings based on MidAmerican's measure sheets. In the case of furnaces, heat pumps, appliances, and water heaters, the savings predicted using the IA TRM algorithms were considerably lower than evaluated savings based on the measure sheets.

Table 3-3. Comparison of Program Reported Savings to IA TRM Predicted Savings

Measure	Evaluated kWh Savings	IA TRM kWh Savings	Percent Change	Evaluated Therms Savings	IA TRM Therm Savings	Percent Change	Comments
Appliances	196,120	197,136	+1%	-	-		Sampled projects included one with an error in savings
Central Air Conditioner	4,900,619	5,089,631	+4%	-	-		IA TRM produces similar savings
Furnace	-	-		1,991,262	1,554,612	-22%	Reported furnace savings incorrectly used input capacity in algorithm; IA TRM seems to use low EFLH value
Furnace Fan	3,442,358	4,048,213	+18%	-	-		IA TRM value was higher than measure sheet deemed savings
Heat Pump	8,316,314	5,959,409	-28%	-	-		Measure sheet approach to use cooling capacity only tends to overstate savings
Room Air Conditioner	13,207	13,207	0%	-	-		Error in measure sheet approach
Thermostat	1,233,020	695,423	-44%	195,001	408,618	+110%	IA TRM approach resulted in lower kWh savings but higher therm savings than measure sheet
Water Heater	125,054	71,656	-43%	-	-		Measure sheet algorithm may produce higher than expected savings when heat pump efficiencies are higher

* As part of PY2016 evaluation activities, The Tetra Tech team did not evaluate clothes washers given they were discontinued on 12/31/2015. A TRM comparison was not completed for clothes washers, so the TRM savings value was set to be equal to the program reported clothes washer savings.

In conducting this review, the Tetra Tech team did find a possible issue with the IA TRM calculation of furnace savings, specifically related to equivalent full load hours (EFLHs), which could lead to considerable differences in energy savings. The IA TRM approach for heating and cooling equipment involves selecting an EFLH value from a table (based on location) and applying equipment capacity, equipment efficiency, and a de-rate factor (furnaces) or savings factor (central air conditioners and heat pumps) in an algorithm to estimate energy consumption.

In the case of central air conditioners, the IA TRM specifies 811 EFLH cooling for Des Moines, which also serves as a general “unknown” location in Iowa. For furnaces, the IA TRM specifies 612 EFLH

heating and a de-rate factor of 6.4 percent applied to the base unit AFUE. The Tetra Tech team noted that the EFLH heating value in the IA TRM is lower than the EFLH cooling value. This is unusual for a city in Des Moines' climate zone, and further research indicated that the EFLH heating appears to be too low.

To address what appears to be a low value for heating EFLH in the IA TRM, the Tetra Tech team reviewed the IL TRM to compare EFLH assumptions. The IL TRM specifies using 1,969 EFLH heating for Rockford, Illinois, which has similar heating degree days to Des Moines.[10] The IL TRM EHLF for heating is used for heat pumps as well as for insulation measures impacting furnaces and heat pumps. The IL TRM notes that the EFLH for heating was based on ENERGY STAR full load hour (FLH) data and adjusted for Illinois using the average natural gas heating consumption in Illinois. In comparing the IL TRM's EFLH for heating and ENERGY STAR FLH heating data for Rockford and Des Moines, the Tetra Tech team estimated that 1,830 EFLH for heating would be a more appropriate value for Des Moines. This value was derived by using the ratio of ENERGY STAR EFLH for Des Moines and Rockford (2,247 and 2,418, respectively) and multiplying by the 1,969 EFLH heating value specified in the IL TRM for Rockford.

[10] MidAmerican uses an estimate of 6,369 HHD65 for insulation measures for Des Moines. We note that the IA TRM presents a HDD60 of 5,052.

4.0 PROCESS EVALUATION FINDINGS

This section details the findings from the process evaluation activities. The process evaluation was designed around the key researchable questions identified in the methodology section 2.2.1. Process evaluation activities involved interviews with program and implementation staff, participating customers, participating trade allies, and nonparticipating customers. The key process-related findings are detailed in the subsections below.

The participating customer survey was used to understand the perspectives of program participants; questions explored consumers' awareness, reasons for participation, program experiences, and satisfaction with the Residential Equipment program. The participating trade ally interviews investigated trade ally awareness, experiences, and satisfaction with the program. In addition, training, education, and outreach[11] were further explored with trade allies, as well as the program's impact on increasing the interest and demand for energy efficient equipment. Both the participant survey and the trade ally interviews included NTG questions. Findings related to NTG can be found in Appendix B.

4.1 INTERVIEWED PARTICIPANT AND TRADE ALLY CHARACTERISTICS

The Tetra Tech team interviewed a total of 325 participating customers and 20 participating trade allies to support the process evaluation. In addition, the Tetra Tech team conducted a nonparticipant survey with 415 residential customers to support all Iowa residential program evaluations.

4.1.1 Participant Characteristics

The table below summarizes the number of PY2016 Residential Equipment program participants surveyed and the number of participants in the survey population by rebated measure category. For evaluation purposes, the participant survey population included PY2016 program participants who installed rebated equipment between January 1, 2016 and October 31, 2016[12].

Table 4-1. Summary of PY2016 Participants Surveyed (January–October 2016)

Measure End Use	Surveyed Participants	All Participants
Appliances	56	2,168
Central Air Conditioner	31	5,790
Furnace	56	6,511
Furnace Fan	37	3,577
Heat Pump	58	562
Room Air Conditioner	29	107
Thermostat	49	5,906
Heat Pump Water Heater	9	20
Total	**325**	**24,641**

[11] Training, education, and outreach findings will be summarized as part of the Education program report.

[12] To try to help with customer recall, the Tetra Tech team sampled from a partial years' participant data so that we could field the telephone surveys early in 2017. Due to the measure types tracked in this program, the Tetra Tech team believes there was no sampling bias introduced based on this methodology.

As shown the table below, participants surveyed were more likely to live in single family detached homes and own their residence compared to those interviewed in the nonparticipant survey.[13] In addition, program participants were more likely to live in larger residences than nonparticipant survey respondents, with over one-third living in homes greater than 2,000 square feet.

Table 4-2. Participant Home Characteristics

House Characteristic		Participant Survey	Nonparticipant Survey
Own/Rent	Own/ buying	99%	80%
	Rent	1%	20%
	Respondents (n)	**324**	**414**
Type of Home	Single family detached house	91%	72%
	Single family attached house	7%	12%
	Apartment building with 2-4 units	0%	3%
	Apartment building with 5+ units	0%	10%
	Mobile home or house trailer	1%	2%
	Other	0%	2%
	Respondents (n)	**325**	**414**
Year Hoe Built	1930s or earlier	20%	23%
	1940s	4%	5%
	1950s	10%	11%
	1960s	7%	9%
	1970s	13%	12%
	1980s	7%	9%
	1990s	13%	8%
	2000s	14%	17%
	2010s	12%	6%
	Respondents (n)	**321**	**390**
Years Lived in Home	Average number of years	15.2	15.4
	Respondents (n)	**323**	**414**
Square Footage	Less than 1,000 square feet	7%	23%
	1,000 to 1,500 square feet	26%	35%
	1,501 to 2,000 square feet	30%	23%
	2,001 to 3,000 square feet	28%	15%
	More than 3,000 square feet	10%	5%
	Respondents (n)	**301**	**373**

Source: Questions D2, D1, D3, D3a, D5, D6; don't know and refused responses are excluded.

[13] Note that these results are reported in aggregate across all customers interviewed, are unweighted, and are representative of the survey sample only.

Approximately three-quarters of participants use natural gas for space and water heating. In addition, nearly 90 percent of participants surveyed reported having central air conditioning in their home. These distributions are similar to results from the nonparticipant survey.

Table 4-3. Participant Energy Use Characteristics

Energy Use Characteristic		Participant Survey	Nonparticipant Survey
Has Central Air Conditioning	Yes	89%	86%
	No	11%	14%
	Respondents (n)	**322**	**413**
Space Heating Fuel	Electricity	16%	14%
	Natural Gas	75%	82%
	Other	9%	4%
	Respondents (n)	**322**	**404**
Water Heating Fuel	Electricity	26%	Not available
	Natural Gas	72%	
	Other	2%	
	Respondents (n)	**315**	

Source: Questions D4, CAC1, D7, D8 (Participant Survey); Questions CW6, CW5 (Nonparticipant Survey); don't know and refused responses are excluded.

As shown in the table below, most key demographic characteristics were similar among participants surveyed and those interviewed in the nonparticipant survey. One key difference is that participants were more affluent on average than the nonparticipant group, with over 60 percent of program participants having annual household incomes of at least $75,000 compared to just under one-third of nonparticipant survey respondents.

Table 4-4. Respondent Demographics

Respondent Demographics		Participant Survey	Nonparticipant Survey
Household Size	Average number of people in home	2.6	2.4
	Respondents (n)	**323**	**414**
	Average number of people under 19 years old in home	0.7	0.8
	Respondents (n)	**283**	**302**
	Average number of people over 65 years old in home	0.6	0.6
	Respondents (n)	**283**	**302**
Respondent Age	18-24	0%	3%
	25-34	14%	15%
	35-44	15%	15%
	45-54	18%	11%
	55-64	23%	24%
	65 or older	30%	32%
	Respondents (n)	**321**	**407**
Household Income	Less than $24,000	4%	19%
	$24,000 to less than $50,000	16%	25%
	$50,000 to less than $75,000	17%	25%
	$75,000 to less than $100,000	23%	17%
	$100,000 or greater	40%	15%
	Respondents (n)	**239**	**355**
Respondent Gender	Male	57%	46%
	Female	43%	54%
	Respondents (n)	**323**	**414**

Source: Questions D9, D10, D11, D12, D13, D14 (Participant Survey); Questions D7, D8, D9, D10, D11, D12 (Nonparticipant Survey); don't know and refused responses are excluded.

4.1.2 Trade Ally Characteristics

The Tetra Tech team interviewed a total of 20 participating trade allies across MidAmerican's Iowa and Illinois territories. Interviewed trade allies included 15 SAVE-certified contractors (eight in Illinois and seven in Iowa) and five appliance retailers (Iowa only) who sold equipment rebated through the Residential Equipment program since 2014. Several trade allies we interviewed serve residential customers in both MidAmerican Iowa and Illinois territories. Considering the smaller number of trade allies in the Illinois service territory, and the similarities in markets and implementation across the two territories, we present trade ally findings in aggregate.

SAVE-certified contractors interviewed varied in size and level of program involvement. Contractors ranged in size from as few as three employees to as many as 100 employees. Most of companies

interviewed reported installing a high percentage of program-qualifying HVAC equipment in 2016, often ranging from 80 percent to nearly 100 percent of their total installations.

The five retail stores we interviewed represented five different big box retail chains that sell program qualifying refrigerators, freezers, thermostats, and room air conditioners.

4.2 PROGRAM DESIGN

4.2.1 Motivations for Participation and Barriers to Implementation

Feedback from program participants indicates that the Residential Equipment program is the first experience for many customers purchasing energy efficient equipment, and may be a launching point for future purchases. Nearly half of participant respondents (43 percent) reported that they had not purchased energy efficient equipment prior to participating in the program. Further, 86 percent of respondents said they are "very likely" to buy energy efficient equipment again in the future.

Participants surveyed were most commonly motivated by financial factors in pursuing rebates for program-qualifying equipment. When asked why they decided to participate in the Residential Equipment program, respondents most often mentioned the financial incentive or rebate offered by the program (45 percent), followed by a desire to save money on their energy bills (32 percent).

One of the objectives of the nonparticipant survey was to better understand the relative importance of different factors in customers' equipment purchase decisions and barriers to implementing energy saving actions. Feedback from respondents indicates that the rebates, education, and technical assistance offered through the Residential Equipment program work to address key barriers customers face to implementing energy saving improvements.

The nonparticipant survey asked customers to rate the importance of the five different factors listed in the table below when considering an appliance or equipment purchase for their home. Among these five factors, respondents attributed the highest importance to saving money on their energy bills and the cost of the equipment (71 percent and 70 percent saying "very important," respectively). Offering rebates to help offset the cost of high efficiency equipment directly target both of these decision-making factors.

Table 4-5. Importance of Different Factors When Considering an Appliance or Equipment Purchase

Decision-making Factor	Respondents (n)	Not at all important	Somewhat important	Very important
Saving money on energy bills	413	2%	27%	71%
Cost of equipment	411	4%	27%	70%
Equipment features	410	8%	38%	54%
Availability of a rebate	411	12%	54%	34%
Recommendation by a contractor or retailer	411	37%	49%	14%

Source: Questions EE1A–EE1E (Nonparticipant Survey); don't know and refused responses are excluded.

The nonparticipant survey also asked customers what challenges, if any, they face in saving energy in their home. Respondents most frequently mentioned challenges relating to temperature and humidity control demands (e.g., air infiltration issues, maintaining comfort), especially in the winter and summer months. Other common responses included the age of their home and inefficient appliances. Regarding challenges faced specifically implementing energy saving actions, respondents most commonly mentioned cost barriers, lack of awareness of energy saving opportunities, and low prioritization of

energy conservation. Again, the rebates provided through the Residential Equipment program, and the customer education provided through MidAmerican's marketing and outreach efforts, are designed to help overcome these barriers.

4.2.2 Incentive Levels

Feedback from SAVE-certified contractors suggests that rebates levels for qualifying HVAC equipment have been sufficient to encourage participation, though several contractors noted the reductions in 2017 rebate amounts for some measures and cautioned against lowering incentive levels much further. Declining rebate amounts was one of the only risks to future participation mentioned by contractors:

> *"I don't think anything [will affect future participation levels] as long as the rebates stay at least where they're at and don't go down."*
>
> *"The rebate amounts have gone down a little bit which I was kind of surprised about but hopefully people won't be too affected by that."*

In addition, maintaining rebate levels was one of the few suggestions offered by multiple different contractors:

> *"Don't decrease the amounts. That concerns me. If dollar amount in rebates go down I don't see people spending that money."*
>
> *"For me I think it's just keeping the rebate amounts high enough. If the rebates get too low I add extra time and labor in my bid now to do the SAVE testing. I'm spending so much time testing it because I want it to be right, and of course we have become more efficient [and] we take less time doing it, but I've learned that if the rebate gets too low the time it takes doesn't really pay off as well."*

In our review of other similar programs across the Midwest, we found that even after the PY2017 rebate reductions, the program's rebate levels are still in-line with or on the higher end of typical rebate levels for similar measures offered by other utilities in nearby territories. However, MidAmerican is one of the only administrators to require SAVE quality installation to qualify for central heating and cooling rebates, which may result in higher installation and/or administrative costs (all else held equal).

4.2.3 Financing

In PY2015, the program discontinued their financing incentive option due to the loss of the financial partner and low adoption. One of the researchable issues for the evaluation was assessing customer interest in financing options for energy efficiency improvements as well as financing approaches used by other utility programs.

Both the participant survey and the nonparticipant survey included a series of questions to better understand how customers are financing major improvement projects and the potential for financing options to help customers overcome first cost barriers. Respondents who own their home said they used financing to a limited extent; of those that said they made a major home equipment purchases in the past five years (defined as over $2,000), 24 percent of participant survey respondents (n=162) and 17 percent of nonparticipant survey respondents (n=90), took advantage of financing options. Most (69 percent from the participant survey, 66 percent from the nonparticipant survey) said they paid for the purchase out of their own account via cash, check, or debit card. Another 19 percent of respondents

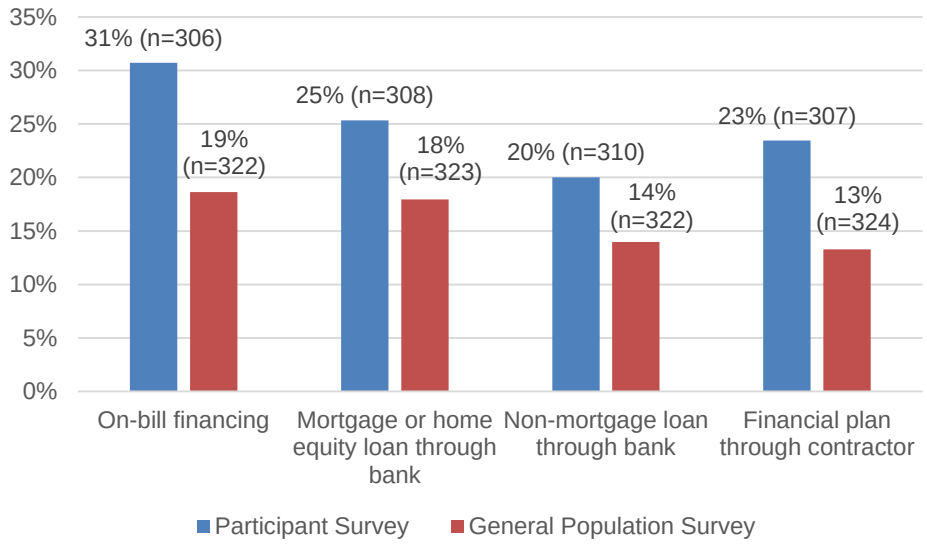
from the participant survey and 21 percent of nonparticipant survey respondents said they put the purchase on a credit card.[14]

We asked all home-owning respondents in both the participant and nonparticipant survey to indicate the extent to which four different financing options would affect their decisions, on a scale of 1 to 5, where 1 was "does not increase likelihood at all" and 5 was "increases likelihood a great deal." Respondents rated the following four specific financing options:

- Mortgage or home equity loan through a bank or financial institution, specifically offered for qualifying energy efficiency upgrades
- On-bill financing
- Non-mortgage loan through a local bank or financial institution
- A payment plan or financing through the contractor.

The survey results indicated that there may be some limited opportunity to increase adoption of efficient equipment solely based on financing. On-bill financing generally elicited the greatest level of interest—31 percent of participant survey respondents and 19 percent of nonparticipant survey respondents rated this option a 4 or 5. Non-mortgage loans and financing plans through a contractor generally received the lowest level of interest. For all financing options, over 40 percent of both participant and nonparticipant respondents said the availability of financing would not increase the likelihood of installing energy efficient equipment at all (gave a rating of 1).

Figure 4-1. Percentage of Homeowners Where Finance Option Would Increase Likelihood of Installing Energy Efficient Equipment (rated 4 or 5)



Source: Questions FN3A–FN3D; don't know and refused responses are excluded.

Participant survey respondents, who had higher incomes on average, gave higher influence ratings across all financing options compared to nonparticipant survey respondents. While on the surface this may seem counter-intuitive, it is important to note that without a near-term intent to install equipment, or a basis for which customers are considering cost and savings, it may be difficult for customers to fully grasp their true likelihood to take advantage of these options. Participants may be more inclined to

[14] Respondents could have reported multiple methods of payment.

recognize the value or application of financing options given their recent purchase(s) of major equipment.

Despite the relatively limited level of interest in financing shown in the customer survey results, several other utilities in nearby territories do continue to offer financing assistance as part of their residential portfolio. In Iowa, Alliant Energy offers a financing option through a third-party, similar to MidAmerican's prior offering. In Illinois, on-bill financing is available to customers of Ameren, ComEd, Nicor, North Shore Gas, and Peoples Gas through the Energy Efficiency Loan Program. While these financing options are offered, the evaluation did not investigate the level of customer interest or uptake in these utility-sponsored financing options. Additionally, it is often the case that customers must choose between either the rebate or finance option.[15] While not specifically addressed in our research, residential customers tend to prefer rebates over financing.

4.2.4 SAVE Quality Installation

The participating contractors we interviewed generally agreed that the program's SAVE quality installation requirements are clear and reasonable, and few had specific suggestions for improvements to the SAVE process. A few interviewees qualified their response noting the additional burden of the SAVE testing or some challenges in achieving passing SAVE scores due to external influences (e.g., retrofit using pre-existing ductwork). One respondent also referred to a general "learning curve" with the SAVE process. Another respondent noted the challenge of not being able to test air conditioner installations when paired with furnace installations in the heating months, necessitating a second visit to the home to complete the SAVE testing and delayed rebate payment.

Despite the additional demands of SAVE requirements, contractors also acknowledged several benefits of SAVE quality installations, including the qualifying rebate and better equipment sizing and performance. Several contractors noted leveraging SAVE-certification to differentiate themselves from competitors who are not SAVE-certified. A couple of interviewees also mentioned the SAVE-certification helps them sell higher efficiency equipment to customers.

Responses from program participants who received a rebate for SAVE-certified installations of central heating or cooling equipment suggest that not all participants are aware that their equipment was installed using SAVE protocols. Survey respondents were asked two separate questions about their awareness of SAVE protocols. When first asked if they had heard of SAVE protocols prior to the interview, 43 percent confirmed they had, while 50 percent said they had not (seven percent said "don't know"). The vast majority of customers said they learned about SAVE protocols from their contractor, though a few participants also mentioned MidAmerican's website or marketing collateral. Later, when asked if they were aware that their heating or cooling equipment was installed following SAVE protocols, 58 percent confirmed they were while 42 percent said they were not.

4.2.5 Overlapping Measure Offerings

By design, many of the measures eligible for Residential Equipment program rebates were also eligible for rebates through other MidAmerican residential programs. As a result, there is considerable overlap across participating trade allies and target markets. MidAmerican has established internal processes to manage how overlapping measures are tracked and reported. For example, any rebated measures identified through the HomeCheck program assessment are tracked under the HomeCheck program, even if they would also qualify under the Residential Equipment program. These processes ensure that

[15] IPL's program in Iowa requires that customers must choose between receiving the incentive or the low-interest loan.

projects are tracked consistently without duplication across programs. It is important to note that these processes were established after the 2014-2018 filing, and therefore were not considered in filed program-specific savings goals for PY2016.

Externally, MidAmerican's marketing materials and program website generally organize residential rebates by equipment or end-use category, opposed to internal program delineations. For example, central heating and cooling equipment rebates are presented under "Heating, Cooling, and Water Heating" rebates, while refrigerators and freezers are presented under "Appliance" rebates.

Across the PY2016 evaluations for the Residential Equipment, Residential HomeCheck, and Residential HVAC Tune-Up programs, we interviewed a number of contractors who completed projects through multiple different programs. None of the contractors we interviewed raised any concerns or confusion associated with measures that may qualify for multiple different programs.

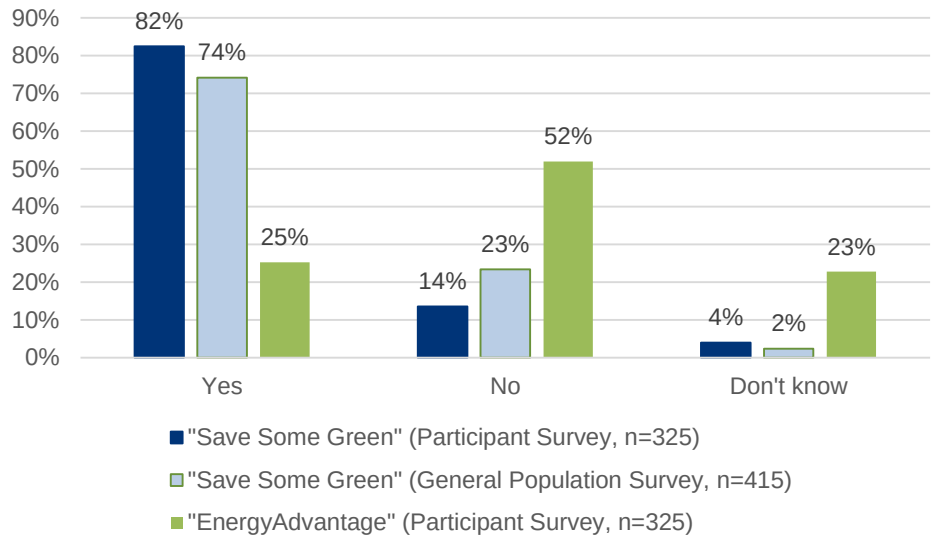
4.3 CUSTOMER EDUCATION, OUTREACH, AND MARKETING

4.3.1 Portfolio-Level Marketing

Both the participant and nonparticipant surveys asked customers if they had seen MidAmerican's "Save Some Green" messaging. The vast majority of both participants and nonparticipants recognized "Save Some Green," though a slightly higher proportion of participants were familiar (82 percent of participants compared to 74 percent of nonparticipant survey respondents). Among those that were familiar with "Save Some Green," both participant and nonparticipant survey respondents most commonly reported seeing the messaging in a MidAmerican utility bill insert or mailing (72 percent of participants and 90 percent of nonparticipant survey respondents), followed by radio or television advertisement (31 percent and 53 percent, respectively), and the MidAmerican website (15 percent and 25 percent, respectively). Nonparticipant survey respondents also rated the effectiveness of these methods in providing information about energy efficiency or MidAmerican's programs in the same relative order as participants, with bill insert or mailing being most often rated as most effective.

In addition to "Save Some Green" messaging, the participant survey also asked customers if they had seen "EnergyAdvantage" messaging or materials. As shown in the figure below, much fewer participants were familiar with "EnergyAdvantage" materials, with only about one-quarter of respondents reporting they had seen the messaging. Among these respondents, respondents most commonly reported seeing the messaging in a MidAmerican utility bill insert or mailing (63 percent), followed by the MidAmerican website (17 percent), and radio or television advertisement (16 percent).

Figure 4-2. Has Seen "Save Some Green" and/or "EnergyAdvantage" Messaging



Source: Questions P2, P4 (Participant Survey); Question P1 (Nonparticipant Survey)

Six percent of nonparticipant survey respondents reported visiting MidAmerican's website in the past year, looking for information on energy efficiency programs (n=12), ways to help save money/energy in their home (n=10), energy efficient appliances (n=3), or general information on energy efficiency (n=3). Among these respondents, 54 percent found it "very easy" and 46 percent found it "somewhat easy" to the find the information they were looking for.

4.3.2 Program-Specific Marketing

Respondents to the participant survey most commonly reported learning about the Residential Equipment program through a contractor (39 percent) or retailer (25 percent), illustrating the key role program trade allies play in generating customer awareness and interest in the program. The next most commonly mentioned sources of awareness were from MidAmerican bill inserts and MidAmerican's website (15 percent and 14 percent, respectively). Few respondents by comparison reported learning of the program from mass media sources (e.g., newspaper, television, radio, billboards).

Table 4-6. Source of Program Awareness

Source	Percent
Contractor	39%
Retail store	25%
MidAmerican utility bill insert	15%
MidAmerican website	14%
Friend/family member/other business	9%
Television	4%
MidAmerican brochure	3%
MidAmerican call center representative	3%
Newspaper	3%
Radio	1%
Home show/conference/trade show	0%
Billboard	0%
Door hangers	0%
Other	10%
Don't know	5%
Respondents (n)	**324**

Source: Question P1 (Participant Survey); refused responses are excluded; multiple responses allowed.

Results from the nonparticipant survey suggests that general customer awareness of the Residential Equipment program's offerings is relatively high, though not universal. Two-thirds of customers interviewed as part of the nonparticipant survey reported having heard of MidAmerican rebates for energy efficient heating and cooling equipment, thermostats, or appliances. Nearly three-quarters (73 percent) of those who were not aware of these rebates expressed at least some interest in learning more about the Residential Equipment program, with nearly one-third (32 percent) saying either they were "very interested" or "extremely interested."

These customer survey results are largely consistent with feedback from the participating trade allies we spoke with. Among those who provided feedback on their perceptions of the level of customer awareness of MidAmerican rebates, nine thought customers were generally aware, five thought customers were generally not aware, and five said customer awareness varied or relatively split half and half. A couple of trade ally interviewees noted that many customers were generally aware of rebate availability, but may not know specifics on eligibility criteria or rebate amounts. A couple of interviewees also observed customer awareness of MidAmerican rebates increasing over time. No interviewees offered specific recommendations on ways MidAmerican can increase customer awareness beyond their current marketing and outreach efforts.

As illustrated in the participant survey results, trade allies play a key role in customer outreach for the Residential Equipment program. Contractors reported routinely discussing program rebates with MidAmerican customers and incorporating MidAmerican rebates into price estimates and comparisons. Only one interviewee offered recommendations for additional support to help them promote the program to their customers, commenting that it may be beneficial to have program informational materials on hand that they could provide to customers at promotional events like home shows.

4.3.3 Trade Ally Outreach and Support

Participating SAVE-certified contractors reported regular communications from the program, including annual trade ally meetings, SAVE trainings, and email updates. Interviewees also reported routinely using the MidAmerican website for program information and rebate forms. Most contractors reported being aware of MidAmerican's Trade Ally Central website, but few reported actively using the site.

Contractors unanimously reported receiving enough support from A-TEC and/or MidAmerican when they have needed it. Below are few comments from interviewers:

> *"They set me up with my own person when I started and she's been fantastic!"*
>
> *"A-TEC contacts us every spring. They're great. We get great support from both A-TEC and MidAmerican"*
>
> *"They're really quick about getting back to me. Usually it's within an hour, especially by email. Almost always within 24 hours I've got a return call or email back."*
>
> *"They're very friendly, very helpful and quick with an answer."*
>
> *"The technical people at MidAmerican when I'm stuck on something have been terrific!"*
>
> *"They inform us soon when there's a problem and if we have any questions they do a good job answering them"*
>
> *"I've never had any problems. Whenever I have a question or problem there's always someone to help me."*

MidAmerican communicates key program changes via annual trade ally meetings, the Trade Ally Central website, and email alerts. All but one of the 15 SAVE-certified contractors interviewed said they felt adequately informed of program changes. The one interviewee who did not feel adequately informed of program changes suggested it would be helpful to receive email alerts highlighting any specific program changes from one year to the next—it is not known whether this particular trade ally had received any prior email communications from the program.

Most contractors did not have any specific recommendations for additional support that they would like to see from the program. The most common request was for additional training or support on SAVE testing, mentioned by three interviewees. Below are a couple of specific comments from interviewees:

> *"It would be nice to have a hands-on kind of thing to make sure they're taking the static pressures in the right areas. I think especially early on we had some questions about things. They had a guide book but some of that was pretty hard to understand."*
>
> *"Like I said earlier, I wish we'd had more of a hands-on training for our guys. We might not do a SAVE testing for quite some time and then when the weather warms up he might have to step back and really think about it. An annual refresher training would be kind of nice."*

Program eligible appliance measures, such as refrigerators, freezers, room air conditioners, are delivered to the market largely through retail outlets. In PY2016, appliances accounted for a small proportion of program savings, and MidAmerican staff do not expect appliances to play a larger role in the program going forward. As a result, program marketing and outreach to appliance retailers has been and will continue to be limited, which is reflected in interviews the Tetra Tech team conducted with local retailers who reported having little or no direct communication with MidAmerican. All but one of the five retailers reported getting most of their information on MidAmerican's rebates through MidAmerican's website. One interviewee expressed interest in receiving additional program information

from MidAmerican to help their sales associates become more knowledgeable, but noted that would need to be a corporate-level decision.

4.4 PROGRAM ADMINISTRATION, PROCESSES, AND RESOURCES

4.4.1 Program Staff Roles and Internal Processes

The Residential Equipment program is administered through a team of MidAmerican and A-TEC implementation staff, supported by ESI and the Midwest Energy Efficiency Alliance (MEEA) for the SAVE program component. Staff roles and responsibilities are clearly delineated and understood by all team members, and program and implementation staff report strong working relationships. In addition, program processes are clearly defined and documented in the program operations manual.

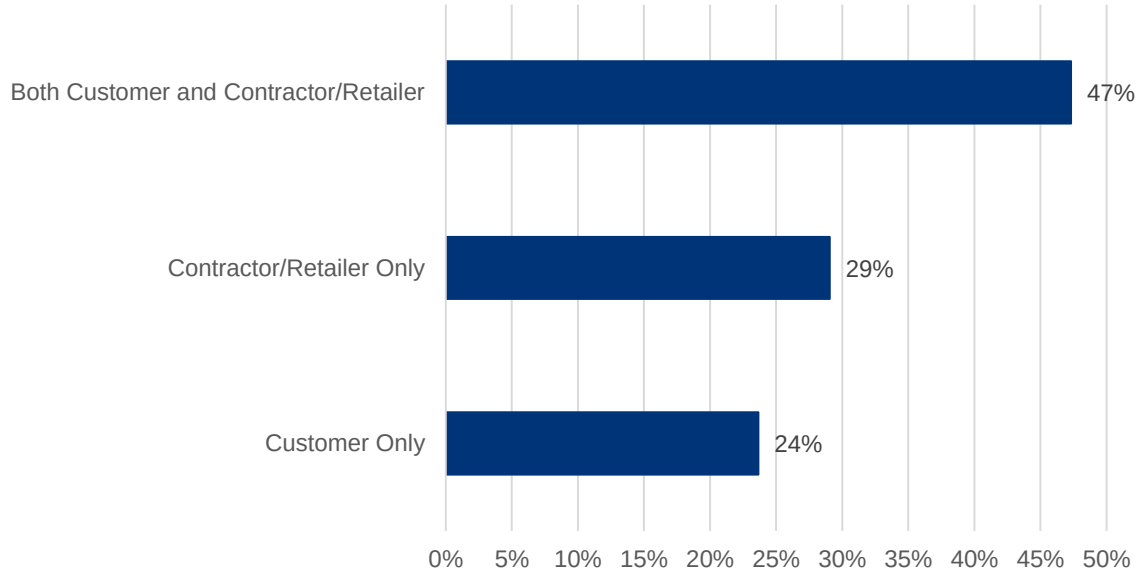
4.4.2 Customer Support

Forty participants surveyed (12 percent) said they contacted MidAmerican program staff for assistance with their participation in the Residential Equipment program. All but one of these respondents said they found the MidAmerican program staff helpful.

Feedback from participant survey respondents suggests that program trade allies are active in informing customers about equipment installation, operation and maintenance, and efficiency benefits. The vast majority of participants who worked directly with a contractor or retailer reported that their contractor/retailer provided instructions or assistance with installation (91 percent), showed them how to maintain their equipment (86 percent), discussed temperature settings (if applicable) (83 percent), discussed energy savings potential (77 percent), and provided literature about ways to save energy in their home (63 percent).

Responses from participant respondents indicate that trade allies are also active in assisting customers fill out program rebate applications, and that the application is generally easy for customers to complete. Among respondents who said they worked with a contractor or retailer for the purchase of their rebated equipment, over three-quarters said their contractor/retailer either helped them complete their application (47 percent) or completed it for them (29 percent). In addition, among all respondents who were involved in the completing the program application, all but three (99 percent) found the application easy to complete.

Figure 4-3. Who Completed Program Application among Participants Working with a Contractor/Retailer (n=241)



Source: Question RE6 (Participant Survey); don't know and refused responses are excluded.

4.4.3 Program Administrative Requirements

Most participating trade allies we spoke with rated the program's administrative requirements or paperwork as low to moderately difficult. A few SAVE-certified contractors mentioned that while the required paperwork is not overly difficult, it can be time consuming. Several interviewees also commented that the additional required information added to the PY2017 program application have increased the level of difficulty from prior years, and felt that some of the new required information were not pertinent to the equipment they were installing (e.g., existing water heating system for a central air conditioner). Also, several interviewees expressed concerns with having to disclose the labor versus equipment cost split in their bids to customers.

Table 4-7. Trade Ally Ratings of Level of Difficulty of Program Administrative Requirements

Trade Ally Classification	Respondents (n)	Difficulty Rating (1-not at all difficult, 5-very difficult)	
		Mean	Percent 4 or 5
SAVE-Certified Contractors	15	2.7	13%
Retailers	4	2.5	25%
Overall	**19**	**2.6**	**16%**

Below are a few specific recommendations offered by SAVE contractors relating to the program's administrative requirements:

> *"Make it easier to put everything onto their system and see if it qualifies and explanations on things as to WHY it doesn't qualify."*

> *"Simplify the paperwork and the computer software. It shouldn't be as hard as it is. It should be more user friendly."*

"Don't ask for more information than you need."

"What we'd like to see is more training and help on entering the rebate. There's some software glitches on the SAVE side. Getting through the software glitches and getting through this so it doesn't take so long."

"If there's one thing I'd like to see changed about the program and done more efficiently it would be to limit the amount of needed information to only what's relevant to the equipment install."

"They're asking questions about equipment cost, labor cost. They ask questions that, no offense to them, but frankly it's none of their business how much we make in profit. I don't like that."

4.4.4 SAVE Quality Assurance Protocols

MidAmerican has established rigorous QA/QC protocols for SAVE rebate applications. In addition to paper verification on a census of SAVE projects, A-TEC's policy in PY2016 was to conduct field verification on the first three applications for each participating trade ally (Tier 1), followed by 1 in 10 installations (Tier 2), then 1 in 30 installations (Tier 3). Program implementation staff noted that SAVE test scores have improved over time with additional contractor training and experience; however, the program's SAVE verification protocols are costly to implement. None of the 15 participating SAVE contractors interviewed for the evaluation mentioned any concerns or complaints with the program's QA/QC requirements.

4.5 MARKET RESPONSE

4.5.1 HVAC Equipment

SAVE-certified trade allies generally reported relatively low difficulty in motivating customers to purchase energy efficient equipment eligible for program rebates. On average, SAVE-certified trade allies gave a rating of 1.4, with 1 being "not at all difficult" and 5 being "very difficult." A few interviewees specifically mentioned the influence of program rebates in driving down the incremental costs of program-qualifying equipment, making customer's decision to upgrade to more efficient equipment easier.

Table 4-8. Contractor Ratings of Level of Difficulty Motivating Customers to Purchase Program-Qualifying Equipment

Trade Ally Classification	Respondents (n)	Difficulty Rating (1-not at all difficult, 5-very difficult)	
		Mean	Percent 4 or 5
SAVE-Certified Contractors	15	1.4	0%

The consensus among SAVE-certified contractor interviewees is that the program is increasing customer interest and demand for high efficiency HVAC equipment. Trade allies we spoke with consistently reported using the program rebates in their sales processes, including incorporating rebates into price quotes and comparisons. Below are few specific comments from interviewees on how they have leveraged program rebates in their sales practices and the influence of the program rebates consumer demand for high efficiency HVAC equipment:

"We're selling more and more efficient equipment. [Customers] want that rebate."

"We show people how it's actually about the same price over an 80% efficiency [furnace] with the rebates. [The rebate] definitely helps. People like getting rebates back."

"Mainly for me [the program] is a selling tool…as long as you offer people money to [upgrade to higher efficiency] I think that increases demand. And I think if you take [the rebates] away it does change people's mindsets…I always put myself in the consumer's shoes—If I'm going to get $700 back that's an incentive to do it."

"When we quote we're going to quote something that qualifies for the rebates to help them get into more efficient equipment at hopefully similar dollars to what they'd pay for the less efficient equipment."

"It's easier to sell higher efficiency equipment with the rebate, with that initial higher cost out of the equation."

"[The rebates] influence [customer decisions] a lot. If they're kind of teetering on the edge [the rebates] kind of pushes them over. I don't think just because of the rebates but it sure helps them make the decision."

Several trade allies also reported that their recommendations, or customers' interest, in high efficiency equipment would be affected if MidAmerican's program was not available. Below are a few specific comments from interviewees:

"We only sell a couple of brands but we might not push the higher efficiency ones so much."

"[Most customers are] going to go with the cheapest [equipment] available if they're not going to get any money back for buying more efficient."

"We were already kind of [upselling to high efficiency] before the program came into effect, I think more so now that the program is in effect."

"I don't know if it would change MY approach but it may change the customer's approach. What would change is when they look at their net number after rebates and see the MidAmerican rebate wasn't there, that number is going to be much greater."

"Oh yeah it definitely would. Like I say, the ones that are Earth conscious are the ones that would ALWAYS put in the high efficiency that would pay the more money whether they got the rebate or not. The other ones that are more on the fence and are on a tight budget feel like they don't care if it's 80% efficient or 96% efficient as long as they've got heat. When there's a difference of $900 between the two most people are going to say they can't afford the extra $900."

"If the program were to go away we'd have to go back to the drawing board. People have gotten used to rebates. It [would] send us into a boom before a bust/recession. In the short term we'll have a great year and then the following summer we'll be in trouble."

Most trade allies we interviewed expected their 2017 sales of program-qualifying HVAC equipment to be similar to 2016. A couple of interviewees suspected sales may decline somewhat due to reduced furnace and central air conditioner rebate amounts in 2017. In addition, one interviewee thought central air conditioning sales might decrease somewhat due to changes equipment eligibility criteria (In 2017 minimum program-qualifying efficiency rating increased from SEER 14 to SEER 14.5).

4.5.2 ENERGY STAR® Appliances

The appliance retailers we interviewed generally reported not actively promoting MidAmerican's rebates to customers, noting that energy efficiency is not typically the primary driver of consumer preferences for refrigerators and freezers. Consumer preferences for these appliances are more commonly driven by size, functionality, and style/appearance. As a result, utility rebates may be less likely to influence consumer decision-making compared to mechanical space and water heating equipment. In addition, retailers reported that while the market share of ENERGY STAR certified refrigerators and freezers is still smaller than clothes washers, the appliance market as whole is trending toward ENERGY STAR independent of MidAmerican rebates.

4.6 PROGRAM SATISFACTION

4.6.1 Participant Satisfaction

Respondents to the participant survey generally expressed high satisfaction with the program overall as well as individual aspects of their participation experience. Nearly 90 percent of respondents said they were either "extremely satisfied" or "very satisfied" with the program overall. We asked those respondents who said they were either "not all satisfied" or "somewhat satisfied" to explain in their own words why they rated their satisfaction in the manner they did. The most common sources of dissatisfaction among this group were associated with the number and types of eligible equipment, clarity in eligibility requirements, and rebate amounts.

Of the individual aspects of the program asked in the survey, on average participants gave the highest satisfaction ratings with the contractor who installed their equipment (if applicable). The amount of the program rebate received the lowest satisfaction ratings on average, though over three-quarters of respondents still said they were either "extremely" or "very" satisfied with the amount of the rebate they received.

Table 4-9. Participant Satisfaction

Program Aspect	Respondents (n)	Extremely Satisfied	Very Satisfied	Somewhat Satisfied	Not at all Satisfied
The length of time it took to receive the rebate	314	30%	52%	17%	1%
The type of equipment eligible for the program	311	26%	58%	14%	2%
The contractor who installed the equipment	165	46%	45%	8%	0%
The rebate application process	316	29%	56%	14%	1%
The amount of the rebate received through the program	319	22%	54%	22%	3%
The program overall	321	32%	55%	12%	0%

Source: Questions SAT1A–SAT1E, SAT4 (Participant Survey); don't know and refused responses are excluded.

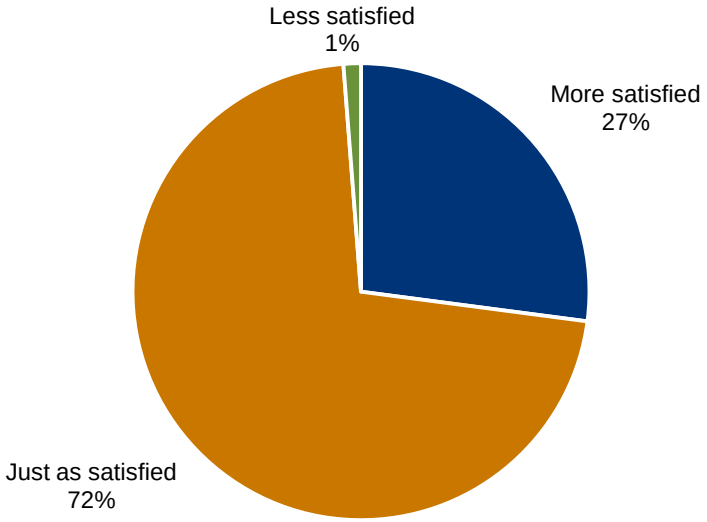
Given the recently added SAVE quality installation requirement for central heating and cooling rebates, one of the key objectives of the process evaluation was to assess customer satisfaction with their SAVE-certified contractor and the SAVE application process. Mirroring the overall results shown above, respondents who received a rebate for SAVE-certified heating or cooling equipment specifically rated their satisfaction with their contractor and the rebate application process highly. Eighty-nine percent of

these respondents said they were either “extremely satisfied” or “very satisfied” with the contractor who installed their equipment, and 87 percent said they were either “extremely satisfied” or “very satisfied” with the rebate application process.

Echoing the high satisfaction ratings, over half of respondents (53 percent) reported having recommended the Residential Equipment program to others. The overwhelming majority of participants who said they have not recommended the program to others explained that they simply have not had the opportunity or generally do not make recommendations relating to purchases of energy-using equipment. Very few customers reported any negative experiences or perceptions directly related to the program as the reason why they have not recommended the program.

Overall, 88 percent of participant respondents said they were either “extremely satisfied” (32 percent) or “very satisfied” (56 percent) with the service provided by MidAmerican. These results are comparable to responses from the nonparticipant survey, where 29 percent of respondents said they were “extremely satisfied” and 60 percent said they were “very satisfied.” While the overall results were similar between participants and nonparticipant survey respondents, over a quarter of participants surveyed (27 percent) said they were more satisfied with the quality of service provided by MidAmerican since their participation in the Residential Equipment program, compared to only one percent who were less satisfied. These results further reflect high program satisfaction.

Figure 4-4. Satisfaction with Service Provided By MidAmerican since Participation (n=325)



Source: Question SAT7 (Participant Survey).

4.6.2 Trade Ally Satisfaction

Like customers, the participating trade allies we spoke with also reported high satisfaction with both the program’s technical support as well as MidAmerican’s residential program portfolio overall. Among SAVE-certified trade allies, 11 of 14 interviewees rated their satisfaction with the program’s technical support a 4 or 5, with 1 being “not at all satisfied” and 5 being “very satisfied.” Similarly, 10 of 14 rated their satisfaction with MidAmerican’s residential programs overall a 4 or 5 using the same scale. The only major sources of dissatisfaction mentioned by trade allies was related to the additional required information added to the 2017 program application, in particular having to disclose labor and equipment costs, as described earlier.

Retailers generally had less direct involvement with MidAmerican's programs, but all retailer respondents gave a rating of 5 for technical support and the program overall.

Table 4-10. Trade Ally Satisfaction

Program Aspect	Trade Ally Classification	Respondents (n)	Satisfaction Rating (1-not at all satisfied, 5-very satisfied)	
			Mean	Percent 4 or 5
Program's technical support	SAVE-Certified Contractors	14	4.2	79%
	Retailers	2	5.0	100%
	Overall	**16**	**4.3**	**81%**
MidAmerican's residential energy efficiency programs overall	SAVE-Certified Contractors	14	4.0	71%
	Retailers	4	5.0	100%
	Overall	**18**	**4.3**	**78%**

5.0 KEY FINDINGS AND RECOMMENDATIONS

Overall, the program exceeded its savings goals for peak kW, but fell short of its goals for kWh savings, natural gas savings, and peak natural gas savings for PY2016. The following table reflects the impact results of the Residential Evaluation program. The overall realization rates for Iowa were 98.8 percent for kWh, 99.8 percent for peak kW, 94.2 percent for natural gas therms savings, and 94.3 percent for natural gas peak therms. In this section we outline the key takeaways of the evaluation, and propose related recommendations.

Table 5-1. Iowa Savings Goals and Impacts for PY2016

Impact	Goal	Reported Gross Savings	Evaluated Gross Savings	Evaluated Realization Rate*
kWh	22,803,941	19,422,409	19,191,249	98.8%
Peak kW	6,461	9,485	9,468	99.8%
Therms	2,598,340	2,352,451	2,217,022	94.2%
Peak Therms	31,854	30,323	28,609	94.3%

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

Based on the evaluation findings, the Tetra Tech team offers the recommendations for MidAmerican's consideration in Table 5-2.

Table 5-2. Residential Equipment Program Recommendations

Program Recommendations
Recommendation #1: Consider consolidating the standard installation algorithm and quality installation algorithm into one and utilize a de-rate factor for base equipment, similar to the approach taken by the IA TRM.
Recommendation #2: Use cooling capacity for the portion of the algorithm that calculates cooling energy savings and heating capacity for the portion of the algorithm that calculates heating energy savings.
Recommendation #3: Specify the use of furnace output capacity in the furnace measure sheet algorithm, or modify the furnace measure sheet algorithm so that furnace input capacity is the correct input for the algorithm.
Recommendation #4: Consider reviewing the heat pump water heater measure sheet algorithm to determine if an alternate algorithm or multiple savings factors may be needed to produce reasonable savings for heat pump water heaters with higher energy factors. The IA TRM approach appears to be sound for determining savings for heat pump water heaters.
Recommendation #5: We recommend no changes to the current measure sheets for refrigerators, freezers, furnace fans, and thermostats.
Recommendation #6: Consider suggesting a revised Equivalent Full Load Hour heating value for the IA TRM high efficiency furnace measure, perhaps even based on actual furnace energy use data and furnace capacity data for Iowa.
Recommendation #7: Continue using direct marketing campaigns (e.g., bill inserts) and leveraging trade allies to educate customers on program offerings.
Recommendation #8: Continue to provide rebates coupled with customer outreach, targeting marketing messages to highlight both equipment cost savings and energy cost savings. Monitor the impact of reduced PY017 rebate levels on participation levels.

Program Recommendations
Recommendation #9: Continue efforts to proactively inform trade allies of program changes and respond to their concerns to maintain trade ally engagement and satisfaction levels. To the extent possible, when changes are made, ensure trade allies understand the rationale behind those changes. Additionally, to avoid unnecessary burden, only require information on the program application that are being used purposefully for administration or QA/QC purposes specific to the rebated measure(s).
Recommendation #10: Continue paper verification and Tier 1 field verification protocols for SAVE installations, as well as provide ongoing training and support to participating contractors. To reduce administrative costs, consider eliminating Tier 2 field verification protocols and instead following Tier 3 protocols thereafter.

The following section represents the key takeaways from the evaluation and associated recommendations.

Finding #1: The measure sheets treat the residential HVAC mechanical equipment measures and their quality installation as two separate savings algorithms, which is a less accurate approach to calculating savings than combining measures.

Efficient HVAC equipment and their quality installation have a combined effect—while the equipment itself is more efficient than the baseline, the quality installation improves the operation of that equipment. Thus, a more accurate representation of the entire system would be for the new high efficiency equipment to be installed and include a SAVE quality installation in order to achieve the equipment's nameplate efficiency. Absent quality installation, the measure would likely not achieve its nameplate efficiency. To account for this, the IA TRM provides de-rate factors for equipment that is installed using a standard installation whereas the measure sheet algorithms use a savings factor multiplied by capacity to determine quality installation savings and a separate algorithm to determine savings for the efficient equipment.

> *Recommendation #1: Consider consolidating the standard installation algorithm and quality installation algorithm into one and utilize a de-rate factor for base equipment, similar to the approach taken by the IA TRM.*

Finding #2: The current measure sheet algorithms for air-source heat pumps and ground source heat pumps incorrectly use cooling capacity to determine both cooling and heating.

Heat pump heating capacities are generally lower than their cooling capacities. In addition, air-source heat pumps in particular have substantially lower heating capacities at lower temperatures. Using heat pump cooling capacity in both the heating and cooling portion of the savings calculation tends to overstate heating-mode energy savings.

> *Recommendation #2: Use cooling capacity for the portion of the algorithm that calculates cooling energy savings and heating capacity for the portion of the algorithm that calculates heating energy savings.*

Finding #3: Reported furnace savings estimates used input capacities in the measure sheet algorithms rather than output capacities, resulting in savings being overstated.

The measure sheet algorithm for furnace energy savings includes a calculation of furnace capacity divided by furnace AFUE. Although the measure sheet does not specify whether furnace input capacity or furnace output capacity should be used, the fact that AFUE is in the denominator of the algorithm indicates that the furnace output capacity would be the correct capacity to use. The lack of specification in the measure sheet may have caused confusion, as in almost all cases the input capacity was used in

the savings calculation even though output capacity was listed on the application as the capacity of the furnace.

> *Recommendation #3: Specify the use of furnace output capacity in the furnace measure sheet algorithm, or modify the furnace measure sheet algorithm so that furnace input capacity is the correct input for the algorithm.*

Finding #4: The heat pump water heater measure sheet algorithm yields reasonable savings at minimum efficiency, but much higher than expected savings at higher efficiencies.

The Tetra Tech team reviewed the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential and found that savings shown in the study matched the savings calculated by the heat pump water heater measure sheet algorithm when the water heater energy factor was set to 2.0 (the minimum efficiency for heat pump water heaters). This was also similar to savings predicted by other algorithms with an energy factor of 2.0 as the input. At higher efficiency levels (EF=3.0 or 4.0), however, the measure sheet algorithm predicted energy savings that were much higher than energy savings predicted by other engineering algorithms, such as the ones in the IA TRM and the IL TRM.

> *Recommendation #4: Consider reviewing the heat pump water heater measure sheet algorithm to determine if an alternate algorithm or multiple savings factors may be needed to produce reasonable savings for heat pump water heaters with higher energy factors. The IA TRM approach appears to be sound for determining savings for heat pump water heaters.*

Finding #5: Measure sheet savings approaches for furnace fans, thermostats, refrigerators, and freezers are reasonable.

The furnace fan measure sheet uses a deemed savings value of 469 kWh. This is similar to the value used in the IA TRM for single family homes in Des Moines (553 kWh), and perhaps even slightly conservative. Thermostat savings appear to be reasonable, but the measure sheet does not include documentation of assumptions, beyond referencing the 2014-2023 Iowa Statewide Assessment of Energy Efficiency Potential. Refrigerator and freezer savings are to be determined from the ENERGY STAR database based on model number energy use in comparison to standard refrigerator energy use. The Tetra Tech team was able to replicate savings for all of these measures.

> *Recommendation #5: We recommend no changes to the current measure sheets for refrigerators, freezers, furnace fans, and thermostats.*

Finding #6: The IA TRM savings algorithms and input assumptions appear reasonable, with the exception of Equivalent Full Load Hours (EFLH) for furnaces.

The Equivalent Full Load Hours (EFLH) heating value listed in the IA TRM for the high efficiency furnaces is 612 EFLH, which seems unreasonably low. This estimate is considerably lower than EFLH assumptions referenced in TRMs in nearby territories with similar climates, include Illinois and Missouri. In addition, despite being a predominantly heating climate, the heating EFLH estimate is lower than the EFLH cooling value specified in the IA TRM for Des Moines (811 EFLH cooling). The Tetra Tech team reviewed the equivalent full load hour heating values specified for Rockford, IL in the IL TRM (1,969 EFLH heating), as well as the approach described for calculating this value. Based on these reviews and our own independent calculations, we determined that a more reasonable estimate for EFLH heating value for Des Moines may be 1,830 EFLH heating.

> *Recommendation #6: Consider suggesting a revised Equivalent Full Load Hour heating value for the IA TRM high efficiency furnace measure, perhaps even based on actual furnace energy use data and furnace capacity data for Iowa.*

Finding #7: Program marketing and outreach efforts have been successful in raising general customer awareness of program rebates—trade allies and bill inserts have been most successful in driving participation.

The vast majority of both participants and nonparticipants surveyed recognized MidAmerican's "Save Some Green" messaging (82 percent and 74 percent, respectively). MidAmerican utility bill inserts or mailings, radio or television advertisement, and the MidAmerican website were the most commonly mentioned sources of awareness of "Save Some Green" messages. In addition, two-thirds of customers interviewed as part of the nonparticipant survey reported having heard of MidAmerican rebates for energy efficient heating and cooling equipment, thermostats, or appliances.

Most participating trade allies thought that customers are generally aware of the availability of MidAmerican rebates, and a couple of interviewees observed customer awareness increasing over time. While generally aware rebates are available, trade allies indicated customers are less knowledgeable about specifics on eligibility criteria or rebate amounts. This feedback underscores the importance of leveraging trade allies to help educate customers on program specifics.

Participants surveyed most commonly reported learning about the Residential Equipment program through a contractor (39 percent) or retailer (25 percent), illustrating the key role program trade allies play in generating customer awareness and interest in the program. Participating trade allies reported routinely discussing program rebates with customers and incorporating MidAmerican rebates into price estimates and comparisons. The next most commonly mentioned sources of awareness were from MidAmerican bill inserts and MidAmerican's website (15 percent and 14 percent, respectively). Few participants by comparison reported learning of the program from mass media sources (e.g., newspaper, television, radio, billboards).

> *Recommendation #7: Continue using direct marketing campaigns (e.g., bill inserts) and leveraging trade allies to educate customers on program offerings.*

Finding #8: The program's rebate offerings and customer education initiatives directly address key customer decision-making factors and barriers.

The rebates provided through the Residential Equipment program, along with the customer education provided through MidAmerican's marketing and outreach efforts, are designed to help overcome key decision-making factors and barriers mentioned by customers. When asked why they decided to participate in the Residential Equipment program, participants most often mentioned the financial incentive or rebate offered by the program (45 percent), followed by a desire to save money on their energy bills (32 percent). Saving money on energy bills and the cost of the equipment were also the two highest rated decision-making factors when considering equipment purchases among nonparticipant survey respondents (71 percent and 70 percent saying "very important," respectively). Regarding challenges faced implementing energy saving actions, nonparticipant survey respondents most commonly mentioned cost barriers, lack of awareness of energy saving opportunities, and low prioritization of energy conservation.

Participating HVAC trade allies that the Tetra Tech team spoke with consistently reported using the program rebates in their sales processes, including incorporating rebates into price quotes and comparisons. Several trade allies also reported that their recommendations, or customers' interest, in high efficiency equipment would be negatively affected if MidAmerican's program was not available. Feedback from these participating trade allies suggests that rebates levels for qualifying HVAC equipment in PY2016 were sufficient to encourage participation. However, several trade allies noted the reductions in PY2017 rebate amounts for some measures and cautioned against lowering incentive levels much further. Declining rebate amounts was one of the only risks to future participation mentioned by trade allies.

Recommendation #8: Continue to provide rebates coupled with customer outreach, targeting marketing messages to highlight both equipment cost savings and energy cost savings. Monitor the impact of reduced PY017 rebate levels on participation levels.

Finding #9: Participating customers and trade allies were highly satisfied with the program.

Participating surveyed customers generally expressed high satisfaction with the program overall as well as individual aspects of their participation experience. Nearly 90 percent of survey respondents said they were either "extremely satisfied" or "very satisfied" with the program overall. SAVE participants were also highly satisfied with the contractor who installed their equipment and the rebate application process. Echoing the high satisfaction ratings, over half of all participant respondents (53 percent) reported having recommended the Residential Equipment program to others.

Like customers, participating trade allies we spoke with also reported high satisfaction with both the program's technical support as well as MidAmerican's residential program portfolio overall. Among SAVE-certified contractors, 11 of 14 interviewees rated their satisfaction with the program's technical support a 4 or 5, with 1 being "not at all satisfied" and 5 being "very satisfied." Similarly, 10 of 14 rated their satisfaction with MidAmerican's residential programs overall a 4 or 5 using the same scale.

The only source of dissatisfaction commonly mentioned by trade allies related to the additional required information added to the PY2017 program application—especially having to disclose labor and equipment costs. Notably, program staff have already taken steps to address this concern, providing trade allies with default labor and equipment cost factors that can be used if they are unable to provide the actual itemized costs.

Recommendation #9: Continue efforts to proactively inform trade allies of program changes and respond to their concerns to maintain trade ally engagement and satisfaction levels. To the extent possible, when changes are made, ensure trade allies understand the rationale behind those changes. Additionally, to avoid unnecessary burden, only require information on the program application that are being used purposefully for administration or QA/QC purposes specific to the rebated measure(s).

Finding #10: SAVE quality installation verification protocols are well documented, systematic, and rigorous.

MidAmerican has established rigorous QA/QC protocols for SAVE rebate applications, which are clearly documented in the program operations manual. In addition to paper verification on a census of SAVE projects, A-TEC conducts field verification on the first three applications for each participating trade ally (Tier 1), followed by 1 in 10 installations (Tier 2), then 1 in 30 installations (Tier 3). Program staff noted that SAVE test scores have improved over time with additional contractor training and experience; however, the program's SAVE verification protocols are costly to implement.

Considering the SAVE program is now in its fourth year and the improvement seen among participating contractors, the same frequency of field verifications may no longer be necessary to maintain the same level of quality installation in the future. While the Tetra Tech team recommends the program continue to perform field verifications on the first three projects for new contractors (Tier 1) as an industry best practice, the program might consider eliminating the second Tier of field verification and instead following Tier 3 protocols thereafter for continuing quality control. The program should also continue to support ongoing training and support for participating contractors.

Recommendation #10: Continue paper verification and Tier 1 field verification protocols for SAVE installations, as well as provide ongoing training and support to participating contractors. To reduce administrative costs, consider eliminating Tier 2 field verification protocols and instead following Tier 3 protocols thereafter.

APPENDIX A: PROJECT REVIEW RESULTS

As noted earlier, the PY2016 Residential Equipment program impact evaluation efforts included an engineering analysis for a sample of 74 participating Iowa projects. The Tetra Tech team made no adjustments to calculated savings for most electric projects, but it was necessary to adjust natural gas savings for furnace quality installation projects because of an error involving use of the incorrect capacity in the measure sheet algorithm—the input capacity was used when instead the output capacity should have been used. The Tetra Tech team made savings adjustments to a total of four electricity savings projects and 45 natural gas savings projects. The table below provides project level realization rates for the 49 total Residential Equipment projects were adjustments were made. A detailed description of the adjustments follow the table.

Table A-1. Project Level Reported and Evaluated Gross Energy Savings

Project ID	Electric Savings (kWh)		Demand Savings (Peak kW)		Gas Savings (Therms)		Gas Savings (Peak Therms)		Realization Rate			
	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	kWh	kW	Therms	Peak Therms
Iowa Projects												
1001A	-	-	-	-	139.3	132.0	1.81	1.72	-	-	0.948	0.948
1001B	-	-	-	-	42.5	40.3	0.55	0.52	-	-	0.948	0.948
1002A	-	-	-	-	76.4	72.6	0.99	0.94	-	-	0.950	0.950
1002B	-	-	-	-	22.1	21.0	0.29	0.27	-	-	0.950	0.950
1003A	-	-	-	-	152.7	148.9	1.99	1.94	-	-	0.975	0.975
1003B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1004A	-	-	-	-	116.3	112.5	1.51	1.46	-	-	0.967	0.967
1004B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1005A	-	-	-	-	106.9	105.0	1.39	1.37	-	-	0.982	0.982
1005B	-	-	-	-	30.9	30.4	0.40	0.39	-	-	0.982	0.982
1006A	-	-	-	-	152.7	147.0	1.99	1.91	-	-	0.963	0.963
1006B	-	-	-	-	44.2	42.5	0.57	0.55	-	-	0.963	0.963
1007A	-	-	-	-	185.9	180.4	2.4	2.3	-	-	0.970	0.970
1007B	-	-	-	-	55.2	53.5	0.72	0.70	-	-	0.967	0.967
1007C	-	-	-	-	111.6	107.8	1.45	1.40	-	-	0.970	0.970
1007D	-	-	-	-	55.2	32.0	0.72	0.42	-	-	0.580	0.580
1008A	-	-	-	-	116.3	112.5	1.51	1.46	-	-	0.967	0.967
1008B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1009A	-	-	-	-	114.6	110.7	1.49	1.44	-	-	0.967	0.967
1009B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1010A	-	-	-	-	116.3	112.5	1.51	1.46	-	-	0.967	0.967

Project ID	Electric Savings (kWh)		Demand Savings (Peak kW)		Gas Savings (Therms)		Gas Savings (Peak Therms)		Realization Rate			
	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	kWh	kW	Therms	Peak Therms
Iowa Projects (cont.)												
1010B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1011A	-	-	-	-	152.7	148.9	1.99	1.94	-	-	0.975	0.975
1011B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1012A	-	-	-	-	117.5	113.6	1.53	1.48	-	-	0.967	0.967
1012B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1013A	-	-	-	-	115.2	111.3	1.50	1.45	-	-	0.967	0.967
1013B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1014A	-	-	-	-	115.2	111.3	1.50	1.45	-	-	0.967	0.967
1014B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1015A	-	-	-	-	114.6	110.7	1.49	1.44	-	-	0.967	0.967
1015B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1016A	-	-	-	-	79.6	74.2	1.03	0.96	-	-	0.932	0.932
1016B	-	-	-	-	24.3	22.3	0.32	0.29	-	-	0.918	0.932
1017A	-	-	-	-	74.4	72.5	0.97	0.94	-	-	0.975	0.975
1017B	-	-	-	-	22.1	21.5	0.29	0.28	-	-	0.975	0.975
1018A	-	-	-	-	114.6	110.7	1.49	1.44	-	-	0.967	0.967
1018B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1019A	-	-	-	-	114.6	110.7	1.49	1.44	-	-	0.967	0.967
1019B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967
1020A	-	-	-	-	79.6	76.0	1.03	0.99	-	-	0.955	0.955
1020B	-	-	-	-	24.3	23.2	0.32	0.31	-	-	0.955	0.983
1021	-	-	-	-	79.6	76.0	1.03	0.99	-	-	0.955	0.955

Project ID	Electric Savings (kWh)		Demand Savings (Peak kW)		Gas Savings (Therms)		Gas Savings (Peak Therms)		Realization Rate			
	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	kWh	kW	Therms	Peak Therms
Iowa Projects (cont.)												
1022A	-	-	-	-	119.4	114.6	1.55	1.49	-	-	0.960	0.960
1022B	-	-	-	-	34.8	33.4	0.45	0.43	-	-	0.960	0.960
1023A	-	-	-	-	154.3	150.5	2.01	1.96	-	-	0.975	0.975
1023B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1024A	-	-	-	-	159.2	153.8	2.07	2.00	-	-	0.966	0.966
1024B	-	-	-	-	48.6	46.9	0.63	0.61	-	-	0.970	0.970
1024C	-	-	-	-	126.0	122.2	1.64	1.59	-	-	0.966	0.966
1024D	-	-	-	-	48.6	35.3	0.63	0.46	-	-	0.727	0.727
1025	2,285.0	1,030.5	0.56	0.25	-	-	-	-	0.451	0.451	-	-
1026A	-	-	-	-	152.7	146.6	1.99	1.91	-	-	0.960	0.960
1026B	-	-	-	-	44.2	42.4	0.57	0.55	-	-	0.960	0.953
1027A	-	-	-	-	173.4	154.3	2.25	2.01	-	-	0.890	0.890
1027B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1028A	-	-	-	-	108.5	104.2	1.41	1.35	-	-	0.960	0.960
1028B	-	-	-	-	33.1	31.5	0.43	0.41	-	-	0.950	0.950
1029A	-	-	-	-	87.9	78.4	1.14	1.02	-	-	0.892	0.892
1029B	-	-	-	-	22.1	21.5	0.29	0.28	-	-	0.975	0.975
1030A	-	-	-	-	212.5	191.9	2.76	2.50	-	-	0.903	0.903
1030B	-	-	-	-	55.2	53.0	0.72	0.69	-	-	0.960	0.960
1031	-	-	-	-	206.2	185.2	2.68	2.41	-	-	0.898	0.898
1032A	-	-	-	-	128.4	115.2	1.67	1.50	-	-	0.897	0.897
1032B	-	-	-	-	33.1	32.0	0.43	0.42	-	-	0.967	0.967

Project ID	Electric Savings (kWh)		Demand Savings (Peak kW)		Gas Savings (Therms)		Gas Savings (Peak Therms)		Realization Rate			
	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	kWh	kW	Therms	Peak Therms
Iowa Projects (cont.)												
1033A	-	-	-	-	171.8	152.7	2.23	1.99	-	-	0.889	0.889
1033B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1034A	-	-	-	-	84.1	76.8	1.09	1.00	-	-	0.913	0.913
1034B	-	-	-	-	22.1	21.0	0.29	0.27	-	-	0.950	0.950
1035A	-	-	-	-	84.1	76.8	1.09	1.00	-	-	0.913	0.913
1035B	-	-	-	-	22.1	21.0	0.29	0.27	-	-	0.950	0.950
1036A	-	-	-	-	206.2	185.2	2.68	2.41	-	-	0.898	0.898
1036B	-	-	-	-	48.6	47.5	0.63	0.62	-	-	0.977	0.977
1037A	-	-	-	-	121.2	106.9	1.58	1.39			0.882	0.882
1037B	-	-	-	-	30.9	30.4	0.40	0.39	-	-	0.982	0.982
1038A	-	-	-	-	179.5	160.6	2.33	2.09	-	-	0.895	0.895
1038B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1039	232.4	240.4	0.31	0.32	-	-	-	-	1.034	1.035	-	-
1040A	-	-	-	-	180.7	160.4	2.35	2.09	-	-	0.888	0.888
1040B	-	-	-	-	46.4	45.3	0.60	0.59	-	-	0.976	0.976
1041A	-	-	-	-	184.8	166.0	2.40	2.20	-	-	0.898	0.898
1041B	-	-	-	-	44.2	43.1	0.57	0.56	-	-	0.975	0.975
1042A	-	-	-	-	178.7	159.2	2.32	2.07	-	-	0.891	0.891
1042B	-	-	-	-	44.2	46.9	0.57	0.61	-	-	1.063	1.063
1043A	-	-	-	-	127.8	114.6	1.66	1.49	-	-	0.897	0.897
1043B	-	-	-	-	33.1	32.0	0.27	0.26	-	-	0.967	0.967
1044A	-	-	-	-	267.0	240.9	3.47	3.13	-	-	0.902	0.902
1044B	-	-	-	-	66.2	64.0	0.86	0.83			0.967	0.967

Project ID	Electric Savings (kWh)		Demand Savings (Peak kW)		Gas Savings (Therms)		Gas Savings (Peak Therms)		Realization Rate			
	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	Reported	Evaluated	kWh	kW	Therms	Peak Therms
Iowa Projects (cont.)												
1045A	-	-	-	-	180.7	160.4	2.35	2.09	-	-	0.888	0.888
1045B	-	-	-	-	46.4	45.3	0.60	0.59	-	-	0.976	0.976
1046	-	-	-	-	180.7	160.4	2.35	2.09	-	-	0.888	0.888
1047A	-	-	-	-	170.4	153.5	2.22	2.00	-	-	0.901	0.901
1047B	-	-	-	-	44.2	42.5	0.57	0.55	-	-	0.963	0.963
1048	38.2	98.7	0.04	0.13	-	-	-	-	2.586	3.376	-	-
1049	147	62	0.02	0.01	-	-	-	-	0.422	0.420	-	-

Details of the project-based savings adjustments are provided below by Project ID:

- Project ID 1001-1006: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1007: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacements (A) and (C), and quality installations (B) and (D) to be somewhat overstated.
- Project ID 1008-1020: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1021: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement to be somewhat overstated.
- Project ID 1022-1023: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1024: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacements (A) and (C), and quality installations (B) and (D) to be somewhat overstated.
- Project ID 1025: The evaluation identified that an incorrect capacity was used in the ground source heat pump quality installation measure sheet algorithm, causing savings to be significantly overstated. The correct capacity was used in the standard replacement algorithm.
- Project ID 1026-1030: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1031: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement to be somewhat overstated.
- Project ID 1032-1038: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1039: The evaluation identified that applying the supplied capacity of the central air conditioner to the quality installation measure sheet algorithm produced slightly higher than reported savings. Calculation of standard replacement savings produced the same results as the reported savings.
- Project ID 1040-1045: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1046: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement to be somewhat overstated.

- Project ID 1047: The evaluation identified that furnace input capacity was incorrectly used instead of output capacity in the measure sheet algorithm, causing savings for the furnace replacement (A), and quality installation (B) to be somewhat overstated.
- Project ID 1048: The evaluation identified that applying the supplied capacity of the room air conditioner to the measure sheet algorithm produced savings significantly higher than reported savings.
- Project ID 1049: The evaluation identified that referring to the ENERGY STAR data for the refrigerator model installed (as required by the measure sheet algorithm) resulted in lower savings than the reported savings.

APPENDIX B: NET-TO-GROSS RESEARCH RESULTS

Historically, primary NTG research in Iowa has not been required—a deemed NTG value of 1.0 was used for all energy efficiency programs, supported by occasional secondary research efforts—and gross savings have been reported. While Iowa remains a gross savings state[16], in 2014 the Iowa Utilities Board (IUB) approved a collaborative statewide NTG study with the intent to provide Iowa utilities and stakeholders with the information and context needed to make an informed choice on the future of NTG research and values in the state, and provide guidance and recommendations for developing an Iowa approach to applying NTG. The study was completed in the fall of 2015.

In April of 2016, the IUB issued the Order Requesting Net-to-Gross Research Plan (Order issued on April 8, 2016), requesting "the NTG Oversight Committee draft a plan for Net-To-Gross research that will be coordinated with work done on the Technical Reference Manual and the joint assessment of Potential." In response to this Order, MidAmerican asked the Tetra Tech team to conduct primary NTG research for its programs that are implemented in Iowa, but to exclude those programs that are jointly implemented with other Iowa investor-owned utilities. Residential Equipment was one of those programs where primary NTG research was conducted in MidAmerican's Iowa service territory.

From an impact perspective, NTG represents a measurement of savings attributable to program interventions. It first accounts for free-ridership, which measures the savings claimed by individuals who would have installed the same high-efficiency measure type on their own at that same time if the program had not been offered. We also accounted for participant spillover, which measures untracked and non-rebated savings resulting from program information and intervention. When free-ridership and spillover are captured, the NTG ratio is calculated. While there has been much interest in and activity surrounding the impact of NTG on energy efficiency programs, Iowa continues to use NTG measurement for program design and planning purposes. And it is important to remember that the NTG estimate is only one piece of the puzzle. Considering all information, inclusive of the NTG estimate, will allow MidAmerican to make informed decisions about the effectiveness of their programs.

The Tetra Tech team conducted primary NTG research with participating customers and trade allies, as well as a secondary review of NTG values used by similar programs in nearby territories. The participant survey estimated free-ridership and participant spillover effects from customer self-reports following the IL TRM protocol (version 5.0). The trade ally interviews also investigated qualitative indicators of the program's influence on customer decision-making and trade ally practices. The secondary review focused on relevant studies addressing residential NTG for states or service territories with characteristics similar to MidAmerican's service territory and the Residential Equipment program.

The customer self-reports resulted in a calculated NTG ratio of 49 percent following the IL TRM self-report protocol (52 percent free-ridership, 1 percent spillover). Feedback from participating trade allies suggests higher program attribution for HVAC measures than indicated by the customer self-report results—trade allies we spoke with consistently reported using the program rebates in their sales processes and pricing quotes and comparisons, and that less program-qualifying high efficiency equipment would be sold if program rebates were not available to help offset the additional cost for these large investment measures. Trade allies are a primary source of program awareness, and participants commonly mentioned the influence of contractor recommendations on their decision to install their rebated equipment. Considering the trade ally-driven nature of HVAC measures, which

[16] Because Iowa remains a gross savings state, net savings have not been calculated.

comprise the bulk of program savings, the customer self-reports alone likely underrepresent true program attribution.

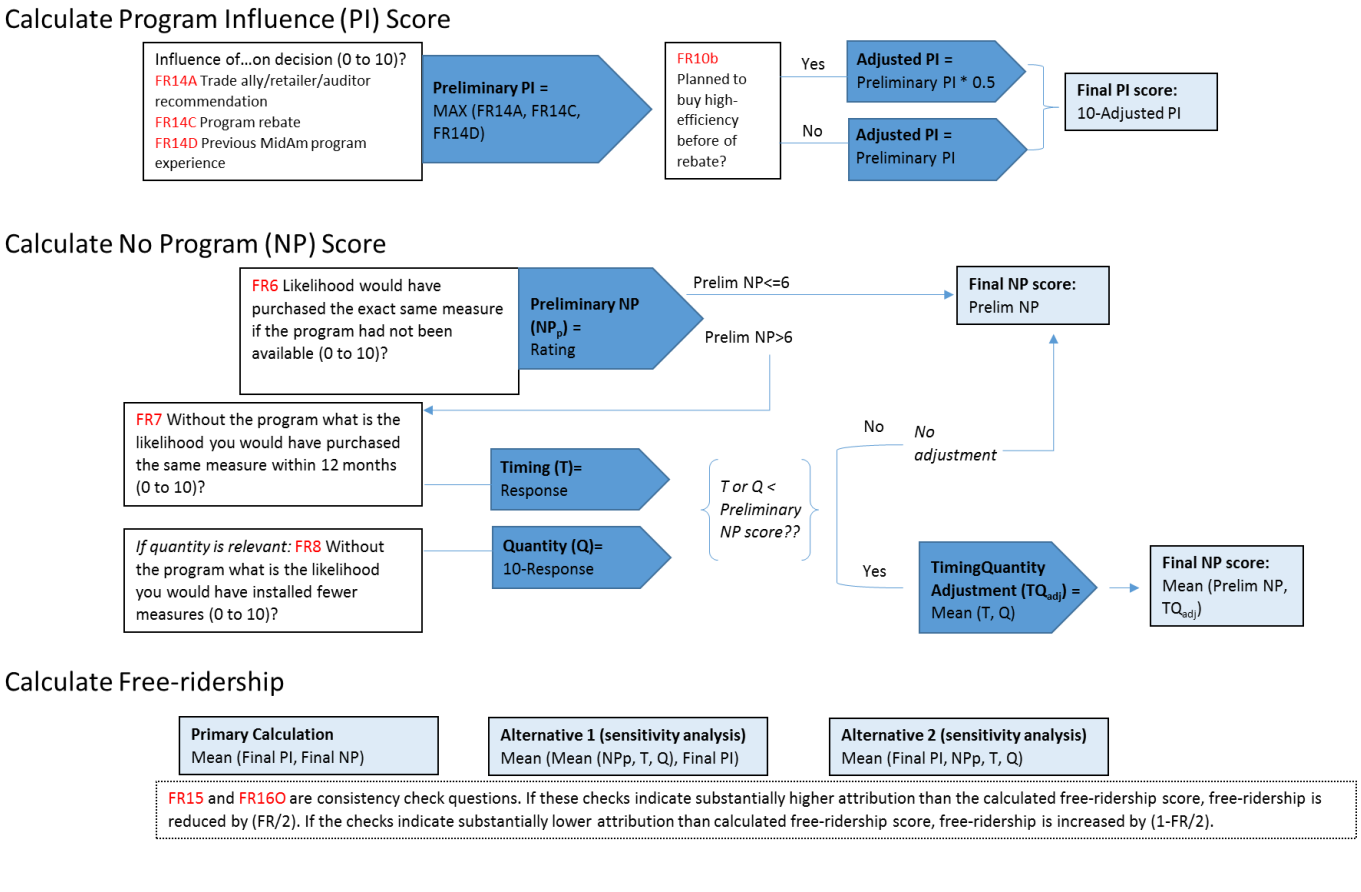
B.1 CUSTOMER SELF-REPORTS

The participant survey asked customers a series of highly structured questions to estimate free-ridership and spillover effects based on the IL TRM self-report protocol.

Free-ridership

The participant survey asked decision-makers a series of questions about the influence of the program on their decision to purchase qualifying equipment and actions that would have been taken in the absence of the program to assess free-ridership. A preliminary free-ridership rate was calculated for each participant, following the scoring algorithm detailed in the IL TRM, as shown in Figure B-1. Preliminary free-ridership scores were further reviewed for consistency with additional consistency check questions included in the participant survey. In some cases, preliminary free-ridership scores were adjusted based on these consistency checks to more accurately reflect program attribution.[17] Individual free-ridership rates were then weighted to adjust for proportional sampling differences, non-response, and reported energy savings to calculate measure-category-level and program-level free-ridership rates.

Figure B-1. Free-ridership Scoring Methodology



[17] A total of 13 preliminary free-ridership scores were adjusted based on the consistency check review.

Following the IL TRM protocol, the participant customer self-reports resulted in an overall free-ridership rate of 52 percent. Self-report free-ridership rates were generally highest for appliances such as refrigerators, freezers, and room air conditioners (ranging from 57 percent to 72 percent) and programmable thermostats (60 percent). On average, free-ridership rates were lowest for heat pump water heaters (29 percent), heat pumps (41 percent), and central air conditioners (44 percent). Free-ridership for furnaces, which represented nearly three-quarters of the combined reported electric and gas savings in the survey population, averaged 52 percent (and 62 percent for furnace fans).

Table B-1. Customer Self-Report Free-Ridership Results

Measure	Surveyed (n)	Population Reported Savings (MMbtu)	Free-ridership Estimate	90% CI (+/-)
Central air conditioner	31	9,393	44%	8%
Freezer	8	36	57%	10%
Furnace	56	109,812	52%	5%
Furnace fan	37	5,776	62%	6%
Heat pump	58	10,617	41%	5%
Refrigerator	48	615	70%	5%
Room air conditioner	18	11	72%	7%
Programmable thermostat	49	13,039	60%	5%
Heat pump water heater	9	226	29%	18%
Overall	**314**	**149,526**	**52%**	**2%**

Customers provided mixed feedback on the influence of the program in their decisions to install program-qualifying equipment.[18] On average, participants rated the influence of the rebate on the decision to install their rebate equipment at 7.7 out of 10, with 0 being “not at all influential” and 10 being “very influential.” Also, where applicable, respondents rated the influence of a recommendation from a contractor, retailer, energy auditor, or other program-related staff at an average of 8.4 out of 10. At the same time, over half of respondents (58 percent) reported that they were already planning to install the equipment before they learned about the rebate available through the program. Additionally, on average, respondents rated the likelihood that they would have purchased the exact same equipment if the program had not been available at 7.8 out of 10, with 0 being “not at all likely” and 10 being “completely likely.” Those who gave a rating of greater than 0 rated the likelihood of purchasing the equipment within 12 months at 7.9 of out of 10, on average, using the same scale. Finally, those purchasing multiple rebated units rated the likelihood of installing fewer units in the absence of the program at 5.5 out of 10 on average, indicating moderate program influence on the quantity of energy efficient purchases.

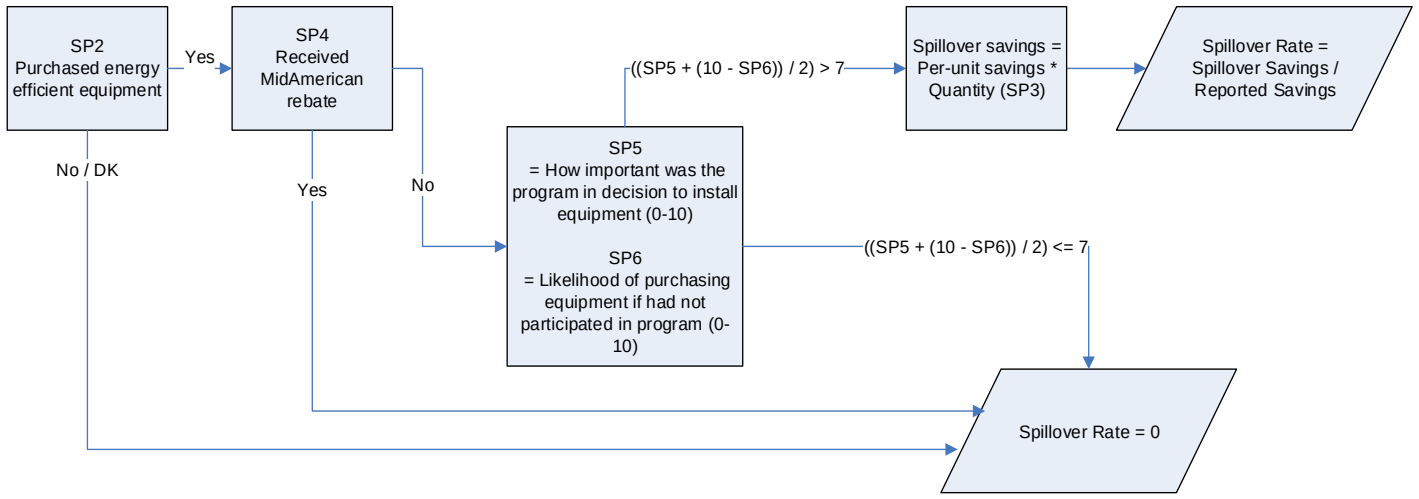
Spillover

In addition to free-ridership, the participant survey included a series of questions designed to measure spillover following the IL TRM protocols, as shown in Figure B-2. Spillover refers to purchases of energy-efficient equipment since participation that were made *without* any financial assistance from MidAmerican as a result of the customer’s participation in the program. A participant spillover estimate

[18] This is typical of customer self-reports, and one of the key challenges in determining true program attribution.

is computed based on energy savings from energy efficient equipment the customer installed on their own since participating because of their experience with the program. The Tetra Tech team followed the IL TRM protocols to estimate attributable spillover for measures where savings could be confidently estimated from MidAmerican's PY2016 tracking data or the IL TRM.[19]

Figure B-2. Participant Spillover Methodology



The participant survey identified overall spillover rate of 1 percent. Six participant respondents reported purchasing equipment resulting in quantifiable spillover savings attributable to the Residential Equipment program. Measures resulting in attributable spillover savings included LEDs (n=3), programmable thermostats (n=2), refrigerators (n=1), furnaces (n=1), and heat pumps (n=1).

Table B-2. Self-Report Participant Spillover Results

Program	Respondents (n)	Spillover Estimate	90% CI (+/-)
Residential Equipment	325	1%	5%

B.2 TRADE ALLY VIEWS

One potential issue with assessing free-ridership through customer self-reports for trade ally-influenced equipment is that programmatic influences on trade ally sales practices and recommendations are likely not fully captured in customer self-reports. The program relies heavily on trade allies for customer outreach and marketing, especially for HVAC measures. Results from the participant survey show that trade allies are a leading source of program awareness for customers. Recognizing this, interviews with participating trade allies investigated the program's influence on sales practices, recommendations, and market trends to support the NTG assessment.

[19] For measures where PY2016 MidAmerican program tracking data were available, average per-unit reported savings from the tracking data were used to calculate spillover savings. For measures not represented in MidAmerican's PY2016 tracking data, per-unit spillover savings were estimated using the IL TRM and pertinent household characteristics available from the participant survey. Spillover savings were not quantified for measures not included in the IL TRM, or where savings could not be confidently estimated based on the respondent data available.

Feedback from participating HVAC trade allies suggests that the program influences trade ally sales processes and customer decision-making. Participating trade allies we spoke with consistently reported using the rebates as part of their sales process, including incorporating rebates into pricing quotes and comparisons. The consensus among interviewees was that the program has increased customer interest and demand for high efficiency HVAC equipment. A few respondents specifically mentioned the influence of program rebates in driving down the incremental costs of program-qualifying equipment, making customer's decision to upgrade to more efficient equipment easier. Trade allies also reported that their recommendations, or customers' interest, in high efficiency equipment would be affected if MidAmerican's program was not available.

Feedback from participating appliance retailers suggests lower program influence for qualifying appliance measures (refrigerator and freezers). The appliance retailers we interviewed generally reported they are not actively promoting MidAmerican's rebates to customers, noting that consumer preferences for these appliances are more commonly driven by size, functionality, and style/appearance rather than energy efficiency. As a result, MidAmerican's (and other utility) rebates may be less likely to influence consumer decision-making compared to HVAC and water heating equipment. In addition, retailers reported that while the market share of ENERGY STAR certified refrigerators and freezers is still smaller than clothes washers, the appliance market as whole is trending toward ENERGY STAR, independent of MidAmerican rebates.

APPENDIX C: PARTICIPANT SURVEY

MidAmerican Energy Residential Equipment Program
Process, Verification, and Net-to-Gross Participant Survey

(NOTE: Each respondent will only be asked the Verification and Free-Ridership for ONE sampled measure)

- Sample Variables
- Introduction
- Phone Screening
- Awareness Source
- Process Questions
- Verification
  - Clothes Washer
  - Dishwasher
  - Refrigerator or Freezer
  - Central Air Conditioner
  - Heat Pump
  - Furnace
  - Furnace Fan
  - Room/Window Air Conditioner
  - Thermostat and Heating and Cooling Temperatures
  - Water Heater
- Free-ridership
- Spillover
- Financing
- Satisfaction
- Final Process Questions
- Demographics
- Conclusion

SAMPLE VARIABLES

The following fills will be used throughout the survey. These fills are program and measure specific. These fills may need to be revised once Tetra Tech has received and analyzed the participant data.

[CASEID] Unique case identifier

[PROGRAM] Residential Equipment program

[DATE] Date of participation

[REBAMT] Rebate dollar amount per measure

[QTY] Quantity of sampled measure installed

[MEASURE_TYPE] Generic product description

2	Central Air Conditioner
3	Clothes Washer
4	Dishwasher
5	Freezer
6	Furnace
7	Furnace Fan
9	Heat Pump
10	Refrigerator
11	Room Air Conditioner
12	Thermostat
13	Water Heater

[MEASURE] Sampled survey measure

2	Central Air Conditioner
3	Clothes Washer
4	Dishwasher
5	Freezer
6	Furnace
7	Furnace Fan
9	Heat Pump
10	Refrigerator
11	Room Air Conditioner
12	Thermostat
13	Water Heater

[EE_MEAS] Specific high efficiency equipment implemented or service performed. These will be generated in the sample file and updated prior to fielding the survey.

2	energy efficient Central Air Conditioner
3	energy efficient Clothes Washer
4	energy efficient Dishwasher
5	energy efficient Freezer
6	energy efficient Furnace
7	energy efficient Furnace Fan
9	energy efficient Heat Pump
10	energy efficient Refrigerator
11	energy efficient Room Air Conditioner
12	energy efficient Thermostat
13	energy efficient Water Heater

[SAVE] Participated in the SAVE program option

0	None
1	SAVE installation included

[REFRIG_FZR] Had refrigerator or freezer installed
- 0 None
- 1 Rebated for refrigerator/freezer

[CAC] Had central air conditioning installed
- 0 None
- 1 Rebated for central air conditioning

[HEATPUMP] Had heat pump installed
- 0 None
- 1 Rebated for heat pump

[FURNACE] Had furnace installed
- 0 None
- 1 Rebated for furnace

[THERM] Had thermostat installed
- 0 None
- 1 Rebated for thermostat

[ADDRESS] Address where measure implemented

[CONTACT] Contact listed in participant files

[BILL_ACCOUNT] Billing account number

[UPREMISE_ID] Utility premise identification number

[EXTPROJECTID] Project identification number

[TERRITORY] Territory where measure was implemented
- 1 Iowa
- 2 Illinois

[QUOTA]
- 101 Iowa - Appliance
- 102 Iowa – Central AC
- 103 Iowa - Furnace
- 104 Iowa – Furnace Fan
- 105 Iowa – Heat Pump
- 106 Iowa – Room AC
- 107 Iowa - Thermostat
- 108 Iowa – Water Heater
- 201 Illinois – Central AC
- 202 Illinois - Furnace
- 203 Illinois – Furnace Fan
- 204 Illinois – Heat Pump
- 205 Illinois – Room AC
- 206 Illinois - Thermostat

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 _____ calling from Tetra Tech on behalf of MidAmerican Energy. We are conducting a study about MidAmerican's <PROGRAM>. This is not a sales call, and responses will be used to inform MidAmerican about your experience with the program.

Our records show that your household received a rebate for purchasing <EE_MEAS> through MidAmerican's <PROGRAM>. May I speak to the person in your household that is most familiar with your participation in the program?

01	Yes	
02	No, R not knowledgeable	[SKIP TO SCREEN1]
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 <PROGRAM>.

I'm not selling anything; I'd just like to ask your opinion about this 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.

This survey will only take about 20 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.

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 20 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.

SCREEN1 Is there someone else in your household that is knowledgeable about your household's participation in the <PROGRAM>?

01	Yes, there's somebody else	
02	No	[THANK & TERMINATE 81]
88	Don't know	[THANK & TERMINATE 81]
99	Refused / Prefer not to answer	[THANK & TERMINATE 91]

SCREEN2 May I please speak with that person?

01	Yes	[RETURN TO INT01]
02	Yes, but R is not currently available	[SCHEDULE CALLBACK]
03	No	[THANK AND TERMINATE 91]
99	Refused	[THANK AND TERMINATE 91]

PHONE SCREENING QUESTIONS

CELL1 Are you currently talking to me on a regular landline phone or a cell phone? [CHECK ONE]

01	Landline phone
02	Cell phone
88	Don't know
99	Refused

CELL2 [SKIP IF CELL1 = 1] Are you currently driving a motorized vehicle? [CHECK ONE]

01	Yes	[SCHEDULE CALL BACK]
02	No	
88	Don't know	[SCHEDULE CALL BACK]
99	Refused	[SCHEDULE CALL BACK]

I3 First, I'd like to ask you a few questions about your household.
Are you, or is anyone in your household, a current or former employee of MidAmerican? [CHECK ONE]

01	Yes	[THANK & TERMINATE 83]
02	No	
88	Don't know	[THANK & TERMINATE 83]
99	Refused	[THANK & TERMINATE 91]

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

01	Yes	[CONTINUE]
02	No	[SCHEDULE CALL BACK WITH OTHER KNOWLEDGEABLE PERSON]
99	Refused	[THANK & TERMINATE 91]

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

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

AWARENESS

[ASK OF ALL]

P2 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 P4]
88	Don't know	[SKIP TO P4]
99	Refused	[SKIP TO P4]

P3 Please tell where you have noticed information about Save Some Green. [DO NOT READ LIST; 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
99 Refused

P4 Have you seen any energy efficiency materials or messaging that included "EnergyAdvantage?" [CHECK ONE]

01 Yes
02 No [SKIP TO P1]
88 Don't know [SKIP TO P1]
99 Refused [SKIP TO P1]

P5 Please tell where you have noticed the "EnergyAdvantage" materials or messaging. [DO NOT READ LIST; 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
99 Refused

Now I would like to ask you about your experience with the <PROGRAM>.

P1 How did you learn about the <PROGRAM>? [DO NOT READ; CHECK ALL THAT APPLY]

01 MidAmerican utility bill insert
02 MidAmerican website
03 MidAmerican brochure
04 MidAmerican call center representative
05 Retail store
06 Contractor
07 Home show/conference/trade show
08 Newspaper
09 Radio
10 Television
11 Billboard
12 Friend/family member/other business
13 Door hangers
14 Other (SPECIFY)
88 Don't know
99 Refused

PROCESS QUESTIONS

[ASK OF ALL]

RE2 For the purchase and installation of the equipment through the program, did you work directly with a contractor, a retailer, or by yourself? [DO NOT READ; CHECK ALL THAT APPLY]

01 Contractor
02 Retailer
03 By myself
04 Other (SPECIFY)
88 Don't know

RE5 **[IF RE2=1 OR 2]** When you purchased the equipment, did the [IF RE2 = 2: retailer; IF RE2 = 1: contractor; IF RE2=1 AND RE2=2: contractor or retailer]…

For RE5A through RE5E

01 Yes
02 No
77 Not Applicable
88 Don't know

RE5A Provide brochures or literature about ways you can save energy in your home?
RE5B Discuss with you the potential energy savings you could achieve by installing energy efficient equipment
RE5C Provide instructions or assistance with installation?
RE6D Show you how to maintain your new equipment?
RE5E [If SAVE=1] Discuss temperature settings for your equipment?

RE6 **[IF RE2=1 OR 2]** Who completed the application for this program? Was it you, your [IF RE2 = 2: retailer; IF RE2 = 1 contractor; IF RE2=1 AND RE2=2: contractor or retailer], or both of you together?

01 Customer
02 Contractor/Retailer
03 Both Customer and Contractor/Retailer
88 Don't know

RE6A **[IF RE6=1 OR 3 OR RE2=3]** Did you find the application easy to complete?

01 Yes
02 No

RE7 **[IF RE6A=2]** What made the application difficult to complete?

[RECORD VERBATIM]

RE8 Did you contact MidAmerican program staff for assistance with this program?

01 Yes
02 No

RE9 **[IF RE8=1]** What did you need assistance with? [CHECK ALL THAT APPLY]

01 Determining if I was an eligible customer
02 Determining if the equipment was eligible
03 Assistance in filling out the application
04 Other (SPECIFY)

RE10 **[IF RE8 = 1]** Did you find the MidAmerican program staff helpful?

01 Yes
02 No

RE11 Had you purchased energy-efficient equipment prior to participating in the <PROGRAM>?

01 Yes
02 No

RE12 On a scale of 1 to 5, where 1 is “not at all likely” and 5 is “very likely,” how likely do you think you are to buy energy efficient equipment again in the future?

__ Record response
88 Don’t know

SAVE PROCESS QUESTIONS

[ASK IF SAVE MEASURE SAMPLED, ELSE SKIP TO NEXT SECTION]

S1 MidAmerican Energy offers post-installation efficiency verification for all high-efficiency heating and cooling system installations rebated through the <PROGRAM>. The System Adjustment and Verification for Efficiency, or SAVE, protocols are designed to ensure that a home’s efficiency and comfort are maximized by focusing on duct work and duct leakage to improve HVAC air flow. Upon installing HVAC equipment, the contractor performs additional checks to ensure the installation meets the SAVE standards.

Prior to today, had you heard of the SAVE protocols?

01 Yes
02 No
88 Don’t know

S2 **[IF S1=1]** How did you first learn about SAVE protocols?

01 MidAmerican website
02 MidAmerican utility bill insert or newsletter
03 MidAmerican flyer/brochure or packet
04 Contractor's advertising (SPECIFY: radio, newspaper, tv, etc…)
05 Contractor told me when looking into different equipment
06 Home show/conference/trade show
07 General advertising - Newspaper
08 General advertising - Radio
09 General advertising - Television
10 Friend/family member
11 Other (SPECIFY)
88 Don't know

S3 Our records show that the installation of your <MEASURE> was done using the SAVE protocols. Were you aware that your equipment installation followed SAVE protocols?

01 Yes
02 No

S4 **[IF S3=1]** How did you find out that the installation of the equipment followed SAVE protocols?

01 I asked that the contractor use SAVE protocols when installing my equipment
02 The contractor/installer told me
03 Leave-behind materials
04 MidAmerican marketing (SPECIFY)
05 My contractor's marketing
06 Midwest Energy Efficiency Alliance (MEEA) marketing
07 Other (SPECIFY)
88 Don't know

CLOTHES WASHER

[ASK IF CLOTHES WASHER MEASURE SAMPLED]

CW1 Now I'm going to ask you some questions about the clothes washer you purchased through the program. Is this clothes washer currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

CW2a How many loads of laundry do you typically wash in a week?

____ [RECORD NUMBER OF LOADS]
88 Don't know
99 Refused

CW2b How many loads of laundry do you typically dry in a week?

____ [RECORD NUMBER OF LOADS]
88 Don't know
99 Refused

CW3 Did the clothes washer you purchased replace an existing clothes washer?

01 Yes
02 No (SPECIFY: Why did you decide to purchase this new appliance?)
88 Don't know

CW4 **[IF CW3=1]** Was the old clothes washer you replaced a high efficiency model?

01 Yes
02 No [SKIP TO CW6]
88 Don't know [SKIP TO CW6]

CW5 **[IF CW4=1]** How do you know that your old clothes washer was high efficiency?

[RECORD VERBATIM]

CW6 **[IF CW3=1]** Was the old clothes washer in good, fair, poor, or non-working condition?

01 Good
02 Fair
03 Poor
04 Non-working
88 Don't know

DISHWASHER

[ASK IF DISHWASHER MEASURE SAMPLED]

DW1 Now I'm going to ask you some questions about the dishwasher you purchased through the program. Is this dishwasher currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

DW2 How many times do you typically run your dishwasher in a week?

____ [RECORD NUMBER OF TIMES PER WEEK]
88 Don't know
99 Refused

DW3 Did the dishwasher you purchased replace an existing dishwasher?

01 Yes
02 No (SPECIFY: Why did you decide to purchase this new appliance?)
88 Don't know

DW4 **[IF DW3=1]** Was the old dishwasher you replaced a high efficiency model?

01 Yes
02 No
88 Don't know

DW5 **[IF DW4=1]** How do you know that your old dishwasher was high efficiency?

[RECORD VERBATIM]

DW6 **[IF DW3=1]** Was the old dishwasher in good, fair, poor, or non-working condition?

01 Good
02 Fair
03 Poor
04 Non-working
88 Don't know

REFRIGERATOR OR FREEZER

[ASK IF REFRIGERATOR/FREEZER MEASURE SAMPLED]

RF1 Now I'm going to ask you some questions about the <MEASURE> you purchased through the program. Is this <MEASURE> currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

RF3 **[IF MEASURE=REFRIGERATOR]** Does your new refrigerator have an ice dispenser, water dispenser, both, or neither?

01 Ice dispenser only
02 Water dispenser only
03 Both
04 Neither
88 Don't know
99 Refused

RF2a **[IF MEASURE=FREEZER]** Is the freezer attached to a refrigerator or a standalone unit?

01 Attached to refrigerator
02 Standalone unit
88 Don't know [SKIP TO RF6]
99 Refused [SKIP TO RF6]

RF2 **[IF MEASURE=FREEZER and RF2a=1]** Where is the freezer located or mounted on your refrigerator?

01 Freezer is on the bottom of the refrigerator
02 Freezer is on the top of the refrigerator
03 Freezer is on the side of the refrigerator
04 Refrigerator does not have an attached freezer
88 Don't know
99 Refused

RF4 **[IF MEASURE=FREEZER and RF2a=2]** Is the freezer you installed through the program a chest freezer or a stand-up unit?

01 Chest
02 Standup
03 Other (SPECIFY)
88 Don't know
99 Refused

RF6 Is the <MEASURE> you installed through the program being used as your main <MEASURE>, or is it a secondary or spare unit?

01 Main
02 Secondary or Spare
88 Don't know
99 Refused

RF7 Where is it located?

01 Kitchen
02 Garage
03 Porch/Patio
04 Basement
05 Other (SPECIFY)
88 Don't know
99 Refused

RF9 Did the <MEASURE> you purchased replace an existing <MEASURE>?

01 Yes
02 No (SPECIFY: Why did you decide to purchase this new appliance?) [SKIP TO NEXT SECTION]
99 Don't know [SKIP TO NEXT SECTION]

RF8 **[IF RF9=1]** Did you get rid of your old <MEASURE> through a utility recycling program?

01 Yes
02 No
88 Don't know
99 Refused

RF10 **[IF RF9=1]** Was the old <MEASURE> you replaced a high efficiency model?

01 Yes
02 No [SKIP TO RF12]
88 Don't know [SKIP TO RF12]

RF11 **[IF RF10=1]** How do you know that your old <MEASURE> was high efficiency?

[RECORD VERBATIM]

RF12 **[IF RF9=1]** Was the old <MEASURE> in good, fair, poor, or non-working condition?

01 Good
02 Fair
03 Poor
04 Non-working
88 Don't know

CENTRAL AIR CONDITIONER

[ASK IF CENTRAL AIR CONDITIONER MEASURE SAMPLED]

CAC1 Now I'm going to ask you some questions about the central air conditioner you purchased through the program. Is this central air conditioner currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

CAC2 Prior to participating in the program, what type of air conditioning system, if any, did you use in your home?

01 Did not have air conditioning (SPECIFY: Why did you decide to purchase this new air conditioner?) [SKIP TO CAC10]
02 Central air conditioner
03 Room/wall air conditioner (SPECIFY: How many?) [SKIP TO CAC10]
04 Fans [SKIP TO CAC10]
05 Evaporative cooler or swamp cooler
06 Geothermal (ground-source) heat pump
07 Air-to-air (air-source) heat pump
08 Add-on heat pump
09 Other (SPECIFY)
88 Don't know
99 Refused

CAC3 **[IF CAC2=2, 5, 6, 7 OR 8]** How old was this air conditioning unit when it was replaced?

__ [RECORD AGE IN YEARS]
88 Don't know
99 Refused

CAC4 Which statement best describes the way your household used the old air conditioning unit during the summer: not used at all, turned on only a few days or nights when really needed, turned on quite a bit, turned on just about all summer, or something else?

01	Not used at all	
02	Tuned on only a few days or nights when really needed	
03	Turned on quite a bit	
04	Turned on just about all summer	
05	Something else (SPECIFY)	
88	Don't know	
99	Refused	

CAC13 [IF CAC3<=5 AND CAC2=2, 5, 6, 7 OR 8] Was the old air conditioner you replaced a high efficiency model?

01	Yes	
02	No	[SKIP TO CAC15]
88	Don't know	[SKIP TO CAC15]

CAC14 [IF CAC13=1] How do you know that your old air conditioner was high efficiency?

[RECORD VERBATIM]

CAC15 [IF CAC2=2, 5, 6, 7 OR 8] Was the old air conditioner in good, fair, poor, or non-working condition?

01	Good	
02	Fair	
03	Poor	
04	Non-working	
88	Don't know	

CAC10 Have you used the new air conditioner though a cooling season yet?

01	Yes	
02	No	[SKIP TO NEXT SECTION]
88	Don't know	[SKIP TO NEXT SECTION]
99	Refused	[SKIP TO NEXT SECTION]

CAC11 [IF CAC10=1]Which statement best describes the way your household uses the new air conditioning unit during the summer: not used at all, turned on only a few days or nights when really needed, turned on quite a bit, turned on just about all summer or something else?

01 Not used at all
02 Tuned on only a few days or nights when really needed
03 Turned on quite a bit
04 Turned on just about all summer
05 Other (SPECIFY)
88 Don't know
99 Refused

WINDOW/ROOM AIR CONDITIONER

[ASK IF WINDOW OR ROOM AIR CONDITIONER MEASURE SAMPLED]
[MEASURE= "Room Air Conditioner"]

WAC1 Now I'm going to ask you some questions about the <MEASURE> you purchased through the program. Is this <MEASURE> currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

WAC2 Did you replace an existing <MEASURE> with the unit you purchased through the program?

01 Yes (SPECIFY QUANTITY REPLACED)
02 No [SKIP TO WAC7]
88 Don't know [SKIP TO WAC7]
99 Refused [SKIP TO WAC7]

WAC201 How many <MEASURE> did you replace?

__ (SPECIFY QUANTITY REPLACED)
88 Don't know
99 Refused

WAC3 How old was your previous air conditioning unit(s)? *(ASK FOR EACH ONE REPLACED – UP TO 3)*

_____ [RECORD AGE IN YEARS]
88 Don't know
99 Refused

WAC4 [IF WAC2=1] Was the old <MEASURE>(s) you replaced a high efficiency model?

01 Yes
02 No
88 Don't know

WAC5 [IF WAC4=1] How do you know that your old <MEASURE> was high efficiency?

[RECORD RESPONSE VERBATIM]

WAC6 [IF WAC2 = 1] Was the old <MEASURE>(s) in good, fair, poor, or non-working condition?

01 Good
02 Fair
03 Poor
04 Non-working
88 Don't know

WAC7 About how often do you run [IF WAC2=1, SHOW: "the new"; IF WAC2<>1, SHOW: "the"] air conditioner unit(s) during a typical summer month? Would you say… *(READ)*

01 Never [SKIP TO NEXT SECTION]
02 5 days a month or less
03 6-15 days a month
04 16-28 days a month
05 Every day
88 Don't know

WAC8 At what temperature or setting do you typically set your air conditioner unit(s) when you use it during the day on weekdays?

[DAYTIME REFERENCE: 8:00 AM TO 5:00 PM]

01 High
02 Medium
03 Low
04 Off
05 No control/no thermostat, just on
06 At a specific temperature (SPECIFY: What temperature (F)?)
88 Don't know

WAC9 At what temperature or setting do you typically set your air conditioner unit(s) when you use it during the day on the weekend?

[DAYTIME REFERENCE: 8:00 AM TO 5:00 PM]

01 High
02 Medium
03 Low
04 Off
05 No control/no thermostat, just on
06 At a specific temperature (SPECIFY: What temperature (F)?)
88 Don't know

WAC10 At what temperature or setting do you typically set your air conditioner unit(s) when you use it in the evening throughout the week?

[EVENING REFERENCE: 5:00 PM TO 11:00 PM]

01 High
02 Medium
03 Low
04 Off
05 No control/no thermostat, just on
06 At a specific temperature (SPECIFY: What temperature (F)?)
88 Don't know

WAC11 At what temperature or setting do you typically set your air conditioner unit(s) when you use it at night?

[NIGHT REFERENCE: 11:00 PM TO 8:00 AM]

01 High
02 Medium
03 Low
04 Off
05 No control/no thermostat, just on
06 At a specific temperature (SPECIFY: What temperature (F)?)
88 Don't know

HEAT PUMP

[ASK IF HEAT PUMP MEASURE SAMPLED]

HP1 Now I'm going to ask you some questions about the heat pump you purchased through the program. Is this heat pump currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

HP2 Is your heat pump system used to heat your home, cool your home, or both heat and cool your home?

01 Only heat
02 Only cool
03 Both
88 Don't know

[COMPUTE SYSTEM: IF HP2=1, SYSTEM="heating system"; IF HP2=2, SYSTEM="cooling system"; IF HP2=3, SYSTEM="heating and cooling system" IF HP2=88, SYSTEM="heating or cooling system"]

HP3 **[IF HP2=1 OR 3]** Prior to participating in the program, what type of equipment did you use to heat your home?

01 Natural gas furnace
02 Electric furnace
03 Electric space heater
04 Geothermal (ground-source) heat pump
05 Air-to-air (air-source) heat pump
06 Add-on heat pump
07 Other (SPECIFY)
88 Don't know

HP4 **[IF HP2=2 OR 3]** Prior to participating in the program, what type of equipment did you use to cool your home?

01 Nothing
02 Central air conditioner
03 Room air conditioner
04 Fans
05 Evaporative cooler or swamp cooler
06 Geothermal (ground-source) heat pump
07 Air-to-air (air-source) heat pump
08 Add-on heat pump
09 Other (SPECIFY)
88 Don't know

HP5 How old was the <SYSTEM> when you replaced it?

_____ [RECORD AGE IN YEARS]
88 Don't know
99 Refused

HP6 **[IF HP5 <=5]** Was the old <SYSTEM> you replaced a high efficiency model?

01 Yes
02 No [SKIP TO HP8]
88 Don't know [SKIP TO HP8]

HP7 **[IF HP6=1]** How did you know that your old <SYSTEM> was high efficiency?

[RECORD VERBATIM]

HP8 Was the old <SYSTEM> in good, fair, poor, or non-working condition?

01 Good
02 Fair
03 Poor
04 Non-working
88 Don't know

FURNACE

[ASK IF FURNACE MEASURE SAMPLED]

FUR1 Now I'm going to ask you some questions about the furnace you purchased through the program. Is this furnace currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

FUR2 Before participating in the program, what type of heating system did you use in your home?

01 Natural gas furnace
02 Electric furnace
03 Electric space heater
04 Geothermal (ground-source) heat pump
05 Air-to-air (air-source) heat pump
06 Add-on heat pump
07 Other (SPECIFY)
88 Don't know

FUR3 How old was your heating unit when you replaced it?

_____ [RECORD AGE IN YEARS]
88 Don't know
99 Refused

FUR5 **[IF FUR3 <=5]** Was the old heating system you replaced a high efficiency model?

01 Yes
02 No [SKIP TO FUR7]
88 Don't know [SKIP TO FUR7]

FUR6 **[IF FUR5 = 1]** How do you know that your old heating system was high efficiency?

[RECORD VERBATIM]

FUR7 Was the old heating system in good, fair, poor, or non-working condition?

01 Good
02 Fair
03 Poor
04 Non-working
88 Don't know

FURNACE FAN

[ASK IF FURNACE FAN MEASURES SAMPLED]

FF1 Now I'm going to ask you some questions about the furnace fan you purchased through the program. Is this furnace fan currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

FF3 What setting is your furnace fan typically set on? [READ IF NECESSARY; CHECK ALL THAT APPLY]

01 Auto
02 On/constant circulation
03 Off
04 Other (SPECIFY)
88 Don't know

THERMOSTAT & HEATING/ COOLING TEMPERATURES

[IF THERMOSTAT MEASURE SAMPLED]

T1 Now I'm going to ask you some questions about the thermostat(s) you purchased through the program. Is this thermostat currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

T1a Did you install the thermostat yourself or did someone else install the thermostat in your home?

01 Installed themselves
02 Someone else installed (SPECIFY)
88 Don't know

T3 Is your thermostat programmed to automatically change the temperature settings at different times of the day or days of the week, or are you manually changing the temperature as needed?

01 Programmed
02 Manually setting
03 Both
88 Don't know
99 Refused

T4 What type of thermostat did your new programmable thermostat replace?

01 Manual thermostat
02 Programmable thermostat
03 Smart/WiFi thermostat
04 Other (SPECIFY)
88 Don't know

WATER HEATER

[ASK IF WATER HEATER MEASURE SAMPLED]

WH1 Now I'm going to ask you some questions about the water heater(s) you purchased through the program. Is this water heater currently installed in your home?

01 Yes [CONTINUE]
02 No (SPECIFY: Why isn't this equipment installed?) [SKIP TO NEXT SECTION]

WH2 How old was your water heater when you replaced it?

_____ [RECORD AGE IN YEARS]
88 Don't know
99 Refused

WH3 **[IF WH2 <=5]** Was the old water heater you replaced a high efficiency model?

01 Yes
02 No
88 Don't know
99 Refused

WH4 Prior to participating in the program, at what temperature did you set your hot water heater?

__ [RECORD TEMPERATURE]
88 Don't know
99 Refused

WH5 After participating in the program, at what temperature do you set your hot water heater?

__ [RECORD TEMPERATURE]
88 Don't know
99 Refused

FREE-RIDERSHIP

[ONLY ONE MEASURE SAMPLED PER PARTICIPANT; SAME MEASURE AS VERIFICATION SECTION]

[ASK IF: CW1=1 or DW1=1 or RF1=1 or CAC1=1 or WAC1=1 or HP1=1 or FUR1=1 or FF1=1 or T1=1 or WH1=1]

INTROFa Now, I'd like to ask you about your decision to install the <EE_MEAS> through the <PROGRAM>.

RR5 Please think back to the time when you decided to purchase the equipment you installed through the program, perhaps recalling things that occurred in your household shortly before and after <DATE>. What factors motivated you to purchase this equipment?
[DO NOT READ; CHECK ALL THAT APPLY; ONCE THEY RESPONDENT HAS FINISHED, PROBE: Are there any other factors?]

01 Old equipment didn't work
02 Old equipment working poorly
03 The program and/or audit recommendation
04 The program and/or audit technical assistance
05 Wanted to save energy
06 Wanted to reduce energy costs
07 The information provided by the auditor
08 Because of past experience with another utility program
09 Recommendation from other utility program (SPECIFY: What program?)
10 Recommendation of someone else (SPECIFY: Who?)
11 Advertisement in newspaper (SPECIFY: For what program?)
12 Radio advertisement (SPECIFY: For what program?)
13 Environmental concerns
14 Global warming
15 Part of a remodeling project
16 Other (SPECIFY)
88 Don't know
99 Refused

FR1 Who, if anyone, recommended you purchase and install the <EE_MEAS> rebated through the <PROGRAM>? [CHECK ONE]

01 Trade ally / contractor
02 Retailer
03 Auditor or Energy expert
04 Family/friends/neighbor
05 No one
06 Other person [SPECIFY]
88 Don't know
99 Refused

FR14 I'm going to ask you to rate how various factors might have influenced your decision to install the <EE_MEAS>. Please rate the influence of each of the following using a scale of 0 to 10, where 0 is "not at all influential" and 10 is "very influential." How influential was… [ROTATE OPTIONS]

For FR14A through FR14E

__ [RECORD INFLUENCE (0-10)]
88 Don't know
99 Refused

A [ASK IF FR1=1, 2, 3, 4, OR 6] The [FR1] recommendation on your decision to install the [EE_MEAS]
[USED IN PRELIMINARY PROGRAM INFLUENCE SCORE]
B The age or condition of the old equipment?]
C The availability of the program rebate?
[USED IN PRELIMINARY PROGRAM INFLUENCE SCORE]
D Previous experience with a MidAmerican energy efficiency program?

FR6 According to our records, the <PROGRAM> provided to you a rebate of <REBAMT> dollars for the <EE_MEAS>. If the program had not been available, what is the likelihood you would have purchased the **exact same** <MEASURE TYPE>? Please rate on a 0 to 10 scale, where 0 is "not at all likely" and 10 is "completely likely." [INTERNAL NOTE: BY EXACT SAME MEASURE WE'RE INCLUDING EXACT SAME EFFICIENCY]
USED FOR PRELIMINARY NO-PROGRAM SCORE

__ [RECORD LIKELIHOOD (0-10)]
88 Don't know
99 Refused

FR7 **[IF FR6 <>0, ASK]** Without the program, what is the likelihood you would have purchased the same <EE_MEAS> within 12 months? Please rate on a 0 to 10 scale, where 0 is "not at all likely" and 10 is "completely likely."
USED TO CALCULATE TIMING SCORE FOR NO-PROGRAM SCORE.

__ [RECORD LIKELIHOOD (0-10)]
88 Don't know
99 Refused

FR8 **[IF FR6 <>0 AND QTY >1, ASK]** Without the program, what is the likelihood you would have purchased fewer <EE_MEAS>?
Again, please use a 0 to 10 scale, where 0 is "not at all likely" and 10 is "completely likely."
USED TO CALCULATE QUANTITY SCORE FOR NO-PROGRAM SCORE

__ [RECORD LIKELIHOOD (0-10)]
88 Don't know
99 Refused

FR10b Had you already been planning to install the same <EE-MEAS> before you learned about the rebate available through the <PROGRAM>?
USED TO ADJUST THE PROGRAM INFLUENCE SCORE. IF RESPOND YES, ADJUST PROGRAM INFLUENCE SCORE BY 0.5 (50%).

01 Yes
02 No
88 Don't know
99 Refused

FR15 Now I want to focus on what it would have cost your household to install this equipment on your own without the program. On a scale of 0 to 10, with 0 being "not at all likely" and 10 being "very likely," how likely is it that you would have paid the additional <REBAMT> dollars on top of the amount you already paid, to implement [IF QTY>1, SHOW: "the same quantity and efficiency"; IF QTY=1, SHOW: "the same efficiency"] of <MEASURE TYPE> at the same time as when you participated in the program?

__ [RECORD LIKELIHOOD (0-10)]
88 Don't know
99 Refused

FR16 Could you please tell me, in your own words, what influence, if any, the <PROGRAM> had in your decision to install the <EE_MEAS> [IF NOT FURNACE FAN, SHOW: instead of the standard efficiency]?

[RECORD VERBATIM]

SPILLOVER

[ASK OF ALL]

SP1 Did your participation in MidAmerican Energy's program influence you to purchase any other type of energy efficient or ENERGY STAR equipment?

01 Yes
02 No [SKIP TO NEXT SECTION]
88 Don't know [SKIP TO NEXT SECTION]

SP2 What energy efficient equipment have you purchased? [DO NOT READ; CHECK ALL THAT APPLY]

01	CFLs	
02	LEDs	
03	Lighting other than CFLs and LEDs	
04	ENERGY STAR electronics	
05	Refrigerator	
06	Water heater	
07	Freezer	
08	Room air conditioner	
09	Central air conditioner	
10	Clothes washer	
11	Furnace	
12	Heat pump	
13	Low flow showerhead	
14	Faucet aerator	
15	Programmable thermostat	
16	Insulation	
17	Windows	
18	Doors	
19	Other (SPECIFY: What kind of equipment?)	
88	Don't know	[SKIP TO NEXT SECTION]
99	Refused	[SKIP TO NEXT SECTION]

SP2C03_OTH **[ASK IF SP2=3]** Can you describe what type of lighting other than CFLs and LEDs?

[RECORD VERBATIM]

SP2C04_OTH **[ASK IF SP2=4]** Can you describe what type of ENERGY STAR electronics?

[RECORD RESPONSE VERBATIM]

SPD1 **[ASK IF SP2=6]** What type of high efficiency water heater was installed? Was it… [READ CATEGORIES]

01	Gas Storage
02	Electric Storage
03	Gas Tankless
04	Electric Tankless
05	Heat Pump Water Heater
06	Other (SPECIFY)
88	Don't know

SPD3 **[ASK IF SP2=12]** What type of equipment did the new energy efficient heat pump replace?

01 Existing Heat Pump
02 Central Air Conditioner w/ Gas Heating
03 Central Air Conditioner w/ Electric Heating
04 Other (SPECIFY)
88 Don't know

SPD4 **[ASK IF SP2=13]** How many total showers are in your home? Please include the total quantity of showers with a showerhead. Please do not include bathtubs without a showerhead.

____ [RECORD NUMBER OF SHOWERS (0-25)]
88 Don't know
99 Refused

SPD5 **[ASK IF SP2=14]** How many total faucets are in your home? (IF NEEDED: Please count the total number of sinks in your home. If you have dual sinks, that would count as two faucets)

____ [RECORD NUMBER OF FAUCETS (0-25)]
88 Don't know
99 Refused

SPD6 **[ASK IF SP2=16]** Where was insulation installed? [CHECK ALL THAT APPLY]

01 Attic Insulation
02 Wall Insulation
03 Floor Insulation
04 Basement Insulation
05 Crawlspace Insulation
06 Rim Joist Insulation
07 Some other place (SPECIFY)
88 Don't know

SPD7 **[ASK FOR EACH RESPONSE TO SPD6] [ASK IF SP2=16] [ASK OF EACH SPD6 SELECT]** What was the total area of installed <RESPONSES FROM SPD6>?

For SPD7_1 through SPD7_7

____ [RECORD TOTAL AREA IN SQUARE FEET (0-7500)]
8888 Don't know
9999 Refused

[ROSTER SP4 to SP6 FOR EACH MENTIONED IN SP2 EXCEPT 19]

SP4 **[SKIP IF SP2=1, 2, 13, 14, 15]** Did you receive a MidAmerican Energy rebate for the [SP2 EQUIPMENT]?

01 Yes [SKIP TO END OF LOOP]
02 No (Note: those who received rebates, but only NON-MidAmerican rebates, go here)
03 No rebate received
88 Don't know

SP3 **[SKIP IF SP2=16; INSULATION]** How many [SP2 EQUIPMENT] did you purchase?

___ [RECORD AMOUNT PURCHASED]
88 Don't know
99 Refused

SP3a **[SKIP IF SP2=1, 2, 14, 15]** How do you know the [SP2 EQUIPMENT] is energy efficient? [PROBE: Is it ENERGY STAR rated? Do you know the SEER level?]

[RECORD RESPONSE VERBATIM]

SP5 On a scale of 0 to 10, with 0 being "not at all important" and 10 being "extremely important," how important was your participation in the MidAmerican <PROGRAM> on your decision to purchase [SP2 Equipment] on your own?

___ [RECORD IMPORTANCE (0-10)]
88 Don't know
99 Refused

SP6 If you had not participated in MidAmerican's program, how likely is it you would have still purchased [SP2 Equipment], using a 0 to 10 scale, where 0 is you "definitely WOULD NOT have purchased" and 10 means you "definitely WOULD have purchased?"

___ [RECORD LIKELIHOOD (0-10)]
88 Don't know
99 Refused

[END ROSTER; SKIP TO NEXT SECTION]

FINANCING

[IF D2=2, 88, 99, SKIP TO SAT1]

FN_INT 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…[SELECT ALL THAT APPLY]

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 how much the following financing options would increase your likelihood of installing energy efficient equipment.
[IF NEEDED: Energy efficient equipment includes insulation or high-efficiency heaters, air conditioners, hot water heaters or appliances.]
[READ LIST; ROTATE STATEMENTS]

____ [RECORD LIKELIHOOD (1-5)]
88 Don’t know
99 Refused

How much would…

FN3A On-bill financing increase your likelihood of installing energy efficient equipment
[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 increase your likelihood of installing energy efficient equipment
FN3C A non-mortgage loan through a local bank or financial institution increase your likelihood of installing energy efficient equipment
FN3D A payment plan or financing through your contractor increase your likelihood of installing energy efficient equipment

[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

[ASK OF ALL]

SAT1 How satisfied are you with the following aspects of the <PROGRAM>? Please indicate if you are not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied? [ROTATE CHOICES]

a. The length of time it took to receive the rebate
b. The type of equipment eligible for the program
c. **[IF RE2 = 1]** The contractor who installed the equipment
d. The rebate application process
e. The amount of the rebate received through the program

01 Not at all satisfied
02 Somewhat satisfied
03 Very satisfied
04 Extremely satisfied
88 Don’t know

SAT3 Have you recommended the <PROGRAM> to others?

01 Yes
02 No (SPECIFY: What is main reason you have not recommend the program to anyone?)
88 Don't know

SAT4 Overall, how satisfied are you with the <PROGRAM>? Would you say not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied?

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

SAT5 **[IF SAT4 <3]** Why did you rate your satisfaction with the program that way?

[RECORD VERBATIM]

S1b The next questions ask about your experience with MidAmerican in general as your energy provider, not just with the <PROGRAM>. How would you rate the service provided by MidAmerican? Would you say not at all satisfied, somewhat satisfied, very satisfied, or extremely satisfied?

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

S1a [ASK IF S1b=1,2,3,4] Why did you rate your satisfaction with MidAmerican Energy as [FILL RATING FROM S1]?

[RECORD VERBATIM]

SAT7 Would you say you are more satisfied, just as satisfied, or less satisfied with the quality of service provided by MidAmerican since your participation in the <PROGRAM>?

01 More satisfied
02 Just as satisfied
03 Less satisfied

SAT8 **[IF SAT7=1 OR 3]** Why do you say that?

[RECORD VERBATIM]

FINAL PROCESS

[ASK OF ALL]

PP1 People participate in energy efficiency programs for different reasons.

Why did you decide to participate in this program? [DO NOT READ; CHECK ALL THAT APPLY]

01 Saving money on my energy bills
02 The financial incentive (rebate, payment for participating)
03 The program was recommended to me by MidAmerican
04 Someone I know had a positive experience with the program
05 The program was a way for me to do something good for the environment
06 Improving the comfort of my home
07 Increasing the value of my home
08 The program was recommended to me by a contractor
09 Other (SPECIFY)
88 Don't know
99 Refused

BEN2 What could MidAmerican Energy do to help your home become more energy efficient??

[RECORD VERBATIM]

DEMOGRAPHICS

[ASK OF ALL]

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 1980s
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

D4 [SKIP IF CAC1=1] Does your home have central air conditioning?

01 Yes
02 No
88 Don't know
99 Refused

D7 What fuel do you use to heat your home?

01 Electricity
02 Gas
03 Other (SPECIFY)
88 Don't know

D8 What is the fuel type used for your home's water heating?

01 Electricity
02 Gas
03 Other (SPECIFY)
88 Don't know

D9 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

D10 **[ASK IF D9 >1]** How many household members are children under 19 years old?

_____ [RECORD RESPONSE (0-20)]
88 Don't know
99 Refused

D11 **[ASK IF D9 >1]** How many household members are 65 years old or older?

_____ [RECORD RESPONSE (0-20)]
88 Don't know
99 Refused

D12 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

D13 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 2016? 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

D14 And finally, I'm required to ask this question. What is your gender?

01 Male
02 Female
99 Refused

CONCLUSION

E1 As part of our evaluation, we may need to follow-up on some of this information. Would it be all right if someone called you if needed?

01 Yes
02 No

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

01 Yes [RECORD COMMENT]
02 No

[End call]
INTERVIEWER: RECORD ANY NOTES ON DIFFICULTY OF R IN RESPONDING TO QUESTIONS, IMPRESSION OF PROGRAM INFLUENCE, ETC.

APPENDIX D: TRADE ALLY INTERVIEW GUIDE

MIDAMERICAN ENERGY RESIDENTIAL EQUIPMENT PROGRAM
TRADE ALLY INTERVIEW GUIDE

Interviewee(s):

Interviewer(s):

Program/Area of responsibility:

Date(s):

A. Background

This guide will be used to understand the perspectives of participating market actors involved with the MidAmerican Energy Residential Equipment program during 2016. Interviews will be conducted with participating installation contractors and retailers working the program.

The Residential Equipment program encourages residential customers to purchase energy efficient equipment by providing rebates to offset the higher purchase cost of efficient equipment, as well customer education of energy efficiency opportunities. The program also encourages quality installation of heating and cooling equipment by tying rebates for HVAC equipment to quality installation by a SAVE (System Adjustment and Verified Efficiency) certified contractor. The program is available to all residential customers and landlords for both new and existing buildings in MidAmerican's service territories in Iowa, Illinois, and South Dakota.

Trade allies play a key role in the implementation and delivery of the Residential Equipment program. Trade allies are one of the primary customer outreach arms of the program, informing customers of the program and available rebates for qualifying energy efficient equipment. Trade allies also commonly build program rebates into their project quotes to customers, and help customers complete and submit rebate applications. MidAmerican maintains an active trade ally program to keep participating contractors informed of program opportunities and changes. Specific outreach efforts include MidAmerican's Trade Ally Central website and an annual meeting with participating trade allies.

In-depth interviews will be conducted by senior Tetra Tech staff via telephone. The interviews will be semi-structured. Therefore, the following interview protocol is only a guide to ensure certain topics are covered, but evaluators will follow the flow of the interview and modify questions as needed to fit the interviewee's circumstance and flow of conversation.

We expect the interviews to take approximately 30 minutes. We will attempt to schedule interviews with respondents in advance to accommodate each trade ally's schedule.

B. Introduction

Hello, may I speak to [_____]? My name is _____, and I'm calling from Tetra Tech on behalf of MidAmerican Energy. We are conducting interviews with firms that sell or install equipment or provide services rebated through MidAmerican's Residential energy efficiency programs.

We would like to ask you some questions about your participation in the program to help provide insight back to MidAmerican Energy about your experience with the program, what worked well, or improvements you might recommend. Additionally we have questions about the program's effect on the market for energy efficiency going forward.

Are you the best person at [COMPANY] to talk to about [COMPANY]'s experience with the MidAmerican Residential rebate programs?

1 Yes [Continue]
2 No -> Can you tell me who I should speak with? [End call if no one is familiar]

Is this a convenient time for you to talk, or would you prefer to schedule another time?
[Proceed or schedule appointment as appropriate.]

The interview should last about 30 minutes. The information you provide will be treated as confidential and will help MidAmerican Energy improve their residential rebate programs in the future.

[If needed: Offer the contact name from below as the person to contact with any questions about the validity of this research.]

Name	Phone #

With your permission, I would like to record the interview. Do I have your permission to do so? [IF NEEDED: We will use the recording to help us compile the results, in order to make sure we accurately represent your responses. No one but Tetra Tech staff will listen to the recording.]

C. Business Scope

I'd like to start with some general information about you and your company.
NOTE TO INTERVIEWER: Overview and verify what you found through website search. Then start as needed with questions below.

1) [IF INSTALLATION CONTRACTOR] To get us started, could you briefly tell me a little bit about your business and position?

- (A) How long have you been in business?
- (B) What type(s) of services do you provide?
- (C) Do you provide services in Iowa?
- (D) Do you provide services in Illinois?
- (E) How many employees (full-time equivalents) does your company employ?

2) [IF INSTALLATION CONTRACTOR] According to our records, in 2016 your company installed <list measures> rebated through MidAmerican's residential energy efficiency programs. What proportion (or percent) of your total projects in 2016 did the rebated projects represent <for each measure>?

3) [IF INSTALLATION CONTRACTOR] For 2017, do you expect this percentage to be higher, lower, or about the same? Why do you say that?

1 Higher
2 Lower -> Is there anything MidAmerican could do to change that?
3 About the same

D. Program Awareness, Marketing, and Recruitment

1) When did you first get involved with MidAmerican's energy efficiency programs? How did you first hear about them?

2) Who do you get most of your program information from? By program information, I mean updates on program requirements, rebate levels, trainings being offered, for example. (Probe if through MidAmerican staff or website, a state or national energy organization, program implementation staff at A-TEC, etc.)

3) Do you feel adequately informed of program changes?

1 Yes
2 No -> (A) How would you like to be better informed of program changes?

4) Besides MidAmerican, are you involved with any other utility energy efficiency programs?

1 Yes -> (A) Which ones?
2 No

5) Are customers generally aware of the MidAmerican rebates prior to working with you?

1 Yes
2 No -> (A) How can MidAmerican increase customer awareness?

6) (A) How do you present the MidAmerican program rebates to your customers? (Probe: discussion, website information, brochure, fact sheets, etc)

- (B) [IF RETAILER] Have you received marketing materials from MidAmerican to promote the program?
- (C) Which methods do you think are most effective or informative for customers?

7) Do you think MidAmerican's marketing strategies have been successful in generating program-related activity for you? How could they be improved to better serve you? What additional tools or support could MidAmerican provide you with to better motivate participation by your customers?

E. Education and Outreach

1) Have you received enough support from A-TEC and/or MidAmerican when you needed it?

- (A) IF NO: What support would you like to see added or expanded (and from which entity)?

2) What type of program-specific training was made available to you and your staff, if any? Would you like to see more trainings or outreach activities offered by MidAmerican to support the Residential energy efficiency programs?

- (A) IF YES: What sort of trainings or outreach would you like to see added or expanded?

3) [IF RETAILER] Are there markets that you feel MidAmerican's residential energy efficiency programs are reaching well? Are there markets that you feel the program is not reaching well?

- Can you identify approaches that might expand the reach of the program into markets that may be underserved by the program?

4) [IF INSTALLATION CONTRACTOR] Are you registered on MidAmerican's Trade Ally Central?

1 (A) Yes → What does that resource provide for you? How valuable do you find those resources? (Probe on program information and updates, marketing materials, applications, etc).

2 (B) No → Are you aware that MidAmerican has a webpage devoted to trade allies? Have you ever visited that site? Is there a particular reason why you are not registered?

F. Participation Process and Support

Now I'd like to ask you about the process of working with the MidAmerican rebate programs.

1) Thinking of a typical MidAmerican rebate project…

- (A) What is the easiest part of the process?
- (B) What would you like to see improved?

2) [ASK IF INSTALLATION CONTRACTOR THAT INSTALLS HVAC EQUIPMENT] Do you install equipment according to SAVE guidelines?

1 Yes → Ask the following:
- (A) Do you ever perform SAVE installations for projects where you are not applying for a MidAmerican rebate? How does the proportion of SAVE installations through a MidAmerican program compare with SAVE installations outside of the program?
- (B) What is your general impression of the SAVE quality installation requirements to qualify for MidAmerican incentives? Are the requirements clear? Are the requirements reasonable?
- (C) What do you feel are the primary challenges with SAVE installations?
- (D) What do you feel are the primary benefits of SAVE installations?
- (E) What influence, if any, has MidAmerican's program had on your standard HVAC installation practices?
- (F) How do you leverage the SAVE certification to promote your business? What affect has it had on your business?

2 No → Why not?

5) Next I'm going to ask you a few scale questions. First, using a scale of 1 to 5 where 1 is 'not at all satisfied' and 5 is 'very satisfied' how satisfied are you with the program's technical support?

- (A) [IF RESPONDENT RATES A 1 OR 2, ASK] What could be done to improve the program's technical support?

6) On a scale of 1 to 5 where 1 is 'not at all difficult' and 5 is 'very difficult', how would you rate the program's administrative requirements (e.g., paperwork) for you?

- (A) [IF RESPONDENT RATES A 4 OR 5, ASK] What could be done to lessen the administrative burden?

8) On a scale of 1 to 5 where 1 is 'not at all difficult' and 5 is 'very difficult,' how difficult do you find it to motivate customers to purchase efficient equipment eligible for program rebates?

- (A) Why is energy efficient equipment (easy / difficult) to sell to customers?
- (B) What are the primary reasons why customers typically want to install efficient equipment?
- (C) What are the primary reasons why customers typically do not want to install efficient equipment?

G. Market Response

0) How have your sales changed as a result of the program? Which types of equipment have seen the greatest change?

1) How much do you see MidAmerican's residential energy efficiency programs influencing the services you provide and/or the equipment you offer?

2) If MidAmerican's programs were not available, would the equipment types or efficiency levels you most strongly recommended be any different? Why or why not? How would they be different?

3) Do you see the program increasing the interest and demand for energy efficient equipment? If so, to what degree – some increase or significant increase? Why do you say that?

4) What issue(s) may affect future program participation? [PROBE: example issues (e.g., changes to building codes and standards promoted in the Midwest, program incentive levels)].

H. Overall Program

Now I'd like to wrap up with a few final questions.

1) Using a five-point scale where 1 means "not at all satisfied," and 5 means "very satisfied," overall, how satisfied are you with MidAmerican's residential energy efficiency programs?

2) If you were to recommend anything to MidAmerican regarding the program design or operations, what would it be?

3) Is there anything else you'd like to share with us about MidAmerican's residential energy efficiency programs?

4) In case we would like to clarify anything we discussed, would it be alright if I contacted you again?

   If YES, get best phone number and email address

That is all the questions I have today. If you think of anything you would like to add, please feel free to contact us. Thank you very much for your time.

APPENDIX E: 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

LM2A [ASK IF LM2=01] 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

AR2A [ASK IF AR2=01] 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]

HOUSEHOLD 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.