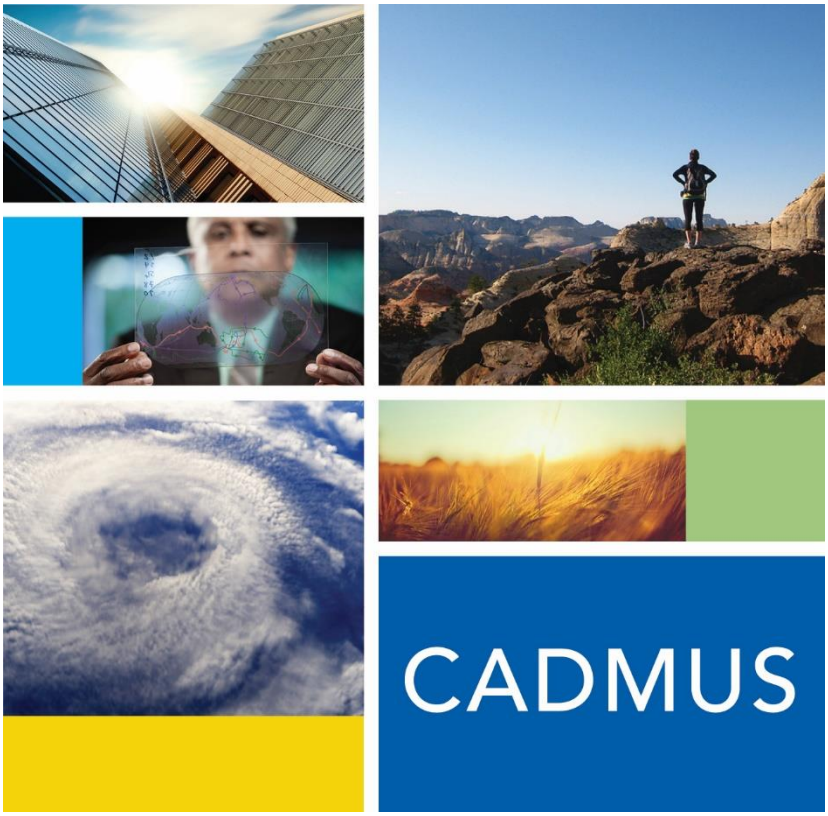


# Ameren Missouri
# Home Energy Report
# Impact and Process Evaluation:
# Program Year 2016

July 13, 2017

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# Executive Summary

Ameren Missouri engaged Cadmus to perform annual process and impact evaluations of the Home Energy Reports program (HER 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 HER program is a new behavioral program offered by Ameren Missouri in program years 2016–2018 (PY16–PY18). The program objective is to provide mailed home energy reports (HER reports) that encourage customers to reduce their energy consumption through behavioral changes. Ameren Missouri designed the program so that a sample of residential customers received home energy reports using a randomized control trial experimental design.

In PY16, the program implementer, ICF, and Ameren Missouri selected customers eligible for the program. Cadmus sampled and randomized customers into treatment and control groups which initially included 225,000 treatment group customers and 75,000 control group customers. ICF produced and distributed three mailed paper HER reports to treatment group customers in August 2016, November 2016, and February 2017. The HER reports contained information about customers' home energy consumption and encouragement to adopt energy-saving home improvements and behaviors. ICF forecasted and tracked savings throughout the program year. Cadmus performed evaluation activities after the third quarter and again after the end of the program year.

## *Key Impact Evaluation Findings*

Cadmus summarized key findings for the PY16 evaluation period below.

### Program Data Adjustments

HER program data consisted of customer data and billing data. Cadmus made no adjustments.

### Gross Impacts

Table 1 summarizes PY16 participation for the HER program. Due to partial year implementation of this program, along with the nature of the program, in which savings ramp up and are predicted to occur mostly in the summer, Cadmus did not report an annual savings value for this program.

The TRM assumption was that the program would result in average savings of 150 kWh per year per customer, or 0.410 kWh per day per customer. The TRM estimated savings were based on an entire program year that includes the cooling season, during which Ameren Missouri expects substantial HER program savings to occur. Due differences in underlying assumptions between the TRM assumptions and program implementation in PY16, Cadmus did not compare evaluated savings with TRM savings or calculate a realization rate.

Table 1. PY16 HER Program Summary: *Ex Post* Program Gross Savings

| Measure | PY16 Participation* | Per-Unit *Ex Post* Savings (kWh/customer/yr)** | Realization Rate** | Number Verified Participants *** | Total *Ex Post* Gross Savings (kWh/yr)** |
|---|---|---|---|---|---|
| Home energy report | 225,000 | NA | NA | 215,278 | NA |

* Number of customers in randomized treatment group.

** Due to partial year implementation of this program along with the nature of the program in which savings ramp up and are predicted to occur mostly in the summer, we did not compute an annual savings value for this program.

*** Number of customers in final analysis data set resulting from the merge of billing data with customer data where data include usage for customers at least up to the first month of the program. Typically utilities, and hence programs, lose customers over the course of the program year due to accounts becoming inactive (i.e., customers moving).

Cadmus did estimate savings for the partial 2016 program year, although the estimate is limited by the duration and timing of program implementation. The findings from the partial year analysis are described in the main body of this report.

### Net Savings

Cadmus did not calculate annual net savings for this program due to partial year implementation.As shown in Table 2, the PY16 program annual net energy and demand savings target were 33,750 MWh and 15,720 kW, respectively, as specified in the Ameren Missouri's residential tariff.[1] Cadmus did not calculate annual net savings for this program due to partial year implementation.

Table 2. PY16 HER Program Savings Comparisons

| Metric | MPSC-Approved Target | *Ex Ante* Gross Savings Utility Reported | *Ex Post* Gross Savings Determined by EM&V | *Ex Post* Net Savings Determined by EM&V | Percent of Goal Achieved |
|---|---|---|---|---|---|
| Energy (MWh) | 33,750 | 33,750 | NA | NA | NA |
| Demand (kW) | 15,720 | 15,720 | NA | NA | NA |

## *CSR Impact Evaluation Requirements*

According to the Missouri Code of State Regulations (CSR),[2] demand-side programs that operate 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 3, which also includes the method that Cadmus used to satisfy these

[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

[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

requirements for the HER program. We provide a summary of process CSR requirements in Table 4 at the end of the next section.

**Table 3. 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 | ✓ | Regression analysis controlling for customer heating and cooling degree days. |
| Comparisons between loads for program participants and an appropriate control group over the same period | ✓ | Regression analysis of customers assigned to randomized control trial. |
| **Data: The evaluation must use one or more of the following types of data to assess program impact:** | | |
| Monthly billing data | ✓ | Regression analysis modeled monthly billing data. |
| Hourly load data | | |
| Load research data | | |
| End-use load metered data | | |
| Building and equipment simulation models | | |
| Survey responses | | |
| **Audit and survey data on:** | | |
| Equipment type/size efficiency | | |
| Household or business characteristics | | |
| Energy-related building characteristics | | |

## *Key Process Evaluation Findings*

Cadmus summarized key findings for the PY16 evaluation period below. Cadmus compared Ameren Missouri's HER program with six other comparable behavioral programs' as a benchmark and included relevant comparisons in the findings below.

### Marketing and Outreach

In PY16, the first HER report welcomed treatment group customers to the program and the customers did not receive any additional marketing materials. Ameren Missouri maintains a program-affiliated web

page[3] and the HER reports provide a link to this web page. However, it serves as a source for frequently asked questions and answers rather than a portal with customer-specific HER-related information. Cadmus found that in benchmarked programs, like Ameren Missouri's HER program, all HER reports included neighbor comparison and energy saving steps, or tips. All other programs (except Ameren Illinois) contained a third customer-specific progress tracker that provides each customer with a comparison of their recent energy usage to historical usage in the same months. As noted by Ameren Missouri staff, comparing current to historical usage in the same months doesn't provide much value until after the customer has received reports and had the opportunity to implement savings. According to Ameren Missouri staff this feature is planned for PY17.

### HER Report Frequency and Timing

In PY16, Ameren Missouri sent three mailed HER reports to treatment group customers, with the first sent in August 2016. Benchmarked utilities delivered more reports during the program year than Ameren Missouri and, in addition to mailed reports, most programs sent out e-mailed reports on a monthly basis and offered participants access to a web portal (additional details provided below). Note that, given the partial year iimplementation of Ameren Missouri's HER program in PY16, the average number of HER reports per month were within the range of other utilities.

Partially due to Ameren Missouri's initial filing having not included the HER program, program planning efforts were initiated later for HER than for other programs. The subsequent planning and additional time required to collect feedback on a draft HER report from a customer panel, used to update the format of subsequent HER reports, resulted in the Ameren Missouri HER program launch occurring in August. The later launch occurred after summer peak energy usage and likely resulted in lower energy savings for the program year as a whole. The second HER report was sent in November 2016. The timing was determined based on the timing of the election – Ameren Missouri did not want to send the HER report before the election due to the high volume of mailers at that time. The timing may have been too late to impact energy saving behaviors during November though.

### HER Participant Feedback

Cadmus found high customer satisfaction both with Ameren Missouri and the HER reports program specifically (over 90% of surveyed customers were very or somewhat satisfied)[4]. The treatment group customers gave a variety of suggestions regarding program improvements, including suggestions regarding delivery and content of the HER reports. Treatment group customers said they wanted to receive emailed HER reports or have them available online and wanted to receive the reports more frequently. The greatest number of suggestions regarded the HER reports' content and including the following varied sentiment: providing more detail on customer energy usage, adding detail to the energy savings tips (e.g., the typical return on investment for the energy-saving actions in the HER report),

[3] https://www.ameren.com/Missouri/energy-efficiency/residential/home-energy-report

[4] Due to differences in reported metrics customer satisfaction rates could not be directly compared to other programs.

making the reports easier to understand, changing the similar homes comparison, and providing a list of local resources for energy efficiency services.

## CSR Process Evaluation Requirements

As previously discussed, the Missouri CSR requires that demand-side programs, functioning 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 4 which also includes a summary response for each specified requirement.

**Table 4. 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? | The HER program's target market segment is randomly sampled from the population of residential Ameren Missouri customers. Primary market imperfections that behavioral programs address include varied human responses to education, engagement, and motivation to perform household energy savings actions. |
| 2 | Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments? | The target market is appropriate because the majority of residential customers should be able to change energy usage behaviors to decrease energy consumption. |
| 3 | Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment? | This program does not incent end-use measures directly but does promote measures, as well as other Ameren Missouri programs, using tips in the HER reports. The tips include measures that are short term and easy to implement as well as measures that are more complex or longer term investments. They included information on LEDs, programmable and smart thermostats, efficient equipment replacements, and weatherization –all applicable to the residential customer segment. |
| 4 | Are the communication channels and delivery mechanisms appropriate for the target market segment? | The communication channel for HER reports is mailing paper reports. Surveyed customers read (89%) and either somewhat or strongly agreed that they were satisfied with the HER reports (95%), indicating that the mailed HER reports functioned as intended and were appropriate for the target market segment. Benchmarking, however, suggests that HER reports should be sent with higher frequency and in combination with an email channel and/or web portal |

| CSR Requirement Number | CSR Requirement Description | Summary Response |
|---|---|---|
| | | where participants could access their customer-specific information. |
| 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? | Ameren Missouri should continue to monitor savings over time as the HER program matures, and should consider strategies that have worked for similar programs (e.g., increasing the number of reports sent; adding a customer-specific progress tracker to the HER report, adding email and web-portal channels; and improving the format of their HER reports). |

## *Key Conclusions and Recommendations*

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

**Conclusion 1. Ameren Missouri sent fewer HER reports at non-optimal times of the year.** With constraints due to the election and a later start than anticipated, the first and second HER reports were sent out after summer peak energy consumption and, perhaps, after the beginning of the heating season.

**Recommendation 1. Update the HER report schedule.** Ameren Missouri could consider sending more HER reports at strategic times of year. For example, it could send HER report in consecutive months during peak energy usage periods and once between peak periods. This would increase the number of reports in total and would increase the frequency during times of year with higher saving potential.

**Conclusion 2. Ameren Missouri' HER program uses a subset of the channels that other utility programs use.** All benchmarked programs used paper mailed reports to deliver their HER programs. Among surveyed Ameren Missouri customers, Cadmus found high readership of the HER paper reports. Treatment group customers also reported checking their mailed utility bills at a much higher rate than emailed bills or bills sent through text message, indicating that customers engage with the paper mailed channel. However, other utility programs supplement the paper HER reports with emailed HER reports and web portals. The multiple channels serve as opportunities to engage the customer more often and in more depth, which may result in deeper savings.

**Recommendation 2. Launch an email channel to deliver HER reports in addition to the mailed version.** Ameren Missouri should continue mailing paper HER reports. The program should also consider adding an emailed HER report. Emailed reports could be sent to all customers in the treatment group or, if Ameren Missouri wants to experiment with different combinations of paper, email, and web delivery, could be sent to a randomized group of treatment customers so that the effects of various channels can be measured.

**Conclusion 3. Customers were satisfied with the HER reports but suggested adding more detail.** Cadmus found high customer satisfaction both with Ameren Missouri and the HER reports, program specifically (over 90% of surveyed customers were very or somewhat satisfied)[5]. Treatment group customers said they wanted to receive emailed HER reports or have them available online and wanted to receive the reports more frequently. The greatest number of suggestions regarded the HER reports' content and including the following varied sentiment: providing more detail on customer energy usage, adding detail to the energy savings tips (e.g., the typical return on investment for the energy-saving actions in the HER report), making the reports easier to understand, changing the similar homes comparison, and providing a list of local resources for energy efficiency services.

**Recommendation 3. Add more detail to the HER report energy savings tips.** Currently the HER report tips give information on the annual savings the customer could enjoy if he or she followed through with a tip. However, customers are interested in the specific return on investment for implementing an energy saving tip which would mean showing not only the savings but balancing the savings against the cost of implementation. This will provide the customer a tangible piece of information that they can track themselves.

**Conclusion 4. Ameren Missouri's HER report design is internally inconsistent and differs from other utility program HER reports.** In our review of the Ameren Missouri HER reports, we found that some images in HER report photos did not align with the tip following the photos. In a comparison of the Ameren Missouri HER reports with other programs' HER reports, Cadmus found differences in the order of items, neighbor comparison, and visual design.

**Recommendation 4. Ameren Missouri should consider updating the photos to align with the tip more closely and studying the impact of the HER report design on customer satisfaction and energy savings.** Customers may connect the tip messages with their intended outcome to a greater degree if the photo preceding the tips show images of equipment or behavior related to the tip. In the next program year, Ameren Missouri and the implementer could conduct a study to determine the optimal HER report design for their customers.

## *PY15 Recommendation Tracking*

The HER program is a new program offered by Ameren Missouri in program years 2016–2018 (PY16–PY18). Cadmus will begin recommendation tracking in PY16.

[5] Due to differences in reported metrics customer satisfaction rates could not be directly compared to other programs.

# Introduction

Ameren Missouri engaged Cadmus to perform annual process and impact evaluations of the Home Energy Report program (HER program) for a three-year period, from 2016 through 2018. This annual report covers 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*

A new behavioral program offered by Ameren Missouri from 2016–2018, (PY16–PY18), the HER program seeks to encourage customers, via mailed home energy reports (HER reports), to reduce their energy consumption through behavioral changes.

The program used a randomized control trial experimental design that randomly assigned customers to a treatment group (i.e., recipients of HER reports) or a control group (i.e., non-recipients). The randomization process served to identify two equivalent groups that could be compared to estimate differences in energy use (following receipt of HER reports) resulting from the program's intervention.

The program implementer, ICF, and Ameren Missouri selected customers eligible for the program. ICF produced and distributed the HER reports to treatment group customers and took responsibility for forecasting and tracking savings.

## *Program Activity*

In PY16, the HER program's population initially contained 225,000 treatment group customers and 75,000 control group customers, as shown in Table 5. Mailed HER reports informed treatment group customers about their home energy consumption and encouraged them to adopt energy-saving home improvements and behaviors. The first home energy report was sent in August 2016, followed by a second report in November 2016, and a third report in February 2017.

**Table 5. PY16 HER Program Activity**

| Measure | Delivery Frequency | PY16 Total Number of Customers |
|---|---|---|
| Treatment Group | Three paper HER reports | 225,000 |
| Control Group | -- | 75,000 |
| **Total** | | **300,000** |

### Program Accomplishments

The HER program focuses on effecting energy consumption behavior changes that result in reduced electricity consumption. Table 6 shows the program's achievements against its goals in PY16. Annual savings targets were 33,750 MWh and 15.7 MW in PY16, and 101,250 MWh and 47.2 MW for the three-

year cycle.[6] Due to partial year implementation of this program, along with the nature of the program, in which savings ramp up and are predicted to occur mostly in the summer, Cadmus did not report an annual savings value for this program. The PY16 verified number of customers equaled the number of customers in the customer and billing data with sufficient pre-program energy consumption that could be used in a savings analysis.

**Table 6. PY16 HER Program Goals and Achievements**

| | PY16 Target | PY16 Verified | Difference |
|---|---|---|---|
| Participation | 225,000 | 215,278 | 9,722 |
| MWh Savings | 33,750 | NA | NA |
| MW Savings | 15.72 | NA | NA |

[6] 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.

# Evaluation Methodology

In evaluating Ameren Missouri's HER program, Cadmus identified the following objectives for PY16.

## *Impact Evaluation Objectives*

- Estimate net energy savings
- Estimate the program's effect on participation in other Ameren Missouri programs
- Assess coincident peak net demand savings using Ameren Missouri's load shapes and estimation method

## *Process Evaluation Objectives*

- Assess program design and implementation and opportunities for improvements
- Determine readership of and satisfaction with the HER reports
- Identify specific energy-saving improvements and actions taken by customers
- Evaluate customer satisfaction with the HER reports and Ameren Missouri
- Track changes in key progress indicators
- Meet evaluation requirements of Missouri Code[7]

In Table 7, we list the evaluation activities and briefly explain the purpose of each activity; we include a check mark to indicate whether the activity was part of the process or impact evaluation. Further descriptions of each activity follow the table.

**Table 7. PY16 HER Program Process and Impact Evaluation Activities and Rationale**

| Evaluation Activity | Process | Impact | Description |
|---|---|---|---|
| Program Material and Marketing Review | ✓ | | Review program materials to understand the structure and implementation of the program. The HER program does not have additional marketing materials for treatment group participants, apart from the HER reports themselves; these were reviewed as part of the program material review. |
| Benchmarking Research | ✓ | | Review similar programs and estimated savings. |
| Program Manager and Implementer Interviews | ✓ | | Conduct interviews with the Ameren Missouri's program manager and the implementer to gather insights into the program design, challenges faced, and expected savings. |
| Randomization and Equivalency Analysis | | ✓ | Use randomization to assign customers to treatment and control groups. Verify that average energy |

[7] State of Missouri. "Administrative Rules: Missouri Code of State Regulations." 4 CSR 240-22.070(8). Revised January 2016. Available online: http://www.sos.mo.gov/adrules/csr/csr.asp

| Evaluation Activity | Process | Impact | Description |
|---|---|---|---|
| | | | consumption in the year preceding the program is equivalent in the treatment and control groups. |
| Customer Surveys | ✓ | | Survey customers in the treatment and control groups to collect data on perceptions about recent behavior changes, energy efficiency awareness, attitudes towards energy efficiency, customer satisfaction, and the HER reports (treatment customers only). |
| Survey Mode Bias Analysis | ✓ | | Complete survey mode bias analysis to test for bias between telephone and online surveys. |
| Calculation of Savings Impact | | ✓ | Determine energy savings using regression analysis of monthly billing data. |
| Uplift Analysis | | ✓ | Use quarterly uplift analysis to estimate the HER program's influence on participation in Ameren Missouri's other efficiency programs, based on program data for treatment group and control group customers. |
| Key Progress Indicators | ✓ | | In PY16, develop key progress indicators to track progress in subsequent program years. |
| Cost-Effectiveness Analysis | | ✓ | Review DSMore inputs and cost-effectiveness results to improve accuracy and verify reasonableness. |

## *Program Material and Marketing Review*

Cadmus reviewed program materials to better understand the program's structure and implementation. The HER program does not use additional marketing materials for treatment group participants, apart from the HER reports themselves.

## *Benchmarking Research*

Cadmus completed benchmarking research to compare the Ameren Missouri HER program with six behavior programs offered by other utilities. We compared HER report content and frequency, delivery channels, and participant satisfaction.

We selected six similar behavior-based energy efficiency programs, offered by utilities in a similar climate region as Ameren Missouri. We identified utilities with established programs that had recently been evaluated using metrics we could benchmark, including the following utility programs:

- Ameren Illinois 2012-2014 Behavior Modification Program
- Consumers Energy 2014 Home Energy Reports Program
- Indianapolis Power and Light (IPL) 2015 Peer Comparison Reports Program
- Northern Indiana Public Service Company (NIPSCO) 2015 Energy Conservation Program
- PPL Electric Utilities 2015 Residential Energy-Efficiency Behavior and Education Program
- Vectren Indiana 2015 Residential Behavioral Savings Program

## Stakeholder Interviews

In December 2016, Cadmus interviewed Ameren Missouri's HER program stakeholders. We designed these interviews to achieve the following:

- Gather information on program design and delivery
- Identify challenges that program staff or implementers have encountered
- Determine appropriate solutions

As shown in Table 8, Cadmus spoke with one program stakeholder from Ameren Missouri and one from ICF. Appendix C provides the stakeholder interview guide.

**Table 8. PY16 HER Program Completed Stakeholder Interviews**

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

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

## Randomization and Equivalency Analysis

Ameren Missouri used a randomized control trial (RCT) study design to implement the HER program to enable non-biased estimation of the program's impacts. It determined which customers were eligible for program participation, including all residential customers except those living in apartments or multifamily housing. However, Ameren Missouri had difficulties identifying these customers and therefore some were included in the eligible set of customers.

Cadmus randomly selected eligible customers and assigned them to treatment and control groups. We used customer and billing data from ICF for randomization. Only customers with 12 months of historic billing data were randomized. After randomizing customers into treatment and control groups, we verified the equivalence of pre-program electricity consumption in the treatment and control groups and provided the randomized customer list to the implementer.

## Customer Surveys

As shown in Table 9, Cadmus completed 815 online surveys and 360 telephone surveys in PY16. Appendix D provides the survey instruments.

Table 9. Survey Targets and Completes

| Population | Survey Mode | PY16 Target Surveys | PY16 Completed Survey |
|---|---|---|---|
| Treatment Group Customers | Telephone | 180 | 180 |
| | Online | 180 | 345 |
| Control Group Customers | Telephone | 180 | 180 |
| | Online | 180 | 470 |
| Total Target Sample Size | Telephone | 360 | 360 |
| | Online | 360 | 815 |

We asked both types of customers a series of questions regarding familiarity with energy efficiency and Ameren Missouri's other efficiency programs, energy-saving improvements made, energy-saving actions taken, attitudes and barriers surrounding energy efficiency, and satisfaction with Ameren Missouri. We asked the treatment group additional questions about their satisfaction with and the content of the HER reports.

In other evaluations, we have found that it takes time for customers to exhibit behavioral changes after initially receiving HER reports. Cadmus fielded the survey in February 2016 and timed the survey so that customers had received the first HER report six months prior to the survey and the most recent report within a week or two of the survey. We intended the timing to provide customers with sufficient time to become familiar with the HER reports and adopt energy-saving measures and behaviors.

To measure the influence of HER reports on treatment group customers, Cadmus compared survey responses between the treatment and control group using one-tailed t-tests for differences in proportions to determine if significant differences existed at 95% ($p \leq 0.05$) and 90% ($p \leq 0.10$) confidence. Statistically significant findings are indicated in the text and figures.[8]

## *Survey Mode Analysis*

In PY16, Cadmus surveyed treatment and control group customers using two modes: telephone and online surveys. We recommended this approach rather than using all web surveys to investigate whether significant differences in responses between survey modes, was evident in the results. To examine this, we used chi-squared and two-sample t-tests for differences in proportions to determine if there were significant differences between telephone and online survey responses.

The results showed that there were significant differences for many, though not all, questions. Thus, Cadmus weighted the PY16 survey responses, treating each surveyed population as a stratum and applying weights based on population and sample sizes to calculate population estimates.

[8] A single plus sign ($^{+}$) indicates a significant difference at the 90% level ($p \leq 0.10$). Double plus signs ($^{++}$) indicate a significant difference at the 95% level ($p \leq 0.05$).

Cadmus found that customer responses differed depending on the survey mode. We detected significant differences in results between customers surveyed via phone and via web surveys and though not every question exhibited survey response differences, many did. Cadmus cannot determine which answers are "correct", or representative of the larger population but we do know that the majority of Ameren Missouri customers do not opt to receive email communications from Ameren Missouri and so the population eligible for web surveys is substantially smaller than for phone surveys.

## *Energy and Demand Savings Calculations*

Due to partial year implementation of the HER program, along with the nature of the program, in which savings ramp up and are predicted to occur mostly in the summer, Cadmus did not report annual savings for this program.

Cadmus did, however, estimate electricity savings to date using a panel regression analysis of treatment and control customer energy consumption, collected through billing data.[9] The billing analysis conformed to IPMVP Option C whole facility methods[10] and the approaches described in the Uniform Methods Project protocols.[11] Because the HER program had been established using an RCT experimental design, regression analysis provided an unbiased savings estimate of net savings. Hence, a separate net-to-gross (NTG) analysis was unnecessary.

Cadmus used multiple regression model specifications to test robustness of the result to different model specifications. We tested two types of models including a customer fixed-effects, difference-in-differences (D-in-D) model and a "post-only" or "lagged seasonal" model and different specifications for each which included all or a subset of the following: customer fixed effects, month-by-year fixed effects, and weather variables (i.e., cooling degree day [CDD] and heating degree day [HDD]).

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9 Reference the "PY16 Review of Home Energy Reports Savings Estimation in the Missouri Technical Resource Manual" document for full details on the billing analysis methodology: Cadmus. "PY16 Review of Home Energy Reports Savings Estimation in the Missouri Technical Resource Manual." Submitted to Ameren Missouri on February 17, 2017.

10 Efficiency Valuation Organization. *International Performance Measurement and Verification Protocol, Concepts and Options for Determining Energy and Water Savings, Volume 1*. January 2012. Page 25. (EVO 10000 – 1:2012) Available online: http://www.evo-world.org/

11 Agnew, Ken, and M. Goldberg. *Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Chapter 8: Whole-Building Retrofit with Consumption Data Analysis Evaluation Protocol.* U.S. Department of Energy, National Renewable Energy Laboratory. April 2013. (NREL/SR-7A30-53827) Available online: http://www1.eere.energy.gov/office_eere/de_ump_protocols.html

Stewart, James and A. Todd. *Uniform Methods Project: Methods for Determining Energy Efficiency Savings for Specific Measures, Chapter 17: Residential Behavior Protocol*. U.S. Department of Energy, National Renewable Energy Laboratory. August 2014. (NREL/SR-7A40-62497) Available online: http://www1.eere.energy.gov/office_eere/de_ump_protocols.html

### *D-in-D Customer Fixed Effects Model*

The D-in-D fixed effects model compared differences in pre-program and post-program usage between treatment and control group customers. The results measured the effect of the HER reports, controlling for changes in temperature and other (unobservable) factors over time. Cadmus specified the model, assuming average daily energy consumption (kWh) of customer 'i' in month 't' was a function of other variables, as shown in Equation 1:

$$ADC_{it} = \beta\ PART_i * PY_{it} + W'\gamma + \alpha_I + \tau_t + \varepsilon_{it}$$

**Equation 1**

Where:

| | | |
|---|---|---|
| $\beta$ | = | Vector of coefficients representing the program's conditional average treatment effect on electricity use (average kWh per customer per day) during each given program year |
| $PART_i$ | = | Indicator variable for program participation (equaling 1 if customer 'i' is in the treatment group and 0 otherwise) |
| $PY_{it}$ | = | Indicator variable for each given program year (equaling 1 if month 't' occurred in the given program year for customer 'i' and 0 otherwise). |
| W | = | Vector using CDD and HDD variables to control for weather impacts on energy use |
| $\gamma$ | = | Vector of coefficients representing the weather variables' average impact on energy use |
| $\alpha_i$ | = | Average energy use of customer 'i' that is not sensitive to weather or time, also referred to as "customer fixed effects" |
| $\tau_t$ | = | Average energy use in month 't' reflecting unobservable factors specific to the month; also referred to as "month-by-year fixed effects" |
| $\varepsilon_{it}$ | = | Error term for customer 'i' in month 't' |

The error term $\varepsilon_{it}$ was uncorrelated with program participation ($PART_i$) and other observable variables due to random assignment of customers to the treatment and control groups.[12] The ordinary least squares estimates resulted in an unbiased estimate of average daily savings and the estimated coefficient $\beta$ represented the HER program's average treatment effect (i.e., the daily kWh savings impact) on the population of customers in the treatment group.

[12] Energy consumption is correlated within each customer over time and we corrected the estimated standard errors for this correlation.

### *Post-Only Model*

Cadmus used the post-only or lagged season effects approach described by Allcott and Rogers[13] using a regression analysis of post-program usage on the following:

- Program treatment group indicator variable
- Month-by-year fixed effects
- Pre-treatment usage
- Pre-treatment usage interacted with the month-by-year fixed effects

We controlled for differences in average energy use in the pre-period by including average usage in the year, summer, and winter in the regression model.

We specified the post-only model, assuming average daily consumption (ADC) of electricity for customer 'i' in month 't' was a function of pre-usage and weather variables, shown in Equation 2:

$$\begin{aligned} ADC_{it} = \; & \beta_1 \, PART_i \times PY_{it} + \beta_2 \, Pre\text{-}Usage_i + \beta_3 \, Pre\text{-}Summer_i + \beta_4 \, Pre\text{-}Winter_i \\ & + \beta_5 \, Pre\text{-}Usage_i \times \tau_t + \beta_6 \, Pre\text{-}Summer_i \times \tau_t + \beta_7 \, Pre\text{-}Winter_i \times \tau_t \\ & + W'\gamma + \tau_t + \varepsilon_{it} \end{aligned}$$

**Equation 2**

Where:

| | | |
|---|---|---|
| $\beta_1$ | = | Vector of coefficients representing the program's conditional average treatment effect on electricity use (average kWh per customer per day) during each given program year |
| $PART_i$ | = | Indicator variable for program participation (equaling 1 if customer 'i' is in the treatment group and 0 otherwise) |
| $PY_{it}$ | = | Indicator variable for each given program year (equaling 1 if month 't' occurred in the given program year for customer 'i' and 0 otherwise). |
| Pre-Usage | = | Mean household energy consumption across all pretreatment months |
| Pre-Summer | = | Mean household energy consumption during June, July, August, and September of the pretreatment period |
| Pre-Winter | = | Mean household energy consumption during December, January, February, and March of the pretreatment period |
| W | = | Vector using CDD and HDD variables to control for weather impacts on energy use |
| $\gamma$ | = | Vector of coefficients representing the weather variables' average impact on energy use |

[13] Allcott, Hunt, and T. Rogers. "The Short-Run and Long-Run Effects of Behavioral Interventions: Experimental Evidence from Energy Conservation." *American Economic Review*. 2014. 104(10): 3003-37.

$\tau_t$ = Average energy use in month 't' reflecting unobservable factors specific to the month; also referred to as "month-by-year fixed effects"

$\varepsilon_{it}$ = Error term for home 'i' in month 't'

Like the D-in-D model, the error term $\varepsilon_{it}$ was uncorrelated with program participation ($PART_i$) and other observable variables due to random assignment of customers to the treatment and control groups.[14] The ordinary least squares estimates resulted in an unbiased estimate of average daily savings. The estimated coefficient $\beta_1$ represented the program's average treatment effect (i.e., the daily kWh savings impact) on the population of customers in the treatment group.

### *Aggregating Savings*

Cadmus used estimates of average daily kWh savings per customer to calculate total annual savings across all verified treatment group customers. We estimated total *ex post* program savings to date as the product of average daily kWh savings per customer and the total number of verified customer treatment days[15] as shown in Equation 3:

$$\text{Total } \textit{Ex Post} \text{ Program Year Net Savings} = -\beta * \sum_j \text{Treatment Days in } PY_j$$

**Equation 3**

Where:

$\beta$ = Average daily kWh savings during the program year after receiving the first reports from regression (see Equation 1 and Equation 2)

$\text{Treatment Days}_j$ = Number of treatment days for treatment group customer 'j' in the program year; this equals the number of days remaining in the program year after receiving the first energy report

Cadmus will report precision at 90% confidence.

## *Uplift Analysis*

HER program savings estimates reflect behavioral changes due to customers receiving HER reports as well as other investments in energy-efficient products. Some customers that invested in and installed efficient products received rebates from Ameren Missouri through other efficiency programs. In such cases, savings from the HER program and other rebate programs would be confounded, i.e., both would be included in the total net savings estimate for the residential portfolio.

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[14] Energy consumption is correlated within each customer over time and we corrected the estimated standard errors for this correlation.

[15] A "treatment day" is a day counted after a customer receives their first HER report. For example, if a treatment group customer receives the first HER report on January 1, the corresponding number of treatment days is 365 in that calendar year.

To identify where HER program savings overlapped with savings from other programs, Cadmus conducted an uplift analysis. We compared cross-program participation among treatment group customers to participation among control group customers, summarized cross-participation savings, and, in the case that there were additional uplift savings, subtract them from the HER program total savings. As a result, the final HER program estimate can be added to other program savings estimates to estimate portfolio total savings without double-counting savings.

## *Key Progress Indicators*

Cadmus plans to track the following key progress indicators for the HER program across the three-year program cycle: program year electric savings, number of home energy report recipients, number of opt-outs, home energy report readership, uplift, and customer satisfaction with HER reports and with Ameren Missouri.

## *Cost-Effectiveness Analysis*

Using final PY16 Home Energy Reports Program participation and implementation data as well as the *ex ante* gross and net savings estimates presented in this report (because annual ex post estimates were not available due to the timing of program startup), 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-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

In this section, we describe the process evaluation findings for Ameren Missouri's HER program. We organized the findings in six sections: program design, program delivery, HER reports' influence, participant experiences, marketing and outreach, and customer surveys.

## *Program Design*

Ameren Missouri seeks to inform customers about their home energy consumption and to encourage adoption of energy-saving home improvements and behaviors. To accomplish this, it implemented the HER program and delivered seasonally focused HER reports that contain the following information:

- Comparison of each customer's energy use to that of similar homes
- Energy-saving action recommendations
- Information on Ameren Missouri's rebates

Not all Ameren Missouri customers received the HER reports. The program used an experimental RCT design to randomly assign customers to a treatment or control group. Though enrollment in the treatment group was automatic, customers could contact Ameren Missouri to opt to not receive the reports.

In PY16, the HER program population included 225,000 treatment group customers and 75,000 control group customers. As shown in Table 10, the first HER reports were sent in August 2016, followed by a second report in November 2016, and a final report in February 2017.

**Table 10. PY16 HER Report Delivery**

| Program Year Quarter | HER Report | | |
|---|---|---|---|
| | Number | Delivery Month, Year | Seasonal Focus |
| Q1 | - | | |
| Q2 | 1 | August 2016 | Summer |
| Q3 | 2 | November 2016 | Fall |
| Q4 | 3 | February 2017 | Winter |

## *Program Delivery*

In this section, Cadmus presents program stakeholder responses regarding program management and delivery topics collected during our stakeholder interviews. We focused the interviews on program implementation in PY16, program achievements, implementation challenges, and potential changes for PY17.

### Program Implementation

Before the HER program launch in August 2016, a panel of Ameren Missouri customers received an email invitation to take a survey regarding the report design in July 2016. The program implementer and program manager reported that the panel delayed the first HER report delivery but that the later start

gave Ameren Missouri time to collect feedback from customers about the preliminary design of the HER report . Although the launch was later than intended, ICF and Ameren Missouri indicated that the panel provided valuable feedback on the HER report design.

In PY16, the program sent three HER reports. Due to the summer launch, treatment group customers did not receive a HER report in the first quarter of PY16. The program implementer reported planning to send five reports in calendar year 2017 and five reports in calendar year 2018.

In our review of HER reports (various utility programs), they typically included the following three components:

- Neighbor comparison
- Customer-specific progress tracker
- Energy savings tips

In PY16, the Ameren HER program reports contained neighbor comparisons and the energy-savings tips, but not the customer-specific progress tracker. The program implementer reported that they were developing the customer-specific progress tracker component for future implementations of the reports and intend to begin providing this information in the fourth home energy report, planned for spring 2017. The intended purpose is to enable customers to set personal energy reduction goals and to track their progress over time.

The program implementer reported that Ameren Missouri requested the reports serve a dual purpose to inform customers about energy saving behaviors and about other Ameren Missouri programs relevant to the customers. ICF cross-promoted other programs to customers based on data on customer demographics. For example, the fall home energy report provided information about smart thermostat rebates to customers it identified as most likely to purchase a smart thermostat.  In Table 11 we summarize the customer demographics and corresponding messages displayed in the November 2016 HER reports. ICF determined which customers to send different messages to based on Ameren Missouri customer population segmentation.

**Table 11. PY16 HER Report Example Messages and Demographics**

| Customer Demographic | HER Report Message |
|---|---|
| Customers that have previously purchased a smart thermostat as determined using Ameren Missouri program participation data | "A smart thermostat isn't as smart without you; Be sure you get the most out of smart technology." |
| Customers identified by the implementer as sharing similar demographics to those already owning a thermostat and likely to use a smart thermostat as determined by ICF analysis of customer data. | "Smart Thermostat = Smart Investment; Upgrade to a smart thermostat to take advantage of these additional benefits" |
| Customers identified by implementer as least likely to buy a smart thermostat as determined by ICF analysis of customer data. This HER report did not include information on the smart thermostat discount. | "The savings are great at 68!; Programming your thermostat is an easy way to save money." |

ICF and Ameren Missouri reported that the program is considering adding a new treatment group cohort that only receives emailed HER reports. At the time of the interview, the program implementer had designed the email-version of the report, but no final decision had been made regarding a PY17 launch. If launched, ICF indicated that it would plan to use a randomized design to study the impact of the emailed reports.

### Delivery Successes and Program Achievements

Stakeholders reported the following about aspects of the program that worked particularly well:

- **Customer Feedback Early On.** The program implementer reported that the draft HER reports, shared with a panel of Ameren Missouri customers in July 2016, received a positive response. The panel provided the program implementer and staff with valuable feedback from customers before sending the first HER report.
- **Low Attrition.** The program manager cited a low opt-out rate (ICF reported that nine customers opted out of receiving the HER reports) as a positive sign that customers did not want to opt out of the program.

**Tailoring the Home Energy Reports.** The program implementer targeted customers with information about additional relevant Ameren Missouri programs. For example, the fall HER report publicized smart thermostat rebates to customers most likely to buy a smart thermostat.

### Program Implementation Challenges

Program stakeholders identified the following challenges:

- **Later Launch Date than Planned.** The first HER report was sent in August 2016, which the program implementer reported was later than the initially planned spring launch. Though the later launch date meant the program missed the summer energy usage peak, it allowed a panel of Ameren Missouri customers to provide feedback on a draft HER report.

- **Winter Timing.** The program implementer said sending the second HER report in November might have been too late to impact the treatment group's energy-saving behaviors during winter. The report's timing, however, was constrained by a strategic decision to not send the HER report before the election.
- **Customer-specific progress tracker.** The HER reports did not include the customer-specific progress tracker in in PY16. The program implementer reported that they would in PY17.

## *Home Energy Report Influence*

The program sought to use HER reports to encourage treatment group participants to reduce their energy consumption through behavioral changes. This section discusses the HER reports' contents along with treatment and control group survey responses regarding self-reported behavioral changes.

To measure the program's influence, Cadmus compared differences in survey responses between the treatment group and the control group using one-sided t-tests for differences in proportions. We reported differences as significant at 95% ($p \leq 0.05$) and 90% ($p \leq 0.10$) confidence. Significant differences are indicated in the text and plots.[16] Cadmus applied weights to survey responses to adjust for survey-mode differences between the phone and web surveys described above.

### Demographics

Survey responses confirmed that the randomization resulted in treatment and control groups with similar demographics, except for total household income which differed between the groups. In Table 12, we show the most frequent responses for each demographic question in the treatment and control groups.

[16] A single plus sign ($^{+}$) indicates a significant difference at the 90% level ($p \leq 0.10$). Double plus signs ($^{++}$) indicate a significant difference at the 95% level ($p \leq 0.05$).

### Table 12. PY16 HER Program Treatment and Control Group Demographics*

| Demographic** | Treatment Group | Control Group |
|---|---|---|
| **Home type** | **n=442** | **n=623** |
| Single-family | 92% | 93% |
| Attached house | 4% | 1% |
| Multifamily | 1% | 1% |
| Mobile or manufactured home | 2% | 4% |
| Other | 0% | 0% |
| **Own or rent** | **n=449** | **n=627** |
| Own/buying | 93% | 91% |
| Rent/lease | 7% | 9% |
| Other | 0% | 0% |
| **Number of people living in the home** | **n=416** | **n=590** |
| 1 | 20% | 22% |
| 2 | 38% | 40% |
| 3 | 18% | 20% |
| 4 | 14% | 13% |
| 5 | 4% | 5% |
| 6 | 2% | 1% |
| 7 or more++ | 2% | 0% |
| **Age of respondent** | **n=434** | **n=608** |
| 18-24 | 1% | 0% |
| 25-34 | 7% | 7% |
| 35-44 | 13% | 16% |
| 45-54 | 20% | 18% |
| 55-64 | 28% | 25% |
| 65-74 | 22% | 23% |
| 75 and older | 10% | 12% |
| **Total household income** | **n=344** | **n=469** |
| Less than $20,000 | 11% | 9% |
| $20,000 -$50,000++ | 20% | 30% |
| $50,000 - $75,000 | 24% | 21% |
| $75,000 - $100,000 | 22% | 15% |
| $100,000 - $150,000 | 16% | 17% |
| $150,000 - $200,000 | 5% | 5% |
| $200,000 or more | 2% | 2% |

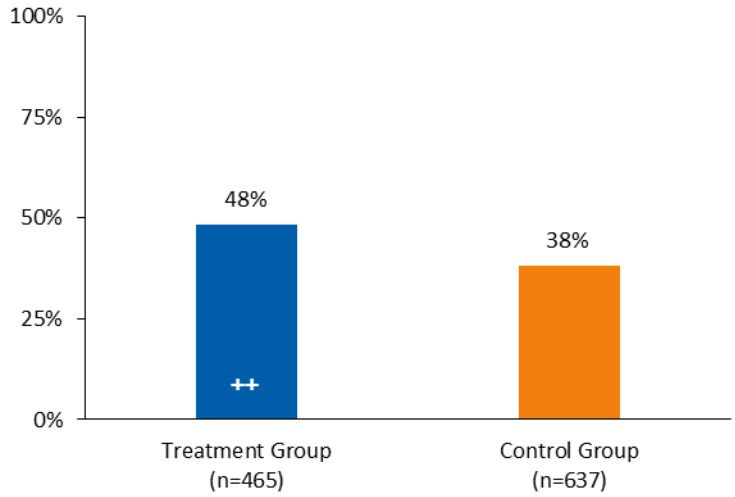
* Sample sizes (n) differ for each question, depending on the numbr of survey respondents that answered each question.

**Responses with significant differences between treatment and control group responses at the 95% level are denoted with++. Despite some significant differences in demographics between the treatment and control groups, Cadmus checked for balance in average daily energy usage prior to the program and found no significant differences.

## Awareness of Ameren Missouri Programs

As shown in Figure 1, 48% (n=465) of treatment group respondents and 38% (n=637) of control group respondents reported familiarity with other energy efficiency programs. The higher proportion of treatment group customers was statistically significant—a finding that indicates the HER reports successfully cross-promoted other Ameren Missouri energy efficiency programs.

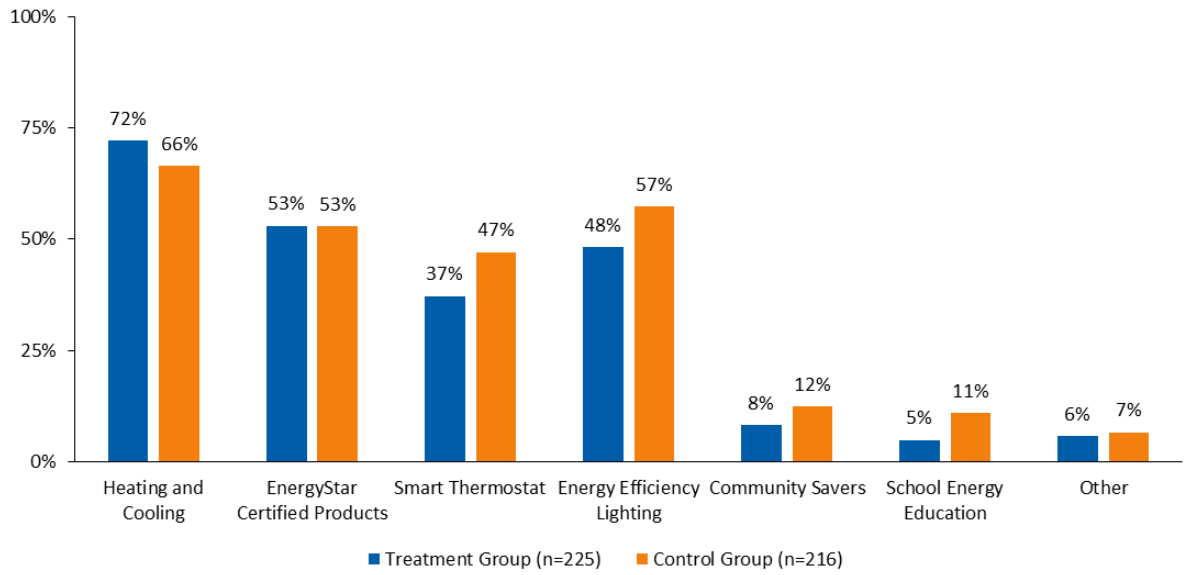
**Figure 1. Familiarity with Ameren Missouri Energy Efficiency Programs**




++ Significant difference at 95% level.
Telephone and online survey: F1. "Are you familiar with any energy-efficiency rebates or programs offered by Ameren Missouri to help you use less energy?" n=1,102

Figure 2 shows the percentage of each group that reported familiarity with specific energy efficiency programs. Respondents most commonly listed the Heating and Cooling program. To gauge customer awareness of Ameren Missouri programs, program names in the online survey reflected Ameren Missouri's marketing of programs through its website.

**Figure 2. Familiarity with Energy Efficiency Programs**



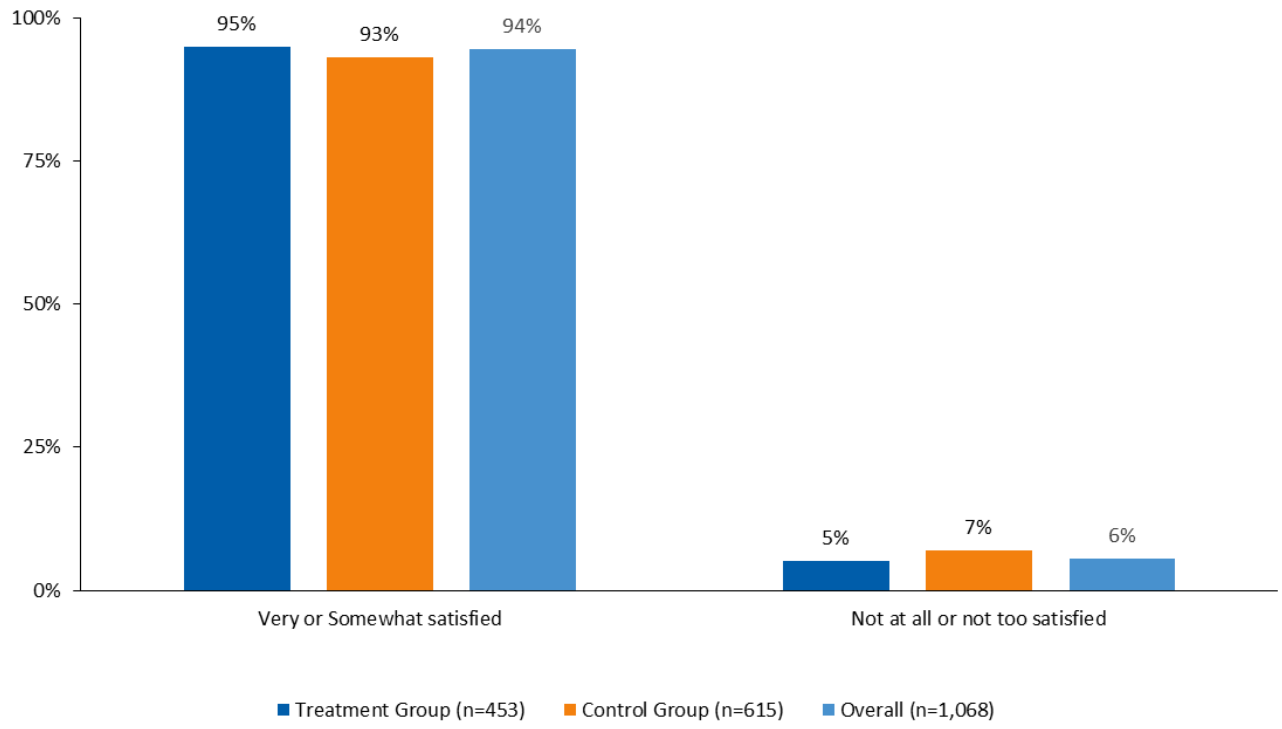

Telephone and email survey: F2. "What energy-efficiency rebates or programs have you heard about that Ameren Missouri offers?" n=441

## Satisfaction with Ameren Missouri

Cadmus asked treatment and control group customers about their satisfaction levels with Ameren Missouri as their utility. Both groups reported similar satisfaction levels, with 95% of treatment group customers (n=435) and 93% of control group customers (n=615) indicating they were very or somewhat satisfied with Ameren Missouri as their utility. As shown in Figure 3, a small percentage of treatment and control group customers were not at all or not too satisfied with Ameren: 5% and 7%, respectively.

Additionally, 27% of treatment group participants indicated that their satisfaction with Ameren Missouri increased after program participation, while 69% indicated that their satisfaction stayed the same, and 4% said their satisfaction decreased (n=444).

**Figure 3. Satisfaction with Ameren Overall as a Utility**




Telephone and email survey: H1. "Thinking about your overall experience with Ameren Missouri as your utility, how satisfied would you say you are with Ameren Missouri?" n=1,068

Cadmus asked participants about reasons for their satisfaction or dissatisfaction with Ameren Missouri. As shown in Table 13, the biggest satisfaction drivers included the following:

- Reliable and dependable service offered by the utility
- Ameren Missouri meeting customers' expectations as a utility
- Satisfaction with Ameren's response to outages

Drivers of dissatisfaction included the following:

- Utility rates
- Reliability
- Billing processes

The treatment group and the control group provided similar responses, though 2% of treatment group respondents (n=265) were satisfied with Ameren Missouri due to its promotion of energy efficiency, while none of the control group respondents cited this.

Table 13. Reasons for Satisfaction or Dissatisfaction with Ameren Missouri

| Reason for Satisfaction | Treatment Group (n=265) | Control Group (n=337) | Reason for Dissatisfaction | Treatment Group (n=99) | Control Group (n=208) |
|---|---|---|---|---|---|
| Dependable and/or reliable service | 32% | 35% | Dissatisfied with utility rates/cost | 70% | 67% |
| Ameren Missouri meets expectations as a utility | 15% | 18% | Dissatisfied with reliability of service | 8% | 15% |
| Satisfied with outage response | 14% | 12% | Dissatisfied with the billing process | 6% | 4% |
| Satisfied with utility rates | 11% | 12% | Dissatisfied with customer service | 6% | 5% |
| Satisfied with customer service | 9% | 6% | Dissatisfied with infrastructure and/or maintenance | 4% | 2% |
| Only one utility to choose from | 9% | 9% | Dissatisfied with outage response | 3% | 2% |
| Satisfied with billing process | 5% | 4% | Dissatisfied with Ameren Missouri's sources of energy | 2% | 3% |
| Satisfied with infrastructure or maintenance | 2% | 1% | Negative overall impression of Ameren Missouri | 1% | 0% |
| Positive overall impression of Ameren Missouri | 2% | 2% | Rebate processing issue | 0 | 0 |
| Ameren Missouri promotes energy efficiency | 2% | 0% | | | |
| Incentive or rebate | 1% | 1% | | | |

## Behavioral Changes

The surveys asked treatment and control groups a series of questions about their attitudes towards energy efficiency and their behaviors to identify self-reported behavior differences between the two groups.

### *Attitudes Toward Energy Efficiency*

Treatment group and control group respondents showed very similar attitudes toward energy efficiency, with treatment group (n=545) and control group (n=616) respondents reporting similar agreement levels on four out of six attitudinal statements. A significantly higher proportion of control group respondents strongly agreed with the statement: "I would like to save more energy but do not know where to start" (treatment 14%; control 23%).[17] A significantly higher proportion of treatment group respondents strongly disagreed with the same statement (treatment 30%; control 19%).[18]

[17] Significant difference at 95% level.

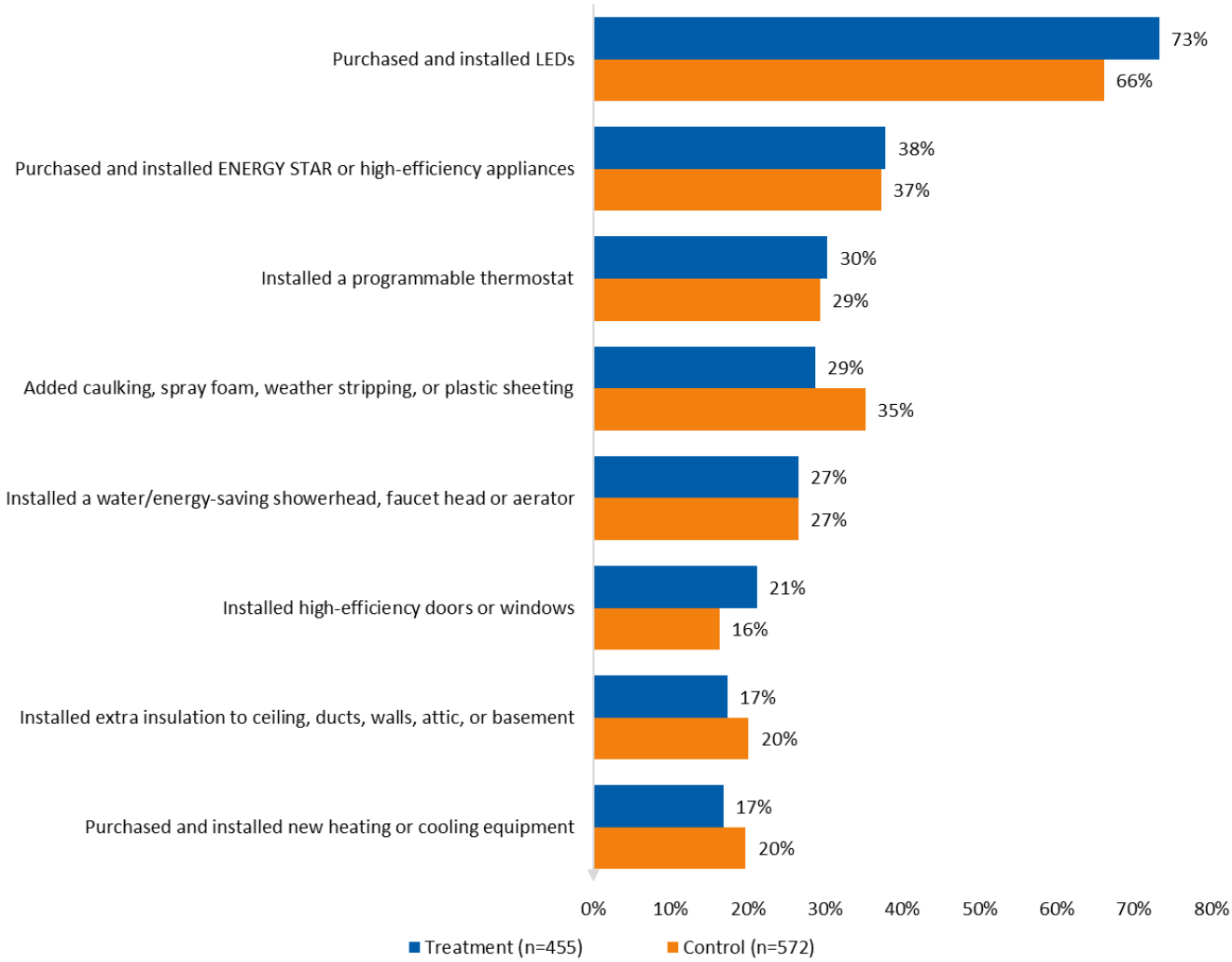
[18] Significant difference at 95% level.

### *Self-Reported Energy-Saving Improvements*

When asked how important respondents found the HER reports in motivating them to make energy-saving improvements to their homes, 68% of survey respondents said "somewhat" to "very important" (n=458).

In four out of 10 improvements shown in Figure 4, treatment group respondents indicated a higher implementation rate. None of these were statistically significant. The treatment group and control group respondents showed no differences in installing water/energy-saving showerheads, faucet heads, or aerators.

### Figure 4. Self-Reported Energy-Saving Improvements

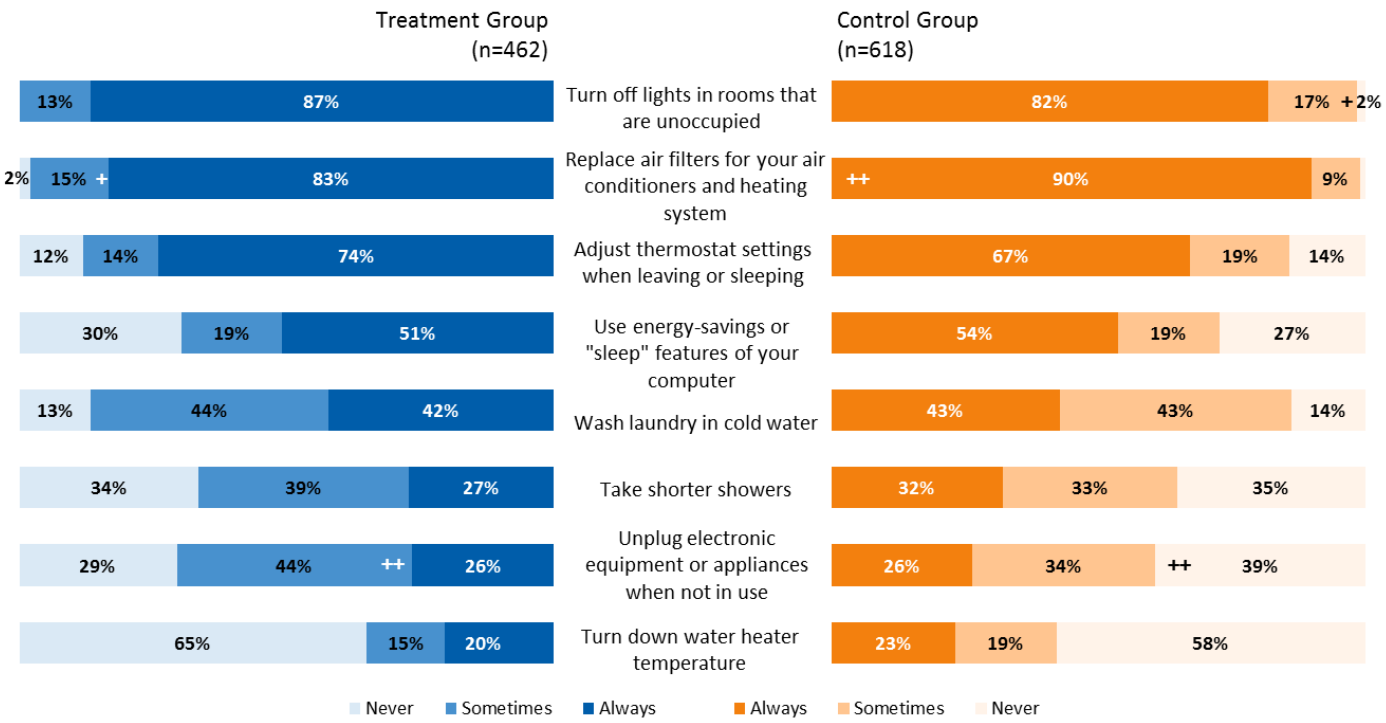



Telephone and email survey: D1. Telephone: "I will read you a list of energy-saving improvements. Tell me if you have done any of the following in the last 12 months." Email: "Have you made any of the following energy-saving improvements in the last 12 months?" n=1,027

## Self-Reported Frequency of Energy-Saving Actions

As shown in Figure 5, treatment and control group respondents self-reported similar rates in always completing energy-saving actions. After testing the responses for statistical significance, Cadmus found a significantly higher proportion of control group respondents (90%, n=618) self-reported "always" replacing air filters for air conditioners and heat systems, compared to treatment group respondents (83%, n=462). Additionally, a significantly higher proportion of treatment group respondents (44%) self-reported "sometimes" unplugging electronic equipment or appliances when not in use, in comparison to control group respondents (34%).

**Figure 5. Self-Reported Frequency of Taking Energy-Saving Actions**




++ Significant difference at 95% level. + Significant difference at 90% level.
Telephone and email survey: E1. Telephone: "I will read through some energy-saving actions you may have heard or read about. Please let me know if you always, sometimes, or never have taken these actions in your home over the past 12 months." Email: "How often have you taken these actions in your home over the past 12 months?" n=1,080

## *Participant Experience*

Cadmus asked treatment group additional questions not asked of the control group regarding the HER report readership, content, and overall satisfaction with the reports as well as suggestions for improvements.

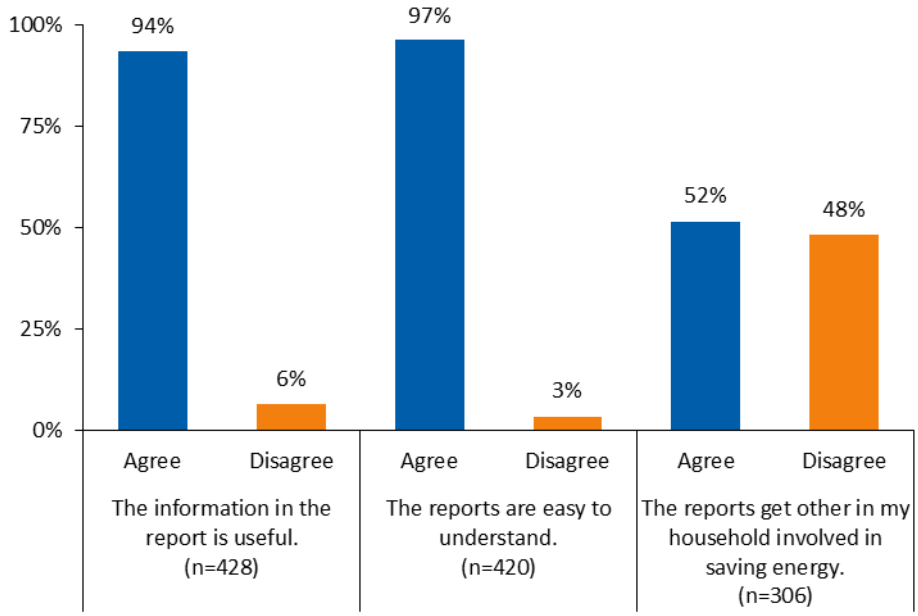
### Readership of HER reports

Respondents indicated high readership of HER reports. A large majority of treatment group respondents said they read the reports (89%, n=461). Of these, 37% read the report thoroughly, 20% read some of the report, and 31% skimmed the report. After receiving HER reports, most respondents, (75%, n=417), looked for opportunities to save energy, a little over half of respondents (53%, n=355) spoke with others in their household about the report, and 15% (n=412) spoke with others outside their households about the report.

Figure 6 shows the percentage of respondents agreeing with three different statements related to the report's usefulness. A large majority agreed that information in the report was useful (94%, n=428) and

that the reports were easy to understand (97%, n=420). Far fewer respondents (52%, n=306) agreed that the reports involved others in their households in saving energy.

**Figure 6. Usefulness of Reports**



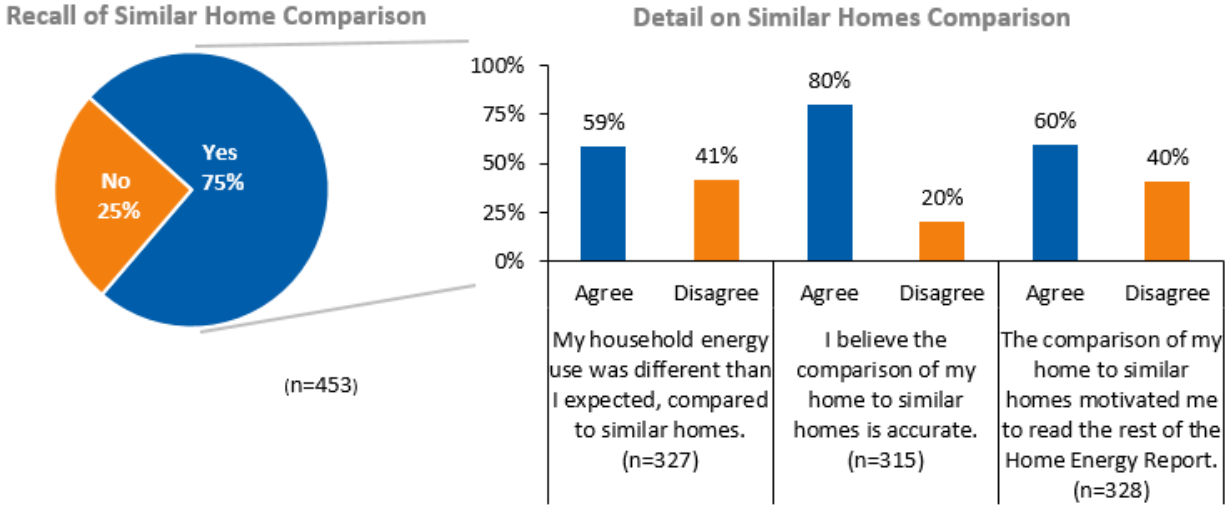

Telephone and email survey: B2. Telephone: "I am going to read you some statements about the Home Energy Reports. Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement." Email: "How much do you agree with the statements about the Home Energy Reports?" n=1,154

### *Recall of HER Reports Contents*

In PY16, mailed HER reports contained information on how customers' energy use compared to that of similar homes, three energy-saving action recommendations, and information on Ameren Missouri's rebates.

The comparison of similar homes provided information on how the customer's energy use compared to homes with similar characteristics (e.g., square footage, home type, cooling and heating types). Figure 7 shows 75% of treatment group respondents recalled seeing how their energy use compared to similar homes (n=453). Of customers recalling the comparison, a majority (59%, n=327) agreed that their own household energy use differed from that expected. Most recalling the comparison also believed the comparison accurate (80%, n=315), and the comparison motivated them to read the rest of the report (60%, n=328).

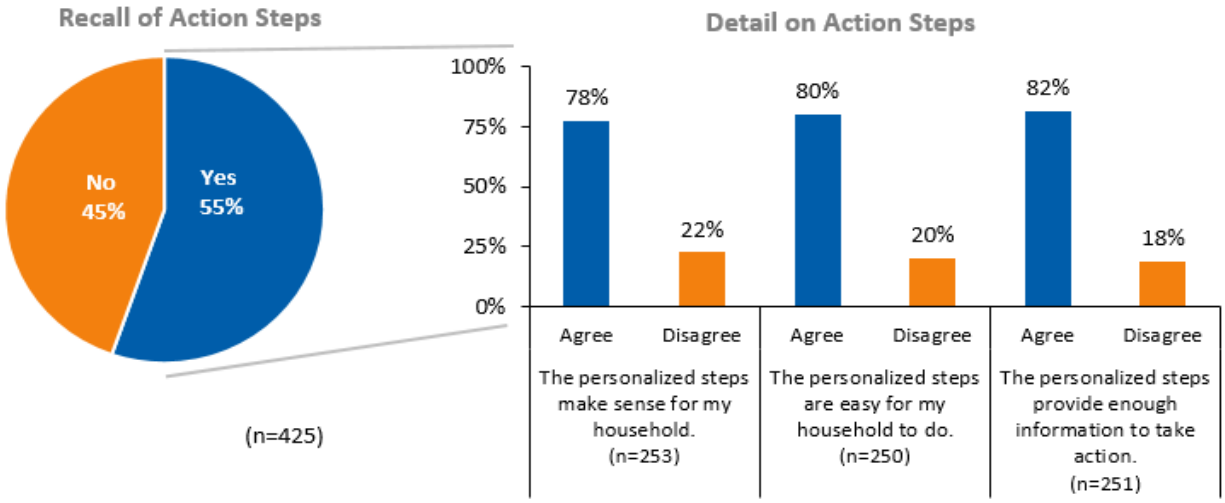
Figure 7. Recall Similar Home Comparison




Telephone and email survey: C1. "Each report compares your energy use from the previous season to that of similar homes. Do you remember seeing this comparison?" n=453
Telephone and email survey: C2. Telephone: "I am going to read you some statements about the comparison. Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree." Email: "How much do you agree with the following statements?" n=970

HER reports contained three seasonal personalized tips or steps the customer could take to save energy. Each tip required no-cost, low-cost, or higher-cost investments. As shown in Figure 8, fewer customers recalled the personalized action steps or tips (55%, n=425) than the energy use comparison. Of those recalling the personalized action steps, the majority agreed that they made sense for their household (78%, n=253), were easy to do (80%, n=250), and provided enough information to take action (82%, n=251).

Figure 8. Recall of Personalized Action Steps



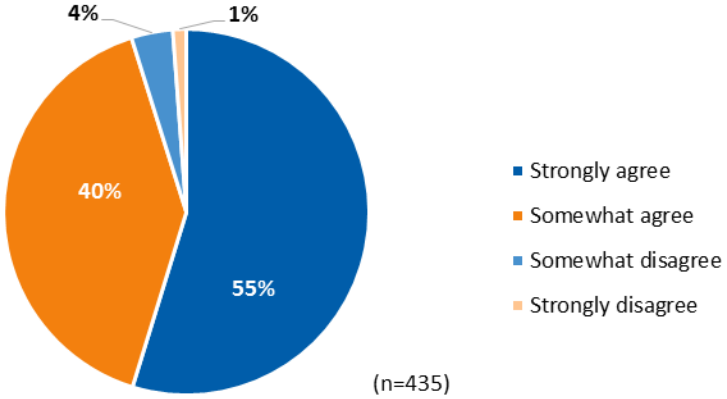

Telephone and email survey: C3. "Each Home Energy Report contains three personalized recommendations or steps you can take to save energy. Do you remember seeing these steps?" n=425
Telephone and email surveys: C4. Telephone: "I will read you some statements about the personalized steps. Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree." Email: "How much do you agree with the following statements?" n=754

When asked which steps respondents took in response to receiving HER reports, the three responses most frequently cited were installing LED bulbs (27%), adjusting thermostat settings (17%), and turning lights and electronics off when not in the room (15%, n=131).

## Treatment Group Satisfaction

As shown in Figure 9, when asked their agreement level with the following statement "overall, I am satisfied with the Home Energy Reports," a majority of respondents said they strongly agreed (55% n=435).

Figure 9. Satisfaction with HER Reports




Telephone and email survey: H3. Telephone: "For the following statement, please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement…Overall I am satisfied with the Home Energy Reports" Email: "How much do you agree with the following statement? Overall, I am satisfied with the Home Energy Reports." n=435

## Suggestions for Improvements

Treatment group customers offered a variety of suggestions on how to improve the program, including suggestions regarding delivery and content of HER reports, and Ameren Missouri rebates in general. Table 14 shows suggestion types and their frequency.

Table 14. Suggestions for HER Program Improvement

| Suggestions | Frequency (n=69) |
|---|---|
| **Delivery** | |
| Email HER reports or make available online | 6 |
| Provide reports more frequently | 4 |
| **Content** | |
| More detail on customer-specific energy usage | 13 |
| Suggest changes to Energy Saving Tips and Recommendations | 11 |
| Make easier to understand | 9 |
| Suggest change to Similar Homes Comparison | 7 |
| Do not change HER reports | 5 |
| I'm using less energy but not seeing reduction in bill | 4 |
| Provide local resources for energy efficiency services | 4 |
| **Rebates** | |
| Provide more rebates to Ameren Missouri customers | 5 |
| Provide more information on current Ameren Missouri rebates | 1 |

Regarding report delivery, treatment group customers wished to receive emailed HER reports or have them available online as well as receiving reports more frequently. One respondent wrote, "make the [HER reports] more current and more frequent."

The most suggestions by far addressed HER report content. Five suggestions left HER report content the same. Those wanting to modify report content offered differing suggestions:

- Some wanted more detail on their own energy usage (n=13). For example, respondents were interested in how their own energy use changed in response to temperature. One respondent wrote: “give a better/detailed explanation of how the average daily temperature effects energy usage compared to previous years.” Another said: “have them include a comparison of the number of degree days since not all years are as hot or cold as other years.”
- Those suggesting changes to energy-savings tips and recommendations (n=11) were interested in the report providing more detail (e.g., the typical return on investment for the energy-saving actions in the HER report). This sentiment by the response: “show specific economic ROI on implementation of an efficiency recommendation. (i.e., if I change all my light bulbs to LED I'll save $xx.00 on my bill starting next month...something that is tangible and the customer can see.) Remember, we are in the "Show Me State.” Another respondent said: “Better, more concrete recommendations, with practical steps to start the process. Not just "weather proof your home!" How, who, why, how much cost, and how much saved.”
- Those interested in making the report easier to understand wrote about its organization and wordiness. One respondent wrote: “[the HER reports] are too cluttered. I would prefer clear and organized data.” Another said: “It helped to give the graphs. Maybe avoid fine print.” Another suggested moving the location of the report modules: “The 3 tips on saving energy should be on a better location on the report.”
- Seven respondents concentrated on the similar homes portion, with one writing: “more specifications in terms to the home-to-home comparison, such as how the rating works.”

Another group of suggestions centered on providing clearer rebate information and additional rebates (n=9). For example, one respondent wrote: “send more [information] about the rebates that are available.” Another wanted clearer signposting of Ameren’s website in the report, so they could find out more about rebates offered. Other suggestions from this group addressed rebates (e.g., Ameren Missouri providing customers with a payment plan to buy energy efficiency equipment).

## *Marketing and Outreach*

In PY16, the first HER report welcomed treatment group customers to the program. The customers did not receive additional mailed marketing materials. As discussed, the program launched later than planned, with the first report sent in the second quarter of PY16.

The program implementer said, due to these time constraints and additional budget constraints, an opportunity did not exist to send a separate welcome letter to the treatment group. Rather, the first report consisted of a mixture of a welcome letter and a first HER report. The program implementer reported this made the report wordier than preferred. Figure 10 provides an example of the introductory HER report.

In addition to the HER reports, Ameren Missouri maintains a program-affiliated web page.[19] The HER reports provided a link to this web page, which contains information on saving energy and FAQs about the program.

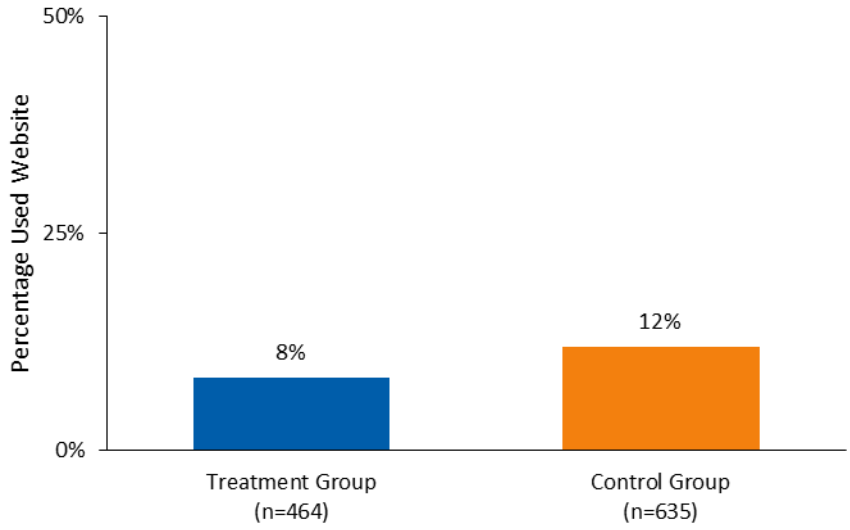
[19] https://www.ameren.com/Missouri/energy-efficiency/residential/home-energy-report

**Figure 10. Example of the HER Report**

Through these FAQs, treatment group customers receive an email and telephone number they can use to provide details about their homes to improve the accuracy of their HER report content. The program-affiliated webpage, however, does not serve as a portal that requires log-in with content only visible to treatment group customers. When discussing suggestions on how to improve the program, the program implementer discussed creating a web portal for Ameren Missouri treatment group customers, where the customers could access program-affiliated content on saving energy. Customers also would be able to provide details about their homes to improve the accuracy of neighbor comparisons (rather than emailing or calling to regard to the details).

Very few survey respondents reported visiting the Ameren Missouri website. Figure 11 shows control group respondents (12%, n=635) visited the website in search of information on how to save money on their bills more often than did treatment group respondents (8%, n=464), though the difference was not statistically significant.

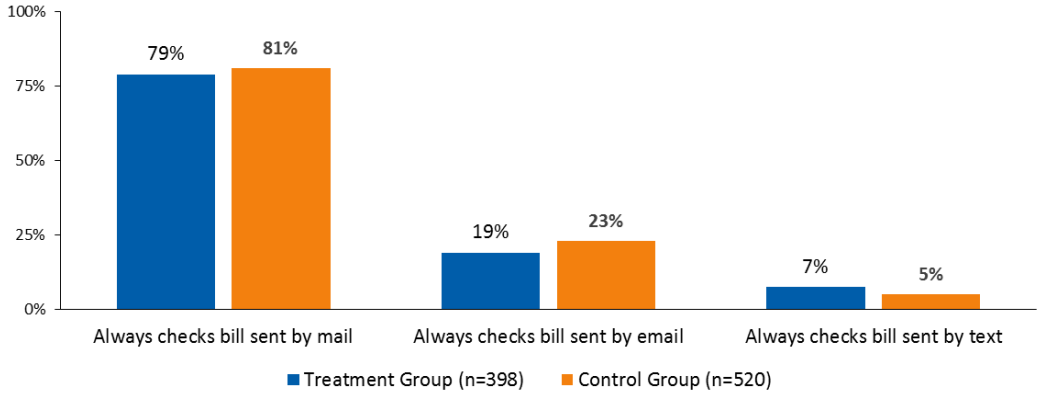
**Figure 11. Visit Website for Energy-Saving Tips**




Telephone and email survey: F3. "Have you visited Ameren Missouri's website to look for ways to save money on your bill?" n=1,099

When asked "How often do you check your utility bill statement sent by mail, email or text message?" treatment and control groups reported always checking utility bills sent by mail at much higher rates rather than utility bills sent by email or text, as shown in Figure 12. The survey asked about utility bills instead of HER reports to include both treatment and control groups.

**Figure 12. Effective Modes of Communication**




Telephone and email survey: I1. "How often do you check your utility bill statement sent by mail, email or text message?" n=918

## *Key Progress Indicators*

Cadmus plans to track the following key progress indicators for the HER program across the three-year program cycle: program year electric savings; number of HER report recipients; number of opt-outs; readership; uplift of Ameren Missouri programs; and recipient satisfaction with HER reports and with Ameren Missouri. Table 15 shows the baseline key metrics.

**Table 15. PY16 HER Program Key Progress Indicators**

| Key Metric | PY 2016 |
|---|---|
| Electric savings | 220.5 MWh/month |
| Number of HER report recipients | 225,000 |
| Number verified HER report recipients | 215,278 |
| Number of opt-outs | 9 |
| HER reports readership | 89% read (n=461) |
| Awareness of energy efficiency programs | 48% were familiar (n=465) |
| Uplift programs | Efficient Products<br>Heating and Cooling<br>Multifamily Low Income |
| Agreement with following statement "Overall, I am satisfied with the Home Energy Reports." | 95% agree (n=435) |
| Satisfaction with Ameren Missouri | 95% satisfied (n=453) |

## Gross Impact Evaluation Results

To evaluate the partial year of HER program's electric energy savings and demand reduction, Cadmus conducted an impact evaluation of the HER program that included the following activities:

- Database review
- Equivalency analysis
- *Ex post* savings estimation using a billing analysis
- Demand reduction estimation using a load-shape coincidence factor
- Uplift analysis
- Realization rate estimation to compare *ex post* to *ex ante* savings

Cadmus performed the impact evaluation at the end of the first quarter and after six months to estimate HER program cumulative savings over the course of its implementation. To do so, we developed a SAS macro to process customer and billing data, estimate regression models, and evaluate savings for the program to date. This report provides details on the partial year program, including savings over time and customer-specific results.

### Total *Ex Ante* Savings

Per Attachment A of the 2017 Missouri TRM Appendix, the HER program total *ex ante* per-household, annual electric savings and demand reduction are 150 kWh and 0.0699 kW, respectively,[20] as shown in Table 16. To calculate total 2016 *ex ante* savings, Cadmus multiplied TRM values by the total number of customers assigned to the treatment group in PY16.

**Table 16. Behavior Measures for MEEIA Cycle 2016–2018***

| Measure Reference No. | Start Date | End Date | Incremental Cost | Cost Unit | Gross Annual Demand Reduction (kW) | Gross Annual Electric Savings (kWh) | Savings Unit | Measure Life |
|---|---|---|---|---|---|---|---|---|
| 1223 | 1/1/16 | - | 0 | Per Home | 0.0699 | 150 | Per Home | 1 |

*2017 Ameren Missouri TRM Appendix: Attachment A.

### *Database Review*

Program data for the HER program evaluation consisted of customer data and billing data, which included the following variables relevant to the evaluation:

- Customer data: customer account number, premise number, premise zip code

[20] Measure reference number 1223, start date January 1, 2016. Gross annual demand reduction listed in the TRM spreadsheet was 0.0669 kW per home.

- Billing data: customer account number, premise number, monthly usage, read date, and days in period

The implementer provided the data sets that Cadmus used to randomize customers into treatment and control groups. In November 2016 and January 2017, Ameren Missouri provided customer and billing data, respectively. Out of the original 300,000 randomized customers, approximately 5% were missing from the customer and billing data used in this interim analysis.

### *Equivalency Analysis*

Cadmus verified the integrity of the program's experimental design by conducting an equivalency analysis. We compared average pre-treatment daily energy consumption between treatment and control group customers to ensure that the groups were balanced using a t-test for the difference in means. In the analysis, a p-value greater than 0.10 indicated the groups were well balanced and adequately randomized.

Cadmus conducted the randomization process before treatment began, randomly assigning eligible customers into treatment and control groups and confirming equivalency at that time. We performed the equivalency analysis at the end of the program year as well, to check that customers missing from the customer and billing data did not affect the balance. As shown in Table 17, the difference in average daily consumption in the treatment and control groups was 7 kWh, which was not significant. Thus, customers in the analysis dataset were balanced. In PY17, Cadmus will check balance to verify equivalency of the treatment and control groups with respect to program participation prior to PY16 (and PY17 as applicable), in addition to energy consumption.

**Table 17. Equivalency Analysis**

| Value | Equivalency Check |
|---|---|
| Treatment Group Pre-Period Annual Consumption (kWh) | 13,182 |
| Control Group Pre-Period Annual Consumption (kWh) | 13,189 |
| Difference (kWh) | 7.2 |
| Percent Difference | 0.1% |
| t-value | 0.3 |
| p-value (Pr>t) | 0.8 |

### *Billing Analysis*

Due to partial year implementation of this program, along with the nature of the program in which savings ramp up and are predicted to occur mostly in the summer, Cadmus did not report an annual savings value for this program. Cadmus did estimate savings for the partial year to provide an estimate of savings to-date, although the estimate is limited by the duration and timing of program implementation. Cadmus estimated *ex post* energy savings using a panel regression analysis of monthly billing data from customers in the HER program treatment and control groups. The findings from the partial year analysis are described in this section.

Our year-to-date estimate is that Ameren Missouri's HER program saved a total of 1,323 MWh between August 2016 and January 2016. The total savings estimate was significant at the 90% confidence level. Cadmus multiplied average daily savings by the total number of treatment days in the treatment period to estimate cumulative total savings to date, as shown in Figure 13 and Figure 14, with the 90% confidence interval around the cumulative total each month. Treatment group customers saved an average of 0.04 kWh per day or 6.2 kWh per year (i.e., 0.11%) compared to control group customers' energy consumption during the same period.

Comparing evaluated savings of 6.2 kWh per year per customer to the TRM assumption of 150 kWh per year per customer, or similarly the total annual evaluated savings of 1,323 MWh per year to the reported 33,750 MWh per year, the realization rate is 4%. The TRM assumption estimates savings based on an entire program year, including the cooling season, when Ameren Missouri expects to achieve substantial savings. Evaluated savings to date do not include HER reports delivered during the summer and thus do not include savings during the cooling season or an entire program year of HER reports.

Cadmus estimated average daily savings per customer in each month and respective confidence intervals, as shown in Figure 14, along with reported savings. So far, the program's monthly impacts have fluctuated above and below average daily savings, reaching peaks in September and January, although only the September savings estimate is statistically significant at 90% confidence.

### *Demand Reduction Estimation*

Cadmus used the residential Building Shell coincident peak demand factor to estimate the HER program's impact on customers' demand.[21] We applied the coincidence peak demand factor of 0.0004660805 to the HER program's energy savings to estimate demand reduction. Total demand reduction was 616.8 kW per year, resulting in a 4% realization rate when compared to *ex ante* savings of 15,730 kW per year.

### Uplift Analysis

HER program savings estimates reflected customers' behavioral changes and other investments in energy-efficient products resulting from the HER program. Some customers invested in and installed efficient products received rebates from Ameren Missouri through other efficiency programs. In such cases, HER program savings and those from other rebate programs were confounded, meaning both would be included in the total net savings estimate for the residential portfolio.

To disambiguate program-related savings from other programs' savings, Cadmus assessed the HER program's effect on customers participating in other programs (i.e., "uplift" or "channeling"). We analyzed participation uplift (i.e., the rate at which treatment group customers participated in other programs compared to the control group) and savings uplift (i.e., the amount energy customers saved through other programs, compared to the control group).

[21] See 2017 Ameren Missouri TRM, Appendix E.

As shown in Table 18, during the HER program's first six months, treatment group customers participated in other downstream efficiency programs 1.1% more frequently than control customers, primarily through the Efficient Products program. More control group customers participated in the Heating and Cooling program than treatment group customers. A small portion of treatment customers participated in the Multifamily Low Income program.

**Table 18. PY16 HER Program Uplift Results**

| | Participation Uplift* | | | | Savings Uplift** | | |
|---|---|---|---|---|---|---|---|
| | Baseline | Treatment | Uplift (Delta) | % | Baseline | Treatment | Uplift (Delta) |
| Efficient Products | 9.069 | 9.625 | 0.557 | 6.1% | 0.005 | 0.006 | 0.000 |
| Heating and Cooling | 12.875 | 12.559 | -0.317 | -2.5% | 0.052 | 0.049 | -0.003 |
| Multifamily Low Income | 0.014 | 0.014 | 0.000 | - | 0.000 | 0.000 | 0.000 |
| **Total** | **21.958** | **22.198** | **0.240** | **1.1%** | **0.057** | **0.055** | **-0.003** |

*Participation uplift is defined as participation rate per 1,000 customers.

**Savings uplift is measured as the difference in average daily cross-program savings (kWh/day) between treatment and control group customers in the post period. There is no sampling uncertainty associated with this estimate because we observe the population of program participants.

Although participation uplift was positive, the control group saved more energy from other programs than did the treatment group, resulting in negative savings uplift of approximately 90 MWh (i.e., about 7% of the HER program's estimated savings). Cadmus has observed negative savings uplift in similar programs. The team will continue to assess uplift as the program matures. As savings uplift was negative, the program's total savings need not be adjusted to account for double-counted savings across the portfolio, as would be necessary for positive savings uplift.

Along with reported savings, Cadmus estimated average daily savings per customer in each month and the respective confidence intervals, shown in Figure 14. So far, the program's monthly impacts have fluctuated above and below average daily savings, reaching peaks in September and January (although only the September savings estimate was statistically significant at 90% confidence).

Figure 13. PY16 HER Program Cumulative Savings

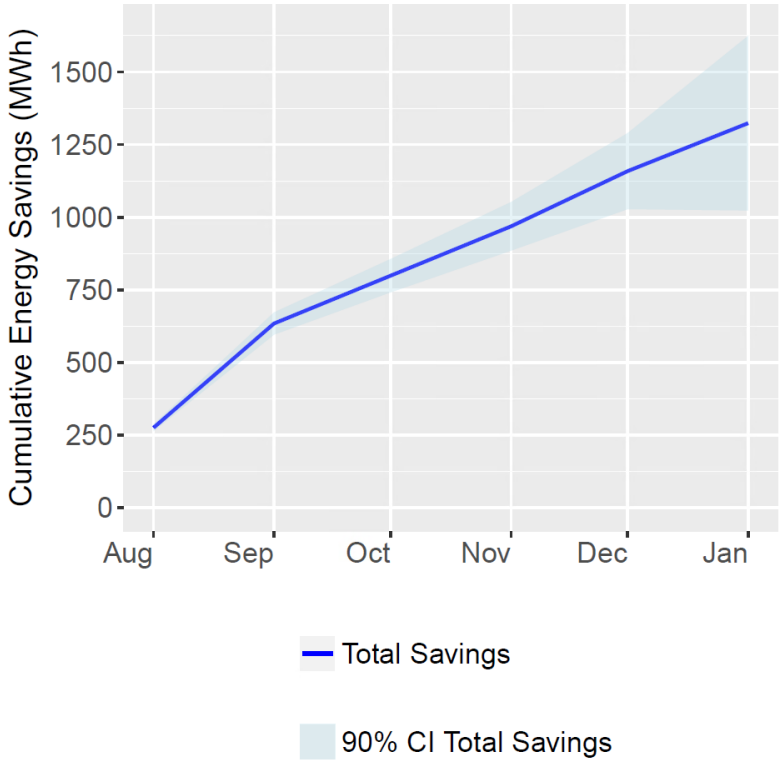
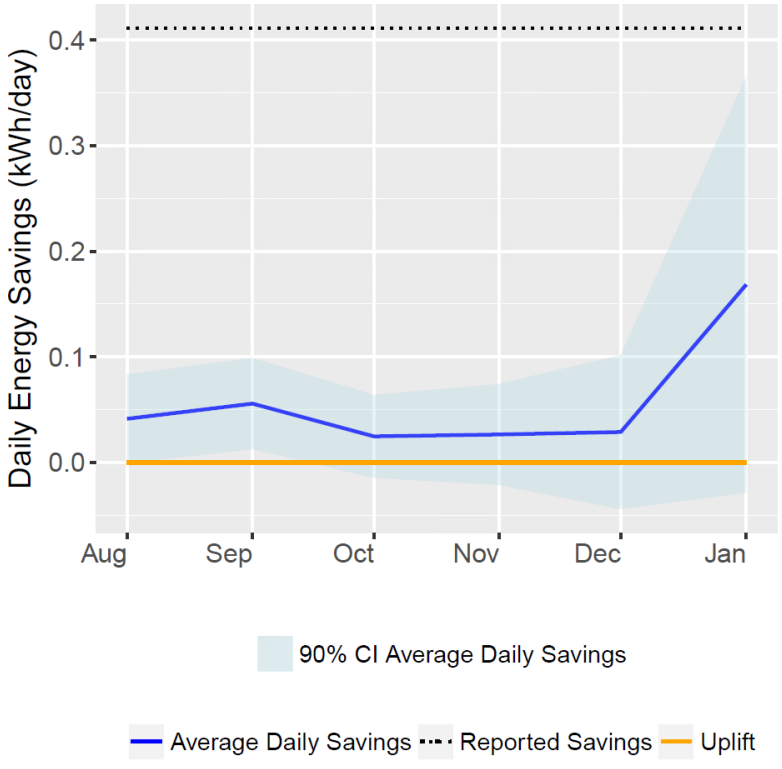



Figure 14. PY16 HER Program Savings per Month



### Customer-Specific Savings

Customers with the highest energy consumption drove HER program savings, while customers with lower usage achieved nonsignificant savings. In Quartile 4, customers with usage over 16,609 kWh/year, exhibited statistically significant energy savings of 0.142 kWh per customer per day, on average. Customers with usage in the remaining also exhibited nonsignificant savings. Table 19 reports average daily savings per customer per day, in each pre-usage quartile, with 90% confidence intervals.

**Table 19. PY16 HER Program Savings by Quartile**

| Pre-Usage Quartile* | Daily Savings to Date** | |
|---|---|---|
| | kWh/day | % kWh/day |
| Quartile 1<br>< 8,541 kWh/year | -0.023***<br>[-0.050, 0.003] | -0.13%<br>[-0.27%, 0.02%] |
| Quartile 2<br>8,542 - 11,899 kWh/year | 0.005<br>[-0.029, 0.040] | 0.02%<br>[-0.10%, 0.14%] |
| Quartile 3<br>11,900 - 16,608 kWh/year | 0.034<br>[-0.011, 0.079] | 0.09%<br>[-0.03%, 0.20%] |
| Quartile 4<br>> 16,609 kWh/year | 0.142<br>[0.077, 0.206] | 0.23%<br>[0.13%, 0.34%] |

*Customers were assigned to quartiles based on their total annual consumption (kWh/year) in the pre-period.

**The brackets represent 90% confidence intervals for each savings estimate.

***Note that although this average daily savings point estimate is negative, it is nonsignificant, i.e., we are 90% confident that the true average savings are in the interval, which contains negative, positive and zero values.

Although statistically significant, the HER program's first six months of savings to date were lower than TRM *ex ante* annual savings and annual savings for similar benchmarked programs. These savings resulted after only five full months and two delivered reports. As discussed above, there were differences between Ameren Missouri's HER program and others (reports sent by benchmarked programs included a customer-specific progress tracker, emailed HER reports and web portals, and more reports during the program period). All of these together could be responsible for the slow savings ramp. However, the benchmarked programs had been established several years prior to the benchmarked evaluation years and used program-year waves that included fewer customers. The timing could coincide with differences in energy efficiency market characteristics.

### Recommendations

Cadmus recommends that Ameren Missouri monitor savings over time as the HER program matures and consider incorporating new strategies into the program. Our analysis of energy consumption through January 2017 shows that energy savings gradually increased over time and indicate that savings may increase through continued implementation of the HER program. Ameren Missouri should consider making changes to increase the frequency of reports sent, and including customer-specific progress tracker in reports. It should also consider sending email reports or providing a web portal specific to treatment group customers. An email reporting strategy would require outreach to increase the number of customers that opt-in to receive Ameren Missouri emails. Rather than making program design

changes solely based on benchmarked programs, Ameren Missouri should also consider adjusting the content to respond to some of the surveyed customers' suggestions, such as providing information on money saved for a particular change and more detail on how that customer uses energy. Customer-specific results indicate that the HER program should continue to monitor savings for customers with different pre-program energy consumption levels, and, in future program waves, could consider testing strategies to determine what works best for customers with lower energy usage as well as those with high usage.

## Net Impact Evaluation Results

As the HER program has been established as an experimental design, utilizing a control group in the regression allowed the savings estimate to be considered “net”; hence, a separate NTG estimation proved unnecessary.

## Benchmarking

Cadmus completed benchmarking research to compare Ameren Missouri's HER program with six behavior programs offered by other utilities. Cadmus researched the following HER programs:

- Ameren Illinois' 2010 and 2014 Behavior Modification Program
- Consumers Energy 2014 Home Energy Reports Program
- Indianapolis Power and Light's (IPL's) 2015 Peer Comparison Reports Program
- Northern Indiana Public Service Company's (NIPSCO) 2015 Energy Conservation Program
- PPL Electric Utilities' 2015 Residential Energy-Efficiency Behavior and Education Program
- Vectren Indiana's 2015 Residential Behavioral Savings Program

### *Benchmarking Metrics and Topics*

The benchmarking research compared the following:

- Treatment group participation
- Impact metrics (average gross energy savings per household and program total gross savings estimates)
- Attrition[22] (opt-outs)
- Report frequency and delivery channels
- Participant satisfaction

#### Impact Metrics

As shown in Table 20, Cadmus reviewed program participation, energy savings, and attrition. Compared to the other six programs, Ameren Missouri's HER program achieved fewer savings (i.e., 1,323 MWh) in its first program year although it was based on only five full months of program activity during sub-optimal time periods. Note that the benchmarked utility behavior based programs listed in the table below (with the exception of Amemern Illinois program in 010-2011) included established programs with program-year waves that included fewer customers than Ameren Missouri's HER program. Many included gas and/or dual-fuel customers, in addition to electric-only customers. All used RCT designs to identify treatment and control groups. None of the benchmarked reports discussed customer targeting; the range of baseline per customer annual energy consumption among other programs is within the range of Ameren Missouri's HER program customer baseline usage.

[22] Attrition occurred when customers opted out of the program or were no longer Ameren Missouri customers.

Table 20. Comparison of Behavior Program Impact Metrics

| Utility | Program Name | Start Year | Evaluation Period | Number of Participants (Treatment) | Verified Gross Savings MWh/yr | Verified Gross Savings per Participant (kWh) |
|---|---|---|---|---|---|---|
| Ameren Illinois | Behavior Modification | 2010 | 2010-2011* | 45,254 | 5,400 | 123.5 |
| Ameren Illinois | Behavior Modification Program | 2010 | 2014 | 319,847 | 33,194 | 103.78 |
| Consumers Energy | Home Energy Reports Program | 2011 | 2014 | 290,318 | 40,481 | 139.44 |
| Indianapolis Power & Light | Peer Comparison Reports Program | 2012 | 2015 | 290,821 | 32,349 | 111.23 |
| Northern Indiana Public Service Company (NIPSCO) | Energy Conservation Program | 2011 | 2015 | 249,450 | 27,570 | 110.52 |
| PPL Electric | Residential Energy-Efficiency Behavior & Education Program | 2010 | 2015-2016 | 126,290 | 39,078 | 309.43 |
| Vectren Indiana | Residential Behavioral Savings Program | 2012 | 2015 | 52,652 | 9,069 | 172.24 |

* Savings between September and January of first program year.

The Ameren Missouri HER program ran for only a portion of the program year, so Cadmus researched average per-customer energy savings in the six-month of this and other HER programs, providing a more meaningful comparison. Cadmus normalized savings across the benchmarked HER programs to a percentage basis to compare to date average daily savings to average daily usage in the control group.

Table 21. Average Energy Savings of HER Programs in the Sixth Month

| Utility | Customer Cohort Name | Starting Month | Percentage Savings at Sixth Months* |
|---|---|---|---|
| Ameren Missouri | - | August 2016 | 0.44% |
| Ameren Illinois | PY3 | September 2010 | 1.75% |
| Consumers Energy | Track 1 - Pilot | June 2011 | 1.10% |
| PPL Electric | Legacy 2 | May 2011 | 1.50% |

* Cadmus calculated percentage savings for the Ameren Missouri program as the quotient of average per-customer savings, divided by control customers' average per-customer usage during the post-period. We estimated percent savings for other utility programs in the sixth month based on monthly savings plots in the cited reports.

We found Ameren Missouri's HER program saved about one third of the amounts the other programs saved in the sixth month.

## Attrition

As shown in Table 22, evaluation results indicated Ameren Missouri had low attrition at 5%. Its attrition was mainly due to customer attrition (moving), with a very small opt-out rate of 0.004%. Evaluations for the six comparison programs did not differentiate attrition rates for customer attrition and opt-out rates, in general and unless otherwise indicated in the table.

Table 22. Behavior Program Attirition

| Program Name | Attrition Rate |
|---|---|
| Ameren Missouri Home Energy Report Program* | 5% |
| Ameren Illinois Program Behavioral Modification Program | 6-14% |
| Consumers Energy Home Energy Reports Program | N/A |
| Indianapolis Power & Light Peer Comparison Reports Program** | 34% |
| Northern Indiana Public Service Company Energy Conservation Program** | 7% |
| PPL Electric Home Energy Reports Program** | 16% |
| Vectren Indiana Residential Behavioral Savings Program* | 6% |
| * Ameren Missouri's attrition was mostly due to customer attrition; its opt-out rate was 0.004%. Similarly, Vectren Indiana's program attrition was mostly due to customer attrition; its opt-out rate was 0.099%.<br>** These attrition rates do not represent opt-outs. | |

## Report Contents

Cadmus compared Ameren Missouri's HER report contents with six comparable behavioral programs, shown in Table 23. All HER reports, except for Ameren Missouri and Ameren Illinois, contained three primary components: neighbor comparisons, customer-specific progress tracker, and energy-saving steps. Ameren Missouri and Ameren Illinois did not include a customer-specific progress tracker.

Table 23. HER Report Contents

| Utility | Neighbor Comparison | Customer Specific Progress Tracker | Energy Savings Steps |
|---|---|---|---|
| Ameren Missouri | ✓ | | ✓ |
| Ameren Illinois | ✓ | | ✓ |
| Consumers Energy | ✓ | ✓ | ✓ |
| IPL | ✓ | ✓ | ✓ |
| NIPSCO | ✓ | ✓ | ✓ |
| PPL | ✓ | ✓ | ✓ |
| Vectren Indiana | ✓ | ✓ | ✓ |

### Program Year Report Frequency and Delivery Channels

Ameren Missouri offers mailed HER reports. Though the six evaluated programs mailed reports to participants, the frequency at which they mailed reports varied, as shown in Table 24. Vectren Indiana sent out mailed reports on a quarterly basis, while Ameren Illinois, Consumers Energy, IPL, and NIPSCO adjusted the number of HER reports delivered per customer, based on energy usage, email address availability, and duration in the program.

In addition to mailed reports, all comparable programs (excepting Ameren Illinois) offered participants access to a web portal with customer specific energy consumption and tips and sent out e-mailed reports on a monthly basis to every treatment group customer with a valid e-mail address. In PY17, Ameren Missouri plans to implement an email delivery channel.

Table 24. Comparison of Program Year Report Frequency and Delivery Channels

| Program Name | Delivery Frequency: Number Paper Reports per Program Year * | Delivery Frequency: Email | Web Portal Access |
|---|---|---|---|
| Ameren Missouri Home Energy Report Program | Three | None | None |
| Ameren Illinois Program Behavioral Modification Program | Four to six | Discontinued email | Web portal access |
| Consumers Energy Home Energy Reports Program | Four to six | 4 to 12 emails | Web portal access |
| Vectren Indiana Residential Behavioral Savings Program | Four | 12 e-mails | Web portal access |
| IPL Peer Comparison Reports Program | One to four | 12-emails | Web portal access |
| NIPSCO Energy Conservation Program | Four to five | 12-emails | Web portal access |
| PPL Electric Energy-Efficiency Education Program | Three | Five e-mails | Web portal access |

* Ameren Missouri delivered three HER reports in the 6 months between launch to the end of the program year. Delivery frequency values for the other utility programs include the number of HER reports delivered during 12 months of a full program year.

## Participant Satisfaction

Ameren Missouri customers were very satisfied with the program. Table 25 compares satisfaction with HER reports among treatment group customers, along with satisfaction with the utility among treatment and control groups. Cadmus found satisfaction with the utility ran higher among control group customers than treatment group customers for four compared utilities. In addition, satisfaction with HER reports was lower than satisfaction with the utility, except for Consumers Energy treatment customers, which gave the highest overall satisfaction ratings for HER reports among the compared programs.

### Table 25. Comparison of Participant Satisfaction with HER Reports and Utility[a]

| Program Name | Satisfaction with HER Reports (Treatment Group) | Satisfaction with Utility (Treatment Group) | Satisfaction with Utility (Control Group) |
|---|---|---|---|
| **Ameren Missouri[b]** | **95%** | **95%** | **93%** |
| Ameren Illinois[c] | 6.4 | 7.2 | 7.4 |
| Consumers Energy[e] | 7.8 | 8.1 | 7.9 |
| Vectren Indiana[e] | 82% | 88% | 90% |
| IPL[f] | 7.5 | 7.9 | 8.2 |

[a] Cadmus did not ask PPL or NIPSCO customers satisfaction questions. As such, satisfaction scales and metrics differed across programs and could not be directly compared.

[b] Ameren Missouri's results are the percentage of customers who responded that they strongly agreed with the statement: "Overall, I am satisfied with the Home Energy Reports," or indicated that they were *very satisfied* or *somewhat satisfied* with Ameren Missouri as their utility.

[c] Ameren Illinios' satisfaction scores are the average customer response to the following statements: "Using a scale of 0 to 10, where 0 means you are *extremenly dissatisfied* and a 10 means you are *extremely satisfied*, how satisfied were you with Home Energy Reports?" and "[same statement] AIC overall?" (averaged scores across program cohorts).

[d] Consumers Energy satisfaction scores represent the average customer rating on a 10-point scale, where 1 means *unacceptable* and 10 means *outstanding*.

[e] Vectren Indiana's percentages are the percentage of customers who responded that they strongly agreed with the statement: "Overall, I am satisfied with the Home Energy Reports," and the percentage of customers who indicated they were *very satisfied* or *somewhat satisfied* with Vectren overall as an energy service provider.

[f] IPL satisfaction scores are the average customer response on a 0–10 scale, where 0 means *very dissatisfied* and 10 meaning *very satisfied*.

## Cost-Effectiveness

Ameren Missouri assessed cost-effectiveness using the following five tests, as defined by the California Standard Practice Manual:[23]

- 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 behaviors and actions encouraged through the HER 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 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 16$^{th}$ 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 ex ante net savings estimates and PY16 evaluated participation as model inputs.

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 behavior program 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,

[23] *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 26 summarizes cost-effectiveness findings by test. Any benefit-cost score of 1.0 or higher passed the test as cost-effective. As shown, the HER program passed the UCT, TRC, and Societal tests.

**Table 26. PY16 HER Program Cost-Effectiveness Results**

| Program | UCT | TRC | RIM | Societal | PART |
|---|---|---|---|---|---|
| HER program | 2.68 | 2.68 | 0.48 | 2.68 | N/A* |

* Participant cost test is N/A because there are no participant costs for this program.

# Appendix A. End Use Load Shapes and Coincidence Factors

Appendix E

**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. Bibliography

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Opinion Dynamics et al. 2015. "Process and Impact Evaluation of 2014 (PY7) Ameren Illinois Company Behavioral Modification Program." Prepared for Ameren Illinois Company.

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# Appendix C. Stakeholder Interview Guide

## Ameren Missouri Home Energy Reports
## Stakeholder Interview Guide PY16

Respondent name: _____

Respondent phone: _____

Interview date: _____ Interviewer initials: _____

For the PY16-PY18 evaluation, Cadmus will interview stakeholders annually. The interview will focus on identifying recommendations for improving subsequent program years and informing the survey instrument.

### Roles and Responsibilities

1. Please describe your roles and responsibilities.
2. 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.]

### Decision to Implement New Program

3. How did the program come to fruition? [Probe: history, concept, prior experience with behavior programs]
4. What is the program theory? i.e., how do you expect the HER reports to influence customers to save energy? (Probe: behavior changes, participation in other programs, etc.)

### Program Goals

5. Appendix B[24] showed 225,000 people for estimated participation and an estimated annual savings target of 33,750 MWh and 15.7MW, are these the correct PY16 program goals?
    a. How were the goals determined?
    b. Are there benchmarks in place to monitor progress throughout the year? If so, what are they [and how will they be measured]?

[24] 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.

c. Have you identified triggers to signal when goals are not being met and contingency plans in case this happens?

### Program Savings

6. How will program *ex ante* (or reported) savings be estimated?
7. Have you calculated the *ex ante* (or reported) savings for PY16?
    a. [IF YES] What are *ex ante* (or reported) savings for PY16?
8. How will participation (by the treatment and control groups) in other energy-efficiency programs be accounted for in the *ex ante* savings estimates?

### Program Delivery

9. How does the program work from the point of view of a treatment group customer that receives home energy reports? Walk me through a customer's experience from start to end of the program.
10. Please describe the design of the Home Energy Report Program in PY16.
    a. What characteristics were used to identify eligible customers? Who has been targeted to participate? What were the selection criteria? (Probe: usage history, high or low energy use customers, size of home, bill-pay history, income, etc.)
    b. How many people will receive home energy reports in the final treatment group, i.e., how many HER reports were sent out?
11. What is the strategy for dealing with attrition, meaning those participants who have opted out of the program or moved out of the service region?
    a. Are there any plans to replace these participants who drop out of the program?

### Home Energy Report Design and Delivery

12. The first two PY16 reports were sent on Aug 8 and November 8, are all reports sent in one day? Or does it take longer to send them out?
    a. Can I confirm the next report is scheduled for the week of Jan 16, 2017?
13. Can you confirm there is no web-portal component or any other delivery mechanism for home energy reports apart from mailed reports?
14. What criteria will you use to determine if emailed reports will be offered next program year?
    a. If emailed reports are offered, what will the frequency be (i.e., monthly, bi-monthly, combination of both)?
    b. If emailed reports are offered, will you select new customers or send them to the PY16 treatment group?
15. The example home energy report included three sections (comparison of customer's usage to similar time period in past and to neighbor, track your progress and three personalized steps, etc.), do all of the reports have the same three sections?

a. Why did you design the report with these three sections? What is the purpose of each section?

16. What types of energy-saving steps (e.g., tips) will be featured in the home energy reports?
    a. How were these tips written?
    b. How are they selected for inclusion on a home energy report?

## Program Marketing

17. Will there be any cross-program marketing in the home energy reports?
    a. [IF YES] Which programs? Why?
    b. [IF NO] Why not?
18. Were any door hangers or other reminder tools provided to customers in PY16?
    a. [IF YES] What were they? What were their purpose?
    b. [IF NO] Were these considered?
19. Did the implementer ultimately send the marketing material discussed this fall? To who? What was the purpose?
    a. [IF YES] Can you share the material with us?
    b. [IF NO] Why not?

## Successes, Challenges, Suggestions for Improvement

20. What would you say is working particularly well so far in PY16? Why is that?
21. Conversely, what is not working as well as anticipated? Why is that?
22. Overall, do you have any suggestions for how to improve the program?
    a. Do you anticipate any areas that might need improvement next year?
23. What changes are being planned or considered for PY17?

## Wrap Up

24. Do you have any specific questions that you want to make sure are included in the customer survey?
25. Those are all the questions I have for you. Is there anything else you would like to add or questions you'd like to ask?

# Appendix D. Participant Telephone Survey, Participant Online Survey

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# Ameren Missouri 2016 Telephone Survey: Home Energy Reports

| Research Areas | Item |
|---|---|
| Introduction and Screener | Section A |
| Home Energy Report Readership, Engagement, and Reception | Section B |
| Report Content | Section C |
| Energy-Saving Improvements | Section D |
| Energy-Saving Behaviors | Section E |
| Awareness of Energy Efficiency Programs | Section F |
| Attitudes towards Energy Efficiency | Section G |
| Satisfaction | Section H |
| Demographics | Section I |

**Interviewer instructions are in green**
**CATI programming instructions are in red**
Do not read answer choices unless indicated with "**[READ LIST].**"

**Variables to be pulled into survey:**

- **Group = Treatment Group or Control Group**

**Back-up information, not to be programmed:**

- **If "No – Not a convenient time," ask if respondent would like to arrange a more convenient time for us to call them back or if you can leave a message for that person.**
- **If respondent asks how long, say, "Approximately 10 minutes."**
- **If questioned about survey's purpose: "This survey is for research purposes only and is not a marketing call. Your responses are important to Ameren Missouri."**
- **If respondent has questions about the Home Energy Report Program: "Please call Ameren Missouri customer service at (877) 215 5752."**
- **If asked for contact information to authenticate survey, offer Laureen Welikson at** LWELIKSON@ameren.com.

## *A. Introduction and Screener*

Hello. I'm **[NAME]**, calling on behalf of Ameren Missouri. We are talking to utility customers about how energy is used in the home.

**[ASK BOTH GROUPS]**

A1. Are you involved in managing energy use in your home or paying your home's utility bills?

1. Yes
2. No **[ASK TO SPEAK WITH THE PERSON WHO IS THE DECISIONMAKER AND START AGAIN. IF NO ONE, THEN THANK AND TERMINATE.]** **[TERMINATE TEXT: We are only surveying customers who are involved in managing energy use and paying utility bills**

**at the present time, but Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!]**

98. Don't know **[ASK TO SPEAK WITH THE PERSON WHO IS THE DECISIONMAKER AND START AGAIN. IF NO ONE, THEN THANK AND TERMINATE.]** **[TERMINATE TEXT: We are only surveying customers who are involved in managing energy use and paying utility bills at the present time, but Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!]**
99. Refused **[THANK AND TERMINATE]** **[TERMINATE TEXT: We are only surveying customers who are involved in managing energy use and paying utility bills at the present time, but Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!]**

**[ASK BOTH GROUPS]**

A2. *Are you, or any members of your household, employed by Ameren Missouri? **[FORCED RESPONSE, NO SKIP OR DON'T KNOW]**

1. Yes, I or someone in my household works for Ameren Missouri **[THANK AND TERMINATE]** **[TERMINATE TEXT: "We are not surveying Ameren Missouri employee households, but we appreciate you for taking time to respond. Thank you. Have a nice day!"]**
2. No, no one in my household works for Ameren Missouri

**[ASK TREATMENT GROUP]**

A3. Our records show that you received documents in the mail called Home Energy Reports. These reports included personalized recommendations on ways to cut your energy costs and take advantage of Ameren Missouri rebates. Do you recall seeing one of these reports or hearing someone in your household talking about these reports?

1. Yes
2. No **[THANK AND TERMINATE]** **TERMINATE TEXT: "In that case we have no further questions for you. Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!"]**

**[ASK BOTH GROUPS]**

A4. We are conducting an important survey today about energy use in the home. This survey will take about 10 minutes. Your answers will remain confidential. Do you have a few minutes to help us out?

1. Yes
2. No **[THANK AND TERMINATE]**

## *B. Home Energy Report Readership, Engagement, and Reception*

**[ASK TREAMENT GROUP ONLY]**

I have a few questions about the Home Energy Reports. **[IF NEEDED: The reports include information on how your energy use compares to that of similar homes, along with personalized recommendations on ways to cut your energy costs and take advantage of Ameren Missouri rebates.]**

B1. Which of the following statements best describes what you did with the Home Energy Report you received? **[READ LIST]**

1. I read the report thoroughly
2. I read some of the report
3. I skimmed the report
4. I did not read the report **[SKIP TO C1]**

98. (Don't know) **[SKIP TO C1]**

99. (Refused) **[SKIP TO C1]**

B2. I am going to read you some statements about the Home Energy Reports. Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement. **[RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, 4=STRONGLY DISAGREE, 97=NOT APPLICABLE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] [RANDOMIZE ORDER]**

A. The information in the reports is useful
B. The reports are easy to understand
C. The reports get others in my household involved in saving energy

B3. Next, I will read you three statements. Please tell me whether you completed these actions after receiving the Home Energy Reports: **[RECORD 1=YES, 2=NO, 97=NOT APPLICABLE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] [RANDOMIZE ORDER]**

A. Looked for opportunities to save energy
B. Talked about the report with others living in your home
C. Talked about the report with other people outside your home

## *C. Report Content*

Now, I'd like to ask you about specific features of the Home Energy Reports.

**[ASK TREATMENT GROUP]**

### Comparison to Similar Homes

C1. Each report compares your energy use from the previous season to that of similar homes. Do you remember seeing this comparison?

1. Yes
2. No **[SKIP TO C3]**

98. Don't know **[SKIP TO C3]**

99. Refused **[SKIP TO C3]**

C2. I am going to read you some statements about the comparison. Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree. **[RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, 4=STRONGLY DISAGREE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] [RANDOMIZE ORDER]**

A. My household energy use was different than I expected, compared to similar homes
B. I believe the comparison of my home to similar homes is accurate
C. The comparison of my home to similar homes motivated me to read the rest of the Home Energy Report

## Personalized Recommendations

C3. Each Home Energy Report contains three personalized recommendations or steps you can take to save energy. Do you remember seeing these steps? **[IF NEEDED: "ACTION STEPS ARE THE ENERGY-SAVING RECOMMENDATIONS FEATUERED IN THE REPORT."]**

1. Yes
2. No **[SKIP TO C7]**
98. Don't know **[SKIP TO C7]**
99. Refused **[SKIP TO C7]**

C4. I will read you some statements about the personalized steps. Please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree. **[RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, 4=STRONGLY DISAGREE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] [RANDOMIZE ORDER]**

A. The personalized steps make sense for my household
B. The personalized steps are easy for my household to do
C. The personalized steps provide enough information to take action

C5. Did you or anyone in your household complete any of the personalized steps in the Home Energy Reports?

1. Yes
2. No **[SKIP TO C7]**
98. Don't Know **[SKIP TO C7]**
99. Refused **[SKIP TO C7]**

C6. Which of the personalized steps or recommendations did you complete?

**[RECORD OPEN ENDED RESPONSE: _____]**

98. Don't know
99. Refused

C7. How important would you say the Home Energy Reports are in prompting you to make energy-saving improvements? Would you say… **[READ LIST]**

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

98. (Don't know)
99. (Refused)

## *D. Energy-Saving Improvements*

**[ASK BOTH GROUPS]**

I'd like to understand more about some of the things you might have done to save energy in your home recently.

D1. I will read you a list of energy-saving improvements. Tell me if you have done any of the following in the last 12 months. **[RECORD 1=YES, 2=NO, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT]**

A. Purchased and installed LEDs **[IF NEEDED: "LEDs are light emitting diodes and they are the super long lasting light bulbs."]**
B. Installed a programmable or smart thermostat **[IF NEEDED: "A programmable thermostat allows you to set the temperature for different times of the day. A smart thermostat learns your temperature setting behaviors and self-adjusts the temperature for you."]**
C. Purchased and installed ENERGY STAR or high-efficiency appliances
D. Purchased and installed new heating or cooling equipment
E. Installed extra insulation to ceiling, ducts, walls, attic or basement
F. Added caulking, spray foam, weather stripping, or plastic sheeting
G. Installed a water/energy-saving showerhead, faucet head or aerator
H. Installed high-efficiency doors or windows
I. other [SPECIFY:_____]

## *E. Energy-Saving Behaviors*

**[ASK BOTH GROUPS]**

E1. I will read through some energy-saving actions you may have heard or read about. Please let me know if you always, sometimes, or never have taken these actions in your home over the past 12 months. **[RECORD 1=ALWAYS, 2 =SOMETIMES, 3=NEVER, 97=NOT APPLICABLE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] [RANDOMIZE ORDER]**

1. Replace air filters for your air conditioners and heating systems
2. Turn off lights in rooms that are unoccupied
3. Wash laundry in cold water
4. Unplug electronic equipment or appliances when not in use
5. Adjust thermostat settings when leaving or sleeping
6. Take shorter showers
7. Turn down water heater temperature
8. Use energy-saving or "sleep" features of your computer

## *F. Awareness of Energy Efficiency Programs*

**[ASK BOTH GROUPS]**

F1. Are you familiar with any energy-efficiency rebates or programs offered by Ameren Missouri to help you use less energy?

1. Yes
2. No
98. Don't know
99. Refused

**[ASK IF F1=1]**

F2. Which Ameren Missouri energy-efficiency or rebate programs have you heard about? **[MULTIPLE RESPONSE] RANDOMIZE ORDER WITH "OTHER SPECIFY" AND "NONE OF THE ABOVE" LAST**

1. **Heating and Cooling:** Rebate for installing efficient AC, heat pump or geothermal system
2. **EnergyStar Certified Products:** Rebate for buying EnergyStar certified products such as pool pumps, air purifiers and more
3. **Smart Thermostat:** Rebate for installing a smart thermostat
4. **Energy Efficient Lighting:** Purchasing energy-efficient LED bulbs at reduced prices at local retailers or at the Ameren Missouri online store
5. **CommunitySavers:** Energy saving opportunities for income eligible Multifamily housing (advertised through low income agencies)
6. **School Energy Education:** Schools distribute free energy-saving kits to students and their parents
7. Other [SPECIFY:_____]

98. Don't know
99. Refused

F3. Have you visited Ameren Missouri's website to look for ways to save money on your bill?

1. Yes
2. No
98. Don't know
99. Refused

## G. Attitudes towards Energy Efficiency

**[ASK BOTH GROUPS]**

Now, I'd like to ask you about your home energy use.

G1. For the following statements, please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree. **[RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, 4=STRONGLY DISAGREE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] [RANDOMIZE ORDER]**

1. It is important to conserve energy as much as possible
2. Using energy to keep the home comfortable is my top priority
3. I am committed to actions that help the environment
4. I would like to save more energy but do not know where to start
5. I have already done as much as possible to save energy in my home
6. Energy-efficient products are too expensive

## H. Satisfaction

Next, I'd like to know more about your experiences with Ameren Missouri as your utility.

**[ASK BOTH GROUPS]**

H1. *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. (Refused)

H2. ***[ASK BOTH GROUPS IF H1=1,2,3, OR 4]** Why are you **[RATING FROM H1]** with Ameren Missouri as your utility?

**[RECORD OPEN ENDED RESPONSE:_____]**

98. Don't know
99. Refused

**[ASK TREATMENT GROUP]**

H3. For the following statement, please tell me whether you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement… **[RECORD 1=STRONGLY AGREE, 2=SOMEWHAT AGREE, 3=SOMEWHAT DISAGREE, 4=STRONGLY DISAGREE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT]**

1. Overall, I am satisfied with the Home Energy Reports.

**[ASK TREATMENT GROUP]**

H4. *As a result of receiving the Home Energy Reports, would you say your satisfaction with Ameren Missouri has… **[READ LIST]**

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

**[ASK TREATMENT GROUP]**

H5. *What suggestions, if any, do you have for improving the Home Energy Reports?

**[RECORD OPEN ENDED RESPONSE: _____]**

98. Don't know
99. Refused

## *I. Demographics*

**[ASK BOTH GROUPS]**

| |
|---|
| Finally, I have a few questions about your home and household. |

I1. How often do you check your utility bill statement sent by mail, email or text message? Please tell me if you always, sometimes, or never check your utility bill statement sent through each of these communication channels… **[RECORD 1=ALWAYS, 2 =SOMETIMES, 3=NEVER, 97=NOT APPLICABLE, 98=DON'T KNOW, OR 99=REFUSED FOR EACH STATEMENT] RANDOMIZE ORDER**

1. My utility bill statement sent by mail
2. My utility bill statement sent by email
3. My utility bill statement sent by text message

I2. Which of the following best describes your home? **[READ LIST]**

1. A single-family detached residence
2. Attached house (such as a townhouse, row house, or twin)
3. Multifamily apartment or condo building with 4 or more units
4. Mobile or manufactured home
5. Other **[SPECIFY:_____]**

99. (Refused)

I3. Do you own or rent this home?

1. Own/buying
2. Rent/lease
3. Other **[SPECIFY:_____]**

99. (Refused)

I4. Counting yourself, how many people live in your home for most of the year?

1. **[RECORD NUMBER]**

99. (Refused)

I5. Please stop me when I mention the range that contains your age. **[READ LIST]**

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65-74
7. 75 and older

99. (Refused)

I6. As our final question, please stop me when I read the range that contains the total combined income of all members of your household over the past 12 months. **[READ LIST]**

1. Less than $20,000
2. $20,000 to less than $50,000
3. $50,000 to less than $75,000
4. $75,000 to less than $100,000
5. $100,000 to less than $150,000
6. $150,000 to less than $200,000
7. $200,000 or more

99. (Refused)

That is the end of the survey. Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!

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# Ameren Missouri 2016 Online Survey: Home Energy Reports

| Research Areas | Item |
|---|---|
| Introduction and Screener | Section A |
| Home Energy Report Readership, Engagement, and Reception | Section B |
| Report Content | Section C |
| Energy-Saving Improvements | Section D |
| Energy-Saving Behaviors | Section E |
| Awareness of Energy Efficiency Programs | Section F |
| Attitudes towards Energy Efficiency | Section G |
| Satisfaction | Section H |
| Demographics | Section I |

**Red text = programming instructions (not visible to respondents)**

**Green text = open-ended responses**

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

**Variables to be pulled into survey:**

- **Group = Treatment Group or Control Group**

## *A. Introduction and Screener*

Thank you for taking Ameren Missouri's survey. We are asking utility customers about how energy is used in the home.

**[ASK BOTH GROUPS]**

A1. Are you involved in managing energy use in your home or paying your home's utility bills? **[FORCED RESPONSE, NO SKIP OR DON'T KNOW]**

1. Yes
2. No **[TERMINATE TEXT: We are only surveying customers who are involved in managing energy use and paying utility bills at the present time, but Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!]**

**[ASK BOTH GROUPS]**

A2. Are you, or any members of your household, employed by Ameren Missouri? **[FORCED RESPONSE, NO SKIP OR DON'T KNOW]**

1. Yes, I or someone in my household works for Ameren Missouri **[TERMINATE TEXT: "We are not surveying Ameren Missouri employee households, but we appreciate you for taking time to respond. Thank you. Have a nice day!"]**

2. No, no one in my household works for Ameren Missouri

**[ASK TREATMENT GROUP]**

A3. Our records show that you received documents in the mail called Home Energy Reports. These reports included personalized recommendations on ways to cut your energy costs and take advantage of Ameren Missouri rebates. Do you recall seeing one of these reports or hearing someone in your household talking about these reports? **[FORCED RESPONSE, NO SKIP OR DON'T KNOW]**

1. Yes
2. No **[TERMINATE TEXT: "In that case we have no further questions for you. Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!"]**

## *B. Home Energy Report Readership, Engagement, and Reception*

**[ASK THIS SECTION FOR TREAMENT GROUP ONLY]**

B1. Which of the following statements best describes what you did with the Home Energy Report you received?

1. I read the report thoroughly
2. I read some of the report
3. I skimmed the report
4. I did not read the report **[SKIP TO C1]**

98. Don't know **[SKIP TO C1]**
99. (Skipped) **[SKIP TO C1]**

B2. How much do you agree with the following statements about the Home Energy Reports? Please select a response from the drop-down menu. **[RANDOMIZE ORDER]**

A. The information in the reports is useful
B. The reports are easy to understand
C. The reports get others in my household involved in saving energy

**MENU OPTIONS:**

- **Strongly agree**
- **Somewhat agree**
- **Somewhat disagree**
- **Strongly disagree**
- **Not applicable**
- **Don't know**

**(99=SKIPPED)**

B3. Have you completed any of these actions after receiving the Home Energy Reports? Please select a response from the drop-down menu. **[RANDOMIZE ORDER]**

A. Looked for opportunities to save energy
B. Talked about the report with others living in your home
C. Talked about the report with other people outside your home

**MENU OPTIONS:**

- **Yes**
- **No**
- **Not applicable**
- **Don't know**

**(99=SKIPPED)**

## *C. Report Content*

**[ASK THIS SECTION FOR TREATMENT GROUP ONLY]**

### Comparison to Similar Homes

C1. Each report compares your energy use from the previous season to that of similar homes. Do you remember seeing this comparison?

1. Yes
2. No **[SKIP TO C3]**

98. Don't know **[SKIP TO C3]**
99. (Skipped) **[SKIP TO C3]**

C2. How much do you agree with the following statements? Please select a response from the drop-down menu. **[RANDOMIZE ORDER]**

A. My household energy use was different than I expected, compared to similar homes
B. I believe the comparison of my home to similar homes is accurate
C. The comparison of my home to similar homes motivated me to read the rest of the Home Energy Report

**MENU OPTIONS:**

- **Strongly agree**
- **Somewhat agree**
- **Somewhat disagree**
- **Strongly disagree**
- **Don't know**

**(99=SKIPPED)**

## Personalized Recommendations

C3. Each Home Energy Report contains three personalized recommendations or steps you can take to save energy. Do you remember seeing these steps? **[IF NEEDED: "ACTION STEPS ARE THE ENERGY-SAVING RECOMMENDATIONS FEATUERED IN THE REPORT."]**

1. Yes
2. No **[SKIP TO C7]**

98. Don't know **[SKIP TO C7]**
99. Skipped **[SKIP TO C7]**

C4. How much do you agree with the following statements? Please select a response from the drop-down menu. **[RANDOMIZE ORDER]**

A. The personalized steps make sense for my household
B. The personalized steps are easy for my household to do
C. The personalized steps provide enough information to take action

**MENU OPTIONS:**

- **Strongly agree**
- **Somewhat agree**
- **Somewhat disagree**
- **Strongly disagree**
- **Don't know**

**(99=SKIPPED)**

C5. Did you or anyone in your household complete any of the personalized steps in the Home Energy Reports?

1. Yes
2. No **[SKIP TO C7]**

98. Don't Know **[SKIP TO C7]**
99. (Skipped) **[SKIP TO C7]**

C6. Which of the personalized steps or recommendations did you complete?
**[RECORD OPEN ENDED RESPONSE: _____]**

C7. How important would you say the Home Energy Reports are in prompting you to make energy-saving improvements?

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

## *D. Energy-Saving Improvements*

**[ASK THIS SECTION FOR BOTH GROUPS]**

D1. Have you made any of the following energy-saving improvements in the last 12 months? Please select a response from the drop-down menu. **[RANDOMIZE ORDER WITH "OTHER SPECIFY" LAST]**

A. Purchased and installed LEDs (LEDs are light emitting diodes and they are the super long lasting light bulbs.)
B. Installed a programmable or smart thermostat (A programmable thermostat allows you to set the temperature for different times of the day. A smart thermostat learns your temperature setting behaviors and self-adjusts the temperature for you.)
C. Purchased and installed ENERGY STAR or high-efficiency appliances
D. Purchased and installed new heating or cooling equipment
E. Installed extra insulation to ceiling, ducts, walls, attic or basement
F. Added caulking, spray foam, weather stripping, or plastic sheeting
G. Installed a water/energy-saving showerhead, faucet head or aerator
H. Installed high-efficiency doors or windows
I. other [SPECIFY:_____]

**MENU OPTIONS:**

- **Yes**
- **No**
- **Don't know**

**(99=SKIPPED)**

## *E. Energy-Saving Behaviors*

**[ASK THIS SECTION FOR BOTH GROUPS]**

E1. How often have you taken these actions in your home over the past 12 months? Please select a response from the drop-down menu. **[RANDOMIZE ORDER]**

A. Replace air filters for your air conditioners and heating systems
B. Turn off lights in rooms that are unoccupied
C. Wash laundry in cold water
D. Unplug electronic equipment or appliances when not in use
E. Adjust thermostat settings when leaving or sleeping
F. Take shorter showers
G. Turn down water heater temperature
H. Use energy-saving or "sleep" features of your computer

**MENU OPTIONS:**

- **Always**
- **Sometimes**
- **Never**
- **Not applicable**
- **Don't know**

**(99=SKIPPED)**

## *F. Awareness of Energy Efficiency Programs*

**[ASK THIS SECTION FOR BOTH GROUPS]**

F1. Are you familiar with any energy-efficiency rebates or programs offered by Ameren Missouri to help you use less energy?

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

**[ASK IF F1=1]**

F2. Which Ameren Missouri energy-efficiency or rebate programs have you heard about? **[MULTIPLE RESPONSE. RANDOMIZE ORDER WITH "OTHER SPECIFY" AND "NONE OF THE ABOVE" LAST]**

1. **Heating and Cooling:** Rebate for installing efficient AC, heat pump or geothermal system
2. **EnergyStar Certified Products:** Rebate for buying EnergyStar certified products such as pool pumps, air purifiers and more
3. **Smart Thermostat:** Rebate for installing a smart thermostat
4. **Energy Efficient Lighting:** Purchasing energy-efficient LED bulbs at reduced prices at local retailers or at the Ameren Missouri online store
5. **CommunitySavers:** Energy saving opportunities for income eligible Multifamily housing (advertised through low income agencies)
6. **School Energy Education:** Schools distribute free energy-saving kits to students and their parents
7. Other **[SPECIFY:_____]**
8. None of the above

99. (Skipped)

F3. Have you visited Ameren Missouri's website to look for ways to save money on your bill?

1. Yes
2. No

98. Don't know
99. (Skipped)

## *G. Attitudes towards Energy Efficiency*

**[ASK THIS SECTION FOR BOTH GROUPS]**

G1. How much do you agree with the following statements? Please select a response from the drop-down menu. **[RANDOMIZE ORDER]**

1. It is important to conserve energy as much as possible
2. Using energy to keep the home comfortable is my top priority
3. I am committed to actions that help the environment
4. I would like to save more energy but do not know where to start
5. I have already done as much as possible to save energy in my home
6. Energy-efficient products are too expensive

**MENU OPTIONS:**

- **Strongly agree**
- **Somewhat agree**
- **Somewhat disagree**
- **Strongly disagree**
- **Don't know**

**(99=SKIPPED)**

## *H. Satisfaction*

**[ASK THIS SECTION FOR BOTH GROUPS]**

H1. *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)

H2. ***[ASK IF H1=1,2,3, OR 4]** Why are you **[RATING FROM H1]** with Ameren Missouri as your utility?
**[RECORD OPEN ENDED RESPONSE:_____]**

**[ASK IF TREATMENT GROUP]**

H3. How much do you agree with the following statement?

- Overall, I am satisfied with the Home Energy Reports.

1. Strongly agree
2. Somewhat agree
3. Somewhat disagree

4. Strongly disagree
98. Don't know
99. (Skipped)

**[ASK IF TREATMENT GROUP]**

H4. *As a result of receiving the Home Energy Reports, would you say your satisfaction with Ameren Missouri has…

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

**[ASK IF TREATMENT GROUP]**

H5. *What suggestions, if any, do you have for improving the Home Energy Reports?

**[RECORD OPEN ENDED RESPONSE: _____]**

## *I. Demographics*

**[ASK THIS SECTION FOR BOTH GROUPS]**

| Finally, we have a few questions about your home and household. |
|---|

I1. How often do you check your utility bill statement sent by mail, email or text message? Please use the drop-down menu to indicate if you always, sometimes, or never check your utility bill statement sent through each of these communication channels… RANDOMIZE ORDER

1. My utility bill statement sent by mail
2. My utility bill statement sent by email
3. My utility bill statement sent by text message

**MENU OPTIONS:**

- **Always**
- **Sometimes**
- **Never**
- **Not applicable**
- **Don't know**
- **(99=SKIPPED)**

I2. Which of the following best describes your home?

1. A single-family detached residence
2. Attached house (such as a townhouse, row house, or twin)
3. Multifamily apartment or condo building with 4 or more units
4. Mobile or manufactured home
5. Other **[SPECIFY:_____]**

99. (Skipped)

I3. Do you own or rent this home?

1. Own/buying
2. Rent/lease
3. Other **[SPECIFY:_____]**

99. (Skipped)

I4. Counting yourself, how many people live in your home for most of the year?

1. **[RECORD NUMBER]**
2. I prefer not to answer this question

99. (Skipped)

I5. How old are you? **[READ LIST]**

1. 18-24
2. 25-34
3. 35-44
4. 45-54
5. 55-64
6. 65-74
7. 75 and older
8. I prefer not to answer this question

99. (Skipped)

I6. What is the total combined income of all members of your household over the past 12 months?

1. Less than $20,000
2. $20,000 to less than $50,000
3. $50,000 to less than $75,000
4. $75,000 to less than $100,000
5. $100,000 to less than $150,000
6. $150,000 to less than $200,000
7. $200,000 or more
8. I prefer not to answer this question

99. (Skipped)

That is the end of the survey. Ameren Missouri appreciates you for taking time to respond. Thank you. Have a nice day!