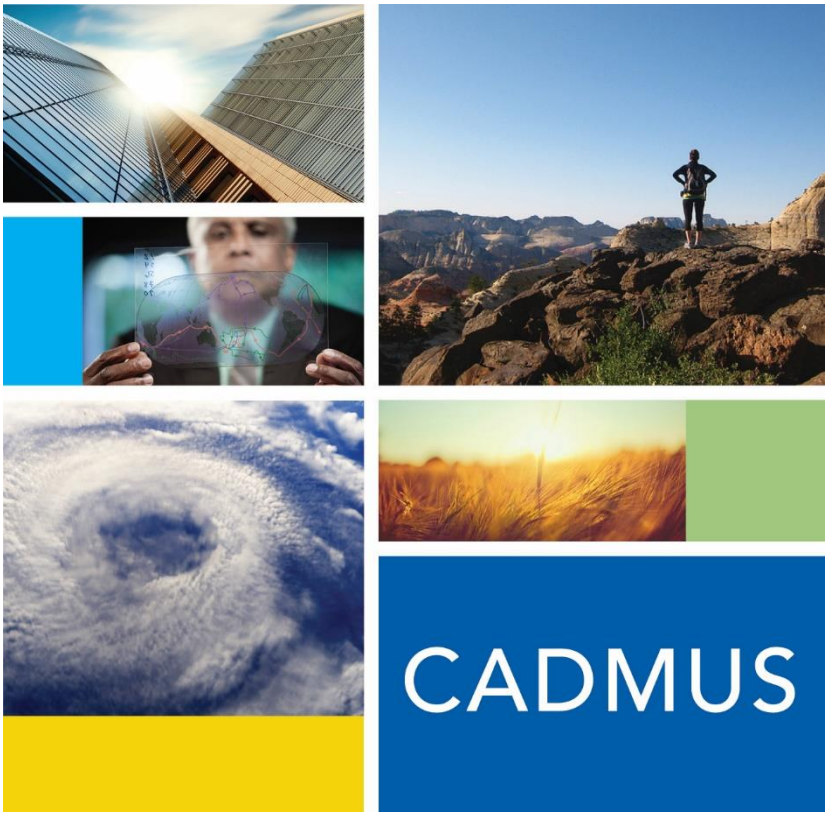

Ameren Missouri
Efficient Products Program
Impact and Process Evaluation:
Program Year 2016

July 13, 2017

AMENDED July 24, 2017

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CADMUS

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CADMUS

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CADMUS

Executive Summary

Ameren Missouri engaged Cadmus to perform annual process and impact evaluations of its Efficient Products program for a three-year period, from 2016 through 2018. This annual report covers the impact and process evaluation findings for Program Year 2016 (PY16), the period from March 1, 2016, through February 28, 2017—the first year of the three-year program cycle.

Program Description

Ameren Missouri's Efficient Products Program provides its residential customers with rebates for purchasing qualifying energy-efficient equipment. Program rebates partially offset the costs of purchasing more efficient models. To participate, residential customers may purchase the equipment from any retailer, including online sources.

In PY16, the Efficient Products program provided downstream mail-in and online rebates for the following:

- ENERGY STAR®-certified room air conditioners (RACs)
- ENERGY STAR-certified heat pump water heaters (HPHWs)
- ENERGY STAR-certified room air purifiers
- ENERGY STAR-certified multi-speed pool pumps
- ENERGY STAR-certified variable-speed pool pumps
- Smart thermostats (selected models)

For PY16–18, Ameren has contracted with ICF International (ICF) to implement the program. ICF markets the program, recruits retailer participation, and processes rebate applications. ICF also takes primary responsibility for maintaining a website for data reporting and for conducting quality control checks. ICF subcontracts a field team (Crossmark) to visit retail locations to provide training and marketing materials, and to monitor stocking practices.

Key Impact Evaluation Findings

The following sections describe Cadmus's key findings for the PY16 evaluation period.

Program Data Adjustments

Cadmus found a small number of HPWHs, RACs, and pool pumps that did not meet program qualifications. In most cases, these measures did not qualify because they were not ENERGY STAR-certified, although a small number of gas water heaters were rebated through the program.

Aside from the gas water heaters, most non-qualifying models identified in the program tracking data are no longer manufactured. Verified qualified equipment rates were 94% for RACs and HPWHs, and 99% for multi-speed pool pumps. Variable-speed pool pumps, room air purifiers, and smart thermostats

had a verification rate of 100%. In PY16, the program rebated 10,843 verified measures, compared to 10,886 measures reported by Ameren Missouri.

Gross Impacts

The program achieved realization rates close to 100% for all measures the program included for PY16, ranging from 88% for HPWHs to 108% for room air purifiers. These updates to *ex ante* values were based on changes to the rebated equipment mix in program records (i.e., on average, room air purifiers were more efficient than predicted) and updated parameter values from PY16 survey results (e.g., heating and cooling saturation for HPWH participants).

Table 1 summarizes PY16 participation, *ex post* gross per-unit savings, realization and installation rates, and *ex post* total gross savings.

Table 1. PY16 Summary: *Ex Post* Program Gross Savings Accounting for Installation Rates*

Measure	PY16 Participation**	Per-Unit *Ex Post* Savings (kWh/yr)	Realization Rate	Installed and Operating	Total *Ex Post* Gross Savings (MWh/yr)	Total *Ex Post* Gross Savings (kW/yr)
Equipment Rebates						
HPHWs	322	2,531	88%	100%	815	72
RACs	324	44.6	90%	98%	14	13
Room air purifiers	1,300	556	108%	99%	717	334
Multi-speed pool pumps	147	1,800	100%	100%	265	62
Variable-speed pool pumps	550	2,053	100%	100%	1,129	266
Smart thermostats	8,200	462	100%	99%	3,732	3,535
Total* **	**10,843**	**n/a**	**100%**	**99%**	**6,671**	**4,283**

* The Non-Unanimous Stipulation and Agreement in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." Cadmus referenced the Ameren Missouri TRM for secondary data on measure EUL in order to assess whether or not measures are sufficiently long-lived to apply the stipulated energy to-demand ratio to determine 2023-persistent kW savings. Demand savings resulting from Smart Thermostats are not counted toward this goal.

** Verified measures.

*** Measure gross savings may not sum to total due to rounding.

Net Savings

As shown in Table 2, the Efficient Products program achieved an overall savings-weighted net-to-gross (NTG) ratio (excluding NPSO) of 76.1%. NPSO is added separately to net savings because it is made up of measures with different load shapes than the program and therefore will affect demand NTG differently than energy NTG.

Table 2. PY16 Net Impact Results Summary*

Measure Group	*Ex Post* Gross Savings (MWh/yr)	Free Ridership	Participant Spillover	NTG (w/o NPSO)	Subtotal Net Savings (MWh/yr)	Subtotal Net Savings (kW/yr)
HPHWs	815	15.2%	0.0%	84.8%	691	61
RACs	14	72.8%	32.6%	59.8%	8	8
Room air purifiers	717	50.0%	0.2%	50.2%	360	168
Multi-speed pool pumps	265	32.3%	0.1%	67.8%	179	42
Variable-speed pool pumps	1,129	32.3%	0.1%	67.8%	766	180
Products Nonparticipant Spillover	-	-	-	-	**190**	**76**
Smart thermostats	3,732	23.1%	5.4%	82.3%	3,071	2,910
Smart Thermostat Nonparticipant Spillover	-	-	-	-	**130**	**52**
Total**	**6,671**	**27.1%**	**3.1%**	**76.1%**	**5,395**	**3,497**

*The Non-Unanimous Stipulation and Agreement in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." Cadmus referenced the Ameren Missouri TRM for secondary data on measure EUL in order to assess whether or not measures are sufficiently long-lived to apply the stipulated energy to-demand ratio to determine 2023-persistent kW savings. Demand savings resulting from Smart Thermostats are not counted toward this goal.

** Measure net savings may not sum to total due to rounding.

As shown in Table 3, the PY16 program achieved 79% of its net energy savings target of 6,847 MWh, as specified in the Ameren Missouri's residential tariff.[1] Appendix A presents the coincidence factors used to calculate demand savings for this program.

[1] Union Electric Company. d/b/a Ameren Missouri's 2nd Filing to Implement Regulatory Changes in Furtherance of Energy File No. EO-2015-0055 Efficiency as Allowed by MEEIA. Appendix B.MEEIA 2016-2018 Summary

Table 3. PY16 Efficient Products Savings Comparisons

Metric	MPSC-Approved Target	Planning Gross Savings Utility Reported[1]	*Ex Post* Gross Savings Determined by EM&V[2]	*Ex Post* Net Savings Determined by EM&V[3]	Percent of Goal Achieved[4]
Efficient Products					
Energy (MWh)	4,760	2,883	2,940	2,195	46%
Demand (kW)	1,399	655	748	537	38%
Smart Thermostats					
Energy (MWh)	2,087	3,788	3,732	3,201	153%
Demand (kW)	1,981	3,589	3,535	2,964	150%
Total[5]					
Energy (MWh)	6,847	6,671	6,671	5,395	79%
Demand (kW)[6]	3,380	4,244	4,283	3,497	103%

[1] Calculated by applying verified program activity to program tracking *ex ante* savings values.

[2] MWh calculated by applying verified program activity to Cadmus's evaluated savings values; kW calculated by applying coincident factors provided in Appendix A.

[3] Calculated by multiplying Cadmus's evaluated gross savings and evaluated NTG ratio and adding program level NPSO.

[4] Compares MPSC Approved Target and *Ex Post* Net Savings Determined by EM&V.

[5] Efficient Products and Smart Thermostat savings may not sum to total due to rounding.

[6] The Non-Unanimous Stipulation and Agreement in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." Cadmus referenced the Ameren Missouri TRM for secondary data on measure EUL in order to assess whether or not measures are sufficiently long-lived to apply the stipulated energy to-demand ratio to determine 2023-persistent kW savings. Demand savings resulting from Smart Thermostats are not counted toward this goal.

CSR Impact Evaluation Requirements

According to the Missouri Code of State Regulations (CSR),[2] demand-side programs serving as part of a utility's preferred resource plan are subject to ongoing process and impact evaluations that meet certain criteria. Specifically, the CSR requires that impact evaluations of demand-side programs satisfy the requirements listed in Table 4. The table also indicates the data Cadmus used to satisfy these impact CSR evaluation requirements for the Efficient Products program. Table 5, at the end of the Process Evaluation section, provides a summary of the process CSR requirements.

[2] State of Missouri. "Administrative Rules: Missouri Code of State Regulations." Revised January 2016. Available online: http://www.sos.mo.gov/adrules/csr/csr.asp

Table 4. Summary Responses to CSR Impact Evaluation Requirements

CSR Requirement	Method Used	Description of Program Method
Approach: The evaluation must use one or both of the following comparisons to determine the program impact:		
Comparisons of pre-adoption and post-adoption loads of program participants, corrected for the effects of weather and other intertemporal differences	✓	The program compares the pre-adoption load, based on assumed baseline technology, with the post-adoption load, based on program technology.
Comparisons between loads for program participants and an appropriate control group over the same period		
Data: The evaluation must use one or more of the following types of data to assess program impact:		
Monthly billing data		
Hourly load data		
Load research data		
End-use load metered data		
Building and equipment simulation models	✓	The evaluator used ENERGY STAR calculators to model the usage characteristics of pool pumps and room air purifiers.
Survey responses	✓	The evaluator used survey responses to estimate in-service rates and NTG for program measures, and to gather household data, such as HVAC saturation rates.
Audit and survey data on:		
Equipment type/size efficiency	✓	The evaluator gathered equipment information from homes participating in the survey and from program data.
Household or business characteristics	✓	The evaluator gathered household information from homes participating in the survey and from program data.
Energy-related building characteristics	✓	The evaluator gathered building information from homes participating in the survey and from program data.

Key Process Evaluation Findings

Cadmus conducted interviews with program stakeholders, reviewed program tracking data and marketing materials, and surveyed customers and retailers to inform the PY16 process evaluation. Key findings from this research follow.

Program Design

Participants awarded the Efficient Products program high ratings: 99% said they were “very satisfied” or “somewhat satisfied” with the performance of measures that they purchased; 99% gave similar

satisfaction ratings for the program overall; and 99% said they would recommend the program to others. These ratings remained consistent between participants surveyed immediately after receiving rebates and participants surveyed six months later.

In PY16, the Efficient Products program rebated five measure types, and Cadmus found that participants who purchased these measures differed in notable ways, including differences in their motivations for purchases, retail channels, and purchase decision-making processes for the various measures:

- Smart thermostats were the only program measure that participants primarily purchased to save energy (63%); only a minority of participants purchased smart thermostats to replace failed or aging equipment (14%). As the most popular measure in the program in PY16, awareness of smart thermostats arose from the broadest variety of sources, and participants were most likely to purchase the units online (41%). Smart thermostat participants were those most likely to know which model they wanted before going shopping (74%), and they overwhelmingly chose Nest and Ecobee models. Most participants installed the equipment themselves (92%), and only a small percentage replaced other heating and cooling equipment at the same time.
- Pool pumps were exclusively installed in single-family homes (100%), which tended to be much larger than average homes. In most cases, participants' purchase motivations resulted from replacing another failed or aging pool pump (59%), though one-third (33%) cited energy savings as their primary motivation. Pool pump participants most frequently purchased their equipment from a contractor (38%), and contractors also most frequently served as source of program awareness (37%). Few participants knew which model they wanted before visiting a store or speaking to a contractor (21%).
- HPWHs were almost always installed in single-family homes (99%), which tended to be newer than average homes, and units often replaced failed or aging equipment (52%), though one-third (34%) cited energy savings as their primary motivation. HPWH participants much more likely lived in all-electric homes (71%), with many already using heat pumps for space heating and cooling (42%). Participants purchased 90% of HPWHs from retail stores, though contractors installed 48% of the units (with stores providing referrals to most of these installation contractors). Most commonly, participants learned of the rebates from Ameren Missouri's website (34%).
- RAC participants tended to live in the smallest, oldest homes (73% built before 1980), and least likely lived in single-family homes (though still a majority of 73%). Participants purchased nearly half of these measures to replace failed or aging equipment (45%), with a similar number purchasing RACs to make their homes more comfortable (45%); only 3% of respondents mentioned energy savings. Further, only 37% knew which model they wanted to purchase before visiting a store, and most learned about Ameren Missouri rebates when shopping for RACs in a store (60%). Participants purchasing RACs were the least satisfied with the rebate amount they received, and surveyed retail staff thought customers would buy ENERGY STAR RACs without the program incentive.

- Participants who purchased room air purifiers most likely learned about program rebates from the store where they purchased the equipment (65%) and were the least likely to know which model they wanted before shopping (13%). They primarily purchased room air purifiers to improve home comfort (67%), followed by improving health and safety (14%); few cited replacing failed or aging equipment (9%) or energy savings (6%).

Marketing and Outreach

Ameren Missouri markets the Efficient Products program directly and through participating retailers, which utilize Ameren Missouri's program marketing materials and co-branded materials. Ameren Missouri's marketing includes messaging with utility bills, direct mail postcards, Internet and television advertisements, brochures and tear sheets, and other channels.

Program Data

ICF updated and maintained program data through the Vision database. Cadmus reviewed these tracking data for reasonableness and completeness. Though the team identified some data entry errors in the final data set, none were systematic. Some fields, not required to calculate gross impacts, remained blank for participants from the program's earliest months (e.g., building types, heating and cooling systems).

CSR Process Evaluation Requirements

As discussed above, the Missouri CSR requires that demand-side programs operating as part of a utility's preferred resource plan are subject to ongoing process and impact evaluations that meet certain criteria. Process evaluations must address, at a minimum, the five questions listed in Table 5. The table provides a summary response for each specified CSR process requirement.

Table 5. Summary Responses to CSR Process Evaluation Requirements

CSR Requirement Number	CSR Requirement Description	Summary Response
1	What are the primary market imperfections common to the target market segment?	Less-efficient equipment is available at lower price points. Customers may not understand that more-efficient equipment can cost less to operate in the long run, or they may not be willing or able to pay the higher upfront costs of more efficient equipment.
2	Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?	The program appropriately targets all residential customers who purchase qualified energy-saving items for use in their homes.
3	Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy	Yes. For equipment other than smart thermostats, the program rebates solely require that equipment has been ENERGY STAR-certified (i.e., the only

CSR Requirement Number	CSR Requirement Description	Summary Response
	service needs and existing end-use technologies within the target market segment?	requirement is energy efficiency). For smart thermostats, equipment is limited to the necessary technological features (i.e., it must be a "learning" model with geofencing capabilities) and includes the most popular models in this emerging market. The program includes rebates for a variety of equipment targeting a variety of end-uses (water heating, air conditioning, swimming pools, heating) that were cost-effective. The program does not currently offer rebates for kitchen or laundry appliances. Other cost-effective end-use technologies are targeted through other programs.
4	Are the communication channels and delivery mechanisms appropriate for the target market segment?	Yes. Customers may purchase qualified items from any retailer, within or outside of Ameren Missouri's service territory, including online purchases. Ameren Missouri markets the program directly through a variety of channels and also through the several large national retail chains that serve differing, broad, cross-sections of the population. Reviews of program marketing materials found Ameren Missouri follows marketing best practices.
5	What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?	Program promotions that provide program and energy education can help to overcome market imperfections. Timing product promotions so that they coincide with seasons of high use for a given measure also helps implementation. Higher incentives and additional marketing for RAC's may improve participation and lower free ridership.

Key Conclusions and Recommendations

The Efficient Products program—effective, well-received, and well-implemented—encourages Ameren Missouri customers, when making new equipment purchases, to upgrade to efficient equipment.

Cadmus offers the following conclusions and recommendations for improving the program.

Conclusion 1. RAC rebates do not seem to be driving sales of efficient measures. The number of rebates for this measure totaled a little over a third of the targeted number for PY16. Very few customers who received rebates for RACs knew about the rebate before they were in a store shopping, and they were also the least satisfied with the rebate they received. About half of these participants were replacing failed or aging equipment and only 3% mentioned energy savings as a reason for their

purchase. This measure had high free ridership (73%), and accounted for only a fraction of 1% of Efficient Products program net savings.

Recommendation 1. As already planned by Ameren Missouri, we recommend increasing the incentive for RACs. Additional marketing should also be considered. Program management reported they plan to increase the RAC incentive to $50 for PY17; this higher incentive may drive sales, lower free ridership, and affect retailer stocking practices. In particular, the program implementers should try to leverage the raised incentive to encourage retailers to stock more ENERGY STAR models, and fewer non-qualifying models. Further recommendations suggest increasing emphasis on marketing.

Conclusion 2. Swimming pool retailers and contractors are crucial for driving participation for pool pump measures. Program records showed that customers usually purchased pool pumps from companies that specialized in swimming pools, while customers purchased most of the other program measures from general retailers. Most pool pump participants learned about Ameren Missouri rebates from a contractor or store personnel.

Recommendation 2. Track residential pool companies in Ameren Missouri territory, and prioritize developing and nurturing relationships with these companies. The program implementer should identify the population of pool equipment companies operating in the territory and set annual goals for recruiting retailer participation. Ameren Missouri should also consider further research into the residential pool market to identify barrier to participation, such as interviews or focus groups with pool equipment sales staff. Other initiatives could include contests with prizes for companies or sales staff who sell the most rebated equipment during a season.

Conclusion 3. Successful marketing is important for driving efficient equipment sales. Based on the review of available program documentation, Cadmus found Ameren Missouri's Efficient Products program employs a well-structured marketing strategy, using industry best practices to inform customers—at key times throughout the year—about available incentives for efficient products.

Recommendation 3a. Marketing materials can be improved. The marketing strategy could be further enhanced by incorporating a promotional strategy—using targeted media and engagement tactics—to spur program interest and activity. Communications should emphasize important information (i.e., use of strategic call-outs through bolding/highlighting of important text), which can be tailored for different equipment (e.g., improved comfort and health were the primary motivations for room air purifier purchases, so materials should reference this benefit). The free-standing Information Insert should be used as a model for other materials. Cadmus also recommends all materials include a strong set of next participation steps to encourage customers' conversion and to drive their actions upon exposure to materials.

Recommendation 3b. Try to increase awareness of rebates through online retailers (including the websites of local retail stores). The online retail channel accounted for a significant amount of equipment sales (for smart thermostats in particular), though very few participants learned of Ameren Missouri rebates from retailer websites. This indicates there may be customers making purchases online who may choose different equipment if aware of the rebates. Program implementers should contact

major online retailers (as identified through program application records) and suggest that adding information about rebates for Ameren Missouri customers can help drive sales. Ideally, this information would appear based on the customer's zip code or other geolocation information.

Conclusion 4. The Efficient Products program currently has limited offerings. The program offered rebates for five types of equipment during PY16. Possible additional equipment that could be rebated, if cost effective, are ENERGY STAR refrigerators, freezers, dishwashers, clothes washing machines, or clothes dryers, none of which are currently rebated through Ameren Missouri programs.

Recommendation 4. Explore adding rebates for residential kitchen or laundry equipment, if cost effective. The Efficient Products program is an effective platform for driving retail sales of efficient equipment, which could be expanded to include measures that are not currently covered by program rebates. The program does not currently offer rebates on any kitchen equipment (ENERGY STAR refrigerators, freezers, and dishwashers) or laundry equipment (ENERGY STAR clothes washers and dryers).

PY15 Recommendation Tracking

Cadmus followed up on Ameren Missouri's response to the PY15 evaluation's recommendations, tracking recommendations that have and have not been implemented. Table 6 presents these actions, as reported by Ameren Missouri.

Table 6. PY15 Evaluation Recommendation Tracking

PY15 Recommendation	Ameren Missouri Response
If the program continues, consider working with the evaluator and implementer to review data currently not recorded in Vision, and identify any changes that could improve program and evaluation activities. For example, although a field exists for EER values for RACs in the Vision database, these data were not captured. Maintaining detailed program data in Vision would improve the accuracy of evaluated savings values by allowing evaluators to base EER values on rebated RACs rather than on program assumptions.	Ameren Missouri coordinated with the evaluator to collect and report all data fields per measure identified by the evaluator to improve the program and evaluation activities before finalizing rebate forms/applications.

Introduction

Ameren Missouri engaged Cadmus to perform annual process and impact evaluations of the Efficient Products program for a three-year period, from 2016 through 2018. This annual report covers the impact and process evaluation findings for Program Year 2016 (PY16), the period from March 1, 2016, through February 28, 2017: the first year of the three-year program cycle.

Program Description

The Efficient Products program provides incentives that encourage customers to purchase technologies that can save money, improve comfort, and save energy. The program also seeks to educate customers about energy-efficient product options and to provide energy-savings tips.

The Efficient Products program began in Cycle 1 (2009–2012) as the energy-efficient product rebate component of the combined PY09 Lighting and Appliance program. Beginning in PY12, Ameren Missouri discontinued the appliance portion of the combined Lighting and Appliance program; so the program focused exclusively on lighting products.

Ameren Missouri and CLEAResult reintroduced RebateSavers in PY13 as a new, standalone appliance program, designed to promote a variety of energy-efficient products in the marketplace. In PY14, Ameren Missouri changed the program name from RebateSavers to Efficient Products. In PY14 and PY15, the program also included energy efficiency kits, which were mailed to customers. The kits, however, became the basis for a separate program in PY16: the Energy Efficiency Kits Program.

In PY16, Ameren Missouri replaced the Efficient Products program's previous, third-party implementation contractors with ICF, which processed rebates on Ameren Missouri's behalf and managed a network of retail partners that sold qualifying equipment.

The PY16 Efficient Products program provided downstream mail-in and online rebates for the measures listed in Table 7.

Table 7. PY16 Efficient Products Measures

Measure	Rebate Amount
ENERGY STAR®-certified RACs	$20
ENERGY STAR-certified HPWHs	$500
ENERGY STAR-certified room air purifiers	$50
ENERGY STAR-certified multi-speed pool pumps	$350
ENERGY STAR-certified variable-speed pool pumps	$350
Smart thermostats (selected models)	$100

Program Activity

In PY16, the Efficient Products program delivered a total of 10,886 rebates to Ameren Missouri participants, as shown in Table 8.

Table 8. PY16 Efficient Products Program Activity Summary

Measure	PY16 Totals *
Equipment Rebates	
ENERGY STAR®-certified RACs	346
ENERGY STAR-certified HPWHs	341
ENERGY STAR-certified room air purifiers	1,300
ENERGY STAR-certified multi-speed pool pumps	149
ENERGY STAR-certified variable-speed pool pumps	550
Smart thermostats (selected models)	8,200
Total	**10,886**

*Reported measures.

Evaluation Methodology

In evaluating Ameren Missouri's Efficient Products program, Cadmus identified the following objectives for PY16:

- Identify PY16 program changes
- Estimate the program's gross energy savings and demand reductions
- Calculate the program's cost-effectiveness
- Determine measure-specific net-to-gross (NTG) estimates, including participant and nonparticipant spillover (NPSO)
- Measure customer satisfaction with the program and customers' motivations for participating
- Identify and understand retailers' selling methods and stocking practices
- Assess the program's achievements against goals
- Assess program design implementation and opportunities for improvements

Table 9 lists evaluation activities and briefly explains each activity's purpose. Descriptions of each activity follow the table.

Table 9. PY16 Process and Impact Evaluation Activities and Rationale

Evaluation Activity	Process	Impact	Rationale
Review the Tracking Data	✓	✓	Provide assurance that all necessary program data are tracked accurately and incorporated into savings estimates.
Interview Stakeholders	✓		Identify changes to program delivery, and identify successes and challenges.
Conduct Surveys with Program Participants	✓	✓	Collect customer feedback about program processes, satisfaction, and information sources about the program. Confirm equipment disposition.
Review Marketing Materials	✓		Identify gaps and opportunities in the program's marketing and outreach strategies and activities.
Interview Participating Retailers	✓		Provide information about Missouri's market for products covered by the program, and about program operations in retail stores.
Program Benchmarking	✓		Identify gaps and opportunities in program offerings, incentive levels, and results in comparison with similar programs in other territories.
Update Engineering Analysis Variables		✓	Update gross kWh savings estimates.
Key Progress Indicators	✓		In PY16, develop key progress indicators to track progress in subsequent program years.

Evaluation Activity	Process	Impact	Rationale
Conduct a Cost-Effectiveness Analysis		✓	Measure the program's cost-effectiveness using five standard perspectives: total resource cost, utility cost, societal cost test, participant cost test, and ratepayer impact test.

Data Tracking Review

Cadmus reviewed program tracking data recorded in the Vision database to determine completeness and to identify the variables necessary for impact calculations. Specifically, the team assessed whether ICF gathered the data necessary for an accurate evaluation; these included an assessment of data quality and completeness.

The continuously updated Vision database contained information such as the following:

- Incentive amount
- Measure type
- Customer information
- Building type and HVAC information
- Equipment manufacturer and model number
- Combined Energy Efficiency Ratio (CEER) for RACs
- Pool size for pool pumps

Stakeholder Interviews

In February 2017, Cadmus interviewed Efficient Products program stakeholders. The interview design addressed the following:

- Understand program successes and challenges
- Gain insights into program marketing processes
- Obtain information about how the program engaged with retailers
- Identify the program's key quality assurance processes

As shown in Table 10, the team spoke with two stakeholders from Ameren Missouri and ICF. Appendix D provides the stakeholder interview guide.

Table 10. PY16 Completed Stakeholder Interviews

Stakeholder Group	Interviews Conducted
Ameren Missouri Program Management	1
ICF Program Management	1
Total	**2**

Throughout PY16, the team regularly spoke with Ameren Missouri program staff to discuss program operations and to coordinate evaluation activities.

Participant Surveys

Cadmus conducted online surveys with participating customers, who received an invitation to participate in the online survey via email, if their application records included an email address.[3]

The team conducted two online surveys, administering one immediately after a customer received a rebate (i.e., a proxy for installation date) and the other six months later:

- The immediate survey included questions about measure and program satisfaction, measure installation, program free ridership, information sources about the program, contractor roles (if any), and demographics and household characteristics.
- The follow-up survey included some of the same satisfaction and installation questions to compare responses over time. Rather than using a battery of questions to inform program free ridership, this survey included a battery of questions to inform program spillover.

Customers participating earlier in the year received invitations to both surveys, while those participating less than six months before the end of the program year only received the immediate survey.[4] When customers purchased multiple measure types, the team selected which measure type that their survey would address.[5] Table 11 shows participant survey response rates.

Table 11. Participant Survey Response Rates

Survey Type	Number of invitations	Number of Responses	Response Rates
Immediate Email Survey	4,532	1,223	27%
Follow-up Email Survey	1,553	335	22%

If customers received rebates for more than one measure type, the team's survey asked about a single measure type. When customers received multiple rebates for the same measure, the survey wording and response options reflected the number of rebates received by the participant. Table 12 summarizes the number of measures purchased by survey respondents.

[3] Ninety-one percent of program records for PY16 included an email address (9,004 out of 9,935 records).

[4] Invitations to the follow-up survey were sent to a census of all participants with valid email addresses. For the immediate survey, the team surveyed a census of program participants with valid email addresses for all measures other than smart thermostats. For two months when there was a very large number of thermostat rebates, we sent immediate survey invitations to a randomly selected sample of thermostat participants, in order to cap the number of thermostat surveys at about 150 per month. During the remaining months, the team surveyed a census of thermostat participants.

[5] Because most measures rebated through the program in PY16 were smart thermostats, customers with multiple measure types were asked about their non-thermostat measure with the largest *ex ante* savings.

Table 12. Participant Survey Measure Quantities

Measure Type	Immediate Survey		Follow-Up Survey	
	Responses (Number of Customers)	Rebates Received (Number of Measures)	Responses (Number of Customers)	Rebates Received (Number of Measures)
RACs	31	36	17	20
HPWHs	86	86	11	11
Room air purifiers	105	118	16	20
Pool pumps *	120	121	59	59
Smart thermostats	881	1,003	232	267
Total	**1,223**	**1,364**	**335**	**377**

*Participants who purchased multi- and variable-speed pool pumps received identical survey questions/wording. Survey results for the measures are reported together as "pool pumps."

Marketing Review

Cadmus completed a strategy assessment and marketing materials review to assess the Efficient Products program's adherence to industry best practices for program marketing strategies and related marketing tactics. In conducting this review, the team examined marketing materials and marketing strategy documents.

Retailer Interviews

Cadmus interviewed store and corporate staff from participating national and local retailers to ascertain the retailers' experience with the program and to gather suggestions for improvements. The team interviewed 15 retailer staff about their interactions with Ameren Missouri representatives, customer awareness and interest in energy-efficient products, marketing and advertising, and other sales trends for products in the Efficient Products program.

ICF provided the team with a list of participating retail stores in Ameren Missouri territory, and the team randomly sampled which stores to contact within each measure category, as shown in Table 13. The team, in attempting to contact a census of the limited number of corporate-level contacts available, completed three interviews.

Table 13. Retailer Interview Segments

Segment	Number of Interviews
Corporate staff	3
Store staff – sell RAC and room air purifiers*	3
Store staff – sell HPWH	3
Store staff – sell pool pumps	3
Store staff – sell smart thermostats	3

*All participating retailers that sold RACs also sold room air purifiers, and vice versa.

Out of 15 interviews, the team spoke with 12 store staff, representing 10 different retailers that participated in the PY16 program. These interviews covered all five types of measure eligible for rebates through the PY16 program.

Corporate and store staff represented national big box retail chains, except for the pool pump segment, which mostly consisted of local companies specializing in residential pool products and services. To supplement store-level feedback, the team interviewed three corporate staff from different participating retailers. Together, retailers interviewed accounted for 35% of measures rebated through the program in PY16.

Engineering Analysis

Cadmus estimated gross savings for most program measures using engineering algorithms established in the Efficient Products Evaluation Plan.[6] The team then compared the deemed per-unit savings, provided in Ameren Missouri's 2017 Technical Reference Manual (TRM), to Cadmus' gross savings estimates (presented in this report). For the smart thermostat measure, the team assessed the reasonableness of deemed per-unit savings by comparing it with Illinois' TRM values.[7] These calculations were per-unit savings estimates that did not include adjustments for installation rates.

Program Benchmarking

Cadmus researched 12 other utilities that offered measures similar to those in Ameren's Efficient Products Program. The team conducted secondary research using its benchmarking database, E-Source, and publicly available information to identify which programs had the most recent evaluations available and to contain information regarding metrics and topics planned for benchmarking.

Key Progress Indicators

Cadmus plans to track the following key progress indicators for the Efficient Products program across the three-year program cycle: program year electric savings, participation by measure, free ridership by measure, and customer satisfaction with upgrades, incentive amounts, the program overall, and with Ameren Missouri.

Cost-Effectiveness Analysis

Using final PY16 Efficient Products Program participation and implementation data, as well as the *ex post* gross and net savings estimates presented in this report, Ameren Missouri determined the program's cost-effectiveness using DSMore (a financial analysis tool designed to evaluate the costs, benefits, and risks of demand-side management [DSM] programs and services). As shown in the Cost-

[6] Cadmus. "Evaluation Plan: Residential Efficient Products Program (PY16-PY18)." September 2016.

[7] Available online: http://www.ilsag.info/il_trm_version_5.html

Effectiveness Results section, Ameren Missouri assessed cost-effectiveness using all five of the standard perspectives produced by DSMore:

- Total Resource Cost (TRC)
- Utility Cost Test (UCT)
- Societal Cost Test (SCT)
- Participant Cost Test (PART)
- Ratepayer Impact Test (RIM)

Process Evaluation Findings

This section presents Cadmus's process evaluation findings for Ameren Missouri's Efficient Products program. The report organizes the findings in five sections: Program Delivery, Marketing and Outreach, Participant Experience, Retailer Experience, and Smart Thermostat Usage.

Program Design

The Efficient Products program seeks to achieve energy and demand savings by encouraging residential customers to purchase efficient RACs, HPWHs, room air purifiers, pool pumps, and smart thermostats. The program broadly targeted residential customers in Ameren Missouri's service territory, incentivizing them to replace existing or broken equipment with efficient units by offering downstream rebates.

Qualifying equipment became eligible for rebates, whether or not purchased within Ameren Missouri's territory, although the program partnered with retailers within the territory to promote and support the program. Participants received rebates by mail after their approval of their applications.

From PY16 through PY18, Ameren Missouri contracted with ICF to implement the program. ICF managed the program's marketing and a network of participating retailers, processed rebates, and conducted quality control checks. Table 14 lists Ameren Missouri's rebate amounts for the Efficient Products program.

Table 14. Rebated Measures

Qualifying Products	Rebate Amount
ENERGY STAR®-certified RACs	$20
ENERGY STAR-certified HPWHs	$500
ENERGY STAR-certified room air purifiers	$50
ENERGY STAR-certified multi-speed pool pumps	$350
ENERGY STAR-certified variable-speed pool pumps	$350
Smart thermostats (selected models)	$100

Program Delivery

This section discusses responses drawn from Cadmus's interviews with program managers and participating retailers. Interviews primarily focused on program changes, relationships with retailers, quality assurance processes, successes and challenges, and future program changes.

PY16 Program Changes

In PY16, the Efficient Products program's major changes included the following:

- ICF took over as the new implementation contractor
- The program added rebates for smart thermostats
- The program no longer rebated water coolers and electric (non-heat pump) water heaters

- The program no longer included home energy kits (as of PY16, a separate Energy Efficiency Kits Program included the kits)
- Ameren Missouri's online store stopped including equipment covered by the Efficient Products program

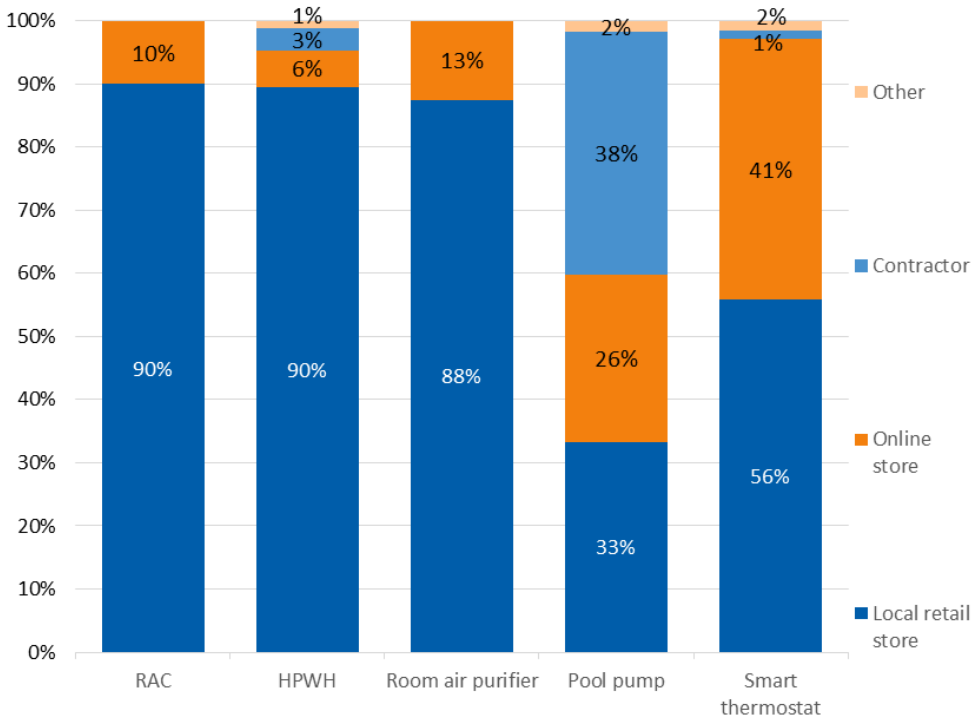
Retailers

To promote efficient equipment sales and, more broadly, the ENERGY STAR brand, the Efficient Products program actively engaged with retailers that sold equipment rebated through the program. Participating retailers disseminated information about the program, including rebate application forms.

Staff from ICF and subcontractor Crossmark regularly met with staff from participating local retailers at their stores to provide program updates, and to provide them with marketing materials, training, and information. ICF also maintained contacts with corporate-level personnel at national retail chains as well as with some distributers and manufacturers for HPWH equipment and with the two largest smart thermostat manufacturers. Since the Efficient Products program, however, operated as a downstream rebate program, implementer staff reported that their main goal was to affect retailer stocking practices, while the program also seeks to affect manufacturer, contractor, and distributor practices.

Participants did not need to purchase equipment from a participating retailer to receive program rebates. Figure 1 shows retailer types where different measures were purchased, per results from Cadmus's participant survey. For RACs, HPWHs, and room air purifiers, 88% to 90% of purchases occurred at a local retail store, as did 56% of smart thermostats, but only 33% of pool pumps. Online retailers served as major sources for smart thermostat (41%) and pool pump (26%) purchases, but customers less commonly used these to purchase room air purifiers (13%), RACs (10%), or HPWHs (6%). Installation contractors served as an important sales source for participants purchasing pool pumps (38%), but not for HPWHs (3%), smart thermostats (1%), or the other measures (i.e., 0% RACs or room air purifiers).

Figure 1. Retailer Types Where Participants Purchased Program Measures



Immediate Participant Survey: B2. "Did you purchase the [measure](s) at a store, or from a contractor?"
RAC n=30, HPWH n=86, Room air purifier n=104, Pool pump n=117, Smart thermostat n=863

Quality Assurance Processes

Implementer staff reported that the Efficient Products program conducted quality assurance by reviewing every application received. This included confirming that the applicant was an Ameren Missouri residential customer, and that fields crucial for verifying the equipment's qualification were complete. If required information was missing from the application, the implementer contacted the applicant by email or mail to ask them to provide the missing information. If no response was received from the applicant after a month of contact attempts, the application was cancelled. Staff reported that online applications tended to require less follow-up with participants due to participants typing data online rather than writing it by hand. Implementer staff also reported that overall, for PY16, about 2% of program applications were rejected as the qualification applicants' equipment could not be verified.

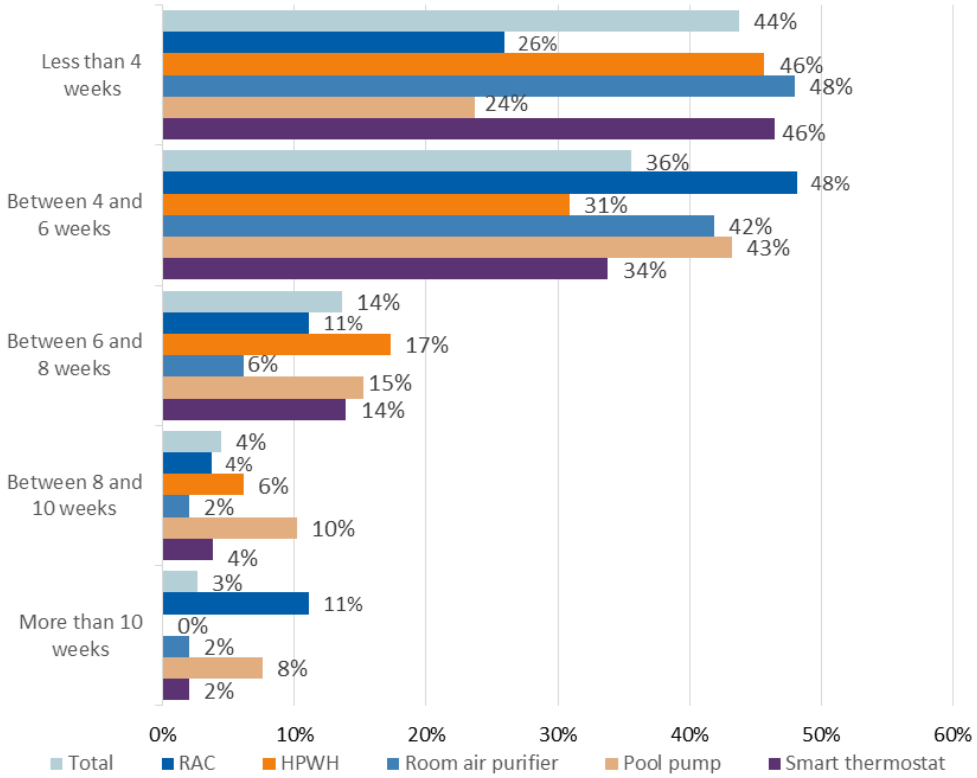
To qualify for the program rebate, smart thermostats had to be included on a list of six qualifying models (from five manufacturers). For other measures, equipment had to be included in a list of ENERGY STAR-certified equipment.

Rebate Processing Time

Program staff reported that the Efficient Products program sought to process rebates in 20 business days or less (i.e., four weeks). Cadmus asked survey respondents how long it took to receive their rebate payments. Figure 2 shows 67% (pool pumps) to 90% (room air purifiers) of participants received their

rebates in six weeks or less. Overall, only 7% of participants reported it taking longer than eight weeks to receive their rebates, with pool pumps (18%) and RACs (15%) the most likely to take more than eight weeks. Pool pump participants' rebates may have taken longer to process because of the higher likelihood that a contractor was involved in their purchase and installation (to the extent contractors provided information or assistance with the application process, the customer would be dependent on the contractor's schedule for providing this information or assistance). According to Ameren Missouri staff, through investigation Ameren Missouri found that 100% of survey respondents indicating they had not received their check, actually did receive it, but it had been discarded, or cashed or deposited by another household member.

Figure 2. Participant-Reported Time to Receive Rebate



Immediate Participant Survey: D3. "After you submitted the rebate application and documentation for the purchase of your [measure](s), how long did it take to receive the rebate check from Ameren Missouri?"
RAC n=27, HPWH n=81, Air purifier n=98, Pool pump n=118, Smart thermostat n=840, Total n=1,164

Delivery Successes and Program Achievements

Stakeholders reported the following program aspects worked particularly well in PY16:

- The program remained on track to reach annual targets for most measures, despite the delay of the PY16 program's launch. Program management credited effective marketing campaigns for this outcome.

- Smart thermostat rebates exceeded the program's initial PY16 target (i.e., 5,400 units) by more than 50%.
- The program manager reported that ICF's Vision database performed more smoothly than its previous implementation contractor's database.

Program Implementation Challenges and Potential Changes

Program stakeholders identified three challenges and areas for future exploration:

RACs fell far short of PY16's goal of 1,000 units, rebating only about one-third of that number. ICF staff reported being surprised by the retail availability of RACs that lacked ENERGY STAR certification. In PY17, program managers planned to increase this measure's incentive to reverse this trend.

Program management expressed concerns over high free ridership levels for certain measures. As Efficient Products operates as a downstream retail program, many participants did not learn about program rebates until already shopping for equipment and the rebate may not be the major influence in product choice.

The program cycle lagged the filing and evaluation cycles, presenting challenges in updating program design and incentive amounts in a rapidly changing marketplace.

Marketing and Outreach

Ameren Missouri marketed the Efficient Products program directly and provided materials and co-branding opportunities to its participating retailers. This marketing and outreach section provides an assessment of the marketing strategy and the program marketing materials, information about marketing practices, and relevant results from the participant surveys.

Marketing Strategy

As part of an evaluative effort to assess its programs' performance, from inception of the three-year plan to the present, Ameren Missouri requested a review of program-specific marketing materials.

Integral program operations included marketing, education, and outreach activities; these ensured targeted audiences knew of energy-saving measures and services available, stayed informed about ways to access these through Ameren Missouri's network of program implementers and trade allies, and received education on proper measure installation and maintenance. Table 15 lists program documents and materials reviewed by the team to assess the Efficient Products program's strategies and marketing materials.

Table 15. Summary of Program Documents and Materials Review

Research Method	Program Documents/Materials Reviewed
Strategy Assessment	• Program Implementation Guide: *Appendix H—MEEIA 2016-18 Program Template* • Marketing Calendar: *Marketing Flow Chart—9.1.16*
Materials Review	• Advertisements: *banner ads* • Collateral: *rebate forms* • Direct Mail: *bill inserts, free-standing inserts, post cards*

In completing a strategy review, Cadmus sought to determine whether the program adheres to industry-recognized marketing best practices. While geographic, economic, and sociographic differences emerge when comparing one utility's service territory to another, and those differences impact program delivery, little variance remains in overarching program designs and related marketing strategies for a majority of DSM programs.

Cadmus reviewed program documentation shown in Table 15 to understand the Efficient Products program's targeted audience, delivery methods, stated marketing strategies, and supporting tactics, along with the confirmed 2016 advertising schedule. To assess the program's marketing strategy, the review used industry insights and the team's expertise in marketing energy efficiency programs.

Strategy Assessment

From the review, Cadmus found that Ameren Missouri's Efficient Products program targeted all residential customers for purchases of ENERGY STAR®-certified HPWHs, RACs, room air purifiers, pool pumps, and smart thermostats,[8] using strategic partnerships with local and national retailers. Ameren Missouri leveraged national ENERGY STAR campaigns and initiatives to work collaboratively with partners and allies within the retail supply chain in promoting these products to customers. Table 16 presents related tactics for engaging retail partners and customers.

Table 16. Ameren Missouri Efficient Product Program Strategies and Tactics

Audience	Residential Customers	Local and National Retailers
Advertising	Print, Radio, TV, mobile, billboards	NA
Co-operative Advertising	NA	Dedicated program for trade ally co-promotion
Ameren-Owned Communications	Bill Stuffers, web placement	NA
Collateral	In-store displays, rebate forms	In-store displays, rebate forms
Events	NA	Retail Trainings

*Though Cadmus did not review Ameren-owned communication materials targeting retailers, the team assumed such materials exist, based on information included in the implementation plan.

[8] The team could not assess Ameren Missouri's approach to smart thermostats due to a lack of information provided from planning or advertising standpoints.

Ameren Missouri's strategy of aligning with ENERGY STAR national campaigns is consistent with industry best practices. The cost-efficiency and increased effectiveness in leveraging the national program's efforts to engage key retailers in local promotions and in nationally developed marketing materials and messaging strategies in local markets provided a consistent, seamless platform to engage customers and retailers throughout the year.

Furthermore, in aligning with ENERGY STAR, Ameren Missouri used seasonality in its marketing and promotion of measures within its efficient products program—a tactic also considered an industry best practice. Upon reviewing the marketing calendar, the team surmised that Ameren Missouri's use of seasonality related to periods when digital advertisements addressed the following:

- Pool pumps (August 8–September 4)
- HPHWs (September 26–October 2; October 17–30)
- Smart thermostats (November 21–27)

From June 27–November 27, a paid search advertising campaign was run for all efficient products and smart thermostats.

2016 Marketing Materials Review

Cadmus assessed 15 different marketing materials provided by Ameren Missouri. The team's analysis grouped the materials into the four categories shown in Table 17.

Table 17. Ameren Efficient Products Program Materials Reviewed

Cluster	Materials Included	Efficient Products
Advertisements	Banner ads, TV commercial	2
Collateral	Beam signs, blade signs, fact card, general sign, stickers, brochures, door hangers, rebate forms, tear pad	5
Direct Mail	Bill insert, insert, post card	8
Direct Communication	Letter, email, enrollment form	-
Total		**15**

Ameren Missouri's marketing materials proved adequate to promote its energy efficiency programs to customers. The materials were direct and easy to comprehend, helping customers to understand available energy efficiency programs and their associated energy and cost savings, while using non-technical terminology. Materials included a strong call-to-action, informing customers of actions required for participation, and providing clear directions to help them take action. Combined, these factors were designed to enhance customers' recall of marketing materials and to drive program participation.

During the review, the team noted that Ameren Missouri had a set of general program materials as well as one for a specific campaign. The team approves of Ameren Missouri's "That's Something to Smile About!" campaign: its creative and messaging strategy, given its appeal and allure, can help excite and entice customers who traditionally have not participated in these programs. The team urges Ameren

Missouri to ensure that pieces developed in the corporate brand adhere to the same guidelines. Some styles differ, specifically fonts and layouts for the energy efficiency kit materials reviewed in relation to the other branded materials.

Ameren Missouri materials equated programs with available incentives, discounts, and savings. Some materials, however, could benefit from improved communication of important information.

Efficient Products Program Marketing Material Review

Cadmus analyzed 15 materials for Ameren Missouri's Efficient Products program, in accordance with a best practices list for effective and successful marketing tactics, as shown in Table 18.

Table 18. Best Practice Elements for Marketing Materials

Element	Description
Consistent messaging and "look and feel"	Repetition in messaging and consistency in appearance helps to reinforce brand awareness and makes it easier for viewers to understand and remember key program information.
Identifiable target audience	Messaging, content, and delivery best engage and motivate participation if clearly focusing on a program's unique target audience, addressing key barriers, and/or leveraging distinct motivators.
Clear and comprehensive program details and benefits	Successful communications materials convey benefits in simple terms and explain the value proposition, leading to a higher likelihood of understanding and participating in the program.
Direct call to action	A target will more likely follow through with a desired action if that desired action has been clearly stated.
Appropriate messaging and creative, given context	Creative layout, design, and messaging should match the marketing and media channel in which it will be placed.
Complementary creative imagery and messaging	An effective and impactful creative platform seamlessly and strategically blends key messaging with imagery and layouts to ensure all components work together to encourage the desired outcomes.
Visual appeal	Visually appealing materials leave positive impressions.
Easy participation steps	Effective marketing and communications materials outline a clear, simple, and—ideally—easy path for consumers to follow to participate in a program.
Memorable and recognizable messages	A memorable and recognizable message increases the likelihood of the target recalling the message, and, in turn, increasing the likelihood of participation.
QA/QC errors	Materials with errors detract from an organization's credibility.

The team assessed each material using a four-point scale for each best practice attribute, with a total score annotating the materials' overall adherence to industry best practices for developing marketing tactics. The team's analysis of key findings follows, drawn from reviewing Efficient Products program marketing materials.

Advertising

Cadmus reviewed two digital banner advertisements—one for pool pumps (Figure 3) and one for other water heaters. These banner ads leverage the "smile" campaign look and feel, which helps draw viewers' attention through appealing graphics and concise messaging. The ad highlights the savings amount prominently, improving visibility and making the call to action easy to identify.

Figure 3. Pool Pump Banner Ad

Collateral

As part of the program's delivery, Ameren Missouri used rebate brochures for each measure (e.g., smart thermostats, RACs, room air purifiers, pool pumps, hot water heaters). These brochures followed industry best practices:

- They contained high-quality and relevant images, complemented by descriptive, short titles on the covers.
- The interior of the brochure presented customers with educational information, including program requirements and ways to find the right model for a customer's needs.
- They provided ample space for customers to write in the details necessary to receive the rebate, and provided clear instructions on where and how rebate forms should be mailed.
- The back cover cross-promoted other possible rebates available for customers, and informed them where to find further information.
- Throughout, the brochures highlighted or somehow differentiated key information from the main body of text (e.g., rebate levels, tables helping customer choose the correct RAC capacity).

Potentially, the brochures' inside sections and back cover could have been more visually appealing. Graphics or product images can help attract a customer's attention, rather than risking information overload (hence, the customer may not finish reading the document, missing critical information.)

Direct Mail

Ameren's direct mail campaign to support efficient products program utilized three components: bill inserts, free-standing inserts, and postcards.

Bill inserts contained short and concise messaging, which varied from month to month. Some of these documents (e.g., the May bill insert) lacked sufficient detail to provide customers with required information about the program. Additionally, most monthly statement messages lacked clear call-outs (i.e., no boldface text). While Cadmus understands limited space and restricted styles, subtle enhancements could better present the information to the customer.

The free-standing insert (shown in Figure 4) used clear, concise messaging and a visually appealing appearance, with creative elements complementing the copy and following Ameren branding guidelines. Combined, this presented a strong call to action for customers viewing the insert and served as a model for other residential marketing materials.

Figure 4. Free-Standing Insert (Front and Back)

The postcards that Cadmus reviewed raised awareness of specific program incentives. The postcards used appealing fronts, with memorable copy and relevant images. All presented a strong call to action and educational materials, but some lacked strong, clear next steps on ways to take advantage of incentives. Additionally, the pool pump postcard's back did not use easy-to-read copy. Though, overall, these postcards offered strong examples of effective marketing materials, they could be improved slightly.

The team scored materials against the "top 10" best practice elements for effective and successful marketing materials, as shown in Table 19. Individual materials were scored using this scale, with scores aggregated for the different groups.

Table 19. Marketing Material Review Scores

Focus Area	Advertising	Collateral	Direct Mail
Consistent messaging and "look and feel"	3.0	3.0	3.0
Identifiable target audience	3.0	3.0	3.0
Clear and comprehensive program details and benefits	3.0	3.3	3.0
Direct call to action	4.0	3.0	3.2
Appropriate messaging and creative, given context	4.0	3.0	3.4
Complementary creative imagery and messaging	3.0	2.0	3.0
Visual appeal	3.0	2.4	3.1
Easy participation steps	3.0	3.5	3.3
Memorable and recognizable messages	4.0	4.0	3.5
QA/QC errors	No	No	No

Retailer Marketing Practices

In general, participating stores advertised the program rebates using rebate-qualifying stickers on product boxes and brochures and/or rebate forms on the shelves, which program representatives came to set up and rotate. With two exceptions, interviewed retailers did not mention end cap or pallet displays for qualified products. Three respondents reported that the retailers' website advertised the rebates.

Cadmus asked retail staff for suggestions to improve the Efficient Products program; respondents offered the following strategies:

- Set up bigger displays at the entrance or checkout
- Increase external advertising to bring customers into the store, particularly online advertising
- Leverage opportunities for cross-promotion between incented products

Two respondents suggested offering rebates for efficient laundry appliances, such as ENERGY STAR clothes washers; other suggestions included bath exhaust fans, microwaves, refrigerator recycling, heat pumps for the pool, and home security cameras.

Sources of Participant Program Awareness

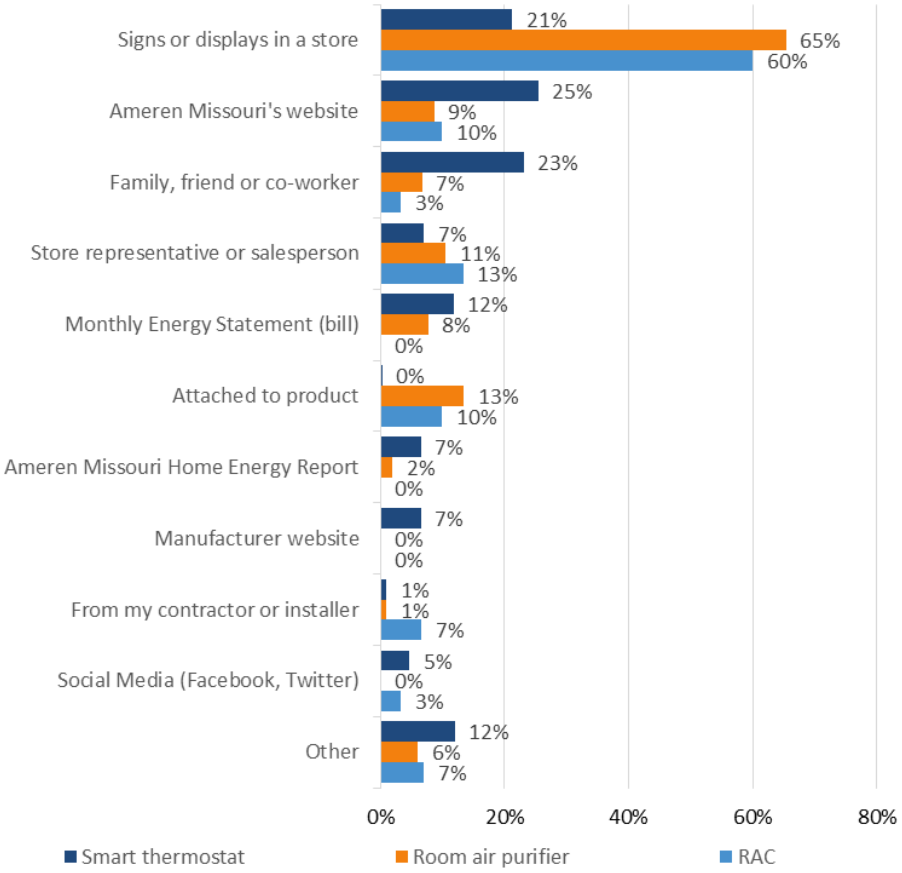
Cadmus asked program participants how they heard about the Efficient Products program rebates. Responses varied greatly, according to the equipment type that the customer purchased. Overall, 7% (n=1,218) of immediate survey respondents reported that, until taking the survey, they were unaware that their rebates had been provided by Ameren Missouri. This varied from 16% of RAC participants (n=31) to a low of 3% of HPWH participants (n=86).

Figure 5 shows awareness sources for less expensive measures, usually self-installed by participants: smart thermostats, room air purifiers, and RACs.

For RACs and air purifiers, a majority learned about the program from signs and displays in stores where they purchased the equipment (65% and 60%, respectively), while more than 10% also reported learning of the program from store personnel and from the rebate application attached to product packaging in the store. About one in 10 learned of the program from Ameren Missouri's website (e.g., 9% air purifiers, 10% RACs), and 8% of air purifier participants reported seeing "something" on their monthly energy statements, though none of the RAC participants cited this. Seven percent of RAC participants learned of rebates from the contractor installing the equipment.

Smart thermostats drew upon broader sources of awareness, led by Ameren Missouri's website (25%), personal recommendations from friends and family (23%), and in-store displays (21%). Other significant ways that customers learned about thermostat rebates included information accompanying their bills (12%), Home Energy Reports (7%), manufacturers' websites (7%), and social media (5%).

Figure 5. Participant Sources of Program Awareness—Smart Thermostats, Room Air Purifiers and RACs

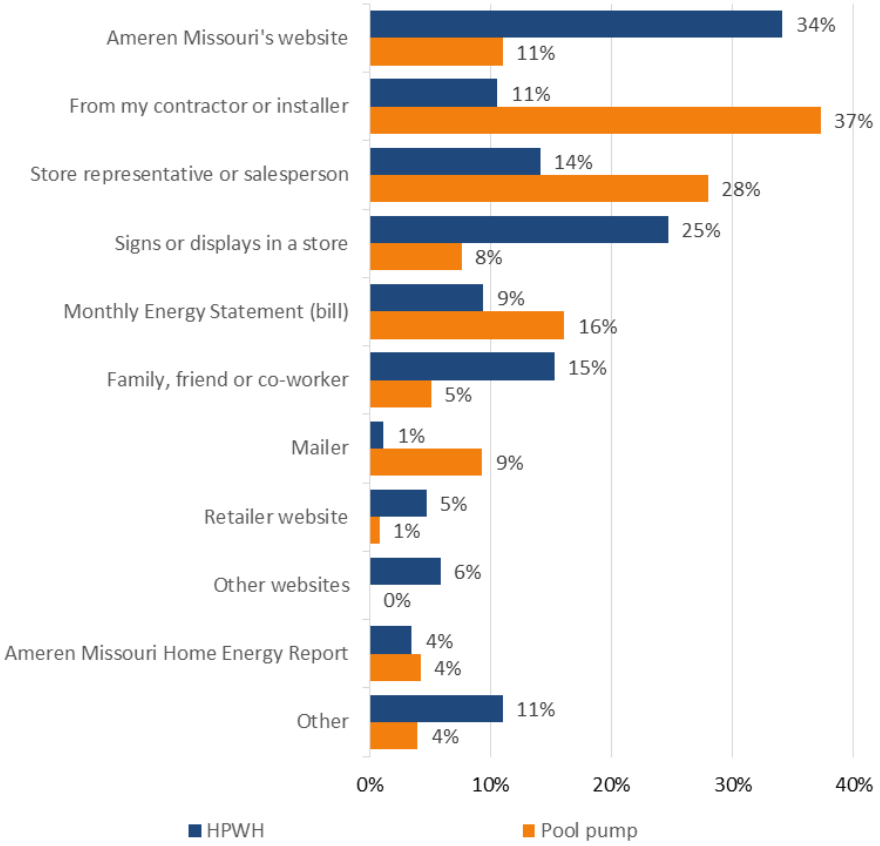


Immediate Participant Survey; A4. "How did you hear about Ameren Missouri's Efficient Products rebate program?" Smart thermostat n=869, Room air purifier n=104, RAC n=30 (Multiple responses allowed)

Figure 6 shows awareness sources for more expensive measures, which contractors often install: HPHWs and pool pumps.

For HPHWs, the most important awareness sources included: Ameren Missouri's website (34%); in-store displays (25%); recommendations from friends and family (15%); and store personnel (14%). The major awareness sources for pool pumps included contractors that installed the equipment (37%); and store personnel (28%), along with monthly energy statements (16%), Ameren Missouri's website (11%), and direct mail (9%).

Figure 6. Participant Sources of Program Awareness—HPHWs and Pool Pumps



Immediate Participant Survey; A4. "How did you hear about Ameren Missouri's Efficient Products rebate program?" HPWH n=85, Pool pump n=118 (Multiple responses allowed)

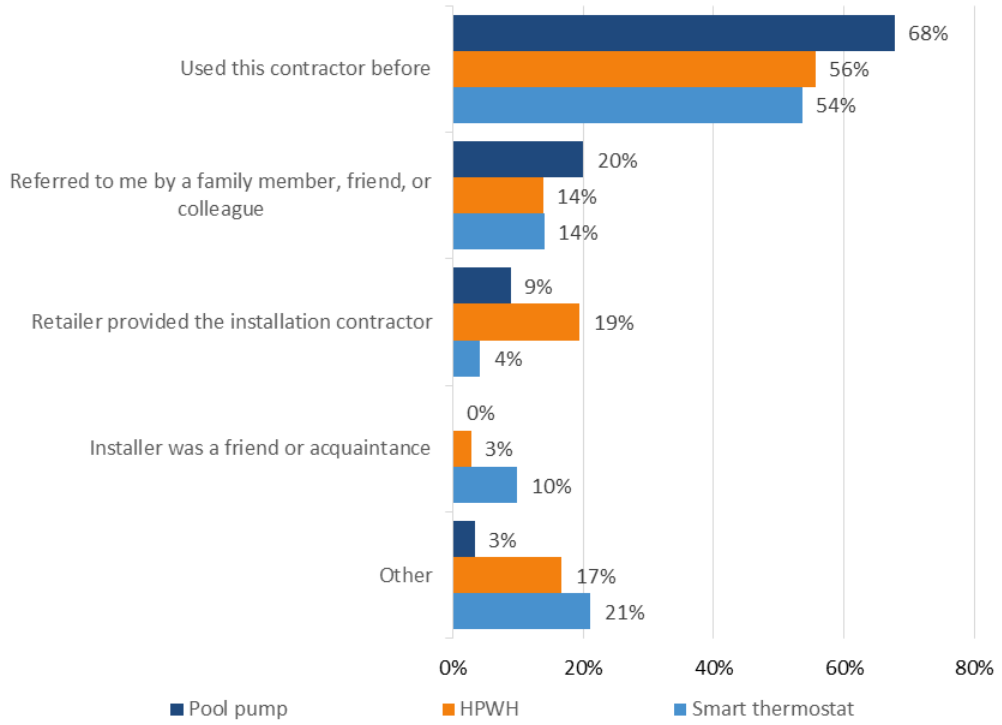
Survey respondents reported that contractors installed most pool pumps (79%) and about half of HPHWs (48%), while someone in the participant household installed more than 90% of the other program measures. The team asked respondents how they selected contractors doing the installation.[9] As shown in Figure 7, a majority of participants using contractors for installation selected their contractor based on prior experience with the contractor (54% to 68%, by measure) or followed a referral from a trusted source (14% to 20%). For HPHWs, the store selling the equipment frequently provided an installation contractor (19%). Contractors who were personal acquaintances of participants installed a relatively high 10% of smart thermostats.

As shown in Figure 7, miscellaneous reasons categorized as "other" included online and traditional advertising, consumer information websites, contractors already doing other remodeling at the time,

[9] The survey did not ask participants who purchased room air purifiers about contractors, as this equipment did not require installation. Only two survey respondents used contractors to install RACs.

and landlords providing the contractors. Only two smart thermostat survey respondents (3%) mentioned the Ameren Missouri website, and none mentioned the website for other measures.

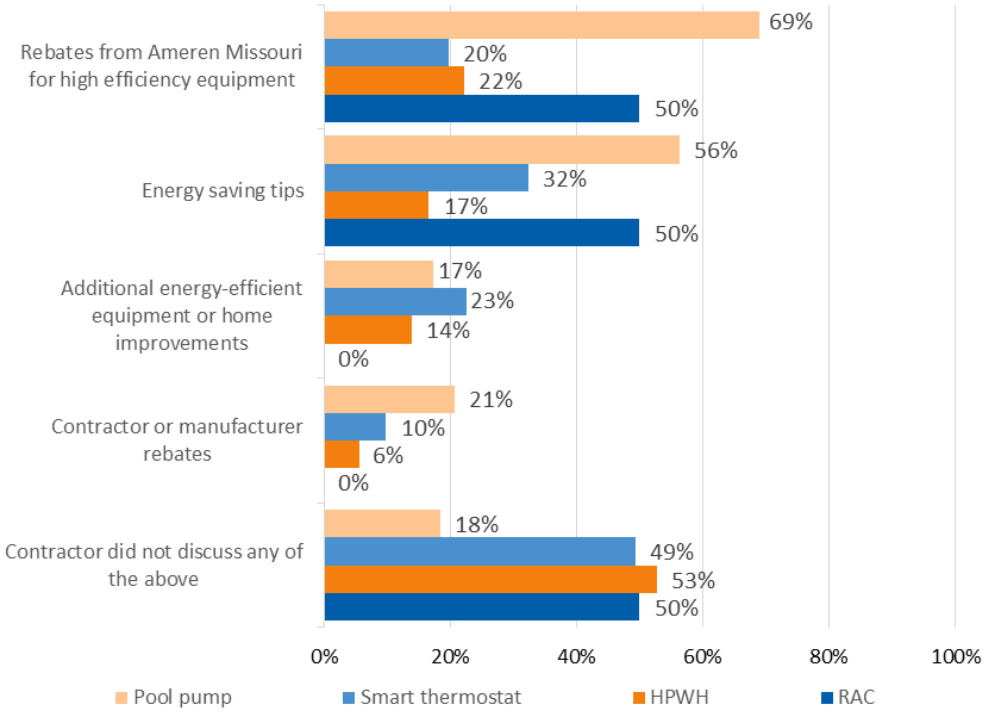
Figure 7. Participant Reason for Selecting Contractor



Immediate Participant Survey; C1. "How did you select the contractor who installed your [measure]?"
Pool pump n=90, HPWH n=36, Smart thermostat n=71 (Multiple responses allowed)

Cadmus asked participants who hired contractors what topics they discussed prior to installations. As shown in Figure 8, most interviewed pool pump participants discussed Ameren Missouri's rebate (69%) and energy-saving tips (56%) with their contractors—rates higher than those reported for other measures. About half of smart thermostat and HPWH customers did not discuss any listed topics with their contractors (i.e., "none of the above" 49% and 53%, respectively).

Figure 8. Topics Participants Discussed with Contractors



Immediate Participant Survey; C2. "Please check any options listed below that your contractor discussed with you prior to installing your new [measure]. Please note, options listed below may or may not have been applicable to your situation." Pool pump n=87, Smart thermostat n=68,
HPWH n=32, RAC n=2 (Multiple responses allowed)

Some participants received rebates from contractors or manufacturers in addition to Ameren Missouri's Efficient Products Program rebates. Figure 8 showed participants most likely discussed these rebates with their contractors when purchasing pool pumps (21%), though some smart thermostat (10%) and HPWH participants (6%) also reported discussing other rebates. Among participants receiving additional rebates, respondents cited average reported rebate amounts of $231 for pool pumps (n=13), $85[10] for smart thermostats (n=5), and $500 for the sole respondent to receive a manufacturer or contractor rebate for purchasing a HPWH.

[10] One survey respondent reported receiving a $700 manufacturer or contractor rebate for their smart thermostat, and was not included in the calculation. Including this outlier, the average manufacturer or contractor rebate was $188 among the six smart thermostat respondents who reported rebate amounts.

Participant Experience

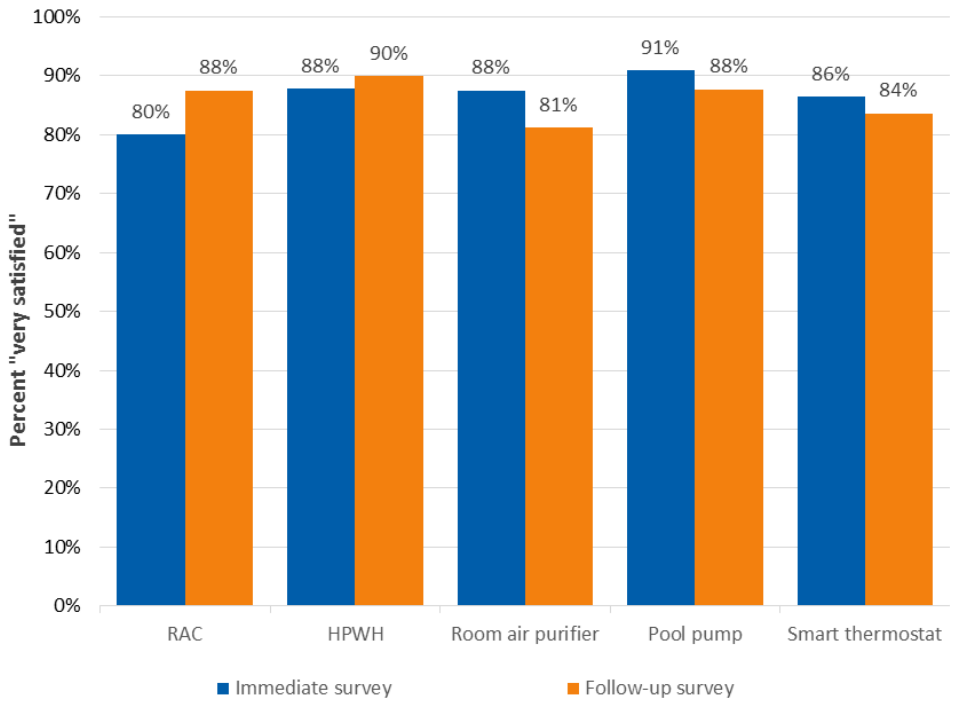
Participant Satisfaction

Cadmus asked participants about their satisfaction with their new equipment, their installing contractor (if applicable), their rebate amounts, the time required to receive the rebate, Efficient Products program overall, and Ameren Missouri. Participants expressed high satisfaction levels with all program elements.

Satisfaction with Measures

Participants expressed high satisfaction levels with their equipment. Between 80% and 91% of customers in both surveys gave the highest possible "very satisfied" ratings for every measure, as shown in Figure 9. Combining results from both surveys, just 2% of participants purchasing RACs gave "not too satisfied" or "not satisfied at all" ratings, while 1% of participants purchasing smart thermostats, air purifiers, and pool pumps indicated they were not satisfied. Of the combined 76 survey responses for HPHWs, none reported they were not satisfied. Participants' satisfaction levels did not change significantly from approximate installation times (i.e., Immediate Participant Survey results) and six months after installation (i.e., Follow-up Participant Survey results).

Figure 9. Participant Satisfaction with Measures, by Survey



Immediate Participant Survey: D6. "How satisfied are you with the performance of your new [measure]?" RAC n=30, HPWH n=66, Room air purifier n=104, Pool pump n=110, Smart thermostat n=859, and Follow-up Participant Survey: B1. "How satisfied are you with the performance of your new [measure]?" RAC n=16, HPWH n=10, Room air purifier n=16, Pool pump n=57, Smart thermostat n=232

Cadmus also asked participants their reasons for satisfaction or dissatisfaction with their equipment. Due to the high number of open-ended responses, the team randomly selected approximately 100 responses from participants purchasing smart thermostats, and a census of comments for all other measures. Table 20 lists customer satisfaction and dissatisfaction drivers, by equipment type, including how frequently each driver was cited in the satisfaction or dissatisfaction categories as a percentage of all references. This analysis combined responses from immediate and follow-up participant surveys.

HPWHs, room air purifiers, and pool pumps exhibited the smallest percentage of dissatisfaction-related comments (5% to 7% of total mentions per measure), while RACs and smart thermostats received somewhat higher rates (13% each). For most measures, satisfactory operations and performance served as the main satisfaction driver, and the unit not functioning according to customer expectations served as the main dissatisfaction driver. Pool pumps presented a notable exception, with the following main satisfaction drivers: energy savings (37%); and quiet operations (22%). Device features served as the main drivers for smart thermostats (57%). Energy savings (32%) also proved important for many participants purchasing HPWHs, as did improved comfort and health (28%) for room air purifiers.

Table 20. Participant Reasons for Satisfaction or Dissatisfaction with Measures

Driver of Satisfaction	%	Driver of Dissatisfaction	%
RAC			
n=48		**n=7**	
Satisfactory overall operation and performance of the unit	54%	Unit not functioning as expected	57%
Quiet operation	17%	High cost of unit	14%
Energy/cost savings experienced after installation	15%	Other reasons	29%
Appreciate features of new equipment	8%		
Home is more comfortable now	6%		
HPWH			
n=66		**n=5**	
Satisfactory overall operation and performance of the unit	41%	Unit not functioning as expected	80%
Energy/cost savings experienced after installation	32%	Energy/cost savings not experienced after installation	20%
Appreciate features of new equipment	18%		
Quiet operation	5%		
Rebate amount	2%		
Other reasons	3%		
Room Air Purifier			
n=93		**n=6**	
Satisfactory overall operation and performance of the unit	39%	Unit not functioning as expected	67%
Home is more comfortable/healthier now	28%	Poor quality/malfunctioning equipment	17%

Driver of Satisfaction	%	Driver of Dissatisfaction	%
Quiet operation	16%	Energy/cost savings not experienced after installation	17%
Energy/cost savings experienced after installation	8%		
Appreciate features of new equipment	8%		
Rebate amount	2%		
Pool Pump			
n=171		**n=9**	
Energy/cost savings experienced after installation	37%	Unit not functioning as expected	78%
Quiet operation	22%	Preferred previous equipment	11%
Satisfactory overall operation and performance of the unit	20%	Other reason (difficult to program)	11%
Appreciate features of new equipment	16%		
Other reasons	4%		
Smart Thermostat			
n=244		**n=37**	
Appreciate features of new equipment	57%	Unit not functioning as expected	57%
Satisfactory overall operation and performance of the unit	20%	Energy/cost savings not experienced after installation	30%
Energy/cost savings experienced after installation	17%	High cost of unit	3%
Home is more comfortable now	3%	Other reasons	11%
Rebate amount	1%		
Other reasons	2%		

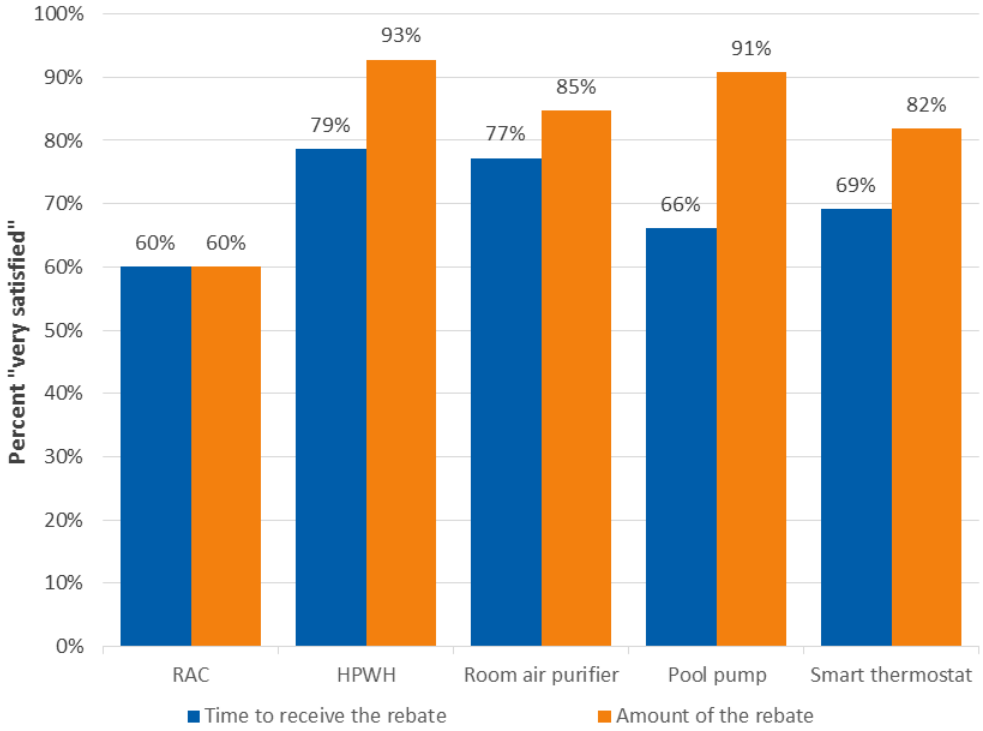
Immediate Participant Survey: D7. "Why are you [RATING] with the performance of your new [measure]?" and Follow-up Participant Survey: B2. "Why are you [RATING] with the performance of your new [measure]?" (Numbers of responses coded for each measure for satisfaction or dissatisfaction are indicated next measure names in the table.)

Satisfaction with Rebate Amounts and Delivery Time

As shown in Figure 10, most participants expressed high satisfaction levels with the rebates they received, but generally they were less satisfied with the time required to receive their rebates. Participants purchasing RACs also awarded lower ratings for both rebate aspects in comparison to others.[11]

[11] RAC participants were significantly less likely to assign "very satisfied" ratings for the rebate amounts, compared to all other measures, at $p < 0.05$ using binomial t-tests. HPWH and air purifier participants also were significantly more likely than RAC participants to offer "very satisfied" ratings for the time required to receive the rebate (i.e., at $p < 0.10$ or better using binomial t-tests).

Figure 10. Participant Satisfaction with Time to Receive Rebates and Rebate Amounts



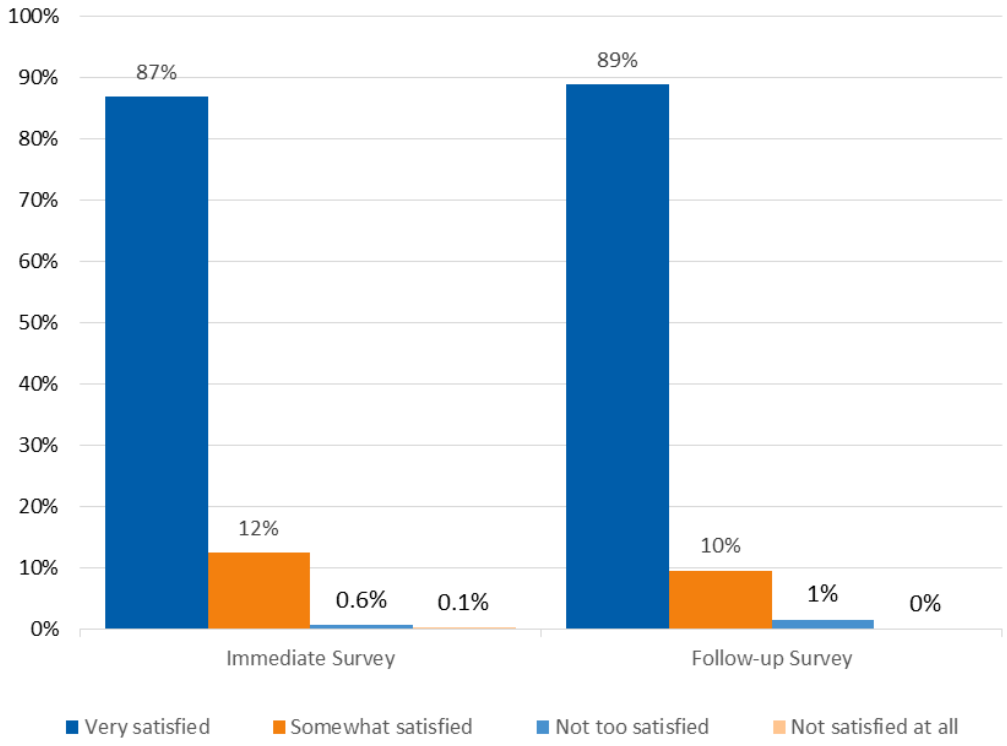
Immediate Participant Survey: D4. "How satisfied are you with the time it took to receive your rebate in the mail?" RAC n=30, HPWH n=84, Room air purifier n=101, Pool pump n=118, Smart thermostat n=867 and D5. "How satisfied are you with the amount of the rebate you received?" RAC n=30, HPWH n=83, Room air purifier n=105, Pool pump n=120, Smart thermostat n=870

Overall Satisfaction and Suggested Improvements

Cadmus asked participants about their satisfaction levels with the Efficient Products program overall, and if they had suggestions for program improvements. Participant expressed high satisfaction levels with the program, which persisted from immediately after their purchasing a measure to approximately six months after installation (i.e., between the Immediate Participant Survey and Follow-up Survey).

In addition to expressing the high satisfaction levels shown in Figure 11, more than 99% of respondents in both surveys indicated they would recommend the Efficient Products program to friends and family members (Immediate survey n=1,203, Follow-up survey n=331). No significant differences emerged in satisfaction ratings or willingness to recommend the program between customers who purchased different types of measures.

Figure 11. Participant Satisfaction with the Efficient Products Program



Immediate Participant Survey: D8. "Thinking about your overall satisfaction with Ameren Missouri's Efficient Products Program, would you say you are:" n=1,169 and Follow-up Participant Survey: B3. "Thinking about your overall satisfaction with Ameren Missouri's Efficient Products Program, would you say you are:" n=334

Cadmus asked participants why they chose their program satisfaction or dissatisfaction ratings. Table 21 lists the program's satisfaction and dissatisfaction drivers; the team did not find notable differences between customers purchasing different measures. Rebates served as the main driver of program satisfaction (53% of 564 mentions), while very few cited too-expensive rebated equipment as a driver of dissatisfaction (5% of 75 mentions). Secondary dissatisfaction drivers included the program's ease and convenience (20%), and energy and utility bill savings (14%). The most commonly cited dissatisfaction drivers included miscommunications about the program (23%) and rebate delays (23%). About one in five dissatisfaction mentions (19%) referenced the program's limited offerings (i.e., other makes, models, or types of measures, should be rebated through the program).

Table 21. Participant Reasons for Satisfaction or Dissatisfaction with the Efficient Products Program

Driver of Satisfaction	%	Driver of Dissatisfaction	%
n=564		n=75	
The amount of the rebate	53%	Communication issues	23%
Program was convenient/easy	20%	Experienced delays	23%
Energy/cost savings experienced after installation	14%	Limited equipment covered by the program	19%
Good program experience	10%	Issues with the rebate process	16%
Satisfactory overall operation and performance of the unit	2%	High cost of unit	5%
Other positive comments	1%	Paperwork requirements	1%
		Other reasons	13%

Immediate Participant Survey: D9. "Why are you [RATING] with Ameren Missouri's Efficient Products rebate program?" and Follow-up Participant Survey: B4. "Why are you [RATING] with Ameren Missouri's Efficient Products rebate program?" (Numbers of responses coded for each measure for satisfaction or dissatisfaction are indicated in the table)

Combining results from both surveys, participants offered 184 suggestions for improving the Efficient Products program. Table 22 provides the list of categorized suggestions offered by program participants.

Table 22. Participant Suggestions for Improving the Efficient Products Program

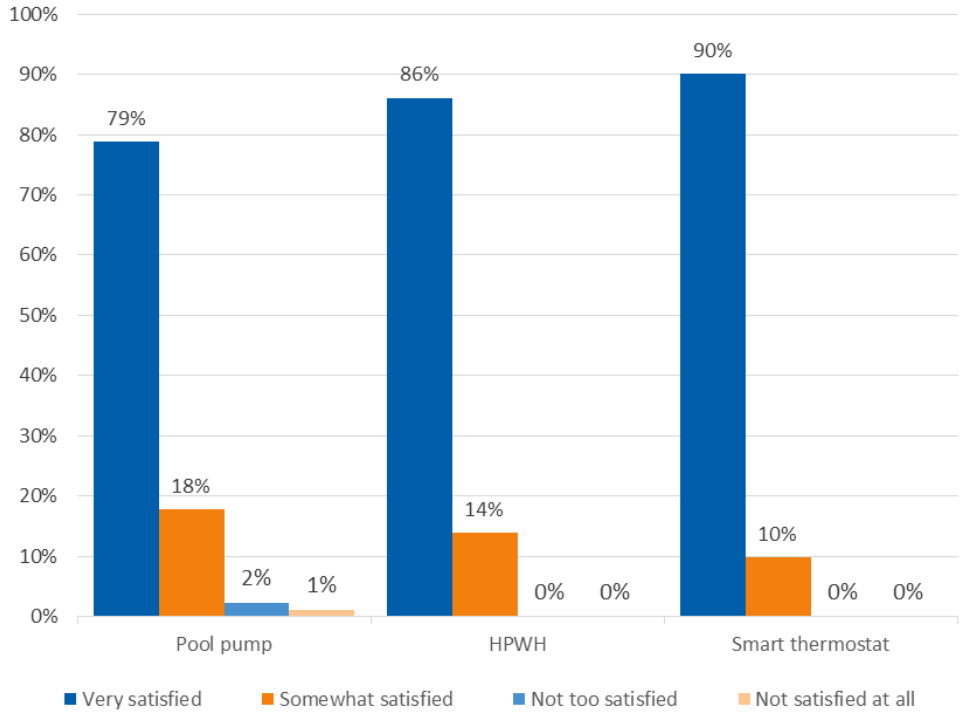
Participant Suggestions (n=184)	% of Suggestions
Improve communications about the program	27%
Offer a wider range of measures	25%
Improve the rebate application process	24%
Reduce delays in rebate processing	12%
Increase the rebate amount	5%
Reduce/simplify paperwork requirements	3%
Other recommendations	4%

Immediate Participant Survey: D11. "What suggestions, if any, do you have for improving the program?" and Follow-up Participant Survey: B6. "What suggestions, if any, do you have for improving the program?"

Satisfaction with the Contractor

Cadmus asked participants if they used contractors to install their equipment, and how satisfied they were with their contractors; participants expressed high satisfaction levels, as shown in Figure 12. Although only 8% (n=863) of smart thermostat participants used contractors for their installations, more of these customers gave their contractor the highest ratings (90%). Pool pump participants exhibited relatively lower satisfaction, with 3% "not too satisfied" or "not satisfied at all" with their contractors. Participants purchasing the other measures did not award such ratings.

Figure 12. Participant Satisfaction with Contractors



Immediate Participant Survey: D1. "How satisfied are you with the contractor you worked with?"
Pool pump n=90, HPWH n=36, Smart thermostat n=71

The team also asked immediate survey participants reasons for their satisfaction or dissatisfaction with their contractors. As most participants proved very satisfied with their contractors, they mostly offered positive feedback, as shown in Table 23.

Table 23. Participant Reasons for Satisfaction or Dissatisfaction with Contractors

Driver of Satisfaction	%	Driver of Dissatisfaction	%
n=77		n=17	
Contractor compliment/good service	94%	Contractor complaint/improve service	71%
Energy/cost savings experienced after installation	4%	Improve communications	12%
Satisfactory overall operation and performance of equipment installed	3%	Reduce delays	6%
		Other reasons	12%

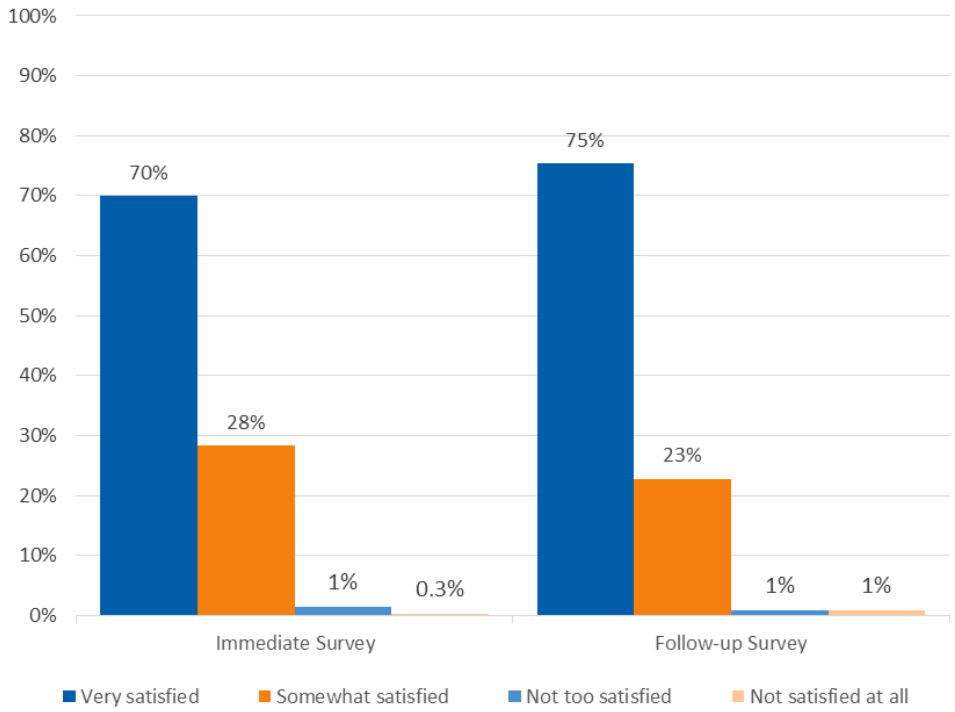
Immediate Participant Survey: D2. "Why are you [RATING] with the contractor?" (The number of responses that were coded for each measure for satisfaction or dissatisfaction is indicated in the table)

Satisfaction with Ameren Missouri

Cadmus asked participants about their satisfaction level with Ameren Missouri as their utility. As shown in Figure 13, majorities of 70% or more awarded the utility with the highest possible "very satisfied" rating; just 2% gave ratings of "nor too satisfied" or "not satisfied at all". The percentage of participants

giving "very satisfied" ratings became significantly higher six months after purchase than immediately after purchase.[12] Additionally, both surveys indicated 66% of participants reported that their satisfaction with Ameren Missouri increased after participating in the Efficient Products program, while only 1% stated that their satisfaction decreased (immediate survey n=1,184, follow-up survey n=330).

Figure 13. Participant Satisfaction with Ameren Missouri



Immediate Participant Survey: J1. "Thinking about your overall experiences with Ameren Missouri as your utility, how satisfied would you say you are with Ameren Missouri?" n=1,202 and Follow-up Participant Survey: G1 "Thinking about your overall experiences with Ameren Missouri as your utility, how satisfied would you say you are with Ameren Missouri?" n=309

Cadmus asked participants to explain why they expressed satisfaction or dissatisfaction with Ameren Missouri. As shown in Table 24, satisfaction's biggest drivers included reliable and dependable service offered by the utility, good customer service from utility staff, and having a good experience with the Efficient Products program. Drivers of dissatisfaction included utility rates, lack of choice in utility service, outages, and concerns about renewable energy. Overall, respondents made nearly three times as many references of satisfaction than dissatisfaction.

[12] $p < 0.10$ using binomial t-test.

Table 24. Participant Reasons for Satisfaction or Dissatisfaction with Ameren Missouri

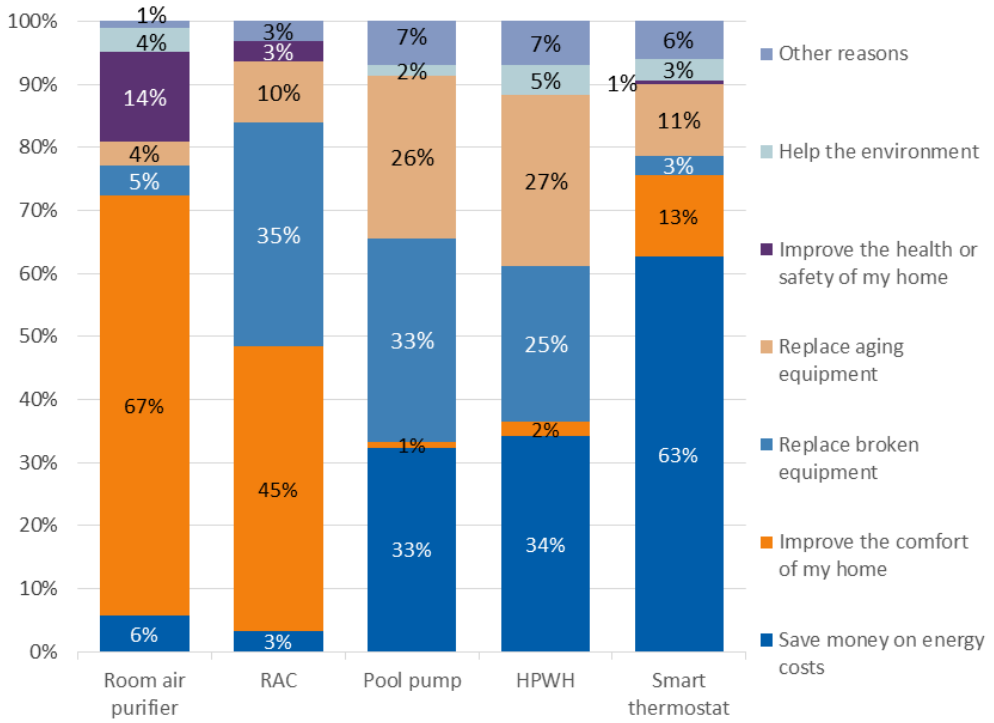
Driver of Satisfaction	%	Driver of Dissatisfaction	%
n=361		n=126	
Reliable service (outages are rare/brief)	32%	Rates are too high/increase too often	41%
Good customer service/staff compliment	22%	Ameren is only choice as utility	17%
Good program experience	14%	Unreliable service/too many outages	11%
Energy prices are fair/reasonable	9%	Should do more to support green/renewable energy	9%
Satisfied with program rebate	9%	Should do more to support energy efficiency/expand program offerings	4%
Ameren is a good corporation/business	7%	Rebate payment took too long	2%
Program was convenient/easy	2%	Issues with tree trimming	2%
Satisfied with energy/cost savings after program	2%	Poor customer service/staff complaint	2%
Other positive reasons	1%	Other issues	11%

Immediate Participant Survey: J2. "Why are you [RATING] with Ameren Missouri as your utility?" and Follow-up Participant Survey: G2. "Why are you [RATING] with Ameren Missouri as your utility?" (The number of responses that were coded for each measure for satisfaction or dissatisfaction is indicated in the table)

Participant Purchase Decisions

Cadmus asked participants for their primary reasons in purchasing their equipment. Responses varied greatly by measure, as shown in Figure 14. Smart thermostat participants were the only group in which a majority cited saving money on energy bills (63%), and only 14% replaced their thermostats because the previous unite broke or aged. Water heater and pool pump respondents offered similar responses, with about one-third citing energy bill savings (34% and 33%, respectively) and just over half replacing broken or aging equipment (52% and 59%, respectively). Most room air purifiers were purchased to improve home comfort (67%), or home health and safety (14%), while only 9% replaced broken or aging equipment. RAC participants most commonly cited improving comfort (45%), with another 45% replacing broken or aging equipment.

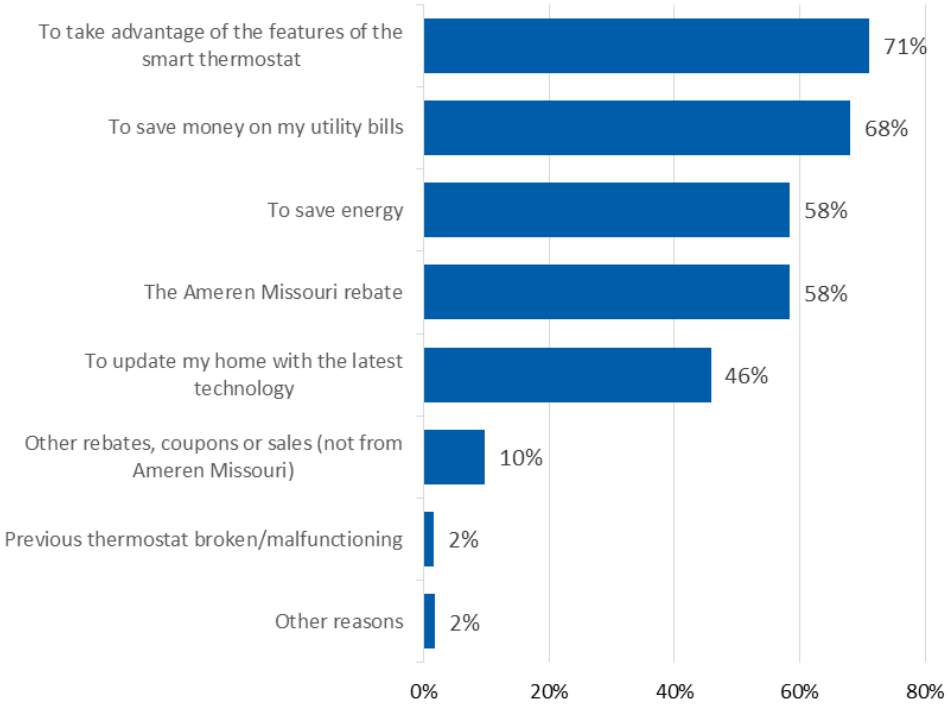
Figure 14. Primary Reason for Purchasing Measure



Immediate Participant Survey: B1. "What was the primary reason you purchased a new [measure]?" RAC n=31, HPWH n=85, Room air purifier n=105, Pool pump n=120, Smart thermostat n=878

As shown in Figure 15, the team also asked smart thermostat participants why they replaced their previous thermostats. Consistent with the previous question, 68% said they wanted to save money on their bills, and only 2% said they replaced broken or malfunctioning equipment. Another 71% reported taking advantage of the smart thermostat's features, and 46% reported updating their home with the latest technology.

Figure 15. Reasons for Replacing Previous Thermostat



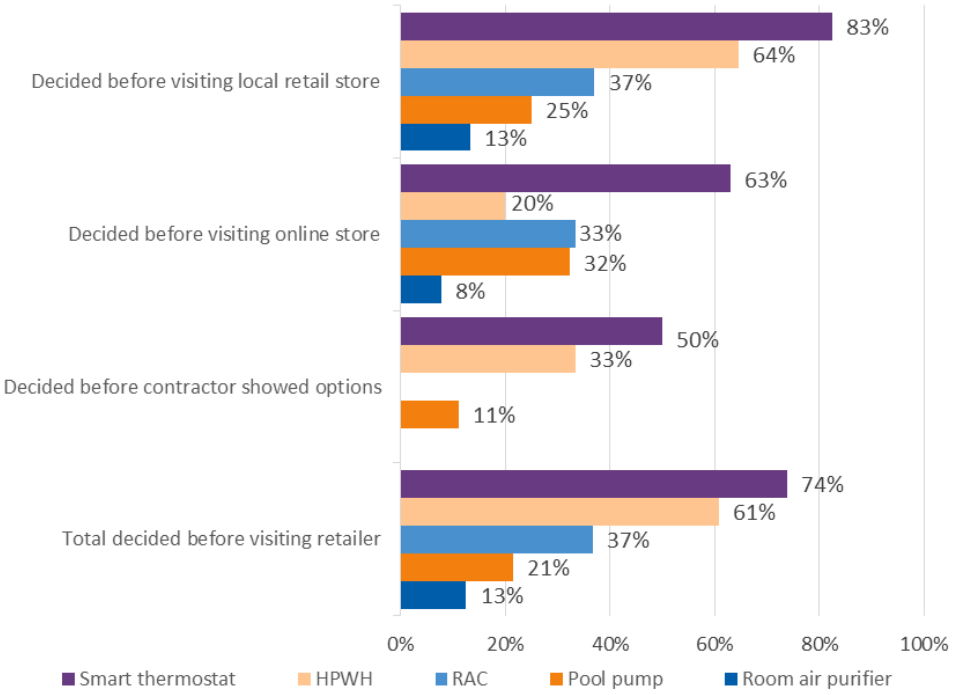
Immediate Participant Survey: G12. "Why did you replace your old thermostat(s)?"
n=843 (multiple responses accepted)

Cadmus asked participants when they decided on the equipment model and brand to purchase. As shown in Figure 16, differences emerged between measures and retail channels.

Smart thermostat participants most likely knew makes and models they wanted before going to a store or talking to a contractor (74% overall), but this particularly held true for those buying their thermostats from local retailers (83%) and even half of those buying thermostats from contractors (50%). The program primarily rebated Nest and Ecobee thermostat models—also the brands participants most likely decided on before visiting a retailer or contractor (76%, n=654; and 74%, n=137, respectively). Of the 35 participants, however, purchasing Honeywell thermostats, only 40% chose their brand and model prior to visiting a retailer or contractor.

Most participants purchasing HPHWs also chose brands and models before going to a store or talking to a contractor (61% overall). Only about one-third of RAC participants knew what they wanted before going to the store (37% overall), and even fewer air purifier participants chose their models and brands before shopping (13% overall). Pool pump participants most likely knew what they wanted before shopping online (32%) and least likely knew before purchasing from a contractor (11%).

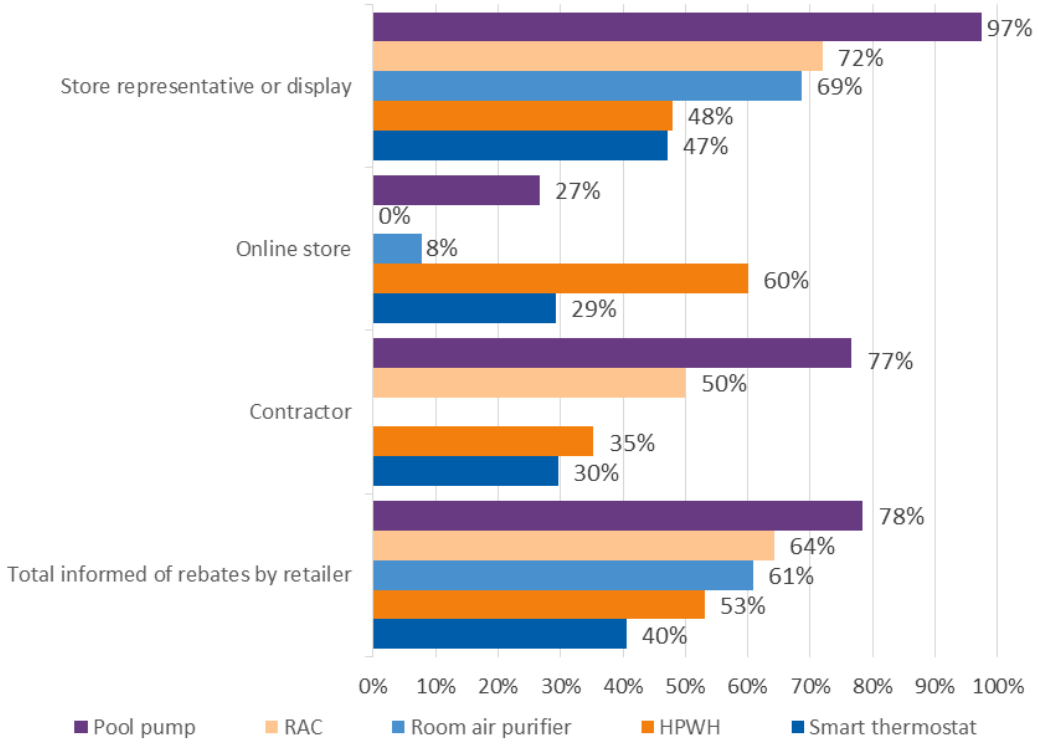
Figure 16. Participants' Point of Decision on Model and Brand



Immediate Participant Survey: B3. "At what point did you determine the exact model and brand you wanted to buy?" RAC n=27 local store, n=3 online store, n=30 total; HPWH local store n=76, online store n=5, contractor n=3, total n=84; Room air purifier local store n=91, online store n=13, total n=104, Pool pump local store n=36, online store n=31, contractor n=45, total n=112, Smart thermostat local store n=475, online store n=351, contractor n=10, total n=836

Cadmus asked participants whether the retailer or contractor informed them about Ameren Missouri's program rebates. Figure 17 indicates retail sources that informed participants about rebates, by measure and retailer types. Overall, local stores (54%, n=669 all measures) and contractors (52%, n=197 all measures) were more likely to inform participants of rebates than online stores (28%, n=369 all measures). Pool pump participants were most likely to be informed by a retailer or contractor (78% overall); smart thermostat participants were the least likely (40%).

Figure 17. Retailers Informing Participants about Program Rebates



Immediate Participant Survey: B8. "Did a store representative or display inform you that the [measure] qualified for an Ameren Missouri Rebate?" or "Did the online store that you purchased your [measure] from inform you that this equipment qualified for an Ameren Missouri Rebate?" and B9. "Did your contractor inform you that the [measure] qualified for an Ameren Missouri Rebate?" RAC local store n=25, online store n=3, contractor n=2, total n=28; HPWH local store n=73, online store n=5, contractor n=34, total n=81; Room air purifier local store n=89, online store n=13, total n=102, Pool pump local store n=39, online store n=30, contractor n=90, total n=116, Smart thermostat local store n=443, online store n=318,
contractor n=71, total n=778 (totals may be lower than the sum of individual questions because respondents who used contractors and purchased equipment from a store were asked about both)

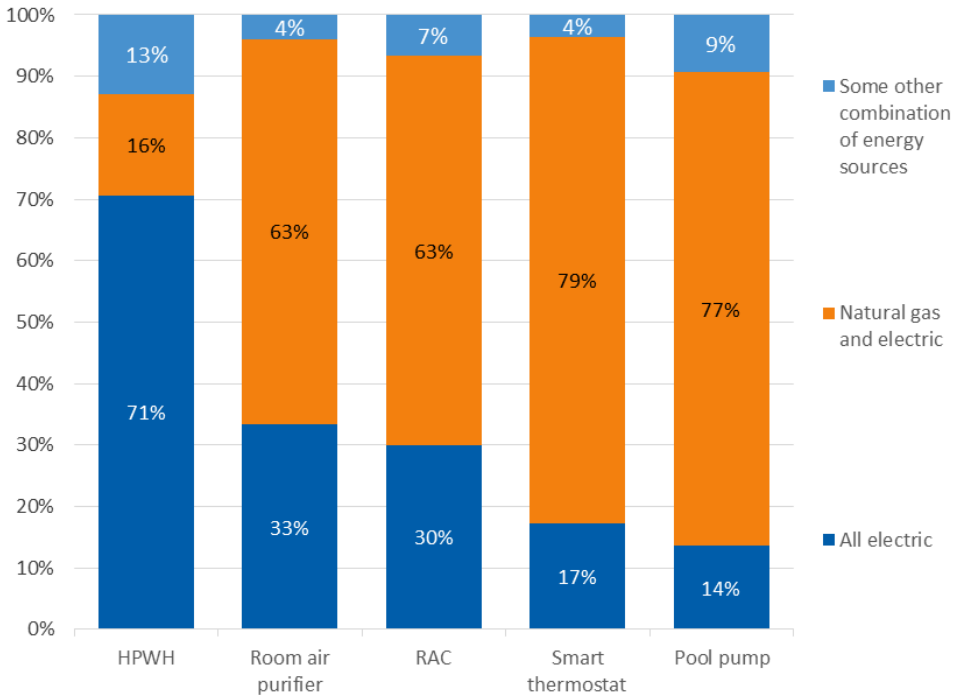
Participant Demographics and Home Characteristics

Cadmus asked survey respondents to provide information about their homes and households. For all program measures, the largest percentage of participant households had two persons living in the homes (ranging from 43% to 61% by measure). About half of pool pump, water heater, and thermostat households had three or more people living in them (50%, 45%, and 47%, respectively), compared to only one-third of RAC and air purifier households (30% and 33%, respectively). Across all measures, occupants per household averaged 2.8.

The team asked participants about energy service types they received in their homes. As shown in Figure 18, participants installing HPHWs were much more likely to have all-electric service (71%) than

participants purchasing other measures (ranging from 14% to 33%). Thermostat (79%) and pool pump (77%) participants were most likely to have natural gas service.

Figure 18. Participant Energy Service by Measure

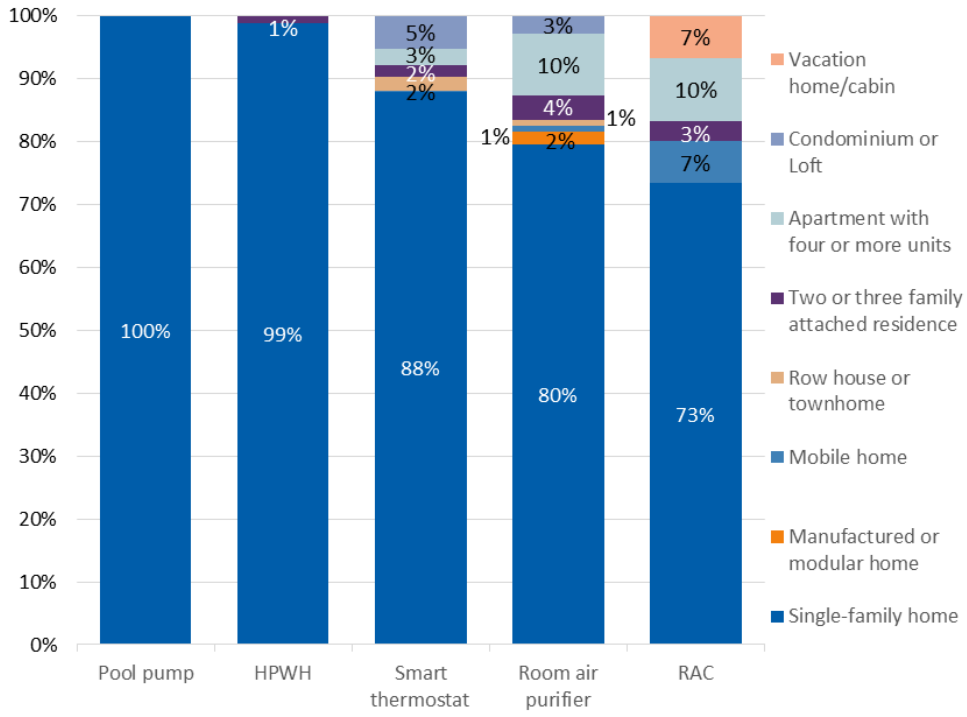


Immediate Participant Survey: K1. "Is the energy used in your home . . :" RAC n=30, HPWH n=85, Room air purifier n=102, Pool pump n=118, Smart thermostat n=859

Figure 19 shows participants' housing types. All pool pump respondents lived in single-family homes (100%), as did 99% of HPWH participants. RACs were least likely to be purchased for single-family homes (73%), with most of the remaining participants purchasing equipment for use in apartments (10%), mobile homes (7%), and vacation homes and cabins (7%). Air purifiers also sold to a larger percentage of apartment dwellers (10%) than most measures.

The team also asked participants if they owned or rented their homes. All pool pump respondents owned their homes (100%), as did 99% of HPWH participants. Participants buying air purifiers were most likely to be renters (20%), followed by those buying RACs (7%) and smart thermostats (5%).

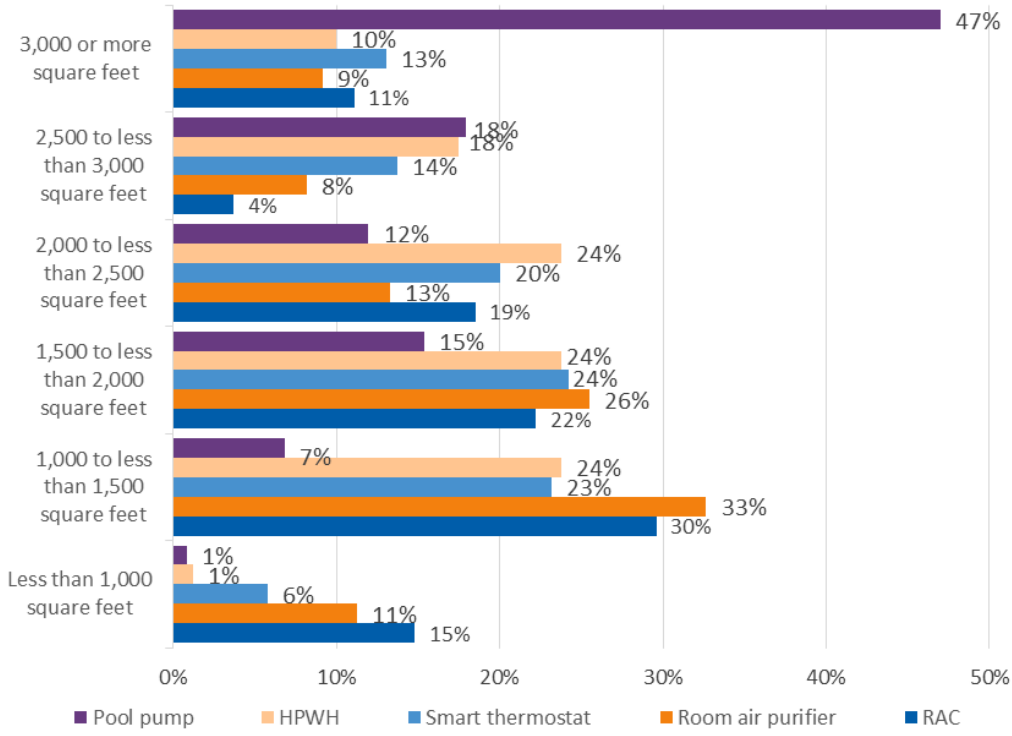
Figure 19. Participant Home Type by Measure



Immediate Survey: K2. "Which of the following best describes your home or residence?" RAC n=30, HPWH n=85, Room air purifier n=103, Pool pump n=118, Smart thermostat n=860

The team asked participants about their homes' size and age. As shown in Figure 20, some notable differences emerged by rebated measures. By far, participants who purchased pool pumps had the largest residences (47% over 3,000 square feet). Air purifier and RAC participants tended to have the smallest homes, with nearly half having 1,500 square feet or less (44% and 45%, respectively.) Across the entire program, the median participant home size was 1,500 to 2,000 square feet.

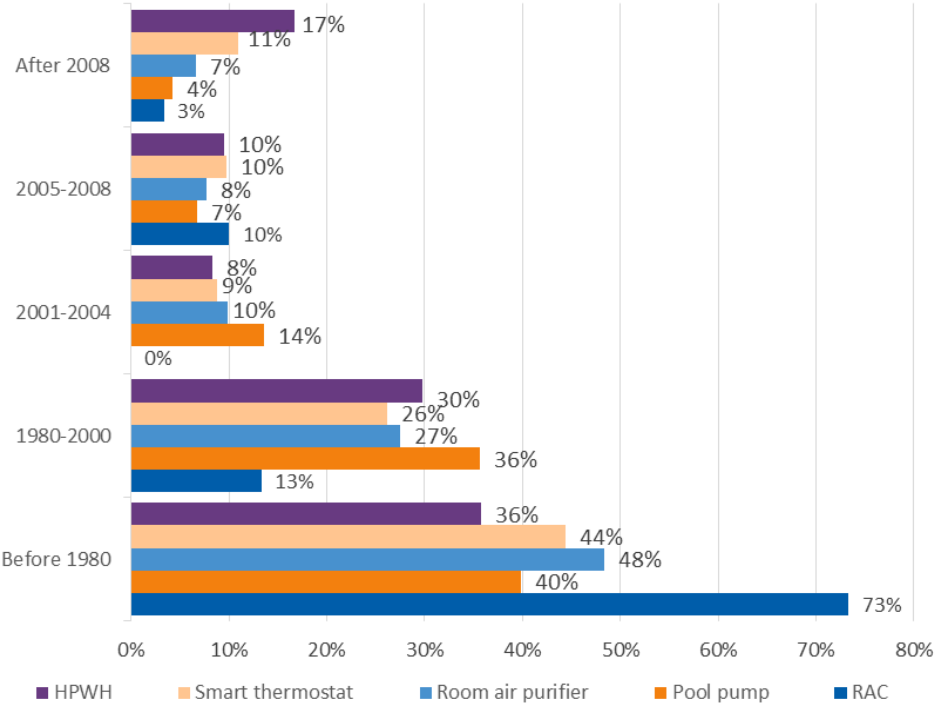
Figure 20. Participant Home Size by Measure



Immediate Survey: K4. "Approximately how many square feet of living space does your home have?"
RAC n=27, HPWH n=80, Room air purifier n=98, Pool pump n=117, Smart thermostat n=859

The team also asked participants about their homes' age, and differences emerged by measure category. As shown in Figure 21, most participants purchasing RACs lived in homes built before 1980 (73%), compared to a minority of participants purchasing other measures. HPWH participants were more likely that those with other measures to live in homes built after 2008 (17%), followed by smart thermostat participants (11%).

Figure 21. Participants' Home Age by Measure



Immediate Participant Survey: K5. "When was your home built?" RAC n=30, HPWH n=84, Room air purifier n=91, Pool pump n=118, Smart thermostat n=844

Retailer Experience

Program Engagement

Cadmus interviewed corporate and store staff from participating retailers to assess their program experiences. Overall, store-level respondents were very satisfied with the PY16 program, although two were only somewhat satisfied (n=11). One respondent reasoned that program representatives "keep on coming back and filling knowledge, unlike some other utilities."

Interactions between store staff and Ameren Missouri representatives served as a driver for the high program satisfaction levels. Ten of 12 store-level respondents interacted in person with Efficient Products program representatives. Half of the store-level respondents reported that program representatives visited at least once a month. Two respondents noted that visits became more frequent during summer, when interest in products such as RACs and pool pumps became highest.

During these visits, representatives typically restocked rebate forms and brochures, asked for feedback, answered questions from the store staff, and offered additional literature on incented products. For corporate staff, keeping in contact with representatives enabled them to stay informed of their stores' program experience. One corporate staffer suggested that representatives could supplement check-in calls with an annual summary of their stores' progress. Generally, respondents found the visits useful

because the program representatives provided physical materials to advertise the products (brochures) and useful tips on selling the products. Only one respondent said they did not find the visits too useful as their store staff were already very familiar with the program.

None of the respondents participated in Ameren Missouri training or company training, although they expressed confidence with the knowledge level they possessed to advertise rebates.

Interestingly, out of six respondents reporting familiarity with Ameren's program for over two years, only one respondent noticed a change in program offerings between 2015 and 2016: smart thermostats replaced programmable thermostats.

Customer Engagement

Store staff thought rebate availability influenced customers' purchasing decisions. To supplement this finding, Cadmus asked the three corporate retail representatives about sales trends for products rebated through the program. Without providing product-specific sales data, all three corporate representatives reported an increase in sales when rebates became available.

Many interviewed store staff reported that customers were somewhat interested in the products' energy-saving potential of products, while five of the 12 respondents believed the energy-saving potential of products served as the *primary* sales driver. Only two respondents cited the rebate amount as the primary driver. Two corporate staff noted that rebates became more important drivers as the rebate amount's proportion of the overall cost increases.

While rebates generally served as sales drivers, some store staff reported that customers would continue to purchase efficient RACs without rebates: they reasoned that, since RAC use was necessary in certain seasons, customers would naturally purchase efficient RACs to save energy. RACs and smart thermostats tied for the most inquired products, which indicated that smart thermostats are becoming more popular, and that customers remain interested in the energy-saving potential of efficient RACs.

Program Effects on Retailer Practices

No respondents thought that their stores changed their available product mix or stocking practices upon participating in Ameren Missouri's program. If Ameren Missouri hypothetically stopped offering rebates for products, all respondents believed that their stores would continue selling the products, as the stores would offer efficient products that saved money for their customers. According to corporate staff interviewed, retailers chose to participate in Ameren Missouri's program because as it served as part of the retailers' overall, long-term strategy to promote ENERGY STAR products and to help customers save money. For each product, Table 25 displays the average reported percentage of stocked items eligible for Ameren Missouri rebates.

Table 25. Percentage of Stocked Items Eligible for an Ameren Missouri Rebate.

Measure	Average Percent	Responses*
ENERGY STAR HPHWs	N/A	0
ENERGY STAR RACs	84%	5
ENERGY STAR Room Air Purifiers	75%	3
Smart Thermostats	51%	2
ENERGY STAR Pool Pumps	68%	3

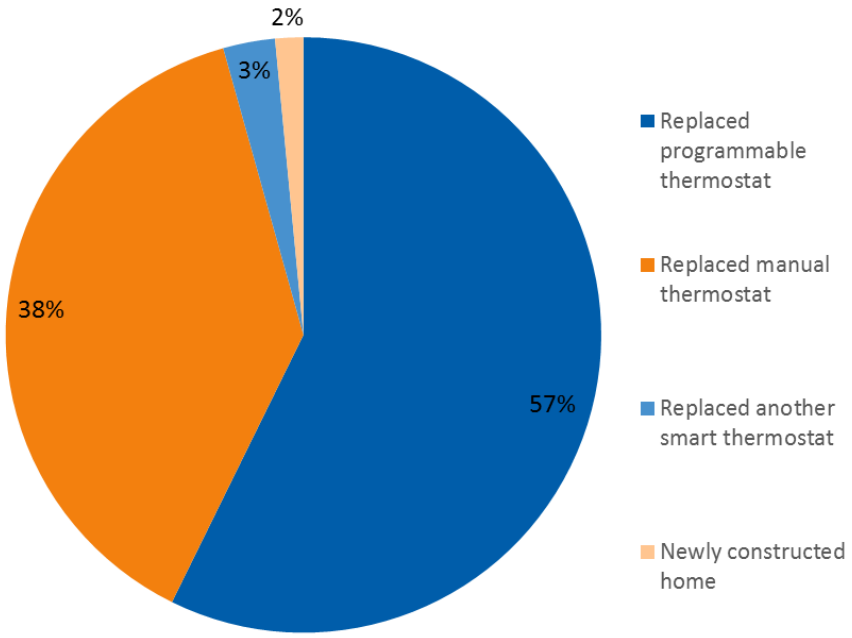
* Some respondents answered this question for more than one measure. None of the retail personnel interviewed could answer the question for HPHWs.

Similarly, store staff reported that the program did not catalyze changes in their sales practices. With two exceptions, all store staff reported that they always or often recommend more energy-efficient products to customers, both in general and for program-incented products. Respondents agreed that participating in Ameren Missouri's program had not affected these practices.

Smart Thermostat Usage

Cadmus asked survey respondents what kind of thermostat they replaced with their new program thermostats. As shown in Figure 22, more than half (57%) replaced programmable thermostats, and more than one-third (38%) replaced manual thermostats. Another 3% replaced other smart thermostats, and 2% were installed in newly constructed homes.

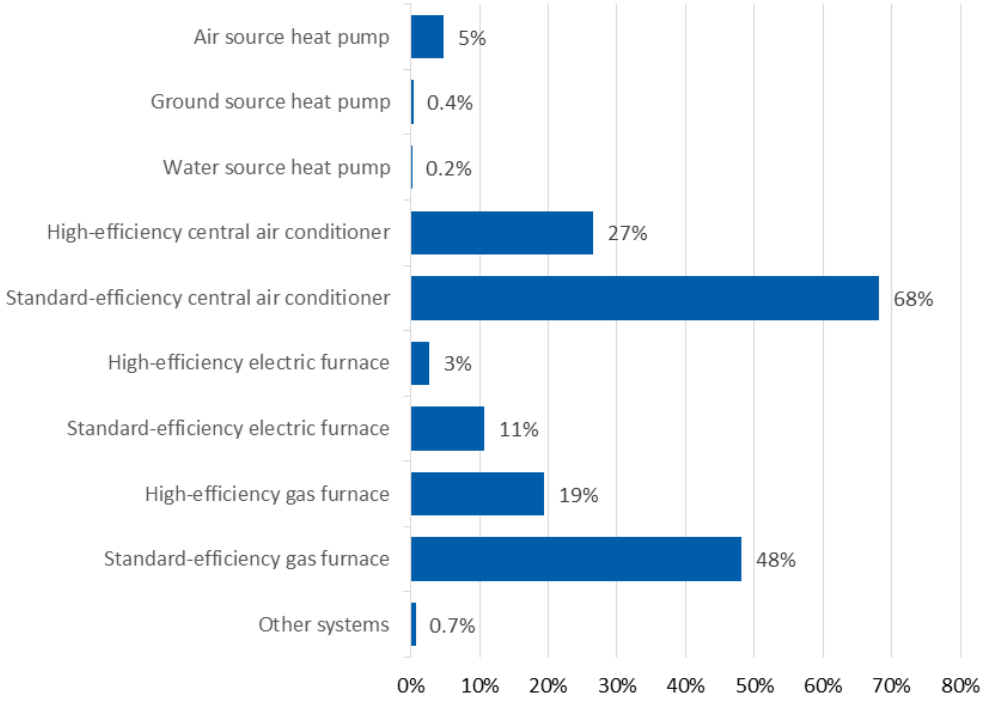
Figure 22. Thermostats Replaced by Program Smart Thermostats



Immediate Participant Survey: G10. "What type of thermostat(s) did you replace with the smart thermostat(s)?" n=852 (multiple responses accepted from respondents with multiple thermostats)

Cadmus asked survey respondents what heating and cooling equipment they used their smart thermostats to control. Figure 23 shows 68% were used to control standard-efficiency CACs, 27% controlled high-efficiency CAC; and about 5% controlled heat pumps. Only 14% of smart thermostats controlled high- or standard-efficiency electric furnaces, though 67% controlled gas furnaces.

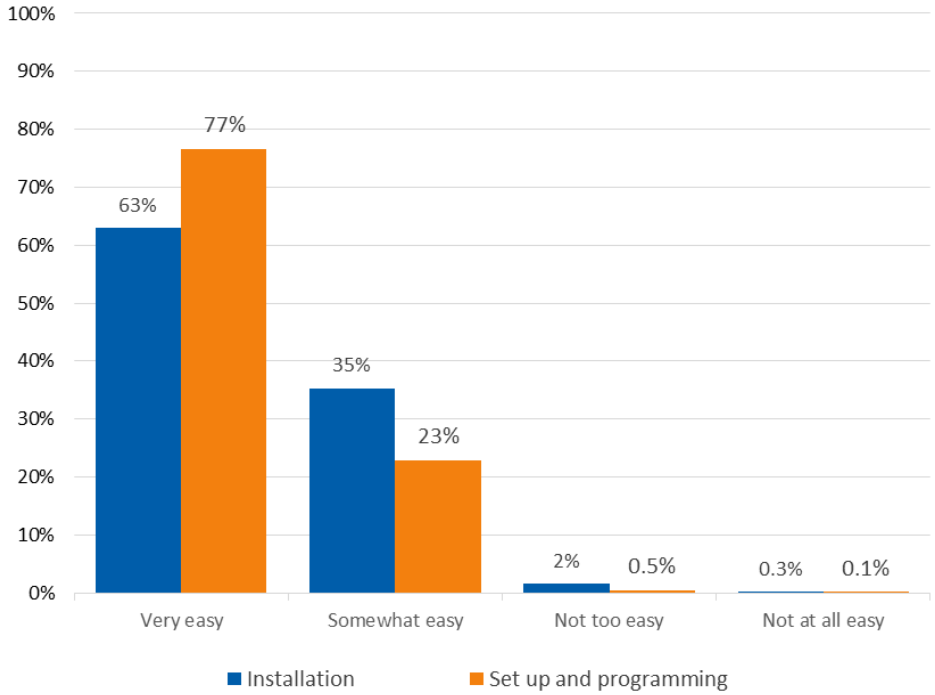
Figure 23. Heating and Cooling Equipment Controlled by Program Smart Thermostats



Immediate Participant Survey: G6. "What types of heating and cooling system is the smart thermostat currently connected to?" n=815

Cadmus asked participants who installed, set up, and programmed their smart thermostats. Overwhelmingly, smart thermostat respondents installed their thermostats themselves (92%, n=863), and performed the set up and programming themselves (96%, n=853). The team also asked participants who installed and set up their thermostats to rate how easy these tasks were. As seen in Figure 24, 63% of participants who installed their own smart thermostats said this was "very easy," while 77% gave "very easy" ratings for setting up and programming the smart thermostats. Only 2% rated the installation as "not too" or "not at all easy," and less than 1% provided ratings for smart thermostat set ups and programming.

Figure 24. Ease of Installing and Setting Up Smart Thermostats

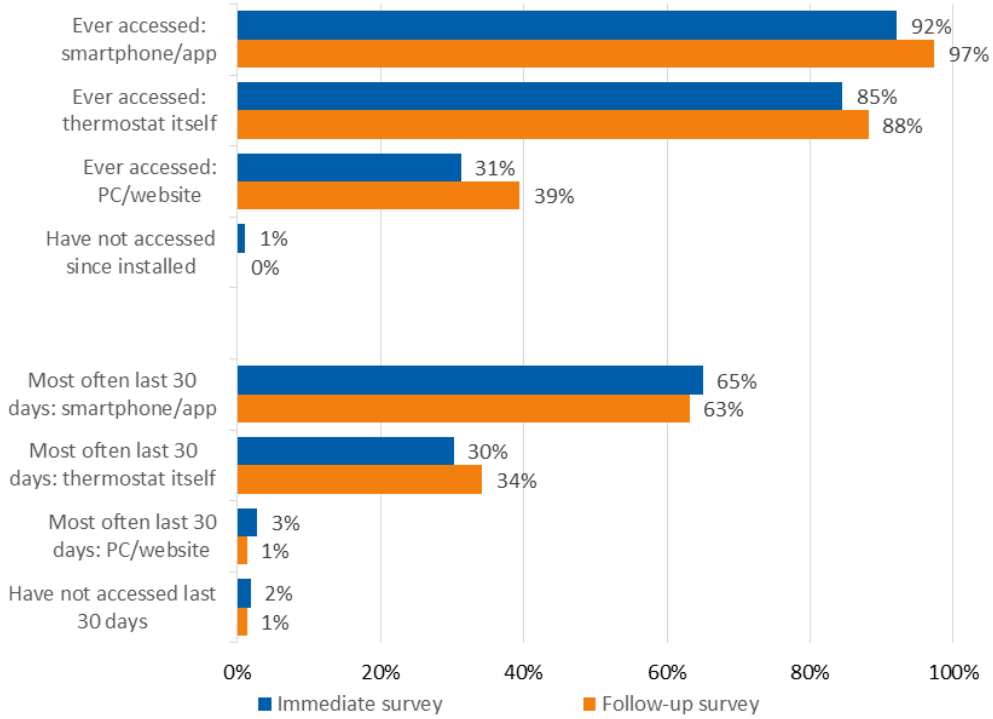


Immediate Participant Survey: B7. "How easy was the smart thermostat to install? Would you say it was…?" n=787, H9. "How easy was it to set up and program your smart thermostat? Would you say it was…?" n=807

During both surveys, the team asked participants how they accessed their smart thermostats. This question took two forms: one asking which methods participants used to access the smart thermostat, and one asking which method they used most often in the past 30 days. Smart thermostats can be accessed in three ways: the interfaces on the units themselves, downloadable apps for smart phones and tablets provided by the manufacturers, and by logging on to websites maintained by the manufacturers. Figure 25 shows nearly every respondent accessed their smart thermostat using the app for smart phones and tablets (i.e., 92% immediate survey, 97% follow-up survey), and a large majority used controls on the thermostat itself (85% immediate survey; 88% follow-up survey). About one-third accessed smart thermostats using the website via a personal computer (31% immediate survey, and 39% follow-up survey). Only 1% had not accessed their smart thermostat in the immediate survey, and none gave this response in the follow-up survey six months later.

Results for access methods used most often in the past 30 days remained consistent between surveys, with about two-thirds using the app (65% immediate survey; 63% follow-up survey) and another one-third using the device itself (30% immediate survey, 34% follow-up survey). Very few participants regularly used the website to access their thermostats (3% immediate survey, 1% follow-up survey) or did not access their smart thermostats at all in the 30 days prior the survey (2% immediate survey; 1% follow-up survey).

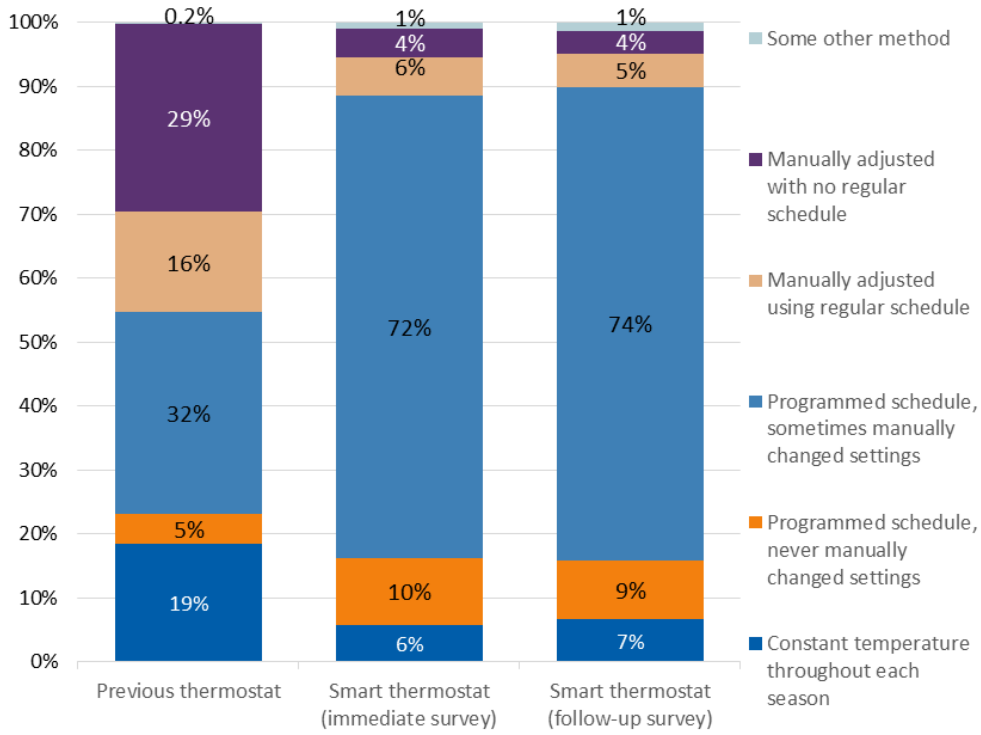
Figure 25. Methods of Accessing Smart Thermostats



Immediate Participant Survey: H5. "In what ways have you ever accessed your thermostat since it was first installed, to do things such as changing your temperature settings or schedules?" n=848 (multiple responses accepted), H6. "In the past 30 days, how have you most often accessed your new thermostat?" n=853, Follow-up Participant Survey: F5. "In what ways have you ever accessed your thermostat since it was first installed, to do things such as changing your temperature settings or schedule?" n=228 (multiple responses accepted), F6. "In past 30 days, how have you most often accessed your new thermostat?" n=228

Cadmus asked participants with smart thermostats how they used them to control their home's temperature, through both the immediate and follow-up surveys, and asking them how they controlled previously-installed thermostats. Figure 26 indicates almost no change in the control strategies used by participants during the immediate survey and the follow-up survey six months later: overwhelmingly, these thermostats are programmed to follow a schedule, but household members sometimes make manual adjustments (72% immediate survey, 74% follow-up survey). This also held true for the most common control strategy used for participants' previous thermostats, but at a much lower rate (32%). The percentage of participants manually controlling their thermostats was 10% or less with smart thermostats, but 45% for the previous thermostats that were replaced. The percentage who said they would leave their thermostats at one constant setting all season long decreased with the installation of smart thermostats, to 6% (immediate) or 7% (follow-up) from 19% with previously-installed thermostats.

Figure 26. Participant Thermostat Control Strategies

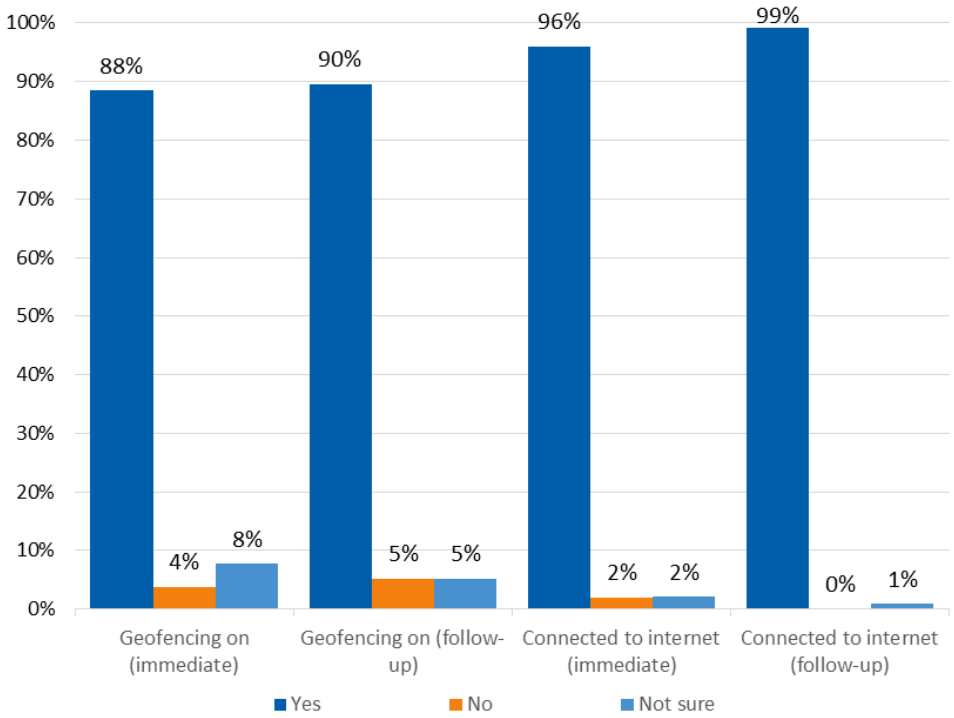


Immediate Participant Survey: G11. "Which option best represents how you most often used or interacted with your OLD thermostat(s)?" n=831, H10. "How is your smart thermostat currently controlled?" n=848, Follow-up Participant Survey: F8. "How is your smart thermostat currently controlled?" n=226

Cadmus asked participants with smart thermostats if they used the geofencing function[13], and if their thermostat connected to the Internet. As shown in Figure 27, nine out of 10 participants confirmed that their geofencing function remained active (88% immediate survey, 90% follow-up survey), and nearly all reported that their thermostats were connected to the Internet (96% immediate survey, 99% follow-up survey). In both surveys for both questions, at least as many participants reported being not sure as those answering in the negative, indicating a small percentage of participants may not know how their smart thermostats work.

[13] The geofencing function uses geolocation technology (i.e., GPS) to create a virtual geographic boundary, enabling software to trigger a response when a mobile device enters or leaves a particular area.

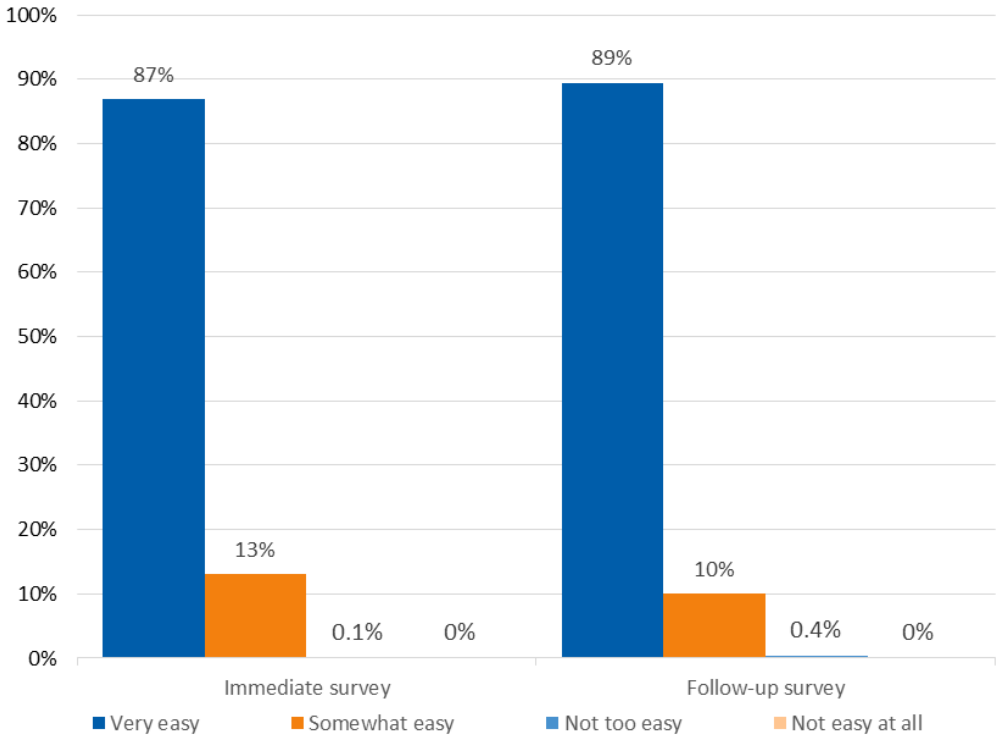
Figure 27. Smart Thermostat Geofencing and Internet Connection



Immediate Participant Survey: H2. “Is the function on your smart thermostat that senses when you are home or away working? (This function is also called "geofencing" or "occupancy sensing")” n=792, H3. “Is your smart thermostat connected to the Internet?” n=839, and Follow-up Participant Survey: F2. “Is the function on your smart thermostat that senses when you are home or away working? (This function is also called "geofencing" or "occupancy sensing")” n=217, F3. “Is your smart thermostat connected to the Internet?” n=226

The team asked participants to rate how easily their smart thermostats were to use, as shown in Figure 28. Nearly nine out of 10 said “very easy” (87% immediate survey, 89% follow-up survey), while fewer than 1% said it was “not too easy” and none gave the lowest possible “not easy at all” rating. Ratings immediately after installation and six months later did not significantly differ.

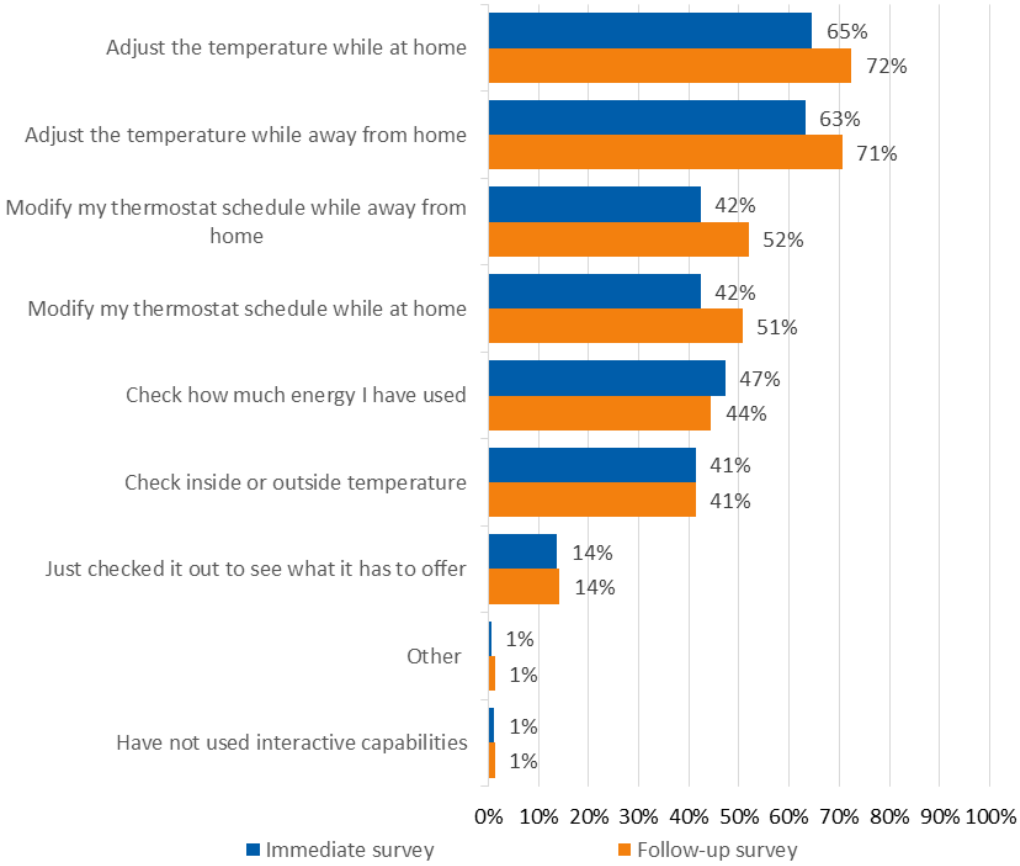
Figure 28. Ease of Using Smart Thermostats



Immediate Participant Survey: H1. "How easy is the smart thermostat to use?" n=860, Follow-up Participant Survey: F1. "How easy is the smart thermostat to use?" n=228

For both the immediate and follow up surveys, the team asked participants how they currently used their smart thermostats' interactive capabilities. The most common actions involved adjusting settings and modifying schedules, and all such responses increased somewhat in the follow-up survey compared to the immediate survey, while using the smart thermostat to monitor energy usage and temperatures remained consistent in both surveys.

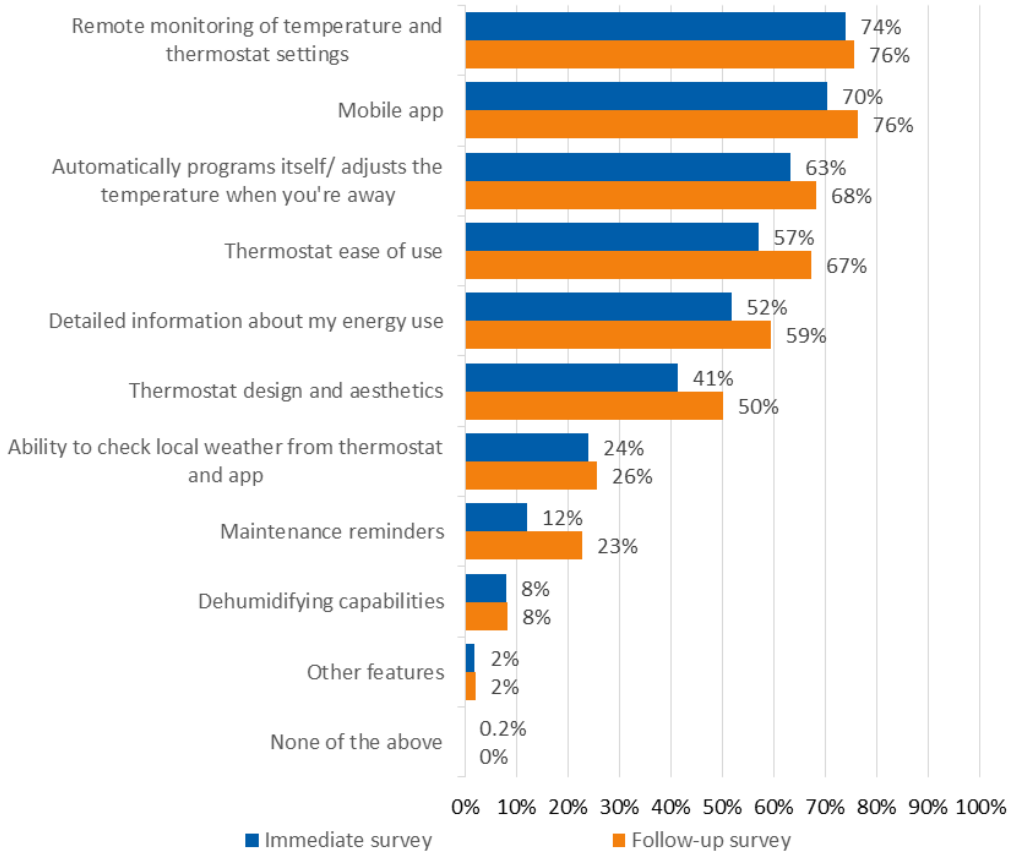
Figure 29. Currently Used Smart Thermostat Features



Immediate Participant Survey: H7. "How do you currently use your thermostat's interactive capabilities?" n=849, Follow-up Participant Survey: F7. "How do you currently use your thermostat's interactive capabilities?" n=225

As shown in Figure 30, the team asked participants which smart thermostat features they liked best. In both the immediate and follow-up surveys, respondents most frequently cited remote monitoring of temperatures and settings (74% and 76%, respectively). Most features arose more often in the follow-up surveys, indicating, over time, participants tried and became comfortable using more features of their smart thermostats. One of the less-frequently cited features—maintenance updates—experienced the largest increase (12% immediate survey; 23% follow-up survey). Respondents rarely cited dehumidifying capabilities in either survey (8%).

Figure 30. Favorite Smart Thermostat Features



Immediate Participant Survey: H4. "What features of your smart thermostat do you like best?" n=854, Follow-up Participant Survey: F4. "What features of your smart thermostat do you like best?" n=229

Smart Thermostats and HVAC Replacement

Cadmus asked smart thermostat participants if they had replaced any other heating or cooling equipment at the same time, and—if not—how old their equipment was. Participants reported that 4% of furnaces, 4% of CACs, and 2% of HP had been replaced at about the same time that smart thermostats were installed. Participants not replacing their systems at the same time as smart thermostat installations reported that their CACs and furnaces averaged a little of 11 years old, while HPs averaged about 10 years old. The oldest equipment reported by survey respondents were furnaces and CACs that were nearly 40 years old (i.e., 1% of units were installed in the late 1970s).

Cadmus also asked survey questions about smart thermostat usage to 21 Heating and Cooling program participants who received rebates for smart thermostats through the Efficient Products program.[14]

[14] The Heating and Cooling Immediate surveys included questions about smart thermostat usage for participants who also received smart thermostat rebates through the Efficient Products program. These responses were analyzed and reported for the Efficient Products program report.

Heating and Cooling program participants who also received smart thermostat rebates represented 2% of CAC and 3% of HP installations rebated through that program. All of these respondents had brand new CACs or HPs, since they had also participated in the Heating and Cooling program (Cadmus did not ask the age of their heating equipment). For the most part, as discussed below, Heating and Cooling participants who also received smart thermostat respondents are very similar to Efficient Products smart thermostat participants who did not receive Heating and Cooling program rebates.

Nearly all smart thermostats installed by Heating and Cooling participants (95%) controlled CACs, while 14% controlled HPs, and 14% controlled electric furnaces or other heating systems. The percentage of smart thermostats controlling CACs and electric heating were very similar to Efficient Products participants who did not participate in the Heating and Cooling program, although more Heating and Cooling participants had HPs.

The 21 surveyed Heating and Cooling participants received rebates for a combined 27 smart thermostats. The models of smart thermostats purchased by these participants (78% Nest, 19% Ecobee, 4% Honeywell) were very similar to the distribution for Efficient Products survey respondents. Respondents reported that 96% of these smart thermostats purchased were installed at the time of the survey. Of the smart thermostats that were installed, 68% (n=25) replaced programmable thermostats, 24% replaced manual thermostats, and 8% replaced other smart thermostats, comparable to the results for Efficient Products smart thermostat participants.

Cadmus asked Heating and Cooling program participants who received smart thermostat rebates why they replaced their old thermostat: the reasons were similar to those given by other Efficient Products smart thermostat participants, led by taking advantages of the features of the new thermostat (55%, n=20), and the Ameren Missouri rebate (50%).

Although all Heating and Cooling participants who purchased smart thermostats hired a contractor to install their heating and cooling equipment, only 15% (n=26) of their smart thermostats were purchased through a contractor, while 54% were purchased in local stores and 31% were purchased online. Nearly half of these respondents learned of the smart thermostat rebate from the Ameren Missouri website (47%, n=19), followed by contractors (21%), and store representatives (21%). Two-thirds of respondents (68%, n=19) knew which model of smart thermostat they wanted to purchase before visiting a store or being presented with options by a contractor.

Gross Impact Evaluation Results

This section details Cadmus's determination of each measure's installation rate and calculations of per-unit savings for Ameren Missouri's Efficient Products program. Cadmus compared these results to unit savings values taken from the Ameren Missouri TRM, as updated in December 2016. Ameren Missouri updated the TRM during PY16 using values from an interim gross impact analysis performed by Cadmus during 2016. The final gross impact results presented here include updated values based on participant surveys and program records through the end of the program year, which concluded on February 28, 2017.

Measure Installation Verification

Cadmus used survey results to verify the installation of program measures. Six months after rebate payments, the team conducted the follow-up survey, which was used to calculate the percentage of installed and operating units for measures with sufficient survey responses (i.e., 267 smart thermostats and 58 pool pumps). For measures with a small number of follow-up surveys, the team used the immediate surveys conducted shortly after payments (i.e., combining 130 room air purifiers, 89 water heaters, and 41 RACs).[15]

Table 26. Measure Installation

Measure	Percentage Installed and Operating
ENERGY STAR®-certified RACs	97.6%
ENERGY STAR-certified HPWHs	100%
ENERGY STAR-certified room air purifiers	99.2%
ENERGY STAR-certified multi-speed pool pumps	100%
ENERGY STAR-certified variable-speed pool pumps	100%
Smart thermostats (selected models)	98.5%

Measure-Specific Gross Savings

Cadmus engineers reviewed the 2017 TRM's deemed per-unit savings for all program measures. The team then compared these assumptions to the latest ENERGY STAR calculators to develop estimated per-unit savings numbers. The remainder of this section outlines estimated per-unit savings for each measure, along with the algorithm and inputs used. Using the engineering algorithms established in the Efficient Products evaluation plan, the team's engineers estimated savings for each program measure. The discussion includes descriptions of gross energy savings determined for each measure, along with algorithms and inputs used.

[15] Fewer than 20 participants took the follow-up survey for RACs, room air purifiers, and water heaters. For these measures, the evaluation used immediate survey responses for participants taking only one survey (only follow-up survey responses were used for those taking both surveys).

ENERGY STAR Room Air Conditioners

Cadmus estimated per-unit savings for RACs using the following algorithm:

$$Energy\ Savings\ (kWh/Year) = \frac{\frac{BTU}{hr} \times \left(\frac{1}{EER_{BASE}} - \frac{1}{EER_{EFF}}\right) \times EFLH_{COOL}}{1{,}000}$$

Where:

Btu/hr	=	Room air conditioner cooling capacity (Btu/hour)
EER_{BASE}	=	Baseline equipment energy efficiency ratio (Btu/W-hour)
EER_{EFF}	=	Efficient equipment energy efficiency ratio (Btu/W-hour)
$EFLH_{COOL}$	=	Equivalent full-load cooling hours
1,000	=	Conversion from between Wh to kWh

Table 27 shows the assumed values for each parameter.

Table 27. Room Air Conditioner Savings Assumptions

Term	Value	Source
Btu/hr	9,558	PY13 Efficient Products Program Database (average Btu/hr)
EER_{BASE}	10.9	Federal Minimum Efficiency Standard (CEER)
EER_{EFF}	11.9	PY16 Efficient Products Program Database (average CEER)*
$EFLH_{COOL}$ – primary unit**	860	PY13 CoolSavers Program data
$EFLH_{COOL}$ – secondary unit**	556	Secondary source***
1,000	1,000	Conversion factor (Wh/kWh)

*Value updated from PY13.

**Cadmus used a weighted average for $EFLH_{COOL}$ for primary and secondary sources, based on PY14 survey responses; 84% of respondents reported using RACs as a secondary cooling source.

***Based on weather-adjusted metering data from California: Cadmus. *Residential Retrofit High Impact Measure Evaluation Report: Evaluation of PGE2000, SDGE3024, & SCE2501 Room Air Conditioners (2006-2008)*. 2010. Available online: http://www2.epa.gov/sites/production/files/documents/CA_PUC_Assessment.pdf

Using this engineering algorithm, the team estimated an energy-savings value of 44.6 kWh per year for each installed and retained RAC, as shown in Table 28. This value equaled 90% of the program's *ex ante* savings estimate, due to updating EER based on PY16 program records (rebated units were not as efficient relative to the baseline).

Table 28. TRM and Estimated Savings Comparison for RACs

TRM Savings/Unit	Cadmus Estimated Savings/Unit	Realization Rate
49.6 kWh/yr	44.6 kWh/yr	90%

ENERGY STAR Heat Pump Water Heaters

Cadmus estimated per-unit savings for HPHWs using the following algorithm:

$$Energy\ Savings\ (kWh/Year) = \left(\frac{1}{EFbase} - \frac{1}{EFeff}\right) \times (HWT - CWT) \times Den \times GPD \times 365 \times C_p \times \frac{1}{3{,}413} - kWheat + kWcool$$

Where:

EFbase	=	Energy factor of baseline water heater
EFeff	=	Energy factor of program-qualified water heater
HWT	=	Hot water temperature (°F)
CWT	=	Cold water temperature (°F)
Den	=	The water density (lb/gal)
GPD	=	Gallons of hot water used per day
365	=	Days/year
C_p	=	Specific heat of water
3,413	=	Conversion factor from Btu to kWh
kWheat	=	Heating interaction due to heat removed from room to heat water
kWcool	=	Cooling interaction due to heat removed from room to heat water

Table 29 shows the assumed value for each of these parameters.

Table 29. HPHWs Savings Assumptions

Term	Value	Source
EFbase	0.90	Federal Minimum Standard
EFeff	3.14	PY16 Efficient Products Database (average EF)*
HWT	135	Ameren Missouri TRM
CWT	61.3	Ameren Missouri TRM
Den	8.33	Density of water (lb/gallon)
GPD	64	Secondary source**
C_P	1	Specific heat of water (Btu/lb-oF)
3,413	3,413	Conversion factor (Btu/kWh)
kWheat	Electric Resistance = 1,577 Heat Pump = 779	Ohio Statewide TRM***
kWcool	180	Ohio Statewide TRM***
Days	365	Conversion Factor (day/yr)

*Value updated from PY15.

**U.S. Department of Energy (DOE) Federal Energy Management Program Energy Cost Calculator. Available online: http://energy.gov/eere/femp/energy-cost-calculator-electric-and-gas-water-heaters-0

***The team adjusted interactive effects to account for saturation of electric resistance heat, HPs, and CACs in Ameren Missouri's territory, as found by the PY16 Efficient Products survey (37%, 42%, and 67%, respectively). *State of Ohio Energy Efficiency Technical Reference Manual.* pp. 86-87. 2010. Available Online: http://s3.amazonaws.com/zanran_storage/amppartners.org/ContentPages/2464316647.pdf

Using this engineering algorithm, the team estimated an energy savings value of 2,531 kWh per year for each installed and retained HPWH. This value equaled approximately 88% of the program *ex ante* value of 2,865 kWh per year, as shown in Table 30. The difference between these estimates resulted from adjustments the team made to saturation percentages of electric resistance heat, HPs, and CAC (as discussed in the note to Table 29).

Table 30. TRM and Estimated Savings Comparison for HPHWs

TRM Savings/Unit	Cadmus Estimated Savings/Unit	Realization Rate
2,865 kWh/yr	2,531 kWh/yr	88%

ENERGY STAR Room Air Purifiers

Cadmus estimated per-unit ENERGY STAR room air purifier savings using the following ENERGY STAR calculator algorithm:

$$Energy\ Savings\ \left(\frac{kWh}{Year}\right) = \left\{CADR\ \times \left(\frac{1}{Eff_{BL}} - \frac{1}{Eff_{ES}}\right) \times \left(Hr_{oper}\right) + \left(SB_{BL} - SB_{ES}\right) \times \left(24 - Hr_{oper}\right)\right\} \times \frac{365}{1{,}000}$$

Where:

CADR	=	Clean air recovery rate for dust
Eff_{BL}	=	Clean air recovery rate for dust per watt for baseline unit
Eff_{ES}	=	Clean air recovery rate for dust per watt for ENERGY STAR unit
Hr_{oper}	=	Hours per day of operation
SB_{BL}	=	Standby for baseline unit
SB_{ES}	=	Standby for ENERGY STAR unit
365	=	Days/year
1,000	=	Conversion factor (Wh/kWh)

Table 31 shows the assumed values for each of these parameters.

Table 31. ENERGY STAR Room Air Purifier Savings Assumptions

Term	Value	Source
CADR	144.42	PY16 Efficient Products Program Database*
Eff_{BL}	1.00	ENERGY STAR Appliance Calculator**
Eff_{ES}	2.91	PY16 Efficient Products Program Database*
Hr_{oper}	16	ENERGY STAR Appliance Calculator**
SB_{BL}	1.00	ENERGY STAR Appliance Calculator **
SB_{ES}	0.293	PY16 Efficient Products Program Database*

*Value updated from PY15.

**Available online:
https://www.energystar.gov/sites/default/files/asset/document/appliance_calculator.xlsx

Using this engineering algorithm, the team estimated a per-unit savings value of 556 kWh per year for each ENERGY STAR room air purifier, as shown in Table 32. This value equaled approximately 108% of the program's *ex ante* savings estimate (i.e., 482 kWh per year). The difference between estimates resulted from: updates to the clean-air delivery rate for dust, and standby energy consumption, based on PY16 program data.

Table 32. TRM and Estimated Savings Comparison for ENERGY STAR Room Air Purifiers

TRM Savings/Unit	Cadmus Estimated Savings/Unit	Realization Rate
515 kWh/yr	556 kWh/yr	108%

ENERGY STAR Multi-Speed Pool Pumps

Cadmus estimated per-unit multi-speed pool pump savings using the following algorithm:

$$Energy\ Savings\left(\frac{kWh}{Year}\right) = Days_{oper} \times \left\{\left(\frac{kWh_{ss}}{Day}\right) - \left(\frac{kWh_{ds}}{Day}\right)\right\}$$

Where:

$$\left(\frac{kWh_{ss}}{Day}\right) = \frac{(RT_{ss} \times GPM_{ss} \times 60)}{(EF_{ss} \times 1{,}000)}$$

$$\left(\frac{kWh_{ds}}{Day}\right) = \left(\frac{kWh_{hs}}{Day}\right) + \left(\frac{kWh_{ls}}{Day}\right)$$

$$\left(\frac{kWh_{hs}}{Day}\right) = \frac{(RT_{hs} \times GPM_{hs} \times 60)}{(EF_{hs} \times 1{,}000)}$$

$$\left(\frac{kWh_{ls}}{Day}\right) = \frac{(RT_{ls} \times GPM_{ls} \times 60)}{(EF_{ls} \times 1{,}000)}$$

And where:

$Days_{oper}$	=	Days/year of operation
RT_{ss}	=	Runtime in hours/day using single-speed pump
GPM_{ss}	=	Gallons per minute using single-speed pump
EF_{ss}	=	Energy factor using single-speed pump
RT_{hs}	=	Runtime in hours/day in high speed using multi-speed pump
GPM_{hs}	=	Gallons per minute in high speed using multi-speed pump
EF_{hs}	=	Energy factor in high speed using multi-speed pump
RT_{ls}	=	Runtime in hours/day in low speed using multi-speed pump
GPM_{ls}	=	Gallons per minute in low speed using multi-speed pump
EF_{ls}	=	Energy factor in low speed using multi-speed pump
1,000	=	Conversion factor (Wh/kWh)

Table 33 shows the assumed value for each of these parameters.

Table 33. ENERGY STAR Multi-Speed Pool Pump Savings Assumptions

Term	Value	Source
$Days_{oper}$	121.6	*ENERGY STAR Pool Pump Calculator adjusted for multi-speed in Missouri
RT_{ss}	11.4	
RT_{ls}	9.8	
RT_{hs}	2.0	
GPM_{ss}	64.4	
GPM_{ls}	31.0	
GPM_{hs}	56.0	
EF_{ss}	2.1	
EF_{ls}	5.4	
EF_{hs}	2.4	

*Available online:
https://www.energystar.gov/sites/default/files/asset/document/Pool%20Pump%20Calculator.xlsx

Using this engineering algorithm, the team estimated a per-unit saving value of 1,799.7 kWh per year for multi-speed pool pumps, as shown in Table 34. This value equals the program's *ex ante* savings estimate.

Table 34. TRM and Estimated Savings Comparison for ENERGY STAR Multi-Speed Pool Pumps

TRM Savings/Unit	Cadmus Estimated Savings/Unit	Realization Rate
1,800 kWh/yr	1,800 kWh/yr	100%

ENERGY STAR Variable Speed Pool Pumps

Cadmus estimated per-unit variable speed pool pump savings using the following algorithm:

$$Energy\ Savings\ \left(\frac{kWh}{Year}\right) = Days_{oper} \times \left\{\left(\frac{kWh_{ss}}{Day}\right) - \left(\frac{kWh_{vs}}{Day}\right)\right\}$$

Where:

$$\left(\frac{\boldsymbol{kWh_{ss}}}{\boldsymbol{Day}}\right) = \frac{(\boldsymbol{RT_{ss} \times GPM_{ss} \times 60})}{(\boldsymbol{EF_{ss} \times 1{,}000})}$$

$$\left(\frac{kWh_{vs}}{Day}\right) = \left(\frac{kWh_{hs}}{Day}\right) + \left(\frac{kWh_{ls}}{Day}\right)$$

$$\left(\frac{\boldsymbol{kWh_{hs}}}{\boldsymbol{Day}}\right) = \frac{(\boldsymbol{RT_{hs} \times GPM_{hs} \times 60})}{(\boldsymbol{EF_{hs} \times 1{,}000})}$$

$$\left(\frac{\boldsymbol{kWh_{ls}}}{\boldsymbol{Day}}\right) = \frac{(\boldsymbol{RT_{ls} \times GPM_{ls} \times 60})}{(\boldsymbol{EF_{ls} \times 1{,}000})}$$

And where:

$Days_{oper}$	=	Days/year of operation
RT_{ss}	=	Runtime in hours/day using single-speed pump
GPM_{ss}	=	Gallons per minute using single-speed pump
EF_{ss}	=	Energy factor using single-speed pump
RT_{hs}	=	Runtime in hours/day in high speed using variable-speed pump
GPM_{hs}	=	Gallons per minute in high speed using variable-speed pump
EF_{hs}	=	Energy factor in high speed using variable-speed pump
RT_{ls}	=	Runtime in hours/day in low speed using variable-speed pump
GPM_{ls}	=	Gallons per minute in low speed using variable-speed pump
EF_{ls}	=	Energy factor in low speed using variable-speed pump
1,000	=	Conversion factor (Wh/kWh)

Table 35 shows the assumed value for each of these parameters.

Table 35. ENERGY STAR Variable Speed Pool Pump Savings Assumptions

Term	Value	Source
$Days_{oper}$	121.6	*ENERGY STAR Pool Pump Calculator (version last updated December 2013) adjusted for variable speed in Missouri
RT_{ss}	11.4	
GPM_{ss}	64.4	
EF_{ss}	2.1	
RT_{hs}	2.0	
GPM_{hs}	50.0	
EF_{hs}	3.8	
RT_{ls}	10.0	
GPM_{ls}	30.6	
EF_{ls}	7.3	

*Available online:
https://www.energystar.gov/sites/default/files/asset/document/Pool%20Pump%20Calculator.xlsx

Using this engineering algorithm, the team estimated a per-unit saving value of 2,053 kWh per year for variable speed pool pumps, as shown in Table 36. This value equals the program's *ex ante* savings estimate.

Table 36. TRM and Estimated Savings Comparison for ENERGY STAR Variable Speed Poop Pumps

TRM Savings/Unit	Cadmus Estimated Savings/Unit	Realization Rate
2,053 kWh/yr	2,053 kWh/yr	100%

Smart Thermostats

Cadmus will conduct a billing analysis to calculate energy savings for smart thermostats in PY17, when sufficient pre- and post-treatment data will be available. For PY16, Cadmus reviewed the reasonableness of the *ex ante* unit savings estimate through comparisons with the Illinois TRM. The Illinois TRM assumes savings of 7.4% for heating consumption and 8% for cooling consumption when replacing a thermostat of an unknown type. Applying these savings percentages to heating and cooling consumption values from the Ameren Missouri billing analysis of ASHP participants, and weighting by the heating system's distribution for single-family homes, taken from the ongoing PY16 Efficient Products participant surveys, produced estimated per-unit savings of 470 kWh. This value equals approximately 102% of the program's *ex ante,* per-unit savings of 462 kWh per year and the *ex ante* estimate is reasonable and consistent with deemed values from other jurisdictions.

Summary

Table 37 lists per-unit, *ex ante* and *ex post* gross savings by measure (kWh); and Table 38 lists the same for demand reduction (KW). [16]

Table 37. PY16 Summary: Comparison of *Ex Ante and Ex Post* Per-Unit Gross Savings

Measure	*Ex Ante* (kWh/yr)	*Ex Post* (kWh/yr)	Realization Rate
Equipment Rebates			
ENERGY STAR®-certified RACs	49.6	44.6	90%
ENERGY STAR-certified HPWHs	2,865	2,531	88%
ENERGY STAR-certified room air purifiers	515	556	108%
ENERGY STAR-certified multi-speed pool pumps	1,800	1,800	100%
ENERGY STAR-certified variable-speed pool pumps	2,053	2,053	100%
Smart thermostats (selected models)	462	462	100%

Table 38. PY16 Summary: Comparison of *Ex Ante and Ex Post* Per-Unit Gross Demand Reduction*

Measure	*Ex Ante* (KW/yr)	*Ex Post* (KW/yr)	Realization Rate
Equipment Rebates			
ENERGY STAR®-certified RACs	0.047	0.042	90%
ENERGY STAR-certified HPWHs	0.254	0.225	88%
ENERGY STAR-certified room air purifiers	0.240	0.259	108%
ENERGY STAR-certified multi-speed pool pumps	0.248	0.424	171%
ENERGY STAR-certified variable-speed pool pumps	0.483	0.483	100%
Smart thermostats (selected models)	0.438	0.438	100%

* The Non-Unanimous Stipulation and Agreement in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." Cadmus referenced the Ameren Missouri TRM for secondary data on measure EUL in order to assess whether or not measures are sufficiently long-lived to apply the stipulated energy to-demand ratio to determine 2023-persistent kW savings. Demand savings resulting from Smart Thermostats are not counted toward this goal.

To estimate the program's total gross energy savings, the team applied per-unit values shown in Table 37 to the Efficient Products PY16 participation rates, shown in Table 39.

[16] Cadmus calculated a realization rate of 171% for multi-speed pool pumps, due to Ameren Missouri's 2017 TRM applying a lower coincident peak demand factor for "commercial motors" rather than the higher factor for "residential pools and spas".

Table 39. PY16 Summary: *Ex Post* Program Gross Savings Accounting for Installation Rates*

Measure	PY16 Participation (Verified)	Per-Unit *Ex Post* Savings (kWh/hr)	Percent Installed and Operating	Total *Ex Post* Savings (kWh/yr)	Total *Ex Post* Savings (kW/yr)
ENERGY STAR®-certified RACs	324	44.6	97.6%	14,084	13.3
ENERGY STAR-certified HPWHs	322	2,531	100%	815,132	72.3
ENERGY STAR-certified room air purifiers	1,300	556	99.2%	716,782	334.1
ENERGY STAR-certified multi-speed pool pumps	147	1,800	100%	264,561	62.3
ENERGY STAR-certified variable-speed pool pumps	550	2,053	100%	1,129,067	265.8
Smart thermostats (selected models)	8,200	462	98.5%	3,731,645	3,535.4
Total**	**10,843**	**N/A**	**98.7%**	**6,671,270**	**4,283.3**

* The Non-Unanimous Stipulation and Agreement in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." Cadmus referenced the Ameren Missouri TRM for secondary data on measure EUL in order to assess whether or not measures are sufficiently long-lived to apply the stipulated energy to-demand ratio to determine 2023-persistent kW savings. Demand savings resulting from Smart Thermostats are not counted toward this goal.

** Measure gross savings may not sum to total due to rounding.

Net Impact Evaluation Results

Cadmus determined total programs net impacts by calculating total gross savings by measure group and then by applying the following[17]:

- Participant Free Ridership
- Participant Spillover
- Nonparticipant Spillover (NPSO)

Free ridership equals the percentage of savings that would have occurred in a program's absence due to participants purchasing the same measures without the program's influence. Thus, free riders can be considered customers who would have purchased a measure independent of a program. As they account for some program costs but none of its benefits, they decrease a program's net savings.

Spillover equals savings that occur when customers undertake installation of energy efficiency measures or perform energy-efficient activities without receiving financial assistance. For participating customers, this is due to their experience participating in a given program, whereas non participating customers engage in energy-efficient activities due to awareness resulting from program marketing. Unlike free ridership, spillover savings do not generate program costs; rather, energy-saving benefits occur, which increase net savings.

To calculate the Efficient Products program's NTG, the Cadmus team used the following formula:

$$\boldsymbol{NTG = 1 - Free\ ridership + Participant\ Spillover}$$

Cadmus applied the resulting NTG ratio to the *ex post* gross savings for each program measure to calculate net savings for the program measures, then added the Efficient Products generated NPSO savings to arrive at total net program savings. Because NPSO is of significant size and does not have the same load shape as the program, we did not include NPSO in the NTG ratio associated with the program, but rather added the net energy and demand impacts separately.

Table 40 shows our estimates of the PY16 program's net impacts.

[17] Cadmus relied upon the Uniform Methods Project definition of spillover than includes both poarticipant and nonparticipant spillover that include subsets of both like and non-like spillover. This is located on page 3 of the linked document. https://energy.gov/sites/prod/files/2015/02/f19/UMPChapter23-estimating-net-savings_0.pdf

Table 40. PY16 Net Impact Results Summary*

Program Measure	*Ex Post* Gross Savings (kWh/yr)	Free Ridership	Participant Spillover	NTG (w/o NPSO)	Net Savings (kWh/yr)	Net Savings (kW/yr)
ENERGY STAR®-certified RACs	14,084	72.8%	32.6%	59.8%	8,422	8.0
ENERGY STAR-certified HPWHs	815,132	15.2%	0.0%	84.8%	691,232	61.3
ENERGY STAR-certified room air purifiers	716,782	50.0%	0.2%	50.2%	359,824	167.7
ENERGY STAR-certified multi-speed pool pumps	264,561	32.3%	0.1%	67.8%	179,372	42.2
ENERGY STAR-certified variable-speed pool pumps	1,129,067	32.3%	0.1%	67.8%	765,507	180.2
Smart thermostats	3,731,645	23.1%	5.4%	82.3%	3,071,144	2,909.7
NPSO	-	-	-	-	319,830	127.6
Program Total *	**6,671,270**	**27.1%**	**3.1%**	**76.1%**	**5,395,332**	**3,496.7**

* The Non-Unanimous Stipulation and Agreement in File No. EO-2015-0055 states: "Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A." Cadmus referenced the Ameren Missouri TRM for secondary data on measure EUL in order to assess whether or not measures are sufficiently long-lived to apply the stipulated energy to-demand ratio to determine 2023-persistent kW savings. Demand savings resulting from Smart Thermostats are not counted toward this goal.

** Measure savings may not sum to total due to rounding.

Free Ridership Results

Cadmus used a participant self-report approach to determine free ridership ratios for 969 participants who chose to install an Efficient Products program measure. This approach relied on a standard battery of questions that focused on the following key areas:

- Would the participant have installed a high-efficiency replacement without the program incentive?
- How soon would the participant have taken the action with the program rebate?
- Did the program rebate cause the participant to purchase a system with a higher efficiency rating than they would have purchased without the program?
- How important was the program rebate in the participant's decision to purchase and install a high-efficiency system?
- How important was the advice from the contractor in the participant's decision to purchase and install the high-efficiency system?

Based on participant responses, we applied a free ridership score ranging from 0% to 100% to each participant individually, based on their collective responses to the set of survey questions. Cadmus then

averaged individual free ridership scores participants (weighted by evaluated gross energy savings) to arrive at measure category level free ridership estimates for the program.

We used the following process for determining a participant's free ridership score: [18]

- We categorized customers as 0% free riders if:
  - They had no plans to install the measure in the absence of the program's incentives and would not have installed the measure within one year in the program's absence;
  - They considered installing the measure before learning about the program, but would not have done so without program incentives; or
  - In the absence of program incentives, they would have purchased or installed less-efficient equipment.
- We categorized customers as 100% free riders if they had installed the measure before learning about the program, or if they would have installed the same measure at the same time without the program and if they confirmed the program rebate was "not at all important" in their decision to purchase the high efficiency equipment.[19]
- We assigned a partial free ridership score (ranging from 12.5% to 75%) to customers who already had plans to install the measure, but who said their decisions about which product to purchase or when they would purchase it was influenced by the program. For customers highly likely to install the energy-efficient equipment right away and for whom the program had less influence over their decisions, we assigned a higher free ridership percentage than for those whom the program may not have had as large an influence (or whose purchases may have occurred later in the program's absence).

After translating survey responses into each participant's free ridership score, we calculated an average free ridership estimate, weighted by evaluated savings, for each program measure category. (Appendix B. Free Ridership Scoring Tables, Table 55 and Table 56, shows the conversion of each raw survey response option into free ridership scoring matrix values, and the free ridership score combinations and scoring legend we used to categorize customer survey responses for incentive-based measures.)

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[18] According to The Energy Efficiency Program Impact Evaluation Guide, from the State and Local Energy Efficiency Action Network, dated December 2012, "A participant is a total free rider if he or she would have absolutely installed the exact same project at the exact same time, at the same price, even if the program did not exist—and they know that."

https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

[19] When respondents reported that a contractor was involved in the customer's purchasing decision they were asked an additional question abouthow important the advice from the contractor was on their decision to purchase and install the high-efficiency program equipment.

Free Ridership Results

Table 41 provides PY16 free ridership estimates by measure.

Table 41. Efficient Products Free Ridership Results

Measure	N	Total Weighted Free Ridership Estimate*
ENERGY STAR®-certified RACs	29	72.8%
ENERGY STAR-certified HPWHs	74	15.2%
ENERGY STAR-certified room air purifiers	104	50.0%
ENERGY STAR-certified multi-speed pool pumps	119	32.3%
ENERGY STAR-certified variable-speed pool pumps		
Smart thermostats	827	23.1%

*Estimates are weighted by *ex post* gross program savings.

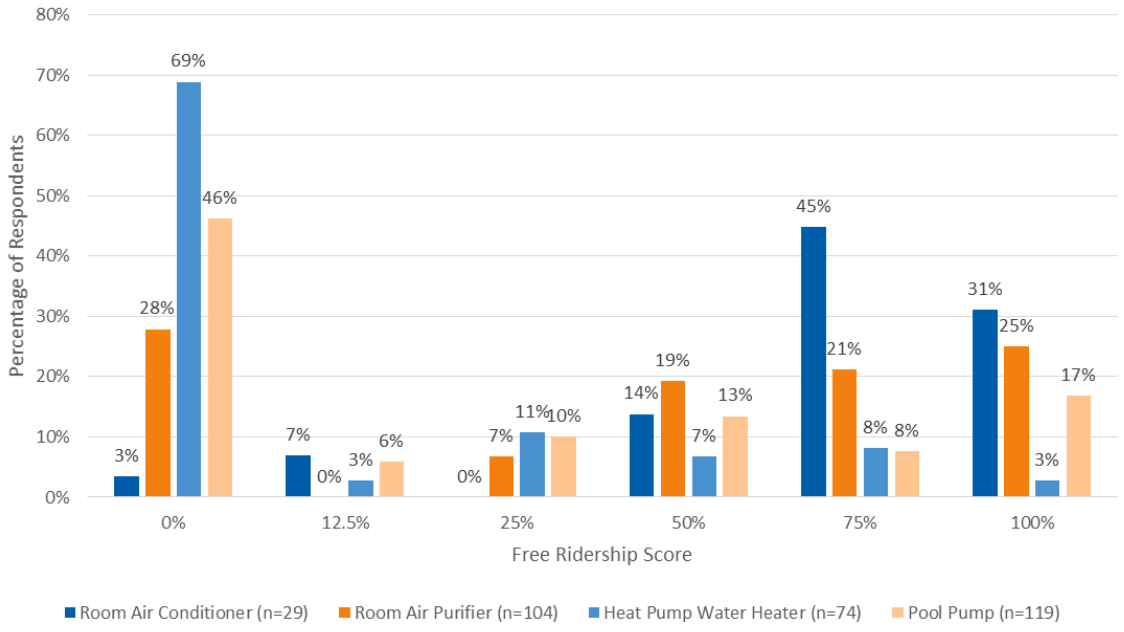
Free Ridership Scoring

Appendix B. Free Ridership Scoring Tables, Table 57 to Table 61, contains: the full set of free ridership responses for the Efficient Products measures, free ridership survey response combinations, the free ridership score assigned to each combination, and the number of responses. Responses of "yes," "no," or "partial" relate to whether the specific response indicates free ridership.

Distribution of Free Ridership Scores

Figure 31 shows the distribution of assigned free ridership scores by measure. Out of all measures, room air conditioner participants had the lowest percentage (3%) of respondents estimated as 0% free riders and the highest percentage (31%) of respondents estimated as 100% free riders. The heat pump water heater measure had the highest percentage (69%) of respondents estimated as 0% free riders and the lowest percentage (3%) of respondents estimated as 100% free riders.

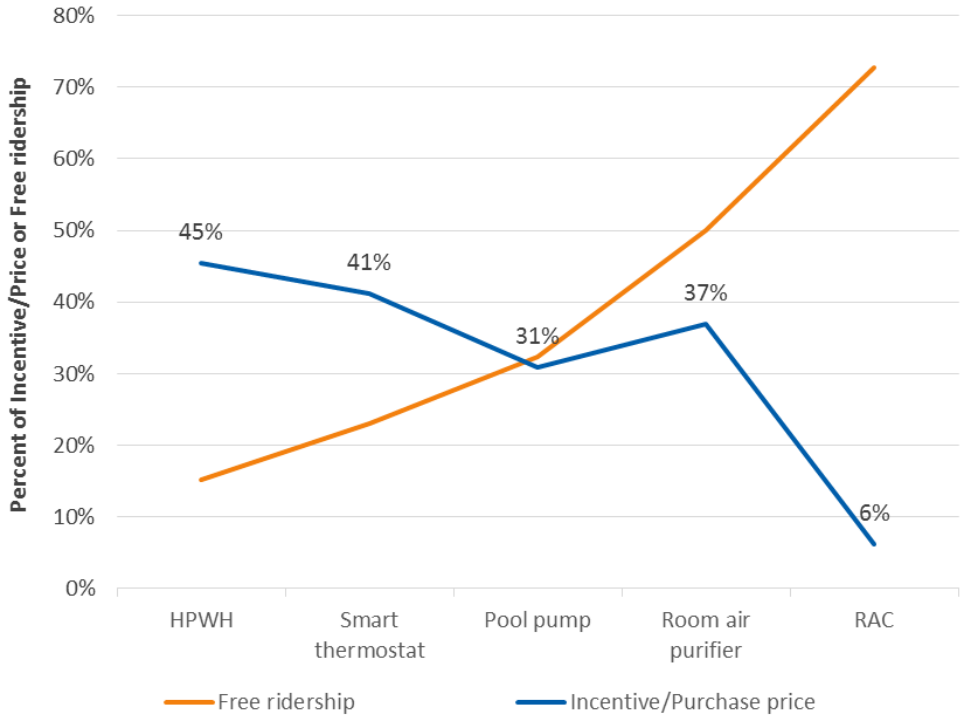
Figure 31. Overall Distribution of Free Ridership Scores by Measure



Free Ridership Scores and Incentives

Figure 32 shows the distribution of assigned free ridership scores by measure plotted with the incentive amount as a percent of the average cost of each measure. There is a clear inverse relationship between the relative amount of the incentive and free ridership, with the measures that have the lowest free ridership having the highest incentive-to-price ratios (45% for HPWHs and 41% for smart thermostats). RACs had the highest free ridership for any measure in the program (72.8%), and also the lowest incentive-to-price ratio (6%). Room air purifiers had relatively high free ridership (50.0%) despite also having a relatively high incentive (37% of average measure price).

Figure 32. Incentive Relative to Price Compared with Free Ridership Scores by Measure



Cadmus calculated the average purchase price for each measure from program records.[20] These results are shown in Table 42 along with the incentive-to-price ratio and estimated free ridership for each measure.

Table 42. Incentive Relative to Price Compared with Free Ridership Scores by Measure

Measure	Incentive	Average Purchase Price	Incentive as Percent of Purchase Price	Free Ridership Estimate
ENERGY STAR®-certified RACs	$20	$325	6.2%	72.8%
ENERGY STAR-certified HPWHs	$500	$1,100	45.5%	15.2%
ENERGY STAR-certified room air purifiers	$50	$136	36.9%	50.0%
ENERGY STAR-certified multi-speed pool pumps	$350	$1,132	30.9%	32.3%
ENERGY STAR-certified variable-speed pool pumps				
Smart thermostats	$100	$243	41.2%	23.1%

[20] Program records included valid purchase price data for 99% of rebated measures (10,729 measures used in this analysis). Cadmus found that participants paid nearly identical average purchase prices for multi-speed ($1,131) and variable-speed ($1,132) pool pumps, so these measures were reported together.

Participant Spillover Results

Cadmus asked Efficient Products Program participants whether they had undertaken additional energy-efficient actions since participating in the program. To calculate spillover, we asked them to rate the importance of the following factors on their decisions to purchase additional energy efficient equipment:

1. Receiving funding through Ameren Missouri's Efficient Products Program
2. Information they heard from Ameren Missouri or a retailer contractor about the benefits of installing additional equipment

Survey respondents reported installing 26 additional energy-efficient measures after participating in the Efficient Products Program and said their experience in the Program was "very important" to the subsequent decision to purchase a high-efficiency appliance rather than a standard efficiency model.

We estimated energy savings for the participants' spillover responses, and then divided the total Efficient Products Program survey sample spillover savings for each program measure group by the survey sample Efficient Products Program gross program savings, drawn from the survey sample, and as described in the following equation:

$$Spillover\ \% = \frac{\sum[Spillover\ kWh\ savings\ for\ all\ program\ measure\ group\ respondents]}{\sum[Program\ kWh\ savings\ for\ all\ program\ measure\ group\ respondents]}$$

Table 43 presents the spillover details by program measure group.[21]

[21] No spillover activity was attributed to Ameren by heat pump water heater respondents and the participant spillover estimate for the measure groups is 0%.

Table 43. Participant Spillover Savings

Measure Group	Spillover Measure	Quantity	Participant Spillover kWh/year Savings*	Total Survey Sample Spillover kWh/year Savings
ENERGY STAR®-certified RACs	Recycled a refrigerator or freezer	1	247.2*	247.2
ENERGY STAR-certified room air purifiers	ENERGY STAR Refrigerator	1	18.5**	18.5
ENERGY STAR-certified pool pumps	ENERGY STAR Refrigerator	2	18.5**	67.4
	ENERGY STAR Freezer	1	30.5***	
Smart thermostats	Efficient Central Air Conditioner	2	323.5†	5,774.1
	Efficient Furnace Fan	1	192.3†	
	Efficient Showerhead	2	330.5††	
	Efficient Insulation	4	192.3†††	
	Efficient Windows	2	186.9^	
	ENERGY STAR Clothes Washer	3	60.0^^	
	ENERGY STAR Refrigerator	5	18.5**	
	ENERGY STAR Freezer	2	30.5***	
	Heat Pump Water Heater	1	2,531.5^^^	

*Based on ½ the savings calculated for the PY15 Refrigerator Recycling evaluation. Adjusting program savings by ½ account for the uncertainty about the type of refrigerator, and if it was disposed of in other ways besides recycling.

**Deemed savings for ENERGY STAR Refrigerator from the Illinois TRM Version 5.0 Volume 3. Reduced by one half due to high market shares of ENERGY STAR refrigerators.

***Deemed savings for ENERGY STAR Freezer from Ameren Missouri 2012 Energy Efficiency Filing Appendix A TRM. Reduced by one half due to high market shares of ENERGY STAR freezers.

†Based on savings calculated for the PY16 Heating and Cooling program.

†† Based on savings calculated for the PY16 Energy Efficient Kits program.

†††Average ceiling insulation savings per home, calculated for the PY15 Home Energy Analysis program.

^Based on savings calculated for the PY15 Home Energy Analysis program.

^^ Deemed savings for gas water heating and unknown dryer fuel, from the Illinois TRM Version 5.0 Volume 3. Reduced by one half due to high market shares of ENERGY STAR clothes washers.

^^^Based on savings calculated for the PY16 Efficient Products program.

Table 44 presents the spillover percent estimates by measure group.[22] The measure group specific spillover estimates were weighted by *ex post* gross population savings to arrive at the 3.1% participant spillover estimate for the overall program

Table 44. Participant Spillover Results by Measure Group

Measure Group	Survey Sample Spillover kWh Savings	Survey Sample Gross Program kWh Savings	Spillover %	*Ex Post* Gross Population Savings (MWh/yr)
ENERGY STAR®-certified RACs	247.2	757.4	32.6%	14
ENERGY STAR-certified room air purifiers	18.5	8,890.3	0.2%	717
ENERGY STAR-certified pool pumps	67.4	115,969.0	0.1%	1,394
Smart thermostats	5,774.1	106,722.0	5.4%	3,732
Total*			**3.1%**	**6,671**

* Total may not equal sum of measures due to rounding

Nonparticipant Spillover

Effective program marketing and outreach generates program participation *and* increases general energy efficiency awareness among customers. The cumulative effect of sustained utility program and general marketing can affect customers' perceptions of their energy usage, and, in some cases, motivates customers to take efficiency actions outside of a utility's program. Cadmus relied upon the Uniform Methods project definition of spilloverThe energy savings caused by, but not rebated through, a utility's demand-side management activity are spillover savings. The spillover savings accrued by customers who did not participate in Ameren Missouri's programs are nonparticipant spillover, or NPSO.

During PY16, Ameren Missouri spent over $1.1 million dollars to market individual residential efficiency programs (excluding the Low-Income and Home Energy Report programs).[23] To understand whether Ameren Missouri's program-specific marketing efforts generated energy efficiency improvements outside of Ameren Missouri's incentive programs, Cadmus implemented a phone survey of residential customers who did not participate in Ameren Missouri's incentive programs in PY16. As this survey has been implemented annually since PY13, the PY16 version represents the latest effort in monitoring nonparticipant activity.

[22] No spillover activity was attributed to Ameren by heat pump water heater respondents and the participant spillover estimate for the measure groups is 0%.

[23] The Home Energy Report program is evaluated using billing analysis, which accounts for both program savings and spillover savings. Thus, it is excluded from this NPSO analysis.

Methodology

Survey Sampling and Disposition

From Ameren Missouri's entire residential customer base, Cadmus selected customers who did not participate in any Ameren Missouri programs in PY16; these 674,577 customers served as the sample frame for the nonparticipant survey.[24] From this sample frame, the team randomly selected 20,000 customers for the survey sample. The team called customers from this sample until reaching a quota of 200 completed nonparticipant surveys.[25]

The team cross-checked each respondent's account ID and phone numbers against the final participant program tracking databases to ensure that respondents were not confused by the questions and, in fact, participated in the program. Analysis found that two survey respondents participated in the Multifamily Efficient Kits program, but they did not report spillover measures. The NPSO analysis focused on 198 verified nonparticipants to avoid potential double-counting of program-specific spillover.

Like and Non-Like Spillover Measures

The survey asked respondents whether they installed any of 11 energy efficiency measures offered by Ameren Missouri programs (i.e., "like" spillover), with the notable exception of products in the Lighting and HVAC programs. The like NPSO analysis excluded products in the Lighting and HVAC programs to avoid double-counting NPSO savings already captured through those programs' like NPSO analyses, as described in those reports.

In addition, the survey asked respondents whether they installed energy efficiency measures or performed energy-saving actions outside of Ameren Missouri's PY16 program offerings (i.e., "non-like" spillover). The rationale for including non-like spillover was that Ameren's program marketing and outreach would raise general awareness of energy efficiency and could result in Ameren Missouri customers taking additional steps to save energy on their own.

For example, some respondents reported installing non-like measures previously offered through Ameren Missouri programs and might have been influenced by Ameren Missouri's prior program marketing and outreach. In addition, Ameren Missouri customers might have adopted other non-like measures due to Ameren Missouri's program marketing and outreach changing their general attitudes towards energy efficiency.

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[24] Invalid or duplicate phone numbers were removed from the sample frame. Home Energy Report participants were also removed from the sample frame.

[25] A small number of survey respondents (n=17) self-reported that they participated in an Ameren Missouri residential program in PY16, so they are not part of the 200 nonparticipant completes.

NPSO Selection Criteria

To confirm a relationship between Ameren's energy efficiency programs and measures adopted by nonparticipants, Cadmus created a set of selection criteria and operationalized these into survey questions. To be included in the NPSO analysis, nonparticipating respondents had to meet all of the following criteria:

a) Familiarity with at least one Ameren Missouri program, rebate, or discount[26]

b) At least one element of Ameren's program marketing and outreach motivated them to adopt the measure

c) They had a valid reason for considering the adopted measure energy efficient

d) For a like measure, they had not received a rebate from Ameren, and had not already tried to receive a rebate from Ameren, and they stated a valid reason for not applying for an Ameren Missouri measure rebate

e) They had a valid reason for deciding to install the measure

f) The adopted measure generated electric savings, not gas savings

For criterion b), the team asked respondents to rate several Ameren Missouri program marketing and outreach elements (in Table 45) importance in motivating them to adopt the spillover measure "very important," "important," "somewhat important," or "not important at all." For like measures, the measure in question met criterion b) if the respondent found at least one element "very important" or "important" in deciding to adopt the measure. For non-like measures, respondents had to find at least one element "very important".

Table 45. Ameren Missouri Marketing and Outreach Elements for Criterion B

Statement
Information about energy savings from Ameren's marketing or bill-inserts
Information from colleagues or friends who installed energy-efficient equipment and received a rebate from Ameren Missouri
If applicable, past participation in an Ameren Missouri rebate program
If applicable, information from the energy assessment conducted at your home through Ameren

Criterion c) helped ensure that spillover measures actually generated energy savings. For applicable measures, the team asked respondents how they knew that their product was energy efficient. Responses passing criterion c) included "it's ENERGY STAR rated" or "the retailer/dealer/contractor told me it was."

[26] Responding "Yes" to C2 "Have you ever seen or heard of the Ameren Missouri energy efficiency programs?" or C10 "Are you aware that Ameren Missouri offers rebates and discounts for energy-saving equipment in your home?"

If respondents reported adopting a like measure, the team asked whether they received a rebate from Ameren Missouri (to double-check whether respondents truly did not participate in the program). The team then asked why they or their contractor did not apply for a rebate through Ameren Missouri. If respondents reported that they applied for a rebate but did not receive it (as their product did not qualify), their adopted measure did not pass criterion d). Hence, the team excluded the measure in NPSO.

The team also asked respondents why they decided to adopt the measure. If the response directly contradicted criterion b), c), or d), the measure did not pass criterion e). For example, one respondent reported installing an "Efficient room air conditioner" because "it was free and I didn't have any choice." This response contradicted criterion b)—that Ameren Missouri's marketing and outreach influenced the measure adoption.

As the PY16 evaluation only concerned electric savings generated by Ameren's programs, the team asked respondents for the fuel types for their water heaters, heating systems, and cooling systems. Reported like and non-like measures satisfied criterion f) if the measures had a corresponding electric water heater, electric heat, or electric cooling.

Results

Of 198 verified nonparticipant respondents, 27 respondents adopted measures that were not incentivized and passed all six NPSO criteria (see Appendix E. Immediate Participant Survey, Follow-up Participant Survey, Nonparticipant Spillover Survey Data). None of these 27 respondents received an incentive from Ameren Missouri for any measure. They were only influenced by Ameren Missouri program marketing and outreach, and adopted NPSO measures on their own.

From these 27 respondents, six respondents reported adopting a total of seven non-incentized like measures; and 23 respondents adopted a total of 32 non-incentivized non-like measures.

Like NPSO

Table 46 shows like measures and gross evaluated kWh savings attributed to Ameren Missouri, achieving average savings of 176 kWh (i.e., Variable A in Table 47).

Table 46. Like NPSO Response Summary

Individual Reported Like Measures	Importance of Ameren Missouri Influence on Adoption	Measure Savings (kWh)*	Allocated Savings	Total kWh Savings	Avg kWh Per Spillover Measure
Efficient kitchen faucet aerators	Somewhat	250*	50%	125	A
Efficient kitchen faucet aerators	Very	250*	100%	250	
Efficient kitchen faucet aerators	Very	250*	100%	250	
Efficient room air conditioner	Somewhat	45**	50%	22	
Efficient room air conditioner	Somewhat	45**	50%	22	
Efficient showerheads	Very	331*	100%	331	
Learning or "smart" thermostat	Somewhat	462**	50%	231	
Total (n=7)				**1,231**	**176**

*Based on savings calculated for the PY16 EE Kits program.

**Based on savings calculated for the PY16 Efficient Products program.

To determine total like NPSO generated by Ameren Missouri marketing in PY16, Cadmus extrapolated like NPSO savings per like measure (shown in Table 46) to Ameren Missouri's entire PY16 residential nonparticipant population. Table 47 presents the like NPSO analysis, resulting in like NPSO total evaluated savings of 5,050 MWh at the portfolio level.

Table 47. Like NPSO Analysis

Variable	Metric	Value	Source
A	Average kWh Savings per Like Measure	176	Survey Data; PY16 Impact Evaluation
B	Number of Like Measures	7	Survey Data
C	Number of Nonparticipant Respondents	198	Survey Disposition
D	Total Residential Population Minus PY16 Participants	812,009	Customer Database
E	Total Like NPSO MWh Savings Applied to Population	5,050	(((B ÷ C) × A) × D)/1000

Like NPSO savings in PY16 (5,050 MWh) were smaller than savings reported in PY15 (12,247 MWh) due to three factors:

a) The total *ex post* residential portfolio savings in PY16 (95,249 MWh) decreased from PY15's 142,016 MWh

b) The like NPSO savings as a percent of total portfolio savings in PY16 (5.3%) decreased from 8.6% in PY15

c) Several measures were no longer "like" measures as in PY15 (e.g., insulation, refrigerator/freezer recycling, programmable thermostats, windows)

Whereas PY15's survey reported like measures from a variety of Ameren Missouri programs, PY16's reported like measures are mostly efficient kitchen faucet aerators from the EE Kits program and efficient room air conditioners in the Efficient Products program.

Non-like NPSO

Cadmus followed a similar methodology as for like spillover in computing non-like spillover with two exceptions. Table 48 shows non-like measures and gross evaluated kWh savings attributed to Ameren, achieving average savings of 110 kWh (Variable A). For the first exception, in contrast with the like NPSO, the team only counted non-like NPSO when the respondent rated Ameren Missouri's influence on the measure adoption as "very important." Due to uncertainty regarding how Ameren Missouri's marketing influenced non-like measure adoption, the team took more conservative actions in counting savings.

For the second exception, the team estimated savings from individual measures more conservatively:

- As ENERGY STAR market shares were generally high for efficient clothes washers, freezers, and refrigerators, the team allocated only 50% of the measure savings. Although respondents rated the program as "very important" in their decisions to make purchases, at least some respondents would have likely bought an ENERGY STAR product regardless of Ameren's influence.
- For the measure defined as "removing a refrigerator or freezer," respondents could have sold the unit or given it to someone else rather than recycling; if so, savings generated from removal would be overestimated. Again, even though the respondent rated Ameren Missouri's marketing as very important and mentioned it as an energy-saving activity, the team allocated 50% of savings to spillover.
- The team excluded efficient dishwashers from the spillover analysis as virtually all dishwashers on the market already were ENERGY STAR-certified.

Table 48. Non-like NPSO Response Summary

Individual Reported Non-like Measures	Quantity	Measure Savings (kWh)	Allocated Savings	Total kWh Savings	Avg kWh Per Spillover Measure
Insulation	3	192*	100%	577	A
Efficient clothes washer (gas water heating)	2	34**	50%	34	
Efficient clothes washer (electric water heating)	1	120***	50%	60	
Efficient freezer	4	61†	50%	122	
Efficient refrigerator	2	37††	50%	37	
Efficient water heater (other than heat pump water heater)	2	157†††	100%	314	
Efficient Windows	2	187^	100%	374	
Programmable (but not "smart") thermostat	1	83^^	100%	83	
Programmed thermostat to reduce usage	8	83^^	100%	664	
Removed a refrigerator or freezer	3	494^^^	50%	741	
Scheduled an air conditioner tune-up	4	126^^	100%	504	
Total (n=32)				**3,510**	**110**

*Average ceiling insulation savings per home, calculated for the PY15 Home Energy Analysis.
**Deemed savings for gas water heating and unknown dryer fuel, from the Illinois TRM Version 5.0 Volume 3.
***Deemed savings for electric water heating and unknown dryer fuel, from the Illinois TRM Version 5.0 Volume 3.
†Deemed savings for ENERGY STAR Freezer from Ameren Missouri 2012 Energy Efficiency Filing Appendix A TRM.
††Deemed savings for ENERGY STAR Refrigerator from the Illinois TRM Version 5.0 Volume 3.
†††Deemed savings from Ameren Missouri 2012 Energy Efficiency Filing Appendix A TRM.
^Based on savings calculated for the PY15 Home Energy Analysis.
^^Based on savings calculated for the PY15 Heating and Cooling program.
^^^Based on savings calculated for the Appliance Recycling program (refrigerator/freezer recycling savings minus refrigerator/freezer replacement savings).

Using the same extrapolation method as that used for the like NPSO analysis, Cadmus determined total non-like NPSO generated by Ameren Missouri's PY16 marketing in MWh savings. Table 49 presents the non-like NPSO analysis, resulting in non-like NPSO evaluated savings of 14,396 MWh at the portfolio level.

Table 49. Non-like NPSO Analysis

Variable	Metric	Value	Source
A	Average kWh Savings per Non-like Measure	110	Survey Data; PY15 Impact Evaluation; Ameren Missouri TRM; Illinois TRM
B	Number of Non-like Measures	32	Survey Data
C	Number of Nonparticipant Respondents	198	Survey Disposition
D	Total Residential Population Minus PY16 Participants	812,009	Customer Database
E	Total Non-like NPSO MWh Savings Applied to Population	14,396	(((B ÷ C) × A) × D)/1000

Spillover Allocation to Individual Programs

Combining the above analyses, Cadmus observed 19,446 MWh of combined like and non-like NPSO, consisting of 20.4% of total evaluated savings. The team considered the following three approaches for allocating total observed NPSO to individual programs:

1. **Even Allocation**: The most straightforward approach allocated NPSO evenly across the residential programs (i.e., made a 20.4% adjustment to each program's NTG). This equaled applying NPSO at the portfolio-level, and, therefore, assumed all programs contributed equally to generating NPSO.
2. **"Like" Programs:** Another approach allocated NSPO savings to specific programs, based on the measure installed by the nonparticipant. This approach only applied to like NPSO. For example, one nonparticipant reported installing a start thermostat, motivated by Ameren's marketing. Using this approach, the team would assign NPSO savings associated with the installation to the Efficient Products Program. While this approach established a clear connection between a reported spillover measure and Ameren's program (which promoted that measure), the research found this direct measure-program relationship did not prove as straightforward as it appeared. Specifically, while all seven respondents reporting like NPSO were aware of Ameren Missouri programs, only one respondent was familiar with the specific program corresponding to the measure they installed.[27] This indicated that Ameren Missouri generated NPSO through the cumulative effects of various program-specific marketing efforts, and mapping spillover measures solely to the program offering the specific measure could undervalue the overall impact of cumulative and sustained energy efficiency messaging.
3. **Marketing Budget and Program Size.** The final allocation approach that the team considered—and eventually chose to use—assigned overall NSPO as a function of each program's marketing and program budget (shown in Table 50). This approach remained consistent with the theory that NPSO resulted from cumulative effects of program-specific marketing and program activity over a particular period—not necessarily by a single, program-specific marketing effort. In

[27] C11 "What rebates or discounts have you heard about?"

addition, while NPSO most commonly was associated with mass media marketing campaigns, the scale of program activity counted as a factor. (For example, even without a significant marketing campaign, a program's size can drive NPSO through word-of-mouth and in-store program messaging.) The team found this approach accurately reflected and attributed NSPO to programs, ensuring those total costs (including marketing) and total benefits (net savings including NPSO) were properly accounted for when assessing overall program cost-effectiveness.

Table 50. Combined Savings and Marketing Allocation

Program	Program *Ex Post* Gross Savings (MWh)	Percentage of Portfolio Savings	Program Marketing	Percentage of Total Marketing	Combined Savings & Marketing (AxB)	Percentage of Combined Savings & Marketing
Lighting	38,349	40.4%	$45,000	5.6%	2.3%	5.9%
Efficient Products	**2,940**	**3.1%**	**$97,882**	**12.2%**	**0.4%**	**1.0%**
HVAC	44,661	46.9%	$608,571	75.6%	35.4%	92.4%
Smart Thermostats	**3,732**	**3.9%**	**$52,530**	**6.5%**	**0.3%**	**0.7%**
EE Kits	5,478	5.8%	$1,479	0.2%	0.0%	0.0%
Total	**95,249**	**100%**	**$805,462**	**100%**	**38.4%**	**100%**

Using the Market Budget and Program Size allocation method, Cadmus distributed the portfolio-level result of 19,446 MWh NPSO to each of Ameren Missouri's residential programs. As shown in Table 51**,** the approach reflected each program's impact on the nonparticipant population, proxied by the combined effect of marketing expenditures and program savings. The Efficient Products program achieved 1.7% of the total NPSO, at 320 MWh (130 MWh of which was from smart thermostats).

Table 51. NPSO by Program

Program	Program Gross Savings (MWh)	Total NPSO (MWH)	Percent of Combined Savings/ Marketing	Program-Specific NPSO (MWh)
Lighting	38,349	19,446	5.9%	1,144
Efficient Products	**2,940**		**1.0%**	**190**
HVAC	44,661		92.4%	17,977
Smart Thermostats*	**3,732**		**0.7%**	**130**
EE Kits	5,478		0.0%	5
Total	**95,249**		**100%**	**19,446**

*In PY16, Smart thermostats were rebated through the Efficient Products program.

Benchmarking

Cadmus researched 12 other utilities offering measures similar to those of Ameren's Efficient Products Program. The team conducted secondary research using its benchmarking database, E-Source, and publically available information to identify which programs had the most recent evaluations available and contained information regarding metrics and topics planned for benchmarking. Table 52 compares the following, where available:

- Measure incentive levels
- Program participation
- *Ex post* per-kit savings (kWh)
- *Ex post* per-kit savings (kW)
- NTG

Benchmarking results showed that Ameren Missouri's rebates were comparable to other utility programs. NTGs by measure were also generally comparable to other programs, although Ameren Missouri's Efficient Products program had one of the highest NTGs for pool pumps, and the highest NTG for smart thermostats. For RACs, Ameren Missouri rebates were comparable to the low amounts offered by other utilities, and these measures also had a relatively low NTG comparable to other programs.

Cadmus was unable to find a program that offered rebates for room air purifiers for comparison to the Efficient Products program.

Table 52. Efficient Product Program Measure Comparisons

Utility	Program	Incentive Amount	Participation	*Ex Post* Per Unit Savings (kWh/yr)	*Ex Post* Per Unit Savings (kW/yr)	NTG
HPHWs						
Ameren MO	2016 Efficient Products Program	$500	341	2,531	0.225	0.848
Baltimore Gas and Electric	2015 Appliance Rebate Program	$500	226	1,889	N/A	0.86
Delmarva Power	2015 Appliance Rebate Program	$500	37	1,892	N/A	0.86
Dayton Power and Light	2015 Heating and Cooling Rebate	$800	4	1,297	0.25	N/A
Entergy Arkansas	2015 Residential Lighting and Appliances Program	$350	5	4,180	0.36	0.875
Indiana Michigan Power	2015 Residential Energy Efficient Products	$350	17	1,297	0.18	N/A

Utility	Program	Incentive Amount	Participation	*Ex Post* Per Unit Savings (kWh/yr)	*Ex Post* Per Unit Savings (kW/yr)	NTG
Potomac Edison	2015 Appliance Rebate Program	$500	80	1,888	N/A	0.86
PPL Electric Utilities	2016 Residential Retail Program	$300–$400	1,235	2,117	N/A	0.69
Southern Maryland Electric Cooperative	2015 Appliance Rebate Program	$500	70	1,900	N/A	0.86
Vectren Indiana	2015 Residential Efficient Products Program	$300	7	2,291	0.31	0.55
Pool Pumps						
Ameren MO	2016 Efficient Products Program	$350	699	Multi-speed: 1,800, Variable-speed: 2,053	Multi-speed: 0.424, Variable-speed: 0.483	0.678
Baltimore Gas and Electric	2015 Appliance Rebate Program	$400	415	595	N/A	0.53
Delmarva Power	2015 Appliance Rebate Program	$400	19	579	N/A	0.57
Indiana Michigan Power	2015 Residential Energy Efficient Products	$50	13	1,383	2.02	N/A
Southern Maryland Electric Cooperative	2015 Appliance Rebate Program	$400	17	588	N/A	0.56
Potomac Edison	2015 Appliance Rebate Program	$400	31	581	N/A	0.55
Public Service Company of New Mexico	2014 Residential Stay Cool Program	$300	74	1,041	0.40	100%
Potomac Electric Power Company	2015 Appliance Rebate Program	$400	109	596	N/A	0.52
PPL Electric Utilities	PY7 Residential Home Comfort (Efficient Products component)	$150	248	1,190	1.05	0.72
Vectren Indiana	2015 Residential Efficient Products Program	$300	70	1,173	1.72	0.55

Utility	Program	Incentive Amount	Participation	*Ex Post* Per Unit Savings (kWh/yr)	*Ex Post* Per Unit Savings (kW/yr)	NTG
RACs						
Ameren MO	2016 Efficient Products Program	$20	346	45	0.042	0.598
Entergy Arkansas	2015 Residential Lighting and Appliances Program	$25	1	300	0.3	0.5
Public Service Company of New Mexico	2014 Residential Stay Cool Program	$25	316	80	0.14	0.4
Smart Thermostats						
Ameren MO	2016 Efficient Products Program	$100	8,200	462	0.438	0.826
Dayton Power and Light	2015 Heating and Cooling Rebate	$75	18	218	0	N/A
Northern Indiana Public Service Company	2015 Energy Efficiency Rebate Program	$50	492	157	0.2	0.46
Vectren Indiana	2015 Residential Efficient Products Program	$100	1,462	412	N/A	0.55

In addition, the team reviewed eligible smart thermostats offered by four other utilities. All five utilities offered rebates for Allure Energy, Ecobee, Honeywell, and Nest smart thermostats, and four of the five offered rebates for Lennox and Radio Thermostat models (Ameren Missouri's Efficient Products program includes the former but not the latter). Table 53 shows the smart thermostat brands rebated by these utilities.

Table 53. Smart Thermostat Brands Offered by Utility

Brand	Utility				
	Ameren Missouri	Consumers Energy	Dayton Power and Light	Northern Indiana Public Service Company	Vectren Indiana
Allure Energy	•	•	•	•	•
Ecobee	•	•	•	•	•
Honeywell	•	•	•	•	•
Lennox	•	•	•		•
Nest	•	•	•	•	•
Amana					•
American Standard		•			
Bryant Housewise			•		
Carrier			•		
Coleman				•	
ComfortNet				•	
Emerson				•	
Home Automation				•	
Lux		•			
Luxaire				•	
Observer				•	
Radio Thermostat		•	•	•	•
Trane		•		•	
White Rogers				•	
York				•	

Cost-Effectiveness

Ameren Missouri assessed cost-effectiveness using the following five tests, as defined by the California Standard Practice Manual:[28]

- Total Resource Cost (TRC) Test
- Utility Cost Test (UCT)
- Ratepayer Impact Measure (RIM)
- Participant Test (PART)
- Societal Test

DSMore takes hourly prices and hourly energy savings from specific measures installed through the Efficient Products program, and correlates prices and savings to 33 years of historic weather data. Using long-term weather ensures that the model captures low-probability, high-consequence weather events, and appropriately values these. As a result, the model produces an accurate evaluation of the demand-side efficiency measure relative to other alternative supply options.

Key assumptions include the following:

- Discount Rate = 6.46%
- Line Losses = 5.72%
- Summer Peak would occur during the 16th hour of a July weekday, on average
- Avoided Electric T&D = $23.03/kW in 2016 and growing at a rate of 2% annually for the next 24 years
- Escalation rates for different costs occur at the component level, with separate escalation rates for fuel, capacity, generation, T&D, and customer rates carried out over 25 years

Ameren Missouri used evaluation results as model inputs (e.g., PY16-specific Efficient Products program participation counts, per-unit gross savings, NTG, NPSO).

Particularly, measure load shapes drove model assumptions, as indicated when the model should apply savings during the day. This ensured that the load shape for an end use matched the system peak impacts of that end use, and provided the correct summer coincident savings. Ameren Missouri used measure lifetime assumptions and incremental costs based on the program database, the Ameren Missouri TRM, or the original Batch Tool.

A key step in the analysis process required PY16 Ameren Missouri program-spending data: actual spending, broken down into contractor administration, incentives, and marketing costs. Ameren Missouri applied contractor administration, marketing, and other costs —including R&D, EM&V,

[28] *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. October 2001.

Educational Outreach, Portfolio Administration, Potential Study, and Data Tracking— at the program level, while incentives were applied at the measure level.

Table 54 summarizes cost-effectiveness findings by test. Any benefit-cost score of 1.0 or higher passed the test as cost-effective. As shown, the Efficient Products program passed the UCT, TRC, Societal, and PART tests. Ameren Missouri conducted the cost-effectiveness analysis separately for smart thermostats and other measures in the Efficient Products program. We therefore present the cost-effectiveness results for smart thermostats separately from the rest of the portfolio.

Table 54. Cost-Effectiveness Results (PY16)

Program	UCT	TRC	RIM	Societal	PART
Efficient Products	1.41	1.00	0.44	1.36	3.66
Smart thermostats	3.42	1.98	0.80	2.55	2.92

Appendix A. End Use Load Shapes and Coincidence Factors

End-Use Category Energy Load Shapes

% Energy by Month

	Residential End-Use Category Load Shape								
Month	**Building Shell**	**Cooling**	**Freezer**	**HVAC**	**Lighting**	**Miscellaneous**	**Pool Spa**	**Refrigeration**	**Water Heating**
January	11.1297%	0.1200%	7.9579%	11.1297%	10.1182%	8.4893%	8.6451%	7.7053%	10.3527%
February	9.3077%	0.1100%	7.2518%	9.3077%	8.8441%	7.7366%	7.1145%	7.2169%	9.0720%
March	7.0042%	0.3130%	8.1080%	7.0042%	9.2879%	8.4863%	8.6052%	8.0272%	9.5543%
April	3.7116%	1.5047%	7.9918%	3.7116%	8.4645%	8.2144%	8.0702%	7.8752%	8.4799%
May	4.0888%	6.5410%	8.4083%	4.0888%	7.9393%	8.4847%	8.6052%	8.5646%	8.3600%
June	10.3973%	21.0823%	8.5730%	10.3973%	6.8508%	8.2122%	8.0702%	8.9112%	7.7065%
July	14.0100%	28.4780%	9.6095%	14.0100%	6.7864%	8.4883%	8.6451%	9.4239%	6.7712%
August	13.3207%	27.0766%	9.6095%	13.3207%	7.0565%	8.4840%	8.5653%	9.4212%	6.3688%
September	6.6759%	12.6605%	8.4277%	6.6759%	7.3792%	8.2136%	8.3032%	8.4971%	6.9373%
October	3.7011%	1.8472%	8.2582%	3.7011%	8.4539%	8.4869%	8.6052%	8.5653%	7.9644%
November	5.9593%	0.1444%	7.8465%	5.9593%	8.9880%	8.2122%	8.1088%	7.8717%	8.4752%
December	10.6937%	0.1222%	7.9579%	10.6937%	9.8312%	8.4915%	8.6619%	7.9204%	9.9577%

End-Use Category Energy to Coincident Peak Demand Factors

	Building Shell	**Cooling**	**Freezer**	**HVAC**	**Lighting**	**Miscellaneous**	**Pool Spa**	**Refrigeration**	**Water Heating**
	0.0004660805	0.0009474181	0.0001685722	0.0004660805	0.0001492529	0.0001148238	0.0002354459	0.0001285253	0.0000887318

Source: Ameren Missouri 2016-2018 Energy Efficiency Plan. MPSC file number EO-2015-0055 Appendix E to evaluated energy saving

Appendix B. Free Ridership Scoring Tables

Table 55 illustrates how initial non-smart thermostat survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of free ridership (in parentheses). The value in brackets is the scoring decrement associated with each response option. Each participant free ridership score starts with 100%, which we decrement based on their responses to the eight questions.

Table 55. Raw Survey Responses Translation to Free Ridership Scoring Matrix Terminology – Non-Smart Thermostat Measures

F1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new [MEASURETYPE] ?	F2. [ASK IF F1=2] Please confirm: You purchased your new [MEASURETYPE] and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	F3. Before you knew about the incentive from Ameren Missouri, were you already planning to install a [MEASURETYPE] in 2016?	F4. [ASK IF MEASURE QTY > 1] Without the incentive from Ameren Missouri, would you have installed same amount of [MEASURETYPE]s ?	F5. Without Ameren Missouri's rebate, would you have installed the [MEASURETYPE].. .?	F6. [ASK IF F5 = 1, 2] Would you have installed the same exact [MEASURETYPE] without the rebate from Ameren Missouri?	F7. [ASK IF F6 = 2, 98, 99] Just so I understand, would you have installed a different [MEASURETYPE] without the Ameren Missouri rebate or would you have decided to not purchase one at all?	F8. [ASK IF F7 = 1] Without Ameren Missouri's rebate, would you have installed a lower efficiency [MEASURETYPE], the same efficiency [MEASURETYPE], or a higher efficiency [MEASURETYPE]?	F9. How important was the Ameren Missouri rebate on your decision to purchase and install the [MEASURETYPE]?	F10. [ASK IF B2=3 OR B6=2] How important was the advice from your contractor on your decision to purchase and install the [MEASURETYPE]?
Learned of rebate before purchase (Yes) [-0%]	Yes (Yes) [100% FR]	Yes (Yes) [-0%]	Yes, the same amount (Yes) [-0%]	Around the same time (Yes) [-0%]	Yes (Yes) [-0%]	I would have installed a different [MEASURETYPE] (Yes) [-0%]	Lower efficiency (No) [-100%]	Very important (No) [-50%]	Very important (No) [-50%]
Learned of rebate after purchase (No) [-0%]	No, that is not correct (No) [-0%]	No (No) [-50%]	No, would have installed less (Partial2) [-50%]	Later in the same year (Partial) [-25%]	No (No) [-50%]	I would have decided not to purchase one at all (No) [-100%]	Same efficiency (Yes) [-0%]	Somewhat important (Partial) [-25%]	Somewhat important (Partial) [-25%]
Don't Know (Partial) [-0%]	Don't Know (Partial) [-0%]	Don't Know (Partial) [-25%]	No, would have installed more (Yes) [-0%]	In one or two years (No) [-100%]	Don't Know (Partial) [-25%]	Don't Know (Partial) [-25%]	Higher efficiency (Yes) [-0%]	Not very important (Partial) [-25%]	Not very important (Partial) [-25%]
			No, would have installed any at all (No) [-100%]	After more than three years (No) [-100%]			Don't Know (Partial) [-25%]	Not at all important (Yes) [-0%]	Not at all important (Yes) [-0%]
			Don't Know (Partial) [-25%]	Never (No) [-100%]				Don't Know (Partial) [-25%]	Don't Know (Partial) [-25%]
				Don't Know (Partial) [-25%]					

Table 56 illustrates how initial smart thermostat survey responses are translated into whether the response is “yes,” “no,” or “partially” indicative of free ridership (in parentheses). The value in brackets is the scoring decrement associated with each response option. Each participant free ridership score starts with 100%, which we decrement based on their responses to the eight questions.

Table 56. Raw Survey Responses Translation to Free Ridership Scoring Matrix Terminology – Smart Thermostat Measure

I1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new thermostat?	I2. [ASK IF I1=2] Please confirm: You purchased your new smart thermostat and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	I3. Before you knew about the rebate from Ameren Missouri, were you already planning to install a smart thermostat this year?	I4. Without Ameren Missouri's rebate, would you have installed a smart thermostat …?	I5. [ASK IF I4 = 1, 2] Would you have installed the same smart thermostat without the rebate from Ameren Missouri?	I6. [ASK IF I5 = 2, 98, 99] Just so I understand, would you have installed a different thermostat without the Ameren Missouri rebate or would you have decided not to replace it?	I7. [ASK IF I6 = 1] When you say you would have installed a thermostat without the rebate from Ameren Missouri, would you have installed…?	I8. How important was the Ameren Missouri rebate on your decision to purchase and install the smart thermostat?	I9. [ASK IF B2=3 OR B6=2] How important was the advice from the contractor in your decision to purchase and install the smart thermostat? Would you say…
Yes (Yes) [-0%]	Yes (Yes) [100% FR]	Yes (Yes) [-0%]	Around the same time (Yes) [-0%]	Yes (Yes) [-0%]	I would have installed a different thermostat (Yes) [-0%]	A smart thermostat (Yes) [-0%]	Very important (No) [-50%]	Very important (No) [-50%]
No (No) [-0%]	No, that is not correct (No) [-0%]	No (No) [-50%]	Later in the same year (Partial) [-25%]	No (No) [-50%]	I would have decided not to replace it (No) [-100%]	A programmable thermostat (No) [-100%]	Somewhat important (Partial) [-25%]	Somewhat important (Partial) [-25%]
Don't Know (Partial) [-0%]	Don't Know (Partial) [-0%]	Don't Know (Partial) [-25%]	In one or two years (No) [-100%]	Don't Know (Partial) [-25%]	Don't Know (Partial) [-25%]	A traditional/manual thermostat (Yes) [-100%]	Not very important (Partial) [-25%]	Not very important (Partial) [-25%]
			After more than three years (No) [-100%]			Would not have installed a new thermostat (No) [-100%]	Not at all important (Yes) [-0%]	Not at all important (Yes) [-0%]
			Never (No) [-100%]			Don't Know (Partial) [-25%]	Don't Know (Partial) [-25%]	Don't Know (Partial) [-25%]
			Don't Know (Partial) [-25%]					

Table 57 illustrates the unique response combinations from pool pump participants answering the Ameren Missouri Efficient Products Program free ridership survey questions (mapped the responses to "yes," "no," or "partial," as indicative of free ridership), the free ridership score assigned to each combination, and the number of responses.

Table 57. Frequency of Pool Pump Free Ridership Scoring Combinations

F1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new [MEASURETYPE] ?	F2. [ASK IF F1=2] Please confirm: You purchased your new [MEASURETYPE] and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	F3. Before you knew about the incentive from Ameren Missouri, were you already planning to install a [MEASURETYPE] in 2016?	F4. [ASK IF MEASURE QTY > 1] Without the incentive from Ameren Missouri, would you have installed same amount of [MEASURETYPE]s ?	F5. Without Ameren Missouri's rebate, would you have installed the [MEASURETYPE]…?	F6. [ASK IF F5 = 1, 2] Would you have installed the same exact [MEASURETYPE] without the rebate from Ameren Missouri?	F7. [ASK IF F6 = 2, 98, 99] Just so I understand, would you have installed a different [MEASURETYPE] without the Ameren Missouri rebate or would you have decided to not purchase one at all?	F8. [ASK IF F7 = 1] Without Ameren Missouri's rebate, would you have installed a lower efficiency [MEASURETYPE], the same efficiency [MEASURETYPE], or a higher efficiency [MEASURETYPE]…?	F9. How important was the Ameren Missouri rebate on your decision to purchase and install the [MEASURETYPE]?	F10. [ASK IF B2=3 OR B6=2] How important was the advice from your contractor on your decision to purchase and install the [MEASURETYPE]?	FR Score	Count
Yes	Yes	x	x	x	x	x	x	x	x	100%	13
Yes	No	No	x	Partial	x	Yes	Yes	No	Partial	0%	1
No	x	Yes	x	Yes	Yes	x	x	Yes	Yes	100%	3
No	x	Yes	x	Yes	Yes	x	x	Yes	x	100%	1
No	x	Yes	x	Yes	Yes	x	x	Partial	Yes	75%	2
No	x	Yes	x	Yes	Yes	x	x	Partial	Partial	50%	8
No	x	Yes	x	Yes	Yes	x	x	Partial	x	75%	2
No	x	Yes	x	Yes	No	Yes	Yes	Yes	Yes	100%	2
No	x	Yes	x	Yes	No	Yes	Yes	Yes	Partial	75%	1
No	x	Yes	x	Yes	No	Yes	Yes	Yes	x	100%	1
No	x	Yes	x	Yes	No	Yes	No	x	x	0%	14
No	x	Yes	x	Yes	No	Partial	x	Yes	Yes	75%	3
No	x	Yes	x	Yes	No	Partial	x	Yes	Partial	50%	1
No	x	Yes	x	Yes	No	Partial	x	Partial	Yes	50%	4
No	x	Yes	x	Yes	No	Partial	x	Partial	Partial	25%	2
No	x	Yes	x	Partial	Yes	x	x	Yes	Yes	75%	1
No	x	Yes	x	Partial	No	Yes	No	x	x	0%	4
No	x	Yes	x	Partial	x	Partial	x	Yes	Yes	50%	1
No	x	Yes	x	Partial	x	Partial	x	Partial	Yes	25%	2
No	x	Yes	x	Partial	x	Partial	x	Partial	Partial	12.5%	1
No	x	Yes	x	No	x	x	x	x	x	0%	6
No	x	Partial	x	Yes	No	Partial	x	Partial	Yes	25%	1
No	x	Partial	x	Partial	x	Yes	Partial	Yes	x	25%	1
No	x	Partial	x	Partial	x	Partial	x	Partial	x	12.5%	1
No	x	Partial	x	No	x	x	x	x	x	0%	1
No	x	No	x	Yes	Yes	x	x	Yes	Yes	50%	2
No	x	No	x	Yes	Yes	x	x	Partial	Yes	25%	3
No	x	No	x	Yes	Yes	x	x	Partial	Partial	12.5%	2
No	x	No	x	Yes	No	Yes	Yes	Partial	Yes	25%	1
No	x	No	x	Yes	No	Yes	Partial	Yes	Yes	25%	1
No	x	No	x	Yes	No	Yes	No	x	x	0%	3
No	x	No	x	Yes	No	Partial	x	Yes	Yes	25%	1
No	x	No	x	Yes	No	Partial	x	Yes	Partial	12.5%	1
No	x	No	x	Yes	No	Partial	x	Partial	Partial	0%	1
No	x	No	x	Partial	No	Yes	No	x	x	0%	1
No	x	No	x	Partial	x	Yes	No	x	x	0%	1
No	x	No	x	Partial	x	Partial	x	Yes	x	12.5%	2
No	x	No	x	Partial	x	Partial	x	Partial	Yes	0%	2
No	x	No	x	Partial	x	Partial	x	Partial	Partial	0%	1
No	x	No	x	Partial	x	No	x	x	x	0%	2
No	x	No	x	No	x	x	x	x	x	0%	18

Table 58 illustrates the unique response combinations from room air purifier participants answering the Ameren Missouri Efficient Products free ridership survey questions (mapped the responses to "yes," "no," or "partial," as indicative of free ridership), the free ridership score assigned to each combination, and the number of responses.

Table 58. Frequency of Room Air Purifier Free Ridership Scoring Combinations

F1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new [MEASURETYPE] ?	F2. [ASK IF F1=2] Please confirm: You purchased your new [MEASURETYPE] and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	F3. Before you knew about the incentive from Ameren Missouri, were you already planning to install a [MEASURETYPE] in 2016?	F4. [ASK IF MEASURE QTY > 1] Without the incentive from Ameren Missouri, would you have installed same amount of [MEASURETYPE]s ?	F5. Without Ameren Missouri's rebate, would you have installed the [MEASURETYPE]...?	F6. [ASK IF F5 = 1, 2] Would you have installed the same exact [MEASURETYPE] without the rebate from Ameren Missouri?	F7. [ASK IF F6 = 2, 98, 99] Just so I understand, would you have installed a different [MEASURETYPE] without the Ameren Missouri rebate or would you have decided to not purchase one at all?	F8. [ASK IF F7 = 1] Without Ameren Missouri's rebate, would you have installed a lower efficiency [MEASURETYPE], the same efficiency [MEASURETYPE], or a higher efficiency [MEASURETYPE]...?	F9. How important was the Ameren Missouri rebate on your decision to purchase and install the [MEASURETYPE]?	F10. [ASK IF B2=3 OR B6=2] How important was the advice from your contractor on your decision to purchase and install the [MEASURETYPE]?	FR Score	Count
Yes	Yes	x	x	x	x	x	x	x	x	100%	16
Yes	No	Yes	x	Yes	No	Yes	Partial	Partial	x	50%	1
No	x	Yes	Yes	Yes	Yes	x	x	No	x	50%	1
No	x	Yes	Partial2	Yes	Yes	x	x	Yes	x	50%	1
No	x	Yes	Partial2	Yes	Yes	x	x	Partial	x	25%	1
No	x	Yes	Partial2	No	x	x	x	x	x	0%	1
No	x	Yes	x	Yes	Yes	x	x	Yes	x	100%	7
No	x	Yes	x	Yes	Yes	x	x	Partial	x	75%	17
No	x	Yes	x	Yes	Yes	x	x	No	x	50%	2
No	x	Yes	x	Yes	No	Yes	Yes	Yes	x	100%	3
No	x	Yes	x	Yes	No	Yes	Partial	Yes	x	75%	3
No	x	Yes	x	Yes	No	Yes	Partial	Partial	x	50%	2
No	x	Yes	x	Yes	No	Yes	No	x	x	0%	8
No	x	Yes	x	Yes	No	Partial	x	Yes	x	75%	2
No	x	Yes	x	Yes	No	Partial	x	Partial	x	50%	5
No	x	Yes	x	Partial	Yes	x	x	Partial	x	50%	1
No	x	Yes	x	Partial	No	Yes	Yes	Partial	x	50%	1
No	x	Yes	x	Partial	No	Yes	Partial	Yes	x	50%	2
No	x	Yes	x	Partial	No	Yes	No	x	x	0%	1
No	x	Yes	x	Partial	No	Partial	x	Yes	x	50%	1
No	x	Yes	x	Partial	x	Partial	x	Yes	x	50%	2
No	x	Yes	x	Partial	x	Partial	x	Partial	x	25%	4
No	x	Yes	x	Partial	x	No	x	x	x	0%	2
No	x	Yes	x	No	x	x	x	x	x	0%	3
No	x	Partial	Partial2	Yes	No	Partial	x	Partial	x	0%	1
No	x	Partial	No	x	x	x	x	x	x	0%	1
No	x	Partial	x	No	x	x	x	x	x	0%	1
No	x	No	Partial2	Partial	No	Yes	No	x	x	0%	1
No	x	No	Partial2	No	x	x	x	x	x	0%	1
No	x	No	No	x	x	x	x	x	x	0%	1
No	x	No	x	Yes	Yes	x	x	Yes	x	50%	1
No	x	No	x	Yes	No	Partial	x	Yes	x	25%	1
No	x	No	x	Partial	x	Yes	Yes	Yes	x	25%	1
No	x	No	x	Partial	x	Partial	x	Partial	x	0%	1
No	x	No	x	Partial	x	No	x	x	x	0%	3
No	x	No	x	No	x	x	x	x	x	0%	4

Table 59 illustrates the unique response combinations from heat pump water heater participants answering the Ameren Missouri Efficient Products free ridership survey questions (mapped the

responses to “yes,” “no,” or “partial,” as indicative of free ridership), the free ridership score assigned to each combination, and the number of responses.

Table 59. Frequency of Heat Pump Water Heater Free Ridership Scoring Combinations

F1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new [MEASURETYPE] ?	F2. [ASK IF F1=2] Please confirm: You purchased your new [MEASURETYPE] and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	F3. Before you knew about the incentive from Ameren Missouri, were you already planning to install a [MEASURETYPE] in 2016?	F4. [ASK IF MEASURE QTY > 1] Without the incentive from Ameren Missouri, would you have installed same amount of [MEASURETYPE]s ?	F5. Without Ameren Missouri’s rebate, would you have installed the [MEASURETYPE]…?	F6. [ASK IF F5 = 1, 2] Would you have installed the same exact [MEASURETYPE] without the rebate from Ameren Missouri?	F7. [ASK IF F6 = 2, 98, 99] Just so I understand, would you have installed a different [MEASURETYPE] without the Ameren Missouri rebate or would you have decided to not purchase one at all?	F8. [ASK IF F7 = 1] Without Ameren Missouri’s rebate, would you have installed a lower efficiency [MEASURETYPE], the same efficiency [MEASURETYPE], or a higher efficiency [MEASURETYPE]…?	F9. How important was the Ameren Missouri rebate on your decision to purchase and install the [MEASURETYPE]?	F10. [ASK IF B2=3 OR B6=2] How important was the advice from your contractor on your decision to purchase and install the [MEASURETYPE]?	FR Score	Count
Yes	Yes	x	x	x	x	x	x	x	x	100%	1
No	x	Yes	x	Yes	Yes	x	x	Partial	x	75%	1
No	x	Yes	x	Yes	Yes	x	x	No	No	12.5%	1
No	x	Yes	x	Yes	No	Yes	Yes	Yes	Yes	100%	1
No	x	Yes	x	Yes	No	Yes	Yes	Yes	No	50%	1
No	x	Yes	x	Yes	No	Yes	Partial	Yes	No	25%	2
No	x	Yes	x	Yes	No	Yes	Partial	Yes	x	75%	1
No	x	Yes	x	Yes	No	Yes	Partial	Partial	Partial	25%	1
No	x	Yes	x	Yes	No	Yes	No	x	x	0%	12
No	x	Yes	x	Yes	No	Partial	x	Yes	Yes	75%	1
No	x	Yes	x	Yes	No	Partial	x	Yes	Partial	50%	1
No	x	Yes	x	Yes	No	Partial	x	Yes	x	75%	1
No	x	Yes	x	Yes	No	Partial	x	Partial	x	50%	1
No	x	Yes	x	Partial	Yes	x	x	Yes	x	75%	1
No	x	Yes	x	Partial	No	Yes	No	x	x	0%	2
No	x	Yes	x	Partial	No	Partial	x	Yes	Partial	25%	1
No	x	Yes	x	Partial	x	Yes	Yes	Yes	x	75%	1
No	x	Yes	x	Partial	x	Yes	Partial	Yes	Partial	25%	1
No	x	Yes	x	Partial	x	Yes	No	x	x	0%	1
No	x	Yes	x	Partial	x	Partial	x	Yes	x	50%	1
No	x	Yes	x	No	x	x	x	x	x	0%	7
No	x	Partial	x	Partial	No	Partial	x	Yes	Yes	25%	1
No	x	Partial	x	No	x	x	x	x	x	0%	2
No	x	No	x	Yes	Yes	x	x	Partial	x	25%	1
No	x	No	x	Yes	No	Yes	Yes	Yes	Yes	50%	1
No	x	No	x	Yes	No	Yes	No	x	x	0%	2
No	x	No	x	Yes	No	Partial	x	Yes	Partial	12.5%	1
No	x	No	x	Yes	No	Partial	x	Partial	Partial	0%	1
No	x	No	x	Partial	x	Yes	Yes	Yes	x	25%	1
No	x	No	x	Partial	x	Yes	No	x	x	0%	1
No	x	No	x	Partial	x	Partial	x	Partial	x	0%	1
No	x	No	x	Partial	x	No	x	x	x	0%	4
No	x	No	x	No	x	x	x	x	x	0%	18

Table 60 illustrates the unique response combinations from room air conditioner participants answering the Ameren Missouri Efficient Products free ridership survey questions (mapped the

responses to “yes,” “no,” or “partial,” as indicative of free ridership), the free ridership score assigned to each combination, and the number of responses.

Table 60. Frequency of Room Air Conditioner Free Ridership Scoring Combinations

F1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new [MEASURETYPE] ?	F2. [ASK IF F1=2] Please confirm: You purchased your new [MEASURETYPE] and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	F3. Before you knew about the incentive from Ameren Missouri, were you already planning to install a [MEASURETYPE] in 2016?	F4. [ASK IF MEASURE QTY > 1] Without the incentive from Ameren Missouri, would you have installed same amount of [MEASURETYPE]s ?	F5. Without Ameren Missouri’s rebate, would you have installed the [MEASURETYPE]…?	F6. [ASK IF F5 = 1, 2] Would you have installed the same exact [MEASURETYPE] without the rebate from Ameren Missouri?	F7. [ASK IF F6 = 2, 98, 99] Just so I understand, would you have installed a different [MEASURETYPE] without the Ameren Missouri rebate or would you have decided to not purchase one at all?	F8. [ASK IF F7 = 1] Without Ameren Missouri’s rebate, would you have installed a lower efficiency [MEASURETYPE], the same efficiency [MEASURETYPE], or a higher efficiency [MEASURETYPE]…?	F9. How important was the Ameren Missouri rebate on your decision to purchase and install the [MEASURETYPE]?	F10. [ASK IF B2=3 OR B6=2] How important was the advice from your contractor on your decision to purchase and install the [MEASURETYPE]?	FR Score	Count
Yes	Yes	x	x	x	x	x	x	x	x	100%	7
No	x	Yes	Yes	Yes	Yes	x	x	Partial	x	75%	2
No	x	Yes	Yes	Partial	Yes	x	x	Yes	x	75%	1
No	x	Yes	x	Yes	Yes	x	x	Yes	No	50%	1
No	x	Yes	x	Yes	Yes	x	x	Yes	x	100%	2
No	x	Yes	x	Yes	Yes	x	x	Partial	Yes	75%	1
No	x	Yes	x	Yes	Yes	x	x	Partial	x	75%	8
No	x	Yes	x	Yes	No	Yes	Yes	Partial	x	75%	1
No	x	Yes	x	Yes	No	Yes	No	x	x	0%	1
No	x	Yes	x	Yes	No	Partial	x	Partial	x	50%	2
No	x	Partial	x	Yes	No	Yes	Yes	Partial	x	50%	1
No	x	Partial	x	Partial	No	Partial	x	Partial	x	12.5%	1
No	x	No	x	Yes	No	Partial	x	Partial	x	12.5%	1

Table 61 illustrates the unique response combinations from smart thermostat participants answering the Ameren Missouri Efficient Products free ridership survey questions (mapped the responses to

"yes," "no," or "partial," as indicative of free ridership), the free ridership score assigned to each combination, and the number of responses.

Table 61. Frequency of Smart Thermostat Free Ridership Scoring Combinations

I1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new thermostat?	I2. [ASK IF I1=2] Please confirm: You purchased your new smart thermostat and then found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?	I3. Before you knew about the rebate from Ameren Missouri, were you already planning to install a smart thermostat this year?	I4. Without Ameren Missouri's rebate, would you have installed a smart thermostat …?	I5. [ASK IF I4 = 1, 2] Would you have installed the same smart thermostat without the rebate from Ameren Missouri?	I6. [ASK IF I5 = 2, 98, 99] Just so I understand, would you have installed a different thermostat without the Ameren Missouri rebate or would you have decided not to replace it?	I7. [ASK IF I6 = 1] When you say you would have installed a thermostat without the rebate from Ameren Missouri, would you have installed…?	I8. How important was the Ameren Missouri rebate on your decision to purchase and install the smart thermostat?	I9. [ASK IF B2=3 OR B6=2] How important was the advice from the contractor in your decision to purchase and install the smart thermostat? Would you say…	FR Score	Count
Yes	Yes	x	x	x	x	x	x	x	100%	85
Yes	No	Yes	Yes	Yes	x	x	Yes	x	100%	1
Yes	No	Yes	Yes	Yes	x	x	No	x	50%	1
Yes	No	Yes	Partial	Yes	x	x	Partial	Partial	25%	1
Yes	No	No	Partial	No	No	x	x	x	0%	1
No	x	Yes	Yes	Yes	x	x	Yes	Yes	100%	1
No	x	Yes	Yes	Yes	x	x	Yes	No	50%	1
No	x	Yes	Yes	Yes	x	x	Yes	x	100%	4
No	x	Yes	Yes	Yes	x	x	Partial	Yes	75%	1
No	x	Yes	Yes	Yes	x	x	Partial	Partial	50%	3
No	x	Yes	Yes	Yes	x	x	Partial	No	25%	2
No	x	Yes	Yes	Yes	x	x	Partial	x	75%	71
No	x	Yes	Yes	Yes	x	x	No	Yes	50%	2
No	x	Yes	Yes	Yes	x	x	No	Partial	25%	2
No	x	Yes	Yes	Yes	x	x	No	No	12.5%	1
No	x	Yes	Yes	Yes	x	x	No	x	50%	15
No	x	Yes	Yes	No	Yes	Yes	Partial	x	75%	2
No	x	Yes	Yes	No	Yes	Yes	No	x	50%	2
No	x	Yes	Yes	No	Yes	Partial	Partial	x	50%	1
No	x	Yes	Yes	No	Yes	No	x	x	0%	7
No	x	Yes	Yes	No	Partial	x	Partial	Partial	25%	2
No	x	Yes	Yes	No	Partial	x	Partial	x	50%	8
No	x	Yes	Yes	No	Partial	x	No	x	25%	4
No	x	Yes	Yes	No	No	x	x	x	0%	1
No	x	Yes	Partial	Yes	x	x	Yes	x	75%	1
No	x	Yes	Partial	Yes	x	x	Partial	Yes	50%	3
No	x	Yes	Partial	Yes	x	x	Partial	Partial	25%	1
No	x	Yes	Partial	Yes	x	x	Partial	x	50%	33
No	x	Yes	Partial	Yes	x	x	No	Yes	25%	1
No	x	Yes	Partial	Yes	x	x	No	Partial	12.5%	3
No	x	Yes	Partial	Yes	x	x	No	No	0%	2
No	x	Yes	Partial	Yes	x	x	No	x	25%	28
No	x	Yes	Partial	No	Yes	Yes	Partial	x	50%	2
No	x	Yes	Partial	No	Yes	Yes	No	No	0%	1
No	x	Yes	Partial	No	Yes	No	x	x	0%	10
No	x	Yes	Partial	No	Partial	x	Partial	No	0%	1
No	x	Yes	Partial	No	Partial	x	Partial	x	25%	7
No	x	Yes	Partial	No	Partial	x	No	x	12.5%	10
No	x	Yes	Partial	No	No	x	x	x	0%	9
No	x	Yes	No	x	x	x	x	x	0%	59
No	x	Partial	Yes	Yes	x	x	Yes	x	75%	1
No	x	Partial	Yes	Yes	x	x	Partial	x	50%	1
No	x	Partial	Yes	No	Yes	Yes	No	x	25%	1
No	x	Partial	Yes	No	Partial	x	No	No	0%	1
No	x	Partial	Partial	Yes	x	x	Partial	Partial	12.5%	1
No	x	Partial	Partial	Yes	x	x	Partial	x	25%	3
No	x	Partial	Partial	Yes	x	x	No	x	12.5%	8
No	x	Partial	Partial	No	Yes	Yes	Partial	x	25%	2
No	x	Partial	Partial	No	Yes	Yes	No	x	12.5%	4
No	x	Partial	Partial	No	Yes	No	x	x	0%	2
No	x	Partial	Partial	No	Partial	x	Partial	x	12.5%	5
No	x	Partial	Partial	No	Partial	x	No	No	0%	1
No	x	Partial	Partial	No	Partial	x	No	x	0%	9
No	x	Partial	Partial	No	No	x	x	x	0%	7
No	x	Partial	No	x	x	x	x	x	0%	35
No	x	No	Yes	Yes	x	x	Partial	Partial	12.5%	1
No	x	No	Yes	Yes	x	x	Partial	x	25%	5
No	x	No	Yes	Yes	x	x	No	x	12.5%	2
No	x	No	Yes	No	Yes	Yes	Partial	Partial	12.5%	1
No	x	No	Yes	No	Yes	No	x	x	0%	2
No	x	No	Yes	No	Partial	x	Partial	x	12.5%	1
No	x	No	Yes	No	No	x	x	x	0%	1
No	x	No	Partial	Yes	x	x	Partial	Partial	0%	1
No	x	No	Partial	Yes	x	x	Partial	x	12.5%	14
No	x	No	Partial	Yes	x	x	No	Partial	0%	1
No	x	No	Partial	Yes	x	x	No	x	0%	22
No	x	No	Partial	No	Yes	Yes	No	x	0%	1
No	x	No	Partial	No	Yes	Partial	No	x	0%	2
No	x	No	Partial	No	Yes	No	x	x	0%	12
No	x	No	Partial	No	Partial	x	Partial	x	0%	5
No	x	No	Partial	No	Partial	x	No	Yes	0%	2
No	x	No	Partial	No	Partial	x	No	Partial	0%	1
No	x	No	Partial	No	Partial	x	No	No	0%	1
No	x	No	Partial	No	Partial	x	No	x	0%	33
No	x	No	Partial	No	No	x	x	x	0%	58
No	x	No	No	x	x	x	x	x	0%	218

Appendix C. Benchmarking Sources

Cadmus used the following reports to conduct the benchmarking research.

ADM Associates, Inc. 2015. *Evaluation of Residential Incentive Program Portfolio*. Prepared for Indiana Michigan Power.

ADM Associates, Inc., and Research & Polling, Inc. 2015. *Evaluation of 2014 Public Service Company of New Mexico Energy Efficiency & Demand Response Portfolio*. Prepared for New Mexico Energy Efficiency Evaluation Committee.

Cadmus. 2015. *ENERGY STAR Appliances Rebate Program Evaluation Report*. Presented to Consumers Energy Company.

Cadmus. 2016. *Entergy Final Energy Efficiency Portfolio Evaluation Report 2015 Program Year*. Prepared for Entergy Arkansas, Inc.

Cadmus. 2016. *Pennsylvania Act 129 of 2008 Energy Efficiency and Conservation Plan*. Prepared for PPL Electric Utilities.

Cadmus. 2016. *2015 Demand-Side Management Programs Evaluation Report*. Prepared for Indianapolis Power & Light.

Cadmus. 2016. *2015 DSM Portfolio Evaluation Report*. Prepared for Vectren Energy Delivery of Indiana.

Cadmus. 2016. *2015 Evaluation, Measurement, and Verification Report*. Prepared for Dayton Power and Light.

Cadmus and Navigant. 2016. "Appliance Rebate Program, EY6 Impact Results Memo." Presented to EmPOWER Maryland Utilities.

CADMUS

Appendix D. Stakeholder Interview Guide

Ameren Missouri Efficient Products Program
Stakeholder Interview Guide PY16

Respondent name:

_____

Respondent phone:

_____

Interview date: _____ Interviewer initials:

_____

For the PY16 evaluation, Cadmus will interview stakeholders (Ameren and ICF program managers) annually. The interview will focus on program changes since PY15, assess the program at year end, and identify recommendations for improving subsequent programs.

A. Introduction

1) Please state your title, and explain your company's role in Ameren Missouri's Efficient Products Program.

2) What are your main roles and responsibilities for Ameren Missouri's Efficient Products Program? Has this changed since PY15?

3) Who do you coordinate with regarding the program? [Probe: internal and external program stakeholders]

   a. What types of communication do you have with these program stakeholders (i.e., formal or informal)? [Probe: frequency, satisfaction, challenges, etc.]

4) How does the program handle communication with participating retailers and contractors? [Probe: communication channels, frequency, satisfaction, challenges, etc.]

B. Program Goals

5) What are the program's participation and savings goals for PY16? By equipment type?

   [For reference, if needed: Appendix B[29] showed that you anticipated installation of

[29] State of Missouri. "In the Matter of Union Electric Company d/b/a Ameren Missouri's 2nd Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as Allowed by MEEIA." File No. EO-2015-0055. February 5, 2016. Refer to Appendix B.

27,831 measures plus 5,444 smart thermostats, with an estimated annual savings of 2,087 MWh for thermostats and 3,846 for the other products, and demand reductions of 1.98 MW for the thermostats and 1.399 MW for the other products.]

a. Are these the correct PY16 program goals?

b. How were these goals determined?

6) In your opinion, how has the program performed so far in PY16 (in general, as well as savings/participation goals)?

a. Why do you think this is?

7) Are there benchmarks in place to monitor progress throughout the year?

a. Have you identified triggers for contingency plans in case goals are not being met?

C. Program Design and Implementation

8) In your view, what is the overall objective of the Efficient Products Program? What do you see as the critical factors for achieving that objective? How is the program designed to influence those factors?

9) Can you provide a summary of how the program has changed since PY15?

a. New measures (and removed measures)? How was this decision made?

b. Discontinued the online store? How was this decision made?

c. Any delivery changes to equipment rebates?

d. Did these changes have the desired outcomes?

10) Does the program have any process or non-impact goals for PY16? [Probe: increased awareness, market transformation, spillover measures such as duct sealing or insulation]

D. Measures

11) How did you determine the requirements for thermostats that qualify for the program? Are you considering any changes to these requirements? (If so, how and why?)

a. Are you considering adding a thermostat-based demand response program? (Or any other ways to capitalize on smart thermostat capabilities?)

12) Why did you remove energy efficiency kits from this program?

13) In your opinion, should any additional measures be considered for inclusion in future programs? If so, what measures?

14) Conversely, should any current measures be excluded?

15) Are you considering changes to the incentive levels for any measures? (If so, what changes and why?)

E. Marketing Efforts

16) [If needed] Can you share your marketing materials with us?

17) Who is responsible for the marketing? (Utility, implementer, or someone else?)

18) How has marketing changed since PY15? (Any new or discontinued channels?)

19) What types of in-store marketing does the program use? Do you customize in-store marketing for different retailers in anyway?

20) Do you track the effectiveness of any of those marketing techniques? (In-store, Coupons, online codes, etc.)

21) Can you describe what you perceive as the impact of the program on the overall efficient products market so far, over the past eight years of implementation? What evidence do you have to support your views?

F. Retailer Participation

22) How does the program recruit retailers and contractors and encourage their participation?

23) Has the retailer and contractor participation process changed since PY15? (Probe: do they need to sign an agreement with ICF, and what are their obligations?)

24) How does the program communicate with retailers and manage retailer participation? (Provide training to retailer staff? Single point of contact at store level? Point of contact at corporate level? Assist with stocking, or invoicing?)

    a. How often does a program representative visit each store location? How many field representatives are on staff?

25) How does the program communicate with retailers/contractors and manage their participation?

26) Does the program coordinate with any online retailers?

    b. If yes, which retailers?
    c. How do these retailers participate in the program?
    d. How does the program communicate with these retailers?

27) How do online sales compare to storefront sales? What barriers and opportunities are associated with online retailers compared to “brick and mortar” stores?

28) Do you receive any response from retailers/contractors regarding the program? How do you receive feedback? What do you know about how retailers/contractors perceive the program?

29) Do you think the program influences sales at nonparticipating stores? How so? What evidence would you cite to support your views?

G. Rebate Processing and Data Management

30) Do you have a goal for rebate processing times?

31) Have there been any issues or difficulties with rebate processing so far?

32) How is the online rebate portal working? (Any issues?) (PROBE: What proportion of sales do you anticipate coming through this channel? Is there a goal?)

33) How is the Vision database working? (Any issues?)

H. Quality Control

34) In your own words, please explain how the program's quality control process works.

I. Summary and Conclusion

35) What would you say is working particularly well so far in PY16? Why is that?

36) Conversely, what is not working as well as anticipated? Why is that?

37) From your perspective, what are the biggest challenges facing the program in PY17?

   b. Do you have any suggestions for how to improve the program (that we haven't already discussed)?

   c. What changes are being planned or considered for PY17 (that we haven't already discussed)?

38) Do you have any questions for us about this year's program evaluation? Is there anything you specifically want us to address in this evaluation?

39) Is there anything else you'd like us to know?

Appendix E. Immediate Participant Survey, Follow-up Participant Survey, Nonparticipant Spillover Survey Data

Ameren Missouri 2016 Online Survey: Efficient Products Immediate Surveys

Researchable Questions	Survey Question Mapping
How do participants learn about this program?	A4
What are the reasons why customers are purchasing new equipment, and which factors influence the type of product they purchase?	B1, B3, B4, B5
From whom do participants purchase the eligible equipment, and how effective are these upstream actors in promoting the program?	B2, B7, B8, C2
How satisfied were participants with the process and the products?	D1, D4 , D6, D7
How satisfied are participants with the program?	D9, D11
What is the installation rate?	Section E (all measures except thermostats), Section G (thermostats)
Are participants using measures correctly?	Section H (thermostats)
Would the participant have purchased the product without the program? (Free ridership)	Section F (all measures except thermostats), Section I (thermostats)
How satisfied are participants with their utility?	J1, J2
Participant Demographics	Section K

Red text = programming instructions (not visible to respondents)

***[MEASURETYPE]* = measure to be surveyed, imported from panel data**

***[QTY]* = quantity installed of survey measure, imported from panel data**

[*THERMOSTAT BRAND*] = make/model of rebated thermostat, imported from panel data

Green text = open-ended responses

(Skipped) responses are not visible (99 = code for nothing selected / skipped question)

Measure types to be surveyed (import data from panel file – [MEASURETYPE] will be replaced with the text in parentheses):

- Smart/learning thermostat (smart thermostat)
- Energy Star Heat pump water heater (water heater)
- Energy Star Room AC unit (room air conditioner)
- Energy Star Air purifier (room air purifier)
- Energy Star Pool pumps: multiple speed and variable speed (pool pump)

A. Verification and Program Awareness

A1. Thank you for participating in Ameren Missouri's Efficient Products rebate program. We would like to know more about your experience with the program. Our records indicate that you received a rebate for purchasing ***[MEASURENAME]***(s). Is this correct? **[FORCED RESPONSE (NO SKIP)]**

1. Yes
2. No **[TERMINATE]**
98. Don't Know **[TERMINATE]**

A2. Are you or any members of your household employed by Ameren Missouri? **[FORCED RESPONSE (NO SKIP OR DK)]**

1. Yes, I or someone in my household works for Ameren Missouri [**TERMINATE**]
2. No one in my household works for Ameren Missouri

A3. Prior to this survey, were you aware that the rebate you received after you purchased your new ***[MEASURETYPE]***(s) was provided by Ameren Missouri?

1. Yes
2. No
98. Don't Know
99. (Skipped)

A4. How did you hear about Ameren Missouri's Efficient Products rebate program? **[RANDOMIZE ORDER, CHECK ALL THAT APPLY]**

1. From my contractor or installer
2. Ameren's Web site
3. Other Web site
   A4a. Which site? **[SPECIFY:_____]**
4. On my Monthly Energy Statement (bill)
5. A brochure
   A4b. Where did you find this brochure, or who gave or sent it to you?
   [SPECIFY:_____]
6. When my rebate check arrived
7. Door hanger
8. Family, friend or co-worker
9. Newspaper
10. Radio
11. Television
12. Ameren Missouri representative
13. Ameren Missouri Home Energy Report
14. Signs or displays in a store
15. Store representative or salesperson
16. Social Media (Facebook, Twitter)
17. Some other way
    A4c. Please specify: **[SPECIFY:_____]**

98. Don't Know
99. (Skipped)

B. Purchase Patterns and Decision-making

B1. What was the primary reason you purchased a new ***[MEASURETYPE]?*** **[RANDOMIZE RESPONSE ORDER, SELECT ONE RESPONSE]**

1. To replace broken equipment
2. To replace aging equipment
3. To improve the comfort of my home
4. To improve the safety of my home
5. The purchase was part of a larger home renovation
6. The equipment is for a newly constructed home
7. To save money on energy costs
8. To help the environment
9. Some other reason
   Please specify: **[SPECIFY: _____]**

98. Don't Know
99. (Skipped)

B2. Did you purchase the ***[MEASURETYPE]***(s) at a store, or from a contractor? **[SELECT ONE RESPONSE]**

1. Local retail store
2. Online store
3. Contractor
4. Other

   Please specify: **[SPECIFY: _____]**

98. Don't Know
99. (Skipped)

B3. At what point did you determine the exact model and brand you wanted to buy?

1. I knew which model I wanted before **[IF B2=1 or 2:** "visiting the store", **IF B2=3:** "calling a contractor"**]**
2. **[IF B2=1 OR 2]** I decided at the **[IF B2=1:** "store", **IF B2=2:** "online store"**]**
3. **[IF B2=3]** I decided after the contractor provided me with options

98. Don't Know
99. (Skipped)

B4. Which factors were important in your decision to purchase the specific model and brand you selected? Please select all that apply. **[RANDOMIZE RESPONSE ORDER, CHECK ALL THAT APPLY]**

1. Price
2. Quality/reputation
3. Cost savings on energy bills
4. The store representative recommended it to me
5. My contractor or installer recommended it to me
6. It qualified for an Ameren Missouri rebate
7. It had specific features I was looking for
8. Impact on the environment
9. It was available when I needed it
10. Other

    Please specify: **[SPECIFY: _____]**

98. Don't Know
99. (Skipped)

B5. **[ASK IF MORE THAN ONE RESPONSE IS CHECKED IN B4]** If you had to choose just one, which factor would you say was the *most* important in your decision to purchase the specific model and brand you selected? **[ONLY SHOW RESPONSES CHECKED IN B4; SELECT ONE RESPONSE]**

1. Price
2. Quality/reputation
3. Cost savings on energy bills
4. The store representative recommended it to me
5. My contractor or installer recommended it to me
6. It qualified for an Ameren Missouri rebate
7. It had specific features I was looking for
8. Impact on the environment
9. It was available when I needed it
10. [**Other specify response from B4]**

98. Don't Know
99. (Skipped)

B6. **[ASK IF MEASURETYPE IS NOT "AIR PURIFIER"]** Did you or someone else in your household install the ***[MEASURETYPE]***, or did you have a contractor install it?

1. I installed it myself OR someone else in the household installed it
2. A contractor installed it
3. Not installed yet

98. Don't Know
99. (Skipped)

B7. **[IF B6 = 1 AND MEASURETYPE = "SMART THERMOSTAT"]** How easy was the smart thermostat to install? Would you say it was…?

1. Very easy
2. Somewhat easy
3. Not too easy
4. Not at all easy

98. Don't Know
99. (Skipped)

B8. **[ASK IF B2=1]** Did a store representative or display inform you that the [***MEASURETYPE***] qualified for an Ameren Missouri Rebate? **[OR ASK IF B2=2]** Did the online store that you purchased your [***MEASURETYPE***] from inform you that this equipment qualified for an Ameren Missouri Rebate?

1. Yes
2. No

98. Don't Know
99. (Skipped)

B9. **[ASK IF B2=3 OR B6=2]** Did your contractor inform you that the [***MEASURETYPE***] qualified for an Ameren Missouri Rebate?

1. Yes
2. No

98. Don't Know
99. (Skipped)

C. Participation Process – Contractors

C1. **[ASK IF B6=2]** How did you select the contractor who installed your **[*MEASURETYPE*]**? **[RANDOMIZE ORDER, CHECK ALL THAT APPLY]**

1. I have used this contractor before
2. The contractor approached me about the program
3. Ameren website
4. The contractor was referred to me by a family member, friend, or colleague
5. Online advertisement
6. I saw contractor's newspaper/TV/radio advertisement
7. Through business owners in my neighborhood or network
8. Yellow pages
9. Angie's List, or similar consumer information source
10. Better Business Bureau
11. Some other way

Please specify **[SPECIFY:_____]**

98. Don't Know
99. (Skipped)

C2. **[ASK IF B2=3 OR B6=2]** Please check any options listed below that your contractor discussed with you prior to installing your new **[*MEASURETYPE*]**. Please note, options listed below may or may not have been applicable to your situation**. [RANDOMIZE ORDER, CHECK ALL THAT APPLY]**

1. Rebates from Ameren Missouri for high efficiency equipment
2. Contractor or manufacturer rebates
3. Additional energy-efficient equipment or home improvements
4. Energy saving tips
5. Contractor did not discuss any of the above

98. Don't know
99. (Skipped)

C3. **[ASK IF C2 = 2]** How much was the rebate you received from the contractor or manufacturer?

[RECORD RESPONSE:_____]

98. (Skipped)

D. Participant Satisfaction

D1. **[ASK IF B2=3 OR B6=2]** How satisfied are you with the contractor you worked with?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all

98. Don't Know
99. (Skipped)

D2. **[ASK IF D1 = 1, 2, 3 OR 4]** Why are you "[**RATING FROM D1**]" with the contractor?

[RECORD RESPONSE:_____]

98. (Skipped)

D3. After you submitted the rebate application and documentation for the purchase of your [***MEASURETYPE***](s), how long did it take to receive the rebate check from Ameren Missouri?

1. Less than 4 weeks
2. Between 4 and 6 weeks
3. Between 6 and 8 weeks
4. Between 8 and 10 weeks
5. More than 10 weeks
5. Have not received the rebate yet

98. Don't know
99. (Skipped)

D4. How satisfied are you with the time it took to receive your rebate in the mail?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all

98. Don't know
99. (Skipped)

D5. How satisfied are you with the amount of the rebate you received?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all

98. Don't know
99. (Skipped)

D6. How satisfied are you with the performance of your new ***[MEASURETYPE***]?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all

98. Don't Know

99. (Skipped)

D7. **[ASK IF D7 = 1, 2, 3 or 4]** Why are you "[**RATING FROM D7**]" with your new ***[MEASURETYPE***](s)?
[RECORD RESPONSE:_____]
98. (Skipped)

D8. Thinking about your overall satisfaction with Ameren Missouri's Efficient Products rebate program, would you say you are:
1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. Don't Know
99. (Skipped)

D9. **[ASK IF D9 = 3 or 4]** Why are you "[**RATING FROM D9**]" with Ameren Missouri's Efficient Products rebate program?
[RECORD RESPONSE:_____]
98. (Skipped)

D10. Would you recommend Ameren Missouri's Efficient Products program to friends or family members?
1. Yes
2. No
98. Don't Know
99. (Skipped)

D11. What suggestions, if any, do you have for improving this program?
Specify suggestions: **[RECORD:**
_____]

E. Measure Installation (Except for Thermostats)

ASK THIS SECTION OF PARTICIPANTS WHO HAVE INSTALLED MEASURES OTHER THAN SMART THERMOSTATS

Next, we have a few questions about the [***MEASURETYPE***](s) that you purchased. The answers to these questions are important because they will help Ameren Missouri determine how much energy is being saved as a direct result of their energy efficiency program.

E1. **[IF QTY=1 AND B6 ≠ 3:** "Is the [***MEASURETYPE***] currently installed?" **IF QTY =2 AND B6 ≠ 3:** "Are both of the [***MEASURETYPE***]s currently installed?" **IF QTY =3 AND B6 ≠ 3:** "Are all three of the [***MEASURETYPE***]s currently installed?"
1. Yes [***SKIP TO E6***]
2. No
98. Don't Know [***SKIP TO F1***]
99. (Skipped) [***SKIP TO F1***]

E2. [***ASK IF QTY >1 AND E1 =2***] How many of your new [***MEASURETYPE***]s are currently installed?

1. None
2. One
3. **[IF QTY=3]:** Two

98. Don't Know
99. (Skipped)

E3. [***ASK IF QTY =1 AND (E1 =2 OR* B6 = 3)**] Why isn't the [***MEASURETYPE***] currently installed? [***ASK IF QTY =2 AND (E1 =2 OR* B6 = 3)**] Why aren't both of the [***MEASURETYPE***]s currently installed? [***ASK IF QTY =3 AND (E1 =2 OR* B6 = 3)**] Why aren't all three of the [***MEASURETYPE***]s currently installed? [***RANDOMIZE ORDER, ALLOW UP TO 3 RESPONSES***]

1. [***MEASURETYPE***] failed or is broken
2. **[IF MEASURETYPE IS NOT "WATER HEATER"]:** I plan to install the [***MEASURETYPE***] during the appropriate season
3. We installed the [***MEASURETYPE***] at one time, but then removed it
4. Have not had time to install [***MEASURETYPE***] yet
5. [***MEASURETYPE***] is in storage
6. [***MEASURETYPE***] is back up equipment to install when other equipment fails
7. Some other reason

Please specify **[SPECIFY:_____]**

98. Don't Know
99. (Skipped)

E4. [***ASK IF E3 =3***] Why did you remove the [***MEASURETYPE***]?

[RECORD RESPONSE:_____]

98. (Skipped)

E5. [***ASK IF MEASURETYPE ="ROOM AC" AND E1 =2 AND E3<>3, 4***] Was the room air conditioner you purchased installed at any point this summer?

1. Yes
2. No

98. Don't Know
99. (Skipped)

E6. ***[ASK IF MEASURETYPE =”ROOM AC” AND E1 =1 OR E5 =1 OR E3=3] [IF QTY=1]:*** In which room did you install the room air conditioner? [***CHECK ONE***] ***[IF QTY>1]:*** In which rooms did you install the room air conditioners? [***CHECK ALL THAT APPLY***]

1. Bedroom
2. Living Room
3. Dining Room
4. Kitchen
5. Office
6. Bathroom
7. Some other location

Please specify **[SPECIFY:_____]**

98. Don’t Know
99. (Skipped)

E7. ***[ASK IF MEASURETYPE =”ROOM AC”]*** In total, how many room or window air conditioning units are installed in your home during the summer, including the room air conditioner(s) you recently purchased that were rebated by Ameren Missouri?

1. One
2. Two
3. Three
4. Four or more
5. None

98. Don’t Know
99. (Skipped)

E8. ***[ASK IF MEASURETYPE =”ROOM AC”]*** Please check all of the heating and cooling equipment that is currently installed in your home in addition to room or window air conditioners. [**MARK ALL THAT APPLY**]

1. High-efficiency central air conditioner
2. Standard-efficiency central air conditioner
3. Air Source Heat Pump
4. Ground Source Heat Pump
5. Ductless Heat Pump
6. High-efficiency gas furnace
7. Standard-efficiency gas furnace
8. High-efficiency electric furnace
9. Standard-efficiency electric furnace
10. Baseboard electric system
11. Some other heating or cooling system

Please specify **[SPECIFY:_____]**

98. Don’t Know
99. (Skipped)

E9. *[ASK IF MEASURETYPE =”HEAT PUMP WATER HEATER” AND E1 =1]* Please check all of the heating and cooling equipment that is currently installed in your home. [**MARK ALL THAT APPLY**]

1. High-efficiency central air conditioner
2. Standard-efficiency central air conditioner
3. Room or window air conditioners
4. Air Source Heat Pump
5. Ground Source Heat Pump
6. Ductless Heat Pump
7. High-efficiency gas furnace
8. Standard-efficiency gas furnace
9. High-efficiency electric furnace
10. Standard-efficiency electric furnace
11. Baseboard electric system
12. Some other heating or cooling system

    Please specify **[SPECIFY:_____]**

98. Don’t Know
99. (Skipped)

[IF (QTY = 1 AND E1= 2) OR (QTY > 1 AND E2 = 1) AND E3 ≠ 2 AND E5 ≠ 1 THEN SKIP TO J1 NOW]

F. Free Ridership (Measures Except for Thermostats)

ASK THIS SECTION OF PARTICIPANTS WHO HAVE INSTALLED MEASURES OTHER THAN SMART THERMOSTATS

F1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new ***[MEASURETYPE]***(s)?

1. Learned of rebate before purchase
2. Learned of rebate after purchase

98. Don't Know
99. (Skipped)

F2. ***[ASK IF F1=2]*** Please confirm: You purchased your new ***[MEASURETYPE]*** and *then* found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?

1. Yes, that is correct ***[SKIP TO F9]***
2. No, that is not correct

98. Don't Know
99. (Skipped)

F3. Before you knew about the incentive from Ameren Missouri, were you already planning to install a ***[MEASURETYPE]*** in 2016?

1. Yes,
2. No

98. Don't Know
99. (Skipped)

F4. ***[ASK IF MEASURE QTY > 1]*** Without the incentive from Ameren Missouri, would you have installed same number of ***[MEASURETYPE]***s?

1. Yes, the same amount
2. No, would have installed fewer
   F4a. How many ***[MEASURETYPES]*** would you have installed without the rebate?
   [SPECIFY:_____]
3. No, would have installed more
4. No, would not have installed any at all

98. Don't Know
99. (Skipped)

F5. Without Ameren Missouri's rebate, would you have installed the ***[MEASURETYPE]***...?

1. Around the same time
2. Later in the same year
3. In one or two years
4. After more than three years
5. Never

98. Don't Know
99. (Skipped)

F6. ***[ASK IF F5 = 1, 2]*** Would you have installed the exact same ***[MEASURETYPE]***(s) without the rebate from Ameren Missouri?

1. Yes
2. No
98. Don't Know
99. (Skipped)

F7. ***[ASK IF F6 = 2, 98, 99]*** Would you have installed a different ***[MEASURETYPE]*** without the Ameren Missouri rebate or would you have decided to not purchase one at all?

1. I would have installed a different ***[MEASURETYPE]***
2. I would have decided not to purchase one at all
98. Don't Know
99. (Skipped)

F8. ***[ASK IF F7 = 1]*** Without Ameren Missouri's rebate, would you have installed a lower efficiency ***[MEASURETYPE]***, the same efficiency ***[MEASURETYPE]***, or a higher efficiency ***[MEASURETYPE]***…?

1. Lower efficiency
2. Same efficiency
3. Higher efficiency
98. Don't Know
99. (Skipped)

F9. How important was the Ameren Missouri rebate on your decision to purchase and install the ***[MEASURETYPE]***?

1. Very important
2. Somewhat important
3. Not very important
4. Not at all important
98. Don't Know
99. (Skipped)

F10. **[ASK IF B2=3 OR B6=2]** How important was the advice from your contractor on your decision to purchase and install the ***[MEASURETYPE]***?

1. Very important
2. Somewhat important
3. Not very important
4. Not at all important
98. Don't Know
99. (Skipped)

G. Smart Thermostat Installation

ASK THIS SECTION IF MEASURETYPE = "SMART THERMOSTAT".

Next, we have a few questions about the Smart Thermostat(s) that you purchased and installed. The answers to these questions are important because they will help Ameren Missouri determine how much energy is being saved as a direct result of their energy efficiency program.

G1. **[IF QTY=1:** Our records indicate that you purchased a [***THERMOSTAT BRAND***] "smart" thermostat, is this correct? **IF QTY > 1:** Our records indicate that you purchased **[*QTY*]** [***THERMOSTAT BRAND***] "smart" thermostats, is this correct?

1. Yes
2. No

G2a. What kind of thermostat(s) did you purchase? **[SPECIFY:_____]**

98. Don't Know
99. (Skipped)

G2. **[IF QTY=1 AND B6 ≠ 3:** Is the smart thermostat currently installed in your home? **[IF QTY>1 AND B6 ≠ 3:** Are all of the smart thermostats that you purchased currently installed in your home?

1. Yes
2. **[INCLUDE OPTION IF QTY> 1:** Only one is installed
3. **[INCLUDE OPTION IF QTY> 2:** Only two are installed
4. **[IF QTY=1:** No **[IF QTY>1:** None are installed

98. Don't Know
99. (Skipped)

G3. ***[ASK IF G2 = 4 AND QTY =1***] Was the smart thermostat . . . ? [***OR ASK IF G2 = 3 AND QTY =3 OR IF G2 = 2 AND QTY =2***] Was your smart thermostat that is not currently installed . . . ? ***[ASK IF G2 = 4 AND QTY >1 OR IF G2 = 2 AND QTY =3]*** Were any of these smart thermostats installed and then removed, or have some of them not been installed yet?

1. **[IF QTY=1 OR IF G2 = 3 AND QTY =3 OR IF G2 = 2 AND QTY =2:** Installed and removed **[IF G2 = 4 AND QTY >1 OR IF G2 = 2 AND QTY =3:** Installed and then removed all (other) thermostats
2. **[INCLUDE OPTION IF G2 = 4 AND QTY> 1:** Installed and removed one thermostat, the rest have not been installed yet
3. **[INCLUDE OPTION IF G2 = 2 AND QTY =3:** Installed and removed two thermostats, the other has not been installed yet
4. **[IF QTY=1 OR IF G2 = 3 AND QTY =3 OR IF G2 = 2 AND QTY =2:** Or not installed yet **[IF G2 = 4 AND QTY >1 OR IF G2 = 2 AND QTY =3:** None have been installed yet
5. Given to someone else / installed at another property

98. Don't Know
99. (Skipped)

G4. ***[ASK IF G3= 1, 2, 3]*** Why did you install and then remove the smart thermostat(s)? [**RANDOMIZE RESPONSE ORDER, MARK ALL THAT APPLY**]

1. Too difficult to use
2. Did not adjust temperatures correctly
3. Thermostat broke
4. Did not think it was saving energy
5. I preferred my previous thermostat(s)
6. Other (please specify) [**RECORD RESPONSE _____**]

98. Don't Know
99. (Skipped)

G5. [***ASK IF G3 = 4 AND QTY=1* OR B6 = 3**] Why has the smart thermostat not been installed in your home yet? [***OR IF (G3 = 4* OR B6 = 3) *AND QTY>1, OR G3 = 2 ,3***] Why have your smart thermostats not all been installed in your home yet?

1. Haven't had time
2. Don't know how to install it
3. Installed in someone else's home / a different property
4. Other reason (please specify), [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

[IF G2 = 4 THEN SKIP TO J1 NOW]

G6. [***ASK IF G2 = 1 AND QTY=1]*** What types of heating and cooling system is the smart thermostat currently connected to? [***OR IF G2 = 1, 2, 3 AND QTY>1]*** What types of heating and cooling system are your smart thermostats connected to? [**MARK ALL THAT APPLY**]

1. High-efficiency central air conditioner
2. Standard-efficiency central air conditioner
3. Air Source Heat Pump
4. Ground Source Heat Pump
5. Ductless Heat Pump
6. High-efficiency gas furnace
7. Standard-efficiency gas furnace
8. High-efficiency electric furnace
9. Standard-efficiency electric furnace
10. Some other heating or cooling system

Please specify **[SPECIFY:_____]**

98. Don't Know
99. (Skipped)

G7. ***[ASK IF G6 = 1, 2]*** About what year was your central air conditioning installed?

1. Installed at the same time as the new smart thermostat(s)
2. Installed previously, in the year: **[RECORD RESPONSE:_____]**

98. Don't Know
99. (Skipped)

G8. ***[ASK IF G6 = 7, 8, 9, 10]*** About what year was your furnace installed?

1. Installed at the same time as the new smart thermostat(s)
2. Installed previously, in the year: **[RECORD RESPONSE:_____]**

98. Don't Know
99. (Skipped)

G9. ***[ASK IF G6 = 4, 5, 6]*** About what year was your heat pump installed?

1. Installed at the same time as the new smart thermostat(s)
2. Installed previously, in the year: **[RECORD RESPONSE:_____]**

98. Don't Know
99. (Skipped)

G10. ***[ASK IF G2 = 1 AND QTY=1]*** What type of thermostat did you replace with the smart thermostat? [**SELECT ONE**] [***OR IF G2 = 1, 2, 3 AND QTY>1]*** What type of thermostats did you replace with the smart thermostats? [**SELECT UP TO 2 IF QTY=2, SELECT UP TO 3 IF QTY=3**]

1. My new smart thermostat(s) are installed in a newly-constructed home
2. My new smart thermostat(s) replaced other smart thermostats (may also be called "learning" thermostats)
3. Replaced a programmable thermostat (a thermostat that can be programmed, but is not "smart" or connected to communication devices)
4. Replaced a traditional/manual thermostat

98. Don't Know
99. (Skipped)

G11. [***IF G10 ≠ 1***] Which option best represents how you most often used or interacted with your OLD thermostat(s)? [**RECORD ONE RESPONSE**]

1. Kept thermostat(s) set at a constant temperature throughout each season
2. [***OPTION APPEARS IF G11 = 2 OR 3***] Relied on the programmed schedule of temperatures, and never manually changed the temperature
3. [***OPTION APPEARS IF G11 = 2 OR 3***] Relied on the programmed schedule of temperatures, but sometimes manually changed the temperature
4. Manually adjusted temperature using a regular schedule by changing the temperature for different times of the day or week
5. Manually adjusted temperature using no regular schedule
6. Some other way [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

G12. [***IF G10 ≠ 1***] Why did you replace your old thermostat(s)? [***RANDOMIZE ORDER, MARK ALL THAT APPLY***]

1. To save energy
2. To save money on my utility bills
3. The Ameren Missouri rebate
4. Other rebates or coupons (not from Ameren Missouri)
5. Part of a "package deal" with other equipment being replaced at the same time
6. To update my home with the latest technology
7. To take advantage of the features of the smart thermostat
8. Some other reason [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

H. Smart Thermostat Usage

ASK THIS SECTION OF PARTICIPANTS WHO HAVE INSTALLED SMART THERMOSTATS.

H1. How easy is the smart thermostat to use?

1. Very easy
2. Somewhat easy
3. Not too easy
4. Not at all easy
98. Don't Know
99. (Skipped)

H2. Is the function on your smart thermostat that senses when you are home or away working? (This function is also called "geofencing" or "occupancy sensing")?

1. Yes
2. No
98. Don't Know
99. (Skipped)

H3. Is your smart thermostat connected to the internet?

1. Yes
2. No
98. Don't Know
99. (Skipped)

H4. What features of your smart thermostat do you like best? [***RANDOMIZE ORDER, MARK ALL THAT APPLY***]

1. Thermostat design / aesthetics
2. Thermostat ease of use
3. Automatically programs itself / automatically adjusts the temperature when you're away
4. Gives me detailed information about my energy use
5. Dehumidifying capabilities (When thermostat uses HVAC system to lower indoor humidity level)
6. Maintenance reminders
7. Mobile app
8. Remote monitoring of household temperature and thermostat settings
9. Ability to check local weather from thermostat and smartphone/tablet app
10. Other features [**PLEASE SPECIFY_____**]
11. None of the above
98. Don't Know
99. (Skipped)

H5. In what ways have you ever accessed your thermostat since it was first installed, to do things such as changing your temperature settings or schedules? [**MARK ALL THAT APPLY**]

1. The thermostat itself
2. Website on a PC or laptop
3. Smartphone or tablet app
4. I have not accessed my thermostat since it was installed

98. Don't Know
99. (Skipped)

H6. In the past 30 days, how have you most often accessed your new thermostat? [**SELECT ONE**]

1. The thermostat itself
2. Website on a PC or laptop
3. Smartphone or tablet app
4. I have not accessed my thermostat in the past month

98. Don't Know
99. (Skipped)

H7. How do you currently use your thermostat's interactive capabilities? [**RANDOMIZE ORDER, CHECK ALL THAT APPLY**]

1. Check how much energy I have used
2. Adjust the temperature while at home
3. Adjust the temperature while away from home
4. Modify my thermostat schedule while at home
5. Modify my thermostat schedule while away from home
6. Check inside or outside temperature
7. Just checked it out to see what it has to offer
8. Have not used interactive capabilities
9. Other, [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

H8. Did you or someone in your household set up and program the thermostat, or did a contractor set it up for you?

1. I or someone in my household set up/programmed it
2. Contractor set up/programmed it
3. No one set up or programmed the thermostat

98. Don't Know
99. (Skipped)

H9. [***ASK IF H8 = 1***] How easy was it to set up and program your smart thermostat? Would you say it was…?

1. Very easy
2. Somewhat easy
3. Not too easy
4. Not at all easy

98. Don't Know
99. (Skipped)

H10. How is your smart thermostat currently controlled? [**SELECT ONE**]

1. I keep it at a constant temperature throughout the season
2. I rely on the programmed schedule of temperatures, and never manually change the temperature
3. I rely on the programmed schedule of temperatures, but sometimes manually change the temperature
4. I manually adjust the temperature using a regular schedule by changing the temperature for different times of the day or week
5. I manually adjust the temperature using no regular schedule
6. Some other way [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

I. Free Ridership for Smart Thermostats

ASK THIS SECTION OF PARTICIPANTS WHO HAVE INSTALLED SMART THERMOSTATS.

I1. Did you first find out about the Ameren Missouri rebate before or after you purchased your new thermostat?

1. Learned of rebate before purchase
2. Learned of rebate after purchase

98. Don't Know
99. (Skipped)

I2. ***[ASK IF I1=2]*** Please confirm: You purchased your new smart thermostat and *then* found out it qualified for a rebate from Ameren Missouri afterwards, is that correct?

1. Yes, that is correct ***[SKIP TO I8]***
2. No, that is not correct

98. Don't Know
99. (Skipped)

I3. Before you knew about the rebate from Ameren Missouri, were you already planning to install a smart thermostat this year?

1. Yes
2. No
98. Don't Know
99. (Skipped)

I4. Without Ameren Missouri's rebate, would you have installed a smart thermostat …?

1. Around the same time
2. Later in the same year
3. In one or two years
4. After more than three years
98. Don't Know
99. (Skipped)

I5. ***[ASK IF I4 = 1, 2, 98, 99]*** Would you have installed the same smart thermostat without the rebate from Ameren Missouri?

1. Yes
2. No
98. Don't Know
99. (Skipped)

I6. ***[ASK IF I5 = 2, 98, 99]*** Would you have installed a different thermostat without the Ameren Missouri rebate or would you have decided not to purchase one at all)?

1. I would have installed a different thermostat
2. I would have decided not to purchase new thermostats(s) at all
98. Don't Know
99. (Skipped)

I7. ***[ASK IF I6 = 1]*** When you say you would have installed a thermostat without the rebate from Ameren Missouri, would you have installed…?

1. A smart thermostat (also called a "learning" thermostat)
2. A programmable thermostat (a thermostat that can be programmed, but is not "smart" or connected to communication devices)
3. A traditional/manual thermostat
4. Would not have installed a new thermostat
98. Don't Know
99. (Skipped)

I8. How important was the Ameren Missouri rebate on your decision to purchase and install the smart thermostat?

1. Very important
2. Somewhat important
3. Not very important
4. Not at all important
98. Don't Know
99. (Skipped)

I9. **[ASK IF B2=3 OR B6=2]** How important was the advice from the contractor in your decision to purchase and install the smart thermostat? Would you say…

1. Very important
2. Somewhat important
3. Not very important
4. Not at all important
98. Don't Know
99. (Skipped)

J. Satisfaction with Ameren Missouri

J1. Thinking about your overall experiences with Ameren Missouri as your utility, how satisfied would you say you are with Ameren Missouri?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. Don't Know
99. (Skipped)

J2. **[ASK IF J1 = 1, 2, 3 or 4]** Why are you "[**RATING FROM J1**]" with Ameren Missouri as your utility?
[RECORD RESPONSE:_____]

J3. Based on your experience with the Efficient Products rebate program, would you say your satisfaction with Ameren Missouri has:

1. Increased
2. Stayed about the same, or
3. Decreased
98. Don't know
99. (Skipped)

K. Customer Demographics

We are almost finished! There are just a few final questions about your home that will help us with our analysis.

K1. Is the energy used in your home . . .

1. All electric,
2. Natural gas and electric,
3. Or some other combination of energy sources?

98. Don't Know
99. (Skipped)

K2. Which of the following best describes your home or residence? **[SELECT ONE RESPONSE]**

1. Single-family home (not a duplex, townhome, or apartment)
2. Manufactured or modular home
3. Mobile home
4. Row house or townhome
5. Two or three family attached residence
6. Apartment with four or more units
7. Condominium
8. Other
   a. Please specify: [**SPECIFY:** _____]

98. Don't Know
99. (Skipped)

K3. Do you own or rent this residence?

1. Own
2. Rent

98. Don't know
99. (Skipped)

K4. Approximately how many square feet of living space does your home have? Don't include the basement unless it is a space that you consider "lived in".

1. Less than 1,000 square feet
2. 1,000 to less than 1,500 square feet
3. 1,500 to less than 2,000 square feet
4. 2,000 to less than 2,500 square feet
5. 2,500 to less than 3,000 square feet
6. 3,000 or more square feet

98. Don't Know
99. (Skipped)

K5. When was your home built?

1. After 2008
2. 2005-2008
3. 2001-2004
4. 1980-2000
5. Before 1980
98. Don't Know
99. (Skipped)

K6. Counting yourself, how many people normally live in your household on a full-time basis? Please include everyone who lives in your home, whether or not they are related to you, and exclude anyone just visiting or children who may be away at college or in the military.

1. Please enter a number: [**RECORD NUMERIC RESPONSE:**_____]
2. I prefer not to answer this question

99. (SKIPPED)

CLOSING

This completes the survey. We appreciate your participation and thank you for your time.

Ameren Missouri 2016 Online Survey: Efficient Products Spillover Surveys

Researchable Questions	Survey Question Mapping
How satisfied were participants with the process, products and program?	Section C
Has the program influenced participants to install additional measures on their own? (Spillover)	Section D
What is the installation rate for each measure (six months after participation)?	Section E (all measures except thermostats), Section F(thermostats)
How are participants using their smart thermostats (six months after participation)?	Section G
How satisfied are participants with their utility?	Section H
Participant Demographics	Section I

Red text = programming instructions (not visible to respondents)

***[MEASURETYPE]* = measure to be surveyed, imported from panel data**

***[MEASURENAME]* = long name of measure, imported from panel data**

***[QTY]* = quantity installed of survey measure, imported from panel data**

[*THERMOSTAT BRAND*] = make/model of rebated thermostat, imported from panel data

Green text = open-ended responses

(Skipped) responses are not visible (99 = code for nothing selected / skipped question)

Measure names and types to be surveyed (import data from panel file – ***[MEASURETYPE]*** will be replaced with the text in parentheses):

- Smart thermostat (smart thermostat)
- Heat pump water heater (water heater)
- ENERGY STAR room air conditioner (room air conditioner)
- ENERGY STAR room air purifier (room air purifier)
- Pool pump (pool pump) – *for both multiple speed and variable speed*

A. *Verification and Program Awareness*

A1. Thank you for participating in Ameren Missouri's Efficient Products rebate program. We would like to know more about your experience with the program. Our records indicate that you received a rebate for purchasing ***[MEASURENAME]***(s). Is this correct? **[FORCED RESPONSE (NO SKIP)]**

1. Yes
2. No **[TERMINATE]**
98. Don't Know **[TERMINATE]**

A2. Are you or any members of your household employed by Ameren Missouri? **[FORCED RESPONSE (NO SKIP OR DK)]**

1. Yes, I or someone in my household works for Ameren Missouri [**TERMINATE**]
2. No one in my household works for Ameren Missouri

B. *Participant Satisfaction*

B1. How satisfied are you with the performance of your new [***MEASURETYPE***]?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. Don't Know
99. (Skipped)

B2. **[ASK IF B1 = 1, 2, 3 or 4]** Why are you "[**RATING FROM B1**]" with your new [***MEASURETYPE***](s)?

1. **[RECORD RESPONSE:_____]**
99. (Skipped)

B3. Thinking about your overall satisfaction with Ameren Missouri's Efficient Products rebate program, would you say you are:

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. Don't Know
99. (Skipped)

B4. **[ASK IF B3 = 1, 2, 3 or 4]** Why are you "[**RATING FROM B3**]" with Ameren Missouri's Efficient Products rebate program?

1. **[RECORD RESPONSE:_____]**
99. (Skipped)

B5. Would you recommend Ameren Missouri's Efficient Products program to friends or family members?

1. Yes
2. No
98. Don't Know
99. (Skipped)

B6. What suggestions, if any, do you have for improving this program?

Specify suggestions: **[RECORD:** _____]

C. Spillover Questions

C1. Since participating in the Efficient Products rebate program, have you added any other energy-efficient products in your home or had any other energy-related services performed that were not discounted through Ameren Missouri?

1. Yes
2. No [***SKIP TO NEXT SECTION***]
98. Don't Know [***SKIP TO NEXT SECTION***]
99. (Skipped) [***SKIP TO NEXT SECTION***]

C2. **[IF C1=1]** Please select the energy-efficient products or services that you purchased (and installed, if applicable) since your experience with Ameren Missouri's Efficient Products rebate program. [**RANDOMIZE ORDER, CHECK ALL THAT APPLY**]

1. Home/building audit
2. Recycled a refrigerator or freezer
3. Constructed an Energy Star New Home
4. Efficient Light fixtures or ceiling fan
   a. How many of these are currently installed in your home? [**SPECIFY:** _____]
5. ENERGY STAR refrigerator
6. ENERGY STAR freezer
7. ENERGY STAR clothes washer
8. ENERGY STAR dishwasher
9. ENERGY STAR room air conditioner
   b. How many? [**SPECIFY:** _____]
10. Energy efficient electronics (e.g. TV, DVD, computer)
11. Efficient room air purifier

A1a. How many? [**SPECIFY:** _____]

12. Efficient pool pump
13. Efficient dehumidifier
14. Efficient water heater (other than heat pump water heater)
15. Efficient showerheads
    c. How many of these are currently installed in your home? [**SPECIFY:** _____]
16. Efficient faucet aerators
    d. How many of these are currently installed in your home? [**SPECIFY:** _____]
17. Efficient central air conditioner
18. Air source heat pump
19. Geothermal heat pump
20. Ductless heat pump
21. Dual-fuel heat pump
22. Efficient Furnace fan
23. Heat pump water heater
24. Programmable (but not “smart”) thermostat
25. Learning or “smart” thermostat
26. Insulation
27. Windows
28. Solar panels
29. Other items
    e. Please specify: [**SPECIFY:** _____]
98. Don’t Know [***SKIP TO NEXT SECTION***]
99. (Skipped)

[PRESENT THIS MESSAGE IF C1=1 AND NOTHING SELECTED IN C2]

You did not check any products or services for the last question.

If you did purchase and install any energy-efficient products or services, please use the back arrow below to return to that question and select one or more answers (select "other items" if you do not see your products or services on the list).

If you did NOT purchase and install any energy-efficient products or services, please use the forward arrow below to continue the survey.

C3. **[Ask if C2=1]** What kind of changes did you make to your home as a result of the audit?

1. [**RECORD RESPONSE:**_____]
99. (Skipped)

C4. **[Ask if C2=24 or 25]** Did you install this thermostat when you installed your **[MeasureType]**?

1. Yes
2. No
98. Don't Know
99. (Skipped)

C5. **[Ask if C2=24 or 25]** What kind of thermostat did you replace with the **["programmable thermostat" or "smart thermostat" from C2]**?

1. ***[IF C2=25 "ANOTHER"]*** Smart thermostat
2. ***[IF C2=24 "ANOTHER"]*** Programmable (but not "smart") thermostat
3. Manual thermostat
98. Don't Know
99. (Skipped)

C6. **[Ask if C2=4, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 26, 27 – ask for each]** How do you know that the **[C2 RESPONSE]** is energy efficient?

1. ENERGY STAR brand
2. Efficiency rating [**RECORD NUMERIC RESPONSE:**_____]
3. Other [**RECORD RESPONSE:**_____]
98. Don't Know
99. (Skipped)

C7. **[ASK if C2 = 26]** How many square feet of insulation did you have installed?

1. [**RECORD NUMERIC RESPONSE:**_____]
99. (Skipped)

C8. **[ASK if C2 = 27]** How many square feet of windows did you have installed?

1. [**RECORD NUMERIC RESPONSE:**_____]
99. (Skipped)

C9. **[ASK if C2 = 26]** In what location in your home was the insulation installed?

1. [**RECORD RESPONSE:**_____]
99. (Skipped)

C10. **[ASK if C2 = 27]** In what location in your home were the windows installed?

1. [**RECORD RESPONSE:**_____]
99. (Skipped)

C11. **[ASK ONCE FOR EACH ITEM CHECKED IN C2]** Why did you choose to purchase or install the items listed below? **[INSERT TABLE OF CHECKED RESPONSES FROM C2]**

1. **[RECORD RESPONSE]**:_____
99. (Skipped)

C12. Did you receive a rebate, discount, or tax credit for any of the items listed below? **(If yes, check all that apply.) [INSERT TABLE OF CHECKED RESPONSES FROM C2 – ALLOW MULTIPLE RESPONSE]**

1. Yes, from Ameren Missouri
2. Yes, from another organization
3. No
98. Don't Know
99. (Skipped)

C13. **[ASK FOR EACH ITEM WHERE C12 = 2]** What organizations besides Ameren Missouri paid the rebates, or provided discounts or tax credits for the items listed below? **[INSERT TABLE OF CHECKED RESPONSES FROM C2]**

1. [**RECORD RESPONSE:**_____]
99. (Skipped)

C14. **[FOR MEASURES for which Ameren provides incentives (9, 11, 12, 17, 18, 19, 20, 21, 22, 23, 25), ASK FOR EACH ITEM WHERE C12= 2 or 3]** Why didn't you apply for a rebate from Ameren Missouri for the purchase of your **[C2 RESPONSE]**?

1. **[RECORD RESPONSE]**:_____
99. (Skipped)

C15. How important was your rebate in the Ameren Missouri program on your decision to purchase or install the **[C2 RESPONSE]**? **[INSERT TABLE OF CHECKED RESPONSES FROM C2]**

1. Not at all important
2. Not too important
3. Somewhat important
4. Very important

98. Don't Know
99. (Skipped)

C16. **[ASK FOR EACH CHECKED ITEM FROM C2]** Prior to purchasing or installing the items listed below, had you heard or read about the benefits of installing this equipment from your contractor, Ameren Missouri, or Ameren Missouri's Act on Energy campaign?

	Yes (1)	No (2)	Don't know (98)
[INSERT 1st CHECKED RESPONSE FROM *C2*]			
[INSERT 2nd CHECKED RESPONSE FROM *C2*]			
[INSERT 3rd CHECKED RESPONSE FROM *C2*]			
[INSERT 4th CHECKED RESPONSE FROM *C2*]			

C17. **[ASK FOR EACH YES RESPONSE IN C16]** How important was the information the contractor or Ameren Missouri provided about the energy efficiency or money saving benefits of in your decision to purchase or install the items listed below? **[INSERT TABLE OF ALL "YES" RESPONSES FROM C16]**

1. Not at all important
2. Not too important
3. Somewhat important
4. Very important

98. Don't Know
99. (Skipped)

D. Measure Installation (Except for Thermostats)

ASK THIS SECTION OF PARTICIPANTS WHO HAVE INSTALLED MEASURES OTHER THAN SMART THERMOSTATS

Next, we have a few questions about the **[MEASURETYPE]**(s) that you purchased. The answers to these questions are important because they will help Ameren Missouri determine how much energy is being saved as a direct result of their energy efficiency program.

D1. **[IF QTY=1]** Is the **[MEASURETYPE]** currently installed? **[IF QTY =2]** Are both of the **[MEASURETYPE]**s currently installed? **[IF QTY =3]** Are all three of the **[MEASURETYPE]**s currently installed?

1. Yes **[SKIP TO E1]**
2. No

98. Don't Know **[SKIP TO E1]**
99. (Skipped) **[SKIP TO E1]**

D2. **[ASK IF QTY >1 AND D1 =2]** How many of your new **[MEASURETYPE]**s are currently installed?

1. None
2. One
3. **[IF QTY=3]:** Two

98. Don't Know
99. (Skipped)

D3. **[ASK IF QTY =1 AND D1 =2]** Why isn't the **[MEASURETYPE]** currently installed? **[ASK IF QTY =2 AND D1 =2]** Why aren't both of the **[MEASURETYPE]**s currently installed? **[ASK IF QTY =3 AND D1 =2]** Why aren't all three of the **[MEASURETYPE]**s currently installed? **[RANDOMIZE ORDER, ALLOW UP TO 3 RESPONSES]**

1. **[MEASURETYPE]** failed or is broken
2. **[IF MEASURETYPE IS NOT "WATER HEATER"]:** I plan to install the **[MEASURETYPE]** during the appropriate season
3. We installed the **[MEASURETYPE]** at one time, but then removed it
4. Have not had time to install **[MEASURETYPE]** yet
5. **[MEASURETYPE]** is in storage
6. **[MEASURETYPE]** is back up equipment to install when other equipment fails
7. Some other reason

   Please specify **[SPECIFY:_____]**

98. Don't Know
99. (Skipped)

D4. **[ASK IF D3 =3]** Why did you remove the **[MEASURETYPE]**?

1. **[RECORD RESPONSE:_____]**

99. (Skipped)

D5. **[ASK IF MEASURETYPE =”ROOM AC” AND D1 =2 AND D3<>3, 4]** Was the room air conditioner you purchased installed at any point this summer?

1. Yes
2. No
98. Don’t Know
99. (Skipped)

E. Smart Thermostat Installation

ASK THIS SECTION IF MEASURETYPE = “SMART THERMOSTAT”.

Next, we have a few questions about the Smart Thermostat(s) that you purchased and installed. The answers to these questions are important because they will help Ameren Missouri determine how much energy is being saved as a direct result of their energy efficiency program.

E1. **[IF QTY=1]** Our records indicate that you purchased a **[THERMOSTAT BRAND]** “smart” thermostat, is this correct? **[IF QTY > 1]** Our records indicate that you purchased **[QTY] [THERMOSTAT BRAND]** “smart” thermostats, is this correct?

1. Yes
2. No

E1a. What kind of thermostat(s) did you purchase? [**SPECIFY:_____**]

98. Don’t Know
99. (Skipped)

E2. **[IF QTY=1]** Is the smart thermostat currently installed in your home? **[IF QTY>1]** Are all of the smart thermostats that you purchased currently installed in your home?

1. Yes
2. **[INCLUDE OPTION IF QTY> 1]** Only one is installed
3. **[INCLUDE OPTION IF QTY> 2]** Only two are installed
4. **[IF QTY=1]** No **[IF QTY>1]** None are installed
98. Don’t Know
99. (Skipped)

E3. **[ASK IF E2 = 4 AND QTY =1]** Was the smart thermostat . . . ? **[OR ASK IF E2 = 3 AND QTY =3 OR IF E2 = 2 AND QTY =2]** Was your smart thermostat that is not currently installed . . .

? **[ASK IF E2 = 4 AND QTY >1 OR IF E2 = 2 AND QTY =3]** Were any of these smart thermostats installed and then removed, or have some of them not been installed yet?

1. **[IF QTY=1 OR IF E2 = 3 AND QTY =3 OR IF E2 = 2 AND QTY =2:** Installed and removed **[IF E2 = 4 AND QTY >1 OR IF E2 = 2 AND QTY =3:** Installed and then removed all (other) thermostats
2. **[INCLUDE OPTION IF E2 = 4 AND QTY> 1:** Installed and removed one thermostat, the rest have not been installed yet
3. **[INCLUDE OPTION IF E2 = 2 AND QTY =3:** Installed and removed two thermostats, the other has not been installed yet
4. **[IF QTY=1 OR IF E2 = 3 AND QTY =3 OR IF E2 = 2 AND QTY =2:** Or not installed yet **[IF E2 = 4 AND QTY >1 OR IF E2 = 2 AND QTY =3:** None have been installed yet
5. Given to someone else / installed at another property

98. Don't Know
99. (Skipped)

E4. **[ASK IF E3= 1, 2, 3]** Why did you install and then remove the smart thermostat(s)? **[RANDOMIZE RESPONSE ORDER, MARK ALL THAT APPLY]**

1. Too difficult to use
2. Did not adjust temperatures correctly
3. Thermostat broke
4. Did not think it was saving energy
5. I preferred my previous thermostat(s)
6. Other (please specify) [**RECORD RESPONSE _____**]

98. Don't Know
99. (Skipped)

E5. **[ASK IF E3 = 4 AND QTY=1]** Why has the smart thermostat not been installed in your home yet? **[OR IF E3 = 4 AND QTY>1, OR E3 = 2 ,3]** Why have your smart thermostats not all been installed in your home yet?

1. Haven't had time
2. Don't know how to install it
3. Installed in someone else's home / a different property
4. Other reason (please specify), [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

F. *Smart Thermostat Usage*

ASK THIS SECTION OF PARTICIPANTS WHO HAVE INSTALLED SMART THERMOSTATS.

F1. How easy is the smart thermostat to use?

5. Very easy
6. Somewhat easy
7. Not too easy
8. Not at all easy
98. Don't Know
99. (Skipped)

F2. Is the function on your smart thermostat that senses when you are home or away working? (This function is also called "geofencing" or "occupancy sensing")?

1. Yes
2. No
98. Don't Know
99. (Skipped)

F3. Is your smart thermostat connected to the internet?

1. Yes
2. No
98. Don't Know
99. (Skipped)

F4. What features of your smart thermostat do you like best? [**RANDOMIZE ORDER, MARK ALL THAT APPLY**]

1. Thermostat design / aesthetics
2. Thermostat ease of use
3. Automatically programs itself / automatically adjusts the temperature when you're away
4. Gives me detailed information about my energy use
5. Dehumidifying capabilities (When thermostat uses HVAC system to lower indoor humidity level)
6. Maintenance reminders
7. Mobile app
8. Remote monitoring of household temperature and thermostat settings
9. Ability to check local weather from thermostat and smartphone/tablet app
10. Other features [**PLEASE SPECIFY_____**]
11. None of the above
98. Don't Know
99. (Skipped)

F5. In what ways have you ever accessed your thermostat since it was first installed, to do things such as changing your temperature settings or schedules? [**MARK ALL THAT APPLY**]

1. The thermostat itself
2. Website on a PC or laptop
3. Smartphone or tablet app
4. I have not accessed my thermostat since it was installed

98. Don't Know
99. (Skipped)

F6. In the past 30 days, how have you <u>most often</u> accessed your new thermostat? [**SELECT ONE**]

1. The thermostat itself
2. Website on a PC or laptop
3. Smartphone or tablet app
4. I have not accessed my thermostat in the past month

98. Don't Know
99. (Skipped)

F7. How do you currently use your thermostat's interactive capabilities? [**RANDOMIZE ORDER, CHECK ALL THAT APPLY**]

1. Check how much energy I have used
2. Adjust the temperature while at home
3. Adjust the temperature while away from home
4. Modify my thermostat schedule while at home
5. Modify my thermostat schedule while away from home
6. Check inside or outside temperature
7. Just checked it out to see what it has to offer
8. Have not used interactive capabilities
9. Other, [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

F8. How is your smart thermostat currently controlled? [**SELECT ONE**]

1. I keep it at a constant temperature throughout the season
2. I rely on the programmed schedule of temperatures, and never manually change the temperature
3. I rely on the programmed schedule of temperatures, but sometimes manually change the temperature
4. I manually adjust the temperature using a regular schedule by changing the temperature for different times of the day or week
5. I manually adjust the temperature using no regular schedule
6. Some other way [**SPECIFY: _____**]

98. Don't Know
99. (Skipped)

G. Satisfaction with Ameren Missouri

G1. Thinking about your overall experiences with Ameren Missouri as your utility, how satisfied would you say you are with Ameren Missouri?

1. Very satisfied
2. Somewhat satisfied
3. Not too satisfied
4. Not satisfied at all
98. Don't Know
99. (Skipped)

G2. **[ASK IF G1= 1, 2, 3 OR 4]** Why are you **[RATING FROM G1]** with Ameren Missouri as your utility?

[RECORD RESPONSE:_____]

G3. Based on your experience with the Efficient Products rebate program, would you say your satisfaction with Ameren Missouri has:

1. Increased
2. Stayed about the same, or
3. Decreased
98. Don't know
99. (Skipped)

H. Customer Demographics

H1. Is the energy used to heat your home . . .

1. All electric,
2. All natural gas,
3. Natural gas and electric,
4. Some other combination of energy sources?
98. Don't Know
99. (Skipped)

H2. Is your hot water heater electric or gas?

1. Electric
2. Gas
98. Don't Know
99. (Skipped)

CLOSING

This completes the survey. We appreciate your participation and thank you for your time.

NONPARTICIPANT SURVEY RESPONSES

Measure Information					Criterion A: Familiarity with at least one Ameren Missouri program, rebate, or discount			Criterion B: At least one element of Ameren's program marketing and outreach motivated them to adopt the measure						Criterion C: They had a valid reason for considering the adopted measure energy efficient		Criterion D: For a like measure, they had not received a rebate from Ameren, and had not already tried to receive a rebate from Ameren, and they stated a valid reason for not applying for an Ameren rebate		Criterion E: They had a valid reason for deciding to install the measure		Criterion F: The adopted measure generated electric savings, not gas savings				Meeting all criteria
ID	Measure ID	Measure	Like or Non-like	Web or Phone Survey	C2. Have you seen or heard of the Ameren Missouri energy efficiency programs?	C10. Are you aware that Ameren Missouri offers rebates and discounts for energy-saving equipment in your home?	Criterion A met? (Yes to C2 or C10)	QG12_A. Information about energy savings from Ameren's marketing, or bill-insert	QG12_C. Information from colleagues or friends who installed energy efficient equipment and received a rebate from Ameren	QG12_D. Past participation in an Ameren rebate program	QG12_E. Information from the energy assessment conducted at your home through Ameren	Criterion B met for 50% savings? (Max rating was 3)	Criterion B met for 100% savings? (Max rating was 4)	QG4. How do you know the measure is energy efficient?	Criterion C met? (qualitative assessment)	QG9. Why you didn't apply for rebate?	Criterion D met? (qualitative assessment)	QG6/QG7. Why did you adopt this measure?	Criterion E met? (qualitative assessment)	Cooling System	Heating System	Water Heating Fuel	Criterion F met? (depends on the measure)	Meeting all criteria
CAD000163256	G203	Efficient room air conditioner	Like	Phone	No	Yes	TRUE	4	Refused	Refused	Refused	FALSE	TRUE	The retailer/dealer/contractor told me it was	TRUE	beacuase I don't know how efficient it is	TRUE	because it was free and I didn't have any choice	FALSE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002669018	G208	Efficient kitchen faucet aerators	Like	Phone	Yes	Yes	TRUE	4	2	0	0	FALSE	TRUE	Galloons per minute used	TRUE	Not worth hassle.	TRUE	Part of the replacement of the faucet.	TRUE	Central air conditioner	Electric baseboard heat	Electric	TRUE	TRUE
CAD002723284	G208	Efficient kitchen faucet aerators	Like	Phone	Yes	Yes	TRUE	1	4	0	0	FALSE	TRUE	It's ENERGY STAR-certified	TRUE	Did not feel it was necessary	TRUE	Save Water	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002723284	G220	Learning or "smart" thermostat	Like	Phone	Yes	Yes	TRUE	3	1	0	0	TRUE	FALSE	NA		Same Reason; Did not feel it was necessary	TRUE	87 yr old mother who screws it up all of the time.	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002698885	G203	Efficient room air conditioner	Like	Phone	Yes	Yes	TRUE	3	3	0	0	TRUE	FALSE	It's ENERGY STAR-certified	TRUE	I wasn't sure my equipment qualified	TRUE	the one we had was too small	TRUE	Window or wall air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002175073	G207	Efficient showerheads	Like	Phone	Yes	No	TRUE	4	4	0	0	FALSE	TRUE	BOX SAID SO	TRUE	DIDN'T KNOW THE PROGRAM WAS AVAILABLE.	TRUE	IT WAS THE ONE I LIKED	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002788370	G207	Efficient showerheads	Like	Phone	Yes	Yes	TRUE	1	1	0	0	FALSE	FALSE	It does good and lowers the bill	TRUE	Just forgot about it	TRUE	To save energy	TRUE	Window or wall air conditioner	Gas furnace/boiler	Electric	TRUE	FALSE
CAD000196966	G203	Efficient room air conditioner	Like	Phone	Yes	Yes	TRUE	3	1	0	1	TRUE	FALSE	Just from what the paper work says.	TRUE	I didn't buy it through a contractor, I picked it up myself.	TRUE	Because it is the hottest room in the house and we wanted that it would cool the room off sooner.	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	TRUE
CAD002203571	G208	Efficient kitchen faucet aerators	Like	Phone	Yes	Yes	TRUE	2	3	0	2	TRUE	FALSE	Word of mouth.	TRUE	Time consumption.	TRUE	Conserve energy.	TRUE	None	Electric furnace	Electric	TRUE	TRUE
CAD002413700	G225	Efficient clothes washer	Non-like	Phone	No	Yes	TRUE	2	2	2	2		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002413700	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	2	2	2	2		FALSE	NA				It was more precise.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD002421391	G229	Efficient Windows	Non-like	Phone	Yes	Yes	TRUE	4	3	1	1		TRUE	The retailer/dealer/contractor told me it was	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	TRUE
CAD002530620	G224	Efficient freezer	Non-like	Phone	No	Yes	TRUE	4	4	4	0		TRUE	It's ENERGY STAR-certified	TRUE			NA		Air-source heat pump	Electric furnace	Electric	TRUE	TRUE

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ID	Measure ID	Measure	Like or Non-like	Web or Phone Survey	C2. Have you seen or heard of the Ameren Missouri energy efficiency programs?	C10. Are you aware that Ameren Missouri offers rebates and discounts for energy-saving equipment in your home?	Criterion A met? (Yes to C2 or C10)	QG12_A. Information about energy savings from Ameren's marketing, or bill-insert	QG12_C. Information from colleagues or friends who installed energy efficient equipment and received a rebate from Ameren	QG12_D. Past participation in an Ameren rebate program	QG12_E. Information from the energy assessment conducted at your home through Ameren	Criterion B met for 50% savings? (Max rating was 3)	Criterion B met for 100% savings? (Max rating was 4)	QG4. How do you know the measure is energy efficient?	Criterion C met? (qualitative assessment)	QG9. Why you didn't apply for rebate?	Criterion D met? (qualitative assessment)	QG6/QG7. Why did you adopt this measure?	Criterion E met? (qualitative assessment)	Cooling System	Heating System	Water Heating Fuel	Criterion F met? (depends on the measure)	Meeting all criteria
CAD002530620	G301	Removed a refrigerator or freezer	Non-like	Phone	No	Yes	TRUE	4	4	4	0		TRUE	NA				It was using up space and it was old.	TRUE	Air-source heat pump	Electric furnace	Electric	TRUE	TRUE
CAD002339649	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	4	4	0	0		TRUE	NA				was already installed when I moved in.	TRUE	Central air conditioner	[DO NOT READ] DON'T KNOWElectric	Electric	TRUE	TRUE
CAD002339649	G302	Scheduled an air conditioner tune-up	Non-like	Phone	No	Yes	TRUE	3	4	0	0		TRUE	NA				because my air conditioner would be running but not blowing out anything.	TRUE	Central air conditioner	[DO NOT READ] DON'T KNOWElectric	Electric	TRUE	TRUE
CAD002779787	G301	Removed a refrigerator or freezer	Non-like	Phone	Yes	Yes	TRUE	3	Don't know	0	0		FALSE	NA				no longer needed it	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD002779787	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	Yes	TRUE	2	Don't know	0	0		FALSE	NA				usefull	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD002551087	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	1	1	0	0		FALSE	NA				NO SENSE TO PAY FOR ENERGY WHEN NOBODY AT HOME TO USE IT.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD002551087	G225	Efficient clothes washer	Non-like	Phone	No	Yes	TRUE	3	2	0	0		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002419453	G302	Scheduled an air conditioner tune-up	Non-like	Phone	No	Yes	TRUE	Refused	Refused	0	0		FALSE	NA				To maintain it through the hot season.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002419453	G225	Efficient clothes washer	Non-like	Phone	No	Yes	TRUE	3	4	0	0		TRUE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	TRUE
CAD002419453	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	Refused	Refused	0	0		FALSE	NA				Save money.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD002281843	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	4	2	0	0		TRUE	NA				So I could reduce my bill	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	TRUE

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CAD002750636	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	2	3	0	0		FALSE	NA				the ac broke	TRUE	Central air conditioner	Gas furnace/boiler	[DO NOT READ] DON'T KNOW	TRUE	FALSE
CAD002439061	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	No	TRUE	Don't know	Don't know	0	Don't know		FALSE	NA				He checks in the summer time	TRUE	None	None	Electric	TRUE	FALSE
CAD002439061	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	Don't know	Refused	0	3		FALSE	NA				No need to run it at night	TRUE	None	None	Electric	TRUE	FALSE
CAD002723284	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	4	1	0	0		TRUE	NA				So it works more efficiently.	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002276715	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	[DO NOT READ] DON'T KNOW	Yes	TRUE	3	4	0	0		TRUE	NA				Just too save more energy because we usually keep it at 60-63 during winter and 70-75 during the summer.	TRUE	Central air conditioner	Electric furnace	Gas	TRUE	TRUE
CAD002175073	G224	Efficient freezer	Non-like	Phone	Yes	No	TRUE	4	4	0	0		TRUE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002762688	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	2	2	0	0		FALSE	NA				[DO NOT READ] DON'T KNOW		Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD002547137	G228	Efficient water heater (other than heat pump water heater)	Non-like	Phone	No	Yes	TRUE	1	1	0	0		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD000091720	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	3	2	0	2		FALSE	NA				just good practice, just operating efficiency	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002778413	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	No	TRUE	3	3	0	0		FALSE	NA				make sure it had plenty of freon in it , cleaned and serviced	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD002778413	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	3	3	0	0		FALSE	NA				they just checked it while at my home , I didn't request it	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD000166644	G225	Efficient clothes washer	Non-like	Phone	Yes	Yes	TRUE	3	3	0	0		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Ground-source or geothermal heat pump	Electric	TRUE	FALSE

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CAD002193741	G301	Removed a refrigerator or freezer	Non-like	Phone	Yes	No	TRUE	4	4	0	1		TRUE	NA				cause the refridgerator went bad	FALSE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD002344338	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	3	1	0	1		FALSE	NA				I have someone come each spring	TRUE	[DO NOT READ] DON'T KNOW	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002289348	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	4	4	0	0		TRUE	NA				we were gonna be gone for a coupkleof days	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	TRUE
CAD002688692	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	Yes	TRUE	Don't know	3	0	0		FALSE	NA				help save money	TRUE	Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD000490371	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	[DO NOT READ] DON'T KNOW	Yes	TRUE	3	3	0	0		FALSE	NA				we live in saint Louis and the weather fluctuates a lot and we don't need to use it	TRUE	Central air conditioner	[DO NOT READ] DON'T KNOWGas	Gas	TRUE	FALSE
CAD000490371	G229	Efficient Windows	Non-like	Phone	[DO NOT READ] DON'T KNOW	Yes	TRUE	4	4	0	0		TRUE	The retailer/dealer/contractor told me it was	TRUE			NA		Central air conditioner	[DO NOT READ] DON'T KNOWGas	Gas	TRUE	TRUE
CAD000490371	G302	Scheduled an air conditioner tune-up	Non-like	Phone	[DO NOT READ] DON'T KNOW	Yes	TRUE	4	4	0	0		TRUE	NA				just do it every year	TRUE	Central air conditioner	[DO NOT READ] DON'T KNOWGas	Gas	TRUE	TRUE
CAD002443279	G225	Efficient clothes washer	Non-like	Phone	No	Yes	TRUE	Don't know	2	0	4		TRUE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Electric furnace	Electric	TRUE	TRUE
CAD002443279	G302	Scheduled an air conditioner tune-up	Non-like	Phone	No	Yes	TRUE	2	1	0	3		FALSE	NA				Because we needed a new air conditioner so we bought a new one.	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD003392328	G226	Efficient dishwasher (exclude from NPSO because virtually all dishwashers on the market are ENERGYSTAR)	Non-like	Phone	No	Yes	TRUE	1	4	0	0		TRUE	It's ENERGY STAR-certified	TRUE			NA		Air-source heat pump	Gas furnace/boilerAir-source heat pump	Electric	TRUE	FALSE
CAD003392328	G301	Removed a refrigerator or freezer	Non-like	Phone	No	Yes	TRUE	4	4	0	0		TRUE	NA				it was old	TRUE	Air-source heat pump	Gas furnace/boilerAir-source heat pump	Electric	TRUE	TRUE

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CAD003392328	G228	Efficient water heater (other than heat pump water heater)	Non-like	Phone	No	Yes	TRUE	4	4	0	0		TRUE	It's ENERGY STAR-certified	TRUE			NA		Air-source heat pump	Gas furnace/boilerAir-source heat pump	Electric	TRUE	TRUE
CAD000148252	G301	Removed a refrigerator or freezer	Non-like	Phone	No	Yes	TRUE	4	4	0	0		TRUE	NA				[DO NOT READ] DON'T KNOW		Central air conditioner	Electric furnace	Electric	TRUE	TRUE
CAD002577182	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	No	TRUE	1	1	0	3		FALSE	NA				to get the coil cleaned, there's always a lot of dirt that gets in there	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000413427	G302	Scheduled an air conditioner tune-up	Non-like	Phone	No	Yes	TRUE	3	1	0	1		FALSE	NA				to make it morwe eefficient	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD000413427	G225	Efficient clothes washer	Non-like	Phone	No	Yes	TRUE	2	1	0	Refused		FALSE	what itr sauid	TRUE			NA		Central air conditioner	Electric furnace	Electric	TRUE	FALSE
CAD000413427	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	Refused	4	0	Don't know		TRUE	NA				saves money	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	TRUE
CAD002794146	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	2	1	0	0		FALSE	NA				for when im not home I adjust it to a lower temp	TRUE	Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD002794146	G225	Efficient clothes washer	Non-like	Phone	Yes	No	TRUE	1	1	0	0		FALSE	The retailer/dealer/contractor told me it was	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000381277	G225	Efficient clothes washer	Non-like	Phone	No	Yes	TRUE	4	4	0	4		TRUE	Marked on the sticker.	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	TRUE
CAD002788370	G228	Efficient water heater (other than heat pump water heater)	Non-like	Phone	Yes	Yes	TRUE	4	4	0	0		TRUE	It lowers the bill	TRUE			NA		Window or wall air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002788370	G224	Efficient freezer	Non-like	Phone	Yes	Yes	TRUE	4	3	0	0		TRUE	It lowers the bill	TRUE			NA		Window or wall air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD002557560	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	No	TRUE	4	4	0	4		TRUE	NA				just trying not to use as much energy, turn it down when i go to bed and dont let it go past 60	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	TRUE
CAD002277386	G229	Efficient Windows	Non-like	Phone	Yes	No	TRUE	3	3	0	0		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE

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ID	Measure ID	Measure	Like or Non-like	Web or Phone Survey	C2. Have you seen or heard of the Ameren Missouri energy efficiency programs?	C10. Are you aware that Ameren Missouri offers rebates and discounts for energy-saving equipment in your home?	Criterion A met? (Yes to C2 or C10)	QG12_A. Information about energy savings from Ameren's marketing, or bill-insert	QG12_C. Information from colleagues or friends who installed energy efficient equipment and received a rebate from Ameren	QG12_D. Past participation in an Ameren rebate program	QG12_E. Information from the energy assessment conducted at your home through Ameren	Criterion B met for 50% savings? (Max rating was 3)	Criterion B met for 100% savings? (Max rating was 4)	QG4. How do you know the measure is energy efficient?	Criterion C met? (qualitative assessment)	QG9. Why you didn't apply for rebate?	Criterion D met? (qualitative assessment)	QG6/QG7. Why did you adopt this measure?	Criterion E met? (qualitative assessment)	Cooling System	Heating System	Water Heating Fuel	Criterion F met? (depends on the measure)	Meeting all criteria
CAD002531208	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	3	1	0	1		FALSE	NA				well its saves money in the long run and if theres problems they find them.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002531208	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	Yes	TRUE	3	Don't know	0	2		FALSE	NA				to save money	TRUE	Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD000233264	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	Don't know	3	0	3		FALSE	NA				Because my wife likes it colder at night.	TRUE	Central air conditioner	Gas furnace/boiler	[DO NOT READ] DON'T KNOW	FALSE	FALSE
CAD002674741	G301	Removed a refrigerator or freezer	Non-like	Phone	Yes	No	TRUE	3	1	0	1		FALSE	NA				I have gotten a new one	TRUE	Central air conditioner	[DO NOT READ] DON'T KNOWElectric	Electric	TRUE	FALSE
CAD000304876	G301	Removed a refrigerator or freezer	Non-like	Phone	Yes	Yes	TRUE	3	3	0	2		FALSE	NA				Because we needed a new fridge, and when I chose it, I needed it to be energy efficient.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000304876	G225	Efficient clothes washer	Non-like	Phone	Yes	Yes	TRUE	3	3	0	2		FALSE	It has a sign that says high effiecny, it was highly detailed.	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000304876	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	3	2	0	2		FALSE	NA				It was for the air quality.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000047136	G224	Efficient freezer	Non-like	Phone	Yes	Yes	TRUE	4	4	0	4		TRUE	The retailer/dealer/contractor told me it was	TRUE			NA		Central air conditioner	Ductless or mini-split heat pump	Electric	TRUE	TRUE
CAD000315574	G302	Scheduled an air conditioner tune-up	Non-like	Phone	No	Yes	TRUE	3	3	0	3		FALSE	NA				It was part of the purchase agreement, that they service it once every year	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000315574	G228	Efficient water heater (other than heat pump water heater)	Non-like	Phone	No	Yes	TRUE	3	3	0	2		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE

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ID	Measure ID	Measure	Like or Non-like	Web or Phone Survey	C2. Have you seen or heard of the Ameren Missouri energy efficiency programs?	C10. Are you aware that Ameren Missouri offers rebates and discounts for energy-saving equipment in your home?	Criterion A met? (Yes to C2 or C10)	QG12_A. Information about energy savings from Ameren's marketing, or bill-insert	QG12_C. Information from colleagues or friends who installed energy efficient equipment and received a rebate from Ameren	QG12_D. Past participation in an Ameren rebate program	QG12_E. Information from the energy assessment conducted at your home through Ameren	Criterion B met for 50% savings? (Max rating was 3)	Criterion B met for 100% savings? (Max rating was 4)	QG4. How do you know the measure is energy efficient?	Criterion C met? (qualitative assessment)	QG9. Why you didn't apply for rebate?	Criterion D met? (qualitative assessment)	QG6/QG7. Why did you adopt this measure?	Criterion E met? (qualitative assessment)	Cooling System	Heating System	Water Heating Fuel	Criterion F met? (depends on the measure)	Meeting all criteria
CAD000302905	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	No	Yes	TRUE	2	1	0	1		FALSE	NA				there was so sense in havoing it run all day	TRUE	Central air conditioner	Gas furnace/boiler	Electric	FALSE	FALSE
CAD000302905	G302	Scheduled an air conditioner tune-up	Non-like	Phone	No	Yes	TRUE	3	1	0	4		TRUE	NA				casue I have a regusular tune up every summer for the heat. time track	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE
CAD000302905	G304	Other action	Non-like	Phone	No	Yes	TRUE	1	1	0	1		FALSE	NA				it was vented properly and the whole thing blew it. destroyed it.	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	FALSE
CAD002203571	G225	Efficient clothes washer	Non-like	Phone	Yes	Yes	TRUE	2	3	0	2		FALSE	Word of mouth	TRUE			NA		None	Electric furnace	Electric	TRUE	FALSE
CAD000243723	G225	Efficient clothes washer	Non-like	Phone	Yes	Yes	TRUE	3	2	0	0		FALSE	I read the information	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000243723	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	Don't know	Don't know	0	0		FALSE	NA				Because you should do that every season, its better for the air conditioner to catch things in the beginning rather than it go haywire in the middle of the season.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000432783	G230	Additional insulation	Non-like	Phone	No	Yes	TRUE	1	Don't know	0	0		FALSE	NA				NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000369716	G228	Efficient water heater (other than heat pump water heater)	Non-like	Phone	Yes	Yes	TRUE	3	2	0	0		FALSE	It's ENERGY STAR-certified	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	FALSE	FALSE
CAD000369716	G301	Removed a refrigerator or freezer	Non-like	Phone	Yes	Yes	TRUE	2	2	0	0		FALSE	NA				it was burning up.	FALSE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002337612	G229	Efficient Windows	Non-like	Phone	[DO NOT READ] DON'T KNOW	Yes	TRUE	3	2	1	0		FALSE	The retailer/dealer/contractor told me it was	TRUE			NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE

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CAD002622738	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	Yes	TRUE	4	4	0	0		TRUE	NA				Well we don't need it hot in the house and night and when we are not at home it doesn't need to run at all.	TRUE	[DO NOT READ] DON'T KNOW	[DO NOT READ] DON'T KNOWElectric	Electric	TRUE	TRUE
CAD002419821	G303	Programmed thermostat to reduce usage (either at night or during the day when people are not home)	Non-like	Phone	Yes	Yes	TRUE	Refused	4	0	0		TRUE	NA				Its just a matter of economy I have always done it.	TRUE	Window or wall air conditioner	Gas furnace/boiler	Gas	TRUE	TRUE
CAD002646472	G302	Scheduled an air conditioner tune-up	Non-like	Phone	Yes	Yes	TRUE	3	Refused	0	0		FALSE	NA				just part of an agreement we have with the air conditioner people	TRUE	Central air conditioner	Electric furnace	Gas	TRUE	FALSE
CAD002646472	G301	Removed a refrigerator or freezer	Non-like	Phone	Yes	Yes	TRUE	Refused	Refused	0	0		FALSE	NA				It was broken	FALSE	Central air conditioner	Electric furnace	Gas	TRUE	FALSE
CAD002565360	G230	Additional insulation	Non-like	Phone	No	Yes	TRUE	1	4	1	0		TRUE	NA				NA		Central air conditioner	Electric baseboard heat	Electric	TRUE	TRUE
CAD002277386	G230	Additional insulation	Non-like	Phone	Yes	No	TRUE	2	3	0	0		FALSE	NA				NA		Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD000047136	G230	Additional insulation	Non-like	Phone	Yes	Yes	TRUE	4	4	0	4		TRUE	NA				NA		Central air conditioner	Ductless or mini-split heat pump	Electric	TRUE	TRUE
CAD002698885	G210	Insulation	Non-like	Phone	Yes	Yes	TRUE	3	3	0	0		FALSE	The retailer/dealer/contractor told me it was	TRUE			to replace the old stuff	TRUE	Window or wall air conditioner	Gas furnace/boiler	Electric	TRUE	FALSE
CAD002565360	G210	Insulation	Non-like	Phone	No	Yes	TRUE	1	4	1	0		TRUE	because the more insulation you have the warmer it is, otherwise its going out the walls	TRUE			[DO NOT READ] DON'T KNOW		Central air conditioner	Electric baseboard heat	Electric	TRUE	TRUE
CAD000381277	G221	Programmable (but not "smart") thermostat	Non-like	Phone	No	Yes	TRUE	4	4	0	4		TRUE	NA				[DO NOT READ] DON'T KNOW		Central air conditioner	Gas furnace/boiler	Gas	TRUE	TRUE
CAD002413700	G221	Programmable (but not "smart") thermostat	Non-like	Phone	No	Yes	TRUE	3	3	3	1		FALSE	NA				Its the one that came with the home and the cost.	TRUE	Central air conditioner	Gas furnace/boiler	Gas	TRUE	FALSE
CAD002175073	G202	Efficient refrigerator	Non-like	Phone	Yes	No	TRUE	3	4	0	0		TRUE	The retailer/dealer/contractor told me it was	TRUE			IT WAS THE ONE I LIKED	TRUE	Central air conditioner	Gas furnace/boiler	Electric	TRUE	TRUE

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CAD002193741	G202	Efficient refrigerator	Non-like	Phone	Yes	No	TRUE	4	3	0	Don't know		TRUE	It's ENERGY STAR-certified	TRUE			Just cause we needed one	TRUE	Central air conditioner	Electric furnace	Electric	TRUE	TRUE